

REPUBLIC OF THE PHILIPPINES

**DATA COLLECTION SURVEY FOR
CLIMATE CHANGE MEASURES
AND GREEN TRANSFORMATION (GX)
IN THE REPUBLIC OF THE PHILIPPINES**

FINAL REPORT

MARCH 2024

JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS GLOBAL CO., LTD.

PACIFIC CONSULTANTS CO., LTD.

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Executive Summary

Background and objective of the Survey

The Republic of the Philippines is an island nation, having 36,289 km of long coastline. The country faces extremely high level of climate risks and is exposed to climate hazards such as typhoons and flood. According to the Global Climate Risk Index for 2021 which assesses the effects of climate change to various countries of the world, the Philippines is ranked as the fourth country most severely affected by climate change between 2000 and 2019. And the country's GDP is expected to decrease up to 13.6% if the effort of climate change is not conducted by 2040.¹ Although the country is undertaking countermeasures to climate change, there is still room to accelerate such climate actions.

The objective of the Survey is to clarify the existing issues, challenges and support needs by collecting and analyzing information on the climate policies and climate actions (mitigation and adaptation) in the Philippines, and to study and identify subjects that require further climate change countermeasures that can contribute to the Philippines' climate change targets including the Nationally Determined Contribution (NDC), aligned with the climate change policies and strategies of the Government of Japan and Japan International Cooperation Agency (JICA).

Japan's climate change policies

The Government of Japan has set up its international cooperation policies on climate change in its "Long-Term Strategy as a Growth Strategy based on the Paris Agreement" and the "Basic Policy for the Realization of GX (Green Transformation): a Roadmap for the Next 10 Years," which emphasize the importance of decarbonization and its policy to provide assistance to other countries. JICA's international cooperation strategy on climate change is set out in the JICA Global Agenda, which sets out two specific cooperation pillars on the promotion of the Paris Agreement implementation (capacity development and policy formulation) and promotion of co-benefit (development benefits and climate benefits) clusters.

International trend on climate change

Climate change is an issue that requires immediate actions by international community. Based on the United Nations Framework Convention on Climate Change (UNFCCC) adopted in 1992, the Conference of the Parties (COP) has been a pivot for active discussions to reduce greenhouse gas (GHG) emissions and to adapt to climate change impacts at the global level every year since 1995.

¹ Philippines Country Climate and Development Report 2022, World Bank

As an international climate framework for the post-2020 period, the Paris Agreement was adopted at COP21 in Paris in December 2015. This agreement is fair and applicable to all Parties. The Paris Agreement aims to limit the global average temperature rise to within 2°C compared to pre-industrial levels and it was subsequently decided to go even further and pursue efforts to keep the temperature below 1.5°C.

Climate change impacts in the Philippines

The mean temperature increase for the Philippines was 0.68°C over the period 1951 – 2015 while rainfall has changed, and extreme weather, particularly tropical cyclones, have changed their paths. Sea levels have already risen by up to 5.7 - 7.0 mm per year in some parts of the country, which is twice as the global average. Projections made by the Intergovernmental Panel on Climate Change (IPCC) multi-model ensemble indicate that (a) temperatures in the Philippines will continue to increase by about 1 – 2°C by the end of the 21st century, depending on the climate scenario; (b) average rainfall may not change much, but variability and intensity are likely to increase; and (c) extreme events will become stronger and more frequent.

According to the Philippine Statistics Authority (PSA), the damages incurred due to natural extreme events and disasters amounted to Philippine Peso (PHP) 462 billion from 2010 to 2019. It was also recorded a total 12,097 casualties due to natural disasters for same period. Agriculture posted the largest share with 62.7% or PHP 290 billion followed by infrastructure with 23 % or PHP 106.3 billion.

Philippine's climate change-related policies and GHG emissions

The Government of the Philippines enacted the Climate Change Act in 2009 (Republic Act No. 9729; which was amended by RA 10174 in 2012 to establish the People's Survival Fund), aiming to mainstream climate change into government planning and decision-making processes and to establish a framework and plans for climate change mitigation and adaptation both at the national and local level, such as the National Framework Strategy on Climate Change 2010-2022, National Climate Change Action Plan (NCCAP) 2011-2028, and Local Climate Change Action Plan (LCCAP).

The Government of the Philippines ratified the UNFCCC in 1994 and acceded to the Paris Agreement in 2017, and submitted the NDC in 2021 to reduce and avoid GHG emissions and minimize the impacts of climate change. In the NDC, the Philippines set a target of GHG emission reduction and avoidance of 2.71% by its own efforts (unconditional) and 72.29% with the support of bilateral or multilateral cooperation and funds (conditional). The NDC also sets a target of peaking its GHG emissions by 2030, as well as refers to the goal of adaptation, which covers sectors such as agriculture, coastal and marine ecosystems and biodiversity, health, and human security. The Philippine government initiated the development of an NDC Implementation Plan 2020-2030 and National Adaptation Plan (NAP) 2023-2050, which will serve as guidelines for promoting specific mitigation and adaptation measures, respectively, in the Philippines at present and in the future. In response to this policy, the governmental budget for climate change countermeasures (mitigation and adaptation) has rapidly increased from PHP 195 billion in 2017 to PHP 289 billion in 2022. Government

agencies that oversee the abovementioned sectors have formulated various policies and plans to implement climate change mitigation and adaptation actions.

According to the GHG inventory of 2020 of the Philippines, the country emitted a total of 230.260 Mt-CO₂e (carbon dioxide equivalent) while the FOLU (Forest and Other Land Use) net sequestration 25.935 Mt-CO₂e. The energy sector is the largest source of GHG emissions, followed by agriculture, waste, transportation, and industrial processes. Most emissions from the energy sector come from energy industries.

Selection of priority sectors of the Survey

A wide range of sectors described in the NDC and climate policies of the Philippines was studied under the Survey. Through the analysis on the collected information, six sectors were selected as priority sectors, namely energy, industry, agriculture, forestry/ natural environment, urban environment, and cross-sectoral issues related to the implementation of Paris Agreement and promotion of private sector engagement in climate actions. The selection was based on the analysis of the progress and priorities of climate change measures and the budget of the Philippine government, the GHG emission status and future projections of the Philippines, and also JICA's cooperation history for climate change measures in the Philippines.

Climate overview of the priority sectors

Energy: In addition to being the largest GHG emitting sector (without transport sector 49% of the total, 99.854 Mt-CO₂e in 2020), the effects of climate change, such as severe typhoons, pose a risk of infrastructure damage, including power generation, and require mitigation and adaptation measures to be implemented. The Philippine Energy Plan (2020-2040) calls for a halt to the construction of new coal-fired power plants and a large-scale introduction of natural gas-fired power generation and renewable energy sources to meet growing electricity demand. Most of the energy industry is privatized, and the promotion of investment in this sector will have a significant impact on the achievement of the government's plan. While progress has been made in solar and wind power development, geothermal, hydroelectric, and natural gas utilization have lagged behind. The power grid is also being privatized, with the ambitious goal of total electrification by 2028. Emerging technologies such as hydrogen and Carbon Capture, Utilization and Storage (CCUS), which are expected to have significant mitigation effects, are also being considered.

As the energy sector has various types of facilities and equipment that take time to develop, it is necessary to form a foundation in the short term to accelerate the introduction of renewable energy power sources, natural gas-fired power generation, and energy conservation to achieve the 2040 target indicated in the Philippine Energy Plan. In addition, when introducing such facilities and equipment, it is necessary to consider in advance the possible damage caused by natural disasters that will become more severe due to the effects of climate change and the possible decrease in the amount of natural energy available, and to work in parallel from the perspective of adaptation measures to minimize the effects of such disasters.

Industry and private sector promotion: The industry sector accounts for about 8% of total GHG emissions (16.772 Mt-CO₂e in 2020). According to 2010 GHG inventory report, among them, the cement industry accounts for 77%, the steel industry for 13%, and the refrigeration and air conditioning (RAC) industry for 9%. Although the Philippine government is promoting and supporting the private sector in their climate actions, the government does not mandate private companies to take climate change measures, and the measures currently being taken are based on the self-help efforts by companies. However, various incentives such as tax breaks and subsidies are being provided to companies to encourage their efforts, and green finance by banks is also being promoted.

While large foreign-owned and conglomerate-based companies in various industries have incorporated zero emissions into their corporate activities and are voluntarily investing and working on climate change countermeasures, Philippine-based companies, including small and medium-sized enterprises (SMEs), are currently not taking measures that would put pressure on company's profits on a voluntary basis. Therefore, it is important to reduce GHG emissions in the industry sector by further providing economic incentives that encourage the voluntariness of companies.

Agriculture: The agriculture sector suffers losses and damages every year due to weather events such as tropical typhoons, El Niño-related droughts, floods, and erratic heavy rains, which amounted to 1.4% of the agriculture sector GDP in 2022, as well as lower labor productivity and income and higher poverty rates compared to other industries, making the sector vulnerable to climate change impacts. The agricultural sector, on the other hand, is one of the major sources of GHG emissions and was the second largest GHG emitter (54.080 Mt-CO₂e) after energy in the 2020 national GHG inventory, accounting for about 26% of the total emissions. The Philippines intends to reduce and avoid GHG emissions for the Agriculture sector, subject to the provision of means of implementation (MOI, i.e., capacity building, finance, and technology transfer and development) under the Paris Agreement.

The Philippine Development Plan (PDP) and the National Agriculture, Fisheries, and Industrialization Modernization Plan (NAFMIP 2021-2030) aim to improve the efficiency of agricultural production and the resilience of the value chain as a whole. In the NCCAP, the resilience of agricultural and fisheries production and distribution systems and agricultural and fisheries communities to climate change is also included as an initiative for food security.

The sector should promote planning and implementation that takes climate change risks into account to reduce damage caused by weather disasters, aiming for a stable supply of food and improved livelihoods for people engaged in agriculture and fisheries, as well as effective use of energy, water, and other resources associated with agricultural modernization and mechanization, and reduction of GHG emissions.

Forestry and Natural Environment: The forest cover in the Philippines has decreased from 17.8 million hectares (60%) of the country's total land area of about 30 million hectares in 1934 to 7.18 million hectares

(about 24%) in 2020. The country is promoting tree plantation to restore abandoned and degraded land of 7.1 million hectares from 2016 to 2028 under the Enhanced National Greening Program (2015). In addition, the Philippine National REDD+ Strategy (2011-2028) outlines a strategy for future REDD+ implementation. In the 2020 national GHG inventory, the forest sector absorbed 71.355 Mt-CO₂e, while the loss of biomass carbon storage due to land use change was 45.420 Mt-CO₂e. Forestry is among the priority sectors for adaptation in the Philippine NDC that include measures on forest protection, forest restoration and reforestation, and access to results-based finance in forest conservation.

In the coastal/ marine and biodiversity sector, the Philippines is at high risk of coastal hazards from typhoons, storm surges, and sea level rise, and is likely to be exposed to extreme weather events while also being a valuable growth and habitat site supporting a diverse biota. Although the Philippines ratified the Convention on Biological Diversity (CBD) in 1993 and is working towards the 30 by 30 target in the Kunming-Montreal Biodiversity Framework for 2022, marine protected areas as of 2023 are 1.74% of the total area of coastal/marine areas, which is lower than 15.87% of terrestrial and inland water protected areas. Furthermore, mangroves, seaweeds, and corals in coastal/marine ecosystems are also the source of blue carbon. The Philippine Biodiversity Strategy and Action Plan (2015-2028), in line with the CBD, calls for the maintenance of ecosystem services and resilient communities by 2028. In terms of marine protection, the plan aims to increase the number of protected areas in various aquatic habitats by 20% by 2028 from 2015 levels. The NDC also includes adaptation measures such as addressing loss and damage in the areas of coastal/marine ecosystems and biodiversity, and working on adaptation strategies with co-benefits from mitigation. The country continues to work on conserving and protecting related ecosystems and expanding marine protected areas, and conserving marine biodiversity to sequester carbon from the oceans through blue carbon policies.

Urban Environment: The urban environment sector includes solid waste management and wastewater treatment and discharge, and is categorized as the waste sector in the GHG inventory. The sector is a source of about 15% of the Philippines' total GHG emissions (30.12 million tons in 2020), of which wastewater treatment (about 70% of the sector) and waste management (about 30%) based on GHG inventory report in 2010, and 90% of its GHG emissions are methane. The quantities of waste and wastewater are on the rise in tandem with the population growth in the Philippines, with GHG emissions also increasing by nearly double from 15.55 million tons in 2010 to over twice that amount within a decade. To reduce GHG emissions, the Philippine government is implementing actions prioritized in the NCCAP such as waste reuse, recycling, and composting programs and implementing centralized/ decentralized wastewater treatment. In addition, measures such as composting, methane recovery at landfill sites, and expansion of sewage treatment facilities, including septic tanks and wastewater treatment plants, are being considered as mitigation measures within NDC PaMs.

The ideal state of the urban environment sector is to strengthen proper management of waste and wastewater treatment through the development of systems and regulations, the placement of dedicated waste management officer in each LGU, promote the effective use and reuse of recyclable resources, encourage the control, reduction, and diversion of waste generation through reuse and recycling for waste management, and establish an appropriate sludge and wastewater treatment system centralized/decentralized for domestic wastewater, as well as ensure the financial foundation necessary for its sustainable operation and maintenance, including LGU clustering. In addition, it is important to secure a system that includes the financial foundation necessary for sustainable operation and maintenance of the system.

Issues related to climate change countermeasures in the Philippines

The Survey identified issues and challenges related to climate change countermeasures in priority sectors through interviews with relevant agencies in the Philippines. Information has been summarized from the perspectives of 1) capacity building, 2) finance, 3) technology, and 4) institutions (laws and regulations, organizations, etc.).

Capacity building: Various stakeholders in the Philippines pointed out the needs to further improve understanding of climate change initiatives in the central and local governments and the needs to improve capacity of government officials in all priority sectors. The private sector and citizens were also found to have limited understanding, interest, and know-how in climate change risks and countermeasures.

Finance: The overall climate change-related budget of the Philippine government has been increasing over the years, and a large portion of the budget has been allocated to disaster prevention and adaptation, such as flood control. In terms of mitigation, while a large amount of budget has been allocated to the transportation sector, budget shortfalls were pointed out in other sectors. Although the initiatives under consideration in the NDC require the introduction of new technologies, there is a lack of budget, including for research and development. In addition, private companies usually need to make new capital investments to implement climate change measures, but it is difficult to secure finance through for example obtaining loans from banks, which is an obstacle for companies to proceed with their initiatives. Several sectors especially the waste sector are facing financial challenge by the local governments which are responsible for the measures such as disposal of municipal waste.

Technology: In several sectors, there are technologies that are difficult to procure domestically to address climate change, and access to these technologies is a challenge. Another issue is the lack of tools and database in some sectors to support climate change countermeasures, or there exist competing tools and databases that cause confusion to data users.

Institution: There are new plans and standards that need to be developed or strengthened, and there are also existing systems that are insufficient or inadequate (inconsistency of standards, lack of enforceability of laws and regulations).

Possible cooperation programs in the Philippines

Possible cooperation programs in each priority sector were analyzed as a potential area that the Philippine government is recommended to work on in coming years. The possible cooperation programs were considered in line with the policies of the Philippines and Japan and they are not only expected to contribute to the resolution of the identified issues, but also expected to be effective climate change countermeasures.

The “possible cooperation programs” are a combination of several “cooperation projects” that could contribute to the resolution of the issues, and support schemes are also hypothetically selected to ensure that the program is optimal for resolving the issues. The projects that make up the cooperation program are divided into two categories: “short-term cooperation projects” that address particularly urgent issues (issues that should be resolved before 2030, which is the end year of the Philippines' current NDC), and “medium- to long-term cooperation projects” that address medium- to long-term issues (issues that should be resolved after 2030 regardless of when the project starts).

In addition, in order to prioritize the possible cooperation programs, each cooperation program is evaluated by analyzing the degree of urgency, climate change adaptation and mitigation effects, sector-wide and policy spillover effects (impact), and applicability of Japanese knowledge and technology.

The following part summarizes the possible cooperation programs of each priority sector and the issues that can be addressed through these programs.

Cross-sectoral issues: The Survey discussed possible cooperation programs aimed at resolving issues that were identified as highly important issues, such as the development of the Enhanced Transparency Report under the Paris Agreement, and the capacity of CCC staff, and LGU's capacity to promote adaptation and mitigation actions in local areas, among others. In addition to the capacity building program to establish a transparency framework, a comprehensive program to improve resilience and a program to help local governments strengthen their GHG emission reduction activities were considered as cooperation programs.

Energy: Major challenges in this sector includes limited private investment to promote renewable energy (especially hydroelectric and geothermal), constraints in expanding and strengthening the power grid, limitation in funding for total electrification which must be achieved by 2028, and absence of policies and plans to introduce emerging technologies such as hydrogen and CCUS that could be game changers. To address these challenges, a program to promote investment in renewable energy, a broad and integrated capacity-building program for transmission and distribution, and a program combining various support schemes for the introduction and promotion of alternative fuels and emerging technologies were considered.

Industry sector and private sector promotion: Issues in high-GHG emission sub-sectors were identified, including the limited introduction of mitigation measures in the cement industry, an issue related to the standards for blended cement, constraints in energy reduction in the steel industry and in fluorocarbon gas measures, as well

as issues related to the introduction of EVs and industrial waste recycling. The issues of the system to introduce EVs and the issues of industrial waste recycling. As possible cooperation programs to address these issues, a comprehensive program to support the promotion of climate change measures in high GHG emitting industries (cement, steel, and RAC industries), a cooperation program including financing to promote the EV industry, and a program to promote waste recycling were discussed.

Agriculture: To address capacity-related issues to plan, operate, and manage irrigation facilities and limitation of facilities, issues related to capacity of stakeholders to promote formulation, budgeting, and implementation of rural development plans in response to climate change, issues related to constraints in agricultural extension in response to climate change, and issues related to promoting livestock and fisheries in response to climate change, multiple cooperation programs were considered including a climate change-responsive irrigation facility development program, a smart livestock development program, a farmland management cooperation program, and a fisheries development program.

Forestry and Natural Environment: In the forestry sector, identified issues include the limitation of a national forest monitoring system including a database, and the forest remote sensing technology which is necessary to promote REDD+. In the area of coastal/ marine biodiversity, the absence of a strategic conservation plan for the management of marine protected areas, limited technology for monitoring and assessment of ecosystems in highly vulnerable marine protected areas, and the absence of policies to support blue carbon conservation were identified as important issues. The possible cooperation programs include a comprehensive program to strengthen forest management capacity in light of climate change, a program to strengthen the capacity of forests to manage water recharge functions in light of climate change, and a cooperative program to strengthen coastal/marine ecosystem conservation and management in light of climate change.

Urban Environment: In the area of waste management, dedicated waste management officers are absent in some LGUs, and there is a low technical expertise and limited local information, as well as a nationwide shortage of sanitary landfill sites and semi-aerobic sanitary landfill sites which is preventing the avoidance of methane emissions, and a nationwide shortage of waste recovery facilities. In the area of domestic wastewater, the Survey identified issues related to the low capacity and funding of LGUs and local water districts to promote sewerage and septage sludge management projects. To address these issues, a comprehensive cooperation program to improve waste management, a program to improve the capacity of final disposal sites, and a program to improve domestic wastewater treatment were considered.

Cooperation Programs that should be Prioritized

Among the above cooperation programs in consideration, two cooperation programs that are expected to have the largest positive impacts among respective sector were selected as ‘high impact’ cooperation programs based on their urgency to address the issues, expected degree of adaptation and mitigation impacts, and expected ripple effects.

Also, the Survey has identified three cooperation programs among all programs that should be highly prioritized by the Philippine government as the highest impact cooperation programs as listed below.

Cooperation Program (priority sector)	Mitigation/ Adaptation	Issues to be addressed and expected positive ripple effects
Program to establish a transparency framework and strengthen response capacity <i>(cross-cutting sector)</i>	Mitigation and Adaptation	Issues: Need for immediate provision of means of implementation (capacity building, finance, technology transfer and development) under the UNFCCC and Paris Agreement in order to ensure that the Philippines will be able to deliver the international climate reports, i.e., National Communications, Biennial Update Report, and Biennial Transparency Report; needs of support for the development of systems and institutions related to data collection and maintenance necessary to ensure transparency; needs to improve smooth coordination and collaboration between CCC and relevant departments and agencies; limited climate change-related knowledge and expertise of CCC staff Expected positive effects: Smooth preparation and submission of official documents such as GHG inventories and national communication to the United Nations will enable the Philippines to show its efforts and support needs for climate change countermeasures to the world. Monitoring and evaluation of the implementation of climate change countermeasures (mitigation and adaptation) on these documents will ensure transparency and progress toward compliance with the Paris Agreement. In addition, clarification of the areas and contents of external assistance needs and provision of basic information necessary to consider donor assistance will promote donor assistance.
Renewable Energy Investment Promotion Program <i>(energy sector)</i>	Mitigation	Issues: Limited private investment in renewable energy Expected positive effects: Introduction of renewable energy to meet the growing energy demand in the future is also the largest GHG emission reduction measure and has the greatest impact on achieving the NDC target; Hydropower can also be a climate change adaptation measure by addressing flood control and water utilization, and has ripple effects such as development of the agricultural sector and securing water supply for citizens; Geothermal can replace fossil fuel power generation as a base-load power source; Promotion of investment by the private sector through risk reduction is expected to influence the expansion of companies and create employment.
Transmission and Distribution and Electrification Capacity Enhancement Program <i>(energy sector)</i>	Mitigation and Adaptation	Issues: Limited expansion and reinforcement of the power grid; Insufficient funds for full electrification by 2028; Limited sustainability of remote island power infrastructure. Expected positive effects: If the introduction of renewable energy is accelerated, the amount of fossil fuel power generation will decrease, which contribute to GHG reduction by a considerable amount; Employment and economic benefits will be promoted; Since the fuel source of power generation in off-grid is 91% petroleum (diesel), it will contribute significantly to GHG reduction; From the perspective of adaptation, a robust energy infrastructure can be built against the frequent and severe disasters caused by climate change, it can contribute to NDC in terms of ensuring stable energy access in the region; reducing the proportion of diesel power generation on remote islands will reduce diesel procurement and mitigate the impact of supply chain disruptions due to disasters, while reducing fuel costs, thereby enhancing the overall sustainability of remote island power sources.

Recommendations

The Philippine government is recommended to promptly initiate deliberations on high-impact and other cooperation programs identified under the Survey with JICA, while concurrently securing domestic funding for climate countermeasures especially for priority sectors of the Survey to expedite the realization of climate goals. In order to accelerate proactive measures for climate adaptation, it is important to augment funding and enhance access to international climate finance. For mitigation, to achieve the country's ambitious GHG emission reduction targets, it is essential to address limitation of awareness and capacity regarding climate planning and implementation within various stakeholders. Furthermore, it is recommended that the Philippine government make a formal commitment to zero emission which would bolster international support, facilitating accelerated planning and implementation of both mitigation and adaptation measures.

Abbreviations and Acronyms

ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Center
AFD	French Development Agency
AFR	Alternative Fuels and Raw Materials
AIM	Asia-Pacific Integrated Model
AMIA	Adaptation and Mitigation Initiative in Agriculture
APA	Adapting Philippine Agriculture to Climate Change
ARR	Afforestation, Reforestation and Revegetation
ASEP	Access to Sustainable Energy Programme
ASTI	Advanced Science and Technology Institute
ASTM	American Society for Testing and Materials
AWD	Alternate Wetting and Drying
AWS	Automatic Weather Stations
AZEC	Asia Zero Emission Community
BAFE	Bureau of Agriculture and Fisheries Engineering
BAFS	Bureau of Agriculture and Fisheries Standards
BAI	Bureau of Animal Industry
BAR	Bureau of Agricultural Research
BARMM	Bangsamoro Autonomous Region in Muslim Mindanao
BAU	Business-as-Usual
BCP	Business Continuity Plan
BDF	Bio Diesel Fuel
BFAR	Bureau of Fisheries and Aquatic Resource
BG	Bangsamoro Government
BIOFIN	Biodiversity Finance Initiative
BLEP	Barangay Line Enhancement Program
BMB	Biodiversity Management Bureau
BOD	Biochemical Oxygen Demand
BOI	Board of Investments
BOP	Base of Pyramid
BPI	Bank of the Philippine Islands
BRT	Bus Rapid Transit
BSMED	Bureau of Small and Medium Enterprise Department
BSWM	Bureau of Soils and Water Management
BTR	Biennial Transparency Report
BUMV	Federal Department for the Environment, Nature Conservation, Nuclear Safety
BUR	Biennial Update Report
CARS	Comprehensive Automotive Resurgence Strategy
CAVCS	Carbon Accounting, Verification, and Certification System
CBD	Conservation of Biological Diversity
CBFM	Community-Based Forest Management
CBSWMP	Community-Based Solid Waste Management Program
CCA	Climate Change Adaptation
CCAM-DRR	Cabinet Cluster on Climate Change Adaptation, Mitigation and Disaster Risk Reduction
CCC	Climate Change Commission
CCET	Climate Change Expenditures Tagging

CCO	Climate Change Office
CCS	Climate Change Service
CCUS	Carbon Capture, Utilization and Storage
CDP	Center for Disaster Preparedness
CES	Clean Energy Scenario
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Center for Tropical Agriculture
CIS	Climate Information System
CLUP	Comprehensive Land Used Plans
CMSP	Coastal and Marine Spatial Planning
CNFIDP	Comprehensive National Fisheries Industry Development Plan
CNG	Compressed Natural Gas
CO ₂ e	Carbon dioxide equivalent
COP	Conference of the Parties
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CRA	Climate resilience agriculture
CRAO	Climate Resilient Agriculture Office
CREATE	Corporate Recovery and Tax Incentive for Enterprises Act
CREVI	Comprehensive Roadmap for the Electric Vehicle Industry
CREZ	Competitive Renewable Energy Zones
CRVA	Climate Risk and Vulnerability Assessments
CSO	Civil Society Organization
CSP	Competitive Selection Process
CTF	Clean Technology Fund
CTI	Coral Triangle Initiative
DA	Department of Agriculture
DAC	Department Assistance Committee
DAO	Department Administrative Order
DAR	Department of Agrarian Reform
DBM	Department of Budget and Management
DBP	Development Bank of the Philippines
DC	Department Circular
DENR	Department of Environment and Natural Resources
DILG	Department of the Interior and Local Government
DND	Department of National Defense
DOE	Department of Energy
DOF	Department of Finance
DOH	Department of Health
DOST	Department of Science and Technology
DOTr	Department of Transportation
DPWH	Department of Public Works and Highways
DREAMS	Development for Renewable Energy Applications Mainstreaming and Market Sustainability
DRR	Disaster risk reduction
DRRM	Disaster Risk Reduction and Management
DSM	Demand Side Management
DSWD	Department of Social Welfare and Development

DTI	Department of Trade and Industry
DWR	Department of Water Resources
DWRM	Department of Water Resource Management
EBT	Energy Balance Table
EBTMS	Energy Balance Management System
EC	Electric Cooperative
ECP	Energy Consuming Products
e-CV	Electric Commercial Vehicles
EE	Energy Efficiency
EECP	Energy Efficiency and Conservation Programs
EIA	Environmental Impact Assessment
ELV	End of Life Vehicles
EMB	Environment Management Bureau
ENSO	El Niño Southern Oscillation
EP	Energy Planning
EPC	Engineering, Procurement, Construction
EPIMB	Electric Power Industry Management Bureau
EPIRA	Electric Power Industry Reform Act
EPPB	Energy Policy and Planning Bureau
ERC	Energy Regulatory Commission
ERDB	Ecosystem Research and Development Bureau (DENR)
ERDB	Energy Resource Development Bureau (DOE)
ESCO	Energy Service Company
ESS	Energy Storage System
ESSD	Environmental Social Safeguards Division
ETC	Energy Transmission Council
ETP	Energy Transmission Partnership
EU	European Union
EUMB	Energy Utilization Management Bureau
EV	Electric Vehicle
EVAP	Electric Vehicle Association of the Philippines
EVIDA	Electric Vehicle Industry Development Act
EVOSS	Energy Virtual One-Stop Shop
EZ	Economic Zone
FIT	Feed in Tariff
FMA	Fisheries Management Areas
FDI	Foreign Direct Investment
FMB	Forest Management Bureau
FMP	Forest Management Project
FOLU	Forestry and Other Land Use
FOS	Field Operation Service
FREL	Forest Reference Emission Levels
FRL	Forest Reference Levels
FY	Fiscal Year
GCF	Green Climate Fund
GDP	Gross Domestic Product
GED	Green Economic Development

GEF	Global Environmental Facility
GEMP	Government Energy Management Program
GEOP	Green Energy Option Program
GFSI	Global Food Security Index
GGGI	Global Green Growth Institute
GHG	Greenhouse Gas
GIZ	German Agency for International Cooperation
GIZ	German Agency for International Cooperation
GPP	Green Public Procurement Roadmap
GWP	Global Warming Potential
HCFC	Hydrochlorofluorocarbon
HDPE	High-Density Polyethylene
HFC	Hydrofluorocarbon
HFEC	Hydrogen and Fusion Energy Committee
HPS	High Pressure Sodium
HUC	Highly Urbanized Cities
IAEECC	Inter-Agency Energy Efficiency and Conservation Committee
IA-MTG	Inter-Agency Meeting
ICAO	International Civil Aviation Organization
ICT	Information and Communication Technology
IDTPG	Industry Development and Trade Policy Group
IEB	Intergovernmental Energy Board
IEC	Information, Education and Communication
IFC	International Finance Corporation
IFRS	International Financial Reporting Standards
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
IPRR	Investment Portfolio for Risk Resilience
IRRI	International Rice Research Institute
ISO	International Organization for Standardization
ISPF	Integrated Spatial Planning Framework
IUU	Illegal, Unreported and Unregulated Fishing
IWMC	Integrated Waste Management Center
IWRM	Integrated Water Resources Management
JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency
JIRCAS	Japan International Research Center for Agricultural Sciences
JOGMEC	Japan Organization for Metals and Energy Security
JST	JICA Survey Team
KBA	Key Biodiversity Area
LAEECC	Inter-Agency Energy Efficiency and Conservation Committee
LANDSAT	Land Remote Sensing Satellite
LASURECO	Lanao del Sur Electric Cooperative
LCCAP	Local Climate Change Action Plan
L/COS	Local/Community Organizations
LDRRMF	Local Disaster Risk Reduction and Management Fund
LDRRMP	Local Disaster Risk Reduction Master Plan

LGA	Local Government Academy
LGU	Local Government Unit
LLDA	Laguna Lake Development Authority
LNG	Liquefied Natural Gas
LOI	Loss of Ignition
LTS	Long-Term Low Greenhouse Gas Emission Development Strategy
LWD	Local Water District
LWUA	Local Water Utilities Authority
MAFF	Department of Agriculture, Forestry and Fisheries
MDB	Multilateral Development Bank
MEPP	Minimum Energy Performance for Sectors
METI	Department of Economy, Trade and Industry
MMDA	Metropolitan Manila Development Authority
METI	Department of Economy, Trade and Industry
M&E	Monitoring and Evaluation
M/CENRO	Municipal and City Environment and Natural Resources Officer
MRV	Measurement, Reporting and Verification
MSMEs	Micro, Small and Medium-sized Enterprises
MSP	Marine Spatial Planning
MTOE	Million Tonnes of Oil Equivalent
MTPIP	Medium-Term Philippine Investment Plan
MW	Megawatt
NAFMIP	National Agriculture and Fisheries Modernization and Industrialization Plan
NAP	National Adaptation Plan
NAREA	National Agriculture and Fisheries Research for Development and Extension Agenda
NARO	National Agriculture and Food Research Organization
NBB	National Biofuel Board
NBSAP	National Biodiversity Strategy and Action Plan
NC	National Communication
NCCAP	National Climate Change Action Plan
NICCDIES	National Integrated Climate Change Database and Information Exchange System
NCR	National Capital Region
NCRMF	National Climate Risk Management Framework
NDC	Nationally Determined Contribution
NDRRMC	National Disaster Risk Reduction and Management Council
NDRRMF	National Disaster Risk Reduction and Management Fund
NDRRMP	National Disaster Risk Reduction and Management Plan
NEA	National Electrification Administration
NEDA	National Economic and Development Authority
NEP	National Expenditure Program
NFMS	National Forest Monitoring System
NFRDI	National Fisheries Research and Development Institute
NGCP	National Grid Corporation of the Philippines
NGO	Non-Government Agency
NGP	National Greening Program
NIA	National Irrigation Administration
NIMP	National Irrigation Master Plan

NIPAS	National Integrated Protected Area System
NIS	National Irrigation System
NOAH	Nationwide Operational Assessment of Hazards
NOAP	National Organic Agriculture Program
NPAAAD	Network of Protected Areas for Agriculture and Agro-Industrial Development
NPC	National Power Corporation
NPTE	National Panel of Technical Experts
NREP	National Renewable Energy Program
NSFCC	National Framework Strategy on Climate Change
NSSMP	National Sewerage and Septage Management Program
OCD	Office of Civil Defense
ODS	Ozon Depleting Substance
OIMB	Oil Industry Management Bureau
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PaMs	Policies and Measures
PAPs	Program/Activities/Projects
PARMS	Philippine Alliance for Recycling and Materials Sustainability
PBSAP	Philippine Biodiversity Strategy and Action Plan
PCA	Philippine Coconuts Authority
PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
PCCI	Philippine Chamber of Commerce and Industry
PCECP	Philippine Conventional Energy Contracting Program
PCIC	Philippine Crop Insurance Corporation
PDP	Philippine Development Plan
PEEP	Philippine Energy Efficient Project
PEISS	Philippine Environmental Impact Statement System
PELP	Philippine Energy Labelling Program
PEMC	Philippine Electricity Market Corporation
PEP	Philippine Energy Plan
PFI	Participating Financial Institutions
PEISS	Philippine Environmental Impact Statement System
PELP	Philippine Energy Labelling Program
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PHP	Philippine Peso
PIA	Philippine Information Agency
PMPCREFD	Philippine Master Plan for Climate Resilient Forestry Development
PMS	Planning and Monitoring System
PNOC	Philippine National Oil Company
PNRPS	Philippine National REDD+ Strategy
POD	Philippine Ozone Desk
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PRDP	Philippine Rural Development Project
PREMS	Philippine Renewable Energy Market System
PRO	Producer Responsibility Organization
Pro-GED	Promotion of Green Economic Development

PSA	Philippine Statistics Authority
PSALM	Power Sector Assets and Liability Management Corporation
PSF	People’s Survival Fund
PUV	Public Utility Vehicle
PUVMP	Public Utility Vehicle Modernization Program
PVM	Photovoltaic Mainstreaming
PWSSMP	Philippine Water Supply and Sanitation Master Plan
R&D	Research and Development
R.A.	Republic Act
RAC	Refrigeration Air Conditioning
RCA	Residual Containment Area
RCP	Resilience Compliance Plan
RE	Renewable Energy
REDD+	Reducing Emissions from Deforestation and Forest Degradation and the Role of Conservation, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks
REM	Renewable Energy Market
REMB	Renewable Energy Management Bureau
RFO	Regional Field Office
ROG	Regional Operations Group
RFO	Regional Field Office
RPS	Renewable Portfolio Standard
ROR	Run of River
SAF	Sustainable aviation fuel
RSBSA	Registry System for the Basic Sectors in Agriculture
SAF	Sustainable Aviation Fuel
SAFDZ	Strategic Agriculture and Fisheries Development Zone
SMEs	Small and Medium-sized Enterprises
SHS	Solar Home System
SMEs	Small and Medium-sized Enterprises
SPUG	Small Power Utilities Group
SWMP	Solid Waste Management Plan
SSIS	Small-scale Irrigation System
TCFD	Task Force on Climate-related Financial Disclosures
TESDA	Technical Education and Skills Development Authority
TGFA	Total Gross Floor Area
TESDA	Technical Education and Skills Development Authority
TWG	Technical Working Group
UNDP	United Nations Development Programme
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UNOPS	United Nations Office for Project Services
UNIDO	United Nations Industrial Development Organization
UNOPS	United Nations Office for Project Services
UP	University of the Philippines
UPLB	University of the Philippines Los Banos
USTDA	U.S. Trade and Development Agency

VPP	Virtual Power Plant
USTDA	United States Trade and Development Agency
WB	World Bank
WESM	Wholesale Electricity Spot Market
WHR	Waste Heat Recovery
WRMO	Water Resources Management Office
WSS	Water Supply and Sanitation
WWF	World Wide Fund for Nature
ZEB	Zero Energy Building
ZEH	Zero Energy House

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Chapter 1 Overview of the Survey

1.1 Background of the Survey

With the entry into force of the Paris Agreement, all countries that ratified or acceded to the agreement including developing countries are now moving forward with efforts to address climate change. The Republic of the Philippines is an island nation, having 36,289 km of long coastline. The country also experiences frequent and intense natural disasters such as typhoons. According to the Global Climate Risk Index for 2021 which assesses the effects of climate change to various countries of the world, the Philippines is ranked as the fourth country most severely affected by climate change between 2000 and 2019*² while in 2022 and 2023, the World Risk Index, which indicates the disaster risk from extreme natural events and negative climate change impacts for 193 countries in the world, ranked the Philippines as the country with the highest disaster risk worldwide.*³ And the country's Gross Domestic Product (GDP) is expected to decrease up to 13.6% if the effort of climate change is not conducted by 2040 *⁴.

The Philippines ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and acceded the Paris Agreement in 2017, and submitted the Nationally Determined Contribution (NDC) in 2021 with the aim of reducing and avoiding the impacts of climate change and reduce greenhouse gas (GHG) emissions. In the NDC, the Philippines set a target of GHG emission reduction and avoidance of 2.71% by its own efforts (unconditional) and 72.29% with the support of bilateral or multilateral cooperation and funds (conditional)*⁵. The NDC also sets a target of peaking its GHG emissions by 2030, as well as refers to the goal of adaptation, which cover sectors such as agriculture, coastal and marine ecosystems and biodiversity, health, and human security.

In order to employ its full national political strength to address the problem of climate change, the Philippines enacted Climate Change Act of 2009 (R.A. 9729, as amended by R.A. 10174) to mainstream climate change in the government's policies and programs. The act also established the Climate Change Commission (CCC) as the country's lead policy-making body tasked with coordinating, monitoring, and evaluating the country's climate change initiatives. Further, the act mandates the formulation of the National Framework Strategy on Climate Change (NFCSS) 2010-2022, and the National Climate Change Action Plan (NCCAP) 2011-2028 to serve as the basis for national and local government entities in developing and implementing their climate programs, projects, and activities.

*² Global Climate Risk Index 2021, GERMANWATCH

*³ WorldRiskReport 2023, Institute for International Law of Peace and Armed Conflict (IFHV)

*⁴ Philippines Country Climate and Development Report, World Bank

*⁵ Reduction targets compared to emissions in the case that no climate change measures are taken during the target year, from 2020 to 2030 (BAU scenario). (3.34 billion tons CO₂ equivalent). The target sectors are agriculture, waste, industry, transportation, and energy.

1.2 Objectives of the Survey

The objective of the survey is to clarify the existing issues, challenges and support needs by analyzing the climate policies and climate actions (mitigation and adaptation) in the Philippines, and to study possible cooperation programs that can contribute to the Philippines' climate change targets including the NDC, aligned with the climate change policies of the Government of Japan and Japan International Cooperation Agency (JICA).

1.3 Location of the Survey

The Survey is conducted in the Philippines, particularly, the National Capital Region, in coordination with relevant government agencies, organizations, and offices.

1.4 Sectors and Coverage

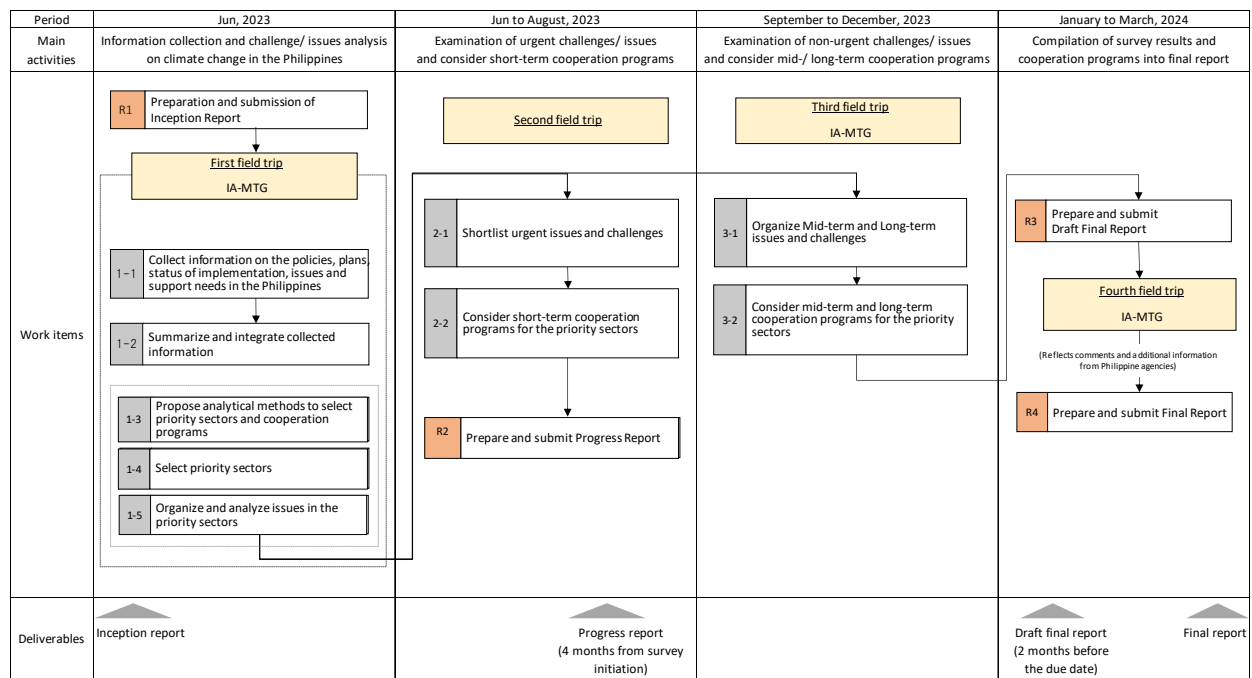
The sectors covered by the Survey include a wide range of sectors described in the NDC and climate policies of the Philippines, which include climate change mitigation and adaptation (where applicable) in energy, industry, agriculture, forestry/ natural environment, and urban environment, where JICA has limited cooperation for climate change measures in the Philippines. Cross-sectoral issues related to the implementation of Paris Agreement and promotion of private sector engagement in climate actions were also covered in the Survey. Other sectors not mentioned above, namely transportation, disaster risk reduction and management, and integrated water resources management were assessed preliminarily (see 1.7 Survey Methods for rationale of priority sector selection).

1.5 Cooperative Organizations

The CCC is the lead cooperative agency and Department of Environment and Natural Resources (DENR), Department of Energy (DOE), and Department of Agriculture (DA) are cooperative agencies of the Survey. Coordination with other executive departments in charge of target sectors of the survey as well as relevant other departments and organizations as summarized in the Annex are being undertaken.

1.6 Schedule

The survey schedule is shown in Figure 1-1. JICA Survey Team (JST) conducted a survey from May 2023 to March 2024. Field survey was conducted four times, namely June, August, October 2023, and January 2024. JICA Survey Team continued a survey while the team members were in Japan via desktop survey and online meetings with the Philippines agencies.



Source: JICA Survey Team

Figure 1-1 Work plan

The basic principles on the implementation of the Survey, study items and contents, methods to collect information and data as well as analyze the sector-specific issues and challenges, the selection method of the envisaged priority sectors and cooperation programs, survey operation and organization including schedule are summarized into an Inception Report and submitted to JICA and the Philippines side after JICA’s approval.

Progress and results of the Survey including identified issues, possible cooperation programs, and their evaluation results were shared with the Philippines agencies through Inter-Agency Meetings (IA-MTG), which were held three times during the Survey period, on June 13 and August 9, 2023 and January 24, 2024, where cooperative agencies other agencies participated as observers such as National Economic and Development Authority (NEDA), Department of Science and Technology (DOST), Department of Trade and Industry (DTI), Department of the Interior and Local Government (DILG), and Department of Public Works and Highways (DPWH). From DOST, officers from the Philippine Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA) and Philippine Institute of Volcanology and Seismology (DOST-PHIVOLCS) attended, and participants from the Board of Investment (BOI) from DTI also participated in the meeting. Results of the Survey was widely shared with the Philippine agencies through the Draft Final Report. Comments and inputs received from the agencies were carefully reviewed and reflected into the final deliverable of the Survey, the Final Report.

1.7 Survey Methods

1.7.1 Basic Method of the Data Collection and Analysis

The Survey was conducted in the following manner.

1 Information gathering

Interviews were conducted with the Philippine government agencies that have jurisdiction over the sectors to be surveyed, as well as organizations, associations, universities, and private sector that are promoting climate change-related initiatives in their respective sectors. In addition, relevant information was collected through questionnaires to these agencies and organizations. Information was also gathered by referring to literature published by various sources including the government agencies and donors.

Relevant information collected included policies and plans related to climate change in each sector and sub-sector, status of climate change countermeasures (mitigation and adaptation measures), involved stakeholders, issues and challenges (those related to the promotion of climate change measures), status of donor supports, and support needs.

2 Selection of priority sectors

The priority sectors to be considered for the possible cooperation programs were selected from the sectors mentioned in the NDC of the Philippines, taking into account the situation in the Philippines and the sectors where there are JICA's existing or past cooperation projects. With regard to the situation in the Philippines, the Survey identified sectors that particularly need to be addressed based on future GHG emission projections and based on the current budget situation of the Philippine government for climate change measures.

3 Analysis of identified issues in priority sectors and possible cooperation programs

For each selected priority sector, issues and challenges were identified and analyzed in detail according to the procedure shown in the figure below, and possible cooperation programs to address these issues were analyzed. Since each sector covers multiple fields and a wide range of topics, each sector was divided into several subsectors and the analysis was conducted by each subsector.



Source: JST

Figure 1-2 Work Flow for Issue Analysis and Consideration of Cooperation Programs

To understand and analyze the current status of the sectors and subsectors, stakeholders and their roles were first identified, and then analyzed the overall climate change status of each sector including climate change impacts and risks as well as GHG emission status and reduction targets. Then relevant policies and plans were analyzed related to climate change in each sector and subsector. The status of donor support, including JICA, was also analyzed, and issues and challenges in each sector and subsector were identified (the identified issues were compiled into a “list of sector issues”).

After identifying the issues, an assessment was conducted on the expected impact by resolving these issues, and the degree of importance of each identified issue was analyzed and prioritized. This impact assessment evaluates not only the extent the resolution of the issues would contribute to the Philippines’ climate policies or meet the GHG reduction targets in the NDC, but also how they would contribute to the implementation and achievement of sector and sub-sector policies, plans, and targets.

In addition, the Survey analyzed whether and how Japan/ JICA’s knowledge, experience, and technology in the field of climate change could be used to solve each identified issue, and JICA’s existing schemes were hypothetically applied. The results of the issue analysis and prioritization are summarized in the “Issue Analysis Sheet” and the “Issue Prioritization” table for each sector. Evaluation of each issue was conducted from the perspective of urgency, climate change countermeasure effects and impacts as shown in the table below.

Table 1-1 Evaluation of Identified Issues

Issue	Urgency	Mitigation/ Adaptation		Impacts and spillover effects
		M	A	
Issue A	High: Issues that need to be resolved as soon as possible. Issues that have a clear policy timeline or require time for development and immediate action.	✓✓✓: Significant amount of GHG emission reduction/ avoidance/ sequestration is expected that can greatly contribute to sector/ sub-sector GHG reduction.	✓✓✓: A significant portion of beneficiaries in the sector/ sub-sector is expected to receive adaptation benefit.	+++: By resolving the issue, positive impacts are expected on the sector as a whole or on society as a whole, which also has a positive impact on various stakeholders. The climate positive impacts are also very large.
	Medium: Although no policy timeline is specified, it is desirable to address this issue as soon as possible considering its significance in sector/ subsector policy.	✓: GHG emission/ avoidance/ sequestration that can contribute sector/ sub-sector GHG reduction is expected to certain extent.	✓: A significant number of beneficiaries is expected to receive adaptation benefit.	++: Resolving the issue will contribute to the promotion of sub-sector policy implementation and have a positive impact on certain stakeholders. The climate positive impacts are also large.
	Low: Issues that do not require immediate action to resolve.	✓: GHG emission/ avoidance/ sequestration is expected.	✓: Although the number is limited, certain beneficiaries are expected to receive adaptation benefit.	+: The climate positive impacts are expected by resolving the issue and some spillover effects are expected.

The Survey then analyzed possible cooperation programs that can contribute to the resolution of the issues in the Philippines. In considering and analyzing possible programs, evaluation indicators shown in Table 1-2 were applied to make sure such programs are in line with the policies of the Philippines and Japan and whether they are expected to be effective as climate change countermeasures. Note that the indicators for economic efficiency and investment effectiveness were set with the assumption that they would be applied only to candidate yen loan projects and candidate private sector projects for which basic data were available. Information on this evaluation method and the possible cooperation programs were widely shared with the Philippine side through the field survey, and opinions were sought from the relevant agencies.

Table 1-2 Indicators and check list items for the Possible Cooperation Programs

Indicator	Content
Contribution to achievement of the Paris Agreement and NDC targets	Does the possible cooperation program contribute to achievement of the NDC goals of the Philippines and the Paris Agreement? Is the program output tangible which can be monitored in the amount of GHG emissions reduced or the number of beneficiaries for adaptation action?
Consistency with sector policies	Is the program consistent with the sector's policies and plans of the Philippines?
Urgency	Is the target year or deadline set for implementation of the cooperation program or indicated in sector roadmap or policy documents?
Status of support from other donors	Are there any similar cooperation programs given by other development partners or climate funds? Duplication with such programs are avoided while collaboration can be considered?
Economic soundness	Is the cooperation program economically sound as indicated in economic/ financial analysis? (where applicable)
Investment impact	Are there expected spillover effects to the entire sector or national economy through implementing the cooperation program, especially program for private sector? (where applicable)
DAC evaluation criteria	Organization for Economic Co-operation and Development -Development Assistance Committee (OECD-DAC) evaluation items: relevance, coherence, effectiveness, efficiency, impact and sustainability
Consistency with Government of Japan and JICA's policies and strategies	Is the cooperation program aligned to the climate change policy of Japanese government and strategy of JICA, such as application of Japanese climate technologies and JICA KPIs?
Inclusion of socially vulnerable population and gender perspective	Does the cooperation program take into account socially vulnerable people in the Philippines who are prone to climate change impacts (including women and indigenous peoples), and contribute to decreasing the sexual gap caused by social, economic, and environmental weakness caused by climate change?

*DAC: Development Assistance Committee
Source: JICA survey team

The “possible cooperation programs” examined in this Survey is a set of programs that are expected to lead to the resolution of the identified climate-related issues and challenges in the Philippines. Each “cooperation program” is a combination of several possible ‘cooperation projects’ under different support schemes, where various schemes, for instance JICA’s technical cooperation project and a private-sector partnership project and JICA’s training programme, were hypothetically applied make the most effective program for solving the issues.

The individual projects that make up the cooperation program are divided into two categories: “short-term cooperation projects” that address particularly urgent issues (issues that should be resolved before 2030, when the current NDC period in the Philippines ends), and “medium- to long-term projects” that address medium- to long-term issues (issues that should be resolved after 2030, regardless of when the project starts). The possible cooperation programs and the major individual cooperation projects that comprise the cooperation programs, as well as the results of the evaluation of the possible cooperation programs using the above indicators, are shown in Chapter 3 of this report.

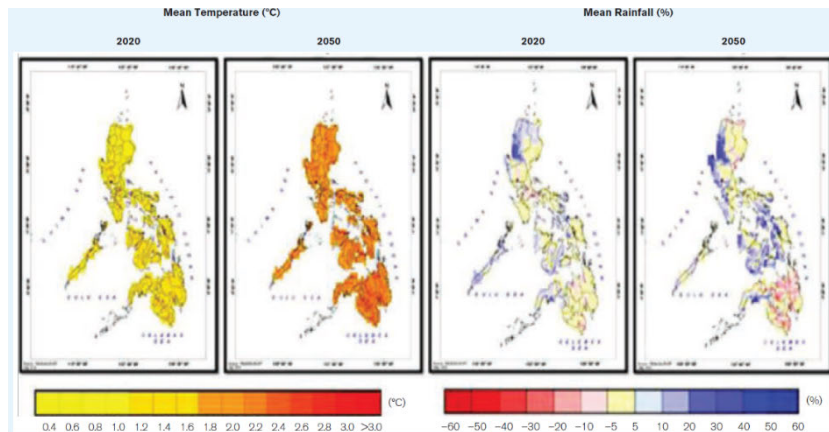
In order to prioritize the possible cooperation programs, the Survey evaluated each program by analyzing the degree of urgency, climate change adaptation and mitigation effects, sector-wide and policy spillover effects (impact), and applicability of Japanese knowledge and technology.

Chapter 2 Analysis of Information Related to Climate Change Measures in the Philippines

2.1 Current Status of Climate Change in the Philippines

2.1.1 Current Status of Climate Change Risks and Future Prediction

The Philippines has already experienced significant climate change. The mean temperature increase for the country was 0.68°C over the period 1951 - 2015. Rainfall has also changed, and extreme weather, particularly tropical cyclones, have changed their paths⁶. Sea levels have already risen by up to 5.7 - 7.0 mm per year in some parts of the country, which is twice as much as the global average during the same period.⁷ Projections made by the IPCC's multi-model ensemble indicate that (a) temperatures in the Philippines will continue to increase by about 1 - 2°C by the end of the 21st century, depending on the climate scenario; (b) average rainfall may not change much, but variability and intensity are likely to increase; (c) extreme events will become stronger and more frequent. The magnitude and direction of change will likely differ geographically, with the northern and central parts of the country projected to become wetter and the southern parts drier throughout the year.⁸



Source: Climate Risk Country Profile, WB

Figure 2-1 Annual projected temperature and precipitation change for 2020 and 2050

According to the National Panel of Technical Experts (NPTE), priority climate-induced risks for the Philippines have been identified as follows: (a) sea level rise, (b) coastal erosion, (c) flooding, (d) increase in severity of tropical cyclones, (e) extreme drought, (f) temperature increase and rising urban heat index, (g) extreme rainfall, (h) climate influenced diseases, (i) wind patterns, and (j) biodiversity loss.⁹

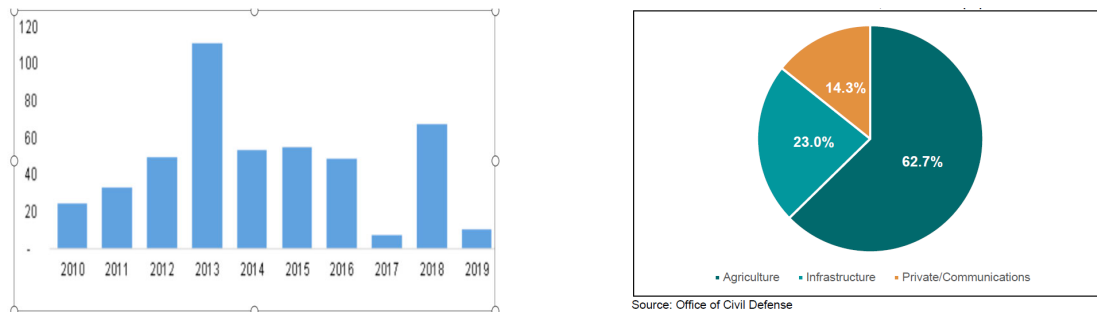
⁶ Observed and Projected Climate Change in the Philippines. Philippine Atmospheric, Geophysical and Astronomical Services Administration, Quezon City, Philippines, PAGASA

⁷ DOST-PAGASA, 2018: Observed and Projected Climate Change in the Philippines. Philippine Atmospheric, Geophysical and Astronomical Services Administration, Quezon City, Philippines, 36 pp

⁸ Philippines Country Climate and Development Report, World Bank

⁹ Commission Resolution No. 2021-010, CCC

Climate change is already affecting many people in the Philippines. According to the Philippine Statistics Authority (PSA), the damages incurred due to extreme natural events and disasters amounted to PHP 462.58 billion from 2010 to 2019. It was also recorded a total 12,097 deaths due to natural disasters for the same periods. Agriculture posted the largest share with 62.7% or PHP 290 billion followed by infrastructure with 23 % or PHP 106.3 billion¹⁰.



Source: Compendium of Philippine Environment Statistics, PSA

Figure 2-2 Damage due to natural extreme events (Unit: Billion PHP) and disasters from 2010 to 2019

2.1.2 International Trend and Current Status of Climate Change in the Philippines

(1) International Trend

Climate change is an issue that requires immediate actions by international community. Based on the UN Framework Convention on Climate Change (UNFCCC), adopted in 1992, the Conference of the Parties (COP) has been a pivot for active discussions to reduce GHG emissions at the global level every year since 1995.

The Paris Agreement was adopted at COP21 in December 2015 as a new international framework for climate change in the post-2020 period applicable to all Parties. The Paris Agreement aims to limit the global average temperature rise to within 2°C compared to pre-industrial levels. Key elements of the Paris Agreement are shown below.

- Setting a long-term common global goal for holding the increase in the global average temperature to well below 2 degrees above pre-industrial levels, and pursuing efforts to limit the temperature increase to 1.5 degrees above pre-industrial levels
- Updating and communicating an emission reduction target every five years
- Reporting on the progress in implementation of a target and reviewing in common but flexible manner.
- Setting the global goal on adaptation, and engaging in adaptation planning processes and the implementation of actions

¹⁰ Compendium of Philippine Environment Statistics, PSA

- Providing financial resources by developed country Parties to assist developing country Parties, and providing support voluntarily by other Parties
- Recognizing the importance of innovation
- Taking stock of the implementation of this Agreement to assess the collective progress towards achieving the purpose of this Agreement and its long-term goals (global stock take) every five years
- Recognizing the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate change
- Use of market mechanisms

The COP26 held in November 2021 reaffirmed the long-term global goal to hold the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change. The COP 27 held in 2022 reaffirmed that limiting global warming to 1.5 °C requires rapid, deep and sustained reductions in global GHG emissions of 43% by 2030 relative to the 2019 level. The COP 28 held in 2023 marked the conclusion of the first global stocktake of the world's efforts to address climate change under the Paris Agreement and it acknowledged that significant collective progress towards the Paris Agreement temperature goal has been made, from an expected global temperature increase of 4 °C according to some projections prior to the adoption of the Agreement to an increase in the range of 2.1–2.8 °C with the full implementation of the latest NDCs.

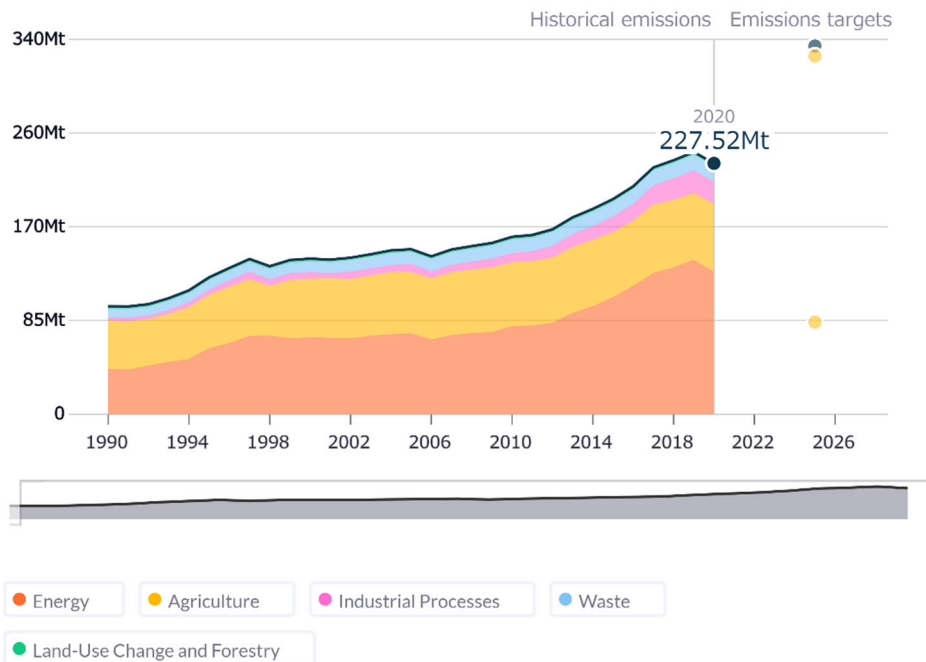
(2) Current Status of the Climate Change Related Actions in the Philippines

1) Status of GHG Emission

According to the national GHG inventory of the Philippines in 2020, GHG emissions in the country were 204.325 million tons of carbon dioxide equivalent (Mt-CO₂e). According to Climate Watch, GHG emissions per capita of the Philippines are slightly increasing year by year and reached 2.08 tons by 2020, which is below the global average, while GHG emissions per GDP has decreased from 1,937 tons per million USD in 1990 to 629 tons per million USD by 2020.

A breakdown of the country's GHG emissions according to the national GHG inventory of the Philippines in 2020 shows that the energy sector accounted for 63.3% of the total (or 129.286 Mt-CO₂e; without transport, 99.854 Mt-CO₂e), followed by agriculture (26.5%, 54.08 Mt-CO₂e), waste (14.7%, 30.122 Mt-CO₂e), industry (8.2%, 16.772 Mt-CO₂e), and forestry and other land use (-12.7%, 25.935 Mt-CO₂e). Within the energy sector, emissions from electricity (48.9% of the total) and transportation (14.4%) were the largest sources of emissions.

On the other hand, looking at GHG emission trend to date, with the exception of 2020 when the COVID-19 slowed down the economy, GHG emissions of the Philippines have consistently increased as the country’s economy grows as shown in the figure below.

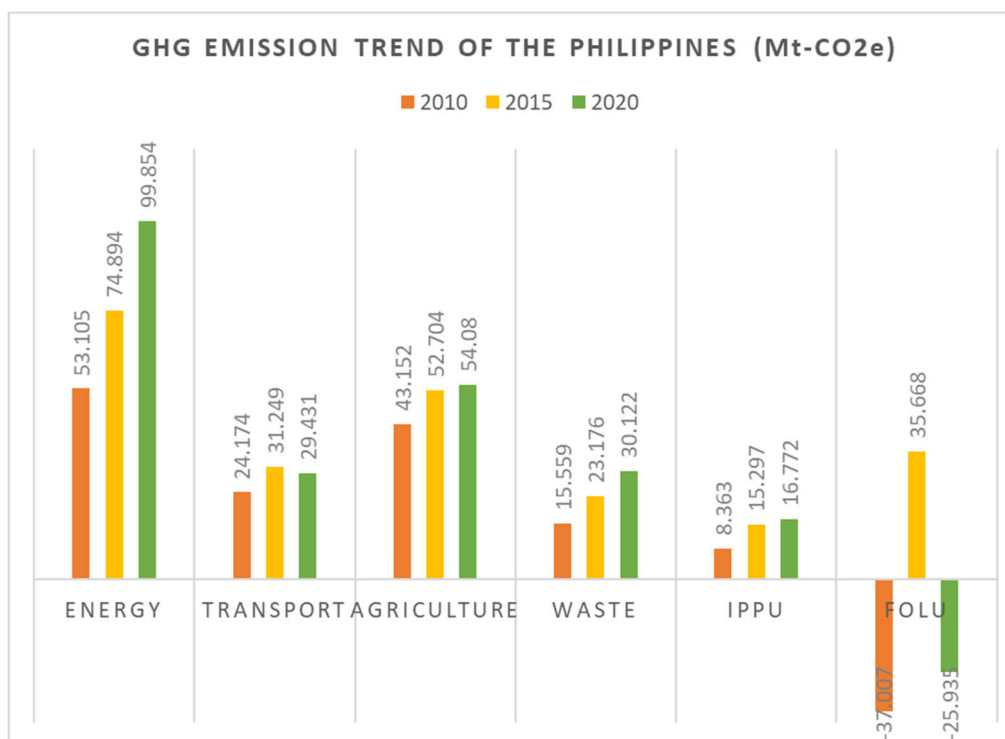


Source: World Resources Institute, 2022. Climate Watch Historical GHG Emissions

Figure 2-3 Philippines’ GHG emission trend

Note that the above GHG emission data is based on estimates from the OECD, FAO, and other organizations, and it differs from the national GHG inventory data by the Philippine government. The sector analysis in this Survey was based on the latest national GHG inventory data of 2020*¹¹, which is the only government-authorized data (see Figure below). Also note that the breakdown of GHG emissions of each sector was based on 2010 GHG inventory data since the latest GHG inventory report available during the Survey period was the national GHG inventory report of 2010.

¹¹ CCC Commission Resolution No. 2023-005 “Adopting the 2015 and 2020 National Greenhouse Gas Inventory Report.”



Source: 2010 Philippine Greenhouse Gas Inventory Report and CCC Commission Resolution No. 2023-005

Figure 2-4 Philippine GHG Inventory (2010, 2015 and 2020)

On the other hand, looking at future GHG emissions projections, under the BAU scenario with no mitigation measures, GHG emissions are expected to nearly double over the 10-year period from 2020 to 2030, as shown in the table below. Over the same period, emissions are expected to increase the most in the industrial sector (2.4 times by 2030 from the 2020 level), transportation (2 times by 2030), energy (1.7 times), and waste (1.2 times). For the agricultural sector, GHG emissions are projected to show a downward trend, and for land use and forestry, those that are sinks as of 2020 are projected to be converted to emission sources.

Table 2-1 Projected annual GHG emissions by sector (BAU scenarios)

Baseline Scenario (BAU): GHG Emissions, MTCO ₂ e												
SECTOR	TOTAL (2020-2030)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Agriculture	539.1	49.5	49.5	49.4	49.4	49.3	49.1	49.0	48.8	48.6	48.4	48.2
Waste	286.1	23.3	23.9	24.4	24.9	25.5	26.0	26.5	27.1	27.6	28.2	28.7
IPPU	279.8	15.8	18.0	18.5	20.7	22.4	24.4	26.6	29.0	31.6	34.7	38.1
Transport	689.2	42.9	45.9	49.1	53.1	57.2	61.1	65.4	70.3	75.6	81.2	87.4
FOLU	-113.4	-24.4	-21.6	-18.8	-15.9	-13.1	-10.3	-7.5	-4.7	-1.9	0.9	3.8
Energy	1,659.5	109.9	116.6	125.5	134.4	143.4	151.5	159.4	167.4	175.5	183.8	192.3
TOTAL:	3,340.3	212.8	228.0	243.9	262.1	280.3	297.3	314.9	333.3	352.5	372.7	393.9

Source: Philippines NDC Quick Facts, CCC

2) GHG Emission Reduction Targets

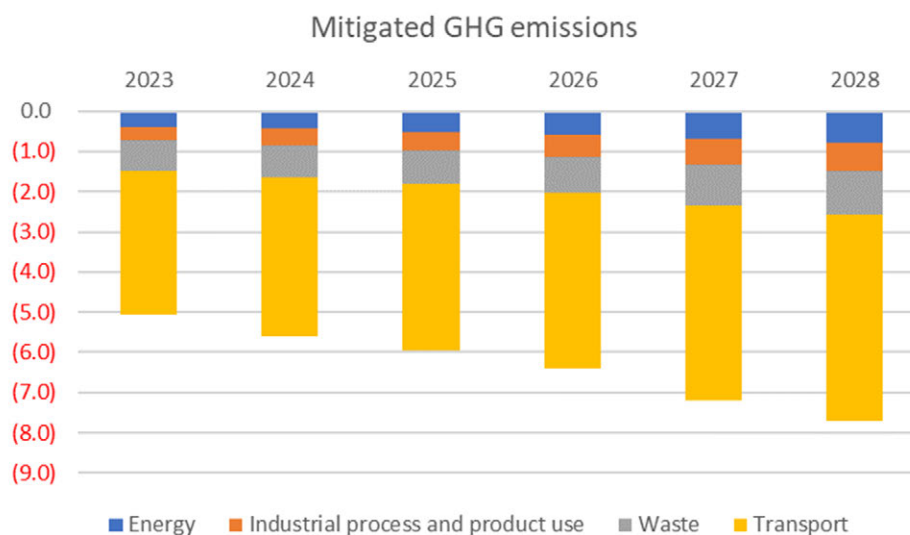
As a reduction target for GHG emissions, the Philippine government submitted an Intended Nationally Determined Contribution (INDC) to the UNFCCC in 2015, setting a reduction target of 70% of BAU, followed by the submission of the NDC in 2021. In the NDC, the Philippines set a GHG emission peak target in 2030 and an emission reduction target of 75% from 2020 to 2030 compared to the BAU. The target sectors for GHG emission reduction in the NDC are energy, transportation, agriculture, industry, and waste management, which are the five sectors with the largest GHG emissions.

Although detailed reduction targets for each sector are not specified in the NDC, the Philippine government has set GHG emission reduction targets for four sectors in the Philippine Development Plan (2023-2028) (PDP): energy, industry, waste, and transportation. The PDP sets a target of 37.9Mt-CO₂e emission reductions from BAU over the five-year period from 2023 to 2028, with the highest emission reductions in the transportation sector.

Table 2-2 Sectoral GHG Emission Reduction Targets in PDP

Sector	Base Year	Reduction target (Unit: million tons CO ₂ e)							Responsible agency
		2023	2024	2025	2026	2027	2028	EOP	
Energy	0 (2019)	0.39	0.44	0.51	0.59	0.69	0.78	3.40	DOE
IPPU		0.33	0.39	0.47	0.54	0.62	0.71	3.06	DENR
Waste		0.76	0.80	0.83	0.89	1.04	1.08	5.40	
Transport		3.58	3.96	4.13	4.37	4.86	5.14	26.04	DOTr
Total		5.06	5.59	5.94	6.39	7.21	7.71	37.9	-

Source: JICA Survey Team based on PDP 2023-2028



Source: PDP 2023-2028

Figure 2-5 Sectoral GHG Emission Reduction Targets in PDP (in Mt-CO₂e)

2.2 Analysis of Information Related to Climate Change Measures in the Philippines

2.2.1 Policies, Institutions and Budget related to Climate Change

As described above, the Philippines is one of the most vulnerable countries in the world to climate change and is ranked fourth in the world as the country most affected by extreme weather events between 2000 and 2019¹². It has been shown in the GHG inventory of 2010 that the Philippines emitted a total of 144.352 Mt-CO₂e while the FOLU sector's net sequestration 38.007 Mt-CO₂e. Although GHG emissions per capita are small, the country's overall emissions are on the rise, and the NDC has set a significant emission reduction target.

According to the 2nd National Communication of the Philippines, there are four (4) areas that are especially vulnerable to climate change and requires adaptation, which are 1) agriculture and food; (2) watersheds, including forestry, biodiversity, and water resources; (3) coastal and marine resources; and (4) human health.

With rapid population growth and social development, the impacts of climate change have been increased and significantly affected the economy and society. Therefore, over the past two decades, the Philippine Government has taken various measures such as continuing reforestation activities and rehabilitation of mangrove forests, agroforestry development, capacity building for watershed protection and alternative livelihoods, and infrastructure development for protection and efficient management of water resources, etc. Measures against weather-related disasters have also included strengthening disaster management programs, improving early warning systems, stabilizing the coastline and strengthening the livelihoods of coastal communities.

In addition to the government's efforts of promotion of climate change adaptation and mitigation measures including the formulation of relevant policies and plans, non-state actors such as local governments, the private sector, NGOs, universities, and research institutions are also making progress in addressing climate change.

The following sections illustrates the basic policies, plans, implementation structure, budgets related to climate change.

(1) Basic Policies, Plans and Targets on Climate Change

1) Climate Change Act of 2009, RA9729

The Climate Change Act was enacted on October 23, 2009, aiming to mainstream climate change into government planning and decision-making processes and to establish a framework for climate change

¹² Global Climate Risk Index 2021, Germanwatch

mitigation and adaptation in the Philippines. Through this Act, the Climate Change Commission (CCC) was established.

The Act specifies the role of CCC, in the formulation of the National Framework Strategy on Climate Change (NFSCC), the formulation of the National Climate Change Action Plan (NCCAP), and the role of the NGAs in providing technical assistance to LGUs for their formulation and implementation of the Local Climate Change Action Plan (LCCAP). The act also specifies the role of each government agency to ensure the effectiveness of the implementation of the framework and plans.

The law was amended in 2012, leading to the establishment of the People's Survival Fund (PSF) as a long-stream domestic finance for climate change adaptation projects at the local and community levels.

2) National Framework Strategy on Climate Change 2010-2022

The National Framework Strategy on Climate Change (2010-2022) was developed by the CCC in 2010 to address national commitments, vulnerability and adaptation needs to climate change, and mitigation actions. The framework “envisions a climate risk-resilient Philippines with healthy, safe, prosperous and self-reliant communities, and thriving and productive ecosystems.” It also states that the goal is “to build the adaptive capacity of communities and increase the resilience of natural ecosystems to climate change and optimize mitigation opportunities towards sustainable development.” It further states that the “national priorities, and therefore, the pillars, of the National Framework Strategy on Climate Change shall be adaptation and mitigation, with an emphasis on adaptation as the anchor strategy. Whenever applicable, mitigation actions shall also be pursued as a function of adaptation.”

The framework was made to guide the national and local development planning processes, particularly the formulation of the Medium-Term Philippine Development Plan (MTPDP), Medium Term Public Investment Plan (MTPIP), and sectoral plans. Within a year after the adoption of the framework, the National Climate Change Action Plan was formulated. The NCCAP will then guide the preparation of LCCAPs of local governments units.

3) National Climate Change Action Plan (NCCAP) 2011-2028

The National Climate Change Action Plan, developed in 2011, provides strategic direction for the period 2011-2028. The plan identifies food security, water sufficiency, ecosystem and environmental stability, human security, climate-friendly industries and service, sustainable energy, and knowledge and capacity building as priorities, as well as cross-cutting actions, implementation measures, and monitoring and evaluation. Specific activities, targets, and desired outcomes for the period 2011-2028 are specified for each of the above priority areas in the annex.

Table 2-3 Priority Areas and Target Outcomes of NCCAP

Priorities	Outcomes
1. Food security	The objective of the national strategic priority on food security is to ensure availability, stability, accessibility, and affordability of safe and healthy food amidst climate change.
2. Water sufficiency	In light of climate change, however, a comprehensive review and subsequent restructuring of the entire water sector governance is required. It is important as well to assess the resilience of major water resources and infrastructures, manage supply and demand, manage water quality, and promote conservation
3. Ecological and Environmental stability	Ecosystem resilience and environmental stability during the plan period is focused on achieving one immediate outcome: the protection and rehabilitation of critical ecosystems, and the restoration of ecological services.
4. Human security	The objective of the human security agenda is to reduce the risks of women and men to climate change and disasters.
5. Climate-friendly industries and services	NCCAP prioritizes the creation of green and eco-jobs and sustainable consumption and production. It also focuses on the development of sustainable cities and municipalities.
6. Sustainable energy	NCCAP prioritizes the promotion and expansion of energy efficiency and conservation; the development of sustainable and renewable energy; environmentally sustainable transport; and climate-proofing and rehabilitation of energy systems infrastructures.
7. Knowledge and capacity development	The priorities of the NCCAP on knowledge and capacity development are: <ul style="list-style-type: none"> • Enhanced knowledge on the science of climate change; • Enhanced capacity for climate change adaptation, mitigation and disaster risk reduction at the local and community level; and • Established gendered climate change knowledge management accessible to all sectors at the national and local levels.

Source: National Climate Change Action Plan 2011-2028

The first monitoring and evaluation of the NCCAP for the period 2011-2016 was initiated in 2017-2018 and finalized in 2019¹³. The report identified the accomplishments and also evaluated gaps under each NCCAP thematic priorities based on the following parameters:

- Governance readiness to adapt (e.g. Enabling policies and key plans and flagship programs, institutional capacity, capacity development, and knowledge management).
- Adaptation action implementation (e.g. Programs and projects, social protection, financing)
- Mitigation co-benefits
- Contributions to enhancing adaptive capacity, reducing vulnerability, and sustained development

The NCCAP M&E report puts forward the enabling policies and structure of institutions and capacity that either facilitates or impedes adaptation, implemented for climate change flagship programs and emerging best practices and programs, and the availability and or absence of knowledge management. Gaps will be

¹³ Supported by the GIZ-funded project "Support to the Philippines in Shaping and Implementing the International CC Regime (SupportCCC) Phase II

re-evaluated in the second round of monitoring and evaluation, and will be utilized for future revisions of the NCCAP.

4) Local Climate Change Action Plan (LCCAP)

Local Government Unit (LGU) is required to develop the LCCAP based on the Climate Change Act of 2009, and local governments will implement climate change countermeasures in their respective regions based on this plan. LCCAPs focus on both climate change adaptation and mitigation and show how local governments will respond to climate change impacts and integrate them into local development plans (land use plans, sectoral development plans, investment programs, etc.). In 2017, the Department of the Interior and Local Government (DILG), the Local Government Academy (LGA), and the CCC issued guidelines for the development of the LCCAP, the Enhanced LGU Guidebook on the Formulation of the LCCAP.

- Guide for Climate and Disaster Risk Assessment
 - Supplemental Guidelines for Mainstreaming CC-DRR in Comprehensive Land Use Plan
 - Guidelines on Mainstreaming DRR-CCA in the Center for Disaster Preparedness (CDP)
- Tool for Low-Emission Development Strategy - GHG inventory tool
- Climate Change Programming - CCET Analysis Tool for Provinces

However, the Climate Change Act of 2009 does not specify a deadline for the development of LCCAPs or how often they should be updated. As of December 2023, 1,484 (about 86.53%) of the 1,715 local governments nationwide have already formulated LCCAPs, while the remaining local governments have not yet submitted them. The regions with the highest number of unsubmitted reports are BARMM (Bangsamoro Autonomous Region in Muslim Mindanao), followed by Region 5 (Bicol Region), Region 7 (Central Visayas), Region 4-A (CALABARZON) Region 9 (Zamboanga Peninsula)". Reasons for not submitting LCCAPs include a limited capacity or personnel in local governments to formulate LCCAPs. In addition, some local governments are unable to participate in the training program for the use of the guidebook in developing LCCAPs due to budget shortage on traveling from remote area, and these local governments have not yet submitted their LCCAPs. Uniformity issues arise in submitted LCCAPs, including the use of unique formats and items that do not adhere to the provided guidebooks.

Table 2-4 Status of LCCAP submissions (as of July 2023)

Region	Total LGUs	Total LCCAP submitted to CCC	Percentage (%)
CAR	83	75	90.36%
Region 1	129	129	100.00%
Region 2	98	85	86.73%
Region 3	137	133	97.08%
NCR	17	15	88.24%
Region 4A	147	125	85.03%
MIMAROPA	78	78	100.00%
Region 5	120	79	65.83%
Region 6	139	129	92.81%
Region 7	136	106	77.94%
Region 8	149	134	89.93%
Region 9	75	57	76.00%
Region 10	98	95	96.94%
Region 11	54	53	98.15%
Region 12	53	47	88.68%
Region 13	77	65	84.42%
BARMM	125	67	53.60%
Total	1715	1472	85.83%

Source: NICCDIES¹⁴

5) Philippines Development Plan (PDP) 2023-2028

The country's five-year development plan, formulated in 2023, consists of an "eight-point socio-economic agenda" that aims to address both the country's short-term challenges during the period 2023-2028 and its medium-term constraints on growth and inclusion. In particular, the key issues are to stimulate job creation and to accelerate poverty reduction toward a prosperous, inclusive, and resilient society. Chapter 15 of the Development Plan, titled 'Accelerate Climate Action and Strengthen Disaster Resilience,' outlines the challenges in climate action and disaster resilience. It also delineates the desired outcomes for addressing these challenges during the plan period, which include: (a) Climate and disaster risk resilience of communities and institutions increased, (b) Ecosystem resilience enhanced, and (c) Low carbon economy transition enabled. It also sets specific GHG emission reduction targets in the energy, industry, waste, and transportation sectors as follows. It also sets specific GHG emission reduction targets in the energy, industry, waste, and transportation sectors.

¹⁴ <https://niccdies.climate.gov.ph/action-plans/local-climate-change-action-plan>, access on 6 January 2024

Table 2-5 Results Matrix to Accelerate Climate Action and Strengthen Disaster Resilience

Table 15.2 Results Matrix to Accelerate Climate Action and Strengthen Disaster Resilience

INDICATOR	BASELINE (YEAR)	TARGETS							MEANS OF VERIFICATION	RESPONSIBLE AGENCY/INTER-AGENCY BODY
		2023	2024	2025	2026	2027	2028	EOP		
Outcome 1: Climate and disaster risk resilience of communities and institutions increased										
Number of deaths attributed to disasters per 100,000 population decreased	0.446 (2021)	0.4014	0.3791	0.3568	0.3345	0.3122	0.2899	0.2899	Progress Report	Office of Civil Defense (OCD)
Number of missing persons attributed to disasters per 100,000 population decreased	0.0240 (2021)	0.0216	0.0204	0.0192	0.018	0.0168	0.0156	0.0156	Progress Report	OCD
Number of directly affected persons attributed to disasters per 100,000 population decreased	4,558.95 (2021)	4,103.06	3,875.11	3,647.16	3,419.21	3,191.27	2,963.32	2,963.32	Progress Report	OCD
Outcome 2: Ecosystem resilience enhanced										
Forest cover increased (%)	24.09 (2020)	24.53	24.83	24.84	24.95	25.13	25.23	25.23	Annual Progress Report of Agencies	DENR
Employment generated from resource-based enterprises or industries increased	2,547 (2021)	1,163	1,500	1,500	5,000	7,500	7,500	24,163	Annual Report	DENR
Outcome 3: Low-carbon economy transition enabled										
Mitigated GHG emissions increased (MtCO ₂ e)*										
Energy	0 (2019)	0.39	0.44	0.51	0.59	0.69	0.78	3.40	Unconditional Nationally Determined Contribution (NDC) policies and measures (PAM)	Department of Energy (DOE)
Industrial process and product use	0 (2019)	0.33	0.39	0.47	0.54	0.62	0.71	3.06	Unconditional NDC PAMs	DENR
Waste	0 (2019)	0.76	0.80	0.83	0.89	1.04	1.08	5.40	Unconditional NDC PAMs	DENR
Transport	0 (2019)	3.58	3.96	4.13	4.37	4.86	5.14	26.04	Unconditional NDC PAMs	Department of Transportation

* Targets are limited to the unconditional policies and measures under the Philippines' Nationally Determined Contribution.

Source: Philippines Development Plan 2023-2028

6) Nationally Determined Contribution (NDC)

The Philippines submitted its Nationally Determined Contribution (NDC) to the United Nations on April 15, 2021, in support of national development goals and priorities of sustainable industrial development, poverty eradication and inclusive growth, energy security, and social and climate justice, and to transform the socio-economic sector into a low-carbon economy that is climate and disaster resilient.

The mitigation goal is to reduce GHGs by 75% (72.29% conditional, 2.71% unconditional) between 2020 and 2030, compared to business as usual (BAU). NDC Unconditional Policies & Measures (PAMs) have also been set in the transport, energy and waste sectors to achieve unconditional targets.

For adaptation, seven priority areas under the NCCAP were set: food security, water security, ecological and environmental stability, human security, climate-smart industries and services, sustainable energy, and knowledge and capacity development.

These are consistent with the Sustainable Development Goals and the Sendai Framework for Disaster Reduction. NDC states that adaptation measures will be implemented to preempt, mitigate, and address loss and damage in the areas of agriculture, forestry, coastal and marine ecosystems, biodiversity, health, and human security. It also states that it is oriented toward access to results-based finance in forest protection, forest recovery and afforestation, and forest conservation.

(2) Implementation Structure

Climate change measures in the Philippines are being implemented by not only various central government agencies, but also local governments, universities and research institutions, the private sector, NGOs, and other non-state actors, and these various actors play different roles in the country-wide efforts to combat climate change.

1) Central Government

The table below shows some of the main central government agencies involved in climate change countermeasures in the Philippines.

Table 2-6 Major central government agencies involved in climate change in the Philippines

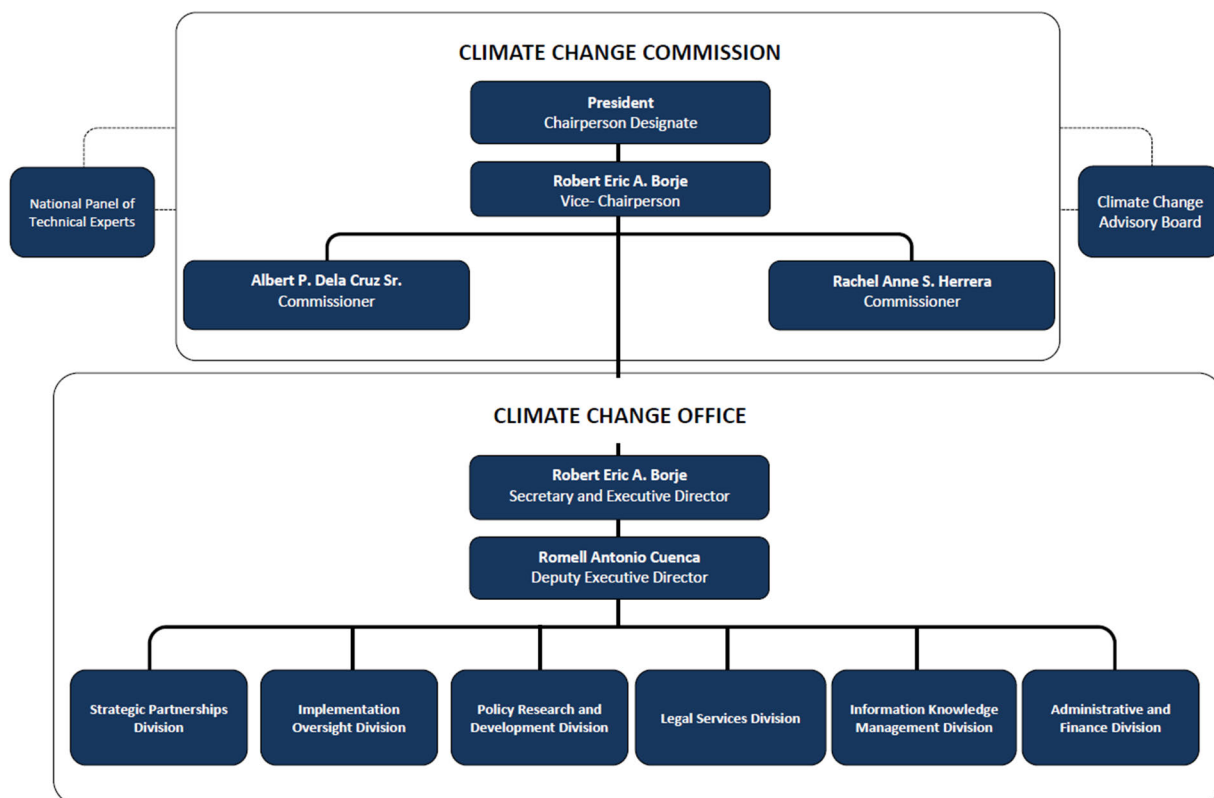
Name of department/ agency	Key areas of responsibility
Climate Change Commission (CCC)	Coordination and monitoring of cross-sectoral policy decisions, government programs and action plans related to climate change (see below for details)
Department of Agriculture (DA)	Developing, implementing and monitoring policies, plans, programs and regulations related to agriculture and fisheries
Department of Budget and Management (DBM)	Preparing government budget policy and budgeting
Department of Energy (DOE)	Preparing, integrating, coordinating, supervising and controlling all plans, programs, projects, and activities of the Government relative to energy exploration, development, utilization, distribution and conservation.
Department of Environment and Natural Resources (DENR)	Overseeing the establishment and maintenance of a climate change information management system and network, including on climate change risks, activities and investments, in collaboration with other concerned national government agencies, institutions and LGUs.
Department of Finance (DOF)	Formulate and administer national fiscal policy, manage the tax system, and manage public sector debt
Department of Foreign Affairs (DFA)	Reviewing international agreements related to climate change and making the necessary recommendation for ratification and compliance by the government on matters pertaining thereto.
Department of Health (DOH)	Developing, implementing and monitoring health-related policies, plans, programs and regulations
Department of the Interior and Local Government (DILG)	Together with Local Government Academy, facilitating the development and provision of a training program for LGUs in climate change. The training program shall include socioeconomic, geophysical, policy, and other content necessary to address the prevailing and forecasted conditions and risks of particular LGUs.

Name of department/ agency	Key areas of responsibility
Department of National Defense	Chair of the National Disaster Risk Reduction and Management Council
Department of Public Works and Highways (DPWH)	Developing, implementing and monitoring policies, plans, programs and regulations for all public utilities, including water and wastewater
Department of Science and Technology (DOST)	Technology development, collection and provision of climate and weather data
Department of Trade and Industry (DTI)	Developing, implementing and monitoring policies, plans, programs and regulations related to trade and industry
Department of Transportation (DOTr)	Developing, implementing and monitoring policies, plans, programs and regulations related to transportation
National Economic and Development Authority (NEDA)	Planning, program coordination and evaluation, coordination and monitoring of official development assistance in national and regional development
Philippine Information Agency (PIA)	Disseminating information on climate change, local vulnerabilities and risk, relevant laws and protocols and adaptation and mitigation measures
Department of Education (DepED)	Integrating climate change into the primary and secondary education curricula and/or subjects, such as, but not limited to, science, biology, sibika, history, including textbooks, primers and other educational materials, basic climate change principles and concepts.

Source: Prepared by JICA Survey Team

(a) Climate Change Commission (CCC)

Established through the Climate Change Act of 2009, the CCC is the lead policy-making body of the government with respect to climate change and is responsible for coordinating, monitoring, and evaluating the government’s programs and action plans related to climate change. The CCC is also responsible for developing and implementing the National Framework Strategy on Climate Change. The CCC is chaired by the President of the Philippines and consists of three commissioners appointed by the President, one of whom serves as the Vice Chairperson of the CCC and heads its support unit, the Climate Change Office (CCO), as Executive Director. The Climate Change Office assist in the operation and the implementation of the roles and responsibilities of the Commission in coordinating the climate change policies and programs of government agencies; proposing and developing frameworks, strategies, programs and budgets on climate change; representatives for international climate change negotiations; and providing technical assistance to relevant ministries and local governments on the development and monitoring of climate change guidelines.



Source: Provided by the CCC (January 2024)

Figure 2-6 CCC Organization Chart

The National Panel of Technical Experts (NPTE) consists of practitioners in disciplines that are related to climate change, including disaster risk reduction who provides technical advice to the CCC in climate science, technologies, and best practices for risk assessment and enhancement of adaptive capacity of vulnerable human settlements to potential impacts of climate change. As the CCC's PSF contact point, the Climate Finance System and Services unit, which is under the Vice-Chairperson, is in charge of reviewing and evaluating PSF project proposals.

Table 2-7 Jurisdiction of divisions of the CCO

Division	Responsibility
Strategic Partnership Division	Responsible for coordinating, networking and negotiating with various stakeholders and establishing partnerships in capacity building in various sectors towards achieving the outcomes identified in the National Climate Change Action Plan and the Philippine Development Plan.
Implementation Oversight Division	Provides monitoring, evaluation, and reporting support on international, national, state, and sectoral climate change measures. The following teams have been established under this division. Climate Reports Team Climate Change Adaptation Monitoring Team Climate Change Mitigation Monitoring Team Climate Change Expenditure Tagging and Climate Change-related GAA Provisions Monitoring Team National Integrated Climate Change Database and Information Exchange System Team

Division	Responsibility
Policy Research and Development Division	Spearheads the forward-looking, science-informed policy thinking and strategic direction of the commission and serves as the i) Philippine Delegation (PHLDEL) Secretariat and ii) National Panel of Technical Experts (NPTE) Secretariat.
Legal Services Division	Supports the day-to-day operations of the Climate Change Office of the CCC. Also, this division is responsible for the secretariat services of the Commission that include the following: i) Commission Secretariat, ii) CCC Advisory Board, iii) Cabinet Cluster on Climate Change Adaptation and Mitigation and Disaster Risk Reduction (CCAM-DRR).
Information and Knowledge Management Division	Provides up-to-date information on various activities and events of the Commission and the Climate Change Office through press releases, media relations, and posting to social media platforms. Also, it facilitates the annual Climate Change Consciousness Week event.
Administrative and Finance Division	Responsible for planning and executing a comprehensive range of administrative services which support office operations. These services include the areas of human resource management, records management, general services, and finance management.

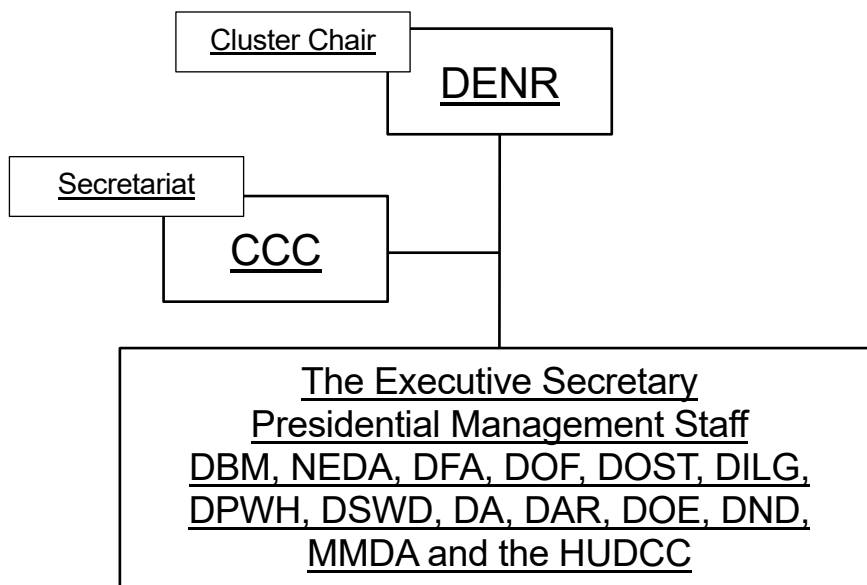
Source: CCC website

(b) Cabinet Cluster on Climate Change Adaptation, Mitigation and Disaster Risk Reduction (CCAM-DRR)

The CCAM-DRR was established through Presidential Decrees No. 43 (2011) and No. 24 (2017) in recognition of the urgent need for climate change adaptation and mitigation measures. The CCAM-DRR Cluster consists of a group of experts in climate change adaptation, mitigation, and disaster risk reduction with a focus on environmental conservation and protection of natural resources and serves as a forum for discussing interrelated issues regarding climate change and disaster risk management. It also leads the effective integration of policies and programs on climate risk management, disaster risk reduction, and sustainable development. The CCAM-DRR Cluster is chaired by the Department of Environment and Natural Resources (DENR) and co-chaired by the Department of National Defense (DND). The CCC serves as both a member agency and a cluster secretariat. The members of CCAM-DRR are the Executive Secretary, the Head of the Presidential Management Staff, the Secretaries of the DBM, NEDA, DFA, DICT, DOF, DOST, DILG, DPWH, DSWD, DA, DAR, DOE, DND, and the Chair of the MMDA and the HUDCC (Executive Order No. 24, s. 2017). The CCAM-DRR has adopted a roadmap of projects aimed at achieving climate change and disaster resilient communities that support equitable and sustainable development through the following outcomes and programs:

Improving the adaptive capacity of vulnerable communities

- Ensuring adequate supplies of clean air, water, and other natural resources
- Improving the resilience of critical infrastructure
- Strengthening access to knowledge, information, and institutional capacity



1. CCAM-DRR: Cabinet Cluster on Climate Change Adaptation, Mitigation and Disaster Risk Reduction
2. DENR: Department of Environment and Natural Resources
3. DBM: Department of Budget and Management
4. NEDA: National Economic and Development Administration
5. DFA: Department of Foreign Affairs
6. DICT: Department of Information and Communications Technology
7. DOF: Department of Finance
8. DOST: Department of Science and Technology
9. DILG: Department of Interior and Local Government
10. DPWH: Department of Public Works and Highways
11. DSWD: Department of Social Welfare and Development
12. DA: Department of Agriculture
13. DAR: Department of Agrarian Reform
14. DOE: Department of Energy
15. DND: Department of National Defense
16. MMDA: Metro Manila Development Authority
17. Housing and Urban Development Coordinating Council

Source: Prepared by JICA Survey Team

Figure 2-7 CCAM-DRR Organization Chart

(c) NDC Technical Working Group (NDC TWG)

Building on the Executive Order 174, s. 2014 (Institutionalizing the Philippine GHG Inventory and Reporting System), the NDC TWG was established as an institutional arrangement entity to formulate the NDC and to facilitate the government's related planning, investment planning, implementation, monitoring and evaluation processes. It comprises key government agencies such as CCC, DENR, DA, DOE, DOTr, DOF, NEDA, and other central government bodies involved in the NDC.

2) Local Government Unit (LGU)

In the Philippines, the Local Government Code/ Republic Act No. 7160 of 1991 (LGC/RA7160) promotes decentralization by devolving powers from the central government to local government units (LGUs). LGUs are divided into 81 provinces, 146 cities (including 33 highly urbanized cities (HUCs)), 1,488 municipalities, and more than 42,000 barangays, each of which is taking steps to address climate change. Each LGU, except for the barangays, develops an LCCAP under the Climate Change Act, and based on this plan, climate actions related to adaptation and mitigation are underway.

Since localities are directly affected by climate change, many LGUs focus on promoting adaptation measures more than GHG emission reductions, according to the submitted LCCAPs. In addition to municipal budgets, government budgets, subsidies, and PSF funds are available in some sectors, but only a limited number of LGUs are utilizing them. Mitigation efforts, on the other hand, due to budget and staffing limitations, have not progressed even in highly urbanized cities with relatively large budgets and local government staff. Quezon City, a highly urbanized city, was one of the first C40 member cities to take action on climate change and has committed to decarbonization (net-zero emissions) by 2050, ahead of the national government, and has been promoting GHG reduction efforts through various measures such as JCM projects.

In addition, in order to strengthen awareness, knowledge, and skills related to climate change countermeasures, which are lacking in LGUs, the CCC, DILG, and LGA are taking the lead in providing training on the preparation and updating of the LCCAP, as well as on climate change risk assessment, adaptation, mitigation, and GHG inventory preparation as the basis for these measures. However, due to budget shortfalls on the part of LGUs, training and guidance have not been provided to all LGUs.

3) Private Sector

The private sector is also considered as an important actor in achieving transformation in the Philippine NDC, and is promoting climate actions through the government support such as green investment promotion policies and tax incentives.

Many companies have started climate initiatives from a Corporate Social Responsibility (CSR) perspective. Many companies, mainly listed companies including conglomerate groups and foreign-affiliated companies, are engaged in energy-saving and energy-creating projects, waste reduction and recycling projects, and tree-planting projects, and these projects are reported in sustainability reports submitted to the Securities and Exchange Commission (SEC) of the Philippines. In addition, an increasing number of companies have committed to net-zero emissions by 2050, although the number is small compared to the number of companies in the country, and some companies are working to reduce GHG emissions throughout their supply chains. Although few companies are moving forward with specific adaptation measures, some companies are assessing climate change risks, including those in their supply chains.

The above efforts are mainly made by large enterprises, while small and medium-sized enterprises are not making much progress. Lack of knowledge about the disadvantages of climate change risks and the advantages of taking climate change measures, as well as the low economic efficiency of climate change measures, are barriers to their implementation.

4) Universities and Research Institutes

Some universities and research institutions in the Philippines are conducting various types of research, data preparation, and human resource development that form the basis for policy formulation and project implementation related to climate change. In addition, they are analyzing the effects of adaptation and mitigation measures, researching and developing new adaptation technologies, and promoting outreach activities to the public. Through these activities, they also contribute to the formulation of government and local government policies and plans related to adaptation and mitigation. Out of the 16 members of the National Panel of Technical Experts (NPTE) in the Philippines, 15 are affiliated with universities and research institutes in the country.

5) NGOs, etc.

There are numerous NGOs/CSOs/community groups in the Philippines that implement community-based adaptation and mitigation projects, promote environmental education, and provide human resource development and empowerment, mainly in the areas of agriculture, forestry, ecosystem conservation, waste, and small-scale renewable energy.

(3) Climate Budget

The trend of the climate change budget allocated to programs/activities/projects (PAPs) addressing climate change adaptation and/or mitigation, is illustrated in Figure 2-8. Notably, there is a significant increase in climate change-related budgets across various sectors after 2023.

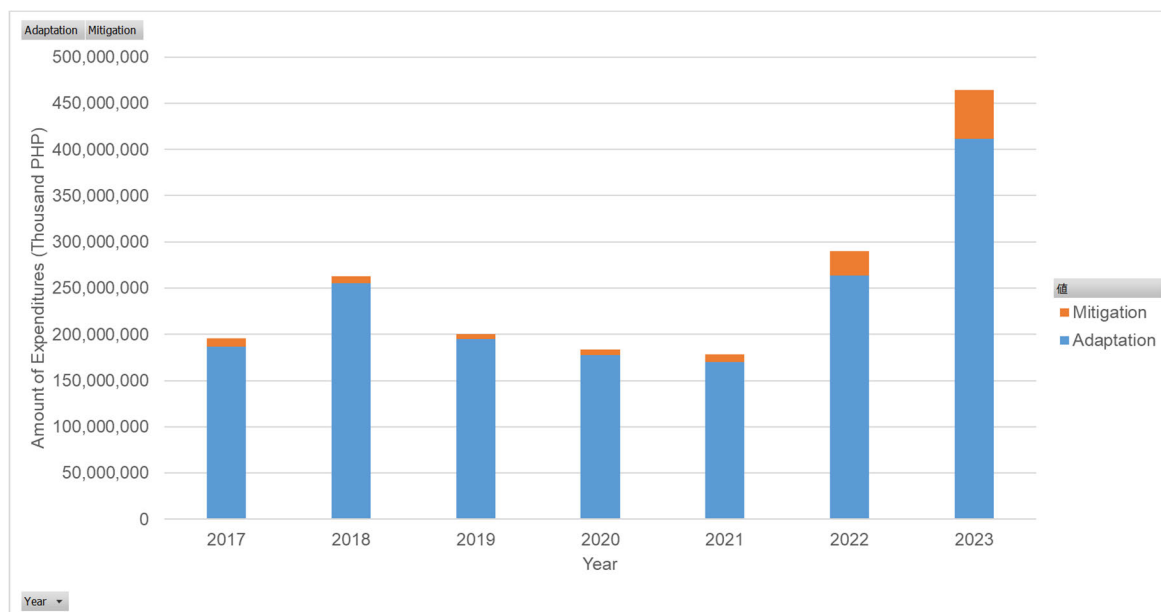
The following is a summary of the climate change budget of the Philippines for each sector.

At the General Appropriations Act (GAA) Level, the approved climate change budget was 464.50 billion PHP, or 8.82% of the national budget, which was appropriated to 120 government agencies (58 National Government Agencies, 9 Government-Owned or Controlled Corporations receiving budgetary support, 53 State Universities and Colleges) for 8,042 climate change programs, activities, and projects in FY2023.

The FY2023 budget appropriated for climate change-related expenditure is 8.82% of the total approved National Budget. This was a significant increase of 60.32% from the last FY2022 climate budget of 289 billion PHP. Of the FY2023 climate budget, 357 billion PHP was allotted for Water Sufficiency Projects such as programs mainly focused on flood mitigation. Meanwhile, 54 billion PHP is allocated to Sustainable Energy development through the improvement of traffic infrastructure and management to reduce GHG emissions per unit transported. Investments for Food Security amount to 36 billion PHP.

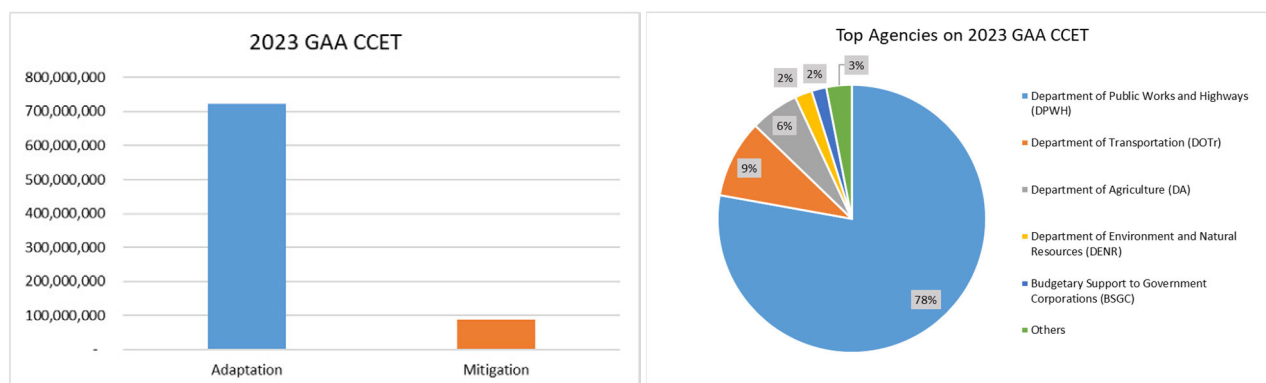
Climate change adaptation has received larger climate budget allocation than mitigation (88.53% and 11.47% in 2023, respectively) This is partly due to the government's policy of positioning climate change adaptation as a central strategy, since the Philippines has relatively low GHG emissions but is significantly affected by climate change, and partly because disaster management-related projects are also included in

climate change adaptation. Thus, most of the climate-related investments are funneled to projects for the climate-proofing of the country’s food systems, public infrastructure, and disaster risk reduction.



Note: 2017-2021 are Actual Expenditures while 2022-2023 are GAA figures.
(Created from the data of National CCET PAPs Figure 2017-2024)

Figure 2-8 Climate Change Related Budget trends (unit: thousand PHP)



Source: Philippines’ Climate Budget Brief FY2023 GAA

Figure 2-9 National Climate Change Budget for FY2022 (Unit: Thousand PHP)

Source: Philippines’ Climate Budget Brief FY2023 GAA

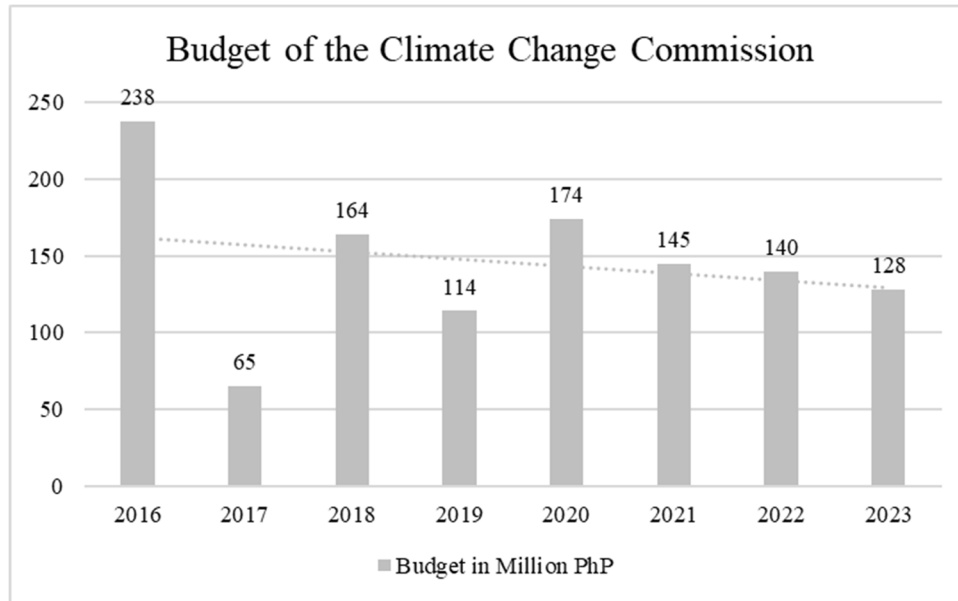
Figure 2-10 Top institutions for climate change-related budgets

Table 2-8 Climate change-related budget by department

Agency	FY 2023 CCET Allocations	% of CCET Allocations
DPWH	361,516,131	77.83%
DOTr	43,660,931	9.40%
DA	27,178,586	5.85%
DENR	9,642,174	2.08%
BSGCs	8,303,881	1.79%
Other NGAs	14,197,929	3.06%

Source: Philippines’ Climate Budget Brief FY2023-GAA Level

As for the budget allocated for the CCC, it has been decreasing since 2016 under the previous and current administration. In FY2023, 128 million PHP was allocated for the CCC.



Source: Created by JICA Survey Team from the CCC Work and Financial Plan, DBM-Approved Budget and Targets¹⁵

Figure 2-11 Trend in the Budget Allocation to CCC

¹⁵ <https://climate.gov.ph/our-story/transparency>

2.2.2 Selection of Priority Sectors

(1) Analysis for the Selection of Priority Sectors

The priority sectors to be considered for the possible cooperation programs were selected from the sectors mentioned in the NDC of the Philippines, taking into account the degree of climate action implementation in the Philippines and also the degree of supports the sector has received from JICA at present and in the past.

Regarding the status of climate action implementation in the Philippines, the importance of achieving its NDC target based on the potential GHG emission reductions and the budget allocated by the Philippine government for climate change actions were analyzed to confirm the progress and priorities of its efforts. The status of JICA's cooperations in the Philippines by sector was also analyzed, for three main support schemes namely technical cooperation, grant aid, and assistance loans from 2001 to the present. The result of analysis is as follows.

1) Importance for achieving the Philippine's NDC target

For the GHG emissions of the Philippines, the BAU scenario at the time of the NDC submission was referred to. As shown below, comparing 2020 and 2030, emissions from the energy sector have the highest emissions and the highest growth rate (75% growth). Emissions from the industrial sector (IPPU) and transportation sector are also expected to double.

For the GHG emissions reduction targets, NDC and PDP 2023-2028 were referred to. As previously described in section 2.1 and 2.2.1, the Philippines set a GHG emission reduction target of 75% between 2020 and 2030, compared to business-as-usual (BAU) in the NDC. Of the 75%, 2.71% is to be achieved solely through the efforts of the country itself (unconditional), while the remaining 72.29% is a conditional target to be achieved with financial and technical assistance from developed countries.

As for the status of climate change initiatives in the Philippines, the CCET in the government budget was referred to. As shown in the table above, the water resources sector accounts for a little more than three-fourths of the total climate budget, followed by the energy sector that includes transportation.

Incorporating climate risk information under the BUILD program, the budget of the DPWH's construction of infrastructures was increased. Investments of the water sector includes the design standards for flood control and drainage systems, and construction and expansion of water supply infrastructure.

Table 2-9 CCET as a percentage of the Philippine Government Budget

Sector	FY 2023 CCET Allocations (in thousand PHP)	% of CCET Allocations
Water Sufficiency	357,304,378	76.92%
Sustainable Energy (including sustainable transport)	54,437,573	11.72%
Food Security	36,241,179	7.80%
Ecosystem and Environmental Stability	5,652,596	1.22%
Climate Smart Industries and Services	5,429,343	1.17%
Knowledge and Capacity Development	947,799	0.81%
Human Security	3,756,166	0.20%
Cross-cutting	730,598	0.16%

Source: Filipinos' Climate Budget Brief for NEP FY2023, CCC

The analysis above confirms that, in terms of mitigation, the energy, industry, and transportation sectors are particularly important in the Philippines' climate change efforts, based on future GHG emission projections. On the other hand, with regard to the progress and priorities of climate change initiatives, the analysis of the Philippines' climate change budget confirmed that the country has been focusing more on adaptation, and in particular, the majority of the budget is for securing water resources, including flood control, and that the budget for transportation initiatives.

2) JICA's Cooperation Projects in the Philippines

Furthermore, cooperation assistance to the Philippines by JICA since 2001 was examined in terms of the number of projects and provided budgets by sector. As shown in the results below, the number of projects and budgets for cooperation in the fields of transportation, water resources, and disaster prevention constitute a large portion of JICA's support in the Philippines.

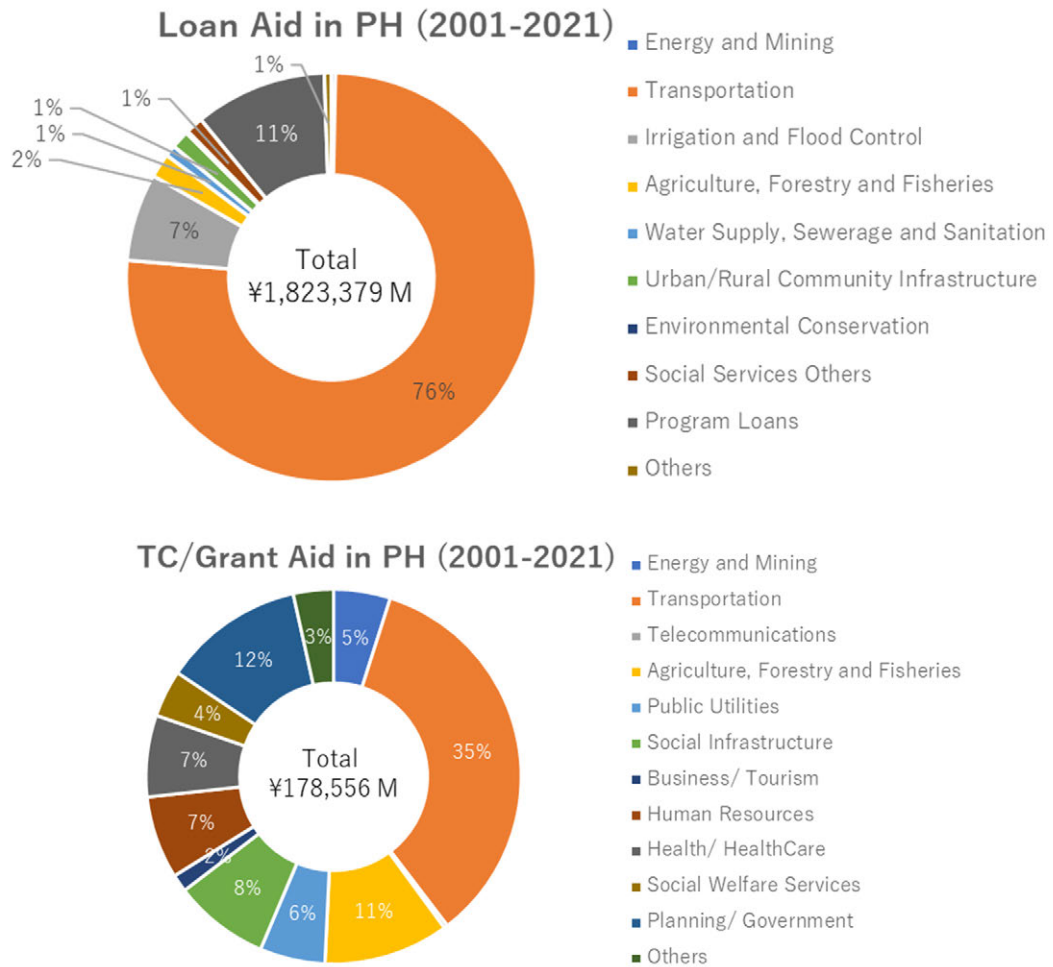
Table 2-10 Cooperation assistance of JICA by sector/scheme in number (2001-2025)

	Transportation	Water resources/DRR	Agricultural and rural development	Healthcare	Peace building, governance	Private sector development	Natural environment preservation	Environment management	Resources, energy	Urban, community development	Education	ICT	Economic policy	TOTAL
TC	15	12	6	9	7	5	3	3	1	3		1	1	64
GA	5	13	3	3	1				3	1	3	1		32
LA	31	11	9				2	1						54
Total	51	36	18	12	8	5	5	4	4	4	3	2	1	150

Source: JICA¹⁶

*TC: technical cooperation, GA: grant aid, LA: loan assistance

¹⁶ JICA Website (as of Aug 2023) <https://www.jica.go.jp/oda/regions/asia.html>



Source: JICA¹⁷

Figure 2-12 Cooperation assistance of JICA by sector/scheme in amount (2001-2021)

(2) Selected Priority Sectors

As a result of the above analysis, the Survey has selected as priority sector 1) energy, 2) industry, 3) agriculture, 4) forestry/ natural environment, 5) urban environment, which are among the sectors listed in the Philippines' NDC and are expected to require further climate efforts in the future, and 6) cross-sectoral matters related to the implementation of the Paris Agreement and private sector promotion.

¹⁷ JICA Operational Result (as of Aug 2023) <https://www.jica.go.jp/english/activities/achievement/index.html>

2.2.3 Cross sectoral Efforts Related to Paris Agreement Implementation

(1) Sector Landscape

1) Sector Status and Climate Change Impacts

The sector status and climate change impacts are described in "2.1.1 Current Status of Climate Change Risks and Future Prediction".

2) Stakeholder Analysis

The following table summarizes some of the key stakeholders in the Philippines involved in the implementation of the Paris Agreement and climate change countermeasures.

Table 2-11 Stakeholders in the Paris Agreement Implementation

Name of organization	Role and responsibilities
National level	
Climate Change Commission (CCC)	Primary government body responsible for coordinating, monitoring, and evaluating programs and action plans related to climate change. It was established under the Climate Change Act of 2009 (Republic Act 9729).
Department of Environment and Natural Resources (DENR)	Primarily involved in implementing climate change policies and programs, including those related to emissions reduction and environmental protection.
Department of Finance (DOF)	Primarily involved in shaping fiscal policies, budget allocations, and financial mechanisms to support climate change mitigation and adaptation efforts
Department of Energy (DOE)	Primarily involved in efforts related to climate change mitigation, particularly energy-related policies and initiatives
Department of Agriculture (DA)	Primary involved in sustainable agricultural practices and initiatives that contribute to climate resilience. Focuses on promoting climate-smart agriculture and sustainable farming practices
Department of Transportation (DOTr)	Involved in initiatives related to transportation sector emissions and mitigation strategies
Department of Science and Technology (DOST)	Primarily involved in scientific research and technology development on climate change. Providing data and information for climate change planning and adaptation
Department of the Interior and Local Government (DILG)	Collaborating with LGUs to mainstream climate change into local government; supported development and implementation of LCCAP
National Economic and Development Authority (NEDA)	Playing a role in integrating climate change issues into the national development planning process
Department of Public Works and Highways (DPWH)	Playing a role in climate change resilience by designing and constructing infrastructure to withstand extreme weather events, implementing flood control and drainage systems, and enforcing building standards for climate resilience.
Department of Health (DOH)	Playing a role to address climate change by implementing health adaptation strategies, conducting public health campaigns, and enhancing disaster preparedness and response
National Disaster Risk Reduction and Management Council (NDRRMC)	Primarily focusing on disaster risk reduction, and with an important role in addressing climate change impacts related to extreme weather events and disasters. The organizations such as Office of President, Office of the Vice President, Department of National Defense, DILG, Department of Social Welfare and Development, DOH, DOF, DOST, DOTr, DENR are involved.
Nationally Determined Contribution- Technical Working Group (NDC-TWG)	A technical body established to facilitate coordination and cooperation among the various government agencies and stakeholders involved in the formulation and strengthening of NDCs. The organizations such as CCC, DENR, DOE, DA, DOTr, DOST, DOF are involved.

Name of organization	Role and responsibilities
PSF Board	Managing the People's Survival Fund, which funds climate change adaptation projects in vulnerable communities. DOF is the secretariat, comprising CCC, DBM, and NEDA.
Local level	
Local Government Units	Developing and implementing LCCAP and implemented projects to increase rural resilience
Financing	
International donors	International organizations such as WB, UNDP, ADB, FAO, UNEP, GCF Bilateral cooperative organizations such as Ministry of the Environment of Japan and GIZ

The following sections will provide detailed information on efforts related to Paris Agreement implementation, focusing on the three subsectors of common sectoral matters, mitigation, and adaptation.

(2) Common sector

1) Relevant Policies and Plans

(a) Paris Agreement

The Paris Agreement is described in Section 2.1.2 (1) International Trend.

(b) Domestic Climate Change-related Policies and Plans

a) NCCAP

Information on the NCCAP is described in 2.2.1 (1) Basic Policies, Plans and Targets on Climate Change.

b) Climate Change Expenditure Tagging (CCET)

CCC has a jurisdiction to track, monitor, and report on climate change-related expenditures and investments in the annual budgets of each implementing agency over the CCET system. The CCET was introduced in 2013 by the Joint Memorandum of Understanding Circular No. 2013-01 issued by CCC and the Department of Budget and Management (DBM) to check how much of the national budget is spent on climate change-related initiatives. The CCET categorizes climate change-related expenditures into four categories as below.

- Mitigation: activities that reduce/ control GHG emissions or enhance carbon sinks
- Adaptation: activities that help communities cope with the impacts of climate change
- Resilience: activities that help communities withstand the impacts of climate change
- Cross-sectoral: activities that support both mitigation and adaptation, such as research and development, capacity building, and public awareness

The CCET system monitors the climate change budgets and investments of national government agencies, state universities and colleges, local government units, and government-owned and managed corporations. The CCET, submitted annually, enables the tracking of tagged budgets, distinguishing between mitigation and adaptation actions based on the seven thematic priorities outlined in the NCCAP. It provides insights into the specific sub-issues addressed under each thematic priority and the means of implementation for each budget allocation.

c) LCCAP

Information on the LCCAP is described in 2.2.1 Policies, Institutions and Budget related to Climate Change.

2) Implementation Status and Issues of Climate-related Measures

(a) Implementation Status of Paris Agreement

As mentioned in previous sections, the CCC is the main agency for the development of policies and oversight of activities related to the implementation of the Paris Agreement and other climate change matters. This section focuses on the measures and actions implemented solely or mainly by the CCC.

The following outlines the current status of the development and submission of documents required for submission to the UNFCCC Secretariat, in connection with the Paris Agreement and other climate change initiatives.

Table 2-12 Status of submission of relevant documents of the Paris Agreement

Title	Status	Basis
National Communication (NC)	National Communication 1 (NC1): submitted in 2002 National Communication 2 (NC2): submitted in 2015	UNFCCC, Article 4 and Article 12 Required to prepare every 4 years (UNFCCC, Decision 9/CP.16)
Nationally Determined Contribution (NDC)	Intended Nationally Determined Contributions ¹⁸ : submitted in 2015 Nationally determined Contribution: submitted in 2021	UNFCCC, 1/CP.21 PA Article 4 Required to prepare every 5 years (PA Article 4)
Long-term low greenhouse gas emissions development strategies	Not developed yet	PA Article 4 Required to prepare by Nov. 2024 (UNFCCC, Decision 1/CMA5)
Biennial Update Report (BUR)	Not submitted yet	PA Article 13 Required to prepare every 2 years (UNFCCC, Decision 2/CP.17)
Biennial Transparency Report (BTR)	Not submitted yet	PA Article 13 Required to prepare in every two years, with the first submission due by 31 December 2024

a) National Communication (NC)

As a signatory Party to the UNFCCC, the Philippines is required to submit NC to the Secretariat of the Convention every (4) four years, subject to the provisions of means of implementation. In accordance with this, the Philippines has submitted two NCs (NC1 and NC2), in 2000 and 2014 respectively, to the UNFCCC secretariat.

¹⁸ 1/CP.19, paragraph 2(b)

The NC1 report indicates that the country's GHG emissions in 1994 were 100.738 Mt-CO₂e, comprising 100.864 Mt-CO₂e from four sectors (energy, industry, agriculture, and waste) and GHG absorption in the land-use change and forestry sectors (-0.126 Mt-CO₂e). The report also projects a forecasted increase of 94% or 4.8% per year over the 14-year period, estimating GHG emissions in 2008 to reach 195.091 Mt-CO₂e from the five sectors. In addition, the report illustrates the impacts of climate change on various sectors, including agriculture, water resources, coastal areas, forests, and health. It underscores the imperative for adaptation measures and the necessity to mitigate GHG emissions, particularly in the energy, transportation, and agriculture sectors. NC1 was developed with support from the Global Environment Facility (GEF).

The NC2 reports GHG emissions as of 2000 as 21.767 Mt-CO₂e (the sum of GHG emissions from four sectors: energy, industry, agriculture, and waste 0.126 Mt-CO₂e - and GHG absorption in the land use change and forestry sectors – 105 Mt-CO₂e). It further describes vulnerabilities and adaptation measures in key sectors such as agriculture, forestry, biodiversity, water resources, coastal and marine areas, and health, addressing the impacts of climate change. Additionally, the report includes GHG emission projections up to 2020, outlining corresponding mitigation measures. As same to the NC1, the NC2 was developed with support from the GEF.

As mentioned earlier, no new reports have been submitted since the second report in 2015. The NC serves as a comprehensive report detailing the country's climate change impacts and the status of its mitigation and adaptation efforts. The Biennial Transparency Report (BTR), mandated by the Paris Agreement, also addresses similar aspects. Consequently, the status and findings presented in the NC can be viewed as foundational to the development of the BTR.

One reason for the delay in formulating and submitting NCs is the delayed submission of data and information from the agencies involved in the process. Another issue is the shortage of measures in place to encourage action to formulate and submit the proposal, as well as measures to deal with the delay on submission.

The CCC encounters challenges in human resources and budgetary constraints. As of October 2023, the CCC operates with a staff of 84 members, including 34 technical staff, with the remainder comprising administrative and management personnel. In addition, it was confirmed through the interview survey that some of those technical staff members would need enhancement of technical, administrative and management skills to better support the coordinative role of the Commission.

In terms of budget, the preparation of documents for submission to international organizations needs financial support from donors and obtaining such support would be significant challenge.

b) NDC Preparation and NDC Implementation Plan

As a party to the UNFCCC, the Philippines has submitted its NDC to the UNFCCC Secretariat on April 15, 2021. The submitted NDC sets a mitigation goal of achieving a 75% reduction in GHG emissions between 2020 and 2030 compared to the BAU scenario. Additionally, it sets an adaptation goal, focusing on the implementation of adaptation measures in sectors such as agriculture, forestry, coastal and marine ecosystems, biodiversity, health, and human security.

The CCC led and coordinated the process of formulating and finalizing the Philippine NDC in accordance with its obligations under the Climate Change Act and the General Appropriations Act with the technical assistance provided by ADB and UNDP, also with the collaboration with the NDC-TWG. Below is the flow for the NDC development.

1. Vetted sectoral mitigation options by DA, DENR and DOTr for NDC target consideration;
2. Facilitated the provision of technical assistance to:
 - NEDA for the Economy-wide analysis and Emission-Scenario Building Study which yielded long-term GDP and Gross Value Added (GVA) projections used in sectoral models for NDC analysis;
 - DA for the development of the model for the agriculture sector's mitigation and adaptation analysis.
3. Coordinated with various development partners for the implementation of the NDC;
4. Consolidated sectoral GHG inventory reports and drafted an Executive Summary of the 2010 GHG Inventory which served as basis for NDC calculations;
5. Drafted the NDC for submission to the UNFCCC.

(Source: CCC HP¹⁹)

The CCC, in coordination with DENR and NDC-TWG, is finalizing the NDC Implementation Plan (NDCIP)²⁰ to outline how the NDC will be considered, reflected, and mainstreamed into the planning processes, policies, and development pathways of the Philippine government. Further, it provides a detailed account of key actions, phasing, costs, and implementation arrangements for delivering the Philippines' NDC under the identified policies and measures (PAMs) in the transport, energy, waste, industry, and agriculture sectors. The development of the NDCIP is supported by and with assistance from the Asian Development Bank (ADB), UNDP through the NDC Support Project for the Philippines, with CCC's budget primarily allocated for stakeholder meetings and consultations.

¹⁹ <https://climate.gov.ph/our-programs/nationally-determined-contributions>

²⁰ The document has not been published as of early January 2024.

c) Long term low-emission development strategy

The Paris Agreement states that all parties should make their effort to develop and submit a long-term low emission development strategy (LTS). With a perspective extending beyond 2050, the LTS aims to guide future development planning, providing insights into the innovations and investments necessary for a transformative approach to decarbonization and addressing climate change.

The ADB and AFD will provide technical assistance in the formulation of the LTSs under the Programmatic Approach and Policy-Based Loan. In addition, the Ministry of the Environment of Japan will provide support for the use of the AIM (Asia-Pacific Integrated Model) in the simulation of future climate projections in the development of the LTS. At this time, a specific timeline for the development of the LTS has not been determined.

d) Biennial Update Report (BUR)

The Biennial Updated Report (BUR) is required to be submitted by parties to the UNFCCC. Developing countries, including the Philippines, are allowed flexibility based on their capacity and level of support for the report. However, the initial BUR was to be submitted by December 2014. However, the Philippines has never submitted a BUR. The following items are required to be reported in the BUR:

- Information on national circumstances and institutional arrangements related to the preparation of ongoing NC
- National GHG inventories
- Information on mitigation actions and their effectiveness
- Information on financial, technical, and capacity-building requirements and support received for climate change action
- Information on support received for the preparation and submission of BURs
- Information on national MRV

As with issues related to NCs (See 2.2.3 2) 2) a) I, there is a need for measures to address institutional, human resource, and budgetary challenges and to enhance the CCC's role as a coordinating body. The draft has already been prepared and is currently undergoing vetting and finalization and will be submitted to the UNFCCC by March 2024.

e) Biennial Transparency Report (BTR)

The Paris Agreement stipulates the formulation of a Biennial Transparency Report (BTR) as one of the transparency frameworks common to all parties, eliminating differences between developed and developing countries. The BTR is to report on national GHG inventories, progress toward reduction targets, and assistance provided to developing countries. The CCC has confirmed that it is currently taking the lead in negotiations with donors and other parties that will support the formulation of the BTR. The development

of the BTR will be funded by the GEF with technical support from FAO, and it is planned to begin in February 2024

(b) Domestic Climate Change-related Policies and Plans

a) NCCAP Monitoring and Evaluation (M&E)

The NCCAP, developed in 2011, outlines the country's climate adaptation and mitigation agenda for the period 2011-2028. CCC is responsible for facilitating the monitoring and evaluation of the NCCAP and determining the progress of implementation toward achieving the plan's objectives. CCC is currently conducting its second cycle of monitoring covering the 2017-2022 period. This is to assess the government's climate change measures, fill gaps and challenges identified during the first NCCAP M&E report in 2019 and make recommendations on how to move forward. A series of initial data gathering and validation meetings with concerned government agencies were conducted in 2023 to cover the periods 2021-2022.

The NCCAP M&E team received support from other technical teams under the IOD, such as the CCET Helpdesk, Climate Change Mitigation, and the Climate Reports team). Activities were funded through the regular fund of the CCC.

After finalizing the NCCAP monitoring report for FY 2017-2022, the CCC plans to undertake an M&E exercise to assess progress toward achieving the objectives and outcomes of the NCCAP. As such, assistance from development partners and consultants will be explored.

b) CCET

Climate-related budgets are described in the section 2.2.3(2) 1) (b) b) Climate Change Expenditure Tagging (CCET).

c) Assistance in Formulating LCCAPs

CCC provides technical assistance to LGUs in developing and strengthening LCCAPs, which are primarily roadmaps for climate change adaptation, as well as climate change mitigation, at the local community level. The budget is funded by the CCC budget and supported by Strategic Partnership Division (SPD) and Implementation Oversight Division (IOD). The budget is funded by the CCC budget and supported by the divisions, units, and officers of the Climate Change Office. The target area is all LGUs in the country. The CCC is conducting capacity building activities as programmed in its work and financial plan and on demand-driven basis response to external requests.

From the above, it has been confirmed that there are institutional and human resource challenges in promoting climate change measures, as detailed below. The challenges and the direction of support are summarized in Table 2-14.

- Needs to strengthen systems that contribute to ensuring transparency, such as systems and regulations for collecting data and information from relevant organizations necessary for the formulation of information and documents (NC, BUR, and BTR) to be submitted to the UNFCCC,
- Needs to increase the number of technical staff to handle the responsibilities and workload of the CCC, and
- Needs to strengthen knowledge and expertise among CCC staff on climate change, to improve external coordination and management capacity.

3) Status of Donor Support

Cross-sectoral climate change-related supports that the Philippines is currently being implemented or considered with donors and partners are as below.

Table 2-13 Status of donor support (Paris Agreement implementation)

Partner Organization	Project Name and Details	Implementing Agency	Status
WB	Project Name: Policy loan on climate change (Philippines First Sustainable Recovery Development Policy Loan) Implementation period: 2023- Activity Objective/Description: This loan amounts to US\$750 million in budget support under the Philippines' first Sustainable Reconstruction and Development Policy Loan (DPL) to support policy reforms in the country aimed at increasing environmental protection and climate change resilience.	DOF	Under Implementation
ADB, AFD	Project name: Programmatic Approach and Policy-Based Loan Implementation period: 2020-2024 (Subprogram 1: 2020-2022, Subprogram 2: 2023-204) Activity Objective/Description: The first climate change policy-focused policy loan (Subprogram 1: 250 million USD, Subprogram 2: 400 million USD) is implementing in coordination with ADB and AfD to support the implementation of national climate change policies, including NDCs. The aim is to expand efforts in climate change adaptation, mitigation, and disaster resilience in the Philippines. Indicators are set for three areas (Planning, financing, and institutional linkages for climate action strengthened, Resilience to climate impacts enhanced and Low-carbon pathways strengthened), and loans will be disbursed according to the achievement of the indicators. Indicators for each of these areas are listed below. < Planning, financing, and institutional linkages for climate action strengthened> - At least 20% of sector agencies' expenditures (including gender-sensitive activities) are climate-tagged - 10% of policies and measures supporting NDC - 50% of short-term activities in the NDC Gender Action Plan under implementation	DOF, Bangko Sentral ng Pilipinas, CCC, DA, DBM, DENR, DOE, DOF, DOTr, ERC, LLDA, NEDA, Public-Private Partnership Center	Under Implementation

Partner Organization	Project Name and Details	Implementing Agency	Status
	<ul style="list-style-type: none"> - Number of LGUs with Energy Efficiency and Conservation Officers increased to 1,032 - At least \$1.5 billion raised through issuances of green, climate, or sustainable sovereign bonds - 100% of domestic, universal, and commercial banks report to BSP on climate and other environmental and social risk exposure and management strategies - At least \$3.0 billion of climate-related development finance from bilateral and multilateral providers committed for activities in the Philippines <p>< Resilience to climate impacts enhanced ></p> <ul style="list-style-type: none"> - 4 million farmers and fisherfolk have access to inclusive climate services - 6 climate-proofed protected area management plans adopted - At least one parametric insurance product developed - 3 organic agriculture hubs covering crops, livestock, and/or fisheries, with 30% participation of women farmers, established - 5 new research projects on developing new climate-smart technologies implemented in public research institutions <p>< Low-carbon pathways strengthened ></p> <ul style="list-style-type: none"> - 26.1% of total electricity generation originated from renewable energy - Construction of the first commercial-scale FPV commenced - First city or municipality electric bus system procured, incorporating inclusive design 		
Department of the Environment Japan	<p>Cooperation on long-term low greenhouse gas emission development strategies (LTS) Period of implementation: Not decided yet Purpose/Description of Activity: Technical cooperation to contribute to the development of long-term strategies (technology transfer related to the use of the AIM model) is planned. Details will be discussed in the future.</p>	CCC	Under Development
GEF/FAO	<p>Project name: Support for BTR development Implementation period: After February 2024 Activity Objective/Description: Funding support (120 million USD) from GEF is being requested to support the development of BTR1 and BTR2 with the support of FAO</p>	CCC	Under Development

Source: JICA Survey Team

(3) Mitigation

1) Relevant Policies and Plans

(a) **Institutionalizing the Philippines greenhouse gas inventory management and reporting system (PGHGIMRS)**

The Executive Order (Executive Order No. 174) issued by the President in 2014 to institutionalize the Philippine GHG inventory management and reporting system specifies the responsibilities of the CCC,

roles of key agencies, and budget for institutionalizing the GHG inventory management and reporting system in the Philippines. The CCC's responsibilities include the following;

- Provide direction and guidance on the accounting and reporting of GHG emissions from major sources for the acquisition and management of centralized, comprehensive, and integrated data on GHG
- Establishment of GHG inventory storage, reporting, monitoring, and evaluation systems covering key sectors
- Presentation and promotion of ongoing capacity-building initiatives and application of state-of-the-art methods for maintaining GHG inventories

In the Order, the following agencies are designated as key agencies and are required to develop and maintain GHG inventories and report to the CCC. It also states that the PSA will support the development of GHG inventories by agencies of each sector.

- Agriculture Sector: DA, PSA
- Energy Sector: DOE
- Waste, Industrial Processes, Land Use, and Forestry Sector: DENR
- Transportation Sector: DOTr

2) Implementation status and issues of climate-related measures

Within the CCC-CCO, the Policy Research and Development Division, Strategic Partnership Division, and the Implementation Oversight Division play a central role in climate change mitigation.

(a) Development of the national GHG inventory

Pursuant to Presidential Decree No. 174, which institutionalized the Philippine National GHG Inventory Management and Reporting System (PGHGIMRS), the CCC leads the development of a national GHG inventory and is responsible for the following. The latest national GHG inventory as of February 2024 is the 2020 GHG inventory.

- Providing direction and guidance in the accounting and reporting of GHG emissions
- Developing systems for GHG inventory storage, reporting, monitoring, and evaluation
- Providing ongoing capacity building initiatives
- Conducting national GHG inventory Quality Assurance/Quality Control (QA/QC)

Currently, a national GHG inventory using 2015 and 2020 data is developed and released to the public. The challenges experienced in developing the national GHG inventory is attributed to the limited resources in terms of technical capacity, priorities of the administration, human workforce among others. On the other hand, there is an issue with the continued use of Tier 1 level methods, involving default values predetermined by IPCC guidelines, for both activity data and emissions/removals estimates used in

developing GHG inventories. It is desirable to transition to the use of more advanced Tier 2 level methods. The CCC needs to establish measures, systems, and structures that contribute to the collection, organization, and analysis of information and data from related organizations.

(b) Support local government in GHG inventory development

CCC collaborates with the DILG and Local Government Academy (LGA) to promote the development of GHG inventories by LGUs and the formulation and updating of LCCAPs. Additionally, CCC develops tools for GHG inventory development and conducts seminars to promote their effective use. Nevertheless, the development of GHG inventory by LGUs is still considered a work in progress in many LGUs²¹. This is partly due to a shortage of clear policies, understanding by LGUs on the significance and necessity, as well as the benefits and incentives associated with GHG inventories. In addition, challenges include staffing constraints and the capacity of LGUs officials to undertake GHG inventory development. Moreover, the rules and regulations for updating and strengthening LCCAPs by LGUs have not been clearly defined or reinforced, and their enforcement has proven ineffective. To encourage the development of GHG inventories by LGUs, there is a need to enhance the understanding of LGUs officials regarding the necessity for such inventories, improve their capacity, and establish the necessary rules and regulations for data maintenance.

(c) Carbon Neutral Program Convergence

The Carbon Neutral Program Convergence aims to promote carbon neutrality using nature-based solutions through afforestation activities in cooperation with the DENR, the Professional Regulation Commission, and the Society of Filipino Foresters, Inc. It is also aiming to implement a reforestation project as a pilot project toward carbon neutrality and to encourage other government agencies to take the same approach toward carbon neutrality.

(d) Carbon Pricing Instruments²²

The Philippine government is considering introducing carbon pricing instruments, but no national carbon pricing policy or program has been formally implemented.

As part of its commitment to addressing climate change and reducing GHG emissions, the government is considering various options, including a carbon tax and a cap-and-trade scheme. On January 16, 2024, a DOF-led “Technical Working Group for the Preparation of Carbon Pricing Instruments in the Philippines” (chaired by DOF, with CCC, NEDA, DOE, DENR, DOTr, and DTI as members), in which the development

²¹ Only two of the seven provincial government LCCAPs available via the Internet as of September 2023 contained information on GHG inventories: Quezon city, Aurora province.

²² A policy vehicle, implemented through a legal and institutional infrastructure, that can deliver a price on carbon emissions on specific sectors and/or entities. (e.g., ETS, Carbon Taxes)

of a carbon tax and emissions trading system (ETS) was advocated as an important step toward achieving a low-carbon economy.

From the above, it has been confirmed that there are institutional, human resource and technical challenges in promoting climate change measures, as detailed below. The challenges and the direction of support are summarized in Table 2-17.

- Needs to develop/improve systems that contribute to ensuring transparency, such as those involving regulations for consolidating data and information necessary for the preparation of GHG inventories from relevant organizations,
- Needs to strengthen understanding and capacity among LGUs officials concerning climate change issues, GHG inventory development, updating LCCAP, and calculating GHG emission reductions from mitigation measures,
- Needs to improve methods and tools for estimating GHG emission reductions resulting from the implementation of mitigation measures, and
- Needs to improve operability of tools used for GHG inventory development,

3) Status of Donor Support

Mitigation supports that the Philippines is currently receiving from donors and partners include that from the UNDP.

Table 2-14 Status of donor support (Paris Agreement implementation: mitigation)

Partner Organization	Project Name and Details	Implementing Agency	Status
UNDP	<p>Project Name: Carbon credits/trading scheme development Implementation period: August 2023 - December 2023 Activity Objective/Description:</p> <p>1. Review of DENR's policy, Carbon Accounting, Verification, and Certification System (CAVCS), to update existing carbon accounting methodologies, etc. As specified in CAVCS to meet international standards;</p> <p>2. carbon trading roadmap: a feasibility study (F/S) will be conducted to develop a framework for carbon trading implementation. Blue carbon is also subject to F/S.</p> <p>3. Carbon Finance Assessment: Investigate whether taxes can be imposed on the sale of carbon credits in other countries. Necessary policy incentive mechanism studied.</p>	DENR	Under Implementation
WB	<p>Project name: Partnership for Market Readiness Implementation period: 2013- Activity: Studying the potential of carbon pricing instruments in the Philippines and conducting assessments and simulations on the impacts of various options, including the use of emissions trading schemes and the combination of emissions trading schemes and carbon taxes.</p>	DOF	Under Implementation

(4) Adaptation

1) Relevant Policies and Plans

(a) Implementation Status of Paris Agreement

a) National Adaptation Plan (NAP)

The UNFCCC established the National Adaptation Plan (NAP) process in 2010 which sets the enabling environment for Parties to formulate and implement NAPs as a means of identifying medium- and long-term adaptation needs and developing and implementing strategies and programmes. The following elements were identified as the building blocks of the NAP process contained in the initial guidelines for developing NAPs given in the annex to decision 5/CP.17:

- Element A: Lay the groundwork and address Gaps
- Element B: Preparatory Elements
- Element C: Implementation strategies
- Element D: Reporting, monitoring and review

(b) Domestic Climate Change-related Policies and Plans

a) Philippines Strategy on Climate Change Adaptation (2010)

GIZ helped develop this adaptation strategy through the “Adaptation to Climate Change and Conservation of Biodiversity in the Philippines (ACCBio)” program (2008 - 2011) funded by the German Federal Department for the Environment, Nature Conservation and Nuclear Safety and Consumer protection (BMUV). The strategy outlines the impacts of climate change in the Philippines and identifies agriculture, coastal and marine resources, water resources, human health, and infrastructure as priority areas for adaptation. It also includes gender, inequality, and capacity building as some cross-cutting issues to be addressed to effectively adapt to climate change.

b) National Climate Risk Management Framework (NCRMF)

As a national policy, Climate Change Commission Resolution No. 2019-00119 on the National Climate Risk Management Framework (NCRMF) aims to provide evidence-based guidance to the public sector to undertake risk profiling, assessment, and management needed to increase the adaptive capacity of communities through technology development and transfer and capacity building, utilizing probabilistic risk assessment methods to consider future scenarios on impacts. The over-all goal of this initiative is to climate proof all sectors and political levels of Philippine society such that losses from climate hazards are manageable and the country can steadily move forward in a sustainable manner.

The Resolution outlines the following imperatives to achieve the target outcomes of the NCRMF, taking into account the needs of local communities, indigenous peoples, youth, and vulnerable communities and sectors: (1) Promotion of multisectoral and multi-stakeholder activities of national government agencies (NGAs) and local government units (LGUs); (2) Probabilistic climate risk assessment (PCRA); (3) Climate risk evaluation; (4) Climate risk management action formulation.

The Resolution directs the immediate conduct of stocktake of existing government actions, including, but not limited to, the consideration of the review of climate risk information from such processes as the Climate and Disaster Risk Assessments (CDRAs) of local government units (LGUs) for their Comprehensive Land Use Plans (CLUPs).

c) NCCAP

Information on the NCCAP is described in Section 2.1.2 (1) International Trend.

d) LCCAP

Information on the LCCAP is described in Section 2.1.2 (1) International Trend.

e) People's Survival Fund Act (RA10174)

Republic Act No. 10174 created the People's Survival Fund (PSF) as a long-stream finance facility for climate change adaptation projects proposed by local government units and local / community organizations. Types of projects that may be supported by the PSF may focus on the areas of water resource management, land management, and sectoral adaptation in agriculture and fisheries, health, infrastructure, and natural ecosystems.

The key provisions of the PSF Act include:

- The PSF is a special fund in the National Treasury.
- The annual appropriation for the PSF shall be at least 1 billion PHP.
- The PSF Board shall be composed of the Secretary of Finance (Chairperson), the Secretary of Environment and Natural Resources, the Secretary of Budget and Management, and the Chairperson of the Climate Change Commission.
- The PSF Board shall develop a set of guidelines for the use of the PSF.
- The PSF shall be used to support adaptation activities of LGUs and accredited local/community organizations.
- The PSF Board shall monitor the implementation of the PSF and ensure that the funds are used effectively.

The PSF Board is comprised of the following:

- Secretary of the Department of Finance (DOF) as Chair
- Vice Chairperson of the Climate Change Commission (CCC)

- Secretary of the Department of Budget and Management (DBM)
- Director-General of the National Economic and Development Authority (NEDA)
- Secretary of the Department of the Interior and Local Government (DILG)
- Chairperson of the Philippine Commission on Women (PCW)
- Representative from the academe and scientific community
- Representative from the private business sector, and
- Representative from the non-government organizations

By law, the PSF Board develops policies and mechanisms for the appropriate use of the Fund, approves project proposals, and issues calls for proposals, among others.

Administrative matters on PSF are facilitated by the PSF Board Secretariat, currently lodged in the DOF. The Development Bank of the Philippines (DBP) serves as the technical assistance arm of the PSF Board Secretariat.

Likewise, the Climate Change Office (CCO) of CCC has the following roles in mobilizing the PSF:

- Evaluate and review project proposals, and recommend approval of project proposals to the PSF Board
- Formulate mechanisms towards transparency and public access to information on the Fund, and
- Develop guidelines to accredit L/COs (Local/Community organizations)²³ to access the Fund

2) Implementation Status and Issues of Climate Change Measures

Within the CCC, the Strategic Partnership Division, Implementation Oversight Division, Policy Research and Development Division, Information and Knowledge Management Division and Climate Finance Systems and Services are involved in climate change adaptation.

a) National Adaptation Plan (NAP)

The Government of the Philippines, through the CCC, in coordination with the DENR and with support from the United Kingdom's Foreign, Commonwealth and Development Office (UK-FCDO) / British Embassy Manila (BEM), is in the process of finalizing its NAP. The Boston Consulting Group served as the technical partner of the UK-FCDO / BEM developed a multi-hazard, multi-sectoral NAP that will guide the prioritization of actions at the national level (including sectors and regions). Inclusive multi-stakeholder consultations towards fit-for-purpose climate risk management were conducted which involved national government agencies, academic institutions, and local government units, among others, from Luzon, Visayas, and Mindanao.

²³ Local/Community Organizations are eligible to access the Fund upon validation of their Certificate of Accreditation under DILG Memorandum Circular 2013-70 or DSWD-DBM-COA Joint Resolution 2014-01

Once the NAP is approved and officially transmitted to the UNFCCC, it will be widely disseminated to national government agencies and instrumentalities, including the legislative and judicial departments, local government units and institutions, and amongst non-state actors throughout the country to guide in planning and implementation. It is expected that development partners will be guided to align efforts for cooperation with the Philippines' development aspirations.

The below eight (8) key sectors have been identified as the focal issues for adaptation action.

- Agriculture, Fisheries, and Food Security
- Water Resources
- Health
- Ecosystems and Biodiversity
- Cultural Heritage, Population Displacement, and Migration
- Land Use and Human Settlements
- Livelihoods and Industries
- Energy, Transport, and Communications

(b) Domestic Climate Change-related Policies and Plans

a) LCCAP Quality Assurance Mechanism

Regarding on adaptation, discussions are underway with DILG to develop an LCCAP Quality Assurance Mechanism to evaluate the content of submitted LCCAPs. The alpha version of an app called the LCCAP Certification App (LC-App) is also being developed. The LC-App is intended to provide a streamlined solution for LGUs to manage their LCCAPs and receive certification from the CCC.

b) Stocktaking and operationalization of the National Climate Risk Management Framework (NCRMF)

In view of the increasing uncertainty surrounding climate change, the NCRMF underpins the Philippines' climate change adaptation and loss and damage management work. Henceforth, all planning, programming, and implementation undertakings will have to be based on the results of probabilistic risk assessments and translated systematically to risk management actions covering risk prevention, risk reduction, and residual impact mitigation.

The NCRMF aims to address the challenging aspect of the NAP formulation by establishing a clear and organized framework of action to enable systematic characterization—including risk and impact quantification—and identify and organize adaptation measures addressing both actual and potential impacts of climate change. Consultations were conducted and a national stock take survey was completed, capturing available climate risk datasets, information, tools, methodologies, capacities, and mechanisms. This process

involved NGAs, LGUs, Academe, Civil society organizations (CSOs)/ Non-government organizations (NGOs) from Luzon, Visayas, and Mindanao. While not every agency, organization and stakeholder were covered, the survey results offer a snapshot of data generation (i.e., slow and sudden onset) across various governance levels and sectors in the country.

c) Implementation of adaptation project utilizing PSF

Before October 2023, only six projects had been approved and implemented, but five new projects and six project development supports were approved and PHP 890 million of the PHP 1 billion fund has been allocated.

Table 2-15 Approved PSF projects

Title	Sector	Budget (Million PHP)
Siargao Climate Field School for Farmers and Fisherfolk	Food Security, Human Security, Knowledge & Capacity development, Sustainable Energy	80
Disaster Risk Reduction and Management (Ridge-to-Reef) as an Adaptation Mechanism to Resiliency	Knowledge & Capacity development, Human Security, Ecosystem & Environmental Stability	39
Promoting Resiliency and a Climate-Informed Gerona	Water Sufficiency, Human Security, Knowledge & Capacity development	38
Building Resiliency through Ecological-based Farming	Food Security, Water Sufficiency, Ecosystem & Environmental Stability, Human Security,	38
Establishment and Sustainable Management of River Ecosystems in Kitcharao, Agusan del Norte	Ecosystem & Environmental Stability, Human Security, Climate-Smart Industries & Services	28
Saub Watershed Ecosystem Rehabilitation and Flood Risk Reduction for Increased Resilience	Food Security, Ecosystem & Environmental Stability, Human Security, Knowledge & Capacity development,	104
Installation of drainage and early warning systems and the development of the agroforestry industry in Maramag, Bukidnon	Food Security	126
Irrigation project in Cabagan, Isabela involving the construction of 3 solar powered irrigation systems	Food Security, Sustainable Energy	21
Mangrove rehabilitation project in Catanauan, Quezon	Ecosystem & Environmental Stability	3
Installation of embankment infrastructure and reforestation for enhanced flood control of Lom River in Borongan City, Eastern Samar	Human security, Ecosystem & Environmental Stability	118
Climate field school for farmers in Mountain Province	Food Security, Capacity Development	271

Source : CCC Website

CCC evaluates and reviews PSF project proposals from technical viewpoints prior to making decision to endorse them to in the PSF board. The CCC has developed mechanisms for transparency and disclosure and guidelines for accrediting organizations accessing the PSF. Furthermore, CCC collaborates closely with the PSF Board and related agencies, offering technical assistance to LGUs and other entities to enhance

the quality of project proposals submitted to the PSF. This initiative aims to make the fund more accessible to local governments and other stakeholders.

One notable issue is that the budget allocation of 1 billion PHP has nearly been exhausted, while there are still projects seeking utilization of the PSF. This indicates high utilization of the budget and necessitating efforts to secure additional funding. Another issue is that some of the proposals submitted by local government officials do not include information that should be included in the proposal, or the content of the proposal differs from the local situation.

Furthermore, there is a recognized need to enhance the technical capabilities of CCC and DOF, which undertake the review of proposals spanning diverse sectors and target technologies. Strengthening the review system is imperative to ensure effective evaluation and selection of projects.

From the above, it was confirmed that there are human, technical, and financial challenges in advancing climate change adaptation measures, as shown below. The challenges and directions for support are summarized in Table 2-17.

- Needs to strengthen capacity and staffing, including knowledge and technical skills related to climate change adaptation, of CCC, DOF, and other staff who review PSF proposals,
- Needs to strengthen understanding, capacity, and proposal writing skills of local government officials and others in climate change and adaptation activities,
- Needs to improve tools for climate change impact and vulnerability assessments that can be used by local government officials or are not easy to use, and
- Needs to improve utilization of PSF funding

3) Status of Donor Support

Table 2-16 Status of donor support (Paris Agreement implementation: adaptation)

Partner Organization	Project Name and Details	Implementing Agency	Status
UK Foreign, Commonwealth and Development Office (UK-FCDO)	Project name: Support for formulation of NAP Implementation period: 2023 The NAP was developed with support of the UK-FCDO, and will develop a multi-hazard, multi-sector NAP to guide prioritization of actions at the national level (including sectors and regions) over a four-month period from June to September 2023. The first Multi stakeholder consultation was held on August 08, 2023, and the second on August 22 and 23.	CCC and DENR	Under implementation
GGGI (Global Green Growth Institute)	Project name: Support to the Operationalization of the People's Survival Fund ²⁴ Implementation period: 2017-2018	CCC	Completed

²⁴ <https://gggi.org/project/support-to-the-operationalization-of-the-peoples-survival-fund/>

Partner Organization	Project Name and Details	Implementing Agency	Status
	<p>Provided technical assistance to strengthen the execution capacity of the CCC as a PSF Secretariat, as well as the capacity of LGUs to prepare proposals. The project aimed to produce the following results.</p> <ul style="list-style-type: none"> - Development of a capacity development plan and monitoring and evaluation system to strengthen PSF operations - Development of "Proponent's Handbook" and "People's Survival Fund project development manuals" for LGUs and others - Prepared and submitted two proposals for green infrastructure projects. - Identification and development of green cities and green infrastructure projects <p>Also, the Agreement between the Government of the Philippines and GGGI on the Establishment of GGGI Office in the Philippines, signed on June 18, 2020, and ratified by President Ferdinand R. Marcos, Jr. on December 19, 2023.²⁵</p>		

Source: JICA Survey Team

²⁵ https://legacy.senate.gov.ph/publications/LRS/Quick%20Notes/Comm%20on%20Foreign%20Relations-GGGI_UNESCO_Foreign%20Relations_14%20Feb%202024.pdf

Table 2-17 Identified issues (cross-cutting issues related to Paris Agreement implementation)

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
<p>Cross-cutting</p>	<ul style="list-style-type: none"> • Impacts caused by climate change <ul style="list-style-type: none"> ➢ In 2022 and 2023, the World Risk Index ranked the Philippines as the country with the highest disaster risk worldwide. ➢ Average temperature increased by 0.68°C from 1951 to 2015, and rainfall patterns and tropical cyclone pathways also changed. ➢ For sea level rise, sea level rose 5.7-7.0 mm/year between 1951 and 2015 (about twice the global average over the same period) ➢ Between 2011 and 2021, the country incurred PHP673.30 billion worth of damage and losses due to tropical cyclones alone ➢ For the economic damage, about 60% (about 290 billion PHP) was to agriculture and fisheries, followed by about 20% (about 109 billion PHP) to infrastructure facilities. • Projections of climate change and impacts <ul style="list-style-type: none"> ➢ It is projected that temperatures will continue to rise by about 1-2°C by the end of the 21st century, rainfall will not change significantly but will increase in variability and intensity, and extreme weather events will increase in intensity and frequency. ➢ Northern and central regions are projected to become wetter throughout the year, while southern regions will become drier. 	<ul style="list-style-type: none"> • Climate Change Act of 2009 <ul style="list-style-type: none"> ➢ Aims to mainstream climate change into government planning and decision-making processes and establish a framework for climate change mitigation and adaptation. ➢ Establishes the CCC and the COO ➢ Provides for the development and implementation of NFSCC, NCCAP and LCCAP • Nationally Determined Contribution (NDC) <ul style="list-style-type: none"> ➢ Peak out GHG emissions by 2030 ➢ Targets on mitigation to reduce GHG emissions by 75% between 2020 and 2030 compared to BAU (72.29% conditional with financial and technical support from developed countries, the remaining 2.71% to be achieved solely through own efforts) ➢ Seven areas have been identified: food security, water security, ecological and environmental stability, human security, climate smart industries and services, sustainable energy, and knowledge and capacity development, aim to consistent with the Sustainable Development Goals and the Sendai Framework for Disaster Reduction ➢ Adaptation measures to mitigate and address loss and damage in each area • National Climate Change Action Plan (NCCAP) <ul style="list-style-type: none"> ➢ Provides strategic direction from 2011 to 2028 ➢ Identifies food security, water self-sufficiency, ecosystem and environmental stability, human security, climate-smart industries and services, sustainable energy, and knowledge and capacity development as priorities • LCCAP <ul style="list-style-type: none"> ➢ Climate change action plans of Local government ➢ Focuses on both climate change adaptation and mitigation ➢ Presents how local governments will respond to climate change impacts and integrate them into local 	<ul style="list-style-type: none"> • National Communication (NC) <ul style="list-style-type: none"> ➢ National Communication (INC) was submitted in 2000, 2nd National Communications (SNC) was submitted in 2014 ➢ Preparing 3rd National Communication (TNC) to be submitted in 2025 • Development of NDC and NDC implementation plan <ul style="list-style-type: none"> ➢ NDC was developed and submitted in 2021 ➢ NDC implementation plan was developed with support from ADB and UNDP (to be released at the end of 2023) • Development of Biennial Update Report (BUR) <ul style="list-style-type: none"> ➢ BUR is being developed for submission in March 2024 • Development of the Biennial Transparency Report (BTR) <ul style="list-style-type: none"> ➢ Under development to be submitted by the end of 2024 (supported by GEF and FAO) • Assessment of the implementation of the NCCAP <ul style="list-style-type: none"> ➢ First round of monitoring and evaluation for 2011-2016 has been completed ➢ Second cycle of monitoring for 2017-2022 is underway • Support for development of LCCAP <ul style="list-style-type: none"> ➢ Technical assistance provided to local governments to formulate and strengthen LCCAPs • WB: Through the Policy loan on climate change, supporting the country's policy reforms aimed at protecting the environment and increasing climate resilience. • ADB, AFD: Support the Philippines' climate change adaptation and mitigation efforts through Programmatic Approach and Policy-Based Loan (policy loan); technical assistance for LST development. 	<ul style="list-style-type: none"> • Institution <ul style="list-style-type: none"> • Needs to strengthen/improve system to ensure transparency, such as a system and regulations to collect data and information necessary for the formulation of information and documents (NC, BUR, and BTR) to be submitted to UNFCCC from relevant organizations • Human resources <ul style="list-style-type: none"> • Needs to strengthen the capacity of technical staff to cope with the tasks and responsibilities of the CCC. • Needs to strengthen external coordination with government agencies in order to achieve a more streamlined process for the vetting and finalization of the report • Financial resources <ul style="list-style-type: none"> • Needs to secure a budget to ensure to employee necessary personnel who are available to cope with the workload of the CCC • Needs to secure a budget to secure personnel and to introduce the necessary equipment and materials to prepare documents to be submitted to international organizations. 	<ul style="list-style-type: none"> • Support for the establishment of measures, systems, and frameworks that contribute to the collection, organization, and analysis of information and data from relevant organizations and the promotion of their implementation • Provide technical support by dispatching experts • Capacity building for CCC staff and support personnel (climate change measures, organizational and operational management capacity building) • Support to obtain budgets including financial support from donors

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
			<ul style="list-style-type: none"> Department of the Environment, Japan: Provide technical assistance mainly for the use of the AIM model through the "Cooperation on long-term low greenhouse gas emission development strategies. 		
Mitigation	<ul style="list-style-type: none"> GHG Emissions <ul style="list-style-type: none"> ➤ GHG emissions in 2020 are 204.325 Mt-CO₂e, excluding carbon sequestration by Forestry and Other Land Use (FOLU). The energy sector is the largest source of GHG emissions, followed by agriculture, IPPU and waste. ➤ 77% of energy sector emissions are from non-transportation fuel.. The energy industry is the largest source of emissions in the energy sector. Rice cultivation is the largest source of emissions in the agriculture sector, while mining accounts for the majority of emissions in the industrial processes. GHG emissions from the waste sector are from wastewater treatment and waste disposal 	<ul style="list-style-type: none"> NDC <ul style="list-style-type: none"> ➤ Targets for mitigation include a 75% reduction in GHG emissions between 2020 and 2030 compared to BAU (72.29% conditional on financial and technical assistance from developed countries, with the remaining 2.71% to be achieved solely through own efforts) Institutionalizing the Philippines greenhouse gas inventory management and reporting system <ul style="list-style-type: none"> ➤ Executive Order issued by the President in 2014 to institutionalize the Philippines GHG inventory management and reporting system ➤ Positioned CCC as the responsible agency in GHG inventory development and designated PSA, DA, DOE, DENR, and DOTr as key agencies NCCAP <ul style="list-style-type: none"> ➤ Provides strategic direction for 2011-2028 ➤ Positioned "Sustainable Energy" with respect to mitigation, including environmentally sustainable transportation LCCAP <ul style="list-style-type: none"> ➤ Climate change action plans of Local government ➤ Focuses on both climate change adaptation and mitigation ➤ Presents how local governments will respond to climate change impacts and integrate them into local development plans (land use plans, sectoral development plans, investment programs, etc.) 	<ul style="list-style-type: none"> Development of NDC and NDC implementation plan <ul style="list-style-type: none"> ➤ NDC was developed and submitted in 2021 ➤ NDC implementation plan was developed with support from ADB and UNDP (to be released at the end of 2023 undergoing high-level technical vetting) Development of national GHG inventories <ul style="list-style-type: none"> ➤ National GHG inventories are available on the website with the 2010 version as the latest data ➤ GHG using 2015 and 2020 data ➤ Inventory being developed Afforestation project underway as a pilot project for mitigation measures <ul style="list-style-type: none"> ➤ Pilot reforestation project in collaboration with the Department of Environment and Natural Resources, the Occupational Regulation Commission, and the Society of Filipino Foresters, Inc. (15,625 trees planted on 5 to 10 hectares in the La Mesa watershed) Promote mitigation actions based on LCCAPs and support strengthening and updating of LCCAPs <ul style="list-style-type: none"> ➤ Supporting local governments to develop GHG inventories and to develop/update LCCAPs based on these inventories, together with DILG and LGAs (support for organizing trainings for local government officials) ➤ Develop tools that can be used to develop GHG inventories and organize seminars to promote their use. 	<ul style="list-style-type: none"> Institution <ul style="list-style-type: none"> • Needs to strengthen/improve systems that contribute to ensure the transparency, such as systems and regulations for collecting data and information necessary for the GHG inventory from relevant organizations Human resources <ul style="list-style-type: none"> • Needs to strengthen understanding and capacity of local government staff on climate change issues, GHG inventory development, LCCAP updates, and GHG emission reductions from mitigation measures. Technology <ul style="list-style-type: none"> • Needs to improve tools and methodologies for estimating GHG emission reductions to be realized through the implementation of mitigation measures • Needs to improve operability of tools available for GHG inventory development, etc. 	<ul style="list-style-type: none"> • Support for the establishment of measures, systems, and frameworks that contribute to the collection, organization, and analysis of information and data from relevant organizations and the promotion of their implementation • Capacity building for local government officials on climate change and mitigation activities and GHG inventory development • Strengthen and support the development of tools that can be used for GHG inventory development and GHG emission reductions calculation

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
			<ul style="list-style-type: none"> • Carbon Pricing Instruments <ul style="list-style-type: none"> ➤ It is considered to introduce carbon pricing, but no national carbon pricing policy or system is formally in place • UNDP: Support for carbon credits/trading scheme development, review of DENR's policy on CAVCS, development of a carbon trading roadmap, and implementation of a Carbon Finance Assessment. • WB: Studying the potential of carbon pricing instruments in the Philippines and conducting assessments and simulations on the impacts of various options, including the use of emissions trading schemes and the combination of emissions trading schemes and carbon taxes. 	<p>Institution</p> <ul style="list-style-type: none"> • National carbon pricing system is not yet in place 	<ul style="list-style-type: none"> • Support for establishing carbon tax, carbon trading, and other schemes at the national level

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
Adaptation	<ul style="list-style-type: none"> • Climate Change Adaptation <ul style="list-style-type: none"> ➢ Support from other donors is ongoing mainly in the field of adaptation, including support for mainstreaming adaptation into various sectors, and various projects and activities are being implemented in each sector that contribute to climate change adaptation ➢ In the water resources and disaster prevention sectors and agriculture, projects are being implemented that take into account the impact of climate change on natural disasters and their future projections. 	<ul style="list-style-type: none"> • Philippine Strategy on Climate Change Adaptation <ul style="list-style-type: none"> ➢ Describe the impacts of climate change on the Philippines and identifies agriculture, coastal and marine resources, water resources, human health, and infrastructure as priority areas for adaptation • National Climate Risk Management Framework (NCRMF) <ul style="list-style-type: none"> ➢ Aims to harmonize and integrate the various efforts of sectors and stakeholders in climate risk management and strengthen the Philippines' early action ➢ Plans for the establishment of a climate change preparedness planning system through the use of a strong risk database, information and analysis system; proposes harmonization among plans and guidelines for local government units (LGUs) • NDC <ul style="list-style-type: none"> ➢ Seven areas have been identified: food security, water security, ecological and environmental stability, human security, climate smart industries and services, sustainable energy, and knowledge and capacity development, aim to consistent with the Sustainable Development Goals and the Sendai Framework for Disaster Reduction ➢ Adaptation measures to mitigate and address loss and damage in each area • National Climate Change Action Plan (NCCAP) <ul style="list-style-type: none"> ➢ Provides strategic direction from 2011 to 2028 ➢ Identifies food security, water self-sufficiency, ecosystem and environmental stability, human security, climate-smart industries and services, sustainable energy, and knowledge and capacity development as priorities • Local Climate Change Action Plan (LCCAP) <ul style="list-style-type: none"> ➢ Describe the results of the implementation of climate hazard, vulnerability and risk assessments and adaptation measures in rural areas 	<ul style="list-style-type: none"> • Considering the Philippines' strategy on climate change adaptation, the National Strategy on Adaptation to Climate Change in the Philippines and other relevant documents have been reviewed and developed. • Stocktaking and operationalization of the National Climate Risk Management Framework (NCRMF) <ul style="list-style-type: none"> ➢ A national stocktaking on currently available climate risk datasets, information, tools, methodologies, capacities, and mechanisms was conducted in 2022. ➢ Validation of improved risk assessment methodologies will be undertaken • Development of NDC and NDC implementation plan <ul style="list-style-type: none"> ➢ NDC was developed and submitted in 2021 ➢ NDC implementation plan was developed with support from ADB and UNDP (to be released at the end of 2023) • Promotion of implementation by relevant ministries and agencies of the measures identified as adaptation measures in the NCCAP • About 85% of all LGUs have developed and submitted LCCAPs. It is assumed that all LGUs are considering matters related to adaptation. • Development of LCCAP Quality Assurance Mechanism (LCCAP Quality Assurance Mechanism) 	<ul style="list-style-type: none"> • Human resources <ul style="list-style-type: none"> • Needs to increase number of staff to cope with the responsibilities and workload of the CCC • Needs to strengthen understanding and capacity of local government officials on climate change and adaptation activities • Technology <ul style="list-style-type: none"> • Needs to improve tools for climate change impact and vulnerability assessment that can be used by local government officials. 	<ul style="list-style-type: none"> • Technical support by dispatching experts • Capacity building for CCC staff and support personnel (climate change action, organizational and operational management capacity building) • Capacity building for local government officials on climate change and adaptation activities • Strengthening and supporting development of tools for climate change impact and vulnerability assessment, etc.

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
		<ul style="list-style-type: none"> • People's Survival Fund Act ➤ The PSF was created upon the enactment of Republic Act 10174 in 2012 (amending the Climate Change Act of 2009) ➤ Special fund to finance the promotion of adaptation programs and project implementation in rural areas ➤ Allocated 1 billion PHP ➤ DOF is the Secretariat ➤ CCC leads the review and evaluation of project proposals 	<ul style="list-style-type: none"> ➤ Discussion between CCC and DILG on development of LCCAP Quality Assurance Mechanism to assess content of submitted LCCAPs is ongoing ➤ Development of an alpha version of an app called the LCCAP Certification App (LC-App) is also underway <ul style="list-style-type: none"> • Six (6) adaptation projects supported by PSF are currently ongoing. Five (5) new projects were approved by the PSF Board in 2023 <p>CCC, together with NPTE members and technical representatives of PSF Board members, review and evaluate PSF project proposal submission</p> <ul style="list-style-type: none"> • NAP is under development (to be released in December 2023) ➤ NAP is under development with support from UK-FCDO (Foreign, Commonwealth and Development Office) (to be released in December 2023) ➤ After the release, donor coordination meetings will be held to discuss the diversion of roles among donors to support the implementation of each set of measures identified as adaptation measures in the NAP. <p>UK-FCDO: Support for formulating NAP GGGI: Support for capacity building of PSF Secretariat and preparation of LGU proposals</p>	<p>Human resources</p> <ul style="list-style-type: none"> • Needs to strengthen capacity and personnel, including knowledge and technical skills related to climate change adaptation, of CCC, DOF, and other staff who review PSF proposals • Needs to strengthen capacity of local government officials and others to prepare proposals for the PSF <p>Funds</p> <p>PSF funds are subjected to replenishment taking into consideration the volume of project proposals received from LGUs</p> <p>Other</p> <ul style="list-style-type: none"> • Adaptation measures based on the NAP to be released in December 2023 need to be discussed after confirmation of the contents of the NAP. 	

Source: JICA Survey Team

2.2.4 Energy

Climate change impacts that affect the Philippine's energy sector include precipitation and extreme weather events. For the former, while the average rainfall itself may not change much across the country, the seasonal variability and intensity are expected to increase, which will have a significant impact on the introduction and operation of hydropower, for example. Regarding the latter, there is a concern about damage to power and energy infrastructure as typhoons become more frequent and intense. Therefore, it is important to implement adaptation measures in anticipation of these impacts.

According to the 2020 national GHG inventory, energy sector emitted an estimated 129.286 Mt-CO₂e. Fuel combustion (excluding transportation) accounted for the majority of energy sector emissions at 99.854 Mt-CO₂e, or about 77% of total sector emissions.

The following sections illustrates the survey result of the energy sector which is divided into six major subsectors (energy statistics and planning, conventional energy, renewable energy, power transmission and distribution, electrification, energy efficiency and conservation, alternative fuels and emerging technologies).

(1) Sector Landscape

1) Sector Status and Climate Change Impacts

The energy sector emitted 129.286 Mt-CO₂e of GHG according to the 2020 national GHG inventory of the Philippines. Fuel combustion (excluding transportation) accounted for the majority of energy sector emissions at 99.854 Mt-CO₂e, or 77% of total sector emissions. As shown in recent results in the table below, emissions of 129.37 Mt-CO₂e in 2019 and 119.40 Mt-CO₂e in 2020 have been more than doubled compared to 2010 GHG inventory. Note that the decrease in GHG emissions from 2019 to 2020 is attributed to the slowdown of economic activity due to COVID-19. The main source of emissions is electricity generation, which is expected to reach 60% of total emissions in 2020, and together with transportation, is projected to exceed 80%.

Table 2-18 Breakdown of GHG Emissions in the Energy Sector

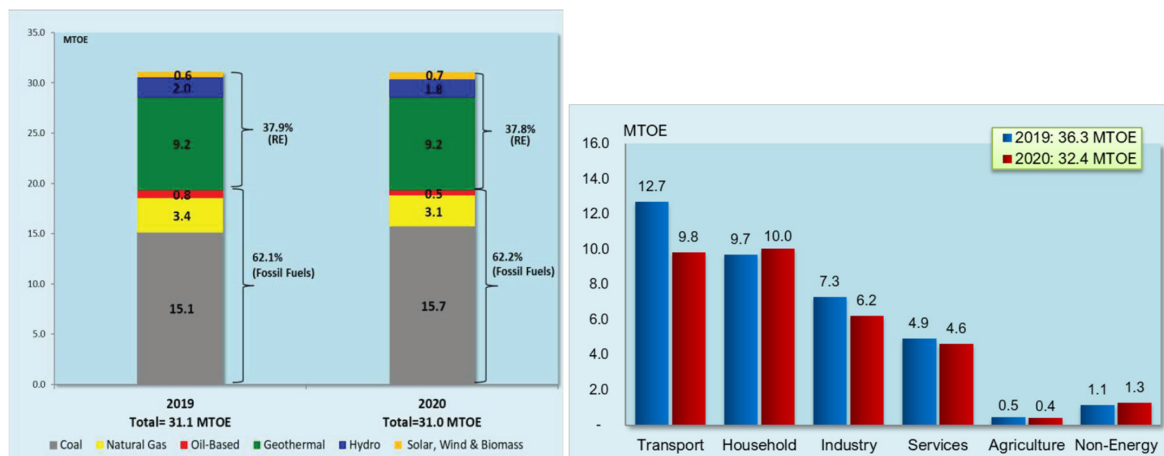
Sector	CO ₂ Emission (MtCO ₂ e)		Total NonCO ₂ Emission (MtCO ₂ e)		Total GHG Emission (MtCO ₂ e)		Percent Change
	2019	2020	2019	2020	2019	2020	2019-2020
Power Generation	69.10	69.70	0.30	0.31	69.40	70.01	0.89
Transport	35.35	27.27	0.22	0.17	35.57	27.44	-22.86
Industry	12.89	10.56	0.07	0.06	12.96	10.62	-18.09
Other Sectors*	11.04	11.10	0.06	0.06	11.10	11.17	0.61
Energy**	1.00	0.77	0.00	0.00	1.00	0.77	-23.25
Total	129.37	119.40	0.67	0.61	130.03	120.01	-7.71
Percent Distribution							Change in Distribution
Power Generation	53.41	58.38	45.62	51.38	53.37	58.34	4.97
Transport	27.32	22.84	33.26	28.48	27.35	22.86	-4.49
Industry	9.96	8.85	11.01	9.14	9.97	8.85	-1.12
Other Sector*	8.53	9.30	9.71	10.72	8.54	9.31	0.77
Energy**	0.77	0.64	0.40	0.28	0.77	0.64	-0.13
Total	100	100	100	100	100	100	

*includes emission from the services, households and agriculture

**includes losses incurred in oil refining

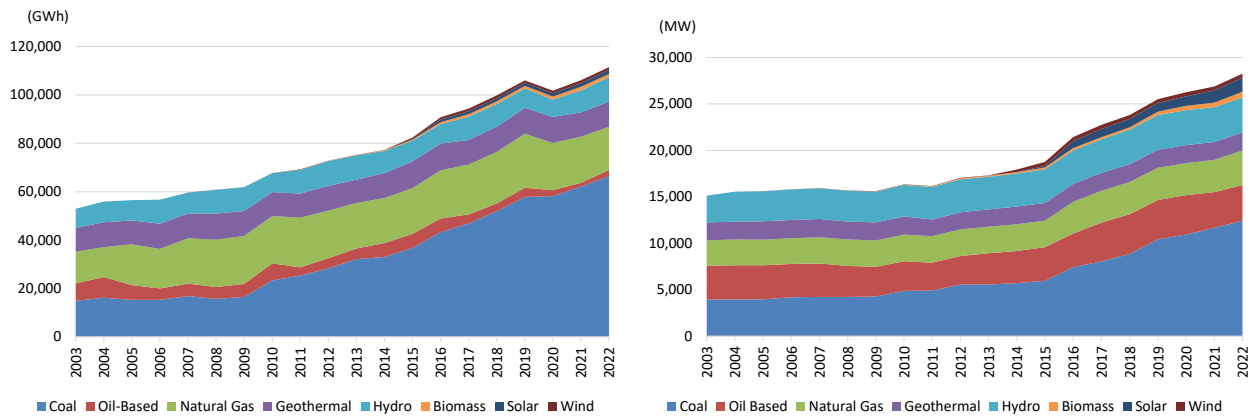
Source : Philippines Energy Plan 2020-2040

Regarding electricity generation, which is the main source of GHG emissions, fossil fuel-derived power generation accounted for 62.2% of total power generation in 2020. In terms of final energy consumption on the demand side, transportation is the largest source, followed by households and industry. Therefore, it is important to simultaneously promote the low-carbonization of power generation, the energy conservation and efficiency of energy use on the demand side.



Source : Philippines Energy Plan 2020-2040

Figure 2-13 Energy Mix (Left) and Demand-Side Final Energy Consumption in the Philippines (Right)



Source : Philippines Energy Plan 2020-2040

Figure 2-14 Power generation by source (Left) and power supply capacity (Right)

2) Climate Change Impacts in the Energy Sector

The Philippines is geographically extremely vulnerable to natural disasters, with most of its land and nearly three-quarters of its population susceptible to combined disasters such as typhoons, earthquakes, floods, storm surges, tsunamis, volcanic eruptions, and landslides, which have affected 120 million people and killed 33,000 over the past 30 years. According to the 2020 edition of the World Risk Indicators (WRI), the Philippines has the ninth highest disaster risk among 181 countries worldwide and the second highest among Asian countries.

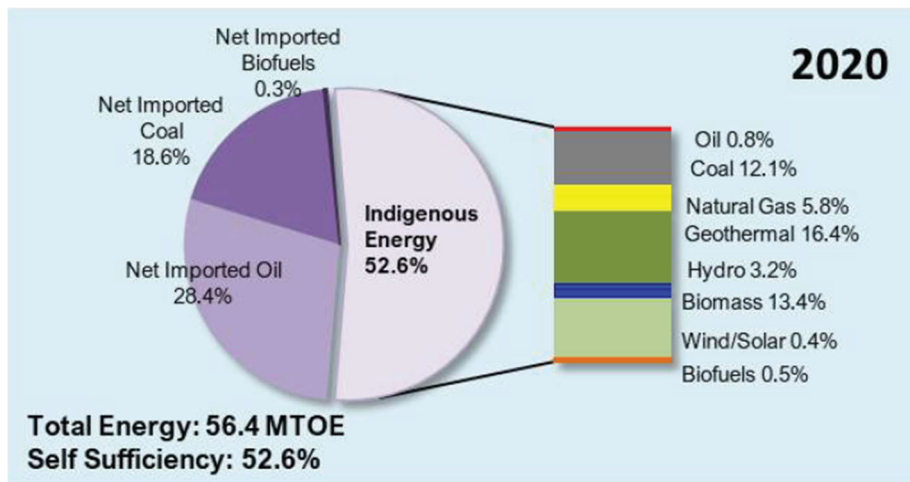
Among the climate change impacts that particularly affect the Philippine's energy sector are precipitation and extreme weather events, such as those associated with typhoons and floods. Regarding precipitation, while the average rainfall itself may not change much across the country, the seasonal variability and intensity are expected to increase, which will have a significant impact on the introduction and operation of hydroelectric power generation. Extreme weather events meanwhile cause damage to power and energy infrastructure as typhoons become more frequent and intense. Indeed, the impact extends beyond the energy sector, climate-related disasters caused approximately 463 billion PHP in losses to the country's infrastructure between 2010 and 2019, according to the Department of Finance. Moreover, the year 2020 alone incurred a loss of 113.4 billion PHP. Adaptation is an urgent agenda in anticipation of these impacts.

3) General Challenges of the Energy Sector

According to the United Nations World Population Prospects (2022 Revision), the population of the Philippines is projected to increase from around 115 million in 2022 to 157 million in 2050. This growth is anticipated to make the Philippines rank 12th in the world by population. The consequent rise in population is expected to drive an increased demand for energy, further emphasizing the need for energy infrastructure.

As illustrated in the figure below, the Philippines currently relies on imported fossil fuels for about half of its domestic energy consumption. Given that energy prices are susceptible to international conditions,

ensuring a stable supply poses a significant challenge. While importing energy resources from abroad has the advantage of lowering costs and quicker implementation than domestic exploration and development, over-reliance on imports to meet the rising energy demand resulting from population growth could compromise energy security. Therefore, it is crucial to adopt highly sustainable energy policies with a long-term perspective, acknowledging these trade-offs. In pursuit of this goal, implementing low-carbon measures, such as promoting locally produced and consumed renewable energy and emphasizing energy conservation, will not only contribute to climate change mitigation but also enhance the overall resilience of the Philippines' energy sector. The efficient execution of these measures will be a key development priority.



Source : Philippines Energy Plan 2020-2040

Figure 2-15 Energy Supply in the Philippines

4) Stakeholder Analysis

The following table summarizes some of the key stakeholders involved in the energy sector and climate change countermeasures. More specific stakeholder analysis for each subsector is provided in the corresponding subsector section below.

Table 2-19 Stakeholders in the Energy Sector

Policy making	Technological development	Implementation of countermeasures	Funding
<ul style="list-style-type: none"> Central Agency of the Department of Energy (DOE) Department of Transport (DOTr) Local governments (LGUs) 	<ul style="list-style-type: none"> Central agency of the DOE Local agencies of the DOE Research Institutes of the DOE Department of Science and Technology (DOST) Universities Private companies 	<ul style="list-style-type: none"> Central agency of the DOE Local agency of the DOE Department of Public Works and Highways (DPWH) DOTr LGUs Private companies (including industry associations) 	<ul style="list-style-type: none"> Government-affiliated financial institutions Private banks Donors

Source: JICA Survey Team

The central organization of the Department of Energy (DOE) is responsible for forming policies in the energy sector. Cross-sectoral measures, such as those related to electric vehicles (EVs), are jointly

formulated by various ministries, including the DOE and Department of Transportation (DOTr). Both ministries share responsibility for policy implementation. Similarly, the DOE primarily handles policy planning for energy conservation measures, while the DOE and Department of Public Works and Highways (DPWH) are jointly responsible for their implementation. The distribution of responsibilities among ministries in the subsectors is not uniform.

Local initiatives are delegated to Local Government Units (LGUs). LGUs, in particular, play a pivotal role in encouraging private sector investment in renewable energy projects within their regions, fostering collaboration with the private sector. On the other hand, the private sector is actively involved in the energy sector, handling not only power distribution but also power transmission. Private operators are entrusted with these responsibilities.

The following sections will provide detailed information on six major subsectors: energy statistics and planning, conventional energy, renewable energy, transmission, distribution, and electrification, energy efficiency and conservation, and alternative fuels and emerging technologies.

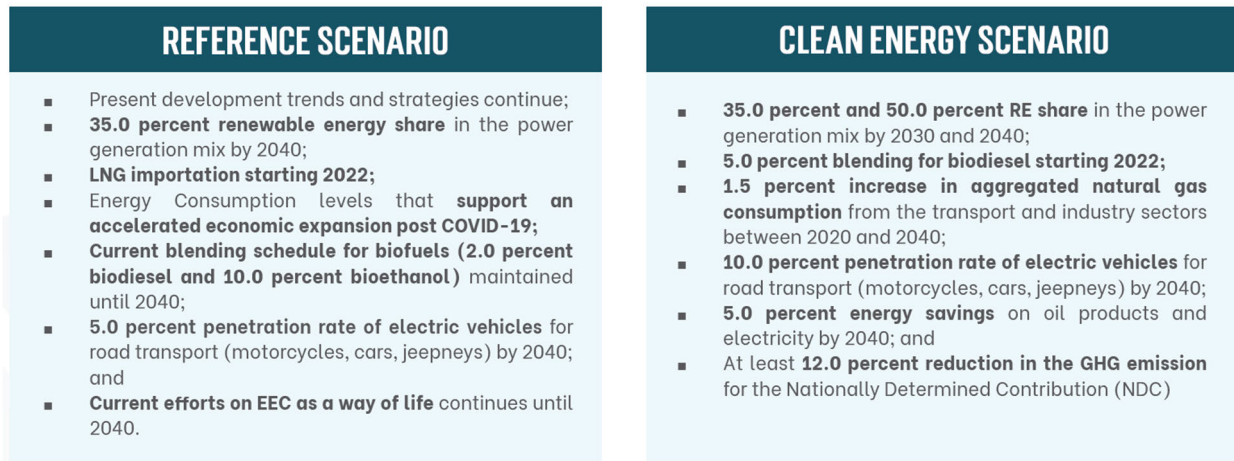
(2) Energy Statistics & Planning, Sector Common Issues

1) Relevant Policies and Plans

Climate change-related policies and plans for the energy sector related to energy planning are outlined below.

(a) Philippines Energy Plan (2020-2040)

The Department of Energy (DOE) has developed the Philippine Energy Plan (PEP) with a view to defining climate justice as an essential component of energy resource use and GHG emission control, and planning collaboration with international and domestic partners. In the long term, the PEP aims to achieve the Ambisyon Natin 2040 government goal for every Filipino and NDC goal, and it outlines the direction of the energy sector and the policies necessary for change. Ambisyon Natin 2040 is a comprehensive development plan that collaborates with stakeholders from different policy areas and sectors to realize the vision by 2040, and contemplates reforms and investments in key areas such as education, employment, health, environment, and infrastructure. PEP is continuously being monitored and presents a quantitatively analyzed Clean Energy Scenario (CES) based on a reference scenario that reflects the current situation. In the Philippines, the detailed targets for the current energy sector refer to the CES conditions, hence the energy sector is targeting a 12% reduction in GHG emissions from Reference Scenario (REF) as its contribution to the NDC. The next plan, PEP 2023-2050, is currently under preparation and public consultation is underway as of September 2023. While there is a possibility that the plan will be revised based on the results of the public consultation, the expected major changes at this stage will be that the capacity and generation of coal and natural gas power will decrease, wind power will increase, and nuclear power will be included in the CES scenario for the first time.

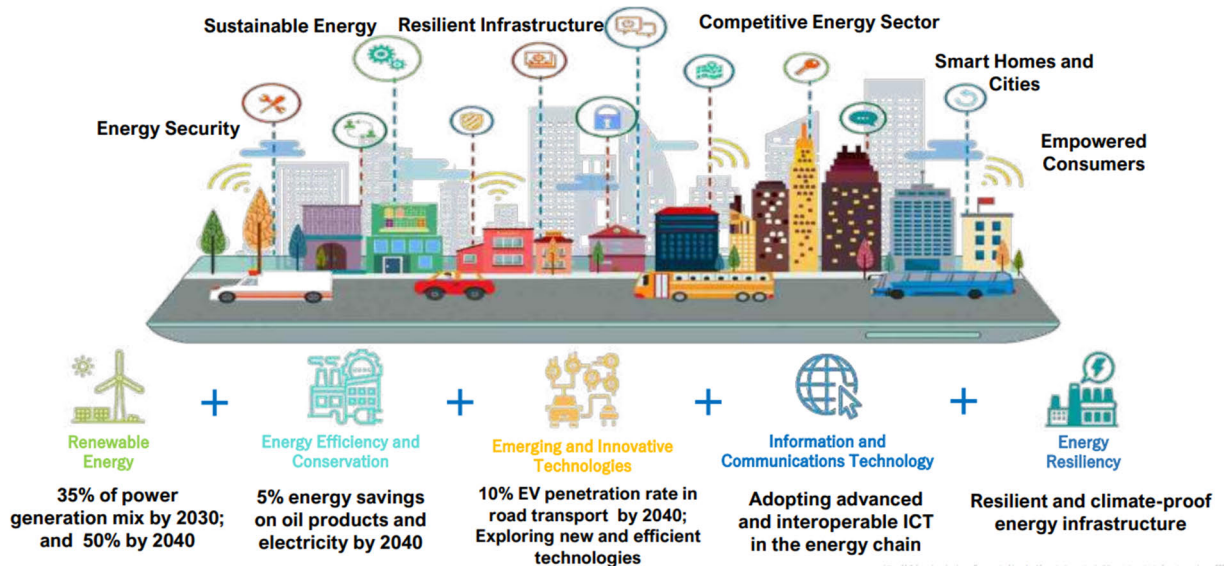


Source: Philippines Energy Plan 2020-2040

Figure 2-16 PEP reference scenario and CES goals

(b) Future Energy Scenario in Capsule

DOE is compiling a framework called “Future Energy Scenario in Capsule” to be reflected in the future PEP. This framework sets forth the goals and policies that DOE will promote, especially in the energy sector in the future. In addition to renewable energy generation, energy efficiency and the promotion of EVs, the framework also includes adaptation measures, such as the utilization of ICT in the energy chain and the improvement of energy infrastructure resilience.



Source: Updates on the Philippine Energy Sector, DOE 2022

Figure 2-17 Future Energy Scenario in Capsule

2) Implementation Status of Climate Change Measures

(a) Implementation Structure

Some of key involved stakeholders in the subsector of energy planning and statistics are summarized below.

Table 2-20 Stakeholders (Energy subsector)

Category	Responsible organization	Role
Policy making	Department of Energy (DOE)	Energy policy formulation and implementation, energy resource development and management, energy infrastructure monitoring and coordination, energy education and awareness, energy market supervision
	Department of Energy, Energy Policy and Planning Bureau (EPPB)	Specialized work on energy policy and planning (e.g., development of sector comprehensive plans such as PEP)
	Department of Transportation (DOTr)	Develop and implement transportation policies, develop and maintain transportation infrastructure, promote public transport, implement road safety measures, introduce and innovate transportation technologies, and improve the Philippines' transportation network and mobility options
Regulations and Licenses	Energy Regulatory Commission (ERC)	Regulate and supervise the energy sector, determine rate structures, review contracts and licenses, promote energy markets, and protect the rights of energy operators and customers
	PTF-SEFEELS Presidential Task Force on the Security of Energy Facilities and Enforcement of Energy Laws and Standards)	Ensure the safety and protection of energy and power facilities and related infrastructure, and the enforcement of energy-related laws and standards
Asset management	Power Sector Assets and Liabilities Management Corporation (PSALM Corp)	Privatization of generation and transmission assets and management of assets under EPIRA
Conventional energy	Department of Energy, Oil Industry Management Bureau (OIMB)	Develop oil industry policy, conduct market research and data management, enforce regulations, and improve national energy security
	Department of Energy, Energy Resource Development Bureau (ERDB)	Planning and execution of energy resource development, evaluation and monitoring of energy resources, formulation and promotion of energy policies, support for research and development
	Philippine National Oil Company (PNOC)	Established by Presidential Decree (PD) 334 to ensure adequate and stable supply and maintenance of oil and petroleum products for domestic demand
	PNOC-Exploration Corporation (PNOC-EC)	Started as an exploration division of PNOC and established as a subsidiary on April 20, 1976 under PD 927. Actively involved in exploration, development and production activities to exploit indigenous energy sources for further energy supply.
	Private-sector business	Exploration and development of energy resources, introduction of power generation facilities, dissemination of equipment and materials for utilization, etc.
Renewable energy	Department of Energy, Renewable Energy Management Bureau (REMB)	Renewable energy policy development and implementation, renewable energy promotion, technology development and research, regulatory and standards development data collection and monitoring
	National Renewable Energy Board (NREB)	Formulate and recommend renewable energy policies, develop energy plans, promote investments, and support innovation and R&D.
	Department of Agriculture (DA)	Promote the use of renewable energy resources in agriculture and fisheries
	National Biofuels Board (NBB)	Develop biofuel policies, promote production and use, support technology development and research, regulatory compliance, market monitoring and data collection
	Private-sector business	Exploration and development of energy resources, introduction of power generation facilities, dissemination of equipment and materials for utilization, etc.
Power transmission and	Department of Energy, Electric Power Industry Management Bureau (EPIMB)	Developing and coordinating policies related to the electricity market, managing electricity-related statistics and data, providing energy information, and evaluating projects.

Category	Responsible organization	Role
distribution, electrification	National Transmission Corporation (TransCo)	It is a government-owned and controlled corporation established under Republic Act (RA) 9136, known as the Electric Power Industry Reform Act of 2001 (EPIRA). It is primarily responsible for the operation and management of the transmission system linking power plants and distribution companies.
	Transmission Company (National Grid Corporation of the Philippines: NGCP)	Management and operation of the power grid, transfer and distribution of electricity, operational planning and coordination, infrastructure expansion and modernization, regulation and compliance
	Independent Electricity Market Operator of the Philippines (IEMOP)	Operation and management of electricity markets, transparency, coordination of electricity supply and demand, compliance with market rules and development, data management
	National Power Corporation (NPC)	Role as power producer, security of electricity supply, support of energy policy, management of electricity infrastructure, dissemination of electricity supply
	National Electrification Agency (NEA)	Promotion of electrification, support of power cooperatives, management and supervision of power projects, improvement of power supply, training and education
	Electric Cooperative (EC)	Management and operation of electricity supply, supply of electricity to the community, pricing and billing, technical improvement and training, contribution to community development
	Utilities	Securing the supply of electricity (in the self-distribution network), sales of electricity, stabilization of electricity supply, business development and technological innovations.
Energy Efficiency & Conservation	Department of Energy, Energy Utilization Management Bureau (EUMB)	Improve energy efficiency, develop energy plans, implement and monitor energy policies, collect and analyze energy use data, and promote energy technologies
	Inter-Agency Energy Efficiency and Conservation Committee (IAEECC)	Policy formulation and proposals, promotion of technology and innovation, awareness-raising and education, monitoring and evaluation, international cooperation
	Department of Public Works and Highways (DPWH)	Aiming to improve energy efficiency in the design and renovation of public buildings and transportation infrastructure for which he is responsible
	Energy service company (ESCO)	Energy audits and efficiency assessments, implementation of energy efficiency projects, investment and financing support, project monitoring and management
	Private-sector business	Development, introduction, and diffusion of energy-saving equipment, introduction of energy-saving design, etc.
Alternative Fuels & Emerging Technologies	Department of Energy (DOE)	Tasked with the promotion of the adoption of electric vehicles (EVs) and the development of charging stations (EVCS) and related equipment.
	Department of Energy, Energy Utilization Management Bureau (EUMB)	Formulates policies, plans, and programs related to alternative fuels and new and advanced energy technologies' development.
	Nuclear Energy Program Implementation Organization (NEPIO)	Planning and implementing nuclear energy programs, liaising with the International Atomic Energy Agency (IAEA), ensuring nuclear safety, and providing and disseminating information
	Nuclear Energy Program InterAgency Committee (NEP-IAC)	Coordination of government agencies on nuclear power generation, technical evaluation and safety assurance, and public awareness
	Hydrogen and Fusion Energy Committee (HFEC)	Policy development and advocacy, support for technology development, international cooperation, education and awareness, and management of environmental impacts related to hydrogen and fusion energy
R & D	Philippine Council for Industry and Energy Research and Development	Promotion of energy-related technology R&D, technology transfer and industrial application, international cooperation, and capacity building

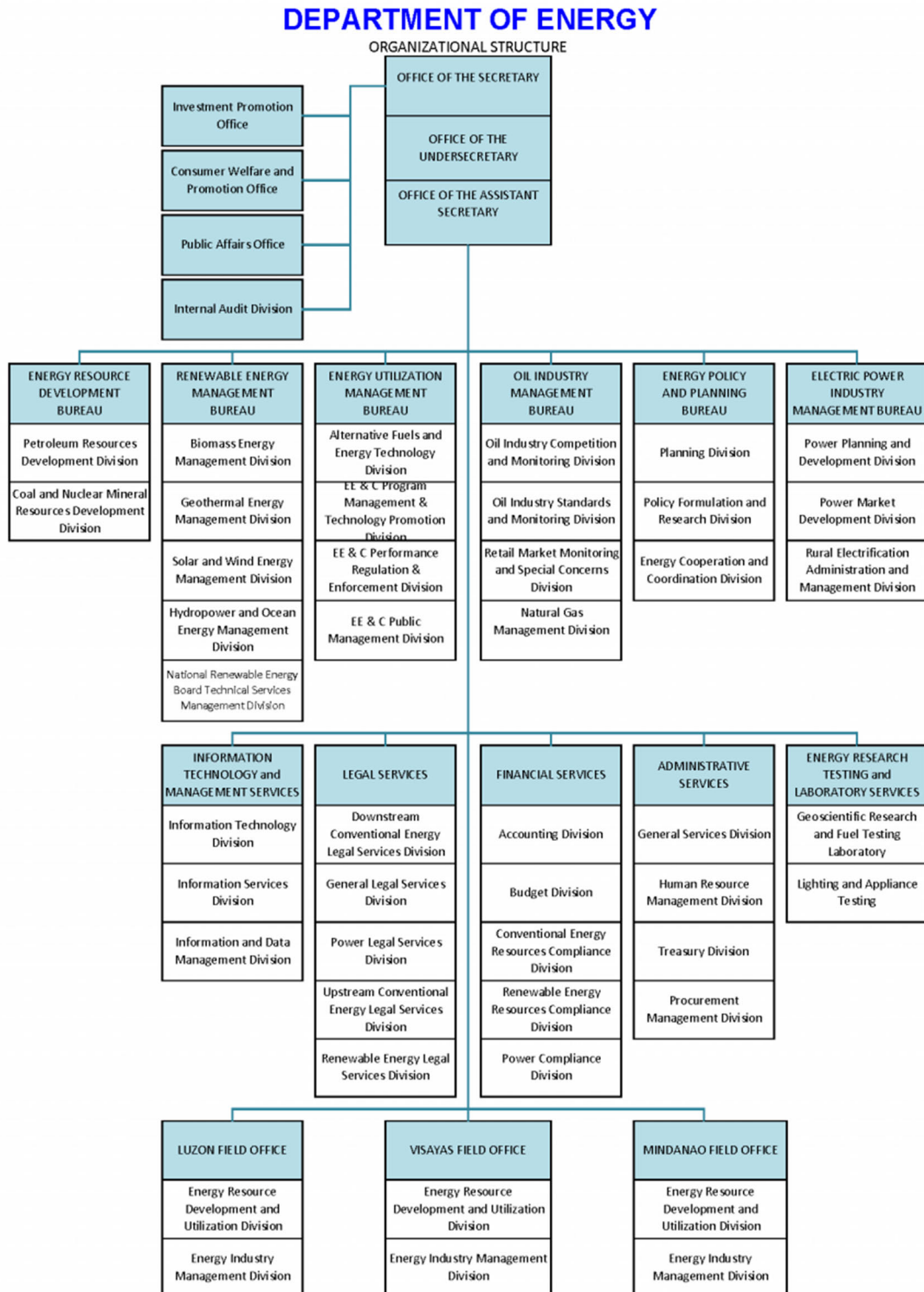
Category	Responsible organization	Role
	(DOST-PCIERD) of the Department of Science and Technology	
	PNOC-Renewables Corporation (PNOC-RC)	A wholly owned subsidiary of PNOC, established as the government's technology and research arm for the development and implementation of sustainable renewable energy and energy efficiency programs and projects. It is also a partner agency of national and LGUs in the implementation of the Energy Efficiency and Conservation Law.
	University of the Philippines, Cavite State University and other universities	Support energy-related technology development, policy advocacy, evaluation, education and awareness, and management of environmental impacts
	Private-sector business	Energy-related technology development
Major donors in action	WB	Providing loans and financing, technical assistance and expertise, and policy advice
	ADB	Providing loans and financing, technical assistance and expertise, and policy advice
	USTDA	Technical assistance and expertise provision, policy advice
	USAID	Providing loans and financing, technical assistance and expertise, and policy advice
	UNOPS	Technical assistance and expertise provision, policy advice
	UNDP	Providing loans and financing, technical assistance and expertise, and policy advice
	EU	Providing loans and financing, technical assistance and expertise, and policy advice
	GEF	Technical assistance and expertise provision, policy advice

DOE is the umbrella agency for the energy sector in the Philippine central government. As shown in the figure below, the DOE has six major technical bureaus, as well as administrative, financial, information technology and management, legal, and research services. It also has field offices that cover the Luzon, Visayas, and Mindanao regions.

In roles such as energy planning and research, DOE's Energy Policy and Planning Bureau (EPPB) undertakes climate change measures. EPPB develops, updates, monitors, and evaluates national and local energy plans, policies, programs, and projects, provides comprehensive demand scenarios and supply options. It also provides assessments and examines the impact of international commitments on energy policy, the economy, and the environment. Furthermore, it is primarily responsible for compiling the PEP, and has begun preparatory work to develop the PEP 2023-2050, reflecting the priorities and standing directives of the current administration. It also has the role of task Force on Energy Resiliency (TFER).

In addition, DOE has already completed and submitted the 2015 and 2020 GHG Inventory Reports for the energy sector to the Climate Change Commission (CCC). A DOE GHG inventory team has been formed to strengthen the efforts of Republic Act (RA) 11825 (Energy Efficiency and Conservation Act of 2019). The DOE GHG Inventory Team was established to collect energy consumption and production data, conduct GHG inventory of the energy sector, prepare GHG inventory report, and then submit the report to CCC.

The team was created not just to strengthen the efforts for RA 11285 but to address the energy sector’s climate change mitigation and adaptation strategies.



Source: DOE

Figure 2-18 Organizational Structure

(b) Climate-related Budgets

Recognizing that the energy sector is a capital-intensive business, the DOE is in the process of transforming the energy industry into a private-sector-driven market under Republic Act (RA) 9136, also known as the Electric Power Industry Reform Act (EPIRA) of 2001. Therefore, the climate change budget relies on private investment, especially since the cost of constructing renewable energy facilities to realize the CES is estimated at \$119 billion, and more private investment is needed. Therefore, the DOE also promotes increased private sector participation and public-private partnerships (PPPs) to secure the necessary investments during the PEP planning period (2020-2040).

The table below also shows the FY2023 climate change budget for the DOE. The overall budget is about 880 million PHP, all for mitigation only. There are no significant changes in the budget amount or distribution between mitigation and adaptation in previous years. The budget for policy and planning falls under "Formulation, updating and monitoring of short, medium and long term national and regional energy policies, plans and programs" category. The budget for mitigation measures is about 36.85 million PHP.

Table 2-21 Approved climate-related budget of DOE (FY2023)

Unit: thousand PHP

Program	Climate change typology	Adaptation	Mitigation	Total
Formulation, updating and monitoring of short, medium and long term national and regional energy policies, plans and programs	Strengthen regulatory and institutional framework to support expansion of renewable energy production and use	-	36,853	36,853
Promotion of renewable energy (RE) resources	Sector reform and capacity building related to promotion of renewable energy	-	6,912	6,912
Supervision and regulation of exploration, development and utilization of RE resources and technologies	Strengthen regulatory and institutional framework to support expansion of renewable energy production and use	-	38,308	38,308
Biofuels Program	Review and integrate the National Biofuels Program	-	7,541	7,541
Total Electrification Project	Sector reform and capacity building related to promotion of renewable energy	-	500,000	500,000
Supervision, development and implementation of energy efficiency and conservation programs (EECP) and projects	Sector reform and capacity building related to energy efficiency and efficient energy pricing	-	15,769	15,769
Promotion of EECP activities and projects	Sector reform and capacity building related to energy efficiency in the energy sector, promotion of renewable energy and efficient energy pricing	-	10,484	10,484
Conduct of energy audit services	Sector studies, surveys, assessments and information systems on energy	-	15,155	15,155

Program	Climate change typology	Adaptation	Mitigation	Total
	efficiency, efficient energy pricing, and promotion of renewable energy			
National Energy Efficiency and Conservation Program	Sector reform and capacity building related to energy efficiency and efficient energy pricing	-	178,295	178,295
Promotion of research, development, demonstration and utilization of alternative fuels and technologies	Strengthening capacity of institutions to plan for low- carbon growth and environmentally sustainable energy supply	-	8,412	8,412
Alternative Fuels for Transportation and Other Purposes	Research and development in low-carbon or non-fossil fuel transport technologies	-	64,500	64,500
	Total	-	882,229	882,229

Source: FY 2023 GAA Climate Change Expenditures

(c) Implementation Status of Climate Change Mitigation Measures

In the PEP, the Clean Energy Scenario (CES) is envisioned to maximize the deployment of sustainable energy sources, such as renewable energy, while stabilizing future energy supply and demand. According to the capacity forecast for 2040, the target is to achieve a 68.72% share of renewable energy sources, marking a significant shift from the 29.02% share in 2020. On the other hand, the government plans to increase the capacity of conventional energy sources, including coal, natural gas, and oil, with a particular focus on natural gas due to its relatively clean profile and relatively low GHG emissions. The future power source composition is expected to change significantly for both conventional and renewable energy sources.

In October 2020, the Secretary of the DOE announced a moratorium on coal, stating that the Philippine government would no longer approve applications for new coal-fired power plants. Despite the moratorium issued in December 2020, the Philippines insists that coal will continue to play a role in the country's energy portfolio. This implies that the government continues to recognize the importance of coal-fired power generation as a reliable source of baseload energy and that transitions are necessary due to the challenge of shutting it down quickly. This recognition also stems from the perspective that a diverse energy mix is essential to ensure the stability and reliability of the power grid.

Table 2-22 Future Power Supply Capacity Projections in the Clean Energy Scenario in the PEP

Fuel Type	Total Capacity		Capacity Additions				Total Capacity	
	2020		2021-2030		2031-2040		2040	
	Levels	% Shares	Levels	% Shares	Levels	% Shares	Levels	% Shares
Coal	10,944	41.69	2,641	9.20	0	-	13,585	11.46
Natural Gas	3,453	13.15	3,750	13.07	11,680	18.36	18,883	15.93
Oil	4,237	16.14	381	1.33	0	-	4,618	3.89
Renewable	7,617	29.02	21,920	76.40	51,948	81.64	81,485	68.72
Geothermal	1,928	7.35	400	1.39	80	0.13	2,408	2.03
Hydro	3,779	14.40	1,987	6.93	14,410	22.65	20,176	17.02
Wind	443	1.69	763	2.66	10,624	16.70	11,830	9.98
Solar	1,019	3.88	18,554	64.67	26,564	41.75	46,137	38.91
Biomass	447	1.70	216	0.75	270	0.42	933	0.79
Total	26,250	100	28,692	100	63,628	100	118,570	100

Source: PEP

The energy sector was the largest emitting sector in the national GHG inventory in 2010, emitting 53.105 Mt-CO₂e. The PEP reference scenario estimates both actual and projected GHG emissions, as shown in the table below. By 2040, GHG emissions are projected to increase to about nine times more than the 2010 level. Therefore, a major concern is how to mitigate this rise in emissions and achieve a state with a reduction of 50 Mt-CO₂e in the 2040 projection, as outlined in the CES.

Table 2-23 Energy sector GHG emission projections for each PEP scenario

	Reference Scenario (REF)	Clean Energy Scenario (CES)
2020	120.01 Mt CO ₂ e	120.01 Mt CO ₂ e
2030	213.68 Mt-CO ₂ e	204.88 Mt-CO ₂ e
2040	370.95 Mt-CO ₂ e	321.25 Mt-CO ₂ e

Source: PEP

Human resource capacity of governments, organizations, investors, and mitigation implementers is a challenge. The limitation of staff capacity has always been an issue at DOE, while at the local government level, basic understanding of mitigation actions still needs to be improved, including mitigation concepts, activity data collection on GHG inventory, and emissions/ reduction calculations. In addition, industry, commercial establishments, and local communities in particular have limited knowledge of mitigation opportunities and benefits, technical operations, and potential financing mechanisms. For financing, Philippines have been encouraged by the United States to participate in the Just Energy Transformation Partnership (JETP), a financing cooperation scheme launched at the UN Climate Change Conference (COP26) in November 2021 to help coal-dependent countries make the transition to clean energy. JETP, a

financing cooperation scheme launched at the UN Climate Change Conference (COP26) in November 2021 to help coal-dependent countries transition to clean energy, but has not yet done so²⁶.

In the context of energy planning and statistics, it is crucial to facilitate and strengthen the implementation and updates of the PEP. Furthermore, ensuring the smooth and expeditious processing of fundamental data is essential for enhancing the reliability of the roadmap towards energy security. Currently, energy statistical data only discerns domestic and international energy balances, having an absence of the data on energy flows at the regional and inter-regional levels such as Luzon, Visayas, and Mindanao. This limitation hinders a more in-depth analysis of the current situation, challenges, and recommendations. On the other hand, manually submitted data from various DOE bureaus in their respective formats to the EPPB results in significant labor, cost, and delays in data processing and analysis within the EPPB. Consequently, the organization faces challenges in establishing data collection and analysis protocols and introducing systems to address these issues.

EPPB has several energy policy studies and research activities to make sure the eventual implementation and updating of the PEP, especially in the energy modeling aspect and has support needs regarding its technical assistance and capacity building. Specifically, these include energy modeling, energy policy and planning training courses (for central government officials), policy research on new and emerging technologies (hydrogen, ammonia, marine technology, offshore wind, deuterium, carbon capture utilization and storage, etc.), and support for energy resilience practices.

Funding and capacity building are also requested for the development and implementation of an Energy Balance Table Management System (EBTMS), especially for improved collection, processing, and dissemination of energy data for regionalization of energy databases.

Furthermore, for promoting investment by private enterprises and advancing climate change mitigation at the regional level, easy access to extensive and detailed energy data for analysis is crucial. Presently, the country disseminates domestic statistics in PDF format, with limited public disclosure of data required for planning, posing a challenge due to its low availability.

The implementation of climate change mitigation measures necessitates a substantial investment, estimated to reach PHP 764.96 billion in the Clean Energy Scenario (CES). The Philippine government is actively seeking additional funds from both domestic and international sources, in addition to the national budget.

²⁶ US, PH partnership pushed for the clean energy transition, Power Philippines,2023 <https://powerphilippines.com/us-ph-partnership-pushed-for-the-clean-energy-transition/>

Table 2-24 Required energy investment for each projection in PEP (billions of PHP)

Sector	Scenario	
	REF	CES
Upstream¹	1,176.50	1,183.87
Oil and Gas	502.51	502.51
Coal	656.06	656.06
Renewable Energy (Pre-Development)	17.93	25.30
Downstream	384.90	354.73
Oil Depot	103.51	93.94
Oil Import Terminal	67.76	53.11
LNG Terminal ²	88.77	88.77
Biodiesel	0.28	4.84
Bioethanol ³	124.59	114.07
Power	5,582.05	6,110.95
Generation	5,233.70	5,762.60
Transmission ⁴	348.35	348.35
Total	7,143.45	7,649.55

Notes: 1. Includes exploration and development (production)
2. Based on the approved LNG Project applications
3. All bioethanol supply requirement is to be produced locally
4. Proposed Transmission Projects from 2021-2030 (Source: Draft Transmission Development Plan 2021-2040)

Source: PEP

Climate change mitigation requires a lot of investment capital. Currently, the Philippine government is actively attracting various alternative sources of funding in addition to the national budget from both domestic and foreign sources. On the other hand, DOE's financial resources for policy implementation are very limited. From the results of interviews with the Philippine side, it is surveyed that there is a common perception throughout the government that the energy sector is private-sector driven, which may have led to the difficulty in having the DOE budget approved. The largest portion of the current climate change budget is for electrification, accounting for 57% of the total. This is followed by a relatively large amount of spending on energy conservation and alternative fuels, suggesting that more emphasis is being placed on the demand side than on the generation side. In any case, the Survey also received a list of projects submitted by DOE to the Department of Budget and Management (DBM), but it is confirmed that all of these projects were rejected by the DBM.

In addition, there is no budget for climate change adaptation measures, but considering that RCP and other measures are being implemented, it is possible that they are being implemented in conjunction with mitigation measures and are classified as a single budget for mitigation measures, or that large-scale finance is divided into separate budgets for the disaster prevention sector.

The energy sector in general is facing the challenge of spending money on imports due to its increasing reliance on energy-related technologies from abroad. Another challenge is that procuring technology, including spare parts, from abroad is time consuming.

On the government side, institutional weaknesses were identified in planning, implementation, and monitoring processes, including the evaluation of the effectiveness and efficiency of mitigation measures. This stems from the fact that the institutional design is a key factor contributing to the ineffective functioning of planning, implementation, and monitoring. Some of the systems were not mandatory from the outset, and others failed to attract private investment. Furthermore, although there are laws, policies, and supporting mechanisms related to renewable energy and energy use rationalization, there is a need to harmonize these with environmental protection laws, such as NIPAs (protected areas) that restrict the utilization of renewable resources like geothermal and hydropower.

BARMM is still in the process of establishing an autonomous structure, and there are challenges in the establishment and smooth implementation of various institutions. Specifically, the specifics of the joint management of energy resources, and the exercise of joint powers, rights, privileges, and interests are issues to be addressed. Moreover, a total of seven electric cooperatives (ECs) have been transferred to BARMM in conjunction with the establishment of autonomy. Specifically, addressing the poor management of utilities such as LASURECO (Lanao del Sur Electric Cooperative, Inc.) and MAGELCO (Maguindanao Electric Cooperative, Inc.) is crucial, including resolving the capacity issues related to fee collection.

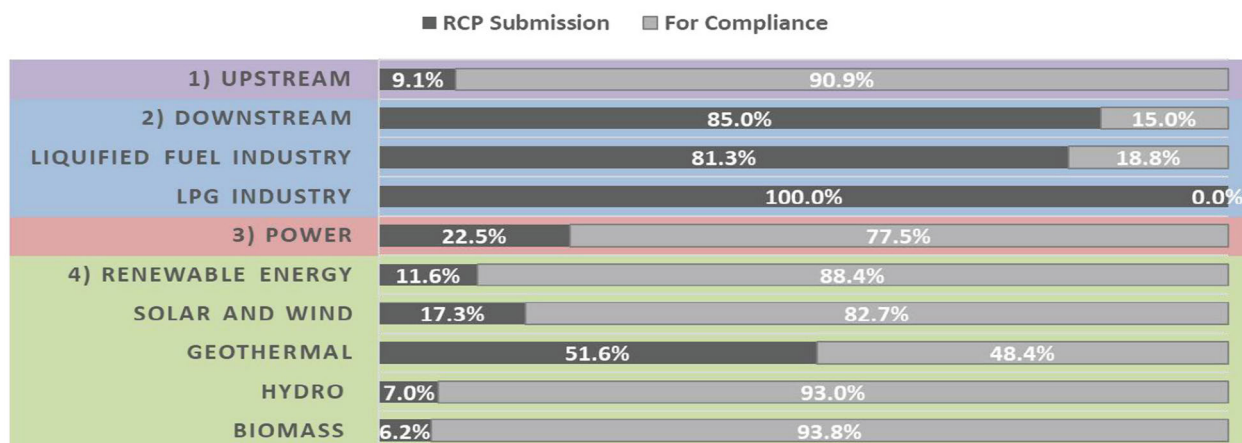
(d) Implementation Status of Climate Change Adaptation Measures

Stakeholders in the energy sector such as energy sources, renewable energy, electric power, oil and energy utilization sector should implement the following guiding principles as described in Department Circular (DC) 2018-01-0001212 developed by DOE in 2028.

- Institutionalize the development, promotion, and implementation of a comprehensive Resilience Compliance Plan (RCP) to improve capacity, promote safety culture and disaster preparedness, and strengthen response mechanisms in the energy sector.
- Strengthen existing infrastructure facilities to adapt to and withstand adverse conditions and disruptive events.
- In accordance with the Build Back Better Principles, incorporate improved mitigation measures into the reconstruction and rehabilitation of damaged infrastructure.
- Improve operation and maintenance standards and practices to ensure efficient restoration of energy supply after a disruptive event.
- Develop resiliency criteria for future energy facility construction to minimize damage and adopt measures to restore and restore energy supplies in a timely manner.

The DOE-EPPB partnered with the USAID-ESP in 2021 to conduct a comprehensive evaluation of the RCP submissions from 2018-2021. The results provided the basis for the issuance of a supplemental policy to the Energy Resiliency Policy (DC2018-01-0001). Hence, the DOE issued DC no. DC2022-06-0028 in June 2022 to boost the measures and strategies in order to achieve an energy resilient system. The new set

of guiding principles considered other factors that were not included in the ERP in 2018. The Energy Resiliency Policies issued by the DOE are set for review every 3 years. The figure below shows the status of compliance with the above DC in 2020, and although the submission of RCPs is considered to be secured, the status of compliance varies from sector to sector, and although not clearly stated in the PEP, appropriate evaluation of RCP submissions in particular is considered an issue. Furthermore, the EPPB’s Energy Resiliency and Planning Section, Policy Formulation and Research Division plans to revise the above policy on RCP and is currently preparing a draft.



Source: PEP

Figure 2-19 Resilience Compliance Plan submission and compliance rates as of 2020

(e) Situation in the Bangsamoro Region

The Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) is an autonomous region established in 2019 in the Bangsamoro, a predominantly Muslim region stretching from western Mindanao to the Sulu Islands in the Philippines. In making this decision, the Philippine government enacted the "Act Providing for the Organic Law of the Autonomous Region of the Bangsamoro of Mindanao (RA 11054)," a law that defines its basic governance structure.

Currently, the Intergovernmental Energy Board (IEB) serves as a framework between the two governments to promote the self-reliance of the Bangsamoro government. Its meeting bodies convene regularly. The DOE primarily functions as a consulting body to the Bangsamoro Transitional Authority (BTA) regarding the management of the energy sector and other provisions stipulated in the IEB's mandate. It collaborates with the BTA through the Technical Working Groups that have been established. Each working group includes members from both the DOE and the BTA's MENRE (Department of Environment, Natural Resources, and Energy) and is mandated to provide technical assistance and policy recommendations to the Intergovernmental Energy Board (IEB) for the effective implementation of RA 11054. A summary of each technical working group is provided below.

Table 2-25 Overview of each technical working group of energy

Technical Working Group	Summary
UCERD(Upstream Conventional Energy Resource Development) TWG	Jointly exercise the power to grant rights, privileges and concessions for the exploration, development and utilization of fossil fuels such as uranium, oil, natural gas and coal (except those related to small-scale mining) within the Bangsamoro territory, pursuant to RA 11054, Article 10, Section 13.
PE(Power and Electrification) TWG	(1) Transfer the powers, functions, and responsibilities of the DOE EPIMB to the Department of Environment, Natural Resources, and Energy (MENRE), subject to limitations and with due regard to the provisions of RA 11054. (2) Privatization of the Agus-Pulangi hydroelectric power plant and resolution of power issues (3) Transfer of management of electric cooperatives (ECs) within the jurisdiction of BARM (4) Management of power supply from Independent Power Producers (IPs) and WESM Mindanao (5) Other related issues and concerns
EP(Energy Planning) TWG	Prepare energy plans, share, update and maintain socioeconomic indicators and energy databases.
REDU(Renewable Energy Development and Utilization) TWG	(1) Transfer of authority, functions, and responsibilities of the DOE REMB to its counterpart agencies in the BG in accordance with RA 9513, Article 32. (2) Enforcement and administration of RA 9513, Section 31 (3) The transfer of the powers, functions, and responsibilities of the DOE REMB to the Corresponding Entity in the BG in accordance with RA 9513, Section 31. (4) Implementation and enforcement of renewable energy policy mechanisms under the Renewable Energy Act, including Renewable Portfolio Standard (RPS), Green Energy Auction Program (GEAP), and Green Energy Options Program (GEOP).
DOGUD(Downstream Oil and Gas Utilization and Development) TWG	Implementation and supervision of the non-pricing aspects of RA 8479, in accordance with Section 2(o) of the IEB TOR.
EIRP (Energy Investment Regulations and Processes) TWG	Pursuant to Section 2(d) of RA 11054, identify policies that will assist the BG in promoting energy investment in the Bangsamoro region, particularly in the energy and power generation sectors, both domestic and foreign, and in the implementation of RA 11234.
EECM(Energy Efficiency and Conservation Management) TWG	Implementation of RA 11285
SSCMI(Small-Scale Coal Mining Industry) TWG	Joint exercise of the power to grant rights, privileges and concessions for the exploration, development and exploitation of small-scale coal mining within the Bangsamoro territory pursuant to RA 11054, Article 10, Section 13.

Source: Prepared by the survey team based on IEB TOR.

Regarding support for BARMM, there is currently no direct institution that has approved assistance, as it needs to be discussed within the IEB. BARMM is a region with at nearly 100% renewable energy, and exports excess electricity to Mindanao Island outside the BARMM region due to its abundant hydroelectric power sources. Additionally, by extracting and tailoring existing energy-related plans in Mindanao for BARMM in the energy planning process, population growth projections and electricity demand forecasts have already been established. Particularly, there is no imminent increase in electricity demand that would pose an immediate concern.

As mentioned above, activities related to BARMM and DOE should be addressed in the IEB. Therefore, DOE EPPB requested donors to begin participating in the relevant TWGs and engaging in discussions on

issues such as resolving the inadequate management of LASURECO and MAGELCO (e.g., addressing the limitation of toll collection capacity), which is considered a current concern.

3) Status of Donor Support

The EPPB does not currently receive support from any other donors, but the following are examples of support that may be relevant.

Table 2-26 Status of Donor support (Energy Statistics and Planning)

Cooperation Partners	Project Name and Description	implementing agency	status of implementation
ADB	Project name: Energy Transition Mechanism Feasibility, Design + CIF ACT IP (CCAP SP2) Implementation period: 2021-ongoing Implementation site: N/A Purpose and nature of activity: N/A	DOE, DOF, Private	ongoing
USAID	Project name: : Energy Secure Philippines (ESP) Implementation period : 2020-2024 Implementation site : N/A Purpose and nature of activity : To enhance the safety and reliability of the integrated power system envisioned in the Philippines by improving the performance of power utilities (including joint implementation of a research project on RCP evaluation), expanding the introduction of advanced energy sources and systems, and strengthening the competitiveness of the power sector. Note that the project will target specific DUs, but the details of the project are not yet known.	DOE ERC DU	ongoing
ETC Leading Countries and various donors for the year	Project name: Energy Transition Council (ETC) Implementation period: 2020- Implementation site: N/A Activity Objective/Description: Initiative launched in 2020 as part of the UK's COP26 Presidency, providing a platform for solution-based discussions and coordination between countries in need of support for energy transition and key international donors and institutions providing assistance.	DOE	ongoing
JICA	Project name: Progress Survey of Energy Sector Reform in the Philippines Implementation period: ~December 2013 Implementation site: Nationwide Activity Objective/Description: In the pursuit of developing an energy sector reform policy aimed at strengthening the power supply system and rationalizing electricity tariffs in the Philippines, a crucial strategy involves engaging in policy dialogues with neighboring countries. Through these dialogues, the objective is to gather information on the energy landscape, ongoing reform initiatives, and current practices related to energy sector reform in these nations. This information will be instrumental in supporting and assisting the Philippine Department of Energy in its endeavors.	DOE	Completed

Source: JICA Survey Team

(3) Conventional Energy

This section discusses conventional energy sources such as oil, coal, and natural gas. As the international world moves toward decarbonization, natural gas, which has the relatively lower GHG emissions among fossil fuels, is expected to play an active role as a transition energy, and this section focuses on its efforts including resource procurement including gas field development. However, policies, plans, and initiatives to increase the use of oil and coal are not described in this section because they are not compatible with climate change countermeasures.

1) Relevant Policies and Plans

(a) Upstream Oil and Gas Roadmap (2017-2040)

In the Philippines, domestic production of primary energy is an issue from the perspective of energy security. The Upstream Oil and Gas Roadmap plans to increase production at existing oil and natural gas fields and develop new fields until 2040 as a measure to address this issue. The Upstream Oil and Gas Roadmap, however, calls for the private sector to develop these fields, and the government is responsible for making them more attractive for investment.

(b) Downstream Natural Gas Roadmap (2017-2040)

The roadmap is focused on the downstream process of natural gas in order to attract investment by establishing an efficient natural gas industry and infrastructure so that natural gas can be used in preference to other resources. Although the roadmap does not specifically address the integration of natural gas with decarbonization efforts, as it is basically focused on creating a sound market and stimulating market principles, the priority given to natural gas as a temporary energy source with low carbon dioxide emissions per unit of energy generated is considered as a contribution to climate change mitigation measures.

(c) Natural Gas Development Plan

The Natural Gas Plan was developed by the Gas Policy Development Project, formed with the support of the ASIA EDGE of the United States and the University of the Philippines Statistical Center Research Foundation, Inc. (UPSCRFI). The plan projects that Philippine natural gas consumption will reach at least 16.8 MTOE for power generation and 0.05 MTOE for non-power generation by 2040, with growth primarily driven by substitution of coal and oil-based fuels in power generation and increased use of gas-fired power as a balancing source. Although not stated as an explicit goal, the report also states that the country is moving toward becoming a natural gas importer in light of this increased demand and the depletion of the Malampaya gas field, the only gas field in the country. Other ideas are also presented, such as the idea of natural gas as a transition fuel toward decarbonization, and carbon capture and storage are mentioned as future technology options for deployment, but this is only an introduction to research and case studies.

2) Implementation Status of Climate Change Measures

(a) Implementation structure

In the conventional energy sector, the Energy Resource Development Bureau (ERDB) is responsible for upstream development and the Oil Industry Management Bureau (OIMB) for downstream development. Therefore, these bureaus will also implement climate change measures in the relevant subsectors.

ERDB formulates and implements government policies, programs and regulations relating to the exploration, development and production of indigenous petroleum, coal and nuclear energy resources, and related product and market development thereof. OIMB develops and implements policies, programs, and regulations related to the downstream petroleum industry, including import, export, stockpiling, storage, transportation, refining, processing, marketing, and distribution of petroleum crude oil, products, and co-products, it formulates and implements programs and regulations and monitors the development of the downstream petroleum industry. It establishes and monitors policies, standards, and systems for related infrastructure (e.g., LNG terminals and gas pipelines) to accelerate the introduction and promotion of natural gas.

(b) Climate-related budgets

Table 2-21 shows that natural gas is not budgeted in terms of conventional energy.

(c) Implementation status of climate change mitigation measures

The DOE has declared a coal moratorium on greenfield coal-fired power projects on December 22, 2020. As a result, no further approvals will be granted for new coal-fired power projects, effectively halting the expansion of coal-fired power generation deployment.

The DOE is steering a fuel switch to natural gas, which is considered relatively clean, in response to this decision against fossil fuel power generation. Meanwhile, with the development rights for Malampaya, the Philippines' only gas field, expiring in 2024 and production expected to decline by 2022, the development of domestic gas fields has become an urgent priority. Therefore, the development and production contract for the Malampaya gas field and surrounding gas fields have been renewed until 2039. In order to ensure the future supply of domestically produced natural gas, DOE continues to monitor and supervise the operation of the 18 active service contracts (SC) to promote the exploration and development of domestic oil and gas resources. Currently, the combined resource potential from 1667 sedimentary basins totals over 700,000 km², of which only about 10% has been explored and developed. In addition, in accordance with Department Circular (DC) 2017-12-001768 issued on December 27, 2017, the Philippine Conventional Energy Contracting Program (PCECP) was formulated to facilitate the promotion and approval of SC in the country. This enabled the country to attract investment in oil and gas exploration and development.

With a view to complementing domestically produced natural gas supply, DOE is also focusing on importing liquefied natural gas (LNG) through the development and operation of LNG receiving facilities. This strategy will not only introduce a new industry, but also stabilize natural gas supplies that will ensure the continued operation of existing power plants supplied by Malampaya, and DOE has already approved seven LNG import terminal project applications.

There are no significant differences in issues related to capacity building, financial, and institutional aspects compared to those outlined in Section 2.2.4(1) “Energy Statistics and Planning”.

Challenges include a limitation of knowledge in the specific subsector (such as limited understanding of natural gas within the DOE) and insufficient private investment. This subsector focuses solely on addressing issues related to technology.

Apart from renewable energy, the Philippines acknowledges the importance of natural gas. Intermediate-capacity natural gas generation serves as a flexible and clean alternative to coal power generation, complementing intermittent renewable energy generation. As intermittent renewables expand, natural gas becomes a reliable energy source, capable of responding swiftly to demand fluctuations, ensuring a stable electricity supply.

In 2020, the total installed capacity of gas-fired power generation was 3,453 MW, and the total supply of natural gas primary energy was 3.29 Mtoe. According to the Reference Energy Forecast (REF), this is projected to expand to 146.86 TWh by 2040. In contrast, the Clean Energy Scenario (CES) anticipates introducing and expanding 18,883 MW of natural gas-fired power generation by 2040, with a total generation of 93.24 TWh.

Despite extending the development rights for the Malampaya gas field, the absence of prospects for new gas fields implies a potential decline in domestic natural gas supply. Therefore, the LNG import plan serves as a temporary solution, with its smooth implementation posing a challenge. Discovering new natural gas fields is a top priority to meet the growing energy demand for natural gas.

Another challenge involves utilizing gas for purposes other than power generation. The Department of Energy (DOE) aims for only a 1.5% increase in total natural gas consumption from the transportation and industrial sectors between 2020 and 2040, despite projected energy consumption growth due to population increase and energy efficiency considerations. The DOE seeks to enhance gas utilization beyond power generation, engaging in discussions with operators in special economic zones (EZs) regarding the potential use of natural gas as a fuel. Additionally, addressing natural gas infrastructure for alternative uses is an ongoing concern.

For these issues, ERDB wishes to collect geophysical data to be used by DOE and upstream petroleum investors in oil and gas exploration to discover new gas fields to replace the Malampaya gas field.

Specifically, with the goal of increasing the prospects of the 16 sedimentary basins in the country, (1) airborne gradiometry geophysical data in the sedimentary basins will be acquired to determine the subsurface extent and the thickness and shape of the sedimentary basins. In addition, (2) to select potential areas suitable for hydrocarbon production with thick sedimentary layers, as identified from the results of the gradiometry survey, and to acquire 2D seismic survey data.

As mentioned above, natural gas development is entirely based on private investment from upstream to downstream, and the OIMB has shared the support needs to formulate a policy to attract further private investment, particularly in downstream infrastructure. In this context, the OIMB also requested the capacity building from three perspectives: technical, legal, and financial, as knowledge on natural gas is limited even within the OIMB. Specific activities include natural gas market research, potential location maps for natural gas infrastructure such as LNG terminals, gas pipelines, and power plants, and capacity building on the latest technologies for gas-fired power generation. As a major policy initiative, the OIMB has received requests from other donors to develop a natural gas roadmap that includes, for example, hydrogen mono-firing, in order to promote the decarbonization of the sector in light of the declining trend of other donors' support for natural gas.

Since it is difficult to determine the location of an LNG terminal if the location of the power plant is unclear, the gas-related private companies requested information on the approximate future location of gas-fired power plants for LNG terminal-related businesses. In particular, it was suggested that it would be more effective in attracting private investment if the candidate sites, development period, and scale of development are all available.

(d) Implementation status of climate change adaptation measures

Aside from the EPPB's efforts, no other adaptation measure was identified in this subsector.

3) Trends in Japanese Private Sector

Trends in Japanese private companies regarding natural gas are shown in the table below. It is likely that business participation in large-scale natural gas combined cycle power generation was conducted by a consortium of large companies, which seems a significant risk hedging factor. In addition, the company has recently been increasingly participating in the construction of LNG terminals.

Table 2-27 Trends in Japanese Private Sector (Conventional Energy subsector)

Classification	Company Name	Trend	Year
Natural Gas Power Generation	JERA Co., Inc." Marubeni Corporation, Mitsubishi Corporation, Kyushu Electric Power Co., Inc.	Participation in the Luzon Batangas Ilijan Power Plant (natural gas combined cycle power generation: 125 MW) project	2007

Natural Gas Power Generation	Mitsubishi Power, Ltd.	Established a new company called MHPS (Philippines) Plant Services Corporation (MHPS-PSC) through its local subsidiary. MHPS-PSC will be engaged in the service business of thermal power generation-related facilities.	2019
LNG Terminal	Tokyo Gas Co., Ltd.	The signing of a mutual cooperation agreement with First Gen Corporation for the construction and operation of the Batangas Floating LNG Terminal (with a send-out capacity of 500 million standard cubic feet per day, and a maximum of 750 million standard cubic feet per day).	2020
LNG Terminal	Osaka Gas Co., Ltd.	The operation of the first phase of the Batangas LNG Terminal project, with an annual processing capacity of 3 million tons, has commenced.	2023

Source: Prepared by the survey team based mainly on various press articles in the last five years.

4) **Status of Donor Support**

Regarding natural gas, The United States Trade and Development Agency (USTDA), in cooperation with the Ministry of Economy, Trade and Industry (METI) of Japan under the Japan-U.S. Strategic Energy Partnership, is implementing the following programs regarding natural gas. Meanwhile, the United States Department of State-Bureau of Energy Resources (USDS-ENR) has completed the second phase of support and is currently in the process of starting the third phase.

Table 2-28 Status of Donor support (Conventional Energy)

Cooperation Partners	Project Name and Description	implementing agency	status of implementation
METI / USTDA	Project name: Liquefied Natural Gas (LNG) Value Chain and Natural Gas Cooperation Training Program. Implementation period: details unknown Implementation site: Details unknown Activity Objective/Content: It supports LNG infrastructure development in the Indo-Pacific region as part of the Japan-U.S. Strategic Energy Partnership (JUSEP). LNG Promoting Value Chain Formation and Natural Gas Cooperation Training Program.	DOE	ongoing
United States Department of State-Bureau of Energy Resources (USDS-ENR)	Project name: GAS POLICY DEVELOPMENT PROJECT Implementation period: September 2018-January 2020 Implementation site: Details unknown Activity Objective/Content : Technical assistance for the implementation of Philippine Downstream Natural Gas Regulation (PDNGR) Department Circular (DC) 2017-11-0012.	DOE	Completed
ADB	Business Name: PSALM Privatization Implementation period: 2023-March '24 Implementation site: Details unknown Activity Objective/Content: Possibly to support the Power Sector Asset Liability Management Company (PSALM) in the management of power-related assets, but details are unknown.	PSALM (Power Sector Assets and Liability Management Corporation)	ongoing
ADB	Project name: Recommendation for Power Sector Assets Implementation period: details unknown Implementation site: Details unknown Activity Objective/Content: Continue efforts to extend the life of PSALM.	DOE, PSALM	in preparation
JICA	Project name: Preparatory Survey for Natural Gas Pipeline Construction Project in the Philippines Implementation Period: July 2013 - June 2014 Implementation site: - BATMAN 1: Batangas to Metro Manila	DOE PNOC	Completed

Cooperation Partners	Project Name and Description	implementing agency	status of implementation
	<ul style="list-style-type: none"> - LNG receiving terminal: Batangas - Natural gas-fired power plant: Southern Luzon, Metro Manila <p>Activity Objective/Description:</p> <ul style="list-style-type: none"> ➤ Evaluate the potential of the Batman1 project within a Public-Private Partnership (PPP) framework by assessing the comprehensive value chain, including LNG facilities, regasification facilities, pipelines, offtake facilities, etc. Propose an appropriate implementation strategy. ➤ Collect necessary information related to Malampaya, other gas facilities, power plants, industrial zones, commercial buildings, CNG buses, and LNG terminals (in Bataan, Mindanao, Pagbilao, etc.). <p>Gather and analyze information on current regulations in the Philippines concerning natural gas development and PPP development. Analyze and propose necessary revisions to ensure the smooth implementation of the project.</p>		

Source: JICA Survey Team

(4) Renewable Energy

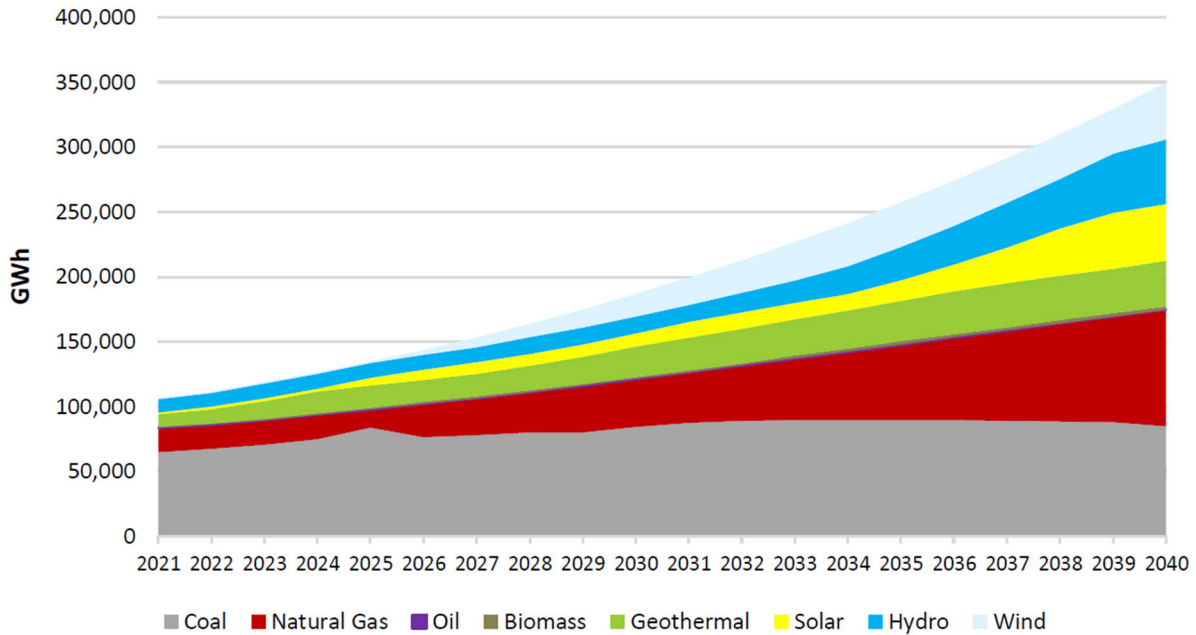
1) Relevant Policies and Plans

(a) Renewable Energy Act 9513

The Renewable Energy Act of 2008 establishes the legal and institutional framework necessary to harmonize policies on the development of renewable energy. The Act accelerates the exploration and development of renewable energy resources, including solar, wind, hydro, ocean, geothermal and biomass energy, and institutionalizes national and local capacity building in the use of renewable energy systems and provides fiscal and non-fiscal incentives to promote efficient and cost-effective. The goal is to expand the use of renewable energy by promoting its efficient and cost-effective commercial use.

(b) National Renewable Energy Program (2020-2040)

The National Renewable Energy Program (NREP) is a plan that outlines the policy framework and implementation strategies to achieve the overall goals of the Renewable Energy Act of 2008 (RA 9513). This is developed by DOE and shows the pathway towards expansion of the market for renewable energy generation, including the enablers like Renewable Portfolio Standard (RPS) and the Green Energy Options Program (GEOP). The report presents a forecast for the transition of the energy mix, aiming to achieve 35% by 2030 and over 50% of power generation from renewable energy sources by 2040. The starting point in 2020 was 21%, and the future outlook involves addressing the increasing power demand due to population growth through the implementation of renewable energy and gas-fired power generation.

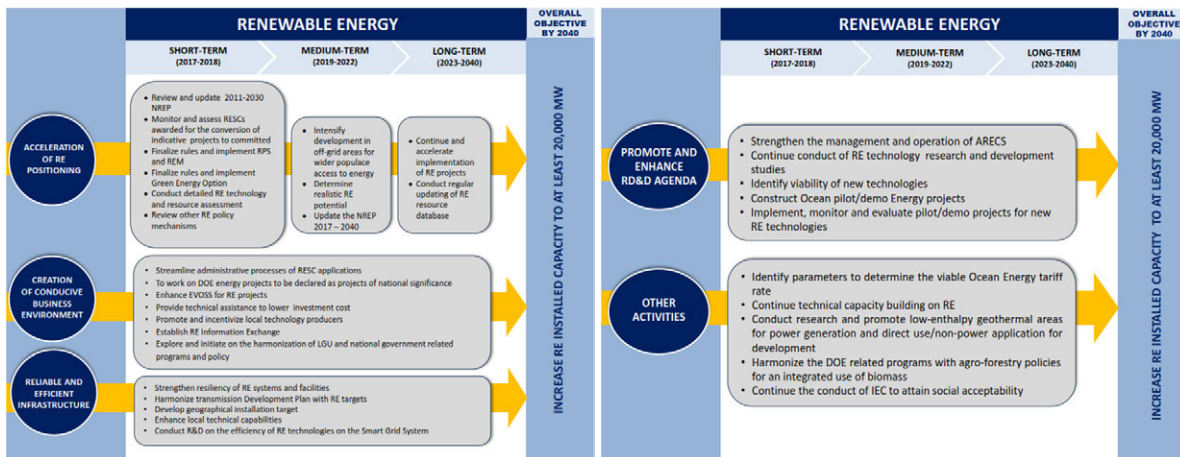


Source: National Renewable Energy Program (2020-2040)

Figure 2-20 Projected Energy Mix in the Philippines 2021-2040

(c) Renewable Energy Roadmap (2017-2040)

This is a roadmap that chronologically organizes the short-, medium-, and long-term actions that have been established to achieve the goal of 20,000 MW of installed capacity for renewable energy installations by 2040. Basically, the roadmap is based on the targets set forth in the NREP.



Source: National Renewable Energy Program (2020-2040)

Figure 2-21 Renewable Energy Roadmap

(d) Offshore Wind Roadmap for the Philippines

This roadmap was developed by the World Bank Country Team in the Philippines under the umbrella of the World Bank Group’s (WBG) Offshore Wind Development Program to assist the Philippine government in establishing policies, regulations, processes, and infrastructure to grow this new industry. The funding

was provided by the Energy Sector Management Assistance Program (ESMAP) in partnership with the International Finance Corporation (IFC). The study strategically analyzes the potential for offshore wind development in the Philippines, examining opportunities and challenges in various hypothetical growth scenarios, and estimates that it could contribute to a total installed capacity of 178 GW of electricity and 480 million tons of GHG reduction (2020-2040), which contribute significantly to achieving the NDC. On the other hand, this roadmap has identified challenges to its diffusion, including cost, grid development, environmental and social impacts, supply chain, financing, and limitations on project ownership by foreign investors.

2) Implementation Status of Climate Change Measures

(a) Implementation structure

REMB is responsible for developing and implementing policies, plans, and programs to accelerate the development, conversion, utilization, and commercialization of renewable energy resources, including emerging energy technologies. The mission of REMB is to develop and implement policies, plans, and programs to accelerate the development, conversion, utilization, and commercialization of renewable energy resources, including emerging energy technologies.

(b) Climate-related budgets

As far as the climate change budgets shown in Table 2-21 are concerned, renewable energy is budgeted under the programs "Promotion of renewable energy resources" and "Supervision and regulation of exploration, development and utilization of RE resources and technologies", with a total amount of 45.22 million PHP. Although it depends on the content of the program, it is considered to be by far the smallest budget if the exploration and utilization of renewable energy technologies are assumed in the literal sense of the word.

(c) Implementation status of climate change mitigation measures

a) Feed-in Tariff (FIT)

FIT is a system that guarantees a feed-in tariff for 20 years for each kWh of electricity produced from renewable energy resources, excluding on-site generation. The FIT Regulation was issued in 2010 by ERC Resolution No. 16 (2010 series), RE Law Article 7, which provides for priority connection to the main grid, priority purchase of renewable energy generation by grid. The renewable energy technologies covered by the FIT include solar, wind, biomass, marine, and run-of-river hydropower.

In addition, the Green Energy Auction Program (GEAP) was launched in 2022, and the format was changed to a FIT contract between the DOE and power suppliers through an auction. Projects that meet the criteria and conditions set by the government will participate in the bidding, and the project that proposes the most competitive price will win the contract, which is expected to help energy suppliers secure long-term

contracts and improve the stability and profitability of their investments while also contributing to lower electricity prices. After a successful first round in 2022 with a target of 2,000 MW, of which approximately 98% was awarded, the second round in 2023 targeted 11,160 megawatts (MW) of renewable energy installations, but only about 32% of the bids were successful. Some media reports²⁷ pointed out that the maximum amount set at the time of the auction (Gear Price) was too low and that the development costs for some technologies were too high as reasons for the low bids. In light of this, it is reported that in the third round of bidding scheduled for the first quarter of 2024, the remainder of the second round will be auctioned and the Gear Price, the upper limit for bidding, may be eliminated.

b) Net metering

The net metering system is based on Article 10 of the Renewable Energy Law, which allows end-users to generate electricity from renewable energy sources up to 100 kW for their own use and sell the surplus through the grid. This creates a new type of end user, the "prosumer" (producer and consumer), and the prosumer can benefit from rebates and reduced generation rates. Net metering allows distribution utilities (DUs) to charge prosumers a net amount of their electricity imports and exports on top of their monthly electricity bills. In light of the fact that most rooftop solar power generation in the Philippines has been introduced through FIT, which has limited the contribution of the program to the promotion of renewable energy introduction, ERC has decided to increase the scale of eligible renewable energy to 1 MW in 2022.

c) Priority supply of renewable energy

Renewable energy to which the FIT applies will be prioritized in the Wholesale Electricity Spot Market (WESM) distribution schedule to ensure maximum output injection into the grid, in accordance with Section 4 of DOE Department Circular (DC) No. DC2015-03-00015. and intermittent renewable energy plants, such as wind, solar, ROR hydro, and marine energy, will always be served in the WESM, regardless of whether they are FIT-eligible or not, and FIT-eligible biomass plants will benefit from priority power supply.

d) Renewable Portfolio Standard (RPS)

DOE DC No. DC2017-12-0015 (commonly known as the RPS on-grid rule) requires all mandatory participants to procure or produce a specified portion of their electricity needs from renewable energy sources and develop indigenous, environmentally friendly energy resources. It also establishes minimum annual RPS requirements and increments, identifies eligible RE facilities, directs mandatory participants compliance monitoring, and provides penalties for noncompliance. The minimum annual RPS increment is initially set at 1% of mandatory participants net sales for the previous year, and off-grid rules have been considered but have not yet been implemented.

²⁷ 3rd Green Energy Auction postponed, INQUIRER.NET, 2023(<https://business.inquirer.net/433768/3rd-green-energy-auction-postponed>)

e) Green Energy Options Program (GEOP)

The GEOP is provided for in Section 9 of the Renewable Energy Act, which allows electricity end-users to receive electricity from a renewable energy power supplier of their choice. For this implementation, DOE issued on July 18, 2018, "Promulgating the Rules and Guidelines Governing the Establishment of the Green Energy Option Program Pursuant to the Renewable Energy Act of 2008," DC No. DC2018-07-0019, establishing the policy framework for the GEOP. Under this DC, participation in the Program is voluntary for end-users with an average peak demand of 100 kW or more over the past 12 months, as the GEOP allows end-users to contract directly with their chosen renewable energy supplier at an agreed upon price through its own procurement process, unregulated activity, it can contribute to the development and use of renewable energy resources in a sustainable manner at minimal cost. As of December 2023, 286 end-users have already switched to GEOP and 19 renewable energy suppliers have obtained GEOP Operating Permits. 65% are from the commercial sector; 34% from the industrial sector; 1% are residential.

Delays in the implementation of renewable energy policy mechanisms are a challenge. Delays in implementing important renewable energy policies and programs (e.g., RPS and GEOP) have contributed to the slow growth of renewable energy capacity in the previous year.

f) Renewable Energy Trust Fund (RETF)

The Renewable Energy Trust Fund (RETF) was established under Section 28 of the Renewable Energy Act to promote the development and increased use of renewable energy. The fund is administered by the DOE as a special account at a governmental financial institution and is to be used solely for the following purposes:

- Research, development, demonstration, and promotion of the diffusion and productive use of renewable energy in power and non-power applications.
- Provides funding for qualified institutions to engage in renewable energy research, as well as scholarships and fellowships for energy research.
- New renewable energy resources development and operational support.
- A national renewable energy resource and market assessment study.
- Accreditation, guidance, training, and provision of benefits to institutions, associations, and organizations promoting renewable energy at the national and local levels for the dissemination of renewable energy knowledge, and
- Other activities necessary to achieve the objectives of the Renewable Energy Act.

g) Renewable Energy Market (REM)

To facilitate compliance with the RPS, RE Act Pursuant to Section 8, DOE issued DC No. DC2019-12-0016, entitled "Promulgating the Renewable Energy Market Rules" or "REM Rules," on December 04, 2019, establishing the REM. The REM will serve as a forum for the transparent and fair trading of RECs,

which represent the environmental attributes of electricity generated from renewable energy resources, among REM participants; on December 17, 2019, with the support of the DREAMS project funded by the Global Environment Facility (GEF) and United Nations Development Programme (UNDP), trading participants established the Philippine Renewable Energy Market System (PREMS), which will serve as an online platform where REC accounts can be managed. As it stands, DC2022-06-0019 was issued in June 2022 as a notice declaring the interim commercial operation of PREMS, and provides the bylaws for operation.

h) Home Electrification Program

The DOE's Home Electrification Program, an initiative to provide household lighting using solar power systems, began in 2010 in support of the then Barangay Electrification Program. One of the government's most extensive renewable electrification programs, it has organized recipient households into Sitio Power Associations and implemented capacity building activities on basic accounting and auditing procedures, load management, and system operation and maintenance, etc.

From 2010 to 2017, a total of 55, 248 households have been provided with solar lighting systems.

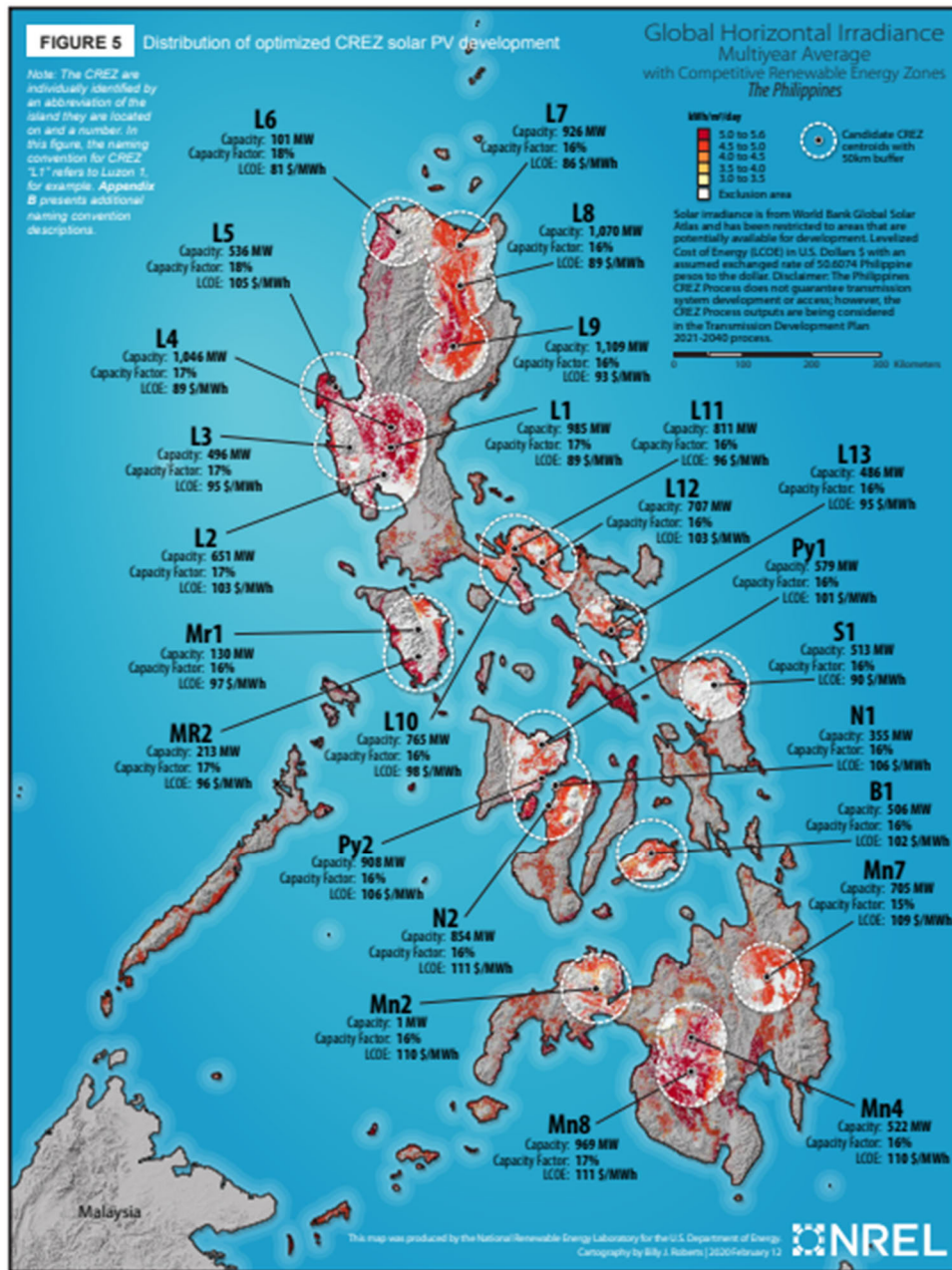
i) Competitive Renewable Energy Zones (CREZs)

On September 18, 2018, DOE DC No. DC2018-09-0027, entitled "Establishment and Development of Competitive Renewable Energy Zones in the Nation," was issued. This DC institutionalizes a process to facilitate aggressive transmission planning by identifying areas with the most economically viable renewable energy resources. Competitive Renewable Energy Zones (CREZs) are geographic areas with abundant renewable energy resources, suitable topography, appropriate land use classifications, and demonstrated interest in development. The identification of such areas will help in the formulation and implementation of the DOE's NREP and PDP and the Transmission Development Plan (TDP) of the National Grid Corporation of the Philippines (NGCP). CREZ is an initiative supported by the U.S. Agency for International Development (USAID) and the National Renewable Energy Laboratory (NREL). In September 2020, the vision for the program, titled "Ready for Renewables Grid Planning and Competitive Renewable Energy Zones (CREZ) in the Philippines," was presented, with projections for the amount of renewable energy species that will contribute to the deployment of renewable energy in each region, as shown in the table below.

Table 2-29 Projections of installed renewable energy capacity via CREZ by region

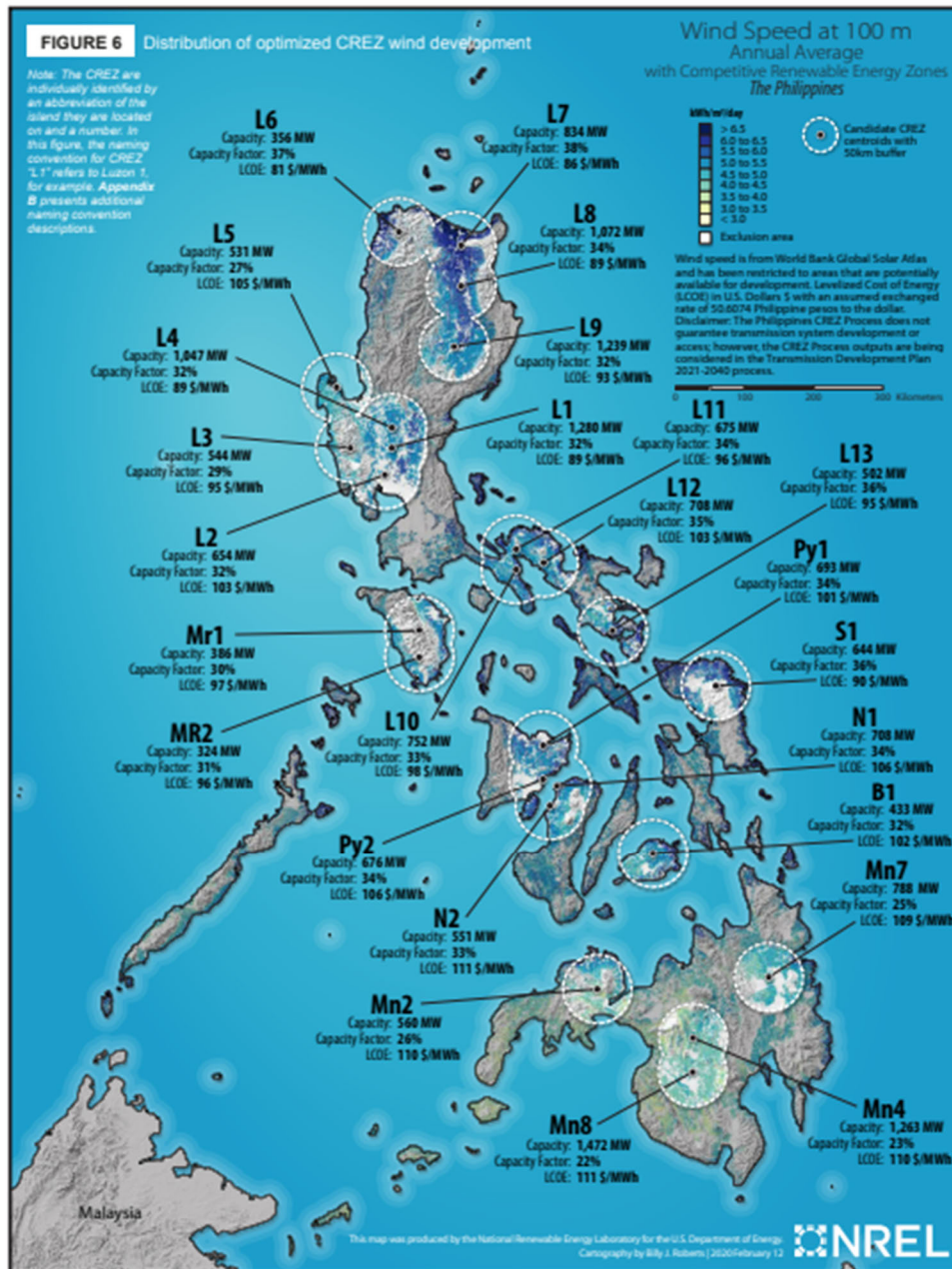
Estimated CREZ Opportunity Capacity (MW)					
System	Solar PV	Wind	Geothermal	Hydropower	Biomass
Luzon	35,031	54,115	285	270,603	210
Visayas	11,876	25,429	40	1,917	71
Mindanao	11,203	14,443	40	382,514	93

Source: Ready for Renewables Grid Planning and Competitive Renewable Energy Zones (CREZ) in the Philippines



Source: Ready for Renewables Grid Planning and Competitive Renewable Energy Zones (CREZ) in the Philippines

Figure 2-22 CREZ Target Areas for Solar



Source: Ready for Renewables Grid Planning and Competitive Renewable Energy Zones (CREZ) in the Philippines

Figure 2-23 CREZ Target Areas for Wind

j) Energy Virtual One-Stop-Shop (EVOSS)

The Energy Virtual One-Stop-Shop (EVOSS) Act was established under Republic Act No. 11234 and signed into law on March 8, 2019, for the purpose of expediting the permitting process for all new generation, transmission, and distribution projects nationwide. The EVOSS system is a centralized web-based platform that facilitates the coordinated submission, synchronized processing, and monitoring of energy project permits and allows for the integration of all relevant agency systems. Through EVOSS, which is managed by the DOE, energy companies and developers will have a transparent and efficient way to submit applications for submissions, monitoring, and status inquiries, and currently most DOE permits and approvals for renewable energy projects are already registered in EVOSS. The attached energy agencies,

the National Electrification Agency (NEA), the National Power Corporation (NPC), and TransCo have also incorporated parts of their processes into EVOSS, and other agencies are preparing their systems for integration into the platform. In September 2023, the EVOSS system has a potential capacity of 100 MW in approving or approved renewable energy projects, and local government units (LGUs) are expected to join EVOSS in the next phase.

Therefore, the complex permit process is still a challenge. The complex process of obtaining local and national permits from various agencies has caused significant delays in the construction, commissioning, and commercial operation of renewable energy projects.

k) Reduction of barriers to entry for foreign capital

In the Philippines, foreign investment in renewable energy projects was limited to 40% or less, but the DOE removed restrictions on foreign investment in biomass power projects in 2019, large-scale geothermal power projects in 2020, and solar, wind, hydro and marine and tidal power projects in 2022. As a result, almost all renewable energy projects can now be expanded by 100% foreign capital, which is expected to accelerate the introduction of renewable energy in the future. In fact, an additional 126 renewable energy contracts have been signed since this initiative, increasing the potential capacity to 31,000 MW.

l) Joint Crediting Mechanism (JCM)

JCM has been established and implemented to quantitatively assess Japan's contribution to GHG emission reductions and absorption achieved through the diffusion and implementation of superior decarbonization technologies, products, systems, services, and infrastructure in developing countries and other countries, and to use the results to help Japan achieve its GHG emission reduction targets. Philippines has become a partner country of the JCM in January 2017 and registered the total of 16 projects so far, which are expected to contribute to a total reduction of 352,818 tCO₂/year. Most of the projects related to the introduction of renewable energies, especially solar power generation, and geothermal power generation has also been adopted.

In response to these proactive efforts in renewable energy, the ERC issues permits and licenses for the installation of renewable energy facilities, but there have been delays due to a limitation of human resources and technical capacity. Details of the challenges within the ERC are discussed in detail in the section on "Transmission, Distribution, and Electrification," which is the most relevant section of this report.

DOE EPPB says limited access to finance is a challenge. Renewable energy projects, especially those by small independent power producers, continue to be perceived as risky by funders, limiting access to project financing.

Technically, the development of renewable energy resources is a challenge. High costs and absence of model projects in such as the offshore wind and marine technologies make renewable energy development

difficult. There are also challenges regarding the interconnection of power grids. Existing grid infrastructure has limited capacity, and necessary grid expansion projects have been delayed. As a result, the transmission line is unable to accommodate the need for capacity changes due to new renewable energy projects, leading to delays in commercial operation.

Moreover, ports are an issue, especially for offshore wind power generation projects. There are no ports near the proposed offshore wind farm sites, and there is not enough space to store the wind turbines in the existing ports, or there are no well-equipped ports where the barges can enter.

Regarding these issues, the following diverse requests were received from REMB.

m) Study on the potential for introducing large-scale hydropower and pumped storage power generation, reflecting and updating the hydropower resource database

While the Philippines has made progress in introducing small- to medium-scale hydropower, there has been no development of large-scale storage-type hydropower in recent years. The PEP and NREP call for a further expansion of hydropower capacity by 6,150 MW by 2040, which will make large hydropower development important. Therefore, REMB intends to further reduce barriers to entry for private companies by identifying the potential of hydropower of 100 MW or more and integrating it into the existing hydropower database. The basis of this database was organized through the "Republic of the Philippines Hydropower Resource Inventory Survey" conducted by JICA in 2012.

Although not a request from REMB, DOST expressed the needs that the program will also take into account flood control and water utilization aspects. The DENR-Climate Change Service (CCS) also requested that the vulnerability of the land as well as rainfall fluctuation and regional migration be considered in order to incorporate the aspect of adaptation into the implementation of the program. The currently submitted SC-based potential for the introduction of hydropower of 100 MW or more is shown in the table below.

Table 2-30 Current potential for hydropower over 100 MW

No.	Project Name	Location	Capacity (MW)
1	Gened 1 Hydroelectric Power Project	Apayao	150
2	Kabulnan 2 Hydroelectric Power Project	Isulan, Sultan Kudarat	110
3	Angat (Pump Storage) Hydroelectric Power Project	Norzagaray, Bulacan	300
4	Pantabangan (Pump Storage) Hydroelectric Power Project	Pantabangan, Nueva Ecija	600
5	Aklan Pumped-Storage Hydroelectric Power Project	Malay, Aklan	300
6	Wawa Pumped Storage 1 Hydroelectric Power Project	Rodriguez, Rizal	500
7	Wawa Pumped Storage 2 Hydroelectric Power Project	Rodriguez, Rizal	100
8	Chico Hydroelectric Power Project	Tabuk, Kalinga	150
9	Davao Hydroelectric Power Project	Davao City	140
10	Pumped Storage Bolusao Hydroelectric Power Project	Lawaan, Eastern Samar	300
11	Pililia Pumped Storage Hydroelectric Power Project	Pitilla, Rizal	300
12	Alimit Hydroelectric Power Project	Lagawe, Ifugao	120
13	Alimit-Pumped Storage Hydroelectric Power Project	Lagawe & Mayoyao, Ifugao	250
14	San Roque Upper East Pumped Storage Hydroelectric Power Project	Itogon, Benguet	600
15	San Roque West Pumped Storage Hydroelectric Power Project	Itogon, Benguet	400
16	Kanan B-1 Hydroelectric Power Project	General Nakar, Quezon	150

No.	Project Name	Location	Capacity (MW)
17	Agus III Hydroelectric Power Project	Pantar, Lanao del Norte & Baloi/Saguiaran, Lanao del Sur	225
18	Kibungan Hydroelectric Power Project	Kibungan, Benguet	1,000
19	Dagkan Hydroelectric Power Project	Nagtipunan, Quirino	125
20	Dingalan Pumped-Storage Hydroelectric Power Project	Dingalan, Aurora	500
21	San Roque Lower East Pumped-Storage Hydroelectric Power Project	Itogon, Benguet	400
22	Binongan-Tineg Hydroelectric Power Project	Tineg & Lagayan, Abra	175
23	Cagayan 1N Hydroelectric Power Project	Iligan City, Lanao del Norte	160
24	Kibungan Pumped-Storage Hydroelectric Power Project	Kibungan, Benguet	500
25	Dambo Pumped Storage Hydroelectric Power Project	Pangil, Laguna	800
26	Jala-Jala Pumped Storage Site 3 Hydroelectric Power Project	Jala-Jala, Rizal	750
27	Jala-Jala Pumped Storage Site 4 Hydroelectric Power Project	Jala-Jala, Rizal	300
28	Kalayaan Pumped Storage Hydroelectric Power Project	Kalayaan, Laguna	600
29	Paete Pumped Storage Hydroelectric Power Project	Paete, Laguna	350
30	Jala-Jala Pumped Storage Site 5 Hydroelectric Power Project	Jala-Jala, Rizal	300
31	Toledo City Pumped Storage Hydroelectric Power Project	Toledo City, Cebu	250
32	Gened 2 Hydroelectric Power Project	Kabugao, Apayao	250
33	South Pulangi Hydroelectric Power Project	Damulog, Bukidnon	250
34	Mapanuepe Site 1 Hydroelectric Power Project	Castillejos and San Marcelino, Zambales	500
35	Calanasan 2 Hydroelectric Power Project	Calanasan, Apayao	220
36	Aya Hydroelectric Power Project	Pantabangan, Nueva Ecija	120
37	Bulsa Pumped Storage Hydroelectric Power Project	City of San Jose, Tarlac	100
38	Dupax Pumped Storage Hydroelectric Power Project	Dupax del Norte, Nueva Vizcaya	108
39	Pakil Pumped Storage Hydroelectric Power Project	Pakil, Laguna	1400
40	Capiz Pumped Storage Hydroelectric Power Project	Tapaz, Capiz	250
41	Panay Pumped Storage Hydroelectric Power Project	Libacao Aklan and Jamindan Capiz	250
42	Malubog Pumped Storage Hydroelectric Power Project	Toledo City, Cebu	250
Total			14,603

Source: DOE

n) Initiatives to promote renewable energy at the public and local levels

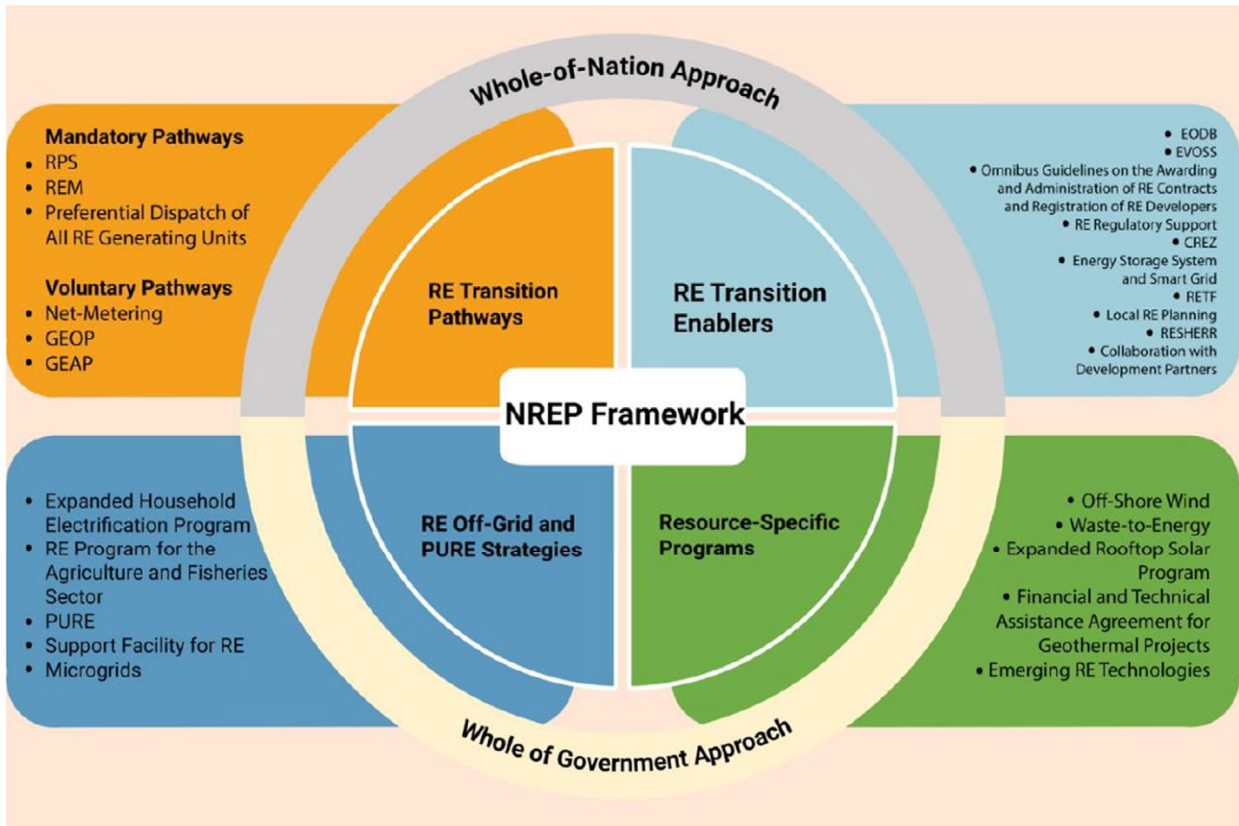
Based on the experience of productive use of renewable energy by ASEP in EU, installation of microgrids in small islands and Small Power Utilities Group (SPUG) areas and promotion of renewable energy for basic services by the DREAMS project (GEF-UNDP) Regional Revitalization Plan and Support Program, REMB requested to promote further RE diffusion.

Specifically, it aims to achieve a 50% share of renewable energy in the overall energy mix through partnerships among 28 multi-agency organizations at both the local and national levels, promoting best practices and capacity building.

- Net Zero Energy Consumption at the University
- Dissemination of RE to hospitals and other institutions as a basic social service (health)
- Promote the development of local renewable energy plans and strengthen implementation
- Promote communication and knowledge sharing

Local Renewable Energy Plans are developed at the municipal level based on surveys and other information on the potential for introducing renewable energy within the relevant geographic segment, and are intended to provide information that is highly effective in attracting private sector investment. The NREP framework,

shown in the figure below, also emphasizes the importance of promoting the plan as one of the RE Transition Enablers.



Source: National Renewable Energy Program (2020-2040)

Figure 2-24 National Renewable Energy Program Framework

o) Establish policy for introduction of floating photovoltaic power generation

REMB wishes to actively promote the introduction of floating photovoltaic (PV) power generation as a means to further accelerate the introduction of PV power generation, and has requested support, including comprehensive capacity building in technology, institutions, and policy. At the time of the survey, REMB received a proposal from ADB for support for the introduction of floating photovoltaic power generation in Laguna Lake. Therefore, this request could be cancelled depending on whether or not REMB accepts the proposal from ADB.

p) Promotion of geothermal power generation projects

REMB is currently receiving support from ADB for the de-risking roadmap for geothermal power generation. A request for support in the implementation phase after the ADB project has been raised, but since the ADB project, which was scheduled to be completed in September 2023, has been delayed, the details of the request will be confirmed in this Survey.

The ERC also requested that technical capacity be strengthened to facilitate procedures for the licensing of renewable energy installations. In particular, they would like to see the limitations of technical expertise in pumped storage power generation and geothermal power generation compensated for.

On the other hand, Support needs from private sector businesses that are or will be locally involved in renewable energy projects are as follows.

- Utilization of foreign investments and loans for floating solar and pumped-storage power generation.
- Establishment of a market structure that encourages various types of subsidies and introduction of pumped storage
- Rapid expansion of transmission lines and capacity
- Facilitation of Eminent Domain Expropriation
- Accelerated application for various permits and approvals

(d) Implementation status of climate change adaptation measures

Adaptation was considered to be similar to the EPPB’s efforts, and no other adaptation was identified in the subsector concerned. On the other hand, climate change adaptation measures have also been a challenge, with severe typhoons having damaged several renewable energy power plants in the past, leading to long-term shutdowns. Climate change is also impacting the availability and production of renewable energy resources, with events such as a significant reduction in hydroelectric power generation during El Niño drought periods becoming problematic.

3) Trends in Japanese Private Sector

The table below shows trends in the Japanese private sector with regard to renewable energy. The solar power market is polarized between mega solar power plants with substantial capacity and small-scale rooftop solar power plants, which are considered to be less likely to generate land-related rights. Several companies, including some with equity participation, are developing wind power. As for geothermal power, there have been some new installations in the past, but most of the projects are for renovation and other purposes. Biomass is rarely seen, and hydropower projects with relatively low environmental impact, such as Run-of-River and small-scale hydropower, tend to be the target of investment.

Table 2-31 Trends in Japanese Private Sector (Renewable Energy subsector)

Classification	Company Name	Trend	Year
Photovoltaic	Mitsui & Co., Ltd.	Established a holding company in the Philippines and entered the business. (JV)	2021
Photovoltaic	Advantech Co., Ltd.	Advantech Corporation and the Philippine Economic Zone Authority (PEZA) signed a Memorandum of Understanding (MOU) on the installation of a solar power generation system in an industrial park under the auspices of JICA. Advantech plans to install photovoltaic power	2023

Classification	Company Name	Trend	Year
		generation systems on the roofs of approximately 33 buildings, including factories and warehouses, and to supply approximately 3,600,000 kWh of electricity annually to the industrial park through PEZA. (JICA Private Sector Partnership)	
Photovoltaic	JGC Holdings Corporation	Construction of a 100 MW-class mega solar power plant in Bugallon, Pangasinan (EPC contract)	2021
Photovoltaic	SUSTAINA JAPAN Inc.	The only Japanese-affiliated independent EPC and power generation company in the Philippines, with a cumulative installed capacity of over 10 MW and a track record of over 50 projects as of March 2021. In recent years, the company has also conducted surveys and made proposals for micro-grid power generation in the islands and non-electrified areas.	continuation
Photovoltaic	Idemitsu Kosan Co., Ltd.	Start of 0.5MW roof-mounted solar power generation project on a warehouse of Fast, a frozen and refrigerated warehouse operator. (PPA contract)	2023
Photovoltaic	Kyushu Electric Power Company, Kyuden International Inc.	Invested in Petro Green, Inc. 31,000 kW worth of Tarlac solar (overall output 70,000 kW) (Investment in local companies)	2022
Photovoltaic	MinebeaMitsumi Inc.	Large-scale solar power generation system (approx. 7.9 MW) installed at the plant site in Danao City, Cebu. (Self-consumption)	2023
Photovoltaic	Philippine Manufacturing Co. of Murata, Inc.	Converting all electricity used by Murata Manufacturing Co., Ltd.'s production subsidiaries to renewable energy. (Self-consumption)	2023
Wind power	RENOVA, Inc.	Entered into onshore wind power generation in Mabini, Batangas with 10 units totaling 50 MW. (JV)	2023
Wind power	Challenergy Inc.	Started operation of the first Magnus wind turbine (onshore: 11 kW) in the Philippines in the province of Batanes. (MOE "Co-Innovation Project for Creation and Dissemination of Decarbonization Technologies")	2021
Wind power	Komai Haltec Corporation, Honda Motor Co.	Demonstration project to combine three KWT300 (rated output 300kW) onshore wind turbines with electric two-wheeled vehicles on Romblon Island. (MOE "Subsidy for Carbon Dioxide Emission Reduction Project" (Low Carbon Technology Innovation Project for Developing Countries))	2022
Wind power	Kyushu Electric Power Company, Kyuden International Inc.	Invested in Petro Green, Inc. 22,000 kW worth of onshore wind power in Nabas, northern Panay Island (overall output of 36,000 kW) (Investment in local companies)	2022
Wind power	SHIZEN ENERGY Inc., Shizen International Inc.	Ganubis Renewable Energy consortium signs MOU to jointly develop up to 96 MW of onshore wind power. (JV)	2023
Wind power	Chodai Corporation, SHIZEN ENERGY Inc., Equi-parco Construction Company, Equi-parco Holdings, Inc. and Caraga Wind Energy, Inc.	Construction of an onshore wind power generation plant with eight 4.2 MW-class wind turbines, totaling approximately 33 MW, in the Caraga region of Mindanao. (MOE "Subsidy for CO2 Emission Reduction Measures Project Expenses (Equipment Subsidy Project under the Bilateral Credit System Fund Support Project)")	2020
Geothermal	Toshiba Energy Systems Corporation, Mizuho Toshiba Leasing Co.	20MW Flash Geothermal Power Generation to be Introduced in Tanawan District, Southern Luzon. (EPC contract)	2022
Geothermal	JGC Holdings Corporation	Awarded for engineering, procurement of equipment and construction (EPC) services for ancillary facilities of a 28 MW binary geothermal power plant in Mahagnadon District, Ormoc City, Leyte Island. (EPC contract)	2023
Geothermal	Kyushu Electric Power Company, Kyuden International Inc.	Invested in Petro Green, Inc. Manila Maibarara Geothermal for 11,000 kW (overall output 32,000 kW) (Investment in local companies)	2022

Classification	Company Name	Trend	Year
Geothermal	Mitsubishi Power Corporation, Turboden, Inc.	New binary power generation facility to be installed at 29 MW geothermal power plant in Palayan, southeastern Luzon. (EPC contract)	2021
Geothermal	Mitsubishi Power Corporation	Receipt of order to upgrade Unit 1 equipment at the Makban geothermal power plant in Laguna. (EPC contract)	2020
Geothermal	Mitsubishi Corporation, Fuji Electric Co., Ltd.	Completion of Malotbog geothermal 230MW (77.5MW x 3 units) (EPC contract)	1998
Geothermal	Sumitomo Corporation	Naslo geothermal power plant (49MW) relocation project awarded. (EPC contract)	2013
Biomass	Chodai Corporation	2.5MW rice husk biomass power generation project in Butuan, Mindanao, Philippines. (METI business feasibility study, JCM equipment subsidy project)	2018
Complex	Electric Power Development Co., Ltd.	Study on the introduction of renewable energy to a poultry farm in Bataan near Manila. Feasibility study on introduction of distributed combined cycle renewable energy. Aiming to replace purchase from the power grid by thermal power generation using rooftop solar power generation system, bio-power generation system, and batteries. (METI "Survey Project on Infrastructure Development for Bilateral Credit Acquisition")	2024
Hydro power	RENOVA, Inc.	Signed a loan agreement to construct the 8.3 MW Kiangyan Hydroelectric Power Plant in Ifugao, Northern Luzon.	2021
Hydro power	Chodai Corporation	In the Caraga Region, Mindanao Island, there are ongoing small hydroelectric power projects. The Asiga River Small Hydroelectric Power Plant has a generation capacity of 8MW. Additionally, there is the Tagibo River Small Hydroelectric Power Plant with a generation capacity of 4MW, and the Wawa River Small Hydroelectric Power Plant with a generation capacity of 10MW. (JBIC Two-Step Loan, JCM Equipment Subsidy Program)	2018
Hydro power	Electric Power Development Co., Ltd.	Lake Mainit Hydroelectric Power Plant (24,900 kW ROR type) in Mindanao; Bulanog Batang Hydroelectric Power Plant (33,500 kW, scheduled to start commercial operation in 2029) is also being developed through BHEC. (JV)	2022
Hydro power	Shin-Energy Corporation	Construction of a 560 kW RoR, canal-type hydropower plant in Ifugao, Luzon, scheduled to start operation in July 2023. (JV)	2021
Hydro power	Toyota Tsusho Corporation	Construction of a small hydroelectric power plant (14.5MW) on the Sigil River, Maasim District, Southern Mindanao. (JV, JCM Equipment Subsidy Program)	2022
Hydro power	Marubeni Corporation, Kansai Electric Power Co.	Participation in Sun Roque Hydro (43MW) (BOT)	1998
Hydro power	Chodai Corporation	Tagibo River Water Supply Facility 0.16MW Micro Hydroelectric Project in Mindanao. (MOE "Subsidy for Carbon Dioxide Emission Reduction Project (Facility Subsidy Project under the Bilateral Credit System Financial Support Project)," JCM Equipment Subsidy Project)	2018
Hydro power	Sumitomo Corporation, Electric Power Development Co., Ltd.	Acquisition of CBK power plants in Laguna (Caliraya, Botocan, Kalayaan: total output of 728 MW) Power Plant Name: Caliraya Hydroelectric Power Plant Location: Lumban, Laguna Type: Dam water conduit (general) Output: 2.26 MW (1.13 MW x 2) Date of opening: 2002.12 (renovation) Power Plant Name: Botocan Hydroelectric Power Plant Location: Mahaihai, Laguna Type: Dam water conduit (general) Output: 20.08 MW (10,000 kW x 2,800 kW) Date of opening: 2003.6 (renovation) Power Plant Name: Karajan Pumped Storage Power Plant Location: Kalayaan, Laguna Type: Dam water conduit (pumping)	2005

Classification	Company Name	Trend	Year
		Output: Phase I 336,000 kW (168,000 kW x 2) Phase II: 34.86 MW (17.43 MW x 2) Date of opening: Period I 2002.3 Period II 2004.1 (Acquisition)	

Source: Prepared by the survey team based mainly on various press articles in the last five years.

4) Status of Donor Support

The status of donor cooperation projects in the renewable energy sector is shown in the table below. Extensive support has been provided, mainly from ADB, in the areas of capacity development, finance, technology, and institutional development in general. Support is being received for multiple types of renewable energy, including solar, geothermal, offshore wind, and marine power, and support that does not interfere with these existing efforts is required. In addition, ADB's Derisking Geothermal Roadmap will continue to be supported in the next fiscal year.

Table 2-32 Status of Donor support (Renewable Energy)

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
ADB	Project Name: Geothermal Risk-Sharing Facility for Exploration/ Pre-Development (FI Loan) Implementation period: 2024/2025 Implementation site: N/A Purpose and details of the activity: Unclear, although it is considered to be a study of risk reduction measures for private sector projects related to the introduction of geothermal power generation.	DOE DBP	in preparation
ADB	Project name: Derisking Geothermal Roadmap (CCAP SP2) Implementation period: 2022-Oct 2023 Implementation site: N/A Activity Objective/Description: Develop geothermal power potential map and make policy proposals	DOE-REMB	ongoing
ADB	Project name: Energy efficiency and small renewables-procurement and financing tools for LGUs (CCAP SP2) Implementation period: 2022-Sept 2023 Implementation site: N/A Purpose of Activity: To develop procurement and financing tools for energy conservation and small-scale renewable energy deployment in LGUs, but details are unknown.	DOE-EUMB, REMB, PPPC	ongoing
ADB	Project name: Offshore Wind Regulatory Framework Implementation period: 2022-Jan 2024 Implementation site : Nationwide Activity Objective/Description: To collect and analyze basic information on offshore wind power development and support the ERC in developing a regulatory framework for offshore wind.	ERC, DOE	ongoing

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
ADB	Project name: Floating Solar PV Technical, Legal, Environmental, and Social Recommendation for LLDA's IRR (CCAP SP2) Implementation period: 2021-July 2023 Implementation site: Laguna Lake Purpose and details of activity: may be a policy proposal on technical, institutional, environmental, and social aspects of floating solar power, but details are unknown; DOE has indicated that it may continue to support the project.	LLDA, DOE, NGCP	ongoing
ADB	Project name: ESIA and ECC guidelines for OSW and FPV Implementation period: 2023-Dec 2023 Implementation site: N/A Purpose and Description of Activity: To develop guidelines for environmental and social impact assessments and environmental compliance certifications for offshore wind and floating solar power, but details are unknown.	DENR	ongoing
ADB	Business Name: PSALM Privatization Implementation period: 2023-March '24 Implementation site: N/A Purpose and nature of activity: Possibly to support the Power Sector Asset Liability Management Company (PSALM) in the management of power-related assets, but details are unknown.	PSALM	ongoing
ADB	Project name: PNR FPV for Rail O&M Implementation period: 2023 Implementation site: N/A Purpose and details of activity: possibly cooperation on floating photovoltaic power generation, but details unknown.	PNR	ongoing
ADB	Project name: Geothermal Risk-Sharing Facility Additional request: Ocean Technologies Implementation period: Nov 2024 Implementation site: N/A Purpose and details of the activity: The activity is considered to be cooperation on marine power generation technologies other than offshore wind power, but the details are unknown as the project is still in the design stage.	DOE DBP	in preparation
ADB	Project name: EC Rehabilitation and Reform Implementation period: N/A Implementation site: N/A Activity Objective/Content: Proposals for revitalization, privatization, corporatization, and consolidation of the EC	DOE NEA	in preparation
ADB	Project name: Alternatives on Port Support Requirements for OSW Implementation period: N/A Implementation site: N/A Activity Objective/Content: To assess the cost of port development, risks at selected ports, and to ensure that port	DOE PPA DOTr	in preparation

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
	development leads to local procurement of components for OSW O&M and completes the OSW supply chain.		
ADB	Project name: Recommendation for Power Sector Assets Implementation period: N/A Implementation site: N/A Activity Objective/Content: Continue efforts to extend the life of PSALM.	DOE PSALM	in preparation
ADB	Project name: Green Bond Program Implementation period: 2015- Implementation site: N/A Activity Objective/Description: Green Bonds target projects that promote a transition to low-carbon and climate resilient growth. In energy, renewable energy deployment and energy efficiency projects are eligible as mitigation measures, while energy infrastructure resilience improvement projects are eligible as adaptation measures.		ongoing
ADB WB	Project name: Clean Technology Fund (CTF) Implementation period : 2008 Implementation site: N/A Purpose and Description: The Climate Investment Funds (CTF) is one of four programs that provide concessional financing to middle-income countries for the demonstration, diffusion, and transfer of low-carbon technologies. The ADB manages over \$1.1 billion in CTF funds for government and private sector projects.		ongoing
OECD	Project Name: Clean Energy Financial Investment Mobilization (CEFIM) Program Implementation period: N/A Implementation site: N/A Activity Purpose/Description: to strengthen national enabling conditions to attract finance and investment in renewable energy, energy efficiency, and industrial decarbonization (clean energy) in emerging economies. Assist countries in developing policies and instruments to expand the pipeline of financially viable clean energy projects. It is financially supported by the governments of Australia, Canada, Denmark, Egypt, and Germany. In the Philippines, this includes offshore wind power and energy efficiency in the building sector, particularly in public buildings.	DOE	ongoing
WB EU	Project name: ACCESS TO SUSTAINABLE ENERGY PROGRAMME (ASEP) Implementation period: 2016-2022 Implementation site: N/A Activity Objective/Content: ASEP is providing grants totaling €60 million to help the Philippines achieve its rural electrification goals through the use of renewable energy while promoting energy efficiency. This includes improving access to sustainable energy for about 100,000 to 150,000	DOE	completion

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
	poor households in remote areas (installation of solar home systems), installing 20 megawatts (MW) of RE generation capacity, and developing an EE&C planning guidebook for local governments (LEECP).		
WB (IFC)	Project name: Sustainable Energy Finance program Implementation period: 2009- Implementation site: N/A Activity Objective/Description: BPI will be able to share the risk of up to 5 billion PHP of the bank's energy efficiency and renewable energy financing portfolio	BPI	ongoing
UNDP GEF	Project name: Renewable Energy Applications Mainstreaming and Market Sustainability (DREAMS) Project Implementation period: 2016-2023 Implementation site: N/A Activity objectives and description: enforcement of a supportive policy and regulatory environment to promote investment in renewable energy development and use at the local level, strengthening institutional capacity to increase RE investment at the local level, increasing the share of RE-based generation capacity, facilitating RE projects by local developers, and promoting RE in operation. project success stories collection, etc.	DOE	ongoing
USTDA	Project name: N/A Implementation period: 2023 (planned) Implementation site: N/A Purpose and Description of Activities: Launch new partnerships to expand infrastructure development in the Philippines and support the construction of high-quality rail, port, and transportation systems. In addition, during 2023, the UATDA will launch new sustainable infrastructure activities aimed at leveraging over \$3 billion in public and private funding to strengthen the Philippines' critical mineral supply chain, advance smart grid technologies and clean energy solutions, and promote secure 5G deployment.	N/A	in preparation
USAID	Business Name: Energy Secure Philippines (ESP) Implementation period: 2020-2024 (planned) Implementation site: N/A Activity Objective/Content: To strengthen the safety and reliability of the integrated power system envisioned in the Philippines. Improving the performance of electric utilities (including jointly conducting research projects on RCP evaluation), expanding the introduction of advanced energy sources and systems, and strengthening the competitiveness of the power sector. Note that the project will target specific electric utilities, but the details of the project are not yet known.	DOE ERC DU	ongoing

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
Mitigation Action Facility	<p>Project Name: Decarbonisation of Electricity Generation on Philippine Islands</p> <p>Implementation period: Continued after 2023</p> <p>Implementation site: N/A</p> <p>Activity Objective/Description: To facilitate the installation of tidal stream energy (TSE) hybrid systems by small island grid operators through a replicable and sustainable private investment project. The project will install 50 MW of TSE hybrid systems and approximately 100 MWh of storage batteries on off-grid islands in the Philippines. In addition, the project will assist in establishing effective regulatory conditions to facilitate access to financial resources.</p>	DOE CCC	in preparation
UNOPS	<p>Project Name : Energy Transition Partnership (ETP) : Offshore Wind Development</p> <p>Implementation period : 13 months</p> <p>Implementation site : Nationwide</p> <p>Activity Objective/Description : It is intended to derisking the investment of the OSW project and is intended to form the basis for all other marine renewable energy projects. The project consists of the following two projects</p> <ul style="list-style-type: none"> • Development of a Marine Spatial Plan • Development of an efficient licensing process for OSW 	DOE DENR PPA DA LGUs Private offshore wind project developer Other	in preparation
JICA Private Sector Cooperation Project	<p>Project Name: Dissemination and Demonstration Project for Development of Unelectrified Areas Using Small Hydropower in the Philippines</p> <p>Period: November 2013 - May 2016</p> <p>Site of the project: East Mindoro area</p> <p>Objective/Description of Activity: Demonstration of small-scale hydroelectric power generation facilities and a package of drinking water purification system, energy-saving LED lighting, and electric tricycle using the power generated by the facilities</p>	Puerto Galera City Villaflor Barangay	Completed
JICA	<p>Project Name: TIWI GEOTHERMAL POWER PLANT COMPLEX REHABILITATION PROJECT</p> <p>Implementing agency : December 1994-</p> <p>Implementation site : TIWI</p> <p>Objective/Description of Activities: To support the repair and replacement of existing facilities at the Tiwi geothermal power plant in order to improve the efficiency and reliability of power generation facilities, to make effective use of domestic energy, and to improve the balance of supply and demand of electricity in the Luzon system.</p>	NPC	Completed
JICA	<p>Project Name: Preparatory Survey for the Wawa River Small Hydropower Project in Agusan del Sur Province, Philippines (PPP Infrastructure Project)</p> <p>Implementation Period: Until March 2013</p> <p>Implementation Site: Caraga Region, Mindanao Island</p>	DOE	Completed

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
	Objective and Activities: Conducting a PPP preparatory survey for the Wawa River Small Hydropower Project in Agusan del Sur Province, Philippines.		
JICA	Project Name: Republic of the Philippines Small Hydropower Planning Survey (Ifugao Province Small Hydropower Project) Implementation Period: May 2013 to February 2015 Implementation Site: Haliap Village, Asipulo Municipality, Ifugao Province Objective and Activities: To contribute to the stabilization of power supply and the enhancement of the terraced rice fields conservation fund in Ifugao Province, the project involves the construction of small hydropower facilities (maximum output of 820 kW) and transmission facilities (13.2 kV) in Ifugao Province.	DOE Ifugao Provincial Government	Completed
JICA	Project Name: Republic of the Philippines Small Hydropower Planning Survey (Isabela Province Small Hydropower Project for Irrigation) Implementation Period: Until March 2013 Implementation Site: Isabela Province Objective and Activities: The project aims to promote the use of renewable energy by constructing small hydropower plants in irrigation areas of rural regions in the Philippines. This initiative contributes to energy source diversification, reduction of greenhouse gas emissions, and facilitates the widespread access to electricity in the designated region.	DOE National Irrigation Agency (NIA) Magat River Integrated Irrigation Management Office (NIA-MARIIS)	Completed

Source: JICA Survey Team

(5) Power Transmission and Distribution, Electrification

1) Relevant Policies and Plans

(a) **Electric Power Industry Roadmap (2017-2040)**

The roadmap defines the DOE's efforts for the entire electric power industry, and shows plans through 2040 for each of the following categories: generation, distribution, supply, market development, institutional support mechanisms, electrification, household electrification, and transmission. Examples of climate change measures in each category are shown below.

Table 2-33 Examples of Climate Change Measures in Electric Power Industry Roadmap (EPIR)

Items	Examples of Climate Change Measures
Generation	<ul style="list-style-type: none"> ➤ Promote introduction of new technologies such as marine power generation, fuel cells, and nuclear power ➤ Develop resiliency policy for power generation assets
Distribution	<ul style="list-style-type: none"> ➤ Develop resiliency policies for power distribution facilities

Supply	➤ none in particular
Market Development	➤ Develop policy and roadmap for Smart Grid ➤ Formation of a renewable energy market in accordance with RPS
Institutional and Support Mechanism	➤ none in particular
Missionary Electrification	➤ Optimal energy mix studies for off-grid areas, etc. ➤ Develop resiliency policies for off-grid facilities
Household electrification	➤ Electrification through the introduction of solar power generation
Transmission	➤ Timely development of transmission facilities ➤ Development of resiliency policies for power transmission facilities, etc.

Source: JICA Survey Team

(b) Transmission Development Plan (2022-2040)

The Transmission Development Plan is a power grid development plan developed by the transmission operator NGCP, and is guided by the overall goals set in the Power Sector Roadmap highlighted in the PEP to 2040 (ensuring quality, reliability, affordability, and secure supply; expanding access to power; ensuring transparent and fair competitive conditions in the power industry Ensuring quality, reliability, price, and secure supply, expanding access to electricity, ensuring transparent and fair competitive conditions in the electricity industry, and ensuring full access to electricity in the country). In particular, the plan focuses on the continued development of a large-scale power grid, implementation of a grid resilience program, transmission projects in support of CREZ, integration of emerging technologies, and a strategy for the re-concentrated development of 69 kV, but is said to fail to reflect the introduction of offshore wind power. Note that NGCP is the only private transmission company in the Philippines that has a concession agreement with TransCo the state-owned transmission company, and is 40% owned by a major Chinese state-owned transmission company, and 30% each by Philippine companies Monte Oro Grid Resources and Calaca High Power. A summary of the concession agreement between NGCP and TransCo is as follows.

Table 2-34 Overview of the concession agreement between NGCP and TransCo

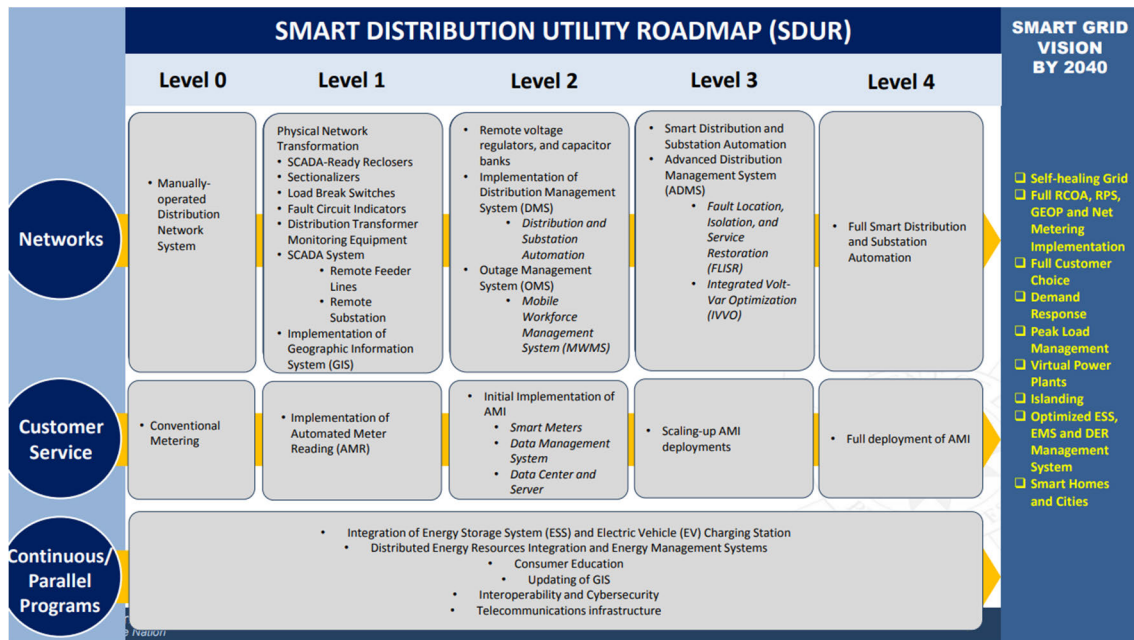
Contents	Description
Concession Period	25 years from 2009
Transfer of TransCo's Business	NGCP is entitled to exercise all of TransCo's rights, and shall discharge all its liabilities and perform TransCo's obligations under all existing contracts relating to the operations of the regulated transmission business.
Title and Risk	TransCo retains title to all of the transmission and associated assets. Risk of loss of, or damage to transmission assets are to be borne by NGCP
Concession Fee	NGCP must pay PSALM a concession fee for the grant of the Concession, which allows NGCP to operate TransCo's transmission business and collect revenue from transmission network users.

Reversion	at the end of the Concession Period (or on the Concession Agreement’s early termination), the transmission business is to be transferred back to PSALM and the PSALM is required to pay the NGCP a recovery payment, calculated with reference to NGCP’s unrecovered costs (including the net present value of the estimated future net cash flows of the transmission business for the remainder of the Concession Period, in the case of early termination).
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Source: Prepared by JST based on WB information and other sources

(c) Smart Grid Vision

Department Circular no. 002020-02-0003 describes the definition of smart grid components as a smart grid policy framework. It also includes a separate roadmap for the smart gridization of power distribution facilities, and each power distribution company is required to introduce technologies in line with this roadmap. It is envisioned that the final result will be the formation of self-healing and automatically operated power distribution facilities.



Source: Department Circular no. 002020-02-0003

Figure 2-25 Smart Power Distribution Roadmap and Smart Grid Vision

(d) Power Sector Roadmap (2021-2040)

The roadmap presented in the Power Development Plan (2020-2040) defines future policies and targets for electrification in the Philippines. In particular, in relation to climate change, the long-term strategy for power transmission, distribution, and electrification is as follows, with a particular focus on the numerical target of 100% electrification by 2040, based on the latest census:

Table 2-35 Long-term goals in the Power Sector Roadmap

Classification	Long-term strategy to 2040
Transmission	<ul style="list-style-type: none"> Improve reliability and resiliency of key transmission networks Interconnection of power grids in Luzon, Visayas, and Mindanao

	<ul style="list-style-type: none"> • Interconnect off-grid islands to the main grid.
Distribution	<ul style="list-style-type: none"> • Institutionalize continuous improvement in the reliability and resiliency of distribution facilities.
Electrification	<ul style="list-style-type: none"> • Based on the most recent census, the electrification rate of eligible specified households will be 100%.

Source: JICA Survey Team

(e) Missionary Electrification Development Plan (2021-2025)

The Missionary Electrification Development Plan (MEDP) was developed by DOE in 2021 in accordance with Rule 13 of the Implementing Rules and Regulations of the Electric Power Industry Reform Act (EPIRA-IRR). It presents policies, strategies, and governance reforms aimed at ensuring quality, reliable, safe, and affordable electricity service, especially in the remote areas of the Philippines, and has the following objectives.

- Achieve total electrification by 2022
- Provide reliable, quality electricity service to off-grid regional users
- Pursue utilization of domestic and renewable energy sources to reduce dependence on imported fossil fuels
- Modernize the power transmission and distribution network and improve efficiency in off-grid power systems
- Universal Charge - Missionary Electrification (UC-ME) Appropriateness and Streamlining of Subsidy Provision
- Promote further coordination and cooperation with all stakeholders in order to achieve the goals

(f) Total Electrification Program

On July 24, 2023, President Ferdinand Marcos, Jr. announced that the Philippines would achieve full electrification by the time he concludes his term in 2028. He pledged to fulfill this commitment and emphasized that the National Electrification Administration (NEA), responsible for nationwide electrification, would take immediate action to meet this goal.

Table 2-36 Project cost required for Total Electrification

(Unit : Billion PHP)

ELECTRIFICATION PROGRAM		2024	2025	2026	2027	2028
Sitio Electrification Program (SEP)		6.895	5.985	7.663	7.243	0.000
Barangay Line Enhancement Program (BLEP)		0.443	0.529	0.763	0.886	2.977
PV Mainstreaming (PVM) Program		5.251	10.059	11.086	9.582	0.460
Total Project Cost	Annual	12.589	16.573	19.512	17.711	3.437
	Cumulative	12.589	29.162	48.674	66.386	69.822

Source: NEA

The electrification rate is as follows, and the remaining un-electrified households are estimated to be 1.26 million.

- 2019: 92.9%
- 2020: 94.5% (Luzon Island: 98.42%, Visayas: 95.66%, Mindanao: 83.57%)

2) Implementation Status of Climate Change Measures

(a) Implementation structure

The Electric Power Industry Management Bureau (EPIMB) is in charge of electricity transmission and distribution and electrification, and this Bureau will also implement climate change measures in the subsectors concerned. The EPIMB has the mandate to ensure adequate, efficient, and reliable electricity supply to establish a competitive market-based environment and to encourage private sector participation, and to develop plans, programs, and strategies for rural electrification.

(b) Climate-related budgets

The "Total Electrification Project" is considered to fall under the climate change budget shown in Table 2-21, with 500 million PHP allocated to this project. The budget is concentrated on rural electrification.

(c) Implementation status of climate change mitigation measures

Regarding the enhancement of the transmission network and transmission capacity, DOE continues to monitor NGCP efforts in line with the TDP and provides support through the issuance of various permits.

In 2019, operational guidelines were issued to ensure the proper use of energy storage systems (ESS) and their integration into the grid. In the same year, a policy was also promulgated that governs the use of Ancillary Services²⁸ (AS) to ensure adequate power supply. Pursuant to this policy, DOE implemented Ministerial Order No. DO2020-06-0009 on June 23, 2020, establishing the AS-Technical Working Group (AS-TWG), which is jointly led by DOE and the Energy Regulatory Commission (ERC) and consists of stakeholders and agencies in the electric power industry. The AS-TWG is, through a joint DOE-ERC Resolution No. 2020-01, making initial recommendations regarding the following issues.

- Coordinating Power Market Design
- AS Testing Guidelines and Technical Specifications
- Adjustment Power Market Readiness Standards
- Adjustment Power Market Mitigation Measures
- AS cost recovery
- AS Third-Party Testing Accreditation Guidelines

²⁸ These services are designed to maintain the stability of the electricity network and include frequency control and rapid adjustment of generation capacity. These services are contracted in the electricity market to support the operation of the power network. The main types include frequency control, grid configuration control, asynchronous interconnection control, and black start capability.

- Competitive Selection Process (CSP) for Contract AS Procurement

As mentioned above, the NGCP is implementing the transmission network, but there have been delays in meeting the schedule for strengthening and expanding the network as indicated in the Transmission Development Plan (TDP). According to the press release, 37 projects in the TDP have experienced delays, averaging 820 days, with a range from 21 to 2561 days. However, it's not only the NGCP's transmission lines that have faced delays. Moreover, NGCP's transmission expansion has seen an average annual progress of 1.05% from 2011 to 2018, a significant delay attributed by NGCP to regulatory approval delays.

In response, TransCo mentions that eminent domain may also be a factor in the delays. Specifically, when TransCo was developing its power grid prior to the concession agreement, the amount of compensation for expropriation of land was capped under the law because TransCo was a public company. Hence, there was a tacit understanding that the land concessionaire would seek compensation at the maximum amount, and disputes were uncommon. However, since the same system does not apply to NGCP, which is private enterprise, landowners can claim compensation without the upper limit. If this compensation amount surpasses the feasibility threshold set by the NGCP, achieving a smooth resolution will be challenging, and the duration of the legal battle will contribute to the delay.

The TDP developed by the NGCP are reviewed by TransCo, the national transmission company with which the NGCP has a concession agreement, and approved by the DOE. The ERC is responsible for approving the detailed plans for the many individual development projects listed in the TDP. The ERC does not approve anything that is not included in the TDP, although it was pointed out to TransCo that the NGCP plans use the latest technology and simulation software, and that TransCo's limited knowledge of emerging technologies makes it difficult to confirm this. However, this has not been a major cause of delay at present.

On the other hand, the ERC is aware of the length of its own licensing process and cites two issues: limited human resources and insufficient technical capacity of personnel. Regarding the first issue, about 45 to 50 people check facilities (permits and licenses for installation of equipment), but even so, each person must review 20 cases per year, which is not enough human resources to handle the volume of reviews. NGCP has software to simulate power quality and system impact studies, and business plans are submitted with values calculated based on this software, but the ERC does not have the software to calculate their validity. However, the ERC does not have the software to calculate the validity of the plans, making the review process more difficult. The ERC also plans to introduce the latest equipment in various substations, and ERC has limited knowledge in this area as well, which is a similar issue. For example, even if only a few people attend some seminars and return home, the knowledge is not shared within the ERC, which makes it impossible to pass on the technology to future generations. In addition, the NGCP also has to submit a power grid development plan to the ERC, and the fact that it takes about one year for the ERC to approve the plan is also an issue in terms of project delays.

On the other hand, the slow approval of projects by the ERC is also a concern for the development of power distribution networks. Even if a power distribution company's investment plan is funded by its own resources, it must be submitted to the ERC for approval. Failure to adhere to this procedure can result in penalties. The ERC has received feedback that, although companies consistently submit their investment plans, the approval process takes a considerable amount of time. During this delay, new technologies emerge, and other issues arise, making it challenging to implement the plans.

The ERC is responsible for reviewing and approving new business investment plans (CAPEX) submitted by power distribution companies once every five years. However, even if a plan is initially approved, any subsequent supplementation or revision requires another review. In practice, power distribution companies often supplement and revise their plans, leading to frequent reviews in the five years since the formulation of new plans. Consequently, the sheer volume of plan reviews from the 150 distribution companies throughout the Philippines has become overwhelming, and a single review now takes 270 days due to a shortage of human resources.

In addition, the ERC is required to approve the installation of renewable energy sources, but there have been delays in this area as well. This issue particularly affects the hybridization of small remote islands. Incentives for renewable energy, such as duty-free imports and income tax breaks, are only available after a project has been issued a contract. The same regulatory and permitting process applies to all renewable energy projects, whether large (megawatt-scale) or small (kilowatt-scale), including installations on mini-grids to enhance energy access in unelectrified areas or areas with limited electricity supply. While this process is relatively straightforward for projects aiming for large-scale installations, it has proven challenging for small-scale renewable energy installations to commence operations due to the transaction costs and time required to make the project profitable for investors. The delay is also attributed to the limited human resources available to handle the number of applications, which is the root cause within the ERC.

No information was received on issues with NGCP's ability to raise funds for the transmission line. On the other hand, because of the risks associated with overseas financing, there is currently a talk by the Philippine government to establish a loan to be used as a financing source for the NGCP.

In the power distribution business, Meralco mentions that the efforts of the various distribution companies to move toward a smart grid are uneven, with Meralco working on implementing Lv1 through Lv3 technologies in its smart distribution roadmap, while most of the other companies have only progressed to Lv1. Each power distribution company is implementing its own smart grid initiatives in accordance with the Smart Power Distribution Roadmap developed by the DOE. However, the absence of detailed policies and systems for elements such as Demand Response (DR), Virtual Power Plant (VPP), etc., has made it difficult to implement these initiatives smoothly.

In particular, from the viewpoint of smooth promotion of projects, Meralco requested support for speeding up the approval process at the ERC. In addition, they also expressed a desire for the government to formulate specific policies and systems for smart grids to facilitate their implementation as a business. In particular, they said that such a specific policy and system would facilitate talks with the ERC.

The NGCP have software to simulate power quality and system impact studies, etc., and business plans, etc., are submitted with values calculated based on this software. The ERC does not have the software to calculate the validity of this, which makes the review difficult. For this reason, ERC asked JICA to provide support for similar simulation software. As for power transmission and distribution, one of the reasons for the delay in licensing is the limitation of knowledge of advanced technologies, and the committee requested assistance in capacity building for the latest transmission and substation technologies.

(d) Implementation status of climate change adaptation measures

For the transmission system, the resilience strengthening plans and programs specified in the TDP, particularly the development of climate resilient transmission infrastructure, needs to be fully implemented to ensure the long-term resiliency of the national transmission system.

In addition, considering that the amount of off-grid electricity (1,618 GWh in 2020) is much smaller than the existing power supply structure and the amount of on-grid electricity (100,138 GWh in 2020), electrification in off-grid areas in the Philippines has great potential as climate change adaptation measures such as stabilizing power supply during disasters and reducing the risk of power outages. The following is a list of initiatives in the field of electrification.

a) Strengthening Home Electrification Programs Nationwide

The Nationwide Intensification Household of Electrification (NIHE) program is designed to implement and subsidize measures to enhance household electrification. Under this program, DUs are encouraged to adopt more aggressive and innovative marketing strategies to speed up the electrification of remaining un-electrified households in both rural and urban areas. The program electrified 166,393 households between 2015 and 2018.

b) Extended Sitio Electrification Program

The goal of the program is to increase the electrification rate in the country to 100% by providing funds to construct distribution lines and house wiring facilities to eligible households. The program provided two light bulbs, one convenience outlet, a kilowatt-hour meter, and 30 meters of service drop wire to cover the cost of the house wiring service. Note that according to the NEA, the goal is to cover 11,114 sitios (territorial enclaves that form part of a barangay) from 2023 to 2028, which is projected to cost a total of 31.7 billion PHP.

c) Barangay Transmission Line Enhancement Program

The Barangay and Transmission Line Enhancement Program (BLEP) is intended to rehabilitate barangays that were previously energized by solar home systems, generator sets, and other off-grid solutions, but were later deemed unsustainable for such projects. To enhance this program, only off-grid barangays where extension of distribution lines is economically feasible will be targeted. Funding has already been provided for grid extension infrastructure such as overhead transmission lines, undersea and underground cables, and for distribution line upgrades.

d) Photovoltaic Mainstreaming (PVM) Program

The program is funded by two different sources: the EU's Access to Sustainable Energy Program and DOE Locally-Funded Projects. It provides Solar Home Systems (SHS) to households in off-grid areas. Until April 2021, approximately 9,984 households have received SHS through DOE Locally-Funded Projects.

e) Universal Charge for Missionary Electrification (UC-ME)

UC-ME institutionalizes the provision of subsidies in areas that are not interconnected to the main grid so that development and progress can be achieved in these areas on par with the main grid. The fund is provided to electrification programs/projects by NPC and other eligible entities. As mandated by Republic Act No. 9136, NPC performs electrification functions through SPUGs and is responsible for providing generation and related transmission systems in areas not connected to the transmission system. UC-ME rates are determined by the Energy Regulatory Commission (ERC) and are based on the amount of electricity that the DU collects from end-users of electricity, collected by DU from electricity end-users.

f) Qualified Third Party (QTP)

Under Article 59 of Republic Act No. 9136 (EPIRA), areas deemed unviable and abandoned by DU may be offered to Qualified Third Parties (QTPs) as part of the Missionary Electrification Program. Together with the government, these entities will share the responsibility of providing electric service in remote and unviable areas of the country. In addition, the issuance of Department Circular DC 2019-11-0015 ensures that all QTP proponents will comply with the Renewable Energy Act of 2008, particularly the Renewable Portfolio Standard (RPS) in non-electrified areas.

As of 2020, there are 14 QTP service areas covering the provinces of Palawan, Cebu, Davao, and Camarines Sur, with three QTP proponents, Power Source Philippines Inc (PSPI), Sabang Renewable Energy Corporation (SREC), and FP (PSPI), Sabang Renewable Energy Corporation (SREC), and FP Island Energy Corporation (FPIEC). Through their activities, approximately 13,500 households have access to electricity service.

In response to these actions, the hybridization of rural electrification, especially for power sources in off-grid areas such as remote islands, is a challenge. The NPC has been bidding for renewable energy

installation and operation companies in accordance with the Renewable Portfolio Standard (RPS) to ensure that at least 30% of the power supply comes from renewable energy sources. However, currently only about 50 of the 158 sites have installed renewable energy. This is due to the fact that the scale of the projects is too small to be profitable for private operators, and therefore they are not participating in the bidding process. On the other hand, there is a plan to use PPP contracts to overcome this problem, but the budget for this project has not been approved. Therefore, not only securing the budget to promote electrification through PPP contracts, but also the practice of contracting and management is an issue. In the Philippines, the main policy of the DOE is not to provide financial subsidies to the private sector, and therefore, it is considered difficult to realize a PPP that is fully publicly funded. Therefore, for example, public land use and a certain amount of contribution to CAPEX can be considered as incentives for the operator of a PPP.

NPC raises a request for hybridization of remote off-grid areas that are directly managed by NPC. As mentioned above, bidding for hybridization has not progressed at present, and about 100 locations have not yet been converted to hybridization, and they request support for assisting NPC's action in this area.

On the adaptation side, NPC pointed out that there is a limitation of capacity to ensure compliance with RCPs, which are important for improving the resilience of power infrastructure. However, it was difficult to confirm whether this is actually being done by the private providers.

NPC shared the current situation where the focus is still on post-disaster restoration and not on improving disaster preparedness in advance. In addition, the contracts for hybridization in off-grid areas include resiliency improvement policies in accordance with DOE directives, but there is a limitation of technical knowledge to confirm compliance with the policies, and thus the contracts are not being managed reliably. Furthermore, even in cases where hybridization contracts are in progress, there are issues such as the inability to shut down existing diesel power generation while introducing solar power generation as a result. This is because grid power becomes unstable due to lack of synchronization and inertia when more than 30% of the energy mix is derived from variable renewable energy sources. Other measures to stabilize power supply in off-grid areas include connecting to the national power grid, but the installation of submarine cables and connection to microgrids and their proper operation remain challenges.

Regarding rural electrification, the DOE has requested support for electrification efforts in general. In particular, EPIMB has requested support for NPC's electrification efforts in off-grid areas directly managed by NPC, where there are no QTPs. NPC is currently looking for a partner and hopes to move forward as soon as possible. Other key points of the request are as follows;

- Financial and institutional support for the development and implementation of renewable energy projects for total electrification.
- Infrastructure investments in off-grid electrification solutions such as stand-alone solar home systems and microgrid systems.

- Support for improving the sustainability of renewable energy systems in rural electrification.
- Training and capacity building activities to effectively formulate renewable energy policies for rural electrification and implement plans and projects.
- Financial support to provide infrastructure investment and/or technical assistant support to the department responsible for evaluating microgrid system applications to increase the capacity of microgrid system providers (MGSPs) in DOE to implement CSPs.

Regarding support for improving sustainability, as an aspect of adaptation, EPIMB would like to make the power infrastructure in off-grid areas in the path of frequent typhoons a disaster resilient system. For example, it mentioned certain areas such as Bicol Region in the eastern part of Luzon Island, where rural electrification has not progressed and may be vulnerable to disasters.

Currently, DOE is working with the National Power Administration, the National Electrification Agency, TransCo, NGCP, and the Association of Isolated Electric Cooperatives, Inc. in the development of a 10-year UC-ME rationalization and graduation planning template that will be part of DU's electric distribution and development plan. Further studies are needed to finalize the template and test the overall impact on consumers and the need for subsidies on the pilot DUs, and EPIMB is in need of help from other partners to do so.

Note that access to UC-ME is limited to areas under the jurisdiction of the NPC-SPUG or in areas where electric cooperatives have granted exemptions to eligible third parties. Under the current rules, electric cooperatives that generate their own electricity on small isolated islands are not eligible for access to UC-ME. This results in an inequitable distribution of UC-ME, with off-grid islands operated by large utility groups receiving the majority of UC-ME funds, while smaller, isolated islands cannot access them. Streamlining the licensing process and rules regarding UC-ME eligibility is needed to further expand the deployment of renewable energy.

EPIMB also requests for support to concretely promote the initiatives of the Smart Grid Roadmap.

3) Trends in Japanese Private Sector

Trends of Japanese private companies related to power transmission and distribution and electrification are shown in the table below. There are projects related to microgrids and regional power distribution, and some companies are installing energy storage systems.

Table 2-37 Trends in Japanese Private Sector (Power Transmission and Distribution, Electrification subsector)

Classification	Company Name	Trend	Year
Electric power transmission and distribution	Kyushu Electric Power Co., Inc., Kyuden International Inc.	Participation in the microgrid project of Palawan and Cebu Power Source, Inc. Microgrid supply capacity will range from 100 kW to 2,100 kW, with solar and batteries. (Investment in local companies)	2020
Electric power transmission and distribution	Tokyo Electric Power Company Power Grid, Inc., Chubu Electric Power Co., Inc.	Hybrid microgrid project combining solar power + batteries + diesel power generation with power grid in un-electrified areas of Palawan Island. (JV)	2019
Distribution of electricity	Kansai Electric Power Company, Incorporated, Marubeni Corporation, Chubu Electric Power Co.	New Clark City Electric Distribution and Retail Project The company has acquired the rights to distribute electricity and is participating in a project to develop distribution lines, distribute electricity, and retail electricity for 25 years. The scale of demand is approximately 250,000 kW. (SPC)	2019
Distribution of electricity	TAKAOKA TOKO CO., LTD.	Start of operation of the pilot project in Lipa City for the promotion of the system and management technology for power distribution systems. (JICA Private sector Partnership)	2019
Electrification	Panasonic Corporation	Project to donate solar lanterns to areas without electricity (CSR)	2022
Storage of electricity	Hitachi, Ltd.	Supplied 2MW lithium-ion energy storage system package to Manila Electric Power in San Rafael, Bulacan	2019

Source: Prepared by the survey team based mainly on various press articles in the last five years.

4) Status of Donor Support

The table below shows the status of other donor cooperation projects in the power transmission and electrification sub-sector, although there is some overlap with other sub-sectors since some of the projects have multiple initiatives in the program. The ADB is considering cooperation with TransCo for the power grid, while USAID and other donors are supporting efforts toward a smart grid for certain electric power distribution companies. This effort could be strengthened with future cooperation from USTDA. The United Nations Office for Project Service (UNOPS) also plans to provide assistance to NEA, EC, DOE, and others in the transition to smart grids.

Table 2-38 Status of Donor support (Transmission, Distribution, and Electrification)

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
ADB	Project name: Smart, Green Transmission (phase 1) (Sovereign Project Loan) Implementation period: 2025/2026 Implementation site: N/A Purpose and nature of activity: multi-phase program including capacity building for TransCo, but details unknown	DOE TransCo	in preparation
ADB	Project name: Ancillary Services Improvements Roadmap (CCAP SP2) Implementation period: 2022-Aug 2023 Implementation site: N/A Purpose and details of the activity: Unknown, although it is considered to be the development of a roadmap for improvement regarding ancillary services.	ERC DOE	ongoing

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
ADB	Project name: Smart, Green Transmission System Multi-year Design, Feasibility/DD/Design for Phase 1 Implementation period: Oct 2024 Implementation site: N/A Purpose and Description of Activity: The purpose of this activity is to support the transition to a smart grid for the power grid through outreach to TransCo, but details are unknown as the project is still in the design phase.	DOE TransCo	in preparation
ADB	Project name: Options for Expiring Distribution Franchises Implementation period: N/A Implementation site: N/A Activity Objective/Content: To develop criteria for evaluating power providers before the expiration of their franchises, to take various actions against expired power providers based on the evaluation, and to develop a legal/regulatory framework, with a particular focus on Meralco.	DOE	in preparation
ADB	Project name: EC Rehabilitation and Reform Implementation period: N/A Implementation site: N/A Activity Objective/Content: Proposals for revitalization, privatization, corporatization, and consolidation of the EC	DOE NEA	in preparation
ADB	Project name: Futures Market and Capacity Market Implementation period: N/A Implementation site: N/A Activity Objectives and Description: Recommendations on appropriate signals for the launch of futures and capacity markets, development of legal and regulatory frameworks.	DOE ERC PEMC	in preparation
USTDA	Project name: Details unknown Implementation period: 2023 (planned) Implementation site: N/A Activity Objective/Content: Launch new partnerships to expand infrastructure development in the Philippines and support the construction of high-quality rail, port, and transportation systems. In addition, during 2023, USTDA will launch new sustainable infrastructure activities aimed at leveraging over \$3 billion in public and private funding to strengthen the Philippines' critical mineral supply chain, advance smart grid technologies and clean energy solutions, and promote secure 5G deployment.		in preparation
USAID	Project name: Energy Secure Philippines (ESP) Implementation period: 2020-2024 (planned) Implementation site: N/A Activity Objective/Content: To enhance the safety and reliability of the integrated power system envisioned in the Philippines by improving the performance of power utilities (including joint implementation of a research project on the evaluation of RCPs), expanding the introduction of advanced energy sources and systems, and strengthening the competitiveness of the power sector. Note that the project will target specific DUs, but the details of the project are not yet known.	DOE ERC DU	ongoing

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
UNOPS	<p>Project name : Energy Transition Partnership (ETP) : Upgrading Energy Regulations for the Energy Regulatory Commission of the Philippines Implementation period : 1 year from December 2021 Implementation site : Nationwide Activity Objective/Content : Provide policy and technical support in the development of measures and mechanisms necessary to facilitate market entry of battery energy and other energy storage systems in the wholesale electricity spot market (WESM) and support market consultations.</p>	PEMC	Completed
UNOPS	<p>Project name : Energy Transition Partnership (ETP) : Smart Grid Transformation in the Power Distribution Sector Implementation period : 20 months Implementation site : Nationwide Activity Objective/Content :</p> <ul style="list-style-type: none"> • Assist NEA and EC in upgrading their power distribution systems to a smart grid • Identify appropriate financing and investment schemes for smart grid upgrades in EC • Strengthen capacity on feasibility simulation to support renewable energy deployment by NEA and EC for existing generation 	NEA EC	in preparation
UNOPS	<p>Project name : Energy Transition Partnership (ETP) : Philippines Grid Diagnostic and Roadmap for Smart Grid Development Implementation period : N/A Implementation site : N/A Activity Objective/Content : Assist in achieving the national goal of power grid modernization by creating a roadmap for investment upgrades and proposing alternative governance structures.</p>	DOE	in preparation
UNOPS	<p>Project name : Energy Transition Partnership (ETP) : Upgrading Design and Implementation of the Energy Battery Storage Market Mechanism of the Philippines Electricity Market Mechanism Implementation period : One year from November 2021 (initial schedule) Implementation site : N/A Activity Objective/Content : Support the Philippine Electricity Market Corporation to establish a competitive and transparent market mechanism for batteries and other energy storage systems in the wholesale electricity spot market.</p>	PEMC (Philippines Electricity Market Corporation) ERC DOE	Completed
JICA Private Sector Cooperation Project	<p>Project Name: Republic of the Philippines Distribution System Operation and Management Technology Dissemination Project Implementation Period: January 2018 to October 2023 Implementation Site: BATELEC II Purpose and Content of Activities: To establish a highly reliable power supply system, proposals for the introduction of distribution system control systems and operation technologies suitable for the Philippines are implemented by Tohkoh Takadake and Tokyo Electric Power Grid.</p>	NEA, EC	Completed
JICA	<p>Project Name: System Loss Reduction Project for Philippine National Power Cooperatives Implementation Period: March 2011 to March 2013 Implementation Sites: Nationwide</p>	NEA	Completed

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
	Objective and Activities: The objective is to enhance the engineering and planning capabilities for reducing distribution system losses by EC (Electric Cooperatives) and NEA (National Electrification Administration). The project involves providing support for organizational and technical improvements within NEA and targeted ECs to reduce distribution system losses.		
JICA	Project Title: Information Gathering and Verification Survey on the Introduction of Incentive Schemes for Improving Distribution Network Disaster Resilience in the Republic of the Philippines Implementation Period: Until October 2015 Implementation Sites: Nationwide Objectives and Contents of Activities: To gather and verify information for the consideration of introducing incentive schemes aimed at enhancing the resilience of the distribution network to disasters in the Philippines.	NEA	Completed
JICA	Project name: The Project for Improvement of Equipment for Power Distribution in Bangsamoro Area Implementation period: March 2017 - 2019 Implementation site : BARMM Objective/Description of Activity: Electricity distribution projects outside of urban areas in the BARMM are managed by regional electric cooperatives (ECs) under the NEA, and in the Bangsamoro region, seven ECs manage the electricity distribution network in their respective jurisdictions. Under this cooperation, equipment for the maintenance of power distribution networks will be procured in the region to strengthen the capacity of each EC to maintain their power distribution networks and to strengthen and stabilize the power supply infrastructure.	DOE NEA	Completed
JICA Private Sector Cooperation Project	Project Name: Business Preparation Survey for Meter Recycling through Technology Transfer for Power Meter Maintenance in the Republic of the Philippines (Promoting BOP Business Collaboration) Implementation Period: October 2013 to November 2014 Implementation Site: BATELEC2 Purpose and Content of Activities: Leveraging the intellectual property of Shikoku Electric Power and Shikoku Keisoku Kogyo, as well as the achievements and network of the Certified 132 Corporation Asia Japan Interchange Center in the Philippines, the activities aim to: ➤ Foster sound management of the electrical industry and reduce power losses in the Philippines. ➤ Enable the BOP (Bottom of the Pyramid) segment in the Philippines to acquire technical expertise and knowledge, striving to create income opportunities. The current situation in the Philippines involves the disposal of meters after a few years due to low-quality power meters. The project aims to investigate the possibility of meter recycling, similar to practices in our country, to extend the lifespan of meters and address this issue.	NEA	Completed

Source: JICA Survey Team

(6) Energy Efficiency and Conservation

1) Relevant Policies and Plans

(a) Energy Efficiency and Conservation Act (2019)

The Energy Efficiency and Conservation Act (EEC Act) (Republic Act No. 11285) took effect in early 2019 and is the first specific law supporting energy efficiency and conservation. The Philippines has a history of energy efficiency efforts since the early 1990s, but previous laws and programs were considered voluntary rather than mandatory. As a result, the Philippines did not have a strong comprehensive regulatory framework to widely promote energy efficiency and conservation efforts. Prior to the enactment of the EEC Act in 2019, the Department of Energy Act of 1992 (Republic Act 7638) was the most relevant and comprehensive law. In 2004, the National Energy Efficiency and Conservation Program was adopted and served as the guiding framework for DOE strategies in energy efficiency across all sectors. The new EEC law, while building on the efforts of that law, authorizes, empowers, and mandates DOE's implementation of energy efficiency, imposes mandatory requirements, and establishes important incentives. DOE now imposes fines and penalties against entities that violate the provisions of the Act and its implementing rules and regulations.

(b) National Energy Efficiency & Conservation Plan and Roadmap (2023-2050)

The National Energy Efficiency & Conservation Plan and Roadmap (NEECP) establishes the implementation of the Energy Efficiency and Conservation Act (EEC Act), enacted in 2019, to institutionalize energy efficiency and conservation across all sectors of energy. It is a plan and roadmap developed with the support of the UK Government and USAID with the aim of institutionalizing energy efficiency and conservation as a national way of life for efficient and sensible use of energy across all sectors. Short, medium, and long-term measures are being considered in each of the government, commercial, consumer, industrial, transportation, power industry, and cross-sector issues, and GHG emission reduction targets are set in the plan as shown in the table below.

Table 2-39 Emission Reduction Targets by Energy Saving Sector

Sector	Programs	Short Term Emissions Savings (2023 – 2024)	Medium Term Emissions Savings (2025 – 2028)	Long Term Emissions Savings (2029 – 2050)
Government	GEMP	1.87 Mt CO ₂ e 16.15%	3.31 Mt CO ₂ e 15.81%	25.06 Mt CO ₂ e 14.48%
Commercial	PELP/MEPPs	7.51 Mt CO ₂ e 16.15%	13.28 Mt CO ₂ e 15.81%	100.50 Mt CO ₂ e 14.48%
Residential	PELP/MEPPs	18.56 Mt CO ₂ e 34.65%	32.79 Mt CO ₂ e 31.66%	248.21 Mt CO ₂ e 23.17%
Industrial	PELP/MEPPs	17.43 Mt CO ₂ e 19.38%	30.81 Mt CO ₂ e 19.17%	233.18 Mt CO ₂ e 18.35%
Transport	Fuel Efficiency Standards (PELP)	-	-	-
	EVCS bill	-	-	-
	10% EV penetration by 2040	-	-	116.54 Mt CO ₂ e 8.22%
Utilities & End use	Power Sector Efficiency	4.34 Mt CO ₂ e 27.95%	7.53 Mt CO ₂ e 27.95%	54.03 Mt CO ₂ e 27.95%

Source: NEECP

2) Implementation Status of Climate Change Measures

(a) Implementation structure

EUMB is in charge of improving energy efficiency and saving energy, and this Bureau will also implement climate change measures in this sub-sector. EUMB’s mission is to develop and implement policies, plans, programs, and regulations for the efficient and economical conversion, marketing, and distribution of new energy technologies, alternative fuels, and conventional and renewable energy resources, and to ensure the efficient and wise use of conventional and renewable energy resources, promoting energy efficiency improvements and energy conservation in three of its four subordinate sections.

(b) Climate-related budgets

Table 2-21 shows that the following projects are considered to fall under the climate change budget, with a total allocation of more than 200 million PHP. The program structure is more diverse and the contributions larger than other subsectors.

- Supervision, development and implementation of energy efficiency and conservation programs (EECP) and projects
- Promotion of EECP activities and projects
- Conduct of energy audit services
- National Energy Efficiency and Conservation Program

(c) Implementation status of climate change mitigation measures

a) Philippine Energy Labeling Program

The Philippine Energy Labeling Program (PELP) is one of the initiatives of the EEC Law approved on April 12, 2019. PELP defines a national labeling system for Energy Consuming Products (ECPs) based on a product's energy performance and aims to transform the market through information displayed on point-of-sale labels and encourage consumers to change their behavior toward the use of energy efficient products and technologies. Initially conducted jointly with DTI but now under the control of the DOE and further strengthened, the PELP defines energy efficiency requirements (scope of application, labels, minimum energy performance (if applicable)) for products such as air conditioners, refrigeration equipment, televisions, lighting products, and others. On December 1, 2022, DOE formally issued a rule expanding the products covered by the PELP, adding cooking and food processing appliances, personal care equipment, ICT equipment, and lighting.

b) Philippines Energy Efficiency Project (PEEP)

The Philippine Energy Efficiency Project (PEEP) is an ADB-funded project that implemented an energy efficiency program, with a particular focus on efficient lighting that will substantially contribute to GHG emission reductions and energy production cost savings. The total project cost is estimated at approximately US\$46.5 million, with direct economic benefits including reduced peak demand through the use of energy-efficient lighting systems and a reduction in imported oil for power generation. The fuel cost reductions will result in annual savings of approximately US\$100 million, and a US\$450 million investment in electricity generation and associated 450 MW of network capacity were avoided. Consumers will also enjoy improved lighting quality and savings from reduced power consumption. In addition, 11.05 GWh of annual energy savings were achieved in the 150 government buildings renovated through June 2013. The project consists of the following three major components:

- Component 1 (Efficient Lighting Initiative): Reducing energy costs and waste by switching office, residential, commercial, and public lighting fixtures to more efficient lighting systems such as compact fluorescent lamps (CFLs), T8 fluorescent lamps, high pressure sodium (HPS) lamps, and electronic ballasts.
- Component 2 (Efficiency Initiatives in Building and Industries): Investigating and identifying barriers to implementing energy efficiency projects in the public and private sectors and to develop a building rating system to reduce energy and GHG emissions in buildings.
- Component 3 (Communication and Social Mobilization): Inducing communication among the various parties involved and promote mutual change in order to promote efficient lighting and efficiency in daily life.

c) Energy Service Company

Under RA 11285 of the Energy Efficiency and Conservation Act, “Energy Service Company (ESCO)” refers to a juridical entity that offers multitechnology services and goods towards developing and designing energy efficiency projects, delivering and guaranteeing energy savings, and ensuring cost-effective and optimal performance. Their services include energy supply and management, energy financing, technical engineering expertise and consultancy, equipment supply, installation, operation, maintenance and upgrade, and monitoring and verification of performance and savings.

Department Circular No. DC2020-09-0018 or the “Guidelines in the Administration, Classification and Certification of ESCOs” was issued to establish the guidelines, rules and procedures in the administration, classification and certification for ESCOs with the goal of enhancing professionalism, credibility and quality of services. As of 2023, ESCO implemented USD113 million in energy efficiency projects, equivalent to 600 GWh of energy savings from implemented energy efficiency projects.

d) DOE Guidelines on the Energy Conserving Design of Buildings

These guidelines were developed by the DOE with technical assistance from the Access to Sustainable Energy Programme (ASEP), supported by the European Union (EU), for energy efficient systems in the building sector. The guidelines were developed to ensure the use of energy-efficient systems in the building sector. The previous guidelines were developed in 2007 through the Philippines Efficient Lighting Market Transformation Project supported by UNDP Global Environment Facility. These Guidelines apply to:

- New buildings and their systems with a total connected electrical load of over 112.5 kVA or a total gross floor area (TGFA) of over 10,000 m², and
- Expansion or retrofit of an existing building or system designed to have a total connected electrical load of 112.5 kVA or more or a TGFA of 10,000 m² or more.

e) Strengthen demand-side management (DSM) mechanisms

The 2019 EEC Act (RA 11285 and its implementing rules and regulations) mandates the development of a Demand Side Management (DSM) program for the electric power industry to promote the reduction of energy consumption through effective load management. The program is intended to shift electricity demand from peak to off-peak hours and encourage energy consumers to manage their energy loads effectively. DOE with technical assistance from the Southeast Asia Energy Transition Philippines (ETP) is developing a DSM Programs with the objective to reduce electricity consumption, shift load patterns, and reduce peak demand. The Southeast Asia ETP is a financial management service of the United Nations Office for Project Services (UNOPS) formed by a multi-donor partnership of governments and philanthropies to accelerate sustainable energy transition in Southeast Asia in line with the Paris Agreement and Sustainable Development Goals. The International Institute for Energy Conservation has been contracted by the UNOPS as ETP's implementing partner for the technical assistance project DSM Program.

A series of Technical Working Group Meetings were conducted for the development of the DSM program. These meetings also provided an opportunity for suggestions and recommendations from the involved agencies, aiming to craft and align the DSM program with consideration of the existing rules and policies within their respective offices. Public consultations will be conducted once the guideline is drafted and finalized.

f) Government Energy Management Program (GEMP)

Recognizing the need to improve energy efficiency, the government issued orders and notices requiring the entire public sector to reduce energy consumption by at least 10 percent. Under the NEECP, the Government Energy Management Program (GEMP) was established to help achieve this goal. GEMP is a government-wide program to reduce monthly electricity and fuel consumption through energy conservation measures. Each agency is required to have an energy conservation program and a dedicated staff under this program. DOE conducts awareness-raising for government agencies, conducts spot checks to ensure agencies are in compliance with the requirements, and gives awards to government agencies with outstanding performance.

According to the DOE, significant savings have been achieved through energy conservation efforts throughout the public sector based on more than 938 (As of December 2023) government agency reports submitted since the NEECP and GEMP were established in 2005. According to Roadmap 2023-2050, the GEMP will be implemented over the short, medium, and long term. In addition, DOE aims to build the capacity of government agencies and promote coordination among them, both at the national and LGU levels. Specifically, in the short term, the capacity of the Inter-Agency Energy Efficiency and Conservation Committee (IAEECC) to evaluate and approve GEMP developments will be strengthened; LGUs will likewise receive assistance from DOE to identify and evaluate energy efficiency projects to be coordinated by the soon to be established National Energy Efficiency and Conservation Office (NEEC Office).

g) Philippine Vehicles Fuel Economy Labeling Program (VFELP)

As part of the requirements in Republic Act (RA) 11285 also known as the Energy Efficiency and Conversation (EEC) Act, the Department of Energy issued the Department Circular No. DC2023-05-0017 also known as the Philippine Transport Vehicles Fuel Economy Labeling Program (VFELP) Guidelines and Department Circular No. DC2023-05-0016 also known as Fuel Economy Performance Rating (FEPR) Guidelines for Road Transport Vehicles.

The establishment of an energy labeling program for transport vehicles aims to gather and benchmark fuel economy performance data in the road transport sector. This will also lead to the empowerment of the consumer to validate information provided by vehicle manufacturers, importers, and dealers which will facilitate the selection of fuel-efficient transport vehicles by consumers, realization of fuel savings, elimination of fuel inefficient vehicles in the market, and reduction of greenhouse gas emissions.

In support of the VFELP, a Vehicle Performance Assessment Facility (VPAF) shall be established for testing, verifying, validating, and gathering first-hand data on the fuel economy of transport vehicles manufactured and assembled locally including imported vehicles. Currently, the DOE-EUMB has a partnership with MERALCO Power Academy to assess the feasibility of the establishment of VPAF.

DOE has faced a general challenge due to the limited technical capacity for EE projects. Hence, DOE regularly sends personnel to JICA Knowledge Co-Creation Programs in Japan for training on energy efficiency. The implementation of the program poses its own challenges. Limited government capacity for monitoring energy efficiency and compliance has resulted in a situation where the quality of energy conservation measures taken by the private sector (e.g., construction of energy-efficient buildings and installation of energy-efficient equipment) cannot be guaranteed.

Other challenges include the shortage of basic data and ongoing statistics related to energy efficiency and conservation, thus complicating the analysis of these measures over time, making benchmarking and assessing the status of changes difficult.

In fact, the EUMB has limitation on technical competence within the EUMB for EE related to offices and industry, and they requests for capacity building. In addition, the government buildings have set a target of 20% of electricity to be supplied by renewable energy sources in the next three years, and they have support needs on achieving this goal. Furthermore, they would like to update the energy consumption trends of general household dwellings to include the above efforts. The previous survey was conducted in 2011 and the data is outdated. In particular, they are willing to conduct a survey not only on energy consumption trends, but also on household awareness of energy conservation from the viewpoint of data expansion.

It was also pointed out that private companies (ESCO companies, etc.) that design and construct energy-saving buildings have limitation on the capacity to implement such projects. With regard to EE for buildings, it was also noted that private architects, etc., have qualified capabilities, but they have limitations on experience and know-how. Therefore, private architects and engineers related to building EE requested support for their participation in government capacity-building programs and for gaining experiential know-how as those who are responsible for actual dissemination. Examples of this are participation in capacity building programs and participation in demonstrations.

In addition, they are told that funds are very limited to implement EE projects in general. Specifically, it has been heard that a budget procurement was made to promote the GEMP project, but was rejected by the DBM.

Moreover, the private sector has expressed their opinions that, in implementing EE projects for buildings, IFC has introduced a risk-sharing mechanism (two-step loan) with the Bank of the Philippine Islands, and

KfW has been cooperating with the Philippine Land Bank in providing loans, so there are no problems in obtaining loans for large buildings.

On the other hand, for small and medium-sized buildings and detached houses, the financing capacity of owners is low, making it difficult to obtain financing. In particular, due to strict loan conditions and high collateral requirements, financial institutions in the Philippines do not receive many requests for EE financing, despite the availability of funds. In addition, although the government subsidizes the construction of residential housing (detached houses, etc.), including energy efficiency, architects also commented that the number of subsidies is small, and as a result, they have not been able to take sufficient measures.

In implementing the initiatives outlined in the NEECP, DOE will be required to act as a market leader. To this end, DOE aims to share lessons learned from its experience with public sector buildings, especially through the development of demonstration programs, and the accumulation and consolidation of know-how through the realization and expansion of demonstrations is a challenge.

The Future Energy Scenario in Capsule aims to investigate emerging technologies that enhance efficiency. The challenge is to introduce and disseminate suitable technologies based on these perspectives.

The EEC Act is relatively new, and the initiatives are emerging and not widely disseminated, which is a challenge. Other challenges include limited knowledge of the EE market and still small demand for EE by final energy consumers. This is due to the limitation of incentives or mandates to promote private demand for EE.

(d) Implementation status of climate change adaptation measures

Adaptation was considered to be similar to the EPPB’s efforts, and no other adaptation was identified in the sub-sector concerned.

3) Status of Donor Support

Similarly, although there is some overlap with other subsectors, the status of other donor cooperation projects related to energy efficiency and conservation are shown in the table below. Since there is no shortage of financial, technical, and policy support, and it is assumed that this support will continue to be provided, there is room to consider cooperation and support that incorporates different elements from the various donors do.

Table 2-40 Status of Donor support (Energy Efficiency and Conservation)

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
ADB	Project name: Energy efficiency and small renewables-procurement and financing tools for LGUs (CCAP SP2) Implementation period: 2022-Sept 2023 Implementation site: N/A	DOE-EUMB REMB PPPC	ongoing

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
	Purpose of Activity: To develop procurement and financing tools for energy conservation and small-scale renewable energy deployment in LGUs, but details are unknown.		
ADB	Project name: Green Bond Program Implementation period: 2015- Implementation site: N/A Activity Objective/Description: Green Bonds target projects that promote a transition to low-carbon and climate resilient growth. In energy, renewable energy deployment and energy efficiency projects are eligible as mitigation measures, while energy infrastructure resilience improvement projects are eligible as adaptation measures.		ongoing
ADB WB	Project name: Clean Technology Fund (CTF) Implementation period : 2008 Implementation site: N/A Purpose and Description: The Climate Investment Funds (CTF) is one of four programs that provide concessional financing to middle-income countries for the demonstration, diffusion, and transfer of low-carbon technologies. The ADB manages over \$1.1 billion in CTF funds for government and private sector projects.	DOE	ongoing
OECD	Project Name: Clean Energy Financial Investment Mobilization (CEFIM) Program Implementation period: N/A Implementation site: N/A Activity Purpose/Description: to strengthen national enabling conditions to attract finance and investment in renewable energy, energy efficiency, and industrial decarbonization (clean energy) in emerging economies. Assist countries in developing policies and instruments to expand the pipeline of financially viable clean energy projects. It is financially supported by the governments of Australia, Canada, Denmark, Egypt, and Germany. In the Philippines, this includes offshore wind power and energy efficiency in the building sector, particularly in public buildings.	DOE	ongoing
WB EU	Project name: ACCESS TO SUSTAINABLE ENERGY PROGRAMME (ASEP) Implementation period: 2016-2022 Implementation site: N/A Activity Objective/Content: ASEP is providing grants totaling €60 million to help the Philippines achieve its rural electrification goals through the use of renewable energy while promoting energy efficiency. This includes improving access to sustainable energy for about 100,000 to 150,000 poor households in remote areas (installation of solar home systems), installing 20 MW of RE generation capacity, and developing an EE&C planning guidebook for local governments (LEECP).	DOE	completion
WB (IFC)	Project name: Sustainable Energy Finance program Implementation period: 2009-.	BPI	ongoing

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
	Implementation site: N/A Activity Objective/Description: Bank of the Philippine Islands (BPI) can share the risk of up to 5 billion PHP of the bank's energy efficiency and renewable energy financing portfolio		
UNOPS	Project name : Energy Transition Partnership (ETP) : Demand Side Management Policy Implementation period : Scheduled to run for 18 months Implementation site : N/A Activity Objective/Description : <ul style="list-style-type: none"> • Development of DSM policy documents • Capacity building on DSM policy makers and energy planners • Development of national DSM implementation plans and monitoring and evaluation frameworks • Development of tools for DSM planning and capacity building of power utilities. 	DOE EUMB	in preparation
UNOPS	Project name : Energy Transition Partnership (ETP) : ESCO-in-a-Box Implementation period : 12 months Implementation site : N/A Activity Objective/Description : Support ESCO activities in the Philippines by establishing an ESCO-in-a box® platform, providing legal and financial tools and templates to facilitate transactions, and providing technical training and operational guidance	N/A	in preparation
UNOPS	Project name : Energy Transition Partnership (ETP) : Investment Grade Audit Program Implementation period : N/A Implementation site : N/A Activity Objective/Description : Funds investment grade audits of energy efficiency projects by local ESCOs, making these projects bankable and reducing the risk to the investment.	N/A	in preparation

Source: JICA Survey Team

(7) Alternative Fuels and Emerging Technologies

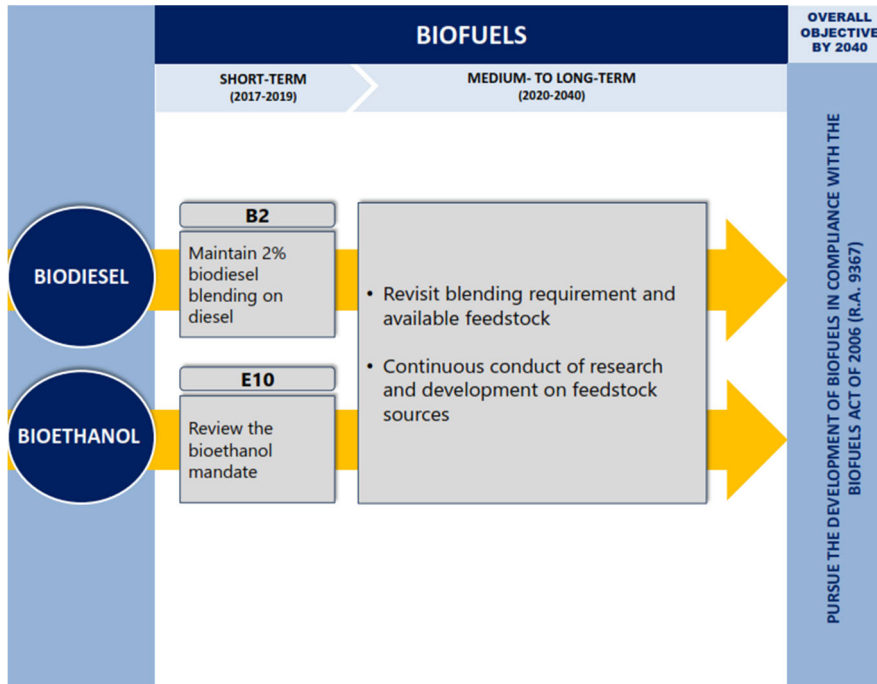
1) Relevant Policies and Plans

(a) Biofuels Act (2006)

The Biofuels Act of 2006 is a national policy direction law that seeks to reduce dependence on imported fuels and expand livelihood opportunities by mandating their use, in harmony with the country's sustainable economic growth, with due regard to the protection of public health, the environment, and natural ecosystems. Article 5 of the Act stipulates that all liquid fuels for vehicles and engines sold in the Philippines must contain locally sourced biofuel components. In accordance with this provision, DOE has continued to research and develop other biofuel feedstocks to boost domestic production and meet the mandated biodiesel and bioethanol blending fuel supply requirements.

(b) Biofuels Roadmap (2017-2040)

This is a roadmap that sets out a future path for improving the blending of biodiesel and bioethanol in vehicle fuels, developed to promote implementation of the Biofuels Act of 2006. It states that B2 (2% blending) will continue for biodiesel and E10 (10% blending) will continue for bioethanol, but the targets for both will be revised. While the biofuels roadmap is yet to be updated, it should be noted that the increase in biodiesel blend from 2% to 3% is to be implemented this year (2024), 3% to 4% in 2025 and 4% to 5% in 2026. Meanwhile, the voluntary E20 is also set to be implemented this year (2024).

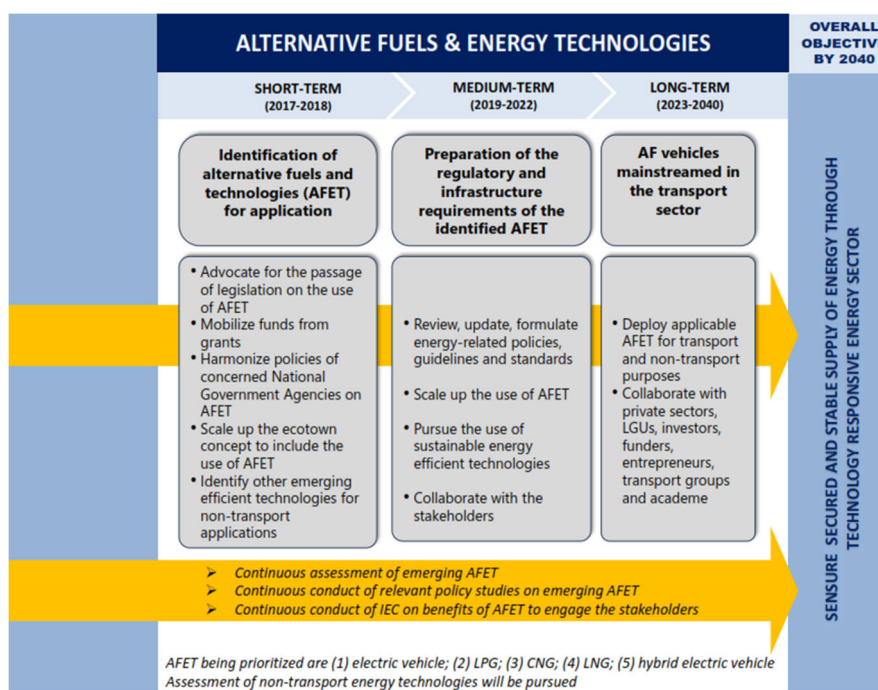


Source: DOE website

Figure 2-26 Biofuel Roadmap

(c) Alternative Fuels and Energy Technologies Roadmap (2017-2040)

This is a roadmap showing future initiatives for the introduction of alternative fuels and new technologies other than the biofuels mentioned above. Currently, EV, LPG, CNG, LNG, and hybrid EV are identified, but if other new technologies or fuels emerge, this roadmap will provide a typical path for how they will be introduced and promoted.



Source: DOE website

Figure 2-27 Alternative Fuels & Energy Technologies (AFET) Roadmap

2) Implementation Status of Climate Change Measures

(a) **Implementation structure**

While EUMB is in charge of alternative fuels, REMB is in charge of biofuels, among others. In particular, the Alternative Fuels and Energy Technology Division of the EUMB is in charge of emerging technologies in addition to alternative fuels. However, since there is no clear jurisdiction for each type of emerging technology, the organization in charge of each technology is assigned according to the content of the technology.

(b) **Climate-related budgets**

Table 2-21 shows that the budgets for climate change measures, such as the "Biofuels Program" and "Alternative Fuels for Transportation and Other Purposes" are considered to fall under this category, with a total appropriation of more than 70 million PHP.

(c) **Implementation status of climate change mitigation measures**

a) **Mandatory blended fuel**

In the Philippines, two laws, the Biofuels Act of 2006 (RA 9367) and the Renewable Energy Act of 2008 (RA 9513), have been enacted to promote renewable energy, reduce dependence on imported fossil fuels, and reduce carbon emissions in response to climate change. This mandates the blending of a certain amount of bioethanol and biodiesel with existing fuels. Specifically, domestically produced fuel ethanol is derived

from sugarcane (mainly molasses) and blended with gasoline, and biodiesel is converted from coconut oil to coco-methyl ester (CME), which is blended with petroleum.

The DOE, along with seven other government agencies, is leading the implementation of these two laws, and the National Biofuels Program, under the guidance of the National Biofuels Board (NBB), is responsible for providing direction. However, the original biofuels roadmap was designed for the period from 2026 to 2040, considering B10 (10% biodiesel blend) and E20 (20% bioethanol blend). As indicated in the latest roadmap above, it currently only extends to B2 and E10, with the current status also being B2 and E10.

The table below shows the production forecasts and other information for biodiesel and bioethanol under each of the PEP scenarios. The production capacity of biodiesel is more than twice that of the REF, and it is important to expand the production system for biodiesel in the future, while the REF exceeds the capacity of the CES for bioethanol. Therefore, unlike biodiesel, it will be important to promote its production quality, cost, and utilization.

Table 2-41 Production and investment forecasts for biodiesel

Year	Demand (ML)		Total Capacity (MLPY)		Capacity Addition (80% Utilization Rate) (MLPY)		Investment Cost (PhP Million @2020 Prices)		Jobs Generation	
	REF	CES	REF	CES	REF	CES	REF	CES	REF	CES
2020	184.43	184.43	707.90	707.90	-	-	-	-	-	-
2025	249.56	590.38	707.90	1,086.78	-	378.88	-	1,790.30	-	394
2030	343.14	791.23	707.90	1,086.78	-	378.88	-	1,790.30	-	394
2035	465.93	1,065.54	707.90	1,331.93	-	624.03	-	2,948.69	-	650
2040	613.62	1,386.43	767.03	1,733.04	59.13	1,025.14	279.39	4,844.01	62	1,067

*Cumulative
On the assumption that PhP4.725 million per MLPY capacity (average)

Source: PEP

Table 2-42 Production and investment forecasts for bioethanol

Year	Demand (ML)		Total Capacity (MLPY)		Capacity Addition (80% Utilization Rate) (MLPY)		Investment Cost (PhP Million @2020 Prices)		Jobs Generation	
	REF	CES	REF	CES	REF	CES	REF	CES	REF	CES
2020	579.30	579.30	380.50	380.50	-	-	-	-	-	-
2025	798.01	755.32	997.51	944.15	617.01	563.65	32,009.73	29,241.45	3,486	3,185
2030	1,145.37	1,083.41	1,431.71	1,354.26	1,051.21	973.76	54,535.26	50,517.36	5,939	5,502
2035	1,622.29	1,530.44	2,027.87	1,913.05	1,647.37	1,532.55	85,463.24	79,506.59	9,308	8,659
2040	2,225.58	2,063.47	2,781.98	2,579.34	2,401.48	2,198.84	124,585.37	114,072.62	13,568	12,423

*Cumulative
Assumption if all bioethanol supply requirement is to be produced locally with estimated investment of PhP51.9 million per MLPY capacity (average).

Source: PEP

Article 5 of the Biofuels Act requires that all liquid fuels for vehicles and engines sold in the country must contain locally sourced biofuel components, but even at present there is already not enough supply (52.3% of domestic demand) to meet the quality of bioethanol blend requirements. There is also a shortage of raw materials for production, making it a challenge to secure raw materials in a way that balances food security. In particular, the production and dissemination of high-quality alternative fuels will be a challenge, as co-firing in power generators, utilization of Sustainable Aviation fuel (SAF), and improvement of blending requirements will be effective in promoting decarbonization in the future. According to the stakeholders interviewed, the cost remains high, and the production volume is not increasing, which is a challenge for the diffusion of these alternative fuels. In addition, the challenge lies in achieving reasonable pricing and ensuring market adaptability.

Regarding biofuels, REMB requests for assistance in formulating a policy for the introduction of SAF and in researching the potential of feedstock crops that do not compete with food self-sufficiency and SAF production.

b) Sustainable Aviation Fuel (SAF)

The Philippines also participates in the International Civil Aviation Organization's (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSA), which aims to achieve domestic SAF production by 2025. In reality, however, no production plant has been established due to a absence of requests from operators, and SAF is currently being supplied from Singapore and other countries.

The legal and institutional framework for SAF is still in the process of being developed, and SAF are not specified in the Philippine National Standards.

In this context, DOE affirms its commitment to SAF for decarbonization of the aviation transport. A Memorandum of Agreement with Central Luzon State University has been signed for the assessment of potential feedstocks for SAF in the Philippines under the UN-ICAO's CORSA Sustainability Criteria.

As for support for SAF, the EUMB has requested support for pilot projects such as manufacturing plants, etc., as they are aiming for domestic production, which is the same as the support from REMB described below. REMB requested support for pilot projects such as a manufacturing plant for SAF, as they are aiming for domestic production of SAF.

c) Hydrogen and ammonia

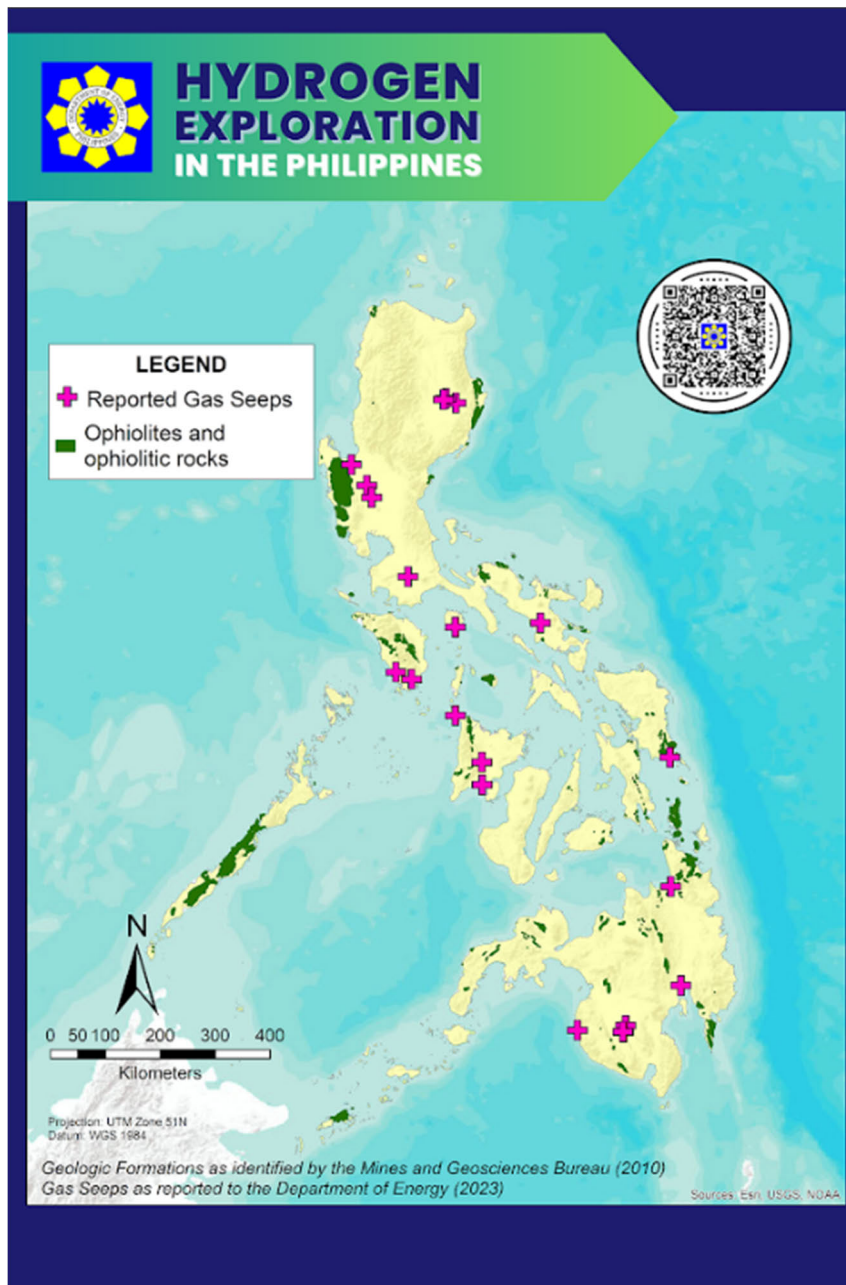
In November 2020, Special Order 179 was issued to “conduct research on hydrogen and fusion energy, including infrastructure development methods and strategies, develop a framework for its inclusion in the energy mix, and create a Hydrogen and Fusion Energy Commission (HFEC) for other purposes” and a study on hydrogen production and utilization was initiated. The study was completed in February 2021, and its results showed the potential benefits of using hydrogen as an alternative energy source, provided that it

is derived from non-fossil fuels. To institutionalize the development partnership, DOE signed a memorandum of understanding with Star Scientific Ltd. of Australia on January 27, 2021, and a similar cooperation agreement with Hydrogen Technology Inc. of Japan (HTI) on April 7, 2021. The company also decided to study the use of hydrogen for electricity supply.

For ammonia, JERA Corporation has signed a memorandum of understanding with Aboitiz Power Corporation, a subsidiary of major Philippine conglomerate group Aboitiz Equity Ventures Inc. to jointly study ammonia. They will initiate a joint study of ammonia co-firing in coal-fired power plants to decarbonize Aboitiz Power Corporation's operations. Thus, the current movement on ammonia is accelerating.

The Department of Energy (DOE) issued Department Circular No. DC2024-01- 0001 providing a national policy and general framework, roadmap, and guidelines for hydrogen in the energy sector. Recognizing the pivotal role of hydrogen in the energy transition, the DOE establishes a comprehensive national policy framework covering various aspects of the hydrogen energy value chain, outlining incentives for hydrogen energy projects, formulation of a hydrogen energy roadmap, among others. Department Circular No. DC2024-01- 0001 also includes a description of incentives, which include tax breaks, equipment and materials exemptions, carbon credit exemptions, and tax credits for domestic capital equipment and services, as well as projects targeting the use of hydrogen fuel cells in transportation, research and development of hydrogen technology, and manufacturing of equipment, which are also eligible for tax breaks, tariff exemptions and other preferential measures.

In addition, the DOE ERDB plans to conduct a seven-year study on the natural hydrogen potential throughout the Philippines, starting in 2023. As depicted in the figure below, certain sites have already been identified.



Source: DOE

Figure 2-28 Distribution of natural hydrogen potential sites

EUMB is eager to develop a general framework for various technologies related to hydrogen and ammonia and requested support for such a framework. In addition, the ERDB expressed a need for assistance in studying policies and systems, including whether ammonia co-firing, etc., would be suitable for the Philippines. ERDB also requested a study on the geological potential of gold hydrogen (natural hydrogen). The EPPB is currently formulating a legal and institutional framework/vision for hydrogen, and it is necessary to consider the details of support based on the details of the framework/vision.

The REMB also expressed that a cross-departmental technical working group on hydrogen has been established within the DOE, and that they would like to receive cooperation in the formulation of future policies on green hydrogen.

d) Carbon dioxide Capture, Utilization and Storage (CCUS)

Although the Philippines is in the process of suspending the introduction of new coal-fired power generation, decommissioning of the remaining coal-fired power generation is seen as unrealistic. For this reason, the introduction of CCUS (especially CCS) technology is attracting attention. ERDB, which conducted the study, has visited Singapore to learn more about this technology and is diligently gathering basic information by attending meetings of the Global CCUS Institute, an international think tank with the mission of accelerating the deployment of CCS technology.

The challenge is that there are no firm policies or institutions for CCUS, and the first step is to develop a framework for creating policies, plans, roadmaps, and institutions for these emerging initiatives.

In response to this, the ERDB asked for assistance in examining policies and institutions, including whether the CCUS is appropriate for the Philippines. There is also a limitation of infrastructure for procurement of technology, and the issue is how to make CCUS feasible in relation to private operators owning all coal-fired power plants.

In the absence of policies and systems regarding SAF, hydrogen, ammonia, and CCUS, the DOE has established an internal research team dedicated to emerging energy technologies such as hydrogen, ammonia, and CCUS. This initiative is supported by the issued Department Circular 2023-05-0014, titled 'Creation of the DOE Research Team for Energy Policy Research and Related Studies.' In this context, the research team is open to technical cooperation and have needs on possible funding to pursue studies on the aforementioned technologies.

(d) Implementation status of climate change adaptation measures

Adaptation was considered to be similar to the EPPB’s efforts, and no other adaptation was identified in the subsector concerned.

3) Trends in Japanese Private Sector

Trends of Japanese private companies regarding alternative fuels and emerging technologies are shown in the table below. For biofuels, there is a trend that initiatives have not been updated as recently as 2018, and for hydrogen and ammonia, related companies have started by signing MOUs with local companies and public entities.

Table 2-43 Trends in Japanese Private Sector (Alternative Fuels and Emerging Technologies subsector)

Classification	Company Name	Trend	Year
Biofuel	Dole Philippines Inc., a group company of ITOCHU Corporation	Biogas power generation using pineapple residue. Pineapple residue produced in the manufacturing process of Dole products is supplied by Dolefil to SBVC as a raw material for biogas, and the biogas produced is purchased by Dolefil from SBVC as electricity. (PPA contract)	2018

Biofuel	Ohara Iron Works Co., Ltd., PEAR Carbon Offset Initiative Corporation	Study on the diffusion of biogas power generation technology in the Philippines. (MOFA "Official Development Assistance Overseas Economic Cooperation Projects (Projects to Promote Assistance to Developing Countries through the Use of Japanese Technology, etc.)")	2014
Hydrogen	Hydrogen Technology Corporation	Memorandum of Understanding (MoU) with the DOE for hydrogen utilization and research and development. (R&D)	2021
Hydrogen	Toshiba Energy Systems & Solutions Corporation	MOU signed with NEA for collaboration in the diffusion of H2One™, a stand-alone hydrogen energy supply system, in the country. (METI "Project Feasibility Study for Overseas Development of High-Quality Energy Infrastructure")	2018
Ammonia	JERA Co., Inc.	Commenced joint study with Aboitiz Power on ammonia co-firing at coal-fired power plants and signed a memorandum of understanding (MOU). (R&D)	2023

Source: Prepared by the survey team based mainly on various press articles in the last five years.

4) Status of Donor Support

The status of donor cooperation projects on alternative fuels and emerging technologies is shown in the table below. Cooperation on ammonia co-firing is being planned by the ADB, which will also go into the supply of green ammonia and hydrogen. On the other hand, no significant cooperation projects on biofuels were identified. On the other hand, several JICA private partnership projects have been confirmed to provide support for biofuels. According to interviews with the DOE ERDB, Australia has also expressed interest in supporting hydrogen-related projects, and support for this area may increase in the future.

Table 2-44 Status of Donor support (Alternative Fuels and Emerging Technologies)

Cooperation Partners	Project Name and Description	Implementing agency	Status
ADB	Project Name: Ammonia / Hydrogen Co-Firing Coal Plants Implementation period: N/A Implementation site: N/A Activity Objective/Description: Identify OSW and other RE resources for green ammonia/hydrogen and coal-fired power plants that can co-fire with green ammonia/hydrogen and develop a legal and regulatory framework.	DOE	Under preparation
USDA GAIN	Project name: N/A Implementation period: N/A Implementation site: N/A Objective/Description of Activities: Continuously publish the Biofuels Annual Report, which surveys and reports on trends in biofuels in the Philippines.		ongoing
JICA Private Sector Cooperation Project	Project Title: Project Feasibility Study for the Promotion of Locally Produced and Consumed Biodiesel Production Systems in the Philippines Implementation Period: April 2016 to March 2018 Implementation Sites: 1.Los Baños, Laguna, Philippines 2.Panglao, Bohol, Philippines 3.Tagbilaran City, Bohol, Philippines Objective and Activities: Career Car Service Co., Ltd. (the proposing company) aims to introduce the Waste Cooking Oil Utilization BDF Refining Equipment "Wonder 100" to local government units in the target areas. The goal is to facilitate the	DENR Laguna Provincial Environmental Management Office Bohol Provincial Environmental Management Office	Completed

Cooperation Partners	Project Name and Description	Implementing agency	Status
	establishment of locally produced and consumed Biodiesel (BDF) production systems, with the local government units serving as the project implementers.		
JICA Private Sector Cooperation Projects	<p>Project Title: Investigation and Implementation of a Waste Cooking Oil Collection System and Biodiesel Production for Environmental Improvement in the Philippines</p> <p>Implementation Period: November 2016 to March 2018</p> <p>Implementation Site: Davao City</p> <p>Purpose and Activities: In collaboration with Biomass Japan and Shinzaki Transport Warehouse, the project aims to construct a waste cooking oil collection system and introduce a Biodiesel (BDF) refining facility. The objective is to address water and air pollution through these measures, contributing to environmental improvement.</p>	Davao City Environment and Natural Resource Office	Completed
JICA Private Sector Cooperation Projects	<p>Project Name: Investigation into the Recycling of Used Cooking Oil and Alternative Fuel Implementation through Renewable Energy Systems in Boracay Island, Philippines</p> <p>Implementation Period: May 2017 to June 2019</p> <p>Implementation Site: Boracay Island</p> <p>Objective/Content: The goal of this project is to introduce Renewable Energy Systems, particularly addressing the disposal challenges of used cooking oil on Boracay Island. Ultimately, the project aims to plan and propose an Official Development Assistance (ODA) initiative contributing to environmental improvement by establishing a sustainable, locally sourced, and energy-circulating system through the reuse of used oil.</p>	Boracay, Philippines / Malai City Hall with jurisdiction over Boracay	

Source: JICA Survey Team

Table 2-45 Identified issues (energy sector)

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
General	<ul style="list-style-type: none"> Transform the energy business into a private sector-driven market under RA. 9136, known as the Electric Power Industry Reform Act (EPIRA) of 2001. Largest emitting sector in the 2010 national GHG inventory, emitting 53.105 Mt CO₂e Damage caused by climate change <ul style="list-style-type: none"> ➢ Damage to energy infrastructure due to climate disasters Climate change future projections and impacts <ul style="list-style-type: none"> ➢ Changes in rainfall patterns will have a significant impact on the installation and operation of hydropower and other energy sources Actual and projected GHG emissions <ul style="list-style-type: none"> ➢ 120 Mt CO₂e emissions in 2020 ➢ Approx. 210 Mt CO₂e emissions in 2030 ➢ Approx. 460 Mt CO₂e emissions in 2040 	<ul style="list-style-type: none"> Philippines Energy Plan (2020-2040) <ul style="list-style-type: none"> ➢ Contribution to NDC to reduce greenhouse gas emissions by 12% (CES) Future Energy Scenario in Capsule <ul style="list-style-type: none"> ➢ Renewable energy share of energy mix 35% (2030), 50% (2040) ➢ 5% energy reduction in petroleum products and electricity by 2040 ➢ Apply interactive ICT to the energy chain ➢ Building resilient and climate resilient energy infrastructure ➢ 10% EV penetration by 2040, exploration of emerging efficiency technologies 	<ul style="list-style-type: none"> Mitigation measures <ul style="list-style-type: none"> ➢ Future renewable energy power source share target of 68.72% (29.02% in 2020) ➢ Capacity increase significantly to 18,883 MW only for coal, natural gas, and oil, which are considered relatively clean and have low carbon dioxide emissions (3,453 MW in 2020) ➢ Coal moratorium halts new coal-fired power construction Adaptation measures <ul style="list-style-type: none"> ➢ Department Circular (DC) 2018-01-0001 establishes guiding principles and institutionalizes the development, promotion, and implementation of Resiliency Compliance Plans (RCPs) ➢ DC 2022-06-0028 supplements the earlier policy on ERP by expanding Task Force on Energy Resiliency (TFER) functions, enhancing RCP compliance monitoring, assessment and funding, and improving guiding principles to better align energy resiliency efforts with disaster risk reduction and climate change adaptation goals. Policy on RCP to be revised in EPPB 	<ul style="list-style-type: none"> <u>Capacity Building</u> <ul style="list-style-type: none"> • Limitation of understanding of the basics of energy sector mitigation measures at the local government level (e.g., mitigation concepts, collection of activity data related to GHG inventories, calculation of GHG emissions and reductions) • Limitation of knowledge of mitigation opportunities and benefits, technical operations, and potential funding mechanisms at the industrial, commercial, and community levels <u>Finance</u> <ul style="list-style-type: none"> • Attracting domestic and foreign investment funds • Limited budget in the DOE (common perception that it is private-sector driven makes it difficult to budget for new initiatives in the energy sector) <u>Institution</u> <ul style="list-style-type: none"> • Limitation of institutions related to proper planning, implementation and monitoring (evaluation of effectiveness and efficiency of mitigation measures) <u>Technology</u> <ul style="list-style-type: none"> • High dependence on foreign technology makes maintenance difficult • Policy research on new and emerging technologies (hydrogen, ammonia, marine technology, offshore wind, deuterium, carbon capture and storage, etc.) 	<ul style="list-style-type: none"> Capacity strengthening of local government officials is expected to be implemented in conjunction with capacity building support for each subsector Conduct workshops (WS) and other activities for stakeholders in conjunction with capacity building support for each subsector In supporting each subsector, consider measures to promote private investment and present the importance and urgency of activities as much as possible Consider institutional improvements in support of each subsector Consider supply chain development in the support of each subsector. Encourage EPPB participation in support on emerging technologies
Energy Statistics & Planning (Mitigation and Adaptation)			<ul style="list-style-type: none"> ➢ Next PEP 2030-2050 will be disclosed ➢ Energy data collection, analysis, and policy development 	<ul style="list-style-type: none"> Limitation of capacity to collect, analyze, and make energy data available <u>Capacity Building</u> <ul style="list-style-type: none"> • Limited capacity to collect and analyze energy data and make it available • Limitation of energy statistics at the regional level • Limitation of knowledge of analytical methods • No system installation for collection, analysis and availability improvement on energy data 	<ul style="list-style-type: none"> Development of an energy statistics database on a regional level, involving LGUs (provincial or city planning offices) in the phasing process, prioritizing energy-intensive regions Development of an energy data management system with appropriate system software / analytical tools Comprehensive data collection and processing on the energy sector in coordination with the Philippine Statistics Authority
Conventional energy (mitigation)	<ul style="list-style-type: none"> Natural Gas Utilization Status, etc. <ul style="list-style-type: none"> ➢ Total installed capacity of gas-fired power generation: 3,453 MW (2020) ➢ Total gas-fired power generation actual and 	<ul style="list-style-type: none"> Philippines Energy Plan (2020-2040) <ul style="list-style-type: none"> ➢ Low-carbon power generation through increased introduction of gas-fired power generation is also necessary to achieve NDC 	<ul style="list-style-type: none"> ➢ Fuel switching to natural gas, which is considered relatively clean ➢ Development rights extended to 2037 for Malampaya gas field and surrounding gas fields ➢ Importation of liquefied natural gas (LNG) (7 LNG import 	<ul style="list-style-type: none"> Limitation of knowledge in technical, legal, and financial aspects of natural gas <u>Capacity Building</u> <ul style="list-style-type: none"> • Limitation of general knowledge about natural 	<ul style="list-style-type: none"> Capacity building paying attention to technical, legal and financial aspects

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
	<p>forecast: 19.5 TWh (2020), 146.86 TWh (2040: REF)</p> <ul style="list-style-type: none"> ➤ Total natural gas primary energy supply: 3.29 Mtoe (2020) ➤ Total natural gas consumption: 133,606 mmscf (2020) 	<ul style="list-style-type: none"> ➤ 18,883 MW of natural gas-fired power generation to be installed and expanded by 2040 (CES) with a total generation of 93.24 TWh (CES) ➤ Total natural gas consumption from transportation and industrial sectors to increase by 1.5% between 2020 and 2040 • Department Circular 2024-01-007 Adopting the Amended Rules and Regulations Governing the Downstream Natural Gas Industry <ul style="list-style-type: none"> ➤ Provides the regulatory framework for the downstream natural gas industry as well as guidelines for investors to develop the natural gas projects/facilities • Downstream Natural Gas Roadmap (2017-2040) <ul style="list-style-type: none"> ➤ Creating a healthy gas market and stimulating market principles ➤ Prioritizing natural gas as a primary energy source contributes to climate change mitigation measures • Natural Gas Development Plan <ul style="list-style-type: none"> ➤ Potential for necessary gas infrastructure development as a natural gas importing country 	<p>terminal project applications approved)</p> <ul style="list-style-type: none"> ➤ METT's Gas Policy Development Program is underway ➤ Decrease in support from other donors <ul style="list-style-type: none"> ➤ Philippine Conventional Energy Contracting Program (PCECP) established to attract investment in oil and gas exploration and development 	<p>gas</p> <p><u>Finance</u></p> <ul style="list-style-type: none"> • Limitation of private investment in the implementation of natural gas downstream infrastructure <p><u>Institution</u></p> <ul style="list-style-type: none"> • Absence of enabling law for the downstream natural gas industry • No Philippine National Standards (PNS) for the downstream natural gas facilities <p><u>Technology</u></p> <ul style="list-style-type: none"> • Expand introduction of natural gas-fired power generation • Smooth implementation of LNG imports • Expansion of natural gas utilization and development of necessary infrastructure <ul style="list-style-type: none"> • Development of new natural gas fields 	<ul style="list-style-type: none"> • Presentation of national policy • Technical assistance for natural gas utilization • Standards Development • Educational campaigns on the safety and acceptance of natural gas (as bridge fuel for energy transition) • Careful consideration of support from Japan due to the characteristics of transition energy
Renewable Energy (Mitigation)	<ul style="list-style-type: none"> • Renewable Energy Installed (2,020) <ul style="list-style-type: none"> ➤ Total: 7,617 MW ➤ Geothermal: 1,928 MW ➤ Hydro: 3,779MW ➤ Wind: 443 MW ➤ Solar: 1,019MW ➤ Biomass: 447MW 	<ul style="list-style-type: none"> • Philippines Energy Plan (2020-2040) <ul style="list-style-type: none"> ➤ Total installed renewable energy capacity by 2040: 81,485 MW ➤ Geothermal: 2,408MW ➤ Hydro: 20,176 MW ➤ Wind: 11,830 MW ➤ Solar: 46,137 MW ➤ Biomass: 933MW • National Renewable Energy Program (2020-2040) <ul style="list-style-type: none"> ➤ Renewable energy share in the energy mix by 2030: 35% (65,316 GWh) ➤ 50% renewable energy share in energy mix by 2040 (174,783 GWh) ➤ Expand new renewable energy capacity by 52,826 MW by 2040 • Renewable Energy Roadmap (2017-2040) <ul style="list-style-type: none"> ➤ Minimum 20,000 MW of installed renewable energy capacity by 2040 	<ul style="list-style-type: none"> • Feed in Tariff (FIT) <ul style="list-style-type: none"> ➤ Solar, wind, biomass, marine, run-of-river (ROR) hydropower • Net Metering <ul style="list-style-type: none"> ➤ Increasing the size of eligible renewable energy to 1 MW • Priority renewable energy supply <ul style="list-style-type: none"> ➤ Intermittent renewable energy plants such as wind, solar, ROR hydro, and marine energy must be supplied by WESM, regardless of whether they are FIT-eligible or not • Renewable Portfolio Standards <ul style="list-style-type: none"> ➤ Defines minimum annual RPS requirements and increments and identifies eligible RE facilities ➤ Provides for compliance monitoring of participants and penalties for noncompliance • Green Energy Options Program <ul style="list-style-type: none"> ➤ Allows electricity end-users to receive electricity from renewable energy power suppliers of their choice • Renewable Energy Trust Fund (RETF: Recycle Equipment Test Facility) <ul style="list-style-type: none"> ➤ Established to promote the development and increased use of renewable energy ➤ Managed by DOE as a special account at government financial institutions • Renewable Energy Market (REM) <ul style="list-style-type: none"> ➤ Will serve as a forum for transparent and fair trading of RECs, which represent the environmental attributes of electricity generated from renewable energy resources, among REM participants 	<p>Limited private investment in renewable energy (especially hydroelectric and geothermal)</p> <p><u>Finance</u></p> <ul style="list-style-type: none"> • Restricted access to project financing for renewable energy installations by small independent power producers <p><u>Technology</u></p> <ul style="list-style-type: none"> • Limitation of renewable energy model projects • High cost of renewable energy deployment • Limited capacity and delay in expansion of power grid • Implementation of geothermal power projects after ADB support <p><u>Institution</u></p> <ul style="list-style-type: none"> • Lengthening of the eminent domain process • Expediting the application for various permits and licenses • Establishment of a market structure to encourage various types of subsidies and introduction of pumped storage (private sector) 	<ul style="list-style-type: none"> • Financial support for the introduction of renewable energy • Technical assistance for implementation of PEP and NREP • *Based on the status of support by other donors and the characteristics and status of renewable energy species, solar, wind, biomass, and marine are considered unlikely to be supported by Japan. • Capacity building support to agencies with jurisdiction over permit applications

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
			<ul style="list-style-type: none"> ➤ On December 17, 2019, with the support of the DREAMS project funded by GEF and UNDP, the Philippine Renewable Energy Market System (PREMS) to serve as an online platform where trading participants can manage their REC accounts The Philippine Renewable Energy Market System (PREMS), which serves as an online platform for trading participants to manage their REC accounts, was established. • Household Electrification Program <ul style="list-style-type: none"> ➤ Provides household lighting with solar power systems ➤ Provided solar-powered lighting systems to a total of 55,248 households between 2010 and 2017 • Competitive Renewable Energy Zones (CREZs) <ul style="list-style-type: none"> ➤ Facilitates aggressive transmission planning by identifying areas with the most economically viable renewable energy resources • Energy Virtual One-Stop Shop (EVOSS: Energy Virtual One-Stop Shop) <ul style="list-style-type: none"> ➤ Expediting the permitting process for all new generation, transmission, and distribution projects nationwide ➤ In September 2023, the potential capacity of renewable energy projects approved or already approved in the EVOSS system is 100 MW • Reducing Barriers to Foreign Investment <ul style="list-style-type: none"> ➤ Restrictions on foreign investment in biomass power projects in 2019, large-scale geothermal power projects in 2020, and solar, wind, hydro, and marine and tidal power projects in 2022 will be lifted • EU support <ul style="list-style-type: none"> ➤ Access to Sustainable Energy Programme (ASEP) productive use of renewable energy ➤ Microgrid installation and promotion of renewable energy for basic services in small islands and SPUG areas through the DREAMS project (GEF-UNDP) Regional Revitalization Plan and Support Scheme • Support by WB <ul style="list-style-type: none"> ➤ Development of roadmap for offshore wind installation • Support by ADB <ul style="list-style-type: none"> ➤ Development of policy for introduction of floating solar power (planned) ➤ Development of risk avoidance roadmap for geothermal power generation • Support by Mitigation Action Facility <ul style="list-style-type: none"> ➤ Introduction of floating tidal stream energy (TSE) hybrid system • Support by UNOPS <ul style="list-style-type: none"> ➤ Promote introduction of sea water pumped storage and some river water pumped storage 		

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
Power transmission and distribution, electrification (Mitigation)	<ul style="list-style-type: none"> TransCo, the state-owned transmission company, signed a 20-year concession agreement with NGCP, the transmission company, and the transmission business was privatized 	<ul style="list-style-type: none"> Electric Power Industry Roadmap (2017-2040) <ul style="list-style-type: none"> ➢ Ensure quality, reliability, affordability, and security of electricity supply by 2040 ➢ Expanding Electricity Accessibility Transmission Development Plan (2022-2040) <ul style="list-style-type: none"> ➢ Transmission development in line with PEP goals POWER SECTOR ROADMAP (2021-2040) <ul style="list-style-type: none"> ➢ Improve reliability and resiliency of key transmission networks 	<ul style="list-style-type: none"> Monitoring of NGCP efforts in line with TDP Development of operational guidelines to ensure appropriate use of Energy Storage Systems (ESS) and their integration into the power grid Establishment and reduction of AS-Technical Working Group (AS-TWG) consisting of stakeholders and relevant organizations in the power industry <ul style="list-style-type: none"> ➢ Design of regulating power markets ➢ AS test guidelines and technical specifications ➢ Regulating Power Market Readiness Standards ➢ Adjustment Power Market Mitigation Measures ➢ AS Cost Recovery ➢ AS Third-Party Testing Accreditation Guidelines ➢ Competitive Selection Process (CSP) for Contract AS Procurement 	<ul style="list-style-type: none"> Delayed expansion and reinforcement of the power grid <u>Capacity Building</u> <ul style="list-style-type: none"> • Delayed business approval by ERC 	<ul style="list-style-type: none"> Capacity Building Support for Facilitation of ERC Project Approval *NGCP is an overseas private sector company, so the possibility of support from JICA is considered low.
	<ul style="list-style-type: none"> Technology Deployment Status in Smart Grid Roadmap <ul style="list-style-type: none"> ➢ Meralco: Various facilities from Lv1 to Lv3 are being installed ➢ Other electric distribution companies: approx. Lv1 	<ul style="list-style-type: none"> Electric Power Industry Roadmap (2017-2040) <ul style="list-style-type: none"> ➢ Ensure quality, reliability, affordability, and security of electricity supply by 2040 ➢ Expand electricity accessibility ➢ Ensure transparent and fair electricity markets Smart Grid Vision <ul style="list-style-type: none"> ➢ Smart Power Distribution by 2040 ➢ Demand Response (DR) and Virtual Power Plant (VPP) realization by 2040 POWER SECTOR ROADMAP (2021-2040) <ul style="list-style-type: none"> ➢ Institutionalize continuous improvement in the reliability and resiliency of distribution facilities. Future Energy Scenario in Capsule <ul style="list-style-type: none"> ➢ Applying interactive ICT to the energy chain 	<ul style="list-style-type: none"> Realization and achievement of Smart Grid Roadmap and Smart Grid Vision Development of operational guidelines to ensure appropriate use of energy storage systems (ESS) and their integration into the power grid Establishment and reduction of AS-Technical Working Group (AS-TWG) consisting of stakeholders and relevant organizations in the power industry <ul style="list-style-type: none"> ➢ Design of regulating power markets ➢ AS test guidelines and technical specifications ➢ Regulating Power Market Readiness Standards ➢ Adjustment Power Market Mitigation Measures ➢ AS Cost Recovery ➢ AS Third-Party Testing Accreditation Guidelines ➢ Competitive Selection Process (CSP) for Contract AS Procurement Support by USAID and UNOPS <ul style="list-style-type: none"> ➢ Support for specific Smart Grid Roadmap initiatives ➢ USTDA plans to provide support for similar purposes 	<ul style="list-style-type: none"> Limitation of concrete policies and systems for smart grid realization <u>Technology</u> <ul style="list-style-type: none"> • Limited initiative for DUs to Delays in Implementing Smart Grid Projects <u>Institution</u> <ul style="list-style-type: none"> • Absence of policies and systems for smart grid elements 	<ul style="list-style-type: none"> Smart Grid Roadmap Initiatives for Distribution Companies Institutional Design Support to DOE EPIMB
	<ul style="list-style-type: none"> Status of hybridization <ul style="list-style-type: none"> ➢ Currently about 50 sites in 158 remote islands in the region are hybridized through private contracts (2023) ➢ Of the 1,618 GWh of total off-grid generation, 91% will come from oil (diesel) and 9% from renewable energy (2020) 	<ul style="list-style-type: none"> Missionary Electrification Development Plan (2021-2025) <ul style="list-style-type: none"> ➢ Providing reliable, quality electricity service to off-grid regional users ➢ Pursuing the use of domestic and renewable energy sources to reduce dependence on imported fossil fuels ➢ Modernize transmission and distribution networks and improve efficiency in off-grid power systems Future Energy Scenario in Capsule <ul style="list-style-type: none"> ➢ Building a Resilient and Climate-Resilient Energy Infrastructure POWER SECTOR ROADMAP (2021-2040) 	<ul style="list-style-type: none"> Hybridization of isolated island power sources <ul style="list-style-type: none"> ➢ Contracts signed with private companies for renewable energy installation on the NPC-regulated grid ➢ RCP compliance reflected in the contract 	<ul style="list-style-type: none"> Limitation of sustainability of remote island power infrastructure <u>Capacity Building</u> <ul style="list-style-type: none"> • Limitation of resiliency compliance status management by NPC • Delays in the permitting process for hybridization of small isolated island power sources <u>Finance</u> <ul style="list-style-type: none"> • Attracting investment in hybridization of off-grid local power sources <u>Technology</u> <ul style="list-style-type: none"> • Outage of remote island diesel generation due to hybridization 	<ul style="list-style-type: none"> Capacity Development for Improving Sustainability (Disaster Resilience) of Remote Island Power Infrastructure Capacity Building Support for Facilitation of ERC Project Approval and DENR Environmental Impact Assessment Investment Promotion Support for the Implementation of the Future Energy Scenario in Capsule Technical assistance for implementation of the Future Energy Scenario in Capsule

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
		<ul style="list-style-type: none"> ➢ Interconnect off-grid islands to the main gr id. 		<ul style="list-style-type: none"> • 30% renewable electricity supply rate not exceeded due to concerns about power instability • Interconnection of off-grid islands to national grid 	<ul style="list-style-type: none"> • Technical assistance for implementation of the POWER SECTOR ROADMAP (2021-2040)
Power transmission and distribution, electrification (Adaptation)	<ul style="list-style-type: none"> • Electrification rate <ul style="list-style-type: none"> ➢ 2019: 92.9 ➢ 2020: 94.5% (2020) ➢ Luzon Island: 98.42% (2020) ➢ Visayas region: 95.66% (2020) ➢ Mindanao: 83.57% (2020) *1.26 million households remaining without electricity 	<ul style="list-style-type: none"> • POWER SECTOR ROADMAP (2021-2040) <ul style="list-style-type: none"> ➢ Based on the most recent census, the electrification rate for eligible specified households will be 100%. • Missionary Electrification Development Plan (2021-2025) <ul style="list-style-type: none"> ➢ Achieve full electrification by 2022 • Total Electrification Program <ul style="list-style-type: none"> ➢ Presidential Announcement to Achieve Total Electrification by 2028 	<ul style="list-style-type: none"> • Strengthening the Home Electrification Program Nationwide <ul style="list-style-type: none"> ➢ Electrified 166,393 households between 2015 and 2018 • Enhanced Sitio Electrification Program <ul style="list-style-type: none"> ➢ Provides funds to construct distribution lines and residential wiring systems to eligible households ➢ Targets to cover 11,114 cities (territorial enclaves that form part of a barangay) from 2023 to 2028, costing a total of P31.7 billion • Barangay Transmission Line Enhancement Program <ul style="list-style-type: none"> ➢ Targets only off-grid barangays where it is economically feasible to extend distribution lines; funds are already provided for grid extension infrastructure such as overhead transmission lines, undersea cables, and underground cables, as well as for distribution line upgrades • Photovoltaic Mainstreaming (PVM) Program <ul style="list-style-type: none"> ➢ Offering Solar Home Systems (SHS) to households in off-grid areas ➢ Approximately 9,984 households will have SHS through DOE Locally-Funded Projects by April 2021 • Universal Charge for Missionary Electrification (UC-ME) <ul style="list-style-type: none"> ➢ Institutionalizes the provision of subsidies in areas not interconnected to the main grid ➢ Funds electrification programs/projects of NPC and other eligible entities ➢ UC-ME fees are determined by ERC and collected by utility companies from electricity end-users • Qualified Third Party (QTP) <ul style="list-style-type: none"> ➢ Areas deemed unviable and abandoned by utility providers are offered to QTPs as part of the Missionary Electrification Program ➢ Ensures that QTP proponents comply with Renewable Portfolio Standards (RPS) in non-electrified areas ➢ Approximately 13,500 households access electricity service 	<ul style="list-style-type: none"> • Limited funds for full electrification by 2028 • Limited funds for Total Electrification Program 	<ul style="list-style-type: none"> • Financial support for implementation of Total Electrification Program
Energy Efficiency and Conservation (mitigation)	<ul style="list-style-type: none"> • GHG Emission Reduction Status <ul style="list-style-type: none"> ➢ National Energy Efficiency & Conservation Plan and Roadmap (2023-2050) just starting to be implemented, data not yet available 	<ul style="list-style-type: none"> • Philippines Energy Plan (2020-2040) <ul style="list-style-type: none"> ➢ Save up to 5.0% energy on petroleum products and electricity by 2040. • National Energy Efficiency & Conservation Plan and Roadmap (2023-2050) 	<ul style="list-style-type: none"> • Philippine Energy Labeling Program <ul style="list-style-type: none"> ➢ Defines a national labeling system for Energy Consuming Products (ECPs) based on the energy performance of products ➢ Encourages changes in consumer behavior toward the use of 	<ul style="list-style-type: none"> • Limited private investment in energy efficiency and conservation • Limited government monitoring capacity for energy efficiency compliance and awareness of 	<ul style="list-style-type: none"> • Capacity building for all stakeholders on implementation of energy conservation schemes

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
		<ul style="list-style-type: none"> ➢ By 2050 <ul style="list-style-type: none"> - Government (30.24MtCO₂e) - Commercial (121.29MtCO₂e) - Private (299.56MtCO₂e) - Electric utilities and end consumers (65.9MtCO₂e) Greenhouse gas emission reductions for Future Energy Scenario in Capsule ➢ Emerging Efficiency Technology Exploration 	<ul style="list-style-type: none"> energy efficient products and technologies ➢ Energy efficiency requirements (scope, labels, Minimum Energy Performance for Products (MEPP), if applicable) • Philippines Energy Efficiency Project (PEEP) <ul style="list-style-type: none"> ➢ Implemented with funding from ADB ➢ Focus on efficient lighting ➢ Fuel cost reductions resulted in annual savings of about \$100 million, with \$450 million in investments in electricity generation and related 450 MW of network capacity held back ➢ 11.05 GWh of annual energy savings achieved in 150 government buildings renovated through June 2013 • Energy Service Company <ul style="list-style-type: none"> ➢ Projects that develop, install, and finance projects to improve facility energy efficiency and maintenance costs ➢ In 2021 alone, ESCOs will implement US\$10.78 million in EE projects, saving the equivalent of 7.65 million kWh of energy • DOE Guidelines on the Energy Conserving Design of Buildings <ul style="list-style-type: none"> ➢ Technical assistance for the Access to Sustainable Energy Programme (ASEP) supported by the European Union (EU) ➢ Developed to ensure the use of energy efficient systems in the building sector • Strengthening Demand Side Management (DSM) mechanisms <ul style="list-style-type: none"> ➢ Mandate to develop a DSM program for the electric power industry • Government Energy Management Program (GEMP) <ul style="list-style-type: none"> ➢ Requires the entire public sector to reduce energy consumption by at least 10 	<p>Government Entities of their roles/obligations towards achieving energy efficient government</p> <ul style="list-style-type: none"> • Limited capacity to collect energy conservation-related data (e.g., energy consumption trends in the consumer sector, household energy conservation awareness) • Limited implementation capacity of ESCO companies, etc. • Limitation of know-how from practical experience of private architects, etc. <p><u>Finance</u></p> <ul style="list-style-type: none"> • Low accessibility of financing for small and medium sized building EE projects • Lack of available funds to implement government energy efficient projects (Solar PV installation, building retrofit etc.) <p><u>Technology</u></p> <ul style="list-style-type: none"> • Limitation of emerging technologies to enhance implementation of the National Energy Efficiency & Conservation Plan and Roadmap (2023-2050) <p><u>Institution</u></p> <ul style="list-style-type: none"> • Limitation of penetration of EEC legislation (small demand for EE by final energy consumers) • Absence of EE incentive or mandatory schemes to promote private demand 	<ul style="list-style-type: none"> • Financial assistance for building EE projects (Possible funding of implementation of GEMP) • Technical Cooperation on emerging energy-saving technologies • Support for institutional design that contributes to EE market formation
Alternative Fuels and Emerging Technologies (mitigation)	<ul style="list-style-type: none"> • Biodiesel production capacity actual and forecast (REF) <ul style="list-style-type: none"> ➢ 2020: 707.9 ML/Y ➢ 2025: 707.9 ML/Y ➢ 2030: 707.9 ML/Y ➢ 2035: 707.9 ML/Y ➢ 2040: 767.3 ML/Y • Bioethanol production capacity actual and forecast (REF) <ul style="list-style-type: none"> ➢ 2020: 380.5 ML/Y ➢ 2025: 997.51 ML/Y ➢ 2030: 1,431.71 ML/Y ➢ 2035: 2,027.87 ML/Y ➢ 2040: 2,781.983 ML/Y 	<ul style="list-style-type: none"> • Nationally Determined Contribution (NDC) <ul style="list-style-type: none"> ➢ 75% reduction in greenhouse gas emissions from 2020 to 2030 • Philippines Energy Plan (2020-2040) <ul style="list-style-type: none"> ➢ 5.0% biodiesel blending starting in 2022 ➢ Explore availability of hydrogen, CCUS ➢ Nationwide biodiesel production capacity of 1733.04 ML/Y by 2040 (CES) ➢ Nationwide biodiesel production capacity of 2579.34 ML/Y by 2040 (CES) • Biofuels Roadmap (2017-2040) <ul style="list-style-type: none"> ➢ B2,E10 improvement • Carbon Offsetting and Reduction Scheme for International Aviation (CORSA) <ul style="list-style-type: none"> ➢ B2,E10 improvement 	<ul style="list-style-type: none"> • Mandatory blending of blended fuels <ul style="list-style-type: none"> ➢ Mandatory blending of certain amounts of bioethanol and biodiesel with existing fuels • Sustainable Aviation Fuel (SAF) <ul style="list-style-type: none"> ➢ Participation in the International Civil Aviation Organization's (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSA) • Hydrogen and ammonia <ul style="list-style-type: none"> ➢ Creation of the Hydrogen and Fusion Energy Committee (HFEC) ➢ Signed a Memorandum of Understanding with Star Scientific Ltd. of Australia on January 27, 2021 	<p>Limitation of private investment environment to promote supply of biofuels, etc.</p> <p><u>Technology</u></p> <ul style="list-style-type: none"> • Limited supply of feedstock crops for biofuel production • High cost of alternative fuel production <p><u>Institution</u></p> <ul style="list-style-type: none"> • Limited policies and systems regarding SAF, hydrogen, ammonia, and CCUS 	<ul style="list-style-type: none"> • Technical assistance to expand biofuel production • Institutional design assistance on SAF, hydrogen, ammonia, and CCUS

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
	<ul style="list-style-type: none"> • Biofuel blending ratio <ul style="list-style-type: none"> ➤ Biodiesel: 2 ➤ Bioethanol: 10 	<ul style="list-style-type: none"> ➤ Domestic SAF production through 2025 	<ul style="list-style-type: none"> ➤ On April 7, 2021, a similar cooperation agreement was signed with Hydrogen Technology Inc. (HTI) of Japan ➤ For ammonia, JERA Corporation started a joint study with Aboitiz Power Corporation on ammonia co-firing in coal-fired power plants to decarbonize its operations. • Support by ADB (planned) <ul style="list-style-type: none"> ➤ Feasibility study on ammonia and hydrogen co-firing in coal-fired power plants, framework to be developed 		

Source: JICA Survey Team

2.2.5 Transportation

(1) Sector Landscape

1) Sector Status and Climate Change Impacts

(a) **Current transport sector in the Philippines**

As of 2021, the length of national roads in the Philippines is 33,212.61 km, of which 99% are paved²⁹. On the other hand, the total length including local roads is approximately 200,000 km. The expressway network is being developed around Metro Manila, and a high-standard road network with a total length of 862 km is planned by 2030, but as of August 2019, the length of the developed expressways nationwide is 406 km. remains.

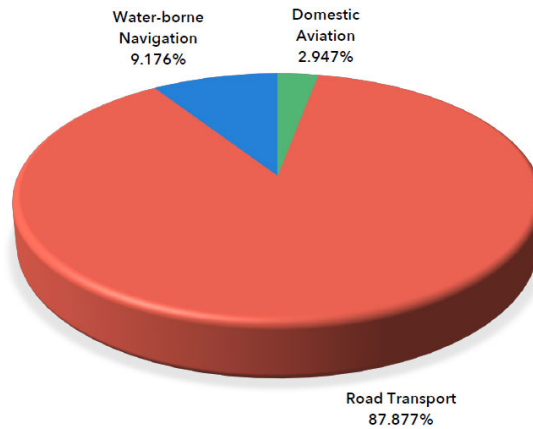
The country has four operational rail lines with a total length of 76.9 km. New mass transit railways were also approved in the last six years, with the two largest now under construction. While a drop of 68 percent in total rail ridership was recorded from 2019 (327.68 million) to 2021 (103.79 million), ridership increased by at least 23.45 percent from January (9.14 million) to May 2022 (11.94 million). The country has a total of 90 airports in operation—comprising 11 international, 41 domestic, 38 community—and 3 airports not in operation in 2022. However, not all the country’s international airports and principal Class 1 and principal Class 2 airports comply with modern safety design thresholds, particularly the minimum runway strip threshold width and night landing capabilities. As of December 2021, about 336.56 million metric tons (MMT) of cargo was transported through the country’s port system compared to 133.74 MMT through airports. Meanwhile, 99.98 percent of the total domestic trade in 2021 was transported by sea, and the rest (0.02%) via air. Despite the maritime sector’s critical role in the transport of goods, most of the country’s ports are operated inefficiently due to their inadequate equipment and ancillary facilities.³⁰

(b) **GHG emission from the transport sector**

According to the GHG inventory of 2020, the transport sector emitted an estimated 29.431 Mt-CO₂e in 2020, accounting for about 14% of the country's total emissions. Under the transport sector, the majority of the emissions was caused by road transportation 88% of the transport sector total, followed by water-borne navigation 9% , and domestic aviation 3% , based on the 2010 GHG Inventory Report, which provides a detailed breakdown.

²⁹ Philippine Statistical Yearbook 2022, PSA

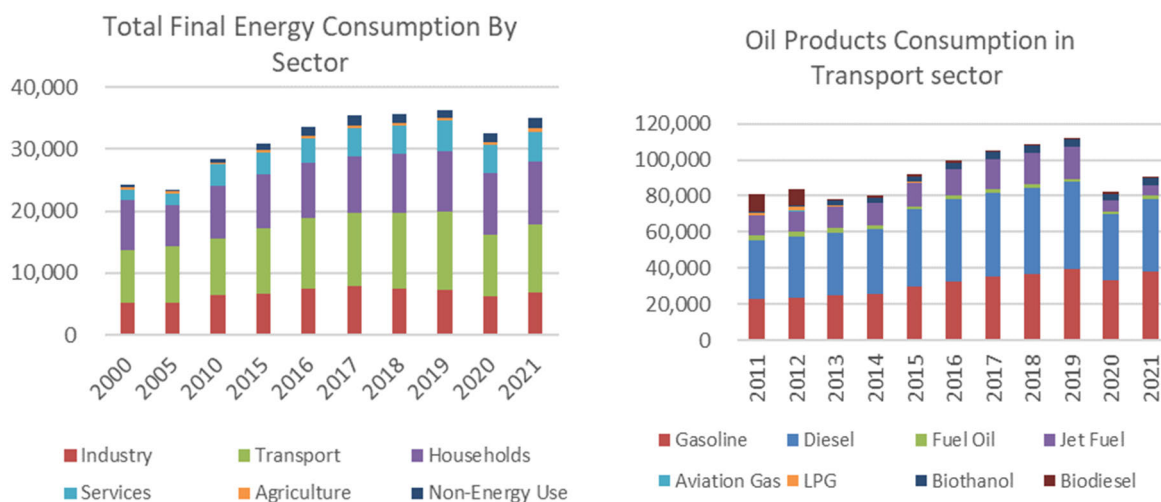
³⁰ PDP 2023-2027 Chapter 12



Source: 2010 GHG Inventory, NCCDIES

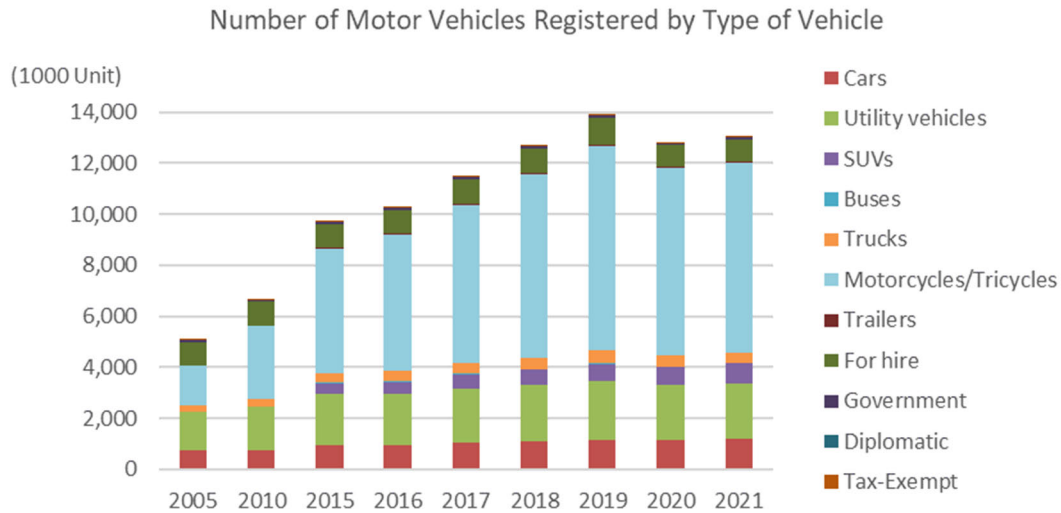
Figure 2-29 GHG Emissions in the Transport Sector (2010)

According to Philippine Statistics Authority data, the Philippines' total final energy consumption continues to increase year by year, reaching 36.26 MTOE (megatons of oil equivalent) in 2019. This is an increase of approximately 27% over the 10 years from 2010 to 2019. Although it declined in 2020 and 2021 due to economic activity restrictions due to the spread of the new coronavirus infection, it recovered to 35.13 MTOE in 2022. The transportation sector accounts for the largest share of the Philippines' total final energy consumption, which has been rapidly increasing since 2014. This appears to be due to the combination of two factors: an increase in household income and a previously low car ownership rate relative to the population size, resulting in a rapid increase in car ownership. The number of registered automobiles reached 13.8 million in 2019, and the number of registered motorcycles and three-wheeled vehicles in particular increased approximately 2.8 times in the 10 years from 2010 to 2019.



Source: Philippine Statistical Yearbook 2015, 2022, PSA

Figure 2-30 Trend of Total Final Energy Consumption and Oil Product Consumption in Transport Sector

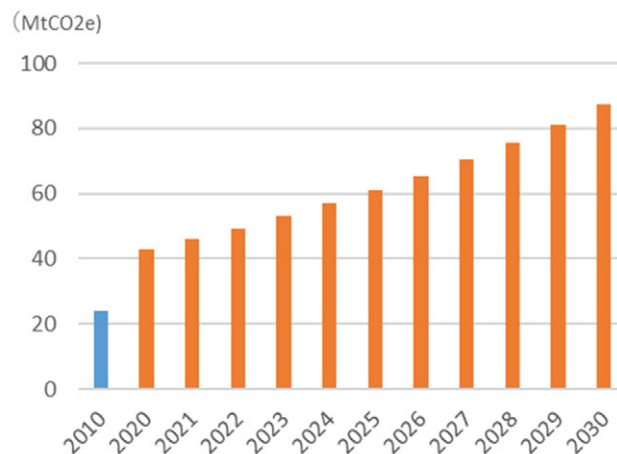


Source: Philippine Statistical Yearbook 2015, 2022

Figure 2-31 Trend of Number of Motor Vehicle Registered by Type of Vehicle

2) Climate Change Impacts in the Transport Sector

Although it slowed down in 2020 and 2021 like energy consumption, the number of registered vehicles has continued to grow at an annual rate of about 6% over the past 10 years, and if this trend continues, it will become an additional source of GHG emissions. Based on the future GHG emission projections, under the BAU scenario without mitigation measures, emissions from the transportation sector in 2030 are expected to be 87.4 Mt-CO₂e, approximately 3.6% compared to 2010. It is predicted to be approximately double compared to 2020.



Source: Philippines NDC Quick Facts, CCC

Figure 2-32 Projection of the GHG Emission in Transport Sector

On average, around 20 typhoons occur in the Philippines every year. Approximately 20% of the damage caused by natural disasters that occurred between 2010 and 2019 was damage to infrastructure facilities, including transportation infrastructure.

Typhoons cause strong winds, storm surge, land slides and flooding, leading to road closures and suspension of railway services. In addition, the Philippines has many mountain ranges, and there are roads that cross the mountains to connect important areas, but in most cases, these connecting roads are single-road national highways, and there are no alternative roads. Therefore, these roads are vulnerable to natural disasters such as typhoons and earthquakes. Due to Typhoon Odette in 2021, 36 percent of seaports were rendered not operational, creating logistics challenges and disruptions in supply chains, especially for isolated islands.

It is predicted that rainfall patterns and typhoon courses will change in future, which are expected to have an impact on transportation infrastructure.

3) **General challenges of the transport sector**

The Philippines is experiencing rapid economic development, and in particular, the Metro Manila area, which consists of 16 cities and one town, continues to have an influx of population at an annual rate of 1.8% into its relatively small urban area of 619 km².

The rapid increase in transportation demand linked to motorization accompanying economic growth is causing serious traffic congestion in the region. This obstructs the flow of people and goods and causes environmental problems such as air pollution due to exhaust gas.

Due to severe traffic congestion, daily transportation costs in 2017 are estimated to be 3.5 billion pesos in Metro Manila and 2.4 billion pesos in surrounding provinces. If nothing is done, it is estimated that by 2035 they will increase to 5.4 billion pesos and 5.9 billion pesos, respectively. Furthermore, transportation demand is expected to increase by 125% by 2035 compared to 2019.

4) **Stakeholder Analysis**

The following table summarizes some of the key stakeholders involved in the transport sector and climate change countermeasures. More specific stakeholder analysis for each subsector is provided in the corresponding subsector section below.

Table 2-46 Stakeholders in the Transport Sector

Policy making	Technological development	Implementation of countermeasures	Funding
<ul style="list-style-type: none"> • Department of Transport (DOTr) • Department of Public works and Highway (DPWH) • Local governments (LGUs) 	<ul style="list-style-type: none"> • Central agency of the DOTr • Research institutes of the DOTr • Universities • Private companies 	<ul style="list-style-type: none"> • Central and sectoral agency of the DOTr • Attached agencies of the DOTr • Central and local agencies of DPWH • LGUs • Private companies (including industry associations) 	<ul style="list-style-type: none"> • Government-affiliated financial institutions • Private banks • Donors

Source: JICA Survey Team

The central organization of the Department of Transportation (DOTr) is responsible for forming policies in the transport sector. DOTr has promoted Environmentally Sustainable Transport (EST) as NDC PaMs for the sectors, including improvement of vehicle fuel economy, EV adoptions and developments of BRT and railway projects, as Climate Change and NDC related activities.

Railway operations are managed by the Philippine National Railways (PNR) and the Light Rail Transit Authority (LRTA), which are attached agencies of the DOTr.

Regarding public works including road transportation, the Department of Public Works and Highways (DPWH) constructs and maintains national roads, and most of them function as primary or major arterial roads. On the other hand, local roads are under the jurisdiction of LGUs, and almost all of them are secondary arterial roads and function as feeders.

Current status of policies and plans that are basis of the sectoral climate change initiatives are shown below.

(2) Common issues

1) Related Policies and Plans

(a) National Transport Policy and its Implementing Rules and Regulations (2019)

The National Transport Policy (NTP) was formulated to help achieve the Transport Vision of “safe, secure, reliable, efficient, integrated, intermodal, affordable, cost-effective, environmentally sustainable, and people-oriented national transport system that ensures improved quality of life of the people.” The NTP was published in general circulation on 14 February 2018, and the rules and regulations were on 30 December 2019.

This rule requests that the process for planning and project selection shall be considered the responsiveness to disaster risk reduction and climate change mitigation/ adaptation strategies. Projects shall include resiliency and redundancy measures in transport networks in relation to both natural and human-induced hazards and disasters. Resilience shall be integrated into the design, construction, operation, and management of transport facilities.

(b) National Climate Change Action Plan (2011-2028) Action plan VI Sustainable Energy

The NCCAP takes on two broad priorities to promote Environmentally Sustainable Transport (EST), namely: (a) integration of environmentally sustainable transport strategies and fuel conservation measures in development plans and programs; and (b) development of innovative financing mechanisms to promote EST.

Table below shows the expected outputs and activities for EST.

Table 2-47 NCCAP outcomes and outputs (transport)

Immediate outcome 1: Environmentally sustainable transport promoted and adopted.	
Output 1.1 Integration of environmentally sustainable transport strategies and fuel conservation measures in development plans and programs	Activity 3.1.1. Implement clean fleet program. Activity 3.1.2. Formally adopt a socially equitable and integrated land-use and transport planning processes at the national and local levels. Activity 3.1.3 Implement energy efficiency labeling for new vehicles.
Output 1.2 Innovative financing mechanisms developed and promoted.	3.2.1. Implement Appropriate innovative financing to encourage new investments in EST.

Source: Prepared by JICA Survey Team based on Annex-1 of the National Climate Change Action Plan 2011-2028

(c) PDP 2023-2028

The plan sets out a strategy framework to expand and upgrade infrastructure is geared toward the delivery of sustainable, resilient, integrated, and modern infrastructure systems. One of the expected outcomes is the realization of seamless and inclusive connectivity via local and international linkages. Expected action is to move people, goods and information through modernized and expanded transport and digital infrastructure, with active participation of the private sector. The following are the main initiatives:

- A National Transportation Master Plan will be formulated and adopted.
- Intermodal transport facilities will be constructed and upgraded to achieve seamless connectivity.
- Active transport networks will be developed.
- Applicable mass transportation systems (i.e., railways, road-based, and ferry systems) will be developed in metropolitan areas.
- Reforms in the provision of public transport services will be strengthened.

The plan also sets GHG emission reduction targets for the plan period, where the transportation sector is expected to reduce GHG emissions by 26.04 Mt-CO₂e over five years through NDC policies and measures.

2) Status of Climate Action Implementation

(a) Implementation Structure

The Department of Transportation (DOTr) is responsible for climate change measures in the transportation sector in the National Climate Change Action Plan and NDC. The DOE is also in charge of some initiatives related to alternative fuels.

Table 2-48 Stakeholders (Transport subsector)

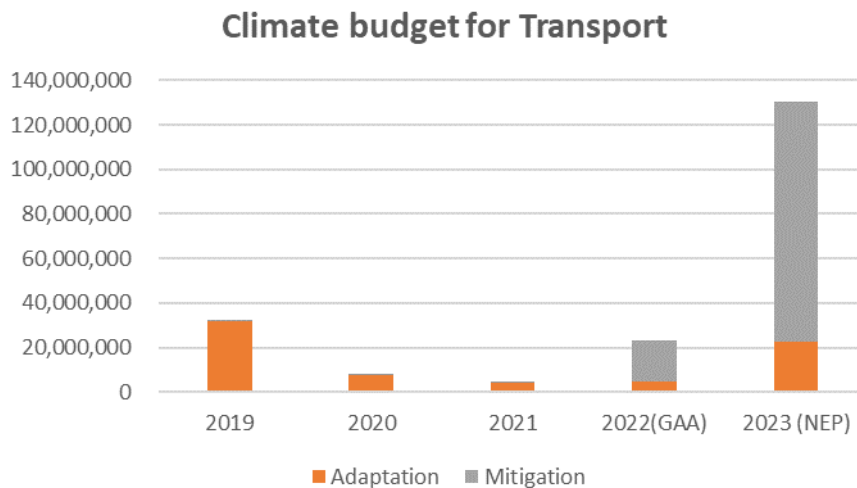
Category	Responsible organization	Role
Policy making	Department of Transportation (DOTr)	Develop and implement transportation policies, develop and maintain transportation infrastructure, promote public transport, implement road safety measures, introduce and innovate transportation technologies, and improve the Philippines' transportation network and mobility options
	DOTr Planning Service	Specialized work on transport policy and planning (road, railway, aviation, and maritime transport)

Category	Responsible organization	Role
	DOTr Project Management Service (DOTr-PMO)	Specialized work on transport projects (road, railway, aviation, and maritime transport)
	Department of Energy (DOE)	Energy policy formulation and implementation, energy resource development and management, energy infrastructure monitoring and coordination, energy education and awareness, energy market supervision
	Department of Environment Natural Resources (DENR)	Setting standards for automobile exhaust gas and inspection equipment
Regulations and Licenses	Land Transportation Office	Promotes the safety and comfort of the traveling public with respect to motor vehicles. Issuance of licenses to qualified motor vehicle drivers, the collection of fines and penalties for motor vehicle related infractions, and the issuance of motor vehicle license plates.
	Land Transportation Franchising & Regulatory Board	Issuance of franchises to land transport operators (verification of compliance with operational and safety standards for commercial and private vehicles)
Road	Department of Public Works and highway	Constriction and maintain the national roads
	Toll Regulatory Boar (TRB)	Supervises and regulates the construction, operation, and maintenance of toll facilities and is responsible for toll collection.
	Office of Transport Cooperative (OTC)	Integrate the transport cooperatives program into the public transport and transit system, in order to achieve economies of scale with respect to fuel consumption
	Private-sector business	Constriction and operation the national roads, operation of public utility vehicles etc.
Railways	Philippines National Railways (PNR)	Provide a nationwide railway transportation system.
	Light Rail Transit Authority (LRTA)	Oversee the construction and operation of the Light Rail Transit project extending from Baclaran in Pasay City, to Monumento in Caloocan
	Private-sector business such as Metro Rail Transit Corporation (MRTC)	Railway business development, rehabilitation, and operation
R & D	Philippines Railway Institutes	Rsearch and training center for the railway sector It serves as the planning, implementing, regulating, and administrative entity for the development of human resources in the railway sector to ensure the delivery of efficient, reliable, and safe railway transportation services
	University of the Philippines, and other universities	Support transport-related technology development, policy advocacy, evaluation, education and awareness, and management of environmental impacts
	Private-sector business	Energy-related technology development
Major donors in action	WB	Providing loans and financing, technical assistance and expertise, and policy advice
	ADB	Providing loans and financing, technical assistance and expertise, and policy advice
	AfD	Providing loans and financing, technical assistance and expertise

Source: JICA Survey Team

(b) Climate-related budgets

Status of Climate-related budgets for transport sector is shown in the figure below. DOTr's share was approximately 14% the CCET-tagged budgets in 2022. In the fiscal year 2023 budget, the railway projects based on the government's Build. Build. Build. program has been positioned as a climate change mitigation measure, which has increased the budget significantly.



Source: National CCET PAPs Figures 2017-2023, CCC

Figure 2-33 Status of Climate-related budgets for Transport

3) Status of climate change mitigation action

As indicated in the NDC PaMs of transport sector, public utility vehicle modernization program, motor vehicle inspection system, Bus Rapid Transit (BRT) projects and rail projects under Build. Build. Build. Program have been promoted by DOTr.

Climate change countermeasures in the transportation sector generally include vehicle-specific measures such as regulating and improving fuel efficiency, traffic flow management to address traffic congestion, and modal shifts from private cars to public transportation.

PDP 2023-2028 lists "connectivity" as an issue facing the transportation sector. In the Philippines, people spend a lot of time getting around due to a lack of public transportation. The supply of mass transit, such as PUVs, trains, and ferry systems, remains inadequate, and the high use of lower-capacity transport modes, such as private cars, contributes to traffic congestion in urban areas. Stations and intermodal transportation hubs are not designed with transfers between lines in mind, and the level of service is inadequate. For example, LRT Line 1 and MRT Line 3 operating in Metro Manila are connected at EDSA Station in the south, but they are connected at Roosevelt Station on LRT Line 1 and North Avenue Station on MRT Line 3 in the north. The structure is such that no one can enter the area. In addition, the limited means of transportation for the last mile from the station to the destination also prevents people from switching from private cars to public transportation.

The NDC Policies and Measures (PaMs) in the transport sector include public transport modernization programs, vehicle inspection systems, BRT projects, and railway projects under the government's Build Better More program, which are being advanced by the DOTr.

Below is an overview of the current status of initiatives in the subsectors of automobile countermeasures, road/traffic flow management, and public transportation.

(3) Automobile countermeasures

1) Relevant polices and plans

(a) Clean Air Act of 1999 (RA8749)

The Clean Air Act of 1999 (RA8749) provides a comprehensive air pollution control program in the Philippines. Article 4 stipulates vehicle exhaust gas standards, and requires vehicle users to conduct exhaust gas tests and install vehicle pollution control devices. This implementation is being carried out in cooperation with the DOTr and DENR.

Due to the revisions to automobile exhaust gas standards implemented in 2015 and 2016 (DENR Administrative Order No. 2015-04 and 2016-23), newly produced passenger vehicles are required to comply with Euro4 standards, and for existing Euro2 and Euro3 diesel vehicles, emission limits for carbon monoxide (CO), nitrogen oxides (HC+NO_x), and particulate matter (PM) are set.

(b) The Philippine Road Safety Action Plan (PRSAP) 2023 – 2028

To address the increasing number of deaths and injuries caused by road accidents in the country, the DOTr is leading the development and implementation of the Philippine Road Safety Action Plan (PRSAP). The latest PRSAP 2023-2028 sets the goal of reducing the number of traffic fatalities by at least 35% during the plan period, with the aim of realizing a society with zero road fatalities. To this end, five pillars have been established as measures: (1) Road safety management, (2) Safer roads, (3) Safer vehicles, (4) Safer road users, and (5) Post - crash response. The third pillar, Safe Vehicles, focuses on ensuring the safety of vehicles on the road through strengthening vehicle registration and inspection systems and compliance with vehicle standards and regulations. It also includes developing regulations for the safe use of electric vehicles (EVs), which are covered by the Electric Vehicle Industry Development Act (RA11697, EVIDA).

The status of EV-related efforts, issues, and support needs are described in the next chapter, industry sector.

(c) Motor vehicle inspection system

In line with the provisions of Republic Act (No 8749) known as the Philippine Clean Air Act of 1999 RA No 8794 the MVUC Law and RA No 4136 the Land Transportation and Traffic Code, the Land Transportation Office (LTO) is committed to provide the following in the Philippine Transportation System.

- Expansion of all MVIS to all regions and key cities of the country
- Development of a systematic and comprehensive vehicle testing system for vehicle road safety and emission
- Computerized data gathering and inspection result, thus avoiding human intervention
- Operation of a countrywide inspection network which shall provide on line, real time data
- Allows expansion as the number of vehicle increases and equipped with upgradeable equipment as the technology and standard evolve in the future

The program policy will enhance road safety for the riding public as well as pedestrian by reducing accidents arising from vehicular defects and mechanical failures. It will also promote clean environment by reducing air pollution coming from in use vehicles.

Every vehicle for renewal of registration with the LTO pass a series of rigorous and automated tests for roadworthiness and compliance to the Clean Air Act, to be conducted by Motor Vehicle Inspection Centers (MVICs).

(d) Biofuels Program

The Clean Air Act has initiated clean fuel programs for the transportation sector, including removing lead from gasoline and promoting clean alternative fuels, especially LP gas and biofuels.

In the energy sector, as noted above, a certain amount of bioethanol and biodiesel must be blended into existing fuels under the Biofuels Act 2006 (RA 9367) and the Renewable Energy Act 2008 (RA 9513).

In the national biofuels program, the National Biofuels Board (NBB) provides biofuel blend ratios depending on the availability of biofuels. In 2007, E5 (bioethanol blending ratio 5%) became mandatory, and in 2011 E10 (bioethanol blending ratio 10%) became mandatory. Similarly, in 2007, B1 (1% biodiesel blending ratio) and B2 (2% biodiesel blending ratio) were mandated in 2009. Regarding the blending ratio over the past 10 years (2014-2023), biodiesel has achieved a blending ratio of 2% in almost all years, while bioethanol has been below 10% due to a lack of production.³¹

(e) Active Transportation Programs

Transportation such as biking and walking are the easiest alternatives for people without cars to meet their transportation needs, and the DOTr plans to expand the bike lane network to 2,400 km nationwide by 2028.³² However, bicycle lanes installed on urban roads face many problems in design, layout, maintenance, etc., and coexistence with other road users (particularly motor vehicles) is also a major issue. In some cases, bike lanes are used for parking, picking up and dropping off passengers, and loading and unloading luggage. It is important that the government consider how to deal with these emerging issues.³³

(4) Road and traffic flow measures

This section summarizes the initiatives targeted at the Manila metropolitan area, which has the highest concentration of population in the Philippines and is experiencing serious traffic congestion.

³¹ USDA, Biofuels Annual (2023)

³² DOTr <https://dotr.gov.ph/55-dotnews/4947-holistic-active-transport-program-to-prioritize-cyclists-pedestrians.html>

³³ JICA (2022)

1) Relevant policies and plans

(a) Roadmap for Transport Infrastructure Development for Metro Manila and its Surrounding Areas

The roadmap for transport infrastructure development for Metro Manila and its Surrounding Areas is called the Metro Manila Dream Plan, which was developed through the support from JICA titled “Study on Roadmap for Transport Infrastructure Development for Metro Manila and Its Surrounding Areas (Region III & Region IV-A), which was conducted from March 2013 to March 2014.” The roadmap was approved by the President in September 2014. This Transport Roadmap was approved by the NEDA Board in June 2014 and was considered a long-term plan for the transport infrastructure development of the Philippine Government.

The projects to realize the plan have been selected from main components of the transport interventions including urban and suburban rail, roads/expressways, road-based public transport, traffic management, and gateway airports/seaports. The plan also consists of soft and hard projects to achieve ideal traffic conditions, organized into short-term (2014-2016), medium-term (2017-2022), and long-term (after 2022).

Follow-up Survey on Roadmap for Transport Infrastructure Development for Greater Capital Region (GCR) conducted in 2019 reviewed and updated the plan toward the year 2035. The revised transportation roadmap proposes two traffic management projects, 15 expressway development projects, and 30 urban road development projects as transportation investment programs related to road and traffic management. In addition, 30 railway projects, and a total of 14 road-based public transportation projects including 5 bus projects, 5 BRT projects, and 4 other projects are proposed as transportation investment programs related to public transportation.

2) Status of climate change countermeasures

(a) Strengthening traffic management

The increase in the number of vehicles is causing traffic congestion, and the MMDA is focusing on traffic regulation in Metro Manila. In the Philippines, the Unified Vehicular Volume Reduction Program (UVVRP), commonly referred to as number coding or color coding, was launched in 1995. This program aims to reduce traffic congestion, especially during peak hours, by restricting the types of vehicles that can use major public roads. First implemented in Metro Manila in 1995, similar programs have also been implemented in the cities of Baguio, Cabanatuan, Dagupan, and the province of Cavite.

Traffic management methods include improving intersections and signals, and eliminating bottlenecks on major roads. In Metro Manila, many intersections and road sections have been identified as bottlenecks, regardless of signalization, and in order to increase road capacity, intersections need to be graded; however,

due to the Right-of-Way problems and opposition from surrounding residents, construction is not progressing.

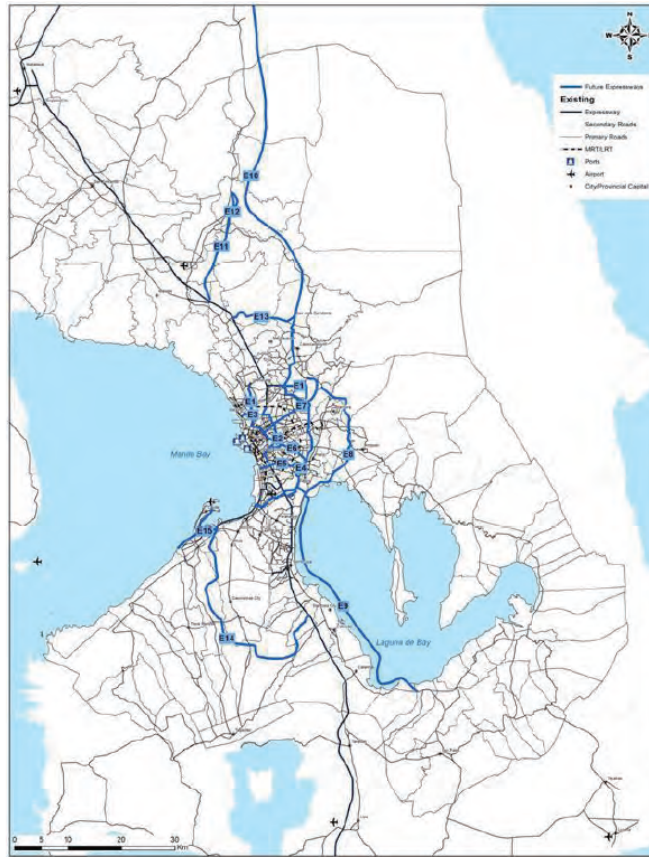
In order to promote traffic management in Metro Manila, the “Project for Comprehensive Traffic Management Plan for Metro Manila” was implemented by MMDA with JICA technical assistance, which aim to formulate a five-year plan that will be updated every year, strengthen collaboration with transportation-related organizations such as DPWH and DOTr, and strengthen the traffic management capacity of MMDA and LGUs in Metro Manila.

(b) Expressway development

Urban expressways separate long-distance trips from short-distance trips and contribute to alleviating congestion on surface road traffic. However, in Metro Manila, the expansion of the urban expressway network has been stagnant for the past 20 years, and it has been pointed out that the existing road network has very poor connectivity and the road hierarchy is unclear.³⁴

The above-mentioned Transportation Roadmap proposes 78 km of urban expressways and 426 km of intercity expressways, and when all expressways are completed, logistics and people's movement will be improved and resilience against disasters will be increased. Expressways tend to be able to recover investment costs and are easy to attract private investment. The roadmap proposes methods to promote private investment, such as interoperability of ticket systems.

³⁴ JICA (2019)



Source: JICA

Figure 2-34 Mega Manila Expressway Network Proposed in the Roadmap

(c) Urban roads development

Urban road development includes, in addition to primary road development, overpasses, bridge construction, and secondary road construction. In particular, construction of secondary roads is expected in surrounding regions such as Bulacan, Rizal, Laguna, and Cavite, where the population is expected to increase by more than 10 million people by 2035. This will require consideration and integration in the Comprehensive Land Use Plan (CLUP) and Comprehensive Development Plan (CDP).

(5) Public transport

1) Status of climate change countermeasures

(a) Public Utility Vehicle Modernization program (PUVMP)

PUVMP is an initiative to improve the safety, comfort, health, and environmental friendliness of public utility vehicles (PUVs) used in public transportation and was launched in 2017 as one of the key policies of the previous administration. The program stipulates those vehicles used for public transportation (buses, jeepneys, taxis, etc.) that have been registered for more than 15 years must be replaced with diesel vehicles or EVs that meet the European emissions standard Euro 4. The rollout of this program is expected to reduce fossil fuel consumption and reduce GHG emissions.

Progress on the PUVMP has been slow due to limited financial support from the government in the form of subsidies for vehicle procurement. This would require the purchase of expensive new vehicles, and there has been a protest movement led by PUV operators.

The status of EV-related efforts, challenges, and support needs related to the PUVMP are described in 2.2.6(6).

(b) Bus Rapid Transit (BRT) projects

Two BRT projects are included in NDC Policies and Measures in Transport sector, BRT projects in Metro Manila (Quezon Avenue) and Cebu BRT project.

The previous administration's Build. Build. Build. program listed two BRT projects in Metro Manila: along Quezon Avenue (Metro Manila BRT Line 1) and along EDSA (Metro Manila BRT Line 2). Detailed design was conducted for BRT1 along Quezon Avenue.

Regarding the BRT line 2, interim operations began on June 1, 2020, serving as a replacement of the former bus routes along EDSA, acting as an augmentation service to the MRT Line 3 due to the limited capacity restrictions put in place by the general community quarantine in Metro Manila because of the COVID-19 pandemic in the Philippines. Full operations began later on July 1, 2020, and it is operated by the Mega Manila Consortium Corporation and ES Transport and Partners Consortium under the supervision of DOTr and Metropolitan Manila Development Authority (MMDA).

Regarding the Cebu BRT project, it aims to establish a BRT system over a 22.96 km corridor that traverses through Cebu City's central business district from Bulacao in the Southwest and Talamban in the Northeast. It is currently underway with support from WB and AfD, with completion scheduled for 2027.

(c) Build More Better program

PDP 2023-2028 provides the strategic framework to expand and upgrade infrastructure. "Connectivity" is the sectoral challenge and expected outcome in transport sector. Mobility of majority of Filipinos is hampered by inadequate transportation facilities. There is a shortage in public transport supply and commuters and passengers spend long hours.

Mass transportation supply in the form of modern public utility vehicles (PUVs), busways, railways, and ferry systems are still inadequate. As a result, the use of lower-capacity transport modes like private vehicles is still prevalent and contributes to worsening traffic congestion, especially in highly urbanized cities. Transit stations and intermodal interchanges lack service standards and remain inconvenient, uncomfortable, and inefficient. Poor last-mile connectivity also discourages private motorists from shifting to public mass transportation.

The administration’s Build More Better program aims to address urban traffic, create more public transportations, and to contribute to the reduction and avoidance of GHG emissions. The table below shows the climate-tagged transportation programs of the DOTr which are part of the Program.

Table 2-49 List of the climate-tagged transportation programs of the DOTr (2022-2023)

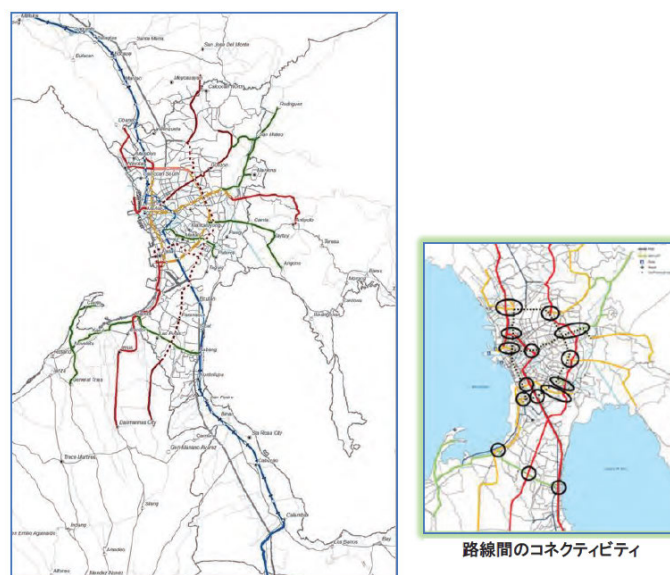
FY2022	FY 2023
MRT 3 Rehabilitation Project	MRT 3 Rehabilitation Project
LRT Line 2 Extension Project	LRT Line 1 Cavite Extension Project
LRT Line 1 Cavite Extension Project	North-South Commuter Railway System
Metro Manila Subway Project Phase I	PNR South Long Haul Project
North-South Commuter Railway System	EDSA Greenways Project
PNR South Long Haul Project	Cebu BRT Project
Subic-Clark Railway Project	Metro Manila Subway Project Phase I
Davao City High Priority Bus System Project	

Source: National CCET PAPs Figures 2017-2023, CCC

(d) Railway development in Metro Manila based on the transportation roadmap

The Metro Manila subway, north-south commuter line, etc. proposed in the above-mentioned “Transportation Roadmap” are being constructed one after another with support from JICA.

On the other hand, the proposed railway line would target Mega Manila (8,099 km², population approximately 25.77 million people (2015)), which includes Metro Manila and the surrounding four provinces of Bulacan, Rizal, Laguna, and Cavite. The total length of 11 lines remains at approximately 318 km, and as the population is expected to continue to grow beyond Mega Manila and extend into the Greater Manila area, there is a need for further development of railway lines.



Source: JICA

Figure 2-35 Mega Manila rail network proposed in the Roadmap

(6) Status of donor support

The administration’s infrastructure flagship projects currently being implemented with donor support are as follows. Among the Infrastructure Flagship projects promoted by the Philippine government, there are 51 projects approved related to transport infrastructure. T

here are 18 projects implemented by DOTr, of which 1 is funded by the Philippine government budget, 4 are PPP, and the remaining 12 are funded by the following international donors (WB, ADB, Japan, China, South Korea). There are 33 projects implemented by DPWH, of which 4 are funded by the Philippine government budget, 4 are PPP, and the remaining 20 are funded by the following international donors (ADB, Japan, China, South Korea).

Table 2-50 List of the transportation programs of the DOTr

PROJECT TITLE	SECTOR	IMPLEMENTING AGENCY	INDICATIVE PROJECT COST (IN PHP B)	FUND SOURCE	DEVELOPMENT PARTNER (IF ODA)	REGION/S	TARGET YEAR OF COMPLETION	STATUS / MILESTONE
Cebu Bus Rapid Transit Project	Physical Connectivity	DOTr	28.78	ODA	WB, AFD	VII	2027	Ongoing
Davao Public Transport Modernization Project (DPTMP)	Physical Connectivity	DOTr	73.38	ODA	ADB	XI	Beyond 2028	Approved for implementation
EDSA Greenways	Physical Connectivity	DOTr	8.79	ODA	ADB	NCR	2027	Approved for implementation
Manila Metro Line 1 Cavite Extension (Baclaran - Niog, Bacoor) (a.k.a LRT 1 Cavite Extension Project)	Physical Connectivity	DOTr	64.92	ODA/PPP	Japan	NCR, IV-A	2027	Ongoing
Metro Manila Subway Project Phase 1	Physical Connectivity	DOTr	488.48	ODA	Japan	NCR	2027	Ongoing
MRT 4	Physical Connectivity	DOTr	57.07	ODA	ADB	NCR, IV-A	2025	Approved for implementation
MRT-3 Rehabilitation Project	Physical Connectivity	DOTr	29.61	ODA	Japan	NCR	2025	Ongoing
New Cebu International Container Port Project	Physical Connectivity	DOTr	9.19	ODA	Korea	VII	2026	Approved for implementation
New Dumaguete Airport Development Project (Bacong International Airport)	Physical Connectivity	DOTr	10.45	ODA	Korea	VII	Beyond 2028	Approved for implementation
North-South Commuter Railway (PNR North 1, PNR North 2, PNR South Commuter)	Physical Connectivity	DOTr	873.62	ODA	Japan, ADB	NCR, III, IV-A	Beyond 2028	Ongoing
PNR South Long Haul	Physical Connectivity	DOTr	175.32	ODA	China	NCR, IV-A, V	2028	Approved for implementation
Subic Clark Railway	Physical Connectivity	DOTr	50.03	ODA	China	III	2026	Approved for implementation

*as of November 2023

Source: Infrastructure Flagship Projects, NEDA

Table 2-51 List of the transportation programs of the DPWH

PROJECT TITLE	SECTOR	IMPLEMENTING AGENCY	INDICATIVE PROJECT COST (IN PHP B)	FUND SOURCE	DEVELOPMENT PARTNER (IF ODA)	REGION/S	TARGET YEAR OF COMPLETION	STATUS / MILESTONE
Arterial Road Bypass Project Phase III (Plaridel Bypass)	Physical Connectivity	DPWH	5.26	ODA	Japan	III	2024	Ongoing
Bataan-Cavite Interlink Bridge	Physical Connectivity	DPWH	219.31	ODA	ADB	III, IV-A	Beyond 2028	Approved for implementation
Cebu-Mactan Bridge (4th Bridge) and Coastal Road Construction Project	Physical Connectivity	DPWH	76.41	ODA	Japan	VII	Beyond 2028	Approved for implementation
Central Luzon Link Expressway (CLLEX), Phase I	Physical Connectivity	DPWH	14.94	ODA	Japan	III	2024	Ongoing
Dalton Pass East Alignment Road Project	Physical Connectivity	DPWH	67.4	ODA	TBD	II, III	Beyond 2028	Approved for implementation
Davao City Bypass Construction Project	Physical Connectivity	DPWH	46.8	ODA	Japan	XI	2027	Ongoing
Davao City Coastal Road Project, including Bucana Bridge	Physical Connectivity	DPWH	28.86	ODA/GAA	China	XI	2025	Ongoing
Davao City Expressway	Physical Connectivity	DPWH	80.53	ODA	China	XI	Beyond 2028	Approved for implementation
Improving Growth Corridors in Mindanao Road Sector Project	Physical Connectivity	DPWH	25.26	ODA	ADB	IX, BARMM	2026	Ongoing
Laguna Lakeshore Road Network Development, Phase I (LLRN)	Physical Connectivity	DPWH	175.7	ODA	ADB	NCR, IV-A	2027	Approved for implementation
Metro Manila Bridges Project (under ADB Financing Facility) - 3 Bridges	Physical Connectivity	DPWH	12.03	ODA	ADB	NCR	2027	Approved for implementation
Metro Manila Priority Bridges for Seismic Improvement Project	Physical Connectivity	DPWH	7.93	ODA	Japan	NCR	2026	Approved for implementation
Panay-Guimaras-Negros Inter-Island Link Bridge	Physical Connectivity	DPWH	187.540	ODA	Korea	VI	Beyond 2028	Approved for implementation
Panglao-Tagbilaran City Offshore Bridge Connector (PTCOBC)	Physical Connectivity	DPWH	6.96	ODA/GAA	China	VII	2028	Ongoing
Panguil Bay Bridge	Physical Connectivity	DPWH	7.38	ODA	Korea	X	2024	Ongoing
Priority Bridges Crossing Pasig-Marikina River & Manggahan Floodway Bridges Construction Project (under China Government Financing Facility) - 3 Bridges	Physical Connectivity	DPWH	16.03	ODA	China	NCR	2026	Approved for implementation
Reconstruction and Development Plan for a Greater Marawi Stage 2 (Output 2 of Emergency Assistance for Reconstruction and Recovery of Marawi)	Physical Connectivity	DPWH	6.840	ODA	ADB	BARMM	2026	Ongoing
Road Network Development Project in Conflict-Affected Areas in Mindanao (RNDP-CAAM)	Physical Connectivity	DPWH	12.86	ODA	Japan	XII, BARMM	2028	Ongoing
Samal Island-Davao City Connector Bridge	Physical Connectivity	DPWH	23.04	ODA	China	XI	2027	Approved for implementation
Samar Pacific Coastal Road (SPCR) II Project	Physical Connectivity	DPWH	7.49	ODA	Korea	VIII	2028	Approved for implementation

*as of November 2023

Source: Infrastructure Flagship Projects, NEDA

1) Status of JICA's Support

JICA's cooperation for transport in the Philippines is presented in the table below. Since 2000, a wide range of support has been provided, including technical cooperation related to road transportation, railways, and ports, as well as grant and loan assistance.

Table 2-52 JICA's Cooperation in the Philippines (transport)

Project title	Scheme	Project Duration/ Loan Agreement
Project for Capacity Enhancement for Transit Oriented Development	T/C	Jul 2023 - Jun 2025
Project for Road Disaster Prevention and Other Countermeasures on Mountainous Roads	T/C	Jun 2022 - Dec 2025
Project for Comprehensive Traffic Management Plan for Metro Manila	T/C	Mar 2019 - Aug 2022
Project for Master Plan on High Standard Highway Network Development (Phase 2)	T/C	Feb 2019 - Jul 2020
Master Plan Study on Urban Transport System Development in Metro Cebu Project	T/C	Jul 2017 - Nov 2018
Project on Improvement of Quality Management for Highway and Bridge Construction and Maintenance Phase 3	T/C	Feb 2016 - May 2019

Project title	Scheme	Project Duration/ Loan Agreement
The project for study on improvement of the bridges through large scale earthquakes disaster mitigating measures	T/C	Feb 2012 - Dec 2013
Study on the Strategic Railways Networks for the Greater Capital Region	T/C	Feb 2012 - Jun 2013
Improvement of Quality Management for Highway and Bridge Construction & Maintenance, Phase 2	T/C	Oct 2011 - Sep 2014
The Project for Capacity Development on Transportation Planning and Database Management in the Republic of the Philippines	T/C	Sep 2011 - Dec 2015
Project for the Study on Airport Strategy for the Greater Capital Region in the Republic of the Philippines	T/C	Oct 2010 - Nov 2011
Capacity Development Project for Improvement of Safety and Efficiency for Air Navigation System	T/C	Feb 2009 - Feb 2014
Philippine Coast Guard Education and Human Resource Management System Development Project	T/C	Jan 2008 - Jan 2013
Improvement of Quality Management for Highway and Bridge Construction and Maintenance	T/C	Feb 2007 - Feb 2010
Philippine Coast Guard Human Resource Development	T/C	Jul 2002 - Jun 2007
Metro Rail Transit Line 3 Rehabilitation Project (II)	Loan	L/A: May 2023
North South Commuter Railway Project (Malolos – Tutuban) II	Loan	L/A: Feb 2023
Metro Manila Subway Project (Phase 1) (2)	Loan	L/A: Feb 2022
Cebu-Mactan Bridge (4th Bridge) and Coastal Road Construction Project	Loan	L/A: Jun 2020
Davao City Bypass Construction Project (2)	Loan	L/A: Jun 2020
Metro Manila Priority Bridges Seismic Improvement Project (2)	Loan	L/A: Mar 2020
Road Network Development Project in Conflict Affected Areas in Mindanao	Loan	L/A: Jun 2019
North-South Commuter Railway Extension Project (1)	Loan	L/A: Jan 2019
Metro Rail Transit Line 3 Rehabilitation Project	Loan	L/A: Nov 2018
New Bohol Airport Construction and Sustainable Environment Protection Project (2)	Loan	L/A: Oct 2018
Metro Manila Subway Project (Phase 1) (1)	Loan	L/A: Mar 2018
Arterial Road Bypass Project (Phase 3)	Loan	L/A: Feb 2018
Maritime Safety Capability Improvement Project for the Philippine Coast Guard (Phase 2)	Loan	L/A: Oct 2016
North - South Commuter Railway Project (Malolos- Tutuban)	Loan	L/A: Nov 2015
Davao City Bypass Construction Project	Loan	L/A: Aug 2015
Metro Manila Priority Bridges Seismic Improvement Project	Loan	L/A: Aug 2015
Metro Manila Interchange Construction Project Phase 6	Loan	L/A: Mar 2015
Maritime Safety Capability Improvement Project for PCG	Loan	L/A: Dec 2013
Capacity Enhancement of Mass Transit Systems in Metro Manila	Loan	L/A: Mar 2013
New Bohol Airport Construction and Sustainable Environment	Loan	L/A: Mar 2013
Central Luzon Link Expressway Project	Loan	L/A: Mar 2012

Project title	Scheme	Project Duration/ Loan Agreement
Arterial Road Bypass Project (Phase 2)	Loan	L/A: Mar 2012
Road Upgrading and Preservation Project	Loan	L/A: Mar 2011
Logistics Infrastructure Development Project	Loan	L/A: Nov 2009
Arterial Road Bypass Project (1) (Plaridel and Cabanatuan)	Loan	L/A: Mar 2004
Central Mindanao Road Project	Loan	L/A: Dec 2003
Urgent Bridges Construction Project for Rural Development	Loan	L/A: Mar 2002
Arterial Road Links Project (Phase 6)	Loan	L/A: Mar 2002
New Communications, Navigation And Surveillance / Air Traffic Management (CNS/ATM) Systems Development Project	Loan	L/A: Mar 2002
SUBIC-CLARK-TARLAC-Expressway Project	Loan	L/A: Sep 2001
Arterial Road Links Project (Phase 3)	Loan	L/A: May 2001
Selected Airports (Trunkline) Development Project (Phase 2)	Loan	L/A: May 2001
Arterial Road Links Project (Phase 5)	Loan	L/A: May 2001
The Project for Enhancement of Communications System for Maritime Safety and Security	Grant	E/N: Jul 2007
The Project for Construction of Bridges along Rural Roads in Northern Luzon	Grant	E/N: Jun 2002

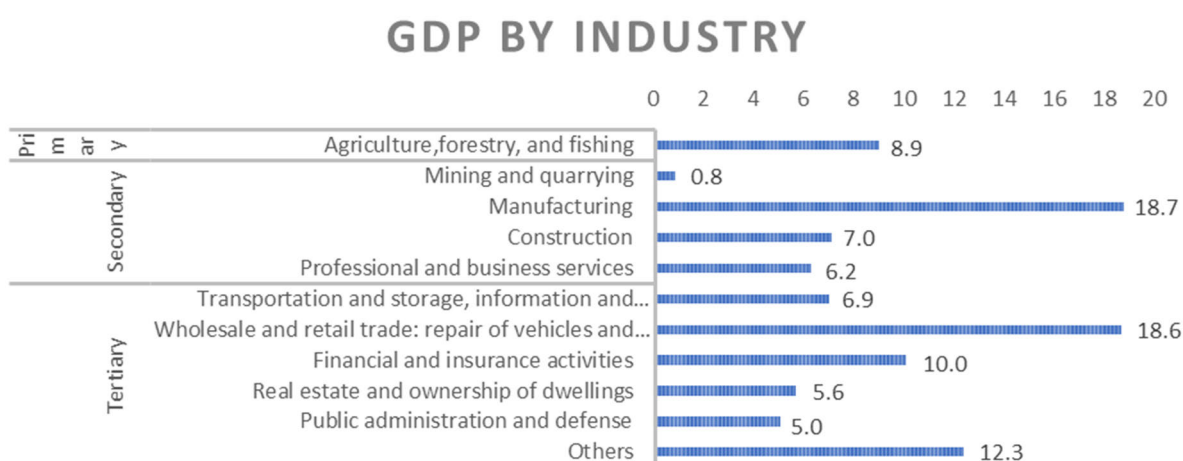
Source: JICA website

2.2.6 Industry sector

(1) Sector Landscape

1) Sector Status and Climate Change Impacts

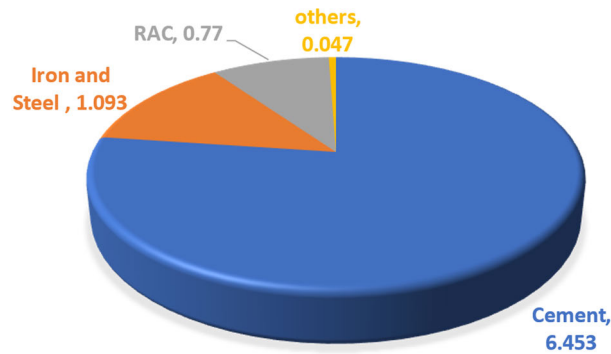
The industrial structure of the Philippines, in terms of nominal GDP by industry in 2022, is dominated by the agriculture, forestry, and fisheries sector (9%), the secondary industry sector (33%), and the tertiary industry services sector (58%). A breakdown of the industrial sector shows that the manufacturing sector accounted for 19%, followed by the construction sector at 7%. The breakdown of the services sector shows trade and repair of motor vehicles, motorcycles, personal and household goods at 19%, followed by real estate at 13%. Based on these ratios, manufacturing in the Philippines accounts for only about 20% of GDP, and in particular, the weakness of the domestic automobile manufacturing industry has resulted in a thriving trade in automobiles.



Source: Prepared by the survey team based on data from Statistica 2023.

Figure 2-36 GDP by Industry (Nominal) (2022)

The Philippines' industrial sector emitted 16.772 Mt-CO₂e in 2020 referred to IPPU(industrial processes and product use) sector data of GHG inventory or 8.2% of the country's total GHG emissions, making it the fifth largest source after energy, agriculture, transportation, and waste. By industry, the cement industry accounts for 77%, followed by the iron and steel industry at 13%, and the refrigeration & air conditioning (RAC) industry at 9% according to data of 2010 GHG inventory where the detailed emission breakdown is available, with these three industries emitting the majority of GHGs in the industrial sector. Therefore, it is necessary to promote climate change countermeasures targeting these three industries with large GHG emissions, and petrochemical industry are targeted in the implementation measures of NDC's Industrial Processes and Product Use (IPPU) sector.



Source: 2010 GHG Inventory, NCCDIES

Figure 2-37 Industry-wise GHG emission (2010) (Unit: MtCO₂e)

The implementation of climate change measures in the industrial sector is largely left to industry and business self-help, although there are policy and regulatory incentives and mandates for implementation. Publicly Listed Companies (PLCs) are obliged by the Securities and Exchange Commission (SEC) to produce Sustainability Reports but it is an obligation to submit the report and not the obligation to actually take an action. In addition, many of the top-tier large companies in each industry are foreign-owned or conglomerate-owned, and they have integrated climate perspectives into their business activities and are voluntarily investing in and working on climate change action. On the other hand, smaller-sized companies, whose main market is the domestic market, are unlikely to voluntarily take measures that would put pressure on their profits. Several factors can be cited for this. One is differences in financial, human and technological resources. Large and listed companies generally have more of these resources and can afford to take environmental measures, whereas Micro-, Small and Medium-sized Enterprises (MSMEs) have limited resources. Second, there are external demands, including that from markets, customers and investors. Large companies competing in the global marketplace need to meet international regulations and requirements in the markets they operate in. Particularly in Europe and the USA, environmental measures are recognized as a necessary part of doing business for companies, and environmental measures can improve corporate value and image.

The promotion of electrification of public transportation vehicles by the EV-related industry is expected to significantly contribute to reducing GHG emissions in the Philippines. This is because, within the transportation sector, GHG emissions account for approximately 16% of the country's total emissions. Particularly, public transport vehicles (PUVs) including jeepneys, tricycles, and buses constitute about 80% of the total distance traveled among all modes of transportation.

Jeepneys, a vehicle type unique to the Philippines, have no manufacturing standards or certification system, which makes: 1) maintenance difficult as there are more than 100 models with no unified standards; 2) prices are not stable and mass production is not possible as each company manufactures to order due to the lack of unified standards; and 3) The absence of safety standards has resulted in the existence of safety

problems, etc., making the formulation of manufacturing standards and certification systems that take into account safety, environmental friendliness, etc., an urgent necessity.

In addition, GHG emissions from solid waste in the waste sector account for 4.85% of the country's total GHG emissions, although industrial waste, including plastics, has significant potential for energy reduction through resource reuse in the industrial sector, such as being used as alternative fuel and raw materials in the cement industry. Although the introduction of the EPR law requires large companies to collect a portion of the plastic used in their products, many of the waste disposal tasks are left to the informal sector, with only a limited number of companies capable of proper disposal, including sorted collection and post-collection recycling, and the lack of an eco-system for recycling means that even after sorting and collection, the waste ends up in landfills mixed with other waste.

Table 2-53 NDC Policies and Measures (IPPU Sector)

Policies and Measures	Barriers/challenges	Responsible Organization/ stakeholder	Support needed
Use of supplementary cement materials (SCM) such as fly ash and steel slag as alternatives to clinker in cement production	The DPWH Bluebook and the Philippine National Standard (PNS) have different Loss of Ignition criteria for blended cement, which limits the use of blended cement in DPWH projects.	DPWH, DTI, DENR, cement manufacturers, cement and construction associations, academia	Technical discussions are needed to harmonize both criteria of DPWH and PNS. Therefore, it is necessary to evaluate existing studies and, if necessary, conduct studies to evaluate the performance of blended cements with different Loss of Ignition (LOI).
Transition to low global warming potential (GWP) alternative refrigerants in the RAC (refrigeration and air conditioning) industry	Domestic manufacturers are forced to procure low-GWP alternative refrigerants from international markets, and transitioning to alternative refrigerants requires changes in production lines and capital investment. Alternative refrigerants have safety concerns such as flammability and toxicity.	DENR, DTI, DOE, TESDA, RAC industry associations, consumer groups	Incentive programs, etc., are needed to support the RAC industry's transition to low-GWP alternative refrigerants. In addition, training on the safe handling of flammable and toxic refrigerants is needed.
Efficient dedicated disposal facilities (non-incineration) for ODS (ozone depleting substances) and HFCs (hydrofluorocarbons)	There are no existing dedicated disposal facilities for ODS and HFCs, and there are challenges in processing recovered ODS and HFCs.	DENR, DTI, DOST, TSD facilities and RAC industry	Technical and financial assistance is needed to set up and operate the disposal facility. Operational training for disposal facilities is also needed.
Installation of Waste Heat Recovery (WHR) facilities at a cement plant	WHR technology requires high investment costs.	Cement manufacturers, DTI, DENR, DOE, local governments	Financial support and incentive programs are needed.
Use of alternative fuels and raw materials (waste and biomass) in the cement co-firing process	The use of AFRs (alternative fuels and raw materials) in cement is still limited, and expanding their use will require capital investment and maintenance costs. In addition, proper segregation and collection of waste is necessary.	Cement manufacturers, DTI, DENR, DOE, local governments, academia	Research needs to be conducted and appropriate incentives considered to promote the use of AFR in the cement co-firing process. Demonstrations are needed to demonstrate the utilization of various materials as AFR.

Policies and Measures	Barriers/challenges	Responsible Organization/ stakeholder	Support needed
Reducing GHG emissions from the steel industry	Uses less energy-efficient technology	Steel industry, DTI, DENR, DOE, local government, academia	A feasibility study (FS) is needed to assess the feasibility of implementing energy efficient technologies in the production process. It is also necessary to demonstrate appropriate GHG reduction technologies.
Use of bio naphtha as a feedstock in ethylene production	Limited supply of bio naphtha and very high cost	Petrochemical industry, DENR, DOE, DOST, DTI	Financial incentives, such as subsidies, are needed to promote the supply and use of bio naphtha.

Source: DENR

In terms of GHG reductions alone, countermeasures for large companies in high GHG emitting industries will have the largest impact. However, while many large companies have abundant human and economic resources and can take measures on their own, it is difficult for many small and medium-sized companies to take measures by themselves. Therefore, this section focuses on high GHG emitting industries (cement, steel, refrigeration, air conditioning, petrochemicals) mentioned in the NDC, and EV-related industries and product waste, where the Survey identified many needs for support, and also includes support for MSMEs.

2) Climate Change Impacts in the Industry Sector

In the Philippine industrial sector, climate change impacts are described below.

Table 2-54 Climate Change Impacts (Industry Sector)

Climate Change Impact	Key Indicators of Climate Change Impact
Impact on production and supply chain	Agriculture and production are affected by weather instability and extreme weather events, resulting in supply chain delays and interruptions, and material price increases.
Pressure on resource supply	Declining water resources and increasing disasters due to climate change could lead to difficulties in the supply of raw materials and energy
Increase of insurance costs	Increased weather-related presence may cause companies to face higher premiums and difficulty in obtaining insurance
Reputation risk	Failure to properly address climate change could lead to loss of public trust in the company
Investor Risk Management	Changes in investor and financial choices related to climate change, such as the perception of climate change as a business risk and the preference for more environmentally friendly products and services
Changing consumer preferences	Increased environmental awareness among consumers will lead to a different scale of product selection, with consumers preferring environmentally friendly products and brands, necessitating changes to the traditional business model.

3) General Challenge of the Industry Sector

The following issues are common challenges the industry sector is facing.

- Lack of support for micro, small and medium enterprises, which account for 99.6% of the total enterprises in the Philippines
- Regional disparities due to the concentration of industry around large cities
- Lack of human resources, especially skilled personnel
- Low international competitiveness due to high electricity prices, compared to other ASEAN countries, which is passed on manufacturing costs
- High logistics costs due to underdeveloped transportation infrastructure and being an island nation, as well as the lagging development of a multi-modal logistics network

4) **Stakeholder analysis**

Climate change stakeholders in the industrial sector are listed below. The government’s departments such as DTI, BOI, and DENR are responsible for policy making related to climate change in the industrial sector, and climate change measures are mainly taken by the private sector with the support of these departments.

Table 2-55 Stakeholders in the Industry Sector

Policy making	Technological development	Implementation of countermeasures	Funding
<ul style="list-style-type: none"> • BOI CARS PMO • BOI policy & planning • DTI BSMED • DENR CCS • DENR Ozone 	<ul style="list-style-type: none"> • DOST • Universities • Private Enterprises 	<ul style="list-style-type: none"> • DTI BSMED • BOI CARS PRO • BOI policy & planning • DENR Ozone • Private Companies 	<ul style="list-style-type: none"> • Government-affiliated financial institutions • Private banks • Donors

Source: JICA Survey Team

Abbreviation

BOI: Board of Investment, CARS PMO: Comprehensive Automotive Resurgence Strategy Program Management Office, DTI BSMEDs: Department of Trade and Industry, Bureau of Small and Medium Enterprises, DENR CCS: Department of Environment and Natural Resources, Climate Change Section, DOST: Department of Science and Technology

Table 2-56 Stakeholders (Industry subsector)

Category	Responsible organization	Role
Policy Formulation	Department of Trade and Industry (DTI)	In order to achieve the goal of expanding the economic opportunities in the industrial and service sectors of the Philippines, this organization is responsible for enhancing the competitiveness of these sectors, improving productivity and efficiency, and ensuring access to safe and high-quality goods and services for consumers. This organization implements legislation for climate change mitigation by private enterprises, provides financial support to businesses, and supports the development of corporate talent.
	Board of Investment (BOI)	This organization is a subsidiary organization under the Department of Trade and Industry, tasked with developing investments in the Philippines. Leading initiatives in industrial development and investment opportunities, this organization supports economic activities by Filipino companies and foreign investors across various sectors, functioning as a one-stop shop for doing business in the Philippines. this organization also provides support for the development of the domestic electric vehicle (EV) industry.

Category	Responsible organization	Role
	DENR Environment Management Bureau (EMB)	This organization is responsible for the preservation, management, development, and appropriate use of the country's environment and natural resources. Particularly, as the Environmental Management Bureau is responsible for developing GHG inventories for industrial sectors' IPPU, this organization conducts formulating policies and measures (PaMs) to reduce emissions from these sectors and supporting companies in emission reduction efforts.
Technological development	Department of Science and Technology (DOST)	This organization conducts scientific research and technological development related to climate change.
Implementation of measures	DIT Bureau of Small and Medium Enterprises (BSMED)	This organization implements training support for enterprise personnel to promote climate change mitigation among small and medium-sized enterprises.
	BOI Comprehensive Automotive Resurgence Strategy Program Management Office	This organization implements programs like CARS (Comprehensive Automotive Resurgence Strategy) and EVIS (Electric Vehicle Incentives Scheme) to promote the EV industry.
	BOI Policy and Planning Bureau	This organization implements management of product waste disposal.
	DENR EMB	The Climate Change Service (CCS) within the Environmental Management Bureau provides technical support for companies' emission reduction efforts. The Ozone Office implements measures to address domestic fluorocarbon gas issues.
	Private companies	This organization is a key entity in implementing major climate change initiatives based on policies and regulations related to climate change. This organization implements mitigation efforts within companies' economic activities through their own initiatives.
Provision of funds, etc.	Government-affiliated financial institutions	Development Bank of Philippine (DBP), Land Bank
	Donors	This organization involves international organizations such as the World Bank (WB), United Nations Development Programme/Global Environment Facility (UNDP/GEF), Asian Development Bank (ADB), United Nations Industrial Development Organization (UNIDO), United Nations Environment Programme (UNEP), World Wide Fund for Nature (WWF), as well as bilateral cooperation agencies like Japan's Ministry of the Environment and GIZ.

Based on the above, this section summarizes the results of information gathered on policies, initiatives, and issues in the following areas.

In addition to the cement, iron and steel, RAC, and petrochemical industries covered in the IPPU area of the NDC, the EV-related industries are studied as they contribute to GHG reduction in the transportation sector through the development of the automotive industry. The expansion of the recycling industry and support for small and medium-sized enterprises (SMEs), which are cross-cutting issues for the industry, are also included in the survey.

(2) Cement Industry Subsector

1) Relevant policies and plans

(a) Guidelines for the use of alternative fuels and raw materials

Guidelines for the Use of Alternative Fuels and Raw Materials in Cement Kilns (DENR Department Administrative Order 2010-006) apply to the Cement industry.

The guidelines, based on a May 2010 ministerial decree, prescribe standards for the Cement industry to be followed in co-processing Alternative Fuels and Raw Material (AFR) for clinker for the production of cement. It includes standards for the acceptance of waste and the emission of AFR, and procedures for waste delivery management, documentation, and reporting. emission standards, and procedures for waste delivery management, documentation, and reporting. Alternative fuels are those used as a source of thermal energy in cement production, and raw materials are those used as a source of essential minerals in cement production. Co-processing refers to the process of reusing the mineral or energy content of these materials in the production of cement.

Alternative fuel wastes used in cement kilns include plastics, car tires, scrap wood, rice bran, sewage sludge, animal feed, waste oil, and solvents, which must meet acceptance criteria based on calorific value, mineral oxides, and heavy metal content set by the guidelines. Alternative fuels with a total calorific value of less than 2,000 calories per kilogram are specified as unacceptable. In addition, the use of medical waste, asbestos waste, batteries of any kind, electronic assemblies and scrap, explosives, cyanide waste, mineral acids, radioactive waste, and non-sorted municipal solid waste as alternative fuels is prohibited.

On the other hand, raw materials include slag and coal ash, which are acceptable if their ash content is at least 50% and their total mineral oxide content is at least 75%.

This guideline was revised in May 2021 (DENR Department Administrative Order 2021-014) and newly defines acceptable medical waste, waste from electronic assemblies, and non-sorted municipal solid waste that are prohibited from being accepted as alternative fuels.

(b) Philippine National Standard for Blended Cement

In November 2019, the Philippine Bureau of Philippine Standards (DTI-BPS) of the Department of Trade and Industry updated the Philippine National Standard (PNS) for cement in adopting ASTM International's (ASTM) standard for hydraulic (hydraulic) cement as the PNS.

The new PNS 63:2019 standard for blended (hydraulic) cement combines two cement types into one standard: portland pozzolanic cement and portland blast furnace slag cement. Also included as blended (hydraulic) cement types are portland limestone cement and ternary blended cement.

Table 2-57 Blended cement standards (PNS 63:2019)

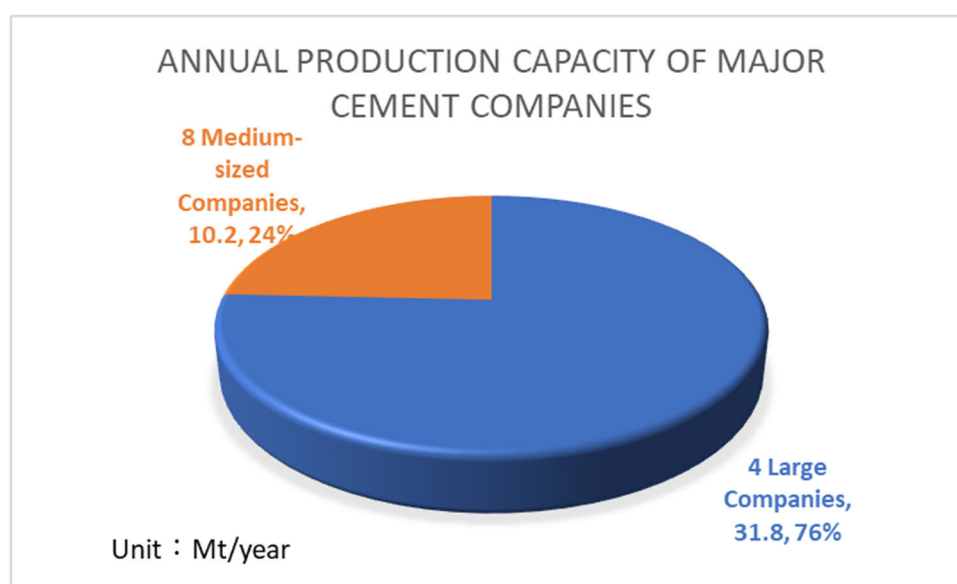
Chemical Composition	Standard Value
Magnesium Oxide, MgO (max, %)	6.0
Sulfur Reported as sulfate (SO ₃) (max, %)	4.0
Loss in ignition (max, %)	8.0

Source: PNS 63:2019

2) Implementation Status of Climate Change Measures and Identified Issues

(a) **Alternative fuels for cement kilns and alternative raw materials for blended cement production**

In the Philippine cement industry, among 12 companies the 4 leading companies such as Holcim Cement, CEMEX Cement, and Republic Cement have been implementing the use of alternative fuels and raw materials based on the "Guidelines on the Use of Alternative Fuels and Raw Materials" (DENR Department Administrative Order 2010- 006). Biomass waste, industrial waste from various industries, and municipal waste such as waste plastics are being used as alternative fuels for cement kilns and alternative raw materials to replace clinker raw materials for blended cement production. EGEL Cement, a major cement manufacturer, plans to start using alternative fuels and raw materials in two years. On the other hand, efforts by medium-sized companies other than the four large ones, which account for about 25% of the total of the 12 companies in terms of cement production capacity, have not progressed.



Source: " 'Build, Build, Build'-ing in the Philippines"(Global Cement Magazine, January,2020)

Figure 2-38 Annual Production Capacity of Major Cement Companies

Pozzolan (silica fume, about 10-20% mixture), fly ash (coal ash, about 5-10% mixture), and a mixture of fly ash and steel slag (about 5-10% mixture) are mainly used as alternative raw materials for blended cement production, while wood chips, agricultural waste, waste plastic, waste wood, agricultural waste, waste plastic, waste tires, and waste oil are used as alternative fuels.

Holcim Cement, the largest company in the cement industry, has its own goal of zero emissions by 2050 and is working on GHG reduction measures such as producing blended cement, using alternative fuels and raw materials, and utilizing waste heat. 78% of Holcim Cement's cement production in 2022 is blended cement. In 2021, a total of 200,000 tons of biomass waste, industrial waste, and municipal waste were used as alternative fuels and raw materials, and the number of local governments with which the company partnered for waste increased to 11 cities. The amount of alternative fuels and raw materials has also increased to 1 million tons with partnered 35 cities in 2022. In addition, the amount of alternative fuels and raw materials has also increased to 1.02 million tons with partnered 50 cities in 2023.

The cement industry is aiming to expand the use of waste plastic as an alternative fuel to 1 million tons per year by 2030 industry-wide. Meanwhile, as waste plastics are hard to come by, and Holcim Cement is opening a campaign of segregation to residents, including the company's own visits to local governments and schools to give lectures on proper waste management.

In addition, Pacific Cement Philippines, a Japanese-affiliated company, plans to increase its cement production capacity to 3 million tons per year by installing a new production line at its cement plant on San Fernando Island. The plant will be operational in May 2024. By introducing state-of-the-art production technology, the company aims to contribute to the reduction of carbon dioxide emissions and the recycling of waste materials.

There are two main issues identified.

The first one pertains to financial constraints. In the cement industry, the use of alternative fuels and raw materials in the cement production process is limited to four major companies, while other medium-sized companies have not progressed in this measure due to financial challenges. The reason is not that there are challenges on the part of local Philippine banks and other lenders to the companies, but rather that the companies that borrow the funds are reluctant to make investment decisions for the implementation of the measures. The use of alternative fuels and raw materials in the cement production process requires an initial large capital investment, including the construction of sites and transportation facilities to store the alternative fuels and raw materials, and the introduction of shredders to cut the alternative fuels into smaller pieces. Since this capital investment is not immediately recoverable after the investment is made, and the payback period is long (more than 5 years) and economically infeasible, the short-term commercial benefits are small, so medium-sized companies that do not have significant financial strength are not likely to be motivated to actively make the investment.

While the second revolves around institutional hurdles. The use of blended cement in cement production using alternative materials such as fly ash and steel slag has led to a reduction in GHG emissions compared to conventional Portland cement (Ordinary cement made by roasting limestone, clay, etc. in a rotary kiln, adding a small amount of gypsum, and grinding it into powder), and its use is increasing in private-funded

projects, including its use in the construction of high-rise buildings. On the other hand, public projects have been limited in their use of blended cement, as DPWH does not permit its use.

Currently, the DPWH Bluebook and Philippine National Standards' (PNS) standards for blended cements have different and inconsistent Loss of Ignition (LOI) requirements. The PNS approved a standard for blended cements with a loss of ignition (LOI) of 8.0, but DPWH insists on a loss of ignition of 5.0 (DPWH Bluebook's standard) and the matter has not been settled.

After nearly a decade of discussions between the two agencies to resolve inconsistencies in the DPWH and NPS standards for blended cement, blended cements were created with varying percentages of LOI from 5% to 8% and tested for durability and other requirements for cement. However, no differences were found in either case, but DPWH did not accept to change its standards.

Against this background, although the blended cement is used in private construction projects and its production is growing, its restricted use in public works projects further discourages medium-sized firms and has further deterred medium-sized firms from investing. Because medium-sized firms are held back by the long payback period of the alternative fuel and raw material utilization measures.

(b) Waste heat recovery from cement kilns

The cement industry has not yet taken steps to recover waste heat from cement kilns, which require temperatures above 1,000 degrees Celsius for cement production, in order to replace electricity from the grid. On the other hand, Republic Cement plans to install a 6 MW waste heat recovery unit through a JCM equipment subsidy project in FY2023.

According to Holcim Cement, a waste heat recovery plant should ideally be 4 MW or more to achieve an adequate return on investment, but many cement plants are not large enough to recover sufficient heat. For this reason, the company is not implementing the plant as a normal waste heat recovery power generation facility but is instead connecting the waste heat to the cement grinding system for use in drying raw materials.

Identified issue lies in financial constraints. The payback period of more than 5 years is also a challenge in waste heat recovery, and many cement companies, including four major companies, have not taken actions because their plants are not large enough to recover enough heat. The payback period for waste heat recovery projects of 4 MW or less is 7 to 10 years, so even Holcim Cement, a largest company with a zero-emission policy and the ability to raise funds within the company, has made an internal decision that investment would be difficult.

Note that Republic Cement, a major company, is implementing a waste heat recovery project, but this is thought to be due to its large scale at 6 MW, which allows for a quicker return on investment, and the use of the JCM equipment subsidy program to reduce the initial investment.

3) Support Needs

(a) Finance

The cement industry is working to promote the use of alternative fuels and raw materials in the cement production process in response to the Philippine government's climate change initiatives, and while four major companies are moving forward with installing equipment with their own funds in an effort to achieve the zero emissions declaration. However, other medium-sized companies are hesitant to invest due to poor economic feasibility.

Therefore, in order to make it easier for companies to make investment decisions, financing support such as low-interest loans that make the initial investment for the introduction of countermeasure equipment as small as possible and allow for a quick payback of the investment, will make it easier for companies to make investment decisions for countermeasures. This is expected to lead to an increase in the implementation of measures in the cement industry.

As a preliminary step to providing financial support to each company, it is necessary to clarify the technologies and equipment to be introduced in each company for the utilization of alternative fuels and raw materials and waste heat recovery measures, and to train the personnel of each company on the technologies to be introduced. It is desirable to strengthen the capacity of DENR at the same time, so that DENR itself can continuously provide training to company personnel.

(b) Institution

The debate over the inconsistency of standards for blended cement in DPWH and the Philippine National Standard can only be left to a high-level government decision to settle according to the interview.

Therefore, in terms of support needs, the assistance in collecting technical information to support the Coordinating Committee on Standards for Blended Cement (e.g., examples of standards for LOI for blended cement in Japan and around the world) can be an option.

4) Status of Donor Support

Table 2-58 Status of donor cooperation projects (cement industry)

Cooperation Partners	Project Name and Description	Implementing Agency	Status of implementation
Department of the Environment, Japan	A 6 MW waste heat recovery power generation system will be installed at Republic Cement's existing cement plant. The system will generate electricity using unused waste heat energy generated during the calcination process of cement production, thereby reducing grid electricity consumption and GHG emissions. This is the first project in the field of power generation using waste heat in the country to utilize JCM facility subsidies. Japanese company: Global Engineering Co.	Prakan State	From 2023

Source: JICA survey team

(3) Iron and Steel Industry Subsector

1) Relevant Policies and Plans

(a) Energy Efficiency and Conservation Act (2019, RA11285)

The EEC Act, which aims for efficient energy use, establishes eligible companies based on their annual energy consumption and mandates that energy conservation officers and energy managers be assigned according to their level of energy consumption. Companies are required to submit Energy Consumption and Conservation Reports (ECCRs) annually and energy audit reports every three years to the DOE as part of their reporting obligations. In addition, companies are required to implement ongoing energy conservation.

2) Implementation Status of Climate Change Measures and Identified Issues

The Philippine iron and steel industry does not use blast furnaces to produce iron from iron ore, but rather uses electric arc furnaces and industrial furnaces to melt imported semi-finished steel products and scrap iron recovered domestically, which is then processed into finished products.

SteelAsia, a major steelmaker, is reducing fuel consumption by 30-35% by introducing technology to automatically optimize the air/fuel mixing ratio in industrial furnaces to reduce fuel consumption, and hot charging technology (waste heat recovery) to reduce electricity consumption by preheating semi-finished steel products and steel scrap to be fed into electric arc furnaces to approximately 500-600 degree using waste heat from the furnace.

However, from the perspective of the iron and steel industry as a whole, the use of fuel auto-optimization and waste heat recovery technologies is limited to major companies.

Speaking about the identified issues, in the iron and steel industry, in promoting energy conservation in the steel production process, the first major capital investment is required to install waste heat recovery technology and other energy-efficient processes, but the payback period is as long as five years or more, and the economics are low, so companies are not willing to invest aggressively. Furthermore, companies do not have sufficient experience or knowledge in introducing these new technologies, which causes them to hesitate to invest in countermeasures in combined with the low economic efficiency.

3) Support Needs

In order to solve the problem of the Iron and Steel industry's reluctance to make investment decisions in waste heat recovery technology which requires large capital investments, low interest rate financial support would make it easier for companies to make investment decisions for the measures. Because financial support allows companies to make as little capital investment as possible to install the equipment necessary to implement the measures and to finish the payback as quickly as possible.

As a preliminary step to providing financial support to each company, it is necessary to clarify the technologies and equipment to be introduced in each company and to educate each company's personnel on the technologies of waste heat recovery. It is desirable to strengthen the capacity of DENR at the same time, so that DENR itself can continuously provide training to company personnel.

4) Status of Donor Support

None in particular.

(4) Refrigeration and Air Conditioning (RAC) Industry Subsector

1) Relevant Policies and Plans

(a) Ratification of the Kigali Amendment to the Montreal Protocol

As a signatory to the Montreal Protocol, the Philippines has phased out all ozone-depleting substances (ODS) by 2010. Ozone Desk (POD) within the DENR Environmental Management Bureau (EMB) established the ODS phase-out program. Common uses of hydrochlorofluorocarbons (HCFCs) in the Philippines include refrigerants (HCFC-22, HCFC-123), blowing agents (HCFC-141b, HCFC-142b), and cleaning agents/solvents (HCFC-141b, HCFC-225).

DENR revised its Chemical Substance Management Order in 2013 to support the implementation of the HCFC phase-out management plan. This revised rule contains rules for registration and renewal of service providers of equipment using ODS under Section 10 of DENR Executive Order No. 2013-25. In addition, a notice implementing this revised rule were issued in 2021, which includes: scope of coverage (Section 1); registration requirements for new or renewal (Section 2); duties and responsibilities of service providers (Section 3); monitoring, inspection, and good practices (Section 4); and validity period of the registration certificate (Section 5). On the other hand, even when using HFCs as alternatives to HCFCs, their Global Warming Potential (GWP) can be as high as 12,400, raising concerns about their significant impact on global warming. Due to this concern, the Kigali Amendment to the Montreal Protocol, which took effect in 2019, agreed to reduce the use of HFCs by over 80% by 2047.

Next, the Philippines ratified the Kigali Amendment to the Montreal Protocol on February 2, 2023, becoming the 141st party. In order to meet its obligations under the Kigali Amendment, the Philippine government has issued a policy to reduce its consumption of HFCs by 80% over 20 years, and the DENR has introduced measures to help the industrial sector transition to so-called climate-friendly alternatives that have a lower impact on global warming.

(b) Chemical Control Order for Hydrofluorocarbons (HFCs), DAO No. 2021-31

Regulations governing the import and consumption of HFCs came into effect in February 2022 as the HFC Chemical Control Order (DENR Executive Order No. 2021-31). These regulations seek to shift the market toward climate-friendly refrigeration and cooling technologies and equipment, requiring proper handling

of refrigerants during inspection operations, as well as proper recovery and disposal of refrigerants emitted from discarded refrigeration and cooling equipment.

Importers, exporters, sellers, retailers, resellers, and service providers of HFCs are required to maintain records of all transactions and prepare annual reports of these transactions. These transaction records are logged into the Online Permitting and Monitoring System (OPMS), and the reports are submitted to the EMB of DENR.

2) Implementation Status of Climate Change Measures and Identified Issues

(a) Transition to low GWP alternative refrigerants

The importation of R22 (HCFC) refrigerants is already prohibited in the Philippines in accordance with HFC regulations under the Montreal Protocol.

The refrigerator industry is shifting from R134a (HFC, GWP: about 1400) to R600a (isobutane, GWP: about 3), a natural refrigerant with a much lower Global Warming Potential (GWP), thereby reducing GHG emissions.

In the air conditioner industry, this is the case when switching from non-inverter air conditioners to inverter air conditioners and from R22 (HCFC) refrigerant to R32 (GWP: 675) and R410a (GWP: 2090), which are HFC refrigerants with a lower global warming potential. The government of the Philippines provides subsidies to manufacturers in the country to switch to R32 (GWP:675) and R410a (GWP:2090), which have lower global warming potentials.

On the other hand, even when HFCs are used to replace HCFCs, as there are concerns about the impact of HFCs on global warming, the Kigali Amendment to the Montreal Protocol, which entered into force in 2019, set targets for HFC reductions in terms of CO₂ equivalent. To comply with this target, a transition from R32(HFC refrigerant) to a refrigerant with an even lower GWP is necessary. Currently, natural refrigerants such as R290 (propane, GWP: 2 or less) are attracting attention, and local Philippine companies are importing and selling equipment using R290 produced in China, but production of equipment in the Philippines using R290 is still in progress.

Speaking about the identified issues, R290 utilization requires changes in the production line, such as piping and copper tubing, requiring new investments. Since the refrigerant R290 is not produced domestically and must be imported from overseas, the cost of procuring the refrigerant rises and the profitability of air conditioner sales declines, making the switch to R290 a second-guessing proposition.

(b) Recovery and destruction of Fluorocarbon gases

In the Philippines, the HFC chemical control order explicitly states that Fluorocarbon gases emissions are prohibited and must be recovered, but there is little Fluorocarbon gases recovery process in place. Due to

the high Global Warming Potential (GWP) of existing refrigerants in air conditioners, there's concern that if these refrigerants continue to be released without proper recovery and destruction, it could further increase the impact of global warming.

In the Philippines, a large percentage of refrigerators and air conditioners are serviced by the informal sector, who do not have offices and do not have proper equipment for recovery. In most cases, when a refrigerant breaks or leaks in a home air conditioner, the technician from the air conditioner manufacturer is not called, and the technician from the informal sector is called to vent and refill the refrigerant gas because it is cheaper and faster.

In addition, few companies are willing to own and collect Fluorocarbon gases recovery equipment because it costs 60,000 PHP per unit and Fluorocarbon gases recovery does not generate much revenue for residential air conditioners because the amount of Fluorocarbon gases recovered per unit is small.

Currently, only Delsa has been granted a Fluorocarbon gases recovery and storage license by the DENR Ozone Desk. In order to obtain a license, companies are required to meet quality and reliability requirements, such as already owning the necessary Fluorocarbon gases recovery equipment and other facilities and having personnel with Fluorocarbon gases recovery skill.

As for the destruction of Fluorocarbon gases, very little is done because the Fluorocarbon gases are not collected for processing. One company, Holcim Cement, is currently certified to destroy Fluorocarbon gases, and the collected Fluorocarbon gases are destroyed using a cement kiln.

The activity of destroying Fluorocarbon gases recovered by Delsa, which has been certified for recovery and storage, in a cement kiln of Holcim Cement has been adopted as a "Development of a Fluorocarbon Collection and Destruction Model Project in Metro Manila, Philippines Utilizing Mixed Combustion Technologies" under the 2021 JCM equipment subsidy project. According to DENR, the results of the project are being closely monitored.

Speaking about the identified issue, very little work is currently being done to recover Fluorocarbon gases sealed in existing air conditioners, and there is only one company with a license to recover and store Fluorocarbon gases, which is significantly less than the 1,000 service companies that install air conditioners. The continual release of Fluorocarbon gases, with high Global Warming Potential (GWP), from existing air conditioners without proper recovery and destruction, is concerning as it contributes to an increased impact on global warming.

The reason why the number of companies registered for Fluorocarbon gases recovery and storage has not increased is that Fluorocarbon gases recovery equipment costs 60,000 PHP per unit, and the profitability of Fluorocarbon gases recovery operations is low because the amount recovered per unit is small for residential air conditioners, and the registration itself to obtain a Fluorocarbon gases recovery and storage license is

not done beforehand by the company. The need to maintain Fluorocarbon gases recovery equipment and to secure personnel with Fluorocarbon gases recovery technology is thought to be the cause of this problem.

Another identified issue is that the destruction of Fluorocarbon gases is carried out in only one kiln at Holcim Cement's cement plant, which has been certified for destruction treatment. Since DENR does not currently have a sufficient system in place to recover Fluorocarbon gases, the facility to destroy the Fluorocarbon gases is expected to utilize the cement company's existing cement kiln. However, in the future, the amount of recovered Fluorocarbon gases may increase and the cement kilns of cement companies may not be able to handle the increased amount of recovered Fluorocarbon gases, so the construction of a dedicated Fluorocarbon gases destruction and treatment facility is considered necessary.

In this case, DENR believes that the non-incineration method is preferable, considering the awareness of local residents regarding the safety of incinerating a large amount of Fluorocarbon gases in a single location. Furthermore, DENR is concerned about the limited experience and ability of DENR staff in selecting appropriate technologies, including not only the non-incineration method but also other proposed treatment technologies, for a dedicated Fluorocarbon gases destruction treatment facility, and in operating the facility after it is installed.

In addition, the feasibility of the Fluorocarbon gases collection and destruction project in Quezon City was studied in the intercity collaboration project of the Ministry of the Environment Japan in year 2020. According to the report of this study, only one company was certified by DENR as a fluorocarbon collection company, and the mechanism for bearing the cost of collecting and destroying Fluorocarbon gases and the environment for this business were not in place. Since there was no incentive for Fluorocarbon gases collection and destruction, there were no other companies that were certified as collection companies.

3) Support Needs

(a) Transition to low GWP alternative refrigerants

In order to respond to the Philippine government's efforts to comply with the Kigali Amendment to the Montreal Protocol's goal of reducing HFC consumption by 80% over 20 years, the low-GWP refrigerant R290 (propane, GWP: 2 or less) should be used by companies easily and they should actively invest in switching to R290. An economic environment must be created that encourages companies to actively invest in switching to R290.

Therefore, it is necessary to design a support system for companies, such as tax incentives for importing R290 from overseas and subsidy support for domestic companies to upgrade their production lines for R290.

(b) Recovery and destruction of Fluorocarbon gas

In order to increase the number of companies registered for Fluorocarbon gases recovery and storage licenses, it is necessary to add economic incentives such as subsidies for the purchase of Fluorocarbon

gases recovery equipment, and to create a system that makes it profitable for companies to implement Fluorocarbon gases recovery and motivates them to participate.

Therefore, it is necessary to conduct study and analysis on issues such as the low profitability of companies due to the high cost of Fluorocarbon gas recovery equipment and services, as well as the significant reliance of consumers on informal sectors for refrigerator and air conditioner services, considering possible solutions. Furthermore, the awareness campaigns about regulations concerning the recovery and destruction of Fluorocarbon gases among companies and consumers is essential.

Moreover, even if the number of registered companies increases after conducting Fluorocarbon gases recovery training for gases recovery companies, it is considered possible to respond for the time being by utilizing cement kilns of cement companies. However, in assuming that the Fluorocarbon gases treatment response capacity of cement companies exceeds the limit in the future, it is necessary to introduce a Fluorocarbon gases destruction treatment facility. It is necessary to provide capacity development to DENR staff regarding the selection of applicable technologies and the operation of Fluorocarbon gases destruction treatment facilities after installation. In this case, it is expected that Japanese companies' technologies will be utilized for the technologies applicable to Fluorocarbon gases destruction treatment facilities.

4) Status of Donor Support

Table 2-59 Status of donor cooperation projects (RAC industry)

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
ADB	Promote fluorocarbon lifecycle management, technical cooperation, advanced technologies, and innovative solution options for fluorocarbon lifecycle management	DENR	2021-
Ministry of the Environment, Japan	“City-to-City Collaboration between Osaka and Quezon: Support for Low Carbon Promoting Projects through Intercity Cooperation between Osaka and Quezon (Promotion of Energy Saving and Fluorocarbon Management Measures) “Osaka City studied a feasibility of a JCM (Joint Crediting Mechanism) project that contributes to the reduction of greenhouse gas emissions and the life cycle management of fluorocarbons in the fields of air conditioning energy conservation and fluorocarbon collection and destruction, which are in high demand in Quezon City. This achievement has led to the JCM project, "Development of a Fluorocarbon Collection and Destruction Model Project in Metro Manila, Philippines Utilizing Mixed Combustion Technologies" of Marubeni Corporation.	DENR	2020-2021
Ministry of the Environment, Japan	JCM (Joint Crediting Mechanism) project titled "Development of a Fluorocarbon Collection and Destruction Model Project in Metro Manila, Philippines Utilizing Mixed Combustion Technologies". Delsa Corporation is implementing a Fluorocarbon gases recovery and destruction project in the Manila region to generate and obtain JCM credits. The mixed combustion destruction facilities utilize the cement kiln furnace of	Delsa Corporation	From 2021

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
	Holcim Philippines, a local cement manufacturing company. Japanese company: Marubeni Corporation		

Source: JICA survey team

(5) Petrochemical Industry Subsector

1) Relevant Policies and Plans

Policies related to climate change action in the Petrochemical industry include the EEC law which aims at more efficient use of energy.

2) Implementation Status of Climate Change Measures and Identified Issues

In the Petrochemical industry, basic petrochemical products such as ethylene and propylene, which are raw materials for plastic products, are manufactured by pyrolyzing naphtha which is obtained by cracking petroleum at high temperature.

In case one ton of polyethylene is produced using ethylene produced by naphtha cracking, it is said that approximately 4.5 tons of CO₂ is emitted.

Although, in the Philippines, the NDC policy measure aims to reduce CO₂ emissions by replacing some of the naphtha from fossil fuel sources with naphtha from plant sources, the utilization of bio-naphtha hasn't progressed significantly.

Speaking about the identified issues, the bio naphtha from plant sources is produced by only a few companies in the world (e.g., Neste), and all of it must be imported from overseas, Therefore, the cost of procurement is increased and the profitability of the companies is lower. Hence, due to the lack of enthusiasm among businesses for manufacturing and utilizing bio naphtha, the utilization of bio naphtha has not progressed at all.

3) Support Needs

In the Petrochemical industry, it is necessary to create an environment in which companies believe that the use of bio naphtha is profitable and actively utilize bio naphtha in order to meet the Philippine government's climate change initiatives.

Therefore, it is necessary to support the design of economic incentive programs, such as tax incentives for importing bio naphtha from overseas.

4) Status of Donor Support

None in particular.

(6) EV-Related Industries

1) Relevant Policies and Plans

The Philippine government has been making efforts to promote EVs and foster the EV industry by establishing laws, roadmaps, incentives, and other measures to break away from dependence on petroleum fuels and to develop the EV industry, which has high potential for job creation in a wide range of supporting industries, into an export industry.

Of the 13 million total vehicles (including sedans, public utility vehicles, buses, motorcycles, etc.) currently registered in the Philippines, only about 9,000 are EVs. Of these, 347 are sedans, 1,168 are SUVs (Sports Utility Vehicles)/UVs (Utility Vehicles), 8,105 are motorcycles, 4 are buses and 2 are trucks.

There are currently 11 EV parts manufacturers and 7 EV importers in the country, but the Philippine government is also keen to enter and develop human resources in a wide range of fields, including battery development and vehicle design, manufacturing, maintenance, and testing.

(a) Electric Vehicle Industry Development Act (EVIDA)

The Electric Vehicle Industry Development Act (Republic Act No. 11697, EVIDA), enacted in April 2022, stipulates the roles of each government agencies in promoting the manufacture, development, trade and use of electric vehicles (including not only passenger cars and buses but also e-jeepneys, e-tricycles, e-bikes, etc.), charging stations and related equipment and components in the Philippines. The EVIDA also sets out the target percentage of EVs in the company vehicles of certain industries like logistics, and LGUs (details are provided in the CREVI (Comprehensive Roadmap for the Electric Vehicle Industry)), and the following incentives for manufacturers, importers and users. It also encourages banks to provide loans for the acquisition of EVs and the construction of charging stations on more concessionary terms.

Table 2-60 List of incentives stipulated in EVIDA (excerpt)

Incentives for manufacturers	Considering the positioning of EV-related industries such as EV manufacturing, assembly, and component manufacturing, charging station installation and operation, and development centers as priority industry sectors in the Strategic Investment Priority Plan (SIPP) (subsequently positioned as Tier 2 industries in the priority industry sectors in the 2022 SIPP that went into effect on June 10, 2022). (EV-related industries are positioned as Tier 2/3 industries in the Priority Industry Sector in the 2022 SIPP, which took effect on June 10, 2022).
	DTI-BOI to propose an EV version of the Comprehensive Automotive Resurgence Strategy Program (CARS Program) implemented in Presidential Decree 182 of 2015 (The CARS program is described later in this chapter.)
Incentives for importers	Consideration will be given to imports of vehicles in line with Republic Act No. 10963 of 2018 (TRAIN Act, Tax Reform for Acceleration and Inclusion) (Currently, for imports of EVs and parts, a five-year duty exemption/reduced duty rate adaptation measure for imports of finished EVs has been issued in Presidential Decree No. 12 of 2023 (Executive Order 12, Series of 2023), issued on January 13, 2023).
	Consider including vehicles, components, charging stations, and the equipment needed to manufacture EV in SIPP sectors (subsequently placed as Tier 2/3 industries in the priority industry sector in the 2022 SIPP, which took effect on June 10, 2022)

Incentives for users	Reduction or exemption of vehicle registration tax
	Issuance of special license plates, which is free from coding system, and priority registration of vehicles
	Faster business registration for public transportation operators that use exclusively EVs to conduct their business

(b) Comprehensive Roadmap for the EV Industry (CREVI)

The Comprehensive Roadmap for the Electric Vehicle Industry (CREVI) was established by the DOE in 2023 as a roadmap for the implementation of EVIDA. The CREVI includes a "BAU scenario" in which EVs account for 10% of the total number of vehicles (including not only sedans but also motorcycles, buses, trucks, Jeepneys, and tricycles) by 2040, and a "Clean Energy scenario" in which EVs account for 50% of the total number of vehicles by 2040. In each scenario, the plan defines short-, medium-, and long-term action plans, specific activities, and the roles to be played by each Department and agency (see table below).

Table 2-61 Targets for both scenarios in CREVI (2040)

		BAU Scenario (EV 10%)	Clean energy scenario (50% EV)
short term (2023-2028)	Number of EV vehicles	311,700 units	2,454,200 units
	Number of charging stations	7,300 locations	66,500 locations
medium-term (2029-2034)	Number of EV vehicles	580,600 units	1,851,500 units
	Number of charging stations	14,000 locations	41,800 locations
long term (2035-2040)	Number of EV vehicles	852,100 units	2,001,600 units
	Number of charging stations	20,400 locations	39,800 locations

Source: Comprehensive Roadmap for the Electric Vehicle Industry (CREVI)

(c) Public Utility Vehicle Modernization Program (PUVMP)

For Jeepneys, which are the main commuting means of many common people especially in the NCR area, DOTr has been implementing the Public Utility Vehicle Modernization Program (PUVMP) since 2017 and has been promoting the conversion of at least 15 years old Jeepneys to Euro 4 compliant engine models or to E-Jeepneys. The program also provides low-interest loans for replacement through the state-owned Land Bank and the Development Bank of the Philippines (DBP), supports forming jeepney cooperatives and rationalize the routes.

The PUVMP is based on DOTr's Order 2017-011 (Omnibus Guidelines on the Planning and Identification of Public Road Transportation Services and Franchise Issuance or the Omnibus Franchising Guidelines), and the Land Transportation Franchising and Regulatory Board (LTFRB) of the DOTr is the responsible department. In addition, Department Order 2018-024 established the Project Management Office (PUV Modernization Program-National Project Management Office, PUVMP-NPMO) and regional offices,

which are responsible for implementing the PUVMP. The EVIDA enacted in 2022 also incorporated conversion to EVs into the PUVMP.

The definition of a PUV is a vehicle that carries passengers or cargo for a fee and includes the following types of vehicles

- UV Express: Air-conditioned vehicles that embark and disembark passengers at specific points within a two-kilometer radius. There are more than 120 routes in Philippines. These vehicles typically carry 10-18 passengers and are often Toyota HiAce and Isuzu Highlander like models.
- Public Utility Buses (PUBs): Fixed Route Bus
- Public Utility Jeepneys (PUJs) : Jeepneys
- Transport Network Vehicle Services (TNVS): Vehicles that provide services through dispatch services such as Grab and Transportify. Usually a sedan with air conditioning.
- Filcab: Shared-ride cab with a vehicle that can carry about 11 passengers, used mainly in Cebu.
- Cab/Taxi

(d) Comprehensive Automotive Resurgence Strategy Program (CARS Program)

The CARS Program (Comprehensive Automotive Resurgence Strategy Program) was launched in 2015 to support the Philippine automotive manufacturing industry. The program provides subsidies and tax exemptions to manufacturers of selected vehicle models manufactured, sold, or exported in the Philippines.

Toyota's Vios and Mitsubishi's Mirage were selected to manufacture 200,000 units each over six years starting in 2018; a five-year extension to 2023 was announced after the Covid-19 pandemic affected manufacturing and sales. The Philippine government is currently formulating an EV version of the CARS program and details are expected to be announced in 2024.

Industrial promotion of the EV automobile industry, including the implementation of this program, is being carried out by the CARS Program Office, established within the Board of Investments (BOI), which is in charge of formulating industrial policy and implementing manufacturing promotion programs at the DTI.

2) Implementation Status of Climate Change Measures and Identified Issues

Public transport vehicles (PUVs), including jeepneys, tricycles, and buses, account for about 80% of all vehicle trips, and GHG reductions in the sector will contribute significantly to reducing emissions in the Philippines. The World Bank report also estimates that electrification of 90% of PUVs and 72% of general vehicles would result in a reduction of 450MtCO₂e in 2050, even with the current power supply composition, and is considered the most effective compared to other measures such as railroad improvement and encouraging teleworking.

In the EV industry, measures are being taken to further promote EVs as electrification of vehicle itself would contribute to climate change countermeasures: the BOI and other government agencies are reducing or

eliminating import tariffs on a temporary basis, and the public and private sectors are developing charging infrastructure, while the Electric Vehicle Association Philippines (EVAP), a private industry organization formed by EV vehicle manufacturers, is working closely with the DOE, DTI-BOI, and other relevant ministries and agencies to make policy recommendations. In addition, DBP and Land Bank, state-owned banks, are providing low-interest loans to jeepney cooperatives that are replacing their vehicles with new ones under the PUV modernization policy implemented by the DOTr, thereby encouraging the replacement of vehicles with EVs and newer models.

DHL, an international logistics company, and Mober, a delivery contractor for IKEA in the Philippines, a furniture manufacturer, are moving forward with the conversion of their delivery vehicles to EVs, while Gogoro, a Taiwanese electric motorcycle manufacturer, and the Ayala Group have partnered to conduct demonstration tests of smart scooters and smart battery-powered vehicles in Metro Manila., and the Globe Group plans to electrify commuter buses for its employees.

(a) Measures and issues related to PUVs

a) Public Utility Vehicle Modernization Program (PUVMP)

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- Public Utility Jeepneys (PUJs) : Jeepneys
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- Filcab: Shared-ride cab with a vehicle that can carry about 11 passengers, used mainly in Cebu.
- Cab/Taxi

b) Absence of manufacturing standards and homologation systems

The Philippines has not established its own certification system, including for petroleum-fueled vehicles, but has been a party to mutual certifying system, with overseas certification being recognized as certification in the country. A roadmap was developed for the Philippines to join the 'Agreement concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations (1958 Agreement)'. Subsequently, from 2013 to 2015, the Department of Land, Infrastructure, Transport and Tourism (MLIT) of Japan has supported Philippine's accession to the 1958 Agreement through the Japan-ASEAN Integration Fund (JAIF) through dispatching experts.

As a result, certificates from other countries can be used in the Philippines to certify petrol-fuelled vehicles and sedan-type EVs/Bus/Van, but the problem is that no standards exist for jeepneys and tricycles, which are unique to the Philippines. Jeepneys and tricycles are produced domestically, but as no standards or certification system has been established for their production, each manufacturer produces them to different specifications and there are more than 100 models. Absence of standards and certification has led to the following problems: 1) GHG emissions cannot be fully controlled by regulation although amount of emissions from jeepneys and tricycles are huge; 2) maintenance is difficult; 3) production is on a make-to-order basis, which prevents inexpensive mass production; and 4) unsafe vehicles are on public roads and battery fire incidents have actually been reported. The establishment of standards for e-jeepneys and e-tricycles and the establishment of a mass production system are urgent issues.

Since there are currently no vehicle testing facilities or test technicians in the Philippines, it will be necessary to develop human resources and infrastructure for this purpose in the future

c) Difficulties in accessing finance by jeepney operators

Jeepney operators are mostly family-run businesses or micro-enterprises, which have been formed into cooperative through the PUV modernization program. For the replacement of vehicles with newer models that meet Euro 4 or higher standards for environmental performance or EVs, a support package called the 5-6-7-8 package (5% down payment, 6% interest, 7-year loan term, and PHP 80,000 subsidy, which has been increased to 160,000 PHP) has been prepared. The state-run DBP and Land Bank offer 6% and 7-year loans, but there are still issues such as the time required for screening, the subsidy not being sufficient

considering that the price of the vehicle is around PHP1.3-3 million , and the difficulty in making the down payment. The government is considering increasing the subsidy amount to PHP 360,000, which is estimated to require PHP 64.2 billion, but the government budget allocated was only PHP 1.8 billion in 2022 and PHP 1.3 billion in 2024.

d) Protest against PUVMP by Jeepney operators

The PUVMP, which started in 2017, promotes the unionization of jeepney operators, optimization of routes and replacement of older vehicles that have been in use for more than 15 years with newer vehicles (Euro-4 standard engine powered vehicles or E-jeepneys). However, these measures are often opposed as burdensome to operators, insufficiently subsidized, and cold-shouldering small businesses, and groups of operators such as Manibela and PISTON have held protest demonstrations, including several strikes. The deadline for the formation of a cooperative with more than 15 members was initially 30 June 2023, but following the demonstrations in March 2023, the deadline was extended to 31 December 2023. Although there was another large protest demonstration in December 2023, the President initially issued a statement that the deadline would not be extended again, as nearly 70% of operators were in favor of the PUVMP. Yet, the deadline was again extended to end of April 2024.

The EV industry promotion program is considered as one of the possible cooperation programs in this survey, but each program focuses on establishing standards for e-jeepneys to lower and stabilize prices, promoting new industries, and providing lower interest rate financing for replacement, etc. and backlash from the operators are not expected.

e) Improper disposal of end-of-life vehicles

In the Philippines, there are many incidents of improper disposal of End of Life Vehicles (ELVs), and it is critical problem to be addressed. 140,000 ELVs are expected to be disposed of by 2025, and if they are disposed of properly, they can be recycled or reused. However, there are no laws and regulations regarding ELVs, and ELVs are often being dismantled at informal scrap factories or just dumped on the streets.

The PUV Modernization Program is promoting a system of certified scrap metal plants to process end-of-life vehicles that have been replaced within the program, and it is desirable to have at least one certified plant in each of the 17 regions, but there are no much qualified plants that can be certified, resulting that only one plant has been certified so far. Once enough certified factories are in place, a system will be put into operation in the future whereby processing at certified factories will be subsidized and that subsidy can be used for the purchase of new vehicles.

Measures and issues related to Manufacturing EVs and EV parts including batteries

f) Comprehensive Automotive Resurgence Strategy Program (CARS Program) and Electric Vehicle Incentives Scheme (EVIS)

The CARS Program (Comprehensive Automotive Resurgence Strategy Program) was launched in 2015 to support the Philippine automotive manufacturing industry. The program provides subsidies and tax exemptions to manufacturers of selected vehicle models manufactured, sold, or exported in the Philippines.

Toyota's Vios and Mitsubishi's Mirage were selected to manufacture 200,000 units each over six years starting in 2018; a five-year extension to 2023 was announced after the Covid-19 pandemic affected manufacturing and sales. The Philippine government is currently formulating an EV version of the CARS program, EVIs, and details are expected to be announced in 2024. Note that Honda and Nissan, two Japanese manufacturers, withdrew from four-wheel vehicle production in the Philippines in March 2020 and March 2021 respectively.

Implementation of CARS and EVIS are being carried out by the CARS Program Office, established within the Board of Investments (BOI).

g) Possible adverse impact in fostering domestic industry due to import tariff exemptions

Executive Order No. 12, Series of 2023, issued on January 13, 2023 and entered into force on February 20, 2023, with the aim of promoting EVs, provides for a five-year time-limited exemption/reduction of import duties. EVs including passenger cars, trucks, bicycles, scooters, etc. at 0% while 30% for gasoline-powered vehicles, but e-motorcycles are not exempt from duty and taxation rate remains at 30%.

While the policy is believed to have contributed to the reduction of EV prices and the spread of EVs, it has also affected the domestic EV manufacturing industry in the Philippines, as evidenced by the suspension of EV-related component manufacturing in the country and the withdrawal of some FDI plans, making the development of the domestic EV industry while balancing the spread of EVs a challenge. It is scheduled for NEDA to conduct a policy review in February 2024, one year after the effective date of this Executive Order.

h) Barriers to EV manufacturing, including battery issues

Barriers to the manufacture of EVs in general are analyzed in CREVI.

As batteries account for around 40% of the price of an EV vehicle, it is crucial for Philippines to position themselves in international battery supply chain. In CREVI, Technical, resource and cost challenges have been identified for future domestic production.

There are currently eight battery manufacturers in the Philippines, but they mainly manufacture batteries used in small electronic devices and almost no EV batteries are produced domestically. The training of engineers capable of designing battery modules is also still an issue.

In terms of resources, the country produces some nonferrous metals and minerals required for the production of batteries, but there are still issues with refining technology. The Philippines is a producer of nickel and cobalt, with cobalt production accounting for 3% of global production. For nickel, the nickel laterite ore produced in the country is of low purity and requires complicated and expensive High Pressure Acid Leach (HPAL) refining. Sumitomo Metal Mining currently operates two plants in the Philippines, all of which are exported for final processing in Japan. CREVI has identified the absence of control of the resources needed for batteries in the country as an issue, and is considering the possibility of attracting more HPAL plants, and at the same time it mentions the need to increase incentives for domestic refining and to limit the exports of domestically produced nickel, as is the case in Indonesia.

In terms of costs, the battery production line consumes significantly large volume of electricity, making production in the Philippines more expensive due to high electricity prices in the country.

Table 2-62 Contributing Barrier for Battery Production in the Philippines

Contributing Barrier for Battery Cell Production	Motor cycle	Tricycle	Car	Van	Jeepney	Bus
Low purity of nickel reserves		High			High	
Foreign control of lithium battery raw material supply		High			High	
Lack of local battery cell demand	Med				Med	
High HPAL investment cost	Med				Med	
Weak local supply chain	Med				Med	
Higher power and operating cost			High	High		High

Degree of Significance High Med Low

Source: CREVI

(b) Measures and Issues related to promotion of EVs

a) Insufficient charging infrastructure

In the EV vehicle industry, one of the barriers in EV promotion is delay in expanding charging infrastructure. According to CREVI, there are 338 charging stations in the Philippines as of 2022, but only 32 of them are officially registered with the DOE. Most of the 338 charging stations are concentrated in Region IV (Calabarzon area), which includes Metro Manila (NCR) and Quezon City, a suburb of NCR. The installation of more charging stations is one of the most important measures for EV promotion, but the economic stagnation caused by the COVID-19 epidemic and continued economic uncertainties, such as declining new vehicle sales, are thought to be one of the reasons for the delay in installation. As for motorcycles and tricycles, Pilipinas Shell and SUN Mobility have started a partnership to install battery swapping stations for motorcycles and tricycles sold by SUN Mobility at gas stations operated by Shell. It is expected that such efforts will be expanded to other gas station chains in the future.

3) Support Needs

The following needs were identified in the EV automotive industry

- Creation and standardization of manufacturing standards for E-jeepneys, which are mainly manufactured in the Philippines, and establishment of a certification system, including support for the establishment of certification facilities and training of skilled labor. As mentioned above, although there is no unique certification system in the Philippines, including for petroleum-fueled vehicles, mutual certification is in place. On the other hand, there is no standard at all for E-jeepneys, which are vehicles unique to the Philippines, and the certification system for E-jeepneys has been cited as the highest priority issue.
- Review of the impact of EV import tariff exemption/reduced tariff policy on the manufacturing side and its effect on promoting EV diffusion, etc.
- Low-interest loans for replacement financing for e-jeepney cooperatives
- Low-interest loans for capital investment for EV manufacturers, including E-jeepneys

4) Status of Donor Support

Table 2-63 Status of donor cooperation projects (EV-related industries)

Cooperation Partners	Project Name and Description	Implementing agency	Status of Implementation
UNDP/GEF	Low Carbon Urban Transport Systems Projects aimed at improving the environment for low-carbon urban transportation systems, including EVs. The project includes policy development and implementation support, awareness-raising activities, technical cooperation, and financial assistance. Pilot areas are Baguio City, Iloilo City, Pasig City, and Santa Rosa City.	DOTr (DOE, DTI, DOST, TESDA) Baguio City, Iloilo City, Pasig City, Santa Rosa City	Under implementation (2019-)
UNEP	"Integrating Electric 2&3 Wheelers into Existing Urban Transport Modes in Developing and Transitional Countries" under the Global Electric Mobility Program The Philippines is one of the focus countries of UNEP's "Integrating of Electric 2- and 3-Wheel Vehicles into Existing Urban Transport Modes in Developing and Transitional Countries" initiative, which is being implemented in six countries in Asia and Africa. The program aims to shift from ICE vehicles to electric and non-motorized 2- and 3-wheeled vehicles. Pasig City was selected as the pilot city, and in cooperation with the Philippine Postal Service and the local government, the use of small EVs for urban freight transportation (mail and parcel delivery, etc.) is being considered.	DOTr, Pasig City	End (2022)
UNIDO	Accelerating the adoption and scale-up of electric mobility for low-carbon city development in the Philippines Expansion of charging stations using innovative technologies, development of business models for electric 3-wheelers, and technical cooperation to create a policy environment for the development of the e-mobility industry and to increase investment	DOE, DOTr	Under implementation (2020-)
UNIDO	UNIDO e-mobility ASAP Project Conduct series of pilot project using e-PUV in 5 cities	DTI, DOTr	Under implementation (2023-2027)

Cooperation Partners	Project Name and Description	Implementing agency	Status of Implementation
ADB	Davao Bus Project Build a sustainable and convenient public transportation system through the organization and integration of public transportation systems, including the use of EV buses. The project plans to reduce the number of jeepneys to zero by the end of 2024 and switch to buses with Euro 5 above engines or EV buses.	DOTr, Davao City	Under implementation (2021-)
JICA	Dissemination and demonstration project for an electric three-wheeled vehicle (E-tricycle) urban transportation system that reduces environmental impact (private-sector collaboration, BIMAC)	Quezon City	Completed (June 2019)

Source: JICA survey team

(7) Cross-Industry Initiatives (Product Waste Management)

1) Relevant Policies and Plans

(a) Extended Producer Responsibility Act (EPR Act), Republic Act No. 11891

Waste management in general is governed by Ecological Solid Waste Management Act of 2000 (Republic Act No. 9003,). This law promotes proper waste management, recycling, and waste reduction in the Philippines, and aims to establish a sustainable waste management system.

In July 2022, the Extended Producer Responsibility Act (EPR Act, RA. 11891) was enacted. The law requires companies that manufacture products using plastic packaging to be responsible for the proper and effective collection, treatment, recycling, or disposal of the plastic packaging used in their products after it has been sold to and used by consumers. The implementation of this law is expected to encourage the design of packaging and products that use less plastic, reduce the amount of plastic waste generated, and extend the life of plastic through upcycling and recycling, thereby reducing GHG emissions and the impact on the natural environment. The target plastics include plastic bottles, cosmetic and shampoo bottles, straws, cups, food trays, plastic bags, Styrofoam, and other containers for daily consumer goods, as well as packaging materials for transportation and sales.

The EPR law requires large companies with total assets exceeding PHP 100 million to collect 20% of the previous year's plastic packaging by the end of 2023, 40% by the end of 2024, and finally 80% by the end of 2028. The collection will be done by the companies themselves, collectively by several companies, or through a Producer Responsibility Organization (PRO). In addition, eligible companies were required to develop an EPR plan by February 2023 and submit it to the National Ecology Center established within the National Solid Waste Management Commission, whose secretariat is the DENR-EMB. However, as of November 2023, only 709 of the 4,000 eligible companies had submitted their EPR plans to the National Ecology Center. Compliance with the EPR Act is subject to the annual submission of an audited ECAR

(EPR Compliance Audit Report), which will require reporting on the volume of utilization and recovery rates. The first report for 2023 is due by 15 July 2024.

The EPR Law also includes penalties and fines for failure to submit an EPR plan, false reporting, and failure to meet targets, with the first violation costing from 5 to 10 million PHP, the second from 10 to 15 million PHP, and the third from 15 to 20 million PHP and suspension until compliance. Failure to meet collection targets will result in a fine of either the above amount or double the cost of collection and recycling, whichever is higher.

2) Implementation Status of Climate Change Measures

According to the OECD, plastic waste accounts for 3.4% of global GHG emissions, 90% of which are emitted during manufacturing. Therefore, efforts need to be made at the product design stage to reduce the amount used and to increase the percentage of recovery and reuse.

In the Philippines, about 2.15 million tons of plastic is used annually as of 2019, and according to WWF (World Wide Fund for Nature) , the breakdown is as follows: 2% is used as cement kiln co-firing/alternative solid fuel, 9% is recycled, and the majority is landfilled without being recycled.

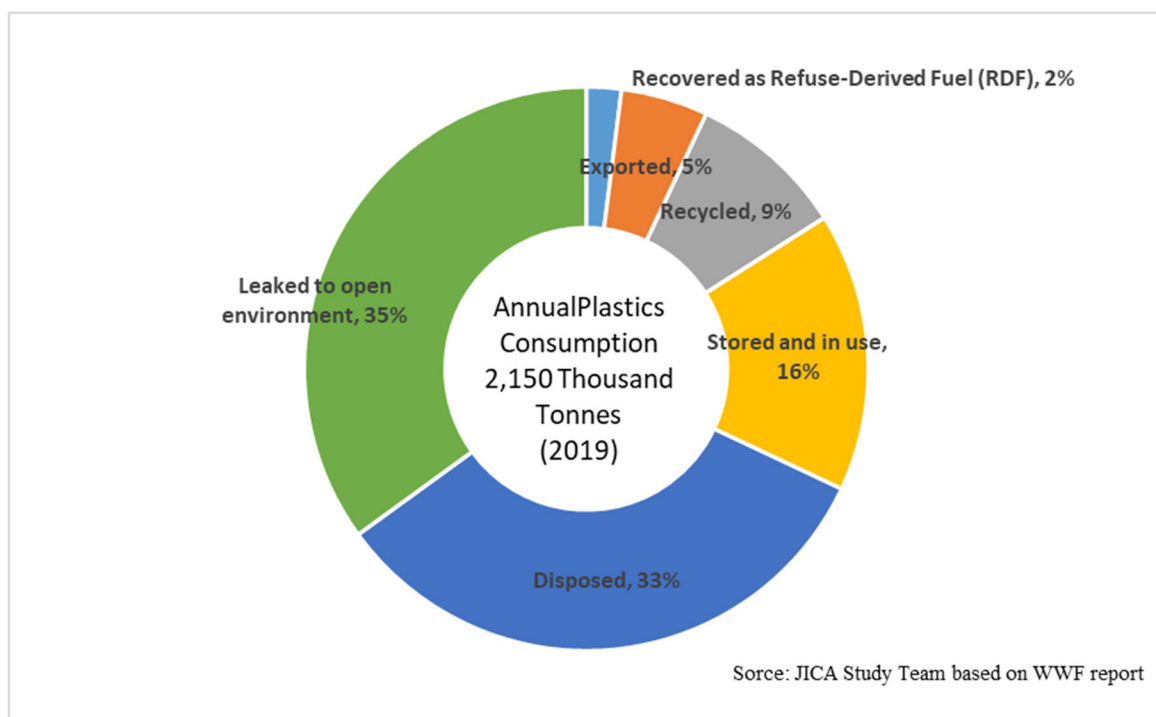


Figure 2-39 Collection and Disposal of Plastics in the Philippines

WWF estimates that 40% of the Philippines' plastic consumption will be collected and recycled/properly disposed of if the targets set in the EPR Law are achieved, and various efforts are being made by both the public and private sectors to promote the EPR Law.

DENR conducted a training of staff to support companies in their activities to promote ERP in March 2023 with the support of UNDP. The trained officials will be at the forefront of information on the EPR law in

their respective regions and will serve as resource speakers in future trainings for the private sector, local governments, and waste management industry stakeholders. Japanese government also supports the LOOPFORWARD (Linking Opportunities and Partnerships Towards Circular Economy through EPR) campaign, which is a part of “the Accelerating NDC through Circular Economy in Cities Project (ACE Project)”, and jointly holds workshops and seminars with UNDP, and DENR inviting industry associations and government officials.

In the private sector, a Producer Responsibility Organization (PRO), PARMS (Philippines Alliance for Recycling and Materials Sustainability), was established in 2014 before the EPR Law was enacted in July 2022. A Producer Responsibility Organization (PRO) is defined by the OECD as an organization that supports the implementation of EPR by each covered company. Although not yet implemented in the Philippines, many countries have established a system in which multiple producers pay a fee to a PRO and outsource the collection and recycling of their products, as it is often impractical for each producer to collect its own products. In Japan, the Japan Containers and Packaging Recycling Association is responsible for the recycling portion in cooperation with businesses and local governments as a PRO.

PARMS, whose members include major daily consumer goods companies such as Ajinomoto, Coca-Cola, Pepsi, Nestle, Unilever, and P&G, has set a goal of "Zero Waste to Nature 2030" (zero waste dumping into the natural environment by 2030). PARMS works with DENR, the National Solid Waste Management Commission (NSWMC) and the National Ecology Center (NEC) to support the promotion of the EPR law from the producer's side. In addition, the Philippine Business for Environmental Stewardship is involved in the Waste Exchange Program, which matches waste generators with potential buyers, as well as training for companies and disseminating information through newsletters.

3) Identified Issues

While the passage of the EPR Law has paved the way for the collection and reuse of plastics, the following issues remain in terms of actual operation.

Of the 4,000 target companies that were originally supposed to submit EPR plans by February 2023, only 709 had done so as of November 2023. Although the target companies are large companies with assets of 100 million PHP or more, there seems to be difficulties in formulating plans on how they will collect and recycle. During interviews with Japanese companies, one of the reasons cited for the low submission rate was the difficulty in selecting reliable contractor, which makes it difficult to formulate a feasible plan. Companies were sometimes offered exorbitant prices by contractors and could not confirm whether the contractors they entrusted with their waste were finally disposing of it properly or recycling it. The tight timeline of the submission deadline, six months after the EPR Law was passed, was also a factor.

Companies subject to the EPR Law are required to collect and recycle/process the equivalent of 20% of the amount of plastic packaging used by the end of 2022, but even if the companies are willing to collect and recycle, it will take time to fully implement this requirement due to the following points:

- Difficult to select a reliable contractor
- Exorbitant prices quoted by contractors result in collection costs being higher than the fine.
- Collection itself is difficult because products subject to collection that have passed to general consumers are disposed without being segregated from general household waste.
- The range of products covered by the Law is complex
- High financial burden on the company

As indicated above, companies are having a hard time selecting reliable collection/recycling companies. The number of recycling companies registered with DENR is limited, and a high percentage of waste is collected and processed in an informal manner, making it difficult to track whether the companies they request are really processing properly.

In addition, waste disposal has been the responsibility of LGUs, but with the implementation of EPR, the responsibility will be partly shared. Therefore, it is necessary to organize the division of roles and cost sharing among the parties concerned, including companies, LGUs, collection agencies (formal and informal), and recycling companies. For example, in countries that have already enacted similar laws, the division of responsibilities varies, but in Japan, local governments are responsible for sorted collection at their own expense, while the Japan Containers and Packaging Recycling Association (PRO) is responsible for recycling, and companies bear the processing costs, and revenue generated from recycling becomes the revenue of local governments. On the other hand, in France, although local governments are responsible for collection, the cost sharing ratio is agreed upon between businesses and local governments, and recycling is carried out by local governments³⁵.

For these issues, UNEP, WWF, the Swedish government, and others have jointly published a White Paper and conducted a policy review since the EPR Act came into effect³⁶.

4) **Support Needs**

Promotion of the EPR law has been provided by UNEP, UNDP, and other donors and NGOs since the legislative process. The following were identified as future support needs.

- Hosting workshops and other events to strengthen the capacity of companies covered by the EPR Law to comply with the requirements of the Law and to show what options are available to them.

³⁵ <https://www.jcpra.or.jp/Portals/0/resource/association/pamph/pdf/h27-tokuji-setu-1.pdf>

³⁶ https://wedocs.unep.org/bitstream/handle/20.500.11822/41846/EPR_withepaper.pdf?sequence=3&isAllowed=y

- Organizing trainings and workshops to strengthen cooperation among businesses and business associations such as chambers of commerce, LGU, NGOs, and recyclers
- Establishing a recycling system involving the informal sector (rag pickers, unregistered scrap mills, junk stores, etc.), which plays an important role in waste management in the Philippines.

Since many Japanese companies have established operations in the Philippines and many of them are subject to the EPR Law, the establishment of an eco-system for product waste recycling will also support these companies' activities.

5) Status of Donor Support

Table 2-64 Status of Donor Support (Product Waste Management)

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
UNIDO, GEF	Implementation of PCB Management Programs for Electric Cooperatives and Safe e-waste Management Strengthen capacity for organic pollutant management, recycling, etc. in e-waste	DENR	Completed in 2023
WWF	No Plastic in Nature Initiative Various measures to reduce plastic discharged into the environment to zero by 2030 through supporting the passage of the ERP Law and supporting its implementation	DENR	being carried out
UNEP, WWF, Swedish government, etc.	EPR White Paper Survey report on the status of EPR compliance and issues to be addressed in the future.	DENR	November 2022 Publication
JICA	Study on Recycling Industry Promotion Plan in the Philippines Research and policy recommendations for recycling industries such as plastics, iron and steel, aluminum, glass, home appliances, and pulp	DTI/BOI	Completed (2006-2008)
JICA	Project for capacity development on improving solid waste management through /advanced/innovative technologies Strengthening the capacity of the central government and LGUs through cooperation that contributes to the promotion of the introduction of advanced technologies, including waste-to-energy (target areas: Quezon City, Davao City, and Cebu City)	DENR	End (December 2022)
JICA	Basic research on the market entry potential of the "RECYINT" business model (Basic Research on Private Sector Collaboration, Tsuruoka Corporation) Study on End of Life Vehicle (ELV) Dismantling and Recycling Business (Target Area: Metro Manila)	DENR	Completed (February 2021)

Source: Research Group

(8) Cross-Industry Initiatives (MSMEs Support)

1) Relevant Policies and Plans

In the Philippines, 99.6% of all enterprises are micro, small and medium enterprises (MSMEs), which generate about 40% of GDP and 63% of employment. The classification of micro, small and medium enterprises (MSMEs) under the Magna Carta for Micro, Small and Medium Enterprises is as follows

- Micro Enterprises: Number of employees: 1 to 9; Assets (excluding land assets): less than P3,000,000
- Small Enterprises: Number of employees: 10 to 99; Assets (excluding land assets): P3,000,001 to P15,000,000
- Medium Enterprises: Number of employees: 100-199; Assets (excluding land assets): 15,000,001 PHP to 100,000,000 PHP

MSMEs play a significant role in the Philippine economy, and their involvement is also an important issue in terms of combating climate change.

(a) Go Negosyo Act (RA. 10644)

The law emphasizes the importance of MSMEs in the overall economy with the aim of promoting MSMEs, creating jobs and sustainable development through the promotion of MSMEs. Under this law, the Negosyo Center, an agency of the DTI, was established in each municipality to provide training, marketing, and other support to MSMEs.

(b) Green Economic Development Program (GED)

DTI's Bureau of SME Development (BSMED) is implementing the Green Economic Development (GED) program as part of its efforts to promote MSMEs' response to climate change. It is a training program to raise awareness of the environmental and social impacts of MSMEs' business activities related to the industry in general; its goal is to help MSMEs reduce their impact on climate change and improve their competitiveness while ameliorating environmental degradation through clean strategies. The program began with the technical cooperation project Pro-GED, which was supported by GIZ from 2013 to 2016, and although GIZ's support has now ended, DTI continues to provide human resource development support to SMEs based on the results of that project.

(c) Greening the Philippine Manufacturing Industry Roadmap

A roadmap developed by DTI with GIZ support to develop Philippine manufacturing into a more environmentally friendly industry, to enhance international competitiveness through disaster resilient and environmentally friendly business growth in six priority sectors: automobiles, auto parts, paper, plastics, furniture, and mass housing construction. The roadmap sets out paths and milestones.

(d) Green Public Procurement Roadmap (GPP)

A policy and process for governments to select more environmentally friendly products and services for public procurement. Guidelines that make it easier for government agencies to select more environmentally friendly goods and services by requiring compliance with specific environmental standards and environmental commitments from bidders in bidding documents and contracts.

In terms of MSME support, if MSMEs are able to provide sustainable products and services, it is expected that they will be able to expand their opportunities to enter new markets, introduce technologies and innovations required by the GPP, and acquire certification, thereby strengthening their competitiveness. In promoting the GPP, the Government Procurement Policy Board (GPPB) will be established as a body that will provide financing and support for MSMEs to comply with the GPP and obtain the necessary funds and advice to develop more sustainable businesses.

2) Implementation Status of Climate Change Measures and Identified Issues

Government support for MSMEs is provided through the Negosyo Center, an agency of the DTI set up in each municipality.

The Negosyo Center offers free business counseling and training. During Covid-19 pandemic, it also provided Business Continuity Plan (BCP) training to MSMEs. DTI is also working with the Asian Disaster Preparedness Center (ADPC) to strengthen the resilience of MSMEs through the Asian MSME Disaster Resilience Enhancement Program. The OECD's "Strengthening climate resilience" report also identified the Negosyo Center's role in outreach to MSMEs, including providing training on disaster and climate change risk management.

Although DTI's budget for climate change is not clear because it is not separated from the budget for DTI's core business, industrial human resource development for SMEs on climate change is reportedly allocated about 800,000 PHP per year for the implementation of its training workshops.

Corporate climate change initiatives are largely left to the self-help efforts of companies, with little government support for funding or human resource development. Publicly Listed Companies are making their own efforts to address environmental and climate change issues through the mandatory preparation of sustainability reports by SEC. On the other hand, MSMEs have difficulties in making progress in their efforts due to limited financial resources and their own human resources. Budgetary support from the government is also limited, and assistance needs are huge.

While adaptation measures such as resilience enhancement and business support measures such as business start-up and expansion have been implemented, measures to reduce GHG emissions from businesses implemented by MSMEs have been slow due to human resource and financial constraints. Possible reasons include a limited incentives within companies to encourage energy conservation and the replacement of

equipment with less emission-intensive ones, as well as insufficient access to such technologies. There is also a great need for capacity building not only for MSMEs companies, but also for LGU staff and DTI's Negosyo Center staff, who are in daily contact with MSMEs.

3) Support Needs

Support for human resource development to MSMEs is a challenge in terms of funding for implementation, as DTI's own budget is limited. Financial resources are needed to support climate change mitigation efforts to a broader range of MSMEs. Even if MSMEs are interested in addressing climate change and want transition to more environmentally friendly business practices, they ultimately have to give up in terms of their own financing. Therefore, it is necessary to implement projects that include incentives to attract SMEs and encourage their participation.

Climate change initiatives in the industrial sector depend on the self-help efforts of individual enterprises, especially MSMEs, which account for more than 90% of the total number of enterprises in the Philippines and have made little progress due to a limited human and financial resources for implementation. In addition, the DTI SME Bureau, which supports the efforts of SMEs, has limited funds for its activities, is able to conduct only limited numbers of seminars for MSMEs per year nationwide, and does not provide financial assistance to SMEs for equipment installation.

Therefore, human resource development support for MSMEs should be provided in conjunction with DTI's Green Economic Development (GED) program to build climate-smart business models and the necessary climate change action plans (e.g., use of renewable electricity, energy-efficient equipment and low-carbon transportation). The GED program needs to strengthen the capacity of MSMEs to develop climate-smart business models and the necessary climate change action plans (e.g., use of renewable electricity, conversion to energy efficient equipment and low-carbon transportation). In conjunction with this, it is important to consider a financing process, including a JICA two-step loan, for the implementation of climate change action plans developed by MSMEs.

4) Status of Donor Support

Table 2-65 Status of Donor Cooperation Projects (SME Support)

Cooperation Partners	Project Name and Description	Implementing agency	Status of implementation
GIZ	Provides training and matchmaking for PROMOTION OF GREEN ECONOMIC DEVELOPMENT projects, technical cooperation, for MSMEs (GIZ support has now ended, but DTI is implementing its own projects.)	DTI	2013-2016

Source: JICA Survey Team

Table 2-66 Identified issues (industry sector)

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
Cement industry	<ul style="list-style-type: none"> Looking at the GHG emissions of the Philippine industrial sector in 2020, 16.772 MtCO₂e, or 8.2% of the country's total GHG emissions, referred to IPPU(industrial processes and product use) sector data of GHG inventory. The implementation of climate change measures in the industrial sector is left to the self-help efforts of industries and companies, with weak incentives or mandates for implementation based on policies and regulations. Listed companies are obligated to prepare Sustainability Reports by the Securities and Exchange Commission (SEC), but are not required to promote climate change action. The Cement industry is responsible for 6.477 MtCO₂e, 77% of the industrial sector's emissions referred to data of 2010 GHG inventory. 	<p>NDC PaMs (DENR)</p> <ul style="list-style-type: none"> Use of alternative fuels and raw materials (waste and biomass) in the Cement co-firing process Installation of Waste Heat Recovery (WHR) facilities at a cement plant <p>DENR DAO 2010-006 Guidelines for the Use of Alternative Fuels and Raw Materials in Cement Kilns.</p> <ul style="list-style-type: none"> Regulations on waste acceptance and emission standards to be followed in co-processing of alternative fuels and raw materials (AFR) for clinker for cement production, as well as on waste delivery management and documentation and reporting procedures. 	<p>Use of alternative fuels and raw materials</p> <ul style="list-style-type: none"> In the Philippine Cement industry, the 4 leading companies are engaged in the use of alternative fuels and raw materials in the cement production process and plan to expand the scale of their use in the future. Other than the 4 major companies mentioned above, medium-sized companies (25% of the total of 12 companies in terms of cement production capacity) have not made progress in their efforts. <p>Waste heat recovery measures</p> <ul style="list-style-type: none"> Most companies have not made progress on waste heat recovery measures. A 6 MW waste heat recovery facility is planned to be installed at a major Republic Cement company with a JCM equipment subsidy in 2023. <p>Blended cement use</p> <ul style="list-style-type: none"> While blends cement with lower GHG emissions are increasingly used in private projects, utilities are limited in their use of blended cement because DPWH will not allow the use of blended cement with a loss on combustion (LOI) of 8.0. 	<p>[Finance]</p> <p>Delayed introduction of alternative fuels and raw materials (AFR) utilization and waste heat recovery in the cement industry</p> <ul style="list-style-type: none"> Low profitability of AFR (alternative fuels and raw materials) utilization and waste heat recovery (WHR) measures in the Cement industry discouraging companies from investing Both AFR (alternative fuels and raw materials) utilization and waste heat recovery (WHR) measures have long payback periods of 5 years or more and low economic feasibility, so the short-term commercial benefits are small, and medium-sized companies that do not have significant financial strength do not make investment decisions. Furthermore, medium-sized enterprises need to further improve experience and knowledge in introducing countermeasure technologies, and it causes them to hesitate to invest in countermeasures in combined with the low economic feasibility mentioned above. <p>[Institution]</p> <p>Negative Impact on the Blended Cement Market Due to Inconsistencies in DPWH Bluebook and Philippine National Standards (PNS) Standards on Blended Cement</p> <ul style="list-style-type: none"> The long-running debate between DPWH and the Philippine National Standards has prevented its use in public works projects and has caused the Cement industry to second-guess the expansion of production of blended cement, which has lower GHG emissions. 	<p>Feasibility study on AFR utilization and waste heat recovery in the Cement industry (technical cooperation)</p> <ul style="list-style-type: none"> AFR (alternative fuels and raw materials) utilization feasibility study (including AFR database creation) Feasibility study on introduction of waste heat recovery <p>Assistance in collecting technical information on blended cement</p>
Iron and Steel industry	<ul style="list-style-type: none"> The Iron and Steel industry, with 1.093 MtCO₂e, accounts for 13% of the industrial sector's emissions referred to data of 2010 GHG inventory. 	<p>NDC PaMs (DENR)</p> <ul style="list-style-type: none"> Reducing GHG emissions from the iron and Steel industry 	<p>Waste heat recovery measures</p> <ul style="list-style-type: none"> The Iron and Steel industry is engaged in the business of melting imported semi-finished steel products and steel scrap collected domestically and processing them into finished products in electric arc furnaces and industrial furnaces, so it is important to take measures to reduce energy used in furnaces. Efforts to reduce CO₂ emissions have begun, including the introduction of technology to automatically optimize the mixing ratio of air and fuel in industrial furnaces to reduce fuel consumption, and waste heat recovery technology to reduce electricity consumption by preheating semi-finished steel products and steel scrap to be fed into electric arc furnaces using waste heat from the furnace, but the use of this technology is limited to major companies. 	<p>[Finance]</p> <p>Delayed measures to replace energy-efficient equipment in the Iron and Steel industry</p> <ul style="list-style-type: none"> Low profitability of measures to replace energy-efficient equipment in the steel industry discourages companies from investing. The introduction of waste heat recovery technology, in particular, requires a large initial capital investment, but the long payback period of more than 5 years (7-10 years) and low economic feasibility prevent companies from making investment decisions due to the small short-term commercial benefits. Furthermore, companies need to further improve experience and knowledge in introducing countermeasure technologies, which causes them to hesitate to invest in countermeasures in combined with the low economic feasibility. 	<p>Feasibility study on introduction of energy reduction measures in the Iron and Steel industry (technical cooperation)</p> <ul style="list-style-type: none"> Feasibility Study on Introduction of Waste Heat Recovery

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
Refrigeration and Air Conditioning (RAC) Industry	<ul style="list-style-type: none"> The RAC industry, with 0.771 MtCO_{2e}, accounts for 9% of the industrial sector's emissions referred to data of 2010 GHG inventory. 	<p>NDC PaMs (DENR)</p> <ul style="list-style-type: none"> Transition to Low Global Warming Potential (GWP) Alternative Refrigerants in the Refrigeration and Air Conditioning (RAC) Industry <p>Kigali Amendment to the Montreal Protocol</p> <ul style="list-style-type: none"> Reduce HFC consumption by 80% over 20 years. Introduction of measures to encourage the industrial sector to shift to alternatives with lower global warming impacts. <p>Chemical Control Order for Hydrofluorocarbons (HFCs), DAO No. 2021-31</p> <ul style="list-style-type: none"> Proper handling of refrigerant during inspection work Require proper recovery and treatment of refrigerants emitted from discarded refrigeration and cooling equipment 	<p>Use of low global warming potential (GWP) refrigerants</p> <ul style="list-style-type: none"> In accordance with regulations under the Montreal Protocol, imports of HCFC refrigerants are already prohibited. The refrigerator industry is shifting to R600a (isobutane, GWP: about 3), a natural refrigerant with low GWP, which is reducing GHG emissions. In the air conditioner industry, domestic companies have already switched from HCFC to HFC using government subsidies. On the other hand, the transition from HFCs to R290 (propane, GWP : 2 or less), a natural refrigerant with low GWP, has not progressed. <p>Recovery and disposal of Fluorocarbon gases from air conditioners</p> <ul style="list-style-type: none"> Although HFC chemical control orders prohibit the emission of Fluorocarbon gases, little is done to recover and process the Fluorocarbon gases. A large percentage of the informal sector services refrigerators and air conditioners because they are inexpensive and fast, and they exhaust gases without recovering it because they do not have the proper equipment. Currently, only one company has been granted license to recover and store Fluorocarbon gases, but the conditions required of companies, such as already owning the necessary fluorocarbon gases recovery and storage equipment and having personnel with fluorocarbon gases recovery technology, are strict in terms of quality and reliability, according to the report. <p>Construction of a Fluorocarbon gases destruction treatment facility</p> <ul style="list-style-type: none"> Very little destruction of Fluorocarbon gases is done because the gases are not collected for processing. DENR's current approach is to use cement kilns of cement companies as Fluorocarbon gases destruction facilities because the system for recovering Fluorocarbon gases has not yet been established. However, if the amount of Fluorocarbon gases recovered increases in the future, a dedicated Fluorocarbon gases destruction facility will be required. 	<p>[Finance]</p> <ul style="list-style-type: none"> Delayed measures to use low global warming potential (GWP) refrigerants in the RAC industry Low profitability of low global warming potential (GWP) refrigerant measures in the RAC industry discourages companies from investing. In the air conditioning industry, the use of the natural refrigerant R290 requires changes to the current HFC refrigerant production line, which requires new investments. Furthermore, since natural refrigerants must be imported from overseas, the cost of procuring refrigerants rises and the profitability of air conditioner sales declines, causing companies to make poor investment decisions. <p>[Capacity Building]</p> <ul style="list-style-type: none"> Lack of registered companies for Fluorocarbon gases recovery and treatment The number of companies registered for Fluorocarbon gases recovery has not increased due to the low profitability of Fluorocarbon gases recovery operations and the strict requirements for registration. <p>[Capacity Building]</p> <ul style="list-style-type: none"> Lack of experience and competence of Department of Environment and Natural Resources staff in selecting technologies for Fluorocarbon gases destruction treatment facilities and operating the facilities Need to further improve the experience and competence of staff in the selection of technologies for Fluorocarbon gases destruction treatment facilities and facility operation Considering local residents' awareness of the safety of incinerating large quantities of Fluorocarbon gases in a single location, DENR believes that a non-incineration method is preferable. There is a concern that DENR staff lacks experience and ability in selecting appropriate technologies for Fluorocarbon gases destruction treatment, including other technology options than the non-incineration method, and in operating the facility after installation. 	<p>RAC Industry Low Global Warming Potential (GWP) Refrigerant Utilization Promotion System Development Study Project (Short-term Expert Dispatch)</p> <ul style="list-style-type: none"> Consideration of preferential treatment for R290 import duties. Consideration of a subsidy program for the renovation of production lines to comply with R290 <p>Technical training for private companies on appropriate Fluorocarbon gases recovery and treatment (technical cooperation)</p> <ul style="list-style-type: none"> Examination of issues on the low profitability of Fluorocarbon gas recovery services, and the significant dependence of consumers on the informal sector Conducting awareness campaign on relevant regulations Reexamination of registration requirements for Fluorocarbon gases recovery companies Fluorocarbon gases recovery procedure manual preparation Fluorocarbon gases recovery training Consideration of economic incentives for registered companies <p>Assistance in selecting technologies for Fluorocarbon gases destruction treatment facilities</p>
Petrochemical industry	<ul style="list-style-type: none"> The Petrochemical industry, with 0.019 MtCO_{2e}, accounts for less than 1% of the industrial sector's emissions referred to data of 2010 GHG inventory. 	<p>NDC PaMs (DENR)</p> <ul style="list-style-type: none"> Use of bio naphtha as a feedstock in ethylene production 	<p>Use of bio-naphtha</p> <ul style="list-style-type: none"> Since naphtha of fossil fuel origin is used, CO₂ is emitted during the cracking process. Although NDC has set a goal of reducing CO₂ emissions by using naphtha of plant origin, the use of bio naphtha has not progressed at all. 	<p>[Finance]</p> <ul style="list-style-type: none"> Delayed measures to utilize bio naphtha in the Petrochemical industry Low profitability of bio naphtha utilization measures in the petrochemical industry discouraging companies from investing Since bio naphtha is produced by only a few companies in the world (e.g., Neste) and all of them import it from overseas, the price of 	<p>Project to study the establishment of a system to promote the use of bio naphtha in the petrochemical industry (short-term dispatch of experts)</p> <ul style="list-style-type: none"> Consideration of preferential treatment for bio naphtha import duties

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
				<p>bio naphtha is two to three times higher than that of naphtha originating from fossil fuels, which increases procurement costs and reduces the profitability of companies, causing them to make poor investment decisions</p>	
EV Industry	<p>- The transportation sector is a major source of GHG emissions with the transportation sector accounting for 14.4% (29.431MtCO₂e) of total emissions in the GHG inventory in 2020</p> <p>- The transportation sector is a major source of air pollution, estimated by the World Bank and³⁷ to be responsible for \$23 billion in losses, or 6% of GDP. Electrification of public transport vehicles (PUVs) such as jeepneys and buses would lead to health cost savings of \$0.0004/person-kilometer</p> <p>- Electrification of public transportation vehicles is considered to be the most GHG-reducing measure compared to the introduction of mass transit such as trains, etc. It is estimated that if 90% of public transportation vehicles and 72% of general vehicles are electrified, the current power source mix will be 450MtCO₂e by 2050.</p>	<p>RA. 11697, The Electric Vehicle Industry Development Act (EVIDA)</p> <ul style="list-style-type: none"> ➢ Regulates EV manufacturing, use, transactions, etc. ➢ Various measures to promote EV use (exempting EVs from license plate number coding, requiring new facilities, etc. to install EV-only parking lots and charging stations, etc.) <p>Comprehensive Roadmap for the Electric Vehicle Industry (CREVI)</p> <ul style="list-style-type: none"> ➢ Roadmap to 2040 for EV Industry Promotion ➢ Aim to make EVs an export industry by 2040 in conjunction with domestic diffusion and industry promotion <p>Public Utility Vehicle Modernization Program PUVMP (DOTr Department Order No. 2017-011)</p> <ul style="list-style-type: none"> ➢ Various measures to convert PUVs (jeepneys, tricycles, buses, etc.) in use for more than 15 years to vehicles that meet Euro 4 standards or EVs ➢ Forming jeepney cooperative, providing loans for replacement funds, proper routing of PUVs, proper recycling and disposal of end-of-life vehicles, etc. <p>Guidelines on the Accreditation of Electric Vehicle Charging Stations Providers and Registrations of Electric Vehicle Charging Stations Pursuant to the Electric Vehicle Industry Development Act, DOE Department Order No. 2023-05-0011</p> <ul style="list-style-type: none"> ➢ Provides the procedure and requirements on the accreditation of EVCS providers and EVCS registration per location ➢ Set the rules on the safe operation and utilization of EVCS in compliance with existing building codes and regulation <p>Guidelines for the Electric Vehicle Recognition and Adoption of EV Standard Classification on Road Transport for Incentive Eligibility Pursuant to the Electric Vehicle Industry Development Act, DOE Department Order No. 2023-05-0012</p>	<ul style="list-style-type: none"> ➢ DOTr has been implementing a PUV modernization program since 2017 to encourage the conversion of PUVs that have been in use for more than 15 years with high GHG emissions to newer jeepneys or e-jeepneys that use more environmentally friendly engines. ➢ The Philippine government has enacted the EVIDA Act of 2022, which establishes regulations for the manufacture and use of EVs and promotes the EV industry as a whole. ➢ CREVI, the roadmap established based on EVIDA, sets a goal of 50% of the domestic fleet to be EVs by 2040, and stipulates the development of charging stations, incentives for EV introduction, and training of technical personnel. ➢ CREVI has established a clean energy scenario in which 50% of all vehicles will be EVs by 2040, with a goal of 2.45 million EV vehicles by 2028, 1.85 million by 2034, and more than 2 million by 2040, including private cars, public transport vehicles, and motorcycles. It also mandates that public transportation operators and LGU to convert 5% of their vehicles in use to EV by 2034 and 10% by 2040. <p>EVs and EV parts are being exempted from custom duty for 5 years in order to promote EVs</p>	<p>The absence of a homologation system for EVs that can be produced in the Philippines, such as E-Jeepneys, E-tricycles, and E-bikes</p> <ul style="list-style-type: none"> (1) Prices are not stable as mass production is not carried out (2) Vehicles using unsafe parts (especially batteries) are on the road without any kind of inspection. (3) It is essential to establish standards and certification systems to convert the entire EV industry, including e-jeepneys, into an export industry by 2040. <p>Difficulty in financial access</p> <ul style="list-style-type: none"> ➢ Many of the jeepney operators are family-owned businesses with high barriers to replacement, such as difficulty in obtaining loans from banks. ➢ Difficulty in accessing finance by EV parts manufacturer/EVCS companies. Delay in expanding EVCS is obstacle for the wider dissemination of EVs <p>Possible adverse effect of tax policy on domestic industry and FDI</p> <ul style="list-style-type: none"> ➢ Tax exemptions/tax reductions for EV vehicles and components have been implemented for a limited time, providing a foothold for widespread adoption, but there are also concerns about the possible decline in domestic industry and the withdrawal of FDI plans. 	<ul style="list-style-type: none"> - Technical cooperation to establish homologation system for E-jeepneys, which is a high priority among EV models for which no manufacturing standards or certification system exists. - Low-interest loans for jeepney cooperatives and PUV operators for purchasing E-PUV - Low-interest loans for capital investment for EV manufacturers/EVCS companies - Study on the impact of EV tariffs policy on domestic industry

³⁷ <https://openknowledge.worldbank.org/entities/publication/3f76cedd-4ab6-5250-ab4e-75f39593f1b3>

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
		<ul style="list-style-type: none"> ➤ Mandates the DOE to recognize EV to provide the public with the correct information in the determination of EVs that may be eligible for EVIDA incentives Customs Modernization and Tariff Act, Executive Order No.12, S.2023 ➤ To cut the tariff rates on certain EVs except for HEVs, for a period of 5 years 			
Product Waste Management	<ul style="list-style-type: none"> - Waste accounts for 14.7% of the country's total GHG emissions in 2020 (30.122 MtCO₂e) and improper disposal is a factor in GHG emissions - It is estimated that 50% of the waste generated in the Philippines is biodegradable and 30% is recyclable. - Currently, the recycling rate for plastics in Philippines is estimated at 9%, and other plastics are either landfilled or illegally disposed of, posing a threat to the environment. 	<ul style="list-style-type: none"> Ecological Solid Waste Management Act (RA 9003) <ul style="list-style-type: none"> ➤ Basic law for solid waste management. Non-hazardous industrial wastes are regulated by this law. Extended Producer Responsibility Act/EPR Act of 2022, RA 11898 <ul style="list-style-type: none"> ➤ Producers (producers of products with total assets of 100 million PHP or more that generate plastic packaging waste) assume certain responsibilities for the environmental impact of their products throughout their life cycle (raw material selection, manufacturing process, use and disposal) 	<ul style="list-style-type: none"> - The EPR Law was passed in July 2022. Companies are obligated to recover plastics used in the package of their products by setting up commercial and factory-scale recycling, thermal processing, and disposal facilities, and by using schemes such as plastic waste recovery through partnerships with LGU, processors, and others. The targets set are 20% of the previous year's use by the end of 2023, 40% by the end of 2024, and ultimately 80% by 2028 - The EPR also requires each company to develop an EPR plan and register it with the National Ecology Center by the end of February 2023, but as of November 2023, only 709 of the 4,000 companies had submitted their EPR plans. - WWF's 2019 report states that the recycling rate for plastics is only 9%. In any case, this is a low recycling rate compared to neighboring countries in ASEAN. - Little sorting is done except for high value-added high density polyethylene (HDPE, tanks and containers, etc.), polypropylene (PP, food containers, etc.), and polyethylene terephthalate (PET, plastic bottles, magnetic tape, etc.). 	<ul style="list-style-type: none"> - No overall waste segregation or recycling system has been established. - While policies are being put in place, the actual collection, proper treatment, and reuse of waste remain a challenge. In addition, although each LGU is responsible for waste management, the majority of responsibility is actually left to the informal sector, which the World Bank estimates at over 100,000 people involved in informal waste management. - No penalties for illegal dumping or improper disposal and limited compliance - High cost of transportation in island countries, need to take measures in areas without waste disposal capacity 	<ul style="list-style-type: none"> - Project for Strengthening Capacity for Policy Formulation to Foster the Recycling Industry (Technical Assistance) - Training, directories creation and matching programs (technical cooperation) for vendors who recycle. - Financial assistance for recycling industry (yen loan)
MSMEs Support	<ul style="list-style-type: none"> - Calculating emissions solely by MSMEs is difficult, but given that they represent 99.6% of Philippine businesses, generate 40% of GDP, and engage 63% of the workforce, climate change action in MSMEs has a significant impact, both in terms of mitigation and adaptation. - The Philippines, which is prone to natural disasters, has been taking measures in the area of adaptation, such as strengthening disaster response capabilities and creating business plans for emergencies. However, considering exports to Europe and other countries that are working to reduce carbon emissions throughout the supply chain, adopting lower-emission manufacturing processes and business practices will also enhance international competitiveness. 	<ul style="list-style-type: none"> Magna Carta for Micro, Small and Medium Enterprises (RA. 6977, amended by RA. 8289, amended by RA. 9501) <ul style="list-style-type: none"> ➤ Laws aimed at promoting small and medium-sized enterprises and creating an enabling environment for growth. Green Economic Development Program (GED) <ul style="list-style-type: none"> ➤ Training programs for SMEs to improve their competitiveness through clean strategies Greening the Philippine Manufacturing Industry Roadmap <ul style="list-style-type: none"> ➤ A Roadmap for Developing a Greener Manufacturing industry in the Philippines 	<ul style="list-style-type: none"> - Government support for small and medium-sized enterprises is provided through the Negosyo Center, an agency of the DTI set up in each municipality. - The Negosyo Center offers free business counseling and training. Under Covid-19 pandemic, it also provided Business Continuity Plan (BCP) training to MSMEs. DTI is also working with the Asian Disaster Preparedness Center (ADPC) to strengthen the resilience of MSMEs through the Asian MSME Disaster Resilience Enhancement Program. 	<ul style="list-style-type: none"> - Limited budget from the government results in limited training and support - While adaptation measures such as resilience enhancement, BCPs creation and other business support measures are being implemented, efforts for mitigation measures are considered insufficient. - There is also limited incentives for MSMEs to adopt energy-saving technologies and purchase equipment, and insufficient access to technology and information about it. 	<ul style="list-style-type: none"> - Capacity building project for the introduction of green technologies for MSMEs and Negosyo Center staff (technical assistance) - Conduct training/workshops for MSMEs and Negosyo Center staff on green technology options, power saving benefits, etc. - Business matching with green technology companies - Low-interest loans (yen loans) for capital investment for green technology

Source: JICA Survey Team

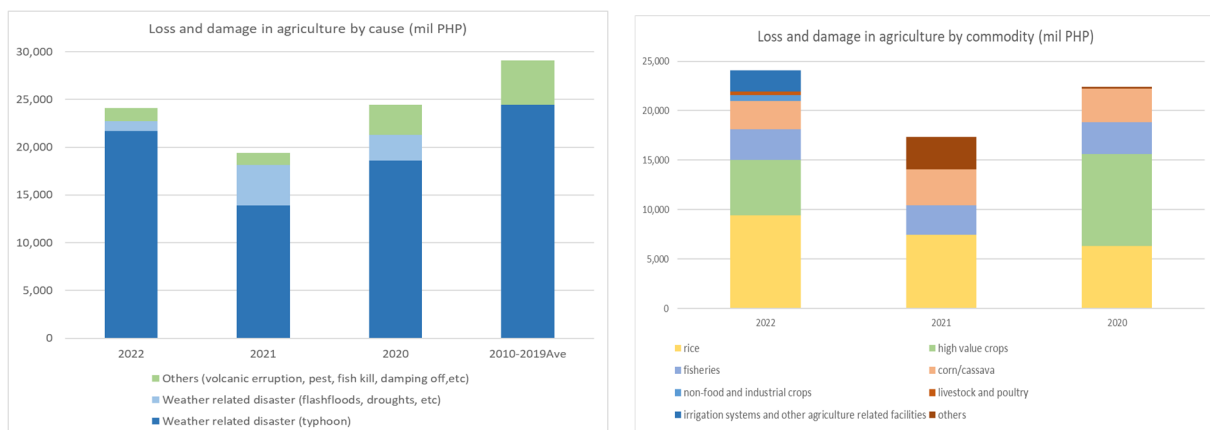
2.2.7 Agriculture

(1) Sector Landscape

1) Sector status and climate change impacts

According to the Philippine Statistics Authority (PSA), the contribution of the agriculture sector to the country's GDP was 8.9%, or PHP 1,783 billion in 2022. Gross Value Added (GVA) in agriculture and fishing consists of crops sub-sector (51.9%), Livestock and poultry subsector (21%), fisheries (12.1%) and other support activities including other animal production (15.2%). While the full-year GDP growth for 2022 reached 7.6%, surpassing the target range of 6.5%-7.5% which is almost same level prior to the pandemic, however, the growth of the agri-fishery sector was hindered, reaching a rate of 0.5%. This can be attributed to the sector's vulnerability to natural disasters and the escalating costs of inputs.³⁸

In the Philippines, extreme weather event such as typhoons, heavy rains, floods, and El Niño-associated drought resulted in catastrophic disasters, causing the greatest damage borne largely by the agriculture and fisheries sectors. Typhoons and other climate-related disasters accounted for more than 80% of total losses over the past decade. In 2022, the rice subsector incurred the highest losses, amounting to PHP 9.42 billion or 39.1%. This was followed by high-value crops at 23.2%, and fisheries at 12.9%. Furthermore, there were reported damages worth PHP 2.16 billion (9.0%) to irrigation systems and other agricultural facilities, machinery and equipment.



Source: JST based on DA annual report 2019-2022

Figure 2-40 Loss and damage in Agriculture by cause and commodity

The number of persons who were employed in agriculture in 2019 is around 9.72 million. Agriculture and fisheries employment share is down to 22.9% in 2019 from a high of 43.4% in 1995.

The average daily basic payment and labor productivity³⁹ for agricultural workers are significantly lower than what workers in the industry and services sectors are receiving. Farmers and fisherfolk are also posting

³⁸ DA 2022 Annual Report

³⁹ Gross Domestic Product at constant 2000 prices divided by total employed.

the highest poverty among the basic sectors. The poor are one the most vulnerable to climate change as they have lower coping capacity, tend to live in cheaper and riskier areas, have fewer safety nets, and often depend on disaster-vulnerable livelihoods such as agriculture and fishing.

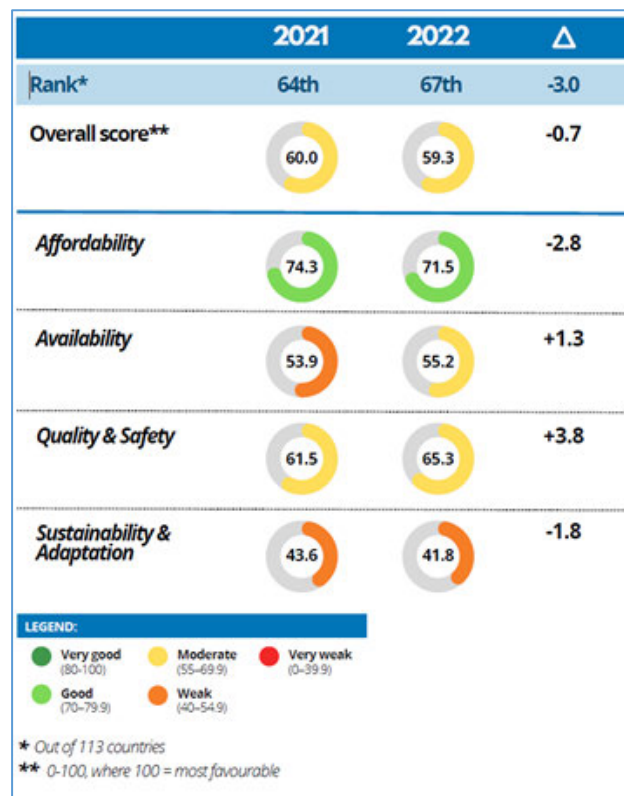
Table 2-67 Average daily basic payment, labor productivity and poverty incidence by sector

	Industry	Service	Agriculture
Average Daily Basic Pay	PhP411.47	PhP499.75	PhP237.38
Labor Productivity	PhP400,567	PhP228,134	PhP74,593
Poverty Incidence	16.7% (National)		31.6 (Farmer) 26.2% (Fisher fork)

Source: JST based on DA annual report 2019

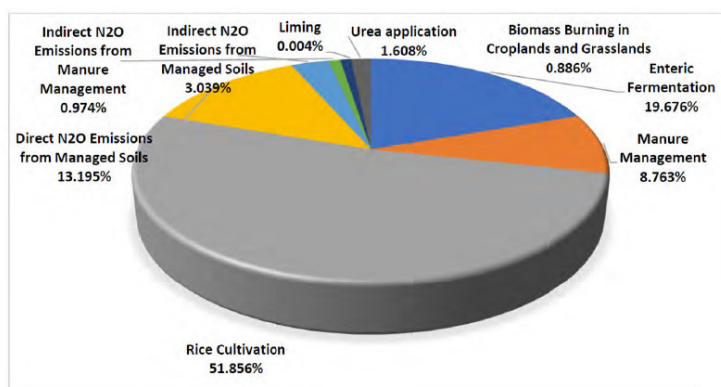
The Philippines ranked 67th out of 113 countries in the 2022 edition of the Global Food Security Index (GFSI) based on the four pillars of food security: (1) food affordability; (2) availability; (3) quality and safety; and (4) sustainability and adaption. The country's weakest performance is observed in the sustainability and adaptation pillars, primarily due to exposure risks related to agricultural water supply, land degradation, and threats to marine biodiversity. The overall category score is still considered weak or moderate although there have been improvements attributed to increased political commitment, enhanced disaster risk management, and the implementation of environmental-economic accounting measures and disaster risk reduction strategies at both national and local levels.

Table 2-68 Food security of the Philippines



Source: DA annual report 2022

As for GHG emissions in the agriculture sector, 54.08 Mt-CO₂e was emitted by the sector in 2020, making it the second-largest emitting sector in the national GHG inventory. According to the 2010 GHG Inventory Report, which provides a detailed breakdown, GHG emissions from rice cultivation account for more than half, followed by emissions from livestock such as livestock rumination and manure management, which account for about 30%.



Source: DA

Figure 2-41 Philippines National GHG Inventory 2010 (Agriculture sector)

2) Climate change impacts in the agriculture sector

Climate change will affect the Agriculture and Fishry sector in the Phillipines. Key indicators of climate change impact are shown in the table below.

Table 2-69 Key climate change impact (Agriculture Sector)

Climate Change Impact	Key points of the predicted climate change impact
Declining crop yields	Grain yield decreased by at least 10% for each 1°C increase in growing-season minimum temperature in the dry season.
Fish catch potential	By the years 2051 to 2060, the maximum fish catch potential of Philippine seas will decrease by as much as 50% compared to 2001-2010 levels.
Coral loss	Around 98 percent of coral reefs in Southeast Asia will die by 2050, practically an extinction by the end of the century, if current global warming trends continue. It will affect the livelihood of fishermen who use coral reefs as fishing grounds.
Water scarcity	The Philippines will experience a 'high' degree of water shortage by the year 2040. The the agriculture sector will bear the brunt of the water shortage.
Higher sea level rise	Observed sea level rise is remarkably highest at 60 centimeters in the Philippines, about three times that of the global average of 19 centimeters. This puts at risk 60% of LGUs, and an estimated 13.6 million Filipinos who would need relocation.
More intense droughts	Significant increase in number of farmers directly affected by El Niño-associated drought and dry spells, causing serious income and livelihood losses.
Labor productivity declined	Climate change-induced heat in the workplace is projected to render 1% loss in working hours by 2025, 2% by 2050, and 4% by 2085

Climate Change Impact	Key points of the predicted climate change impact
Emergence of more infectious animal and plant diseases and pests	Climate change is triggering effects on the incidence and severity of animal and plant diseases and pests.
Poorest farming and fishing communities could be plunged further into poverty	With climate change and disasters, the causes and consequences of poverty will worsen. Inequality will deepen as agriculture is inherently vulnerable to climate change. It will become more common that farmers and fisherfolk are farthest away from recovery, every after a climatic disaster.
More public health emergencies	Higher temperatures also trigger the surge of diseases such as dengue, malaria, cholera, and typhoid.
More women endangered and killed	Climate-sensitive and gender-specific health impacts affect women disproportionately than men. The impacts of natural hazards such as droughts, floods, and storms affect more women than men, and tend to affect women at a younger age.

Source: National Agriculture and Fisheries Modernization and Industrialization Plan 2021-2030

3) General challenge of the agriculture sector

The JICA experts who were dispatched to the Department of Agriculture from 2018 to 2020 and from 2021-2022 pointed out the current status and challenges of the Philippine agricultural sector.

Low productivity and high price of rice, resulting in increased rice imports. Delays in mechanization and high prices of production materials.

Government measures are too focused on supporting rice cultivation, and support for other crops is insufficient.

In vegetable production, production of high quality products is insufficient and unstable. In addition, the quality maintenance system is inadequate and the distribution system is inefficient.

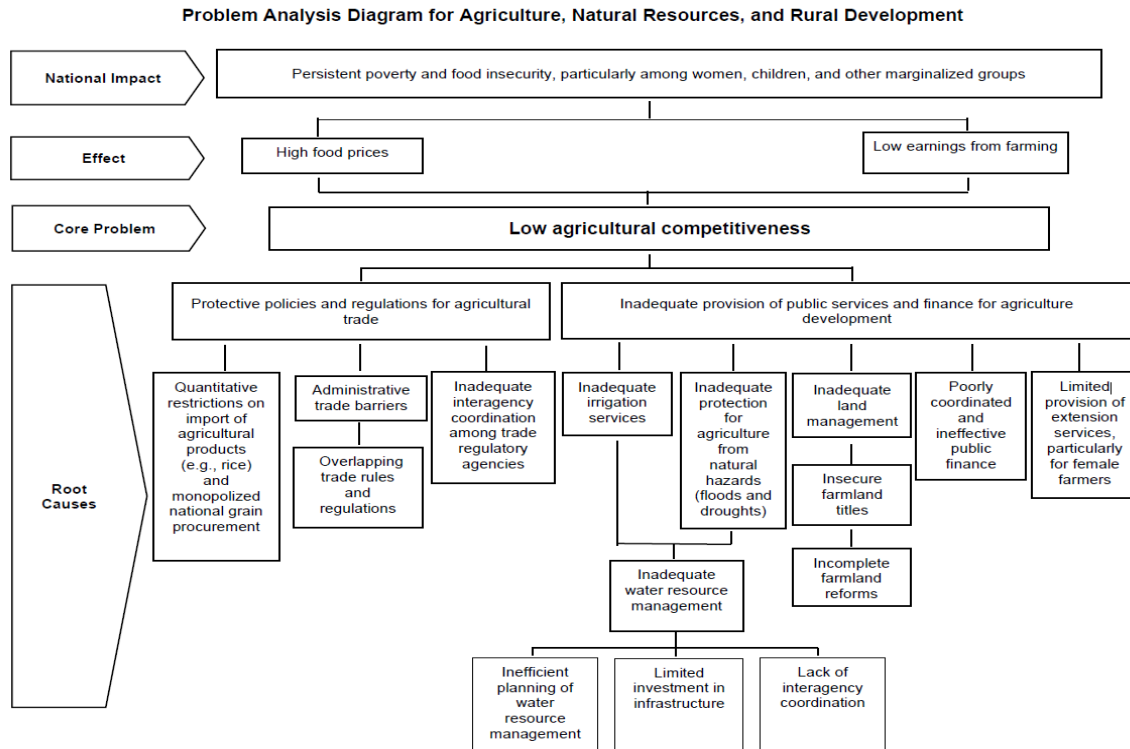
The sophistication of production, processing, and distribution through collaboration with private companies has not progressed.

Sluggish productivity (9.7% of GDP in 2016). In recent years, the labor force in the agricultural sector has flowed to the more productive service sector. Agricultural workers are aging, and the labor force in the sector is becoming tighter.

70% of the poor are concentrated in rural areas, and it is a big challenge to improve agricultural productivity and farmers' income.

Furthermore, in Japan's Country Cooperation Policy for the Republic of the Philippines in April 2018, "Ensuring human security for inclusive growth" is positioned as a priority objective, and "Improving agricultural productivity and high value-added" has been set as a sub-goal for development issues, and the response policies include mechanization and modernization of agriculture, improvement of agricultural product distribution, effective use of existing irrigation facilities, farming guidance and capacity building for farmers, improvement of financial access. Agribusiness is cited as a measure to deal with the risk of income loss due to climate change, etc., and as a measure to increase non-agricultural income in rural areas.

Analysis of issues in this sector has also been carried out by other donors, and ADB identifies the “low competitiveness of Philippine agriculture” as a core problem, and analyzes the causes as follows.



Source: ADB Sector assessment Summary⁴⁰

4) Stakeholder Analysis

Stakeholders in the Philippine agricultural sector are shown below. Stakeholders in the sub-sectors are described in the following sub-sectors.

Table 2-70 Stakeholders in the Agriculture Sector

Policy making	Technological development	Implementation of countermeasures	Funding
<ul style="list-style-type: none"> DA central offices LGUs 	<ul style="list-style-type: none"> DA central offices DA Regional Field Offices (RFOs) DA Institutions DOST LGUs Universities Private 	<ul style="list-style-type: none"> DA RFOs LGUs Farmers group Fisherfolks Private NGO 	<ul style="list-style-type: none"> Public Banks Private Banks Donors

Source: JICA Survey Team

⁴⁰ Competitive and Inclusive Agriculture Development Program

The Department of Agriculture (DA) is the government agency responsible for the promotion of agricultural development by providing the policy framework, public investments, and support services.

It is the mission of DA to help and empower the farming and fishing communities and the private sector to produce enough, accessible, and affordable, safe, and nutritious food for every Filipino and a decent income for all. DA central offices are responsible for making policies and standards and DA RFOs are responsible for implementation.

Based on the LGC/RA7160 (1991), decentralization is progressing through the transfer of authority from the central government to local governments (LGUs), and LGUs are responsible for agricultural and fisheries guidance and regulation, on-site research, procurement and distribution of seeds and seedlings, and management of irrigations, support for fisherforks, and construction and maintenance of public works infrastructure using local funds.

Agricultural technology development is being carried out by each department of the central organization of the Department of Agriculture, attached organizations, local organizations, and LGUs. Research and development is also underway at universities using the budget of the Department of Science and Technology (DOST). LGUs are in charge of providing technical guidance to farmers and fisherforks on the ground using the developed technology, but DA RFOs are also providing support.

Government and private financial institutions also offer a variety of insurance and loan programs to small farmers and Agri businesses.

This section summarizes the collected information regarding climate change countermeasures in the agriculture sector, including the following five subsectors: common sectoral matters, crop production, irrigation development, fisheries, and livestock industries.

(2) Common Issues

1) Relevant policies and plans

The policies and plans relevant to climate change in the agriculture and fishery sector are as follows.

(a) Philippine Development Plan (2023-2028)

The plan pursues a whole-of-society approach in modernizing agriculture and agribusiness, emphasizing the crucial role of both the government and private sector in enhancing the efficiency of Agriculture, Forest and Fisheries (AFF) production, expanding access to markets and AFF-based enterprises, and improving the resilience of AFF value chains. This will be complemented with strategies to strengthen agricultural institutions that will enable the modernization of the country's agriculture and agribusiness. As of Climate Change countermeasure, the outcome 3 "Resilience of AFF value chains improved" includes the following activities.

- Create and adopt climate- and disaster-resilient technologies
- Strengthen local food systems
- Develop and mainstream early warning systems/anticipatory mechanisms
- Integrate climate and disaster risks in AFF planning and programming
- Develop innovative insurance schemes
- Boost local capability on the production of AFF inputs

(b) National Climate Change Action Plan (NCCAP) (2011- 2028)

The national strategic priority for food security is to ensure safe and healthy food, stability, accessibility, affordability amidst climate change and it will focus on the following two immediate outcomes.

- Enhanced climate change resilience of agriculture and fisheries production and distribution systems
- Enhanced resilience of agricultural and fishing communities in the midst of climate change

The outcomes and activities planned for the two short term objectives are shown below.

Table 2-71 Outcomes, outputs and activities in NCCAP (food security)

Immediate outcome 1: Enhanced climate change resilience of agriculture and fisheries production and distribution systems	
Output Area 1 Enhanced knowledge on the vulnerability of agriculture and fisheries to the impacts of climate change.	Activity 1 Enhance site –specific knowledge on the vulnerability of agriculture and fisheries to the impacts of climate change.
	Activity 2 Conduct researches and disseminate knowledge and technologies on climate change adaptation to reduce vulnerability of the sector to climate change
	Activity 3 Establish knowledge management on climate change information for agriculture and fisheries
Output Area 2 Climate-sensitive agriculture and fisheries policies, plans and program formulated.	Activity 1 Integrate and harmonize climate change actions and Disaster Risk Reduction (DRR) in national and local agriculture and fisheries policies and plans, including the Philippine Development Plan
	Activity 2 Scale up implementation of best practices
	Activity 3 Monitor and evaluate implementation of climate change actions and DRR plans in agriculture
Immediate outcome 2: Enhanced resilience of agricultural and fishing communities in the midst of climate change	
Output Area 1 Enhanced capacity for climate change actions and DRR of government, farming and fishing communities and industry.	Activity 1 Build the capacity of farming and fishing communities on adaptation and DRR
	Activity 2 Integrate climate change actions and DRR in agriculture and fishery curricula and training programs
Output Area 2 Enhanced social protection for farming and fishing communities.	Activity 1 Implement risk transfer and social protection mechanisms for agriculture and fishery

Source: JST based on Annex-A of the National Climate Change Action Plan 2011-2028

(c) National Agriculture and Fisheries Modernization and Industrialization Plan (NAFMIP) (2021-2030)

NAFMIP 2021-2030, as a whole-of-nation plan, serves as a Directional Plan to steer sector-wide growth over the next decade. It guides the trajectory of more detailed and operations-oriented agri-fishery development plans such as the commodity system roadmaps, Provincial Commodity Investment Plans (PCIPs), and Comprehensive Land Use Plans (CLUP).

NAFMIP will seek to more than double smallholder farmers' and fishers' incomes, through the promotion of transformative interventions to significantly diversify sources of income and employment and ultimately sustainably lift farmers and fisherfolk out of poverty.

To ensure environmental sustainability and climate resilience of food systems, the NAFMIP considers the particular areas that need to be fixed as follows: (1) natural resource depletion; (2) agrobiodiversity losses; (3) energy-water-carbon efficiency; and (4) priorities for action in reducing the footprint of the system on the environment.

The NAFMIP will protect and conserve natural resources through sustainable agriculture and fisheries systems innovations grounded on an integrated spatial planning framework (ISPF). In the ISPF, Climate Risk Vulnerability Assessment (CRVA) will be used for consideration of climate change vulnerability.

(d) Memorandum from the Secretary: Mainstreaming Climate Change in DA Programs, Plan and Budget (January 25, 2013)

Based on the R.A.9729 Climate Change Act (2009) and National Climate Change Action Plan (NCCAP) 2011-2028, Department of Agriculture (DA) announced the Memorandum from the Secretary: Mainstreaming Climate Change in DA Programs, Plan and Budget which aims to help the DA to craft appropriate climate change policies and translate them into programs with the corresponding budget for national implementation.

Key components of the Secretary's memo were 1. Adaptation and Mitigation Initiative in Agriculture (AMIA) became national initiative on climate change in agriculture, 2. Planning agriculture development should be integrated, holistic based on a landscape, 3. DA's Systems-Wide Programs (SWPs) on climate change were developed, and 4. DA Systems-Wide Climate Change Office (DA SWCCO) was established.

Based on the memorandum, the following 7 Systems-Wide Programs (SWPs) on climate change were established.

- Mainstreaming Climate Change and AMIA
- Climate Information System (CIS)
- Philippine Adaptation & Mitigation in Agriculture Knowledge Toolbox
- Climate Smart Agriculture Infrastructure

- Financing and Risk Transfer Instruments on Climate Change
- Climate Smart Agriculture & Fisheries Regulations
- Climate Smart Agriculture Extension System

(e) Memorandum Circular no.4, s.2020: Institutionalization of Climate Resilient Agriculture (February 20, 2020)

The memorandum to institutionalize Climate Resilient Agriculture (CRA) was circulated by the DA in February 2020. The DA-SWCCO was renamed to the Climate Resilient Agriculture Office (DA-CRAO) and it is to take on the following tasks.

- Mainstream climate and weather advisories
- To utilise the decision tools which were developed by AMIA to update the commodity road maps and ensure that climate resilient agriculture technologies and practises are applied and supported
- To level up AMIA to Climate Resilient Agri-Fishery Technology-based Enterprises (AMIA-CREATE)
- To complete the CRVA
- To formulate Disaster Risk Reduction Financing and Risk Transfer

(f) No. PBBM-2023-320 Implementation of Whole-of-Government Measures to Prepare for El Niño

As global seawater temperatures rise due to global warming, El Niño forecast was announced by PAGASA in March 2023. President has directed different government agencies to make the necessary preparations and come up with a whole-of-government strategy to address the looming dry spell or El Niño phenomenon. Through the mechanisms of the National Disaster Risk Reduction and Management Council (NDRRMC), an El Niño team was established, and a system was established to take food, water, energy, health, and public security measures. The DA is responsible for food, the DENR for water, the DOE for energy, the DOH for health, and the DILG for public safety. In addition, the El Niño Action Plan was announced by PAGASA, and initiatives related to crop production, water management, livestock, fisheries, and livelihood security were presented as initiatives related to food security.

(g) Para Sa Masaganang Bagong Pilipinas program 2024-2026

DA announced its new plan to increase agricultural productivity, lower food cost, ensure food security, and make farming and fisheries a more bankable investment alternative. To achieve this vision, a three-year plan that involves:

- Expanding and improving available agri-fishery areas to increase production
- Mechanize and modernize agriculture and fishery production systems
- Develop and improve post-harvest systems and infrastructures

- Develop efficient logistics systems for input and production output
- Improve and expand market access
- Digitalization
- Proper balancing of both the development and regulatory role of the Department of Agriculture
- Strong partnership with farmers, fisherfolk, and the private sector

To expand production areas in both land and water, new irrigation facilities are needed, zoning, and identification of key areas should be established, as well as enhancing existing infrastructures.

2) Implementation status of climate change measures

(a) Implementation structure

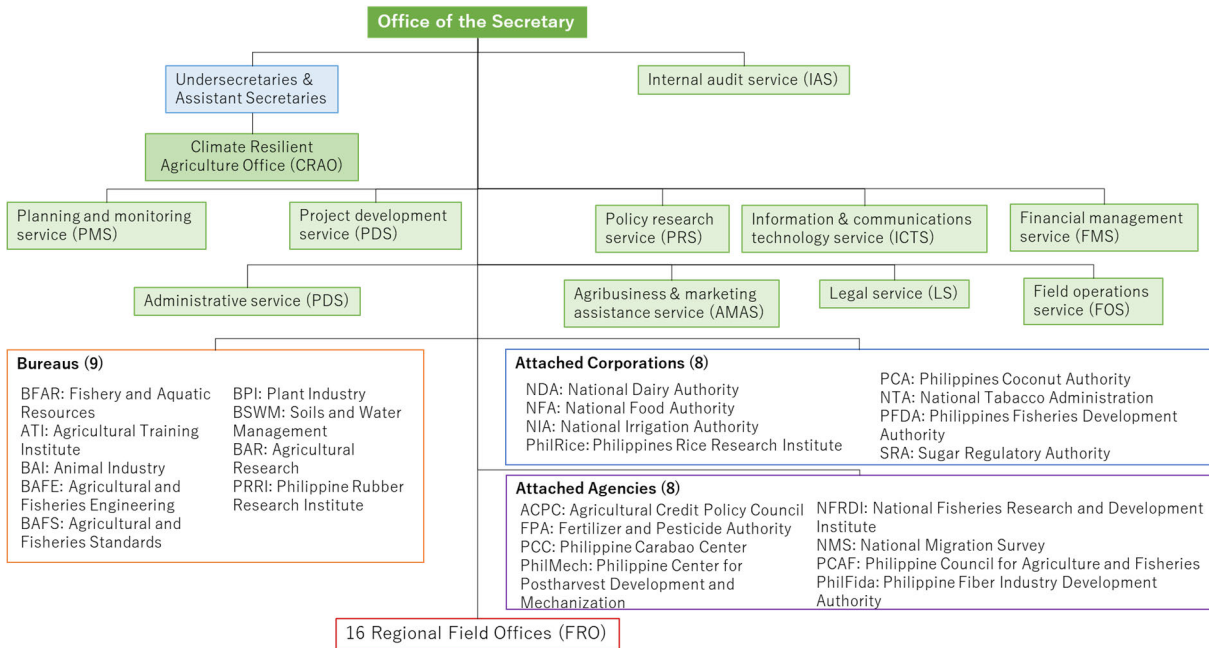
The following organizations are listed as related departments and offices in the agricultural sector.

Table 2-72 Climate Change-related Departments in the Agricultural Sector

Category	Responsible organization	Role
Policy formulation	DA- Planning and Monitoring Service (DA-PMS)	Agricultural policy formulation and monitoring
	DA- Climate Resilience Office (DA-CRAO)	Climate change related policies and measures planning and promotion
Implementation	DA Field Operations Service (DA-FOS)	Cooperation with RFOs in banner programs
	DA-RFOs	Various projects, agricultural and fishery guidance
	LGUs	Various projects, agricultural and fishery guidance
Agrometeorology	DOST-Philippine Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA)	Weather Observation and Forecasting
	DA-Bureau of Soil and Water Management (DA-BSWM)	Agrometeorological Observation
Farmland management	DA-BSWM	Soil analysis and evaluation
	DA Basic Agricultural Information Registration System (DA-RSBSA) *	Basic information for agricultural and fisheries workers
	Department of Agrarian Reform (DAR)	Manages land redistribution
Irrigation development	National Irrigation Administration (NIA)	Planning, design, and construction of large-scale irrigation facilities
	DA-BSWM	Planning and design of Small-scale irrigation facilities
	DA-RFOs	Construction and Operation and maintenance of Small-scale irrigation facilities
	LGUs	Construction and operation and maintenance of communal irrigation facilities
	Irrigation Association (IA)	Construction and operation and maintenance of communal irrigation facilities

Category	Responsible organization	Role
Mechanization	Bureau of Agriculture and Fisheries Engineering (DA-BARE)	Standards for agricultural machinery and facilities, promotion of RE introduction
	DA ICT Service (DA-ICTS)	ICT and data integration
	Philippine Rural Development Program (DA-PRDP)*	Rural development project supported by WB
Agricultural Finance	Agricultural Credit Policy Committee (ACPC)	Agricultural credit policy review and implementation
	Philippine Crop Insurance Corporation (PCIC)	Providing agricultural insurance
Research and Development	Bureau of Agricultural Research (DA-BAR)	Agriculture Research and Development
	Philippines Rice Research Institute (DA-PhilRice)	Technology development and dissemination related to rice production
	UPLB	Promotion of smart agriculture
Agriculture in general	Listed in sub-sector	-
Livestock in general	Listed in sub-sector	-
Fisheries in general	Listed in sub-sector	-
Main active donors	WB	PRDP , land reform support
	ADB	CCAP Subprogramm2
	FAO	GCF-APA

The central organization of the Department of Agriculture includes the Office of the Secretary, the Undersecretary, Assistant Secretary, and administrative services (10 organizations) and specialized bureaus (9 organizations). In addition, there are 16 regional field offices (RFOs) and 16 attached organizations such as research institutes and associations.



Source: JST based on the DA organogram (<https://www.da.gov.ph/organizational-chart-2/>).

Figure 2-42 Organization of DA

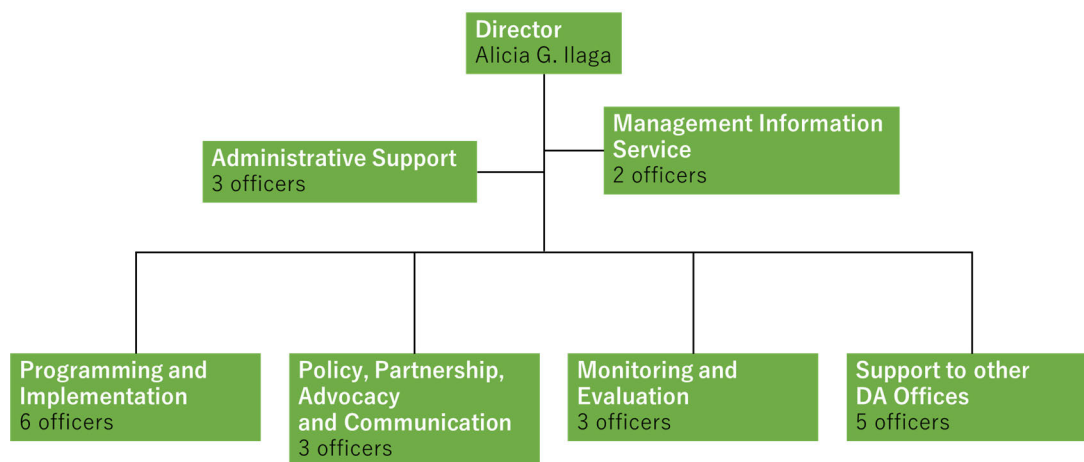
As mentioned above DA established SWCCO in 2013 to mainstream climate change actions, and renamed it to DA-CRAO in 2020. It will mainly focus on scaling up climate change mainstreaming which were being promoted by as SWCCO.

There are 11 main functions of DA-CRAO.

- Provide policy support focusing on the predicament of agriculture and fisheries industry due to climate change
- Provide strategic directions to mobilize resources and capabilities of DA to meet the challenges of CRA in the food system, to achieve sustainable high productivity, food sufficiency, an increase in incomes for farmers and fisherfolks
- Support the establishment of climate resilient AMIA villages through AMIA
- Provide guidance on the formation of scientific information and the development of technologies for climate change adaptation and mitigation measures
- Strengthen the capabilities of DA and LGUs for the planning and implementation of climate change adaptation and mitigation measures
- Design and coordinate AMIA villages in the DA-RFOs nationwide
- Design, institutionalize and strengthen the climate information service for agriculture
- Develop and increase the awareness of decision support tools which are based on climate information that support agriculture and fishery plans and research plans in the national, regional, local and farmer's level

- Actively participate in various forums to influence national and international climate change policies and programmes
- Consider, review and implement the NDC in the agricultural sector
- Access the climate change action support included in the Paris agreement.

DA-CRAO is an ad hoc organization working under the Undersecretary for policy and regulation. As many of the staff work concurrently for other departments and the number of staff is limited, DA is working on allocating permanent staff to DA-CRAO with the support from ADB.



Source: JST based on a material provided from DA-CRAO

Figure 2-43 Organization of DA-CRAO

DA-CRAO has started the following activities as their action plans.

Table 2-73 Short term action plan of DA-CRAO

Activity	Resource Requirement	Output	Outcome
1. Advocacy, and communication on AMIA decision support tools methodologies/protocol & application: a) AMIA Village Approach b) CRVA c) CIS	IEC Materials; partnership with ATI & RFOs	Conducted advocacy and communication campaign to create awareness and appreciation of the significance and utility of AMIA DSTs in mainstreaming climate change in DA PAPs & LGU development plans & projects.	Increased awareness and appreciation of climate consideration in the development, planning and implementation of DA PAPs
2. Capacity building on the use of CRVA in local development planning	CRVA for 77/82 provinces; CRVA Teaching modules; partnership with ATI & DILG	Trained key RFO & LGU staff on CRVA integration in development plans and programs;	Integration of CRA in local development plans and; Inclusion of “climate resilience” criteria in DILG’s Seal of Good Local Governance (SGLG)
3. Capacity building on the provision and evaluation of localized Climate Information Services (CIS)	Localized platform on Agro Climatic Advisory Portal (ACAP); partnership with ATI, Banner programs, NOAP,	Institutionalization of ACAP in all RFOs for the regular provision of localized CIS Use of	Provision of local CIS – weather/climate-based farm advisories as basic RFO service to manage

and use of Climate Risk Maps	SAAD, 4K, LGU & PAGASA	climate risk maps to adjust planting calendars	weather-induced hazards and climate risks, reducing production loss and damage
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Source: DA (N/A). Climate Resilient Office Adaptation and Mitigation Initiative in Agriculture

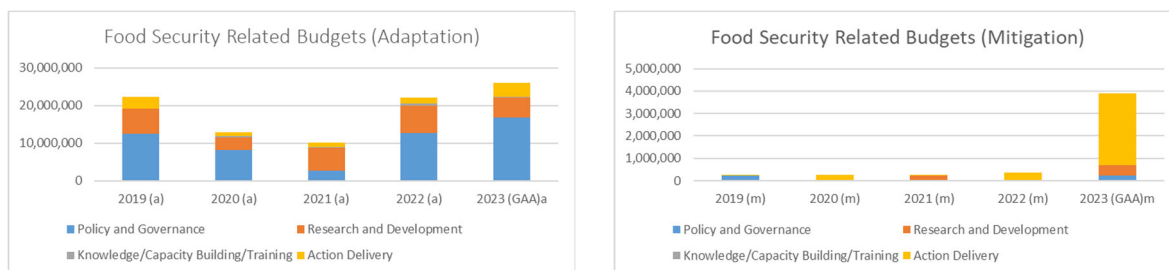
Table 2-74 Long term action plan of DA-CRAO

Activity	Resource Requirement	Output	Outcome
1. Scaling up CRA options/practices/technologies to accelerate CCA and mitigation Lead: FOS, Banner Programs, NOAP, SAAD, 4K, RFOs	Packages of tail or fitted integrated support services - (technology, capacity building, financing and market link)	Strategic local CCA and mitigation actions implemented to increase productivity and mainstream marginalized farmers/fishers along the commodity value chain and reduce climate vulnerability	Increased farmer's incomes, reduced loss and damage, and contribute to GHG reduction per NDC commitments; DA budget = CCET
2. Integrate climate change in planning, design and construction of DA-funded mechanization & infrastructure Lead: BAFE, BAFS, NIA	Guidelines on the implementation of farm-fishery mechanization and infrastructure projects with climate-resilient design	Construction/deployment of climate-resilient DA funded mechanization & infrastructure	Increased farmer's incomes, reduced loss and damage, and contribute to GHG reduction per NDC commitments
3. Prioritize Research for Development agenda to address CCA & DRR Lead: BAR, BSWM, BPI, PhilRice, PCC, BFAR-NFRDI	Support for R4D development	Generated methodologies, measurements, varieties or strains for climate-resilient crop, livestock and fisheries	Sustain productivity, reduce loss and damage and contribute to reducing GHG emissions.
4. Provision of accessible and innovative climate financing & risk transfer schemes Lead: ACPC/PCIC	Tailor-fitted financial packages and risk transfer mechanisms	Financing & risk transfer mechanisms accessed by farmers/fishers to support CRA and enterprise development	Sustain productivity, reduce loss and damage and contribute to reducing GHG emissions.
5. Strengthen capacities of LGUs in Climate Resilience Building Lead: ATI	Teaching modules on CCA, DRR and AMIA DSTs	Climate resiliency as core component of ATI trainings	Scaled implementation of CCA & DRR actions for climate resilience, sustained productivity, reduced loss and damage and GHG emission.
6. NDC Commitments implementation monitoring and reporting Lead: PMS/ NDC Technical Working Groups	Enhanced understanding of the UNFCCC COP commitments – Paris	Agreement, including the Koro Nivia Joint Work on Agriculture (KJWA) program MRV documentation and submission	International commitments managed for proper negotiation and reporting

Source: DA (N/A). Climate Resilient Office Adaptation and Mitigation Initiative in Agriculture

(b) Climate-related budgets

Figure 2-44 shows the budgets which were Climate Change Expenditure Tagged (CCET) within DA and the agricultural related sector (which is under food security that is a strategic priority in CCET) from 2019 to 2023. It ranges around 15 to 20% of all of the DA budget amounting to PHP 22-25 billion/year.



Source: JST using the CCC's Climate Change Expenditure Tagging Data

Figure 2-44 Climate budgets related to food security (adaptation and mitigation)

(c) Implementation status of climate change mitigation measures

a) GHG Inventory

DA estimates the GHG emissions from the agriculture sector based on the data from the Philippines Statistics Authority and submitted them to the CCC.

In addition, an estimate of carbon sequestration has been made for approximately 3.6 million hectares of coconut plantations throughout the country. This estimate needs further validation, but it has been reported that the carbon sequestration could be higher than the annual emissions from the agricultural sector⁴¹

b) NDC Policy and Measures (PaMs)

DA is planning and implementing the following mitigation measures under the NDC policies and measures for the agriculture sector. The budget for the following initiatives is estimated at approximately 54 billion PHP. The DA relies on foreign support for financial and technical support, because the GHG reduction target of 72.29% in the NDC is a conditional goal that can be achieved with financial and technical support from developed countries.

Table 2-75 Priority mitigation measures for the agriculture sector planned by DA

Source of GHGs (% of total emissions from the agriculture sector)	Target	Technology	Involved bureaus and organization*
Paddy Rice (51.97%)	100% adoption in total irrigated paddy rice area = 3.21 M ha	<u>Dry Season</u> Technology development and promotion of AWD + cropland management + renewable energy (RE) for water management	DA-CRAO, DA-BSWM, NIA, PhilRice, DA-BAR
		<u>Wet Season</u> Technology development and promotion of AWD + RE for flood and water management + cropland management	
Livestock – Enteric Fermentation (19.65%)	50% reduction in enteric fermentation/animal	Technology development and promotion of nature-based solutions and breeding interventions	DA-CRAO, DA-BAI, DA-BAR

⁴¹ Country situation on estimation of carbon stock change in mineral soils

Source of GHGs (% of total emissions from the agriculture sector)	Target	Technology	Involved bureaus and organization*
N ₂ O emission from annually cultivated soils (16.2%)	25% reduction in total N ₂ O emission (total cultivated area = 8.02 mil ha)	Technology development and promotion of cropland management + precision agriculture + biotech crops	DA-CRAO, DA-BSWM, DA-BAR
Livestock – Manure Management (9.7%)	100% adoption by livestock sector	Technology development and promotion of biodigester+ nature-based solutions	DA-CRAO, DA-BAI, DA- BSWM, DA- BAR
Urea application (1.6%)	50% reduction in urea application	Technology development and promotion of precision agriculture+ cropland management	DA-CRAO, DA-BAR
Emissions from Biomass Burning (0.88%)	Zero biomass burning	Technology development and promotion of nature-based solutions-circular bioeconomy	DA-CRAO

Source: JST based on materials provided from DA-CRAO “NDC Policies and Measures (PAMs) for Agriculture” and DA-BFAR
* DA-BSWM: DA Bureau of Soil and Water Management, NIA: National Irrigation Authority, PhilRice: Philippine Rice Research Institute, DA-BAR: DA Bureau of Agricultural Research, DA-BAI: DA Bureau of Animal Industry, DA-BFAR: DA Bureau of Fisheries and Aquatic Resource

In addition to the above, the following additional measures have been submitted to the CCC by the Department of Agriculture. These have not yet been studied in detail, and the expected GHG reduction effects have not yet been fully evaluated. The needs for support were also identified for technical and financial assistance for NDC policy measures and for conducting cost-benefit assessments for additional measures.

Table 2-76 Additional mitigation measures for the Agriculture sector planned by DA

Category	Technology	Involved organization
1. Implement additional measures to reduce carbon dioxide emissions from agricultural products	Use of pest-resistant crops	DA, DOE, DOST LGUs, civil society
	Use of biological control agents	
	Microbial inputs to reduce inorganic fertilizer requirements	
	Use of fast-growing and climate-tolerant crop, livestock, and aquaculture species	
	Agricultural machinery, machinery, post-harvest and processing facilities using renewable energy sources	
	Precision Agriculture Using Digital Technology	
2. Carbon sequestration measures	Climate Information System	DA, DENR LGUs, civil society
	Use of organic fertilizers	
	Use of biochar	
	Coconut plantations in areas prone to storm surge damage	
	Restoration and expansion of mangrove forests	
	Bamboo Plantation	
3. RE introduction of DA facilities	Increase in soil organic carbon	DA, DOE,DPWH LGUs, civil society

Source: JST based on materials provided from DA-CRAO “NDC Policies and Measures (PAMs) for Agriculture”

Table 2-77 Examples of priority mitigation measures for the fishery sector planned by DA

Source of GHGs	Target	Involved bureaus and organization*
Fuel consumption in fisheries	Farmers and fisherfolk are utilizing RE systems for their farming	DA, DOE
Use of wood material for wooden boats	-	DA-BAFR

Source: JST based on materials provided from DA-CRAO “NDC Policies and Measures (PAMs) for Agriculture” and DA-BAFR

c) Renewable Energy Program for Agriculture and Fisheries Sector (REPAFS 2022-2030)

Energy consumption in the agricultural sector in 2019 was reported to be 471.7 kTOE (kilo tons of oil equivalent), or about 1.4% of the country's total energy consumption, of which 84.3 kTOE came from agricultural production, 161.7 kTOE from the livestock industry, 7.9 kTOE from agricultural services and 216.6 kTOE from fisheries.

Table 2-78 Energy Consumption from the Agricultural Sector

Subsector	2017	2018	2019
Agri-Industry	246.7	239.4	254.0
Agri-Crops Product	93.1	78.4	84.3
Livestock/Poultry	146.3	153.4	161.7
Agri Services	7.3	7.5	7.9
Forestry	6.6	1.0	1.1
Fishery	262.4	199.1	216.6
Total	515.6	439.6	471.7

Source: DA BAFE⁴²

The Renewable Energy (RE) Program for Agriculture and Fisheries is based on the Joint Memorandum of Circulars (JMC 2021-02-0001) between the Department of Agriculture and the Department of Energy, issued in 2021, to increase the installation and use of cost-effective renewable energy systems for increased productivity, environmental protection, and sustainable development in the agriculture and fishery sectors.

Based on RE technology and its application, the specific goals of the REPAFS to be achieved by the end of 2030 are as follows. In the Department of Agriculture, the Bureau of Agricultural and Fishery Engineering (BAFE) is responsible for promoting and monitoring the program, while the Department of Energy provides technical support.

Table 2-79 Summary of Renewable Energy Programs for Agriculture and Fisheries

Components	Target
Infrastructure Facility Introduction	Adoption of existing RE technology <ul style="list-style-type: none"> • Irrigation services and farmer beneficiaries increased by 484%. • Increased installed capacity (kWp) of solar-powered irrigation by 662% • Increased installed capacity (kWp) of photovoltaic systems by 118%

⁴² <https://bafed.gov.ph/index.php/2021/12/02/http-bafed-gov-ph-wp-admin-post-phppost11816/>

Components	Target
	<ul style="list-style-type: none"> Increased the number of Ram Pump Irrigation System (RPIS) units installed by 220%. 235% increase in the number of irrigation systems installed for wind power generation Installed capacity of the biogas plant (in meters) increased by 44%. 46% increase in biomass dryer installations.
R & D	Increase the number of R&D activities on different renewable energy sources and systems used in the agricultural and fisheries industries.
standards development	Increased number of standards developed for various renewable energy machines and equipment used in the agricultural and water industry sectors <ul style="list-style-type: none"> One standard development per year
Human Resource Development	Increase the number of training activities on various existing renewable energy systems, with emphasis on biomass (including biogas, solar, wind, and water)
Support for fundraising	Strengthen activities to secure financing and credit support for local developers, manufacturers, end-users of renewable energy, and producers of energy feedstock. <ul style="list-style-type: none"> 8 loans and credit support activities will be conducted.
Incentive Study	Develop support mechanisms to leverage existing policy incentives by domestic developers, manufacturers, end-users of renewable energy, and producers of energy feedstock. Develop guidelines and plans to increase the use of renewable energy technologies in the agriculture and fisheries sectors

Source: Prepared by survey team based on Draft REPAFS

Existing RE technologies in the agriculture and fisheries sector include solar power irrigation system, biomass and biogas projects, and biofuel development. The program is planned to conduct demonstration projects of RE technologies in the short term (2022-2026) and full-scale implementation in the medium term (2026-2030). The budget for the project is estimated to be approximately 4.4 billion PHP for the infrastructure facilities.

BAFE, which is promoting this program, will be in charge of reviewing the installation plans of LGUs and other entities that will actually introduce RE, establishing standards for facilities, and training human resources. At present, there are few domestic manufacturers with RE technology, which means that the initial cost of importing equipment is high, and problems with equipment breakdowns and maintenance in existing projects are preventing the introduction of RE.

The support needs on the development of technical demonstration of agricultural solar power generation (agrivoltaics), as well as the guidelines for introduction support, and human resource development as part of REPAFS were confirmed by BAFE.

In addition, in the survey of the subsector (livestock sector), it was confirmed that biomass and biogas technologies have been introduced but have not been fully evaluated, which has not led to further efforts. It is necessary to have concrete effects such as the ability to reduce production costs through the introduction of RE and an incentive system for its introduction.

a) National Biofuel program

As mentioned in the energy sector, the National Biofuels Program based on the Biofuels Act of 2006 (RA9367) is being promoted under the leadership of the Department of Energy. The Sugar Regulatory Administration (SRA) and the Philippine Coconut Association (PCA), which are related agencies of the DA, are Vice Chairs of the National Biofuels Board (NBB).

Currently, biodiesel made from coconuts can be produced to meet domestic consumption, but the production volume of bioethanol made from sugarcane is about half of domestic consumption.

Although the DA is making progress in assessing suitable land for coconut and sugarcane production, the issues are that the DA has not yet established a policy regarding land use for food fuel crops, and that land use decisions are made by LGUs.

Table 2-80 Production, Imports, Export and Consumption of Biodiesel (Million Liters)

Calendar Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023f
Beginning Stocks	20	29	32	41	57	53	64	56	47	48
Production	172	204	227	220	220	242	188	198	203	220
Imports	0	0	0	0	0	0	0	0	0	0
Exports	0	0	0	0	0	0	0	0	0	0
Consumption	163	201	218	204	224	231	196	207	202	230
Ending Stocks	29	32	41	57	53	64	56	47	48	38

Source: DOE

Table 2-81 Production, Imports, Export and Consumption of Bioethanol (Million Liters)

Calendar Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023f
Beginning Stocks	na	na	na	na	na	25	14	14	10	18
Fuel Begin Stocks	na	na	na	na	na	25	14	14	10	18
Production	na	na	na	na	na	375	344	400	402	402
Fuel Production	115	168	230	235	297	346	280	355	375	375
Imports	na	na	339	322	347	341	322	385	398	410
Fuel Imports	339	311	260	276	285	257	241	225	277	310
Exports	0	0	0	0	0	0	2	4	0	0
Fuel Exports	0	0	0	0	0	0	0	0	0	0
Consumption	na	na	na	na	na	727	664	785	792	820
Fuel Consumption	454	479	490	511	557	614	521	584	644	693
Ending Stocks	na	na	na	na	25	14	14	10	18	10
Fuel Ending Stocks	na	na	na	na	25	14	14	10	18	10

Source: DOE and SRA

Based on the above, it was confirmed that the following issues exist in promoting climate change mitigation measures.

- Limited capacity of staff in the departments responsible for planning climate change mitigation measures, evaluating GHG emission reduction effects, and conducting evaluations
- Limited materials and equipment for planning and evaluation

- Limited capacity of RFOs and LGUs to plan, obtain budget, and implement climate change mitigation measures, as well as the development and dissemination of mitigation technologies including RE.

(d) Implementation status of climate change adaptation measures

According to DA, the annual average of damage to agriculture due to climate disasters was PHP 29 billion (2010-2019), thus adaptation measures in the agriculture sector is very important. The main activities related to adaptation in the agriculture sector are as follows.

a) National Adaptation Plan(2023-2050)

The NAP, which is currently being prepared, has eight priority adaptation strategies, and the agricultural sector is related to the priority adaptation strategy 1 agriculture, fisheries, and food security.

b) Promotion of CRA through AMIA Program

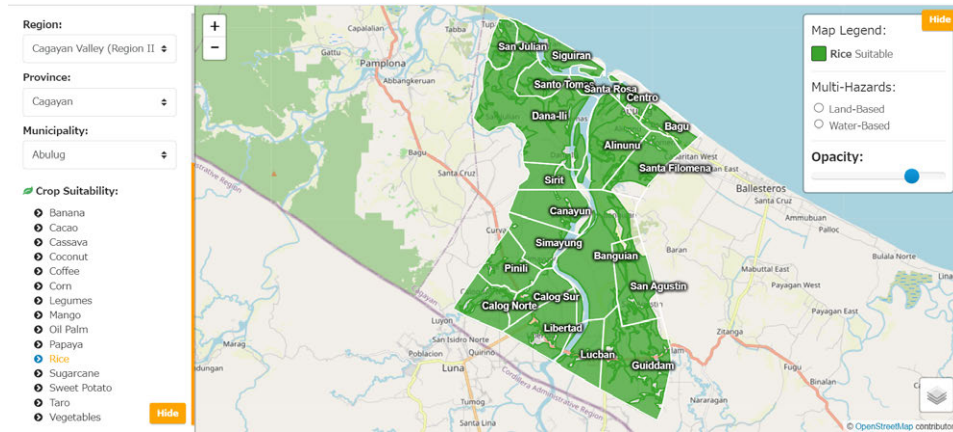
DA has been working on creating multi hazard maps including climate change and data bases, and has utilized these in the national, provincial and local strategies and plans. It is also putting effort in the creation of the Climate Information system (CIS) with the coordination with the Department of Science and Technology-Philippine Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA) to give better advisories to the farmers. CRVA in the provincial level are also being pursued with the support from national and international research institutes and donor.

DA-CRAO has developed AMIA decision making tools to support the planning and implementation of climate change adaptation measures listed below and are disseminating them to the LGUs.

- National Color-coded Agricultural Guide (NCCAG) Map
- Climate Risk Vulnerability Assessment (CRVA)
- Typhoon Risk Information
- Agro -Climatic Advisory Portal (only Bicol Region)
- Participatory Climate Risk Vulnerability Assessment (PCRVA) training manual
- Climate Risk Profiles
- AMIA CRA Technical and Investment Briefs

The NCCAG identifies the agricultural areas that are naturally suitable to crops and overlays data on soil properties, elevation, slope, rainfall pattern, temperature and climate induced multi-hazards.

The map also indicates the availability of water in an area, which could benefit in the proposal for solar-powered irrigation systems. Currently, there are 21 economically-important crops that have been identified by the NCCAG. As of now, version 2 of the NCCAG has been developed and released in November 2023.



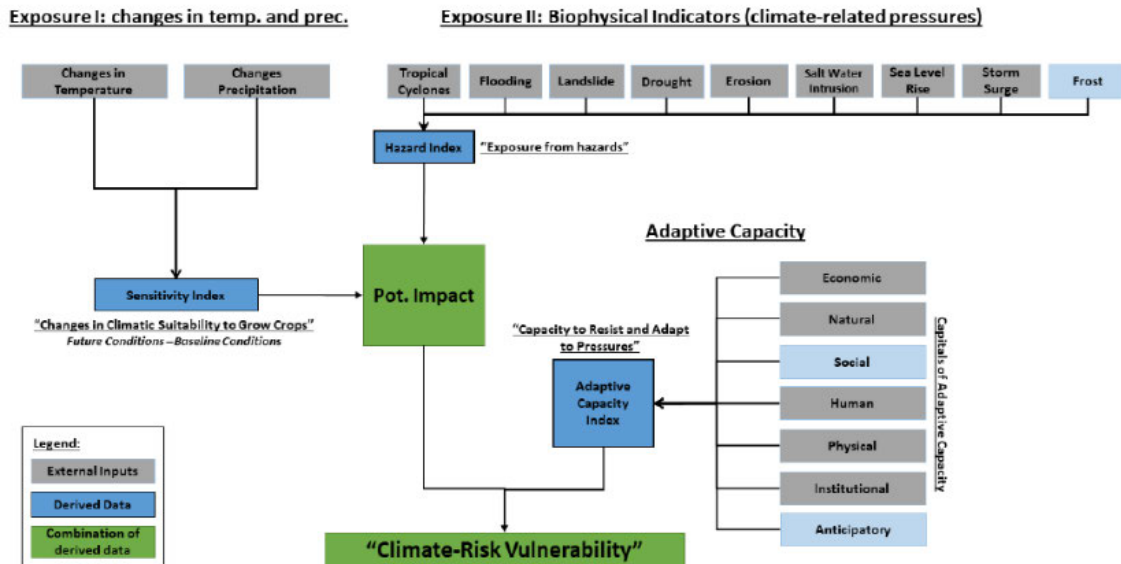
Source: DA

Figure 2-45 Development of National Color-coded Agricultural Guide Map

Climate Risk Vulnerability Assessment Maps are also supports tools to evaluate climate change vulnerability for targeting and planning of adaptation and mitigation initiatives at regional level. The first 10 regional CRVAs were conducted in collaboration with the International Center for Tropical Agriculture (CIAT), an affiliate of Consultative Group on International Agricultural Research (CGIAR).

In the CRVA framework, vulnerability is assessed by Exposure to Climate-Related Risks and Hazards, Sensitivity of the targeted major crops, and Adaptive Capacity in the target area.

Climate-Risk Vulnerability Assessment (CRVA) Framework



Source: DA-CRAO data

Figure 2-46 CRVA Framework

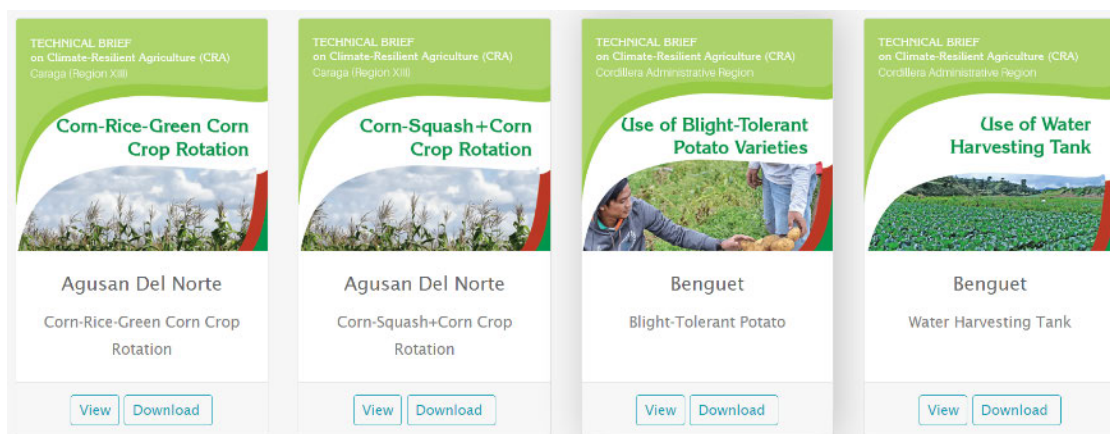
Sensitivities of major crops have been assessed based on the latest climate change scenarios, incorporating the latest data on natural disasters and climate stress.

Although the vulnerability assessment for rice and corn have been organized in many regions, the targets commodities of evaluation vary by region, and there are few examples in the fisheries sector.

According to the University of the Philippines, climate risk information for major cultivated crops is provided to farmers, but horticultural crops are lagging behind in development. Furthermore, sub-sector surveys have revealed that climate risk assessments for livestock and fisheries sectors are limited.

As of now, CRVA for 63 of 81 provinces were completed and 5 more provinces will be added with ADB support in the Policy-based Loan Sub program 2 on Climate Change Action Plan, Accelerating Climate-resilient Agriculture in the Philippines Phases 2.

Specific CRA techniques are available on the web in the form of AMIA CRA Technical and Investment Briefs.



Source: DA-AMIA website

Figure 2-47 CRVA Technical Brochure

These tools need to be disseminated and reflected in the banner programs and major agricultural roadmaps implemented by the Department of Agriculture, as well as in the local development plans formulated by LGUs. Limited provinces have reflected these tools in their local development plan. As of August 2023, only 18 provinces have reflected CRVA to Provincial Commodity Investment Plan (PCIP), and therefore training and capacity building are needed to promote the use of CRVA in LGUs.

World bank supports this activity with the Development Policy Loan with a Catastrophe Deferred Drawdown Option (CAT-DDO) in Phase 4. Through the Philippine Rural Development Project (PRDP) , World Bank is supporting the reflection of CRVA in PCIP. JICA also support this effort in Phase 3 of the disaster recovery stand-by loan agreed upon in August 2023. The goal is to have CRVA reflected in PCIPs in 60 provinces by the end of 2024.

Knowledge on climate change risks, understanding technologies for countermeasures, planning and implementation of effective investment plans of DA central offices, RFOs, LGUs are necessary for the mainstreaming of climate change measures, but it is not sufficient.

As an example, DA has made mid-term roadmaps for 20 main agricultural and fisheries commodities. However, it can be seen in the roadmaps that there is awareness on the necessity of measures and

technologies based on the CRVA results, there are not much mention of specific actions to be taken in the latest roadmaps.

This may be due to the fact that the DA-CRAO, which is responsible for climate change mainstreaming in the DA, is an Ad hoc organization, making it difficult to take leadership within the Department, and that it has a limited budget compared to other DA departments, resulting in a lack of training programs for the relevant agencies of the DA and LGUs.

According to DA-CRAO, the ability of the staff at the bureau of the DA to assess the impact of climate change, such as changes in the production environment, the impact on yield, and to control pests and diseases is insufficient, and further capacity building is needed.

Although the DA-CRAO is expected to be strengthened with ADB support in the future, direct involvement and capacity building for DA agencies might be limited.

DA-CRAO has established 181 AMIA villages in 59 provinces for climate resilient farming and fishing communities. The AMIA Village is an extension mode where the unit of assistance is a group of farmers tilling adjacent lands covering about 100 ha.

Farming communities are organized as AMIA villages and receive integrated support such as information and trainings on production techniques in consideration of climate risks from DA. Through the RFOs and LGUs, farming communities receive information to select the appropriate adaptation measures against climate risks, support on testing climate resilient agriculture methods, improved access to finance and insurances, trainings on climate change action and disaster risk reduction.

The common adaptation strategy in all of the AMIA villages is the diversification of agriculture, which leads to securing multiple income sources and strengthen the farmer's adaptation capacities.

DA is now aiming in the scaling up of the AMIA villages as well as enterprise development of the AMIA villages with the basis of climate change adaptation measures.

Some AMIA villages are now being transformed into AMIA-Climate Resilient Agri-Fishery Technology-based Enterprises (CREATE). Through greater participation in the value chain, strengthened institutional cooperation, creation of a market for agricultural products and business opportunities, and expansion of network linkages, AMIA CREATE increases farm productivity and farmer's incomes.

The AMIA program is spreading but has not been rolled out to all provinces. As a result, there are still agricultural and fishing communities that have limitation of knowledge on how to respond to climate risks, create a profit structure and efficient input, and access to finance such as agricultural insurance and credit.

In order to disseminate climate change adaptation technologies in agricultural and fisheries communities such as AMIA Villages, technical advisors at DA RFOs and LGUs are needed, but there is a shortage of

both manpower and capacity. In addition to recruiting and training young technicians, advisory tools must be developed that respond to the weather and soil conditions of each region and the crops grown, in order to conduct efficient and effective extension activities. Some advisory tools such as Rice Crop Manager Advisory Service (RCMAS) and climate information provided by PAGASA are widespread, but advisory tools for agricultural products other than rice, livestock, and fishery products are still limited.

There are several existing information and tools as basis for making climate change policies in DA. Different bureaus have been separately coordinating with other organizations (such as DOST and UPLB) and provides climate change action tools and information portals. However, since this information are not sufficiently being organized and informed, it is causing confusion to the LGUs when making their development plans.

In order to implement efficient and effective planning and agricultural guidance with limited human resources, it is necessary to organize information from relevant agencies within the DA, avoid duplication, and identify tools that are behind in development or need to be reviewed, and make improvements including simplification.

Specifically, disseminating the effects of climate change on the agricultural sector and the goals as a nation to the relevant officers of DA, and promoting climate change actions in DA as a whole, and updating and enhancing the tools that were developed through the AMIA program and scaling the activities up as well promoting the usage of these tools are the support needs of DA-CRAO.

DA-CRAO has launched the Agro-Climatic Advisory Portal, which provides agricultural advice that takes into account local weather information and climate risks related to rice at the municipal level. Currently, this service is targeted at Rigan5, but in the future, it is expected to expand this service nationwide, and to expand it to agricultural products other than rice, livestock products, and fishery products in order to promote the diversification of production and livelihood. To achieve this, it is necessary to expand CRVA, but livestock and fishery products are delay. Support needs on the development of farming tools for small-scale farmers are confirmed by DA-BAFE, too.

DA-BAFE is also developing farming tools for other agricultural products, using RCMAS for rice as a reference. By providing accurate crop yield predictions, streamlined resource access, and market linkage, the application can empower farmers to make informed decisions, optimize resource allocation, and mitigate risks, ultimately contributing to sustainable agriculture, improved livelihoods, and regional food security.

c) Climate Information System

PAGASA is mandated to observe and forecast climate, floods and other climate events which may affect the citizens' safety, health and the national economy by Presidential Decree No. 78, s. 1972 and Presidential Decree No. 1149, s. 1977.

PAGASA has nine main types of meteorological stations. Of these, the synoptic meteorological stations are used to observe almost all weather elements, and the measured meteorological data are sent to PAGASA's headquarters. The agricultural meteorological stations (Agromet) are equipped with solar radiation instruments and soil measurement equipment in addition to the usual meteorological instruments.

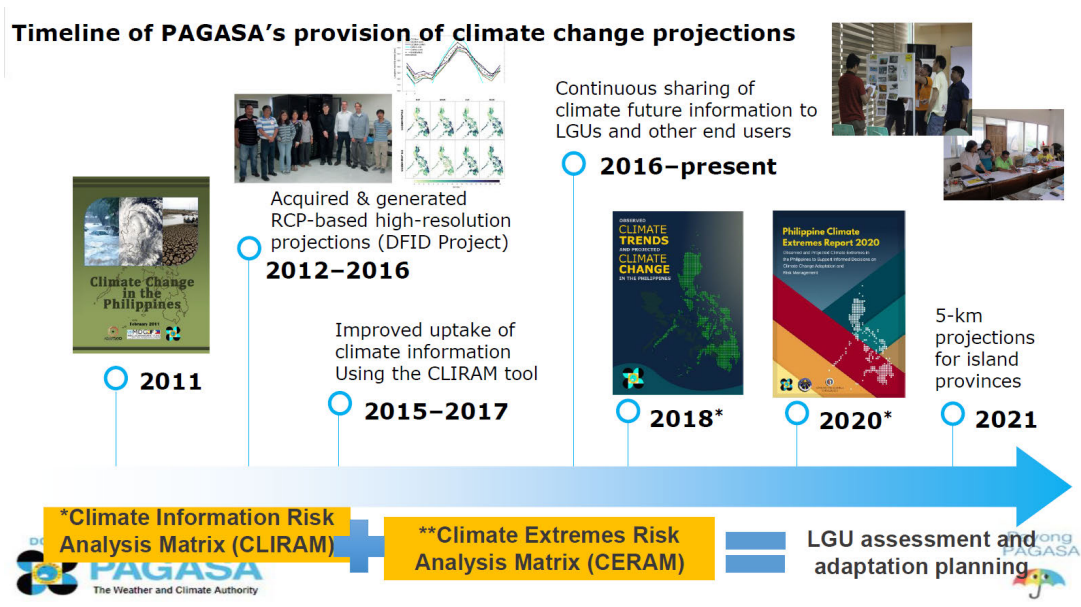
Table 2-82 PAGASA's Main Meteorological Observation Facilities

Facility	Number of installations
1. Synoptic station	58
2. Agromet station	22
3. Upper Air weather observation	9
4. Automatic Weather Station (AWS)	69
AWS installed by ASTI	76
5. Automatic rain gauge (ARG)	86
6. Hydrology stations	156
7. MetBuoy	2
8. Weather radar	16
9. Coastal radar	12

Source: PAGASA

For the agriculture sector, PAGASA provides agrometeorological and forecast data to relevant institutions, and urges its use for policy decisions. It has developed the following decision making support tools.

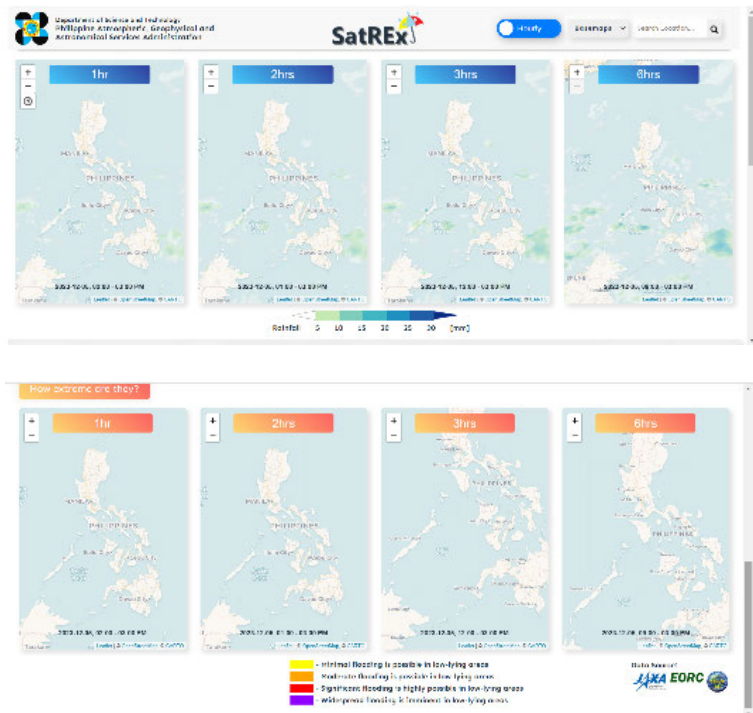
- Heat Index Chart
- MARITIES : Managing Risks and Uncertainties
- ENSO Risk Matrix : El Nino/La Nina Risk Matrix
- CLIRAM : Climate Information Risk Analysis Matrix
- CERAM : Climate Extremes Risk Analysis Matrix



Source: Material provided from PAGASA

Figure 2-48 Activities of PAGASA related to climate change

PAGASA also uses the Global Satellite Mapping of Precipitation (GSMaP) provided by JAXA to monitor precipitation and forecast floods, which are available to the public.



Source: PAGASatRex website

Figure 2-49 Use of Satellite Global Maps for Rainfall in PAGASA

Although weather observation data is necessary to accurately assess climate change risk according to regional characteristics, there is a limitation of seasonal forecasts and agricultural weather information according to regional characteristics and crops grown, due to a lack of maintenance equipment and delays

in updating equipment. In addition, the development of climate-indexed insurance policies also requires accumulated regional weather data, which is in short supply.

One of the challenges for PAGASA, which is responsible for weather observation, is the number of weather stations, especially the need to strengthen automatic weather stations (AWS) that can collect weather data automatically. Another challenge is the large area covered by existing automatic weather stations, ranging from 100 to 150 km. For example, precipitation stations in Japan's AMeDAS (Automated Meteorological Data Acquisition System), a regional meteorological observation system, are located at approximately 1,300 locations across the country at intervals of approximately 17 km.

The support needs on the development and installation of weather stations in the rural areas, as well as the calibration of the equipment (equipment to calibrate the weather stations, capacity building of the technicians and human resources) were confirmed by PAGASA.

In the agricultural sector, temperature and solar radiation data, in addition to precipitation, are essential for yield prediction, and AWS installation is required by the Bureau of Soil and Water Management (BSWM) of the Department of Agriculture and the Philippine Rice Research Institute (PhilRice).

There is also a need to instruct staff providing agricultural guidance on how to use the data obtained. Capacity building for PAGASA and the Department of Agriculture's CIS is planned through the FAO-supported GCF-APA project (Adapting Philippine Agriculture to Climate Change), but the area covered is limited to nine provinces. The need for nationwide expansion support has been raised by DA-CRAO.

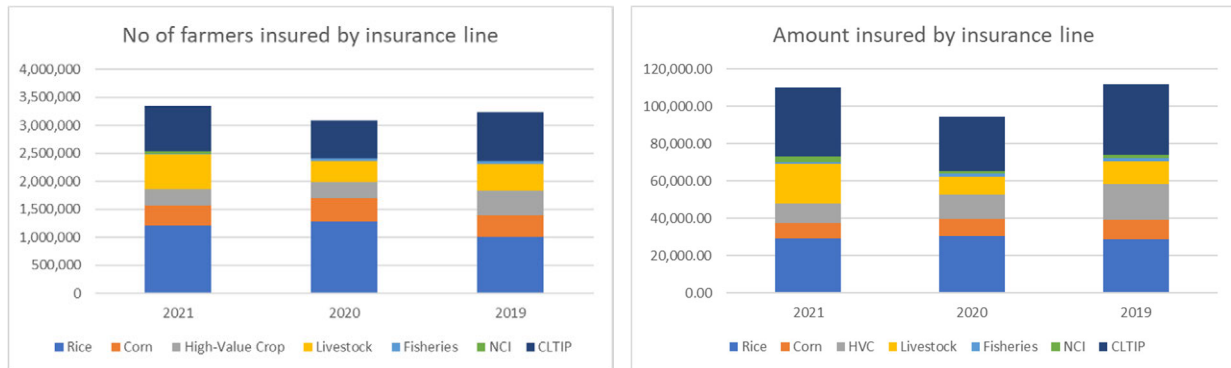
d) Agricultural insurance

Agricultural insurance programs that cover production loss and damage are very important to farmers and fisherfolks who are vulnerable to climate and disaster risks. Agricultural insurance is mainly provided by the Philippine Crop Insurance Corporation (PCIC) which is a public institution.

PCIC is a public agricultural insurance program implementing agency which was established based on P.D. No. 1467. PCIC covers damages such as crop damages from climate disasters and pests and diseases, and other agricultural assets (agricultural machinery, transport equipment, infrastructure)

By the end of the year 2021, the total number of farmers and fisherfolk that enrolled in PCIC's insurance programs reached 3,357,540. They were provided insurance cover worth about PhP 110.095 Billion. The volume of enrollment means that about 30.8% of the insurable farmers and fisherfolk have been provided insurance. The universe of agricultural insurance beneficiaries is the 10.9 Million farmers and fisherfolk listed in the Registry System for Basic Sectors in Agriculture (RSBSA). 73.23% of the total number of insured were fully subsidized, so it has become clear that the this agriculture insurance is highly dependent on government. Among the crop insurance lines, rice insurance continued to dominate in terms of participation. It accounted for 36.02% of the total insured. Livestock insurance followed, accounting for

18.18%; corn insurance came in third, accounting for 10.72% of those insured. In the non-crop insurance lines, the credit and life term insurance program (CLTIP) accounted for 24.2% of the total insured. According to interviews with PCIC, there are no major differences in gender. The number of insured appears to be small compared to the amount of disaster damage to the fishery.



Source: PCIC Annual Report 2021-2019

Figure 2-50 Number of Farmers and Fisherfolk and Amount Insured

It should be noted that the insurance products offered by PCIC are suitable for small-scale subsistence farmers (e.g., loss coverage) with a cultivation area of 0.5-1.0 h. In interviews with PCIC, it was clear that the limited budget does not allow for adequate coverage for small-scale businesses and women farmers who are vulnerable to weather-related disasters, etc., and that PCIC does not have a reinsurance mechanism.

Furthermore, it is a challenge for PCIC to quickly respond to insurance claims after a disaster occurs, and the company aims to pay within 20 days by shortening the examination period. In April 2022, PCIC signed an MOA with Land bank to build a system that allows agricultural insurance policyholders to receive insurance money from ATMs using their bank cards. This system has been tested since April 2023.

The funds for the agricultural insurance program provided by PCIC comes from the annual General Appropriations Act (GAA) but the continuity of this fund is not clear. The number of finance users linked to RSBSA is increasing, and the establishment of a sustainable system is required.

Recently it has been receiving support from donors such as ADB and are developing climate index agricultural insurance products. The current project is a pilot and several issues are identified. Due to the shortage of past climate data and insufficient coverage of installation of automatic weather stations (AWS), the low correlation with the index and actual damage was found in some cases. However, PCIC is interested in this method since, while there are limitations and challenges, it requires less assessment costs.

For agricultural insurance, the strengthening of the PCIC organization is to be supported by WB, and the development of a mid-term agricultural insurance program roadmap as well as new insurance products are to be supported by ADB.

e) Agricultural Finance Program

The agricultural sector has a number of loan programs available to small farmers, businesses, and others. The following is a list of the main programs that have been offered to date. The Agricultural Credit Policy Council (ACPC) is the implementing agency for the SURE program, which aims to provide immediate recovery assistance to victims of disasters.

The SURE program is an interest-free, unsecured loan for disaster victims registered in the Registry System for the Basic Sectors in Agriculture (RSBSA), once the damage level is determined by the LGU after a disaster occurs, the loan is disbursed immediately. Users are required to repay the loan within three years.

In addition to the ACPC, there are also industry promotion programs offered by specific industry-related agencies such as the Bureau of Fisheries and Aquatic Resources (BFAR) of the Department of Agriculture, the National Tobacco Administration (NTA), the Sugar Regulatory Administration (SRA), and other government financial institutions such as the Land Development Bank of the Philippines (LDB) and the Development Bank of the Philippines (DBP).

Producers, companies, etc. registered with RSBSA are making progress in accessing finance, but RSBSA registration of fisher folks who fish while traveling has not progressed, and fisherfolks are not making progress in accessing finance.

Table 2-83 Major Credit Programs in the Agricultural Sector

Lead agency	Program Overview	subject (of taxation, etc.)				
		whole	Crop	High Value addition	Livestock	Fisheries
ACPC	Programs for small-scale farmers, disaster/epidemic response, SMEs, etc.	✓	✓		✓	✓
DA-BFAR	Aquaculture support program in collaboration with the Land Bank (e.g. BFAR- Land Bank Partnership for the Promotion and Development of Mariculture Park Program (PDMP))					✓
DA-NTA	Programs targeting agricultural production through integrated farming methods (e.g. Integrated Farming and Other Income Generating Activities Project- Tobacco Contract Growing System)		✓	✓		
DA-SRA	Socialized Credit Program			✓		
LBP	Diverse programs to support small-scale farmers and institutional horticultural farmers (e.g. Agricultural Competitiveness Enhancement Fund (ACEF))	✓	✓	✓	✓	✓
DAR	Credit Assistance Program for Program Beneficiaries Development	✓				
DBP	Programs for farmers implementing sustainable farming practices	✓		✓	✓	

Source: Agricultural Credit Policy Council

Based on the above, it was confirmed that the following issues exist in advancing climate change adaptation measures.

- Strengthen the capacity of staff in the DA responsible for planning adaptation measures, and consider countermeasures,
- Insufficient equipment such as AWS to assess climate change risks,
- Strengthen the capacity of staff of RFOs and LGUs for the dissemination of climate change adaptation measures,
- Development of farming tools for small-scale farmers

3) Status of donor support

The DA's ongoing and planned climate change related projects with development partners are as follows.

Table 2-84 Status of donor support (agriculture sector: common issues)

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
ADB	Project name: Accelerating Climate-resilient Agriculture in the Philippines Phases 2 (part of implementing ADB Policy-based Loan Sub program 2 on Climate Change Action Plan) Period: 2023-2024 Objective/content: Strengthening climate resilience in the agriculture sector (including supporting (support DA-CRAO, supporting MRV activities related to NDC, implementing CRVA at the province level, enhancing CIS), strengthening climate resilience in the natural resources and environment sectors, improving agricultural insurance for climate risk management, supporting implementation of the organic agriculture methods R&D of climate smart technologies	DA	Ongoing
CIRAD* ADB-AFD	Project name: Support for Research and Development for the Agriculture Policy Reform Agenda of Climate Change Action Program Period:2023- Objective/content: As part of CCAP Subprogram 2 above, 5 R&D projects on climate smart technologies will be implemented in CCAP	DA-CRAO DA-BAR	Ongoing
FAO	Project name: Development of the agriculture component of the Philippines' NDC under the Paris Agreement Period: N/A Objective/content: cost and benefit evaluation of NDC mitigation measures in the agriculture sector	DA-CRAO	Done
FAO (GCF)	Project name: Adapting Philippine Agriculture to Climate Change (GCF-APA) Period: 7 years (2023-2030) Objective/content: CIS enhancement in 9 provinces, agribusiness development, mainstreaming CRA	DA DOST-PAGASA	Ongoing
GIZ-	Project name: Towards a South-South Collaboration on Climate Information Services Project (SSCIS) Period: 2019-2024	CCC, DOST, UP, DENR, DA-DOH	Under preparation

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
	Objective/content: Improve the service of CIS and share the experience at the Climate Vulnerable Forum		
GIZ	Project name: Strengthening Disaster Resilience and Risk Mitigation through Ecosystem-based Planning and Adaptation Period: 2021-2025 Site: Region 8 – Eastern Visayas. Objective/content: piloting of ecosystem-based measures based on biodiversity, development of climate risk insurance products and national frameworks for SMEs, infrastructure and agriculture	NEDA, DA	Ongoing
WB	Project name: Philippine Rural Development Project Additional Financing 2 Period: Sept 2021-Jul 2023 (started 2015) Objective/content: enterprise development of agriculture and fishery communities, access to markets, strengthening of small-scaled producers ⁴³	FOS***	Ongoing
GGGI**- KOICA	Project name: Climate Resilient and Inclusive Green Growth for Poor Rural Communities- Accelerating Implementation in the Agriculture Value Chain Period: 2020-2024 Objective/content: Develop a Climate Vulnerability and Risk Information System (CVRIS) and related climate resilient policies Establish a new Provincial Agricultural Center (PAC) Provide catalytic investment and technical assistance plan (ITAP) to four (4) agri-MSMEs Operate Private Sector Advisory Group (PSAG) to provide strategic and technical guidance	Oriental Mindoro DTI, CCC	Ongoing

Source: JICA Survey Team

*CIRAD: French Agricultural Research Centre for International Development

**GGGI: Global Green Growth Institute

(3) **Agricultural Production**

1) **Status of the subsector**

Agricultural production in the Philippines can be broadly divided into food crops for domestic consumption, such as rice and corn, and cash crops for export, such as sugarcane, coconut, and banana. The former are small-scale operations, while the latter are mainly large plantations that were formed during the colonial period of Spain and the United States.

The production volume and planted area of major crops are shown in the table below. Comparing 2010 and 2020, there is an increasing trend in the planted area, except for coffee, but production is decreasing, except for rice and corn. Of the total cultivated area, rice accounts for 35%, corn 19%, and coconut 27% (2010-2016 average).

⁴³ DA (N/A). Overview. <http://prdp.da.gov.ph/about-us/overview/>

Table 2-85 Volume of Production for major agricultural products (Thousand tons)

Crops	2010	2015	2016	2017	2018	2019	2020	2020/2010
Sugarcane	26,395.9	29,286.9	24,730.8	20,719.3	24,398.9	26,277.4	24,398.9	0.92
Rice	18,032.5	19,276.3	19,066.1	18,814.8	19,294.9	19,960.2	19,294.9	1.07
Coconut	15,863.8	14,049.1	14,726.2	14,765.1	14,490.9	14,717.3	14,490.9	0.91
Banana	9,226.8	9,166.3	9,358.8	9,157.7	9,056.1	9,091.3	9,056.1	0.98
Corn	7,407.1	7,914.9	7,771.9	7,978.8	8,118.5	8,300.3	8,118.5	1.10
Rubber	443.0	407.0	423.4	431.7	422.4	430.6	422.4	0.95
Coffee	88.9	62.1	60.3	60.0	60.6	60.6	60.6	0.68

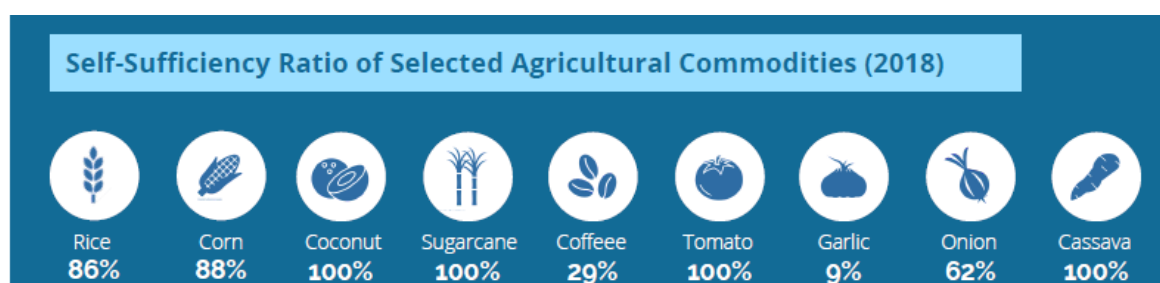
Source: PSA

Table 2-86 Area Planted/ Harvested for major agricultural products (Thousand hectare)

Crops	2010	2015	2016	2017	2018	2019	2020	2020/2010
Rice	4,354.2	4,656.2	4,556.0	4,811.8	4,800.4	4,651.5	4,718.9	1.08
Corn	2,499.0	2,561.9	2,484.5	2,552.6	2,511.4	2,516.7	2,553.8	1.02
Coconut	3,575.9	3,517.7	3,565.1	3,612.3	3,628.1	3,651.9	3,651.3	1.02
Sugarcane	354.9	421.3	410.1	437.5	437.5	379.3	399.1	1.12
Banana	449.4	443.4	442.9	446.8	447.9	449.0	451.2	1.00
Rubber	138.7	222.6	223.3	226.3	228.9	229.4	230.7	1.66
Coffee	121.4	113.7	114.8	112.8	113.4	112.0	113.3	0.93

Source: PSA

The self-sufficiency rate of major crops in the Philippines is shown below. Rice, one of the staple foods, has been imported since 1995 due to the increase in consumption resulting from population growth and the conversion of rice paddies for economic development.



Source: DA Annual Report 2019

Figure 2-51 Self-sufficiency rate of major agricultural products

2) Relevant policies and plans

The climate change related policies and plans of DA for production, soil and water resources management are summarized below.

(a) **Philippine Rice Industry Roadmap 2020-2030 (PRIR)**

With the vision to always meet the food demand, the following goals are listed with the following aims to be achieved by 2026 and become more climate resilient .

- At least 60% of the rice producers are insured

- All of the rice producers use climate resilient agricultural technologies
- All of the rice producers who are affected by disasters receive seeds for rapid recovery

To achieve the vision that is set in the roadmap, rice production areas which the productivity is mid-level will be prioritized for irrigation development by NIA or other small-scaled irrigation projects. Support on relevant technology and capacity building will be provided to the beneficiaries.

(b) Commodity Industry Roadmaps

DA has developed commodity industry roadmaps for 20 priority commodities which includes the roles of all relevant private, public, academic stakeholders and cooperatives. Climate mitigation actions are also planned for each commodity. The commodities are high value crops, livestock, fishery and rice. The planned actions and strategies relevant to climate change are summarized below.

Table 2-87 Commodity industry roadmaps and plans relevant to climate change

Roadmap	Plans and strategies for climate change
Philippine Yellow Corn Industry Roadmap (2021-2040)	The possibility of corn production being affected by climate change is raised, and climate change actions are included as Key Result Areas (KRAs). Specific initiatives include the implementation of climate smart farming and training and capacity building for farmers are being considered.
Philippine Abaca Industry Roadmap (2021-2025)	Droughts and typhoons are some of the effects of climate change that are being raised as issues and development of climate resilient varieties are being considered as adaption measures.
Philippine Banana Industry Roadmap (2021-2025)	Considering the issues of the whole industry along with climate change related issues is mentioned as the function of the Banana Industry Development Council (BDIC), but there are no specified climate adaptation measures in the roadmap.
Philippine Cacao Industry Roadmap (2021-2025)	There is no mention of climate change.
Philippine Coconut Industry Roadmap (2021-2040)	The effect of climate change on the agriculture sector is mentioned, but there are no climate change adaptation measures planned.
Philippine Coffee Industry Roadmap (2021-2040)	There is no mention of climate change.
Sugarcane Roadmap 2020	Adaptation measures include Cloud Seedling, water system conservation for irrigation, and CIS use in cultivation, but climate change impacts are not mentioned. There is mention of increasing biofuel production as a mitigation measure. The review of the roadmap has not been completed.
Philippine Mango Industry Roadmap (2021-2025)	Although the OneDA Reform Agenda is followed and the impact of climate change on the mango industry is described, no specific response or adaptation measures are planned.
Philippine Onion Industry Roadmap (2021-2040)	One of its missions is to address climate change. Specific activities are described related to the use of agricultural insurance against natural disaster damage.
Philippine Vegetable Industry Roadmap (2021-2040)	Addressing climate change has been identified as one of the priorities. Providing weather information (weekly and 6-month forecasts) to producers and implementing climate change adaptation and mitigation measures, implementing

Roadmap	Plans and strategies for climate change
	capacity-building activities related to climate change preparedness in the short-term, and developing climate resilient varieties in the medium-term are listed.

Source: Prepared by JICA Survey Team based on the Commodity Industry Roadmaps for livestock. <https://www.pcaf.da.gov.ph/index.php/commodity-industry-roadmap/>

As shown in the table above, some commodity roadmaps for high value-added agricultural and fishery products do not take into account the impact of climate change, so it is necessary to consider the impact of climate change on production and what countermeasures will be required.

(c) Comprehensive Agrarian Reform Program

Beginning in 1988, the Philippines initiated a Comprehensive Agrarian Reform Program covering almost three-quarters of the total national agricultural land. It aims to distribute land to landless farmers and give them ownership rights.

By the end of 2015, land redistribution was mostly completed, but procedures for granting ownership and transferring ownership from one generation to another have been delayed; in July 2021, the government amended the Public Land Law and the Asset Registration System (Republic Act 11573) to simplify procedures and requirements for identifying land holders.

(d) National Organic Agriculture Program (NOAP)

This program is based on RA.10068, also known as the "Organic Agriculture Act of 2010" issued in April 2010, which aims to develop and promote organic agriculture in the Philippines⁴⁴. The policy aims at food security of the country, empowerment and resilience of farmers and fisherfolk, health of farmers and consumers, and protection of the environment.

(e) Network of Protected Areas for Agriculture and Agro-Industrial Development (NPAAAD) and Strategic Agriculture and Fisheries Development Zones Network of Protected Areas for Agriculture and Agro-Industrial Development (NPAAAD) and Strategic and Fisheries Development Zone (SAFDZ)

Under the Agriculture and Fisheries Modernization Act (RA.8435), the Department of Agriculture (USDA) identified the Network of Protected Areas for Agriculture and Agro-industrial Development (NPAAAD) in 1998, which are defined as prime agricultural lands whose soil, topography, and agro-climate are suitable for agricultural and fishery development. Strategic Agriculture and Fisheries Development Zones (SAFDZs), on the other hand, refer to strategically located and accessible areas within the NPAAAD. These areas are technically identified by the Department of Agriculture, verified by local governments, and serve

⁴⁴ Republic of the Philippines Department of Agriculture National Organic Agriculture Program (N/A). About the Program. (last checked 14th August, 2023) . <https://noap.da.gov.ph/about-us/about-the-program/>.

as areas to showcase modern agricultural and fisheries technologies. a review of this map was conducted over the 2018-2021 period.

(f) National Soil Health Program (NSHP)

Through the National Soil Health Program (NSHP), the Department of Agriculture seeks to adopt a systematic and comprehensive approach to addressing soil health. The main goal is to ensure sustainable use and management of soil resources, ultimately increasing farmers' productivity and income. The program includes four main components with the following objectives

- Institutionalize a national soil monitoring and rehabilitation program.
- Establish a mobile soil laboratory for continuous monitoring of soil health.
- Strengthen collaboration with relevant agencies and organizations to maintain food security.

Improve soil macronutrient and micronutrient analysis by developing a manual on the use of physical and biological parameters as indicators of soil health.

This program is being implemented from 2021 to 2023. In 2022, the program completed the identification and mapping of soil reference and soil monitoring sites across 81 states. This will ensure regular updating and mapping of soil fertility and land suitability data.

(g) National Agriculture and Fisheries Research for Development and Extension Agenda (NAREA) 2023-2028

To address the impacts of climate change on agricultural productivity and the livelihoods of farmers and fisherfolks, DA, in cooperation with the Bureau of Agricultural Research (DA-BAR) and other DA-related organizations and research institutions, developed the Climate Change Research and Development and Extension Agenda and Program (CC RDEAP) for Agriculture and Fisheries in 2011. Through the implementation of the CC RDEAP (2011-2015, 2016-2022), adaptation and mitigation technologies to cope with climate change has been developed.

For 2023 and beyond, R&D is being integrated into the National Agricultural and Fisheries R&D Agenda (NAREA 2023-2028), along with R&D on high value crops and cross-sectoral priorities.

For climate change, the following R&D is positioned as necessary.

- Climate Suitability Maps
- R&D on climate change impacts and resilience in the production systems
- Climate change adaptation and mitigation measures (e.g. climate proofed animal housing)
- Climate risk insurance model
- Agricultural extension and advisory based on climate

3) **Implementation status of climate change measures**

(a) **Organization to Promote Climate Change Action**

Relevant departments and organizations in the agricultural production subsector include the following organizations

Table 2-88 Climate change-related departments in the agricultural production subsector

category	responsible organization	role
Agriculture in general	DA Field Operations Service (DA-FOS)	Cooperation with RFOs in banner programs
	DA-RFOs	Various projects, agricultural and fishery guidance
	LGUs	Various projects, agricultural and fishery guidance
	Philippine Coconut Association (PCA)	Promotion of coconut industry
	Sugar Regulatory Administration (SRA)	Promotion of the sugar industry
Farmland management	DA-BSWM	Soil analysis and evaluation
R & D	DA Agricultural Research Service (DA-BAR)	R&D policy formulation
	Rice Research Institute, Department of Agriculture, Philippines	Development of Smart Agriculture Technology in Rice Cultivation
	University of the Philippines	Development of Smart Agriculture Technology
private-sector business	Agricultural producers, agribusiness	Agricultural production, processing and sales of agricultural products, etc.

In addition to the activities of the AMIA program mentioned above, efforts to address climate change in agricultural production are ongoing in the food security, poverty alleviation, and seven banner programs (rice, maize, high-value crops, livestock, fisheries, organic agriculture, and halal)⁴⁵ at the national level led by DA, and in the implementation of the commodity roadmaps.

The specific climate change measures in the Banner Programs and the commodity roadmaps are being promoted by DA Field Operation Service (DA-FOS) and 16 Regional Field Offices (RFOs), which are supported by the relevant agencies of DA.

DA-CRAO is providing training to agencies in charge of banner programs on the use of AMIA policy-making support tools such as CRVA, and collaboration with the National Rice Program is progressing. It was found that further collaboration is required for other banner programs.

⁴⁵NEDA (2019). Department of Agriculture (DA) Banner Programs (Rice, Corn, National High Value Crops, Livestock and Organic Agriculture Programs). <https://sdg.neda.gov.ph/department-of-agriculture-da-banner-programs-rice-corn-national-high-value-crops-livestock-and-organic-agriculture-programs/>

(b) Implementation status of Climate Change countermeasures

Agricultural production is vulnerable to negative impacts from climate change. For example, rising temperature and changes in rainfall patterns can lead to a decrease in productivity due to insufficient moisture for crop cultivation, soil degradation, decrease in farmland due to salt damage in coastal areas caused by rising sea levels, and outbreaks of diseases and pests.

The status of climate change initiatives in the agricultural production subsector in response to these climate change risks is outlined below.

a) Research on climate change countermeasures in agricultural production

The direction of research and development related to climate change and priority research items are indicated in NAREA 2023-2028 published by the Department of Agriculture.

Rising temperatures and changing rainfall patterns will not only affect crop growth, but also soil and water conditions on farmland as a growing environment, which is expected to have a significant impact on crop yields.

Improvement of agricultural soils is a climate change adaptation and mitigation measure because its increased fertility and health is expected to prevent soil runoff and increase the ability of agricultural activities to fix carbon⁴⁶.

The following is a list of future efforts to develop technologies for soil and water management as outlined in the NAREA.

Table 2-89 Technology development areas for soil and water management

Crop Type	Period	Research Area	Expected Output
Rice	2024-25	Assessment of water quality in Small-scale Irrigation System (SSIS) for rice irrigation and other agricultural uses	water quality assessment of the SSIS
	2023	Impact assessment of production related products and technologies	Solar Powered Irrigation and Fertigation System (SPFS) assessed
	2023	Assessment of irrigation facilities	irrigation policy innovations in the design of SSIS
Cassava	2024-25	Nutrient optimization and upscaling of appropriate fertilization management	Site-specific nutrient management, policy recommendation for scaling
	2024-25	Climate-resilient production systems and agroecosystems	Production POT for specific agro-climatic/ agroecosystem
	2026-2028	Development/Refinement of processing protocols and facilities	Technologies for the utilization of cassava by-products and wastes

⁴⁶ MAFF, Forestry and Fisheries Technology Council, Forestry Agency, Fisheries Agency (2022). R&D and Social Implementation Plan for the Green Innovation Fund Project "Development of CO2 Reduction and Kyushu Technology for Food, Agriculture, Forestry and Fisheries" Project.

Crop Type	Period	Research Area	Expected Output
Other Root Crops	-	Promotion of enhanced cultural management practices towards organic agriculture	Green manuring technology and recommended crops and seeds for green manuring
	-	GIS-Based site suitability assessment for sweet potato production	GIS-Based suitability assessment for sweet potato production

Source: JST based on NAREA

NAREA2023-2028 is promoted by the Department of Agriculture, Bureau of Agricultural Research (DA-BAR). During the hearing, opinions were expressed about the necessity of research and development and human resource development related to climate change, and the possibility of technical cooperation based on NAREA. ADB/AFD are supporting R&D activities in the project Accelerating Climate-resilient Agriculture in the Philippines Phases 2.

b) Effort in Rice production

As an example of agricultural technology initiatives to cope with climate change, an example in rice production is shown below.

Table 2-90 Agricultural technologies to adapt to climate change (rice)

Value Chain Stage	Technologies / Research Outputs
Input	Alternative rice-based cropping systems for climate change adaptation
	Solar-powered motor pump for irrigation systems of small farms
	Water harvesting technologies to improve water use efficiency
	Alternate wetting and drying (AWD) as water-saving technology: drum seeder, water-saving technology in electric-driven water pump areas, Indian Intensification System of practice in rice production, SRI and Legowo row planting technology, water management of rice-based cropping system, and laser land leveling technology, Automon pH
	Site suitability analysis for small scale Irrigation through GIS-based water resource assessment
	Solar-powered irrigation system (SPIS) for rice production
	Soil loss assessment in Small Water Impounding Projects (SWIP) areas
	Soil health cards and soil test-based fertilizer recommendation
Production	Upland rice based cropping patterns in the context of climate change
	Simulation of the growth and yield performance of selected rice-based cropping system using DSSAT under various climate change scenarios
	Assessment of the climate change adaptation programs/strategies of institutions in Ilocos Norte towards a resilient rice-based production
	Local observations, evidence, and adaptation strategies to climate change impacts for resilient rice-based production system

Source: JST based on NAREA

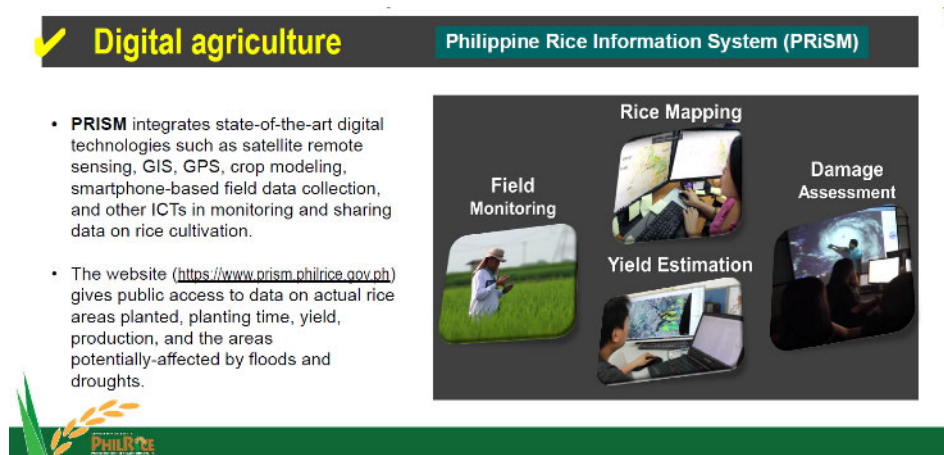
The Department of Agriculture's Philippines Rice Research Institute (PhilRice) aims to improve the competitiveness of the Filipino rice farmers and the Philippine rice industry and transform it to be more profitable, resilient, and sustainable through responsive, balanced, environmentally sound and partnership-based research, development, and extension.

As climate change adaptation measures, PhilRice provides the assessment of the impact of Climate Change on rice yields, development of climate change tolerant varieties (Drought tolerant, heat tolerant, flood waterlogged, etc.) and seed distribution projects.

As climate change mitigation measures, it is developing agricultural technologies that take into account energy and water conservation and is promoting the use of intermittent irrigation technology called Alternate wetting and drying (AWD) and direct seeding of rice, both of which are believed to be effective in reducing methane emission from paddy field.

The institute is promoting smart agriculture and digital agriculture using ICT, and sharing the results as the Philippine Rice Information system (PRiSM). Although efforts are being made to digitize rice field data, progress has only reached about 30% of all rice fields. It is also developing and distributing farming guidance tools including pest and disease diagnosis for rice and weed control.

In order to accelerate these efforts, DA-PHILRICE need to strengthen local research facilities, including automatic weather observation equipment (AWS), and establish a data center to analyze accumulated data and utilize it for new initiatives.



Source: PhilRice data.

Figure 2-52 Promoting Digital Agriculture at the Philippine Rice Research Institute

Intermittent irrigation (AWD) technology, which reduces methane emissions from paddy fields, is widely used in the Asian region. Japan's National Agriculture and Food Research Organization (NARO) and Japan International Research Center for Agriculture and Science (JICAS), in collaboration with the International Rice Research Institute (IRRI), are continuing to research and develop technologies to reduce GHG emissions in monsoon Asia. IRRI is building a methodology to credit the reduction effects of AWD.

There is also a movement among private companies to collaborate with farmers' associations in the Philippines and other organizations to reduce methane emissions and convert them into credits through AWD. AWD is limited in that it can only be introduced in locations with irrigation facilities and water

management. Farmers also need incentives to take action, and consideration has begun to convert them into credits.

Currently, NIA, an Canadian company, and IAs are working together to reduce methane using AWD and convert it into credits and PhilRice is cooperating with technical support such as methane measurement and water management.

In addition, several Japanese companies are considering carbon credit projects in the Philippines. In the interview with a company that is conducting field demonstration projects, they mentioned several challenges in developing the project include scrutinizing the ownership of the target farmland, securing someone to carry out on-site monitoring, and a buyer for the carbon obtained.

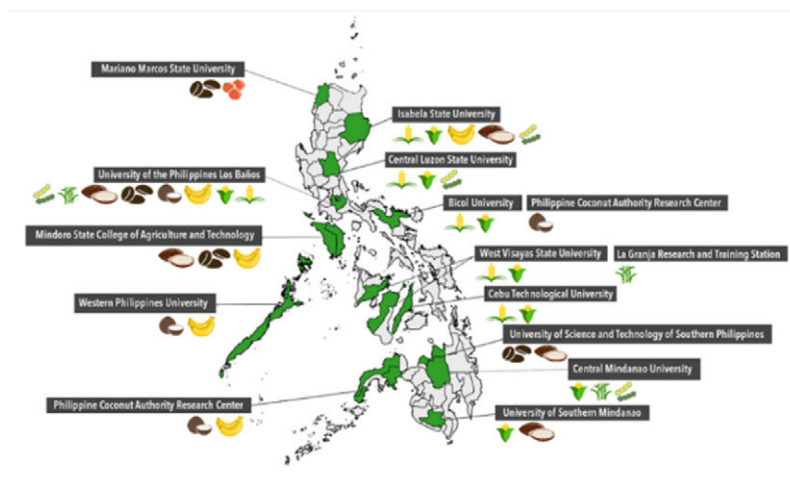
c) Effort in production in corn, banana, cacao, coffee, etc.

Project SARAI (Smarter Approaches to Reinvigorate Agriculture as an Industry in the Philippines) is a research program funded by the Philippine Council for Agricultural, Aquatic, and Natural Resources Research and Development (DOST-PCAARRD), that works toward reducing climate risks by providing agricultural stakeholders with information on region-specific crops.

The project, being implemented by the University of the Philippines Los Baños (UPLB), 11 state universities and colleges (SUCs), and six central government agencies, implements near real-time monitoring of production sites using remotely captured images.

It also aims to establish SARAI hubs at the regional and community levels where farmers can easily access up-to-date information and report on the status of their farms.

The project focuses on rice, corn, banana, coconut, coffee, and cacao. At the hearing, the limited information provided to farmers about horticultural crops was raised as an issue, and they confirmed their intention to expand the range of crops covered in the future.



Source: Project SARAI materials

Figure 2-53 Project SARAI Participating Universities

Several agricultural stakeholders in rural areas, including RFO staff, provided information on the emerging impacts of climate change, the effectiveness of CIS and various farming tools, and the shortage of technical extension staff at regional offices and LGUs. It was found that rural areas are actively recruiting young staff to supplement the scarce human resources and that there is a need to develop reliable farming tools. Farming tools have already been developed for major crops such as rice, corn, and banana. There is a need to improve existing tools and consider the need for new tools, such as pest and disease control measures in light of the impacts of climate change.

As mentioned above, DA-CRAO expressed its support needs on tools that can provide farming advice based on local weather, soil conditions, agricultural products, etc. in order to respond to the diversification of cultivation, while DA-BAFE has support needs on tools that can provide such information as yield prediction, available materials and equipment, and market information, etc.

The farming tools confirmed in the Survey are shown below. Several applications are available on smartphones.

Table 2-91 Examples of farming tools developed in the Philippines

Type	Name of the Tools	Contents	Service Provider
Farm weather	Payong PAGASA BETA	A mobile app that provides daily farm weather forecasts and advisories	PAGASA
	Agro-climatic Advisory Portal - BICOL(ACAP-BICOL)	A web-based system that provides daily, 10days, seasonal weather forecasts and advisories for municipal level	DA-AMIA
Rice	Rice Crop Management and Advisory Services (RCMAS)	Computer and mobile phone-based tool providing rice farmers with a personalized crop and nutrient management guideline.	
	PalayCheck Super App Leaf Color Chart (LCC) App MOET App eDamuhan Binhing Palay App Bantay Palay App	Mobile phone-based tools providing rice farmers with fertilizer, pests and disease, rice varieties and market price, etc.	DA-PhilRice
	Pest Advisory for Rice	A web-based system that provides pests and disease information for rice farmers	DA-BPI
	AgriDoc App	Farm and crop data can be organized, stored, retrieved and reprocessed to provide just-in-time knowledge, and simple information.	UPLB
Banana	BANATECH	A mobile app used to determine the harvest date of 'Lakatan' & 'Saba' bananas	Project SARAI
Coffee	CAPHE (Coffee Application Harvest Estimator)	A mobile app that forecasts the best harvest date of Robusta, Arabica, Liberica, and Excelsa coffee.	Project SARAI
Multi-production	Smarter Pest Identification Technology (SPidTech)	Android application which can be used to identify pests for rice, corn, coffee, cacao, coconut, sugarcane, banana, soybean, onion, and tomato	Project SARAI

Type	Name of the Tools	Contents	Service Provider
	e-Extension Program for Agriculture and Fisheries	e-Extension portal includes online certificate courses and digital learning resources such as technology kits, video clips, and mini-tutorials available.	DA-ATI
Farmland Management	Water Advisory for Irrigation Scheduling System (WAISS)	WAISS composes field units and software to monitor the soil moisture conditions.	Project SARAI
	SARAI-Enhanced Agriculture Monitoring System (SEAMS)	A web-based system that uses GIS, remote sensing and Normalized Difference Vegetation Index, etc. to monitor the status of agricultural crops.	Project SARAI
Machinery and Infrastructure	Geographic Information System for Agricultural and Fisheries Machinery and Infrastructure (GEOAGRI)	A web mapping application that displays information on Farm-to-Market Roads (FMR) projects and other Agri-fisheries Machinery and Rural Infrastructure Projects.	DA-BAFE

Source: Prepared by JICA Survey Team

Japan's Ministry of Agriculture, Forestry and Fisheries has introduced to the public the following technologies and services developed and provided by universities, research institutions and private companies related to smart agricultural technologies on cultivated agriculture (paddy rice, field crops, outdoor vegetables, greenhouse horticulture, and fruit trees) and livestock farming.⁴⁷ As of January 2024, 350 technologies are listed for the cultivated agriculture and 60 technologies for the livestock farming, including farming tools that are becoming increasingly popular and utilized in Japan.

- Management of farming management data: Technology to manage materials, sales, labor, etc.
- Cultivation data utilization: Technology that utilizes cultivation-related data such as weather and the know-how of experienced farmers.
- Environmental control: Technology for managing water in rice fields, irrigation in fields, temperature control in gardening greenhouses, etc.
- Autonomous driving/ work reduction: Technology that assists the operation of automatically operating robots and machines, and reduces the labor of agricultural work.
- Sensing/monitoring: Technology that provides data on the status of crops, the environment, etc.

d) Effort in Coconut production

Coconut is a typical export cash crop in the Philippines. In recent years, production has been surpassed by countries such as Indonesia and India, and there is a need for improved varieties to improve productivity.

⁴⁷ Smart agriculture technology catalogue https://www.maff.go.jp/j/kanbo/smart/smart_agri_technology/smartagri_catalog.html

The Philippine Coconut Association (PCA) analyzes suitable land for coconut cultivation throughout the Philippines based on information such as altitude, slope, soil quality, temperature, rainfall, and cover, identifies areas with high vulnerability, and uses this information to carry out tree planting.

The PCA intends to select varieties based on the effects of future climate change (changes in temperature and rainfall, possibility of outbreaks of pests and diseases), and to conduct multiple projects such as preserving genetic information and monitoring growth using satellite data.

In October 2023, a presidential order was issued to achieve the goal of planting 100 million coconut trees by 2028. In addition to improving productivity, PCA intends to evaluate the effects of afforestation as a climate change mitigation measure, such as soil carbon fixation and GHG absorption, and convert this into credits.

PCA mentioned the need for technical cooperation in the selection of cultivars and gene storage technology that takes climate change into account, growth management using satellite data, and verification of carbon sequestration functions according to cultivar and growing area.

e) Efforts in sugarcane production

Sugarcane is another typical cash crop for export. In recent years, production has been declining due to soil acidification, intensification of weather conditions, and outbreaks of pests and diseases.

The Sugar Regulatory Administration (SRA) has developed an El Niño Action Plan, installed weather observation and soil moisture measurement equipment, monitored the growing environment, conducted research and development of flood and flood-resistant varieties, and implemented measures to prevent soil erosion).

Eighty percent of sugarcane farmers in the Philippines are small-scale producers with an average production area of about 5 hectares. In order to achieve efficient production, farmers are clustered into groups of about 30 hectares under the BLOCK FARM PROGRAM, and productivity is being increased through the joint use of farm machinery and other measures.

SRA is currently receiving technical assistance from the Japan International Research Center for Agricultural Science (JIRCAS) to address climate change and agricultural waste recycling.

SRA mentioned the need for technical cooperation regarding cultivation management technology using remote sensing and the establishment of a system to assess damage in the event of a disaster.

f) Efforts in farm soil management

The Bureau of Soils and Water Management (DA-BSWM) is responsible for soil conservation and sustainable farmland management for agricultural production, including soil resource assessment and

mapping, farmland and water resource management, and various analyses, and it conducts research and development related to soil and water resources.

DA-BSWM has developed various soil maps (e.g., soil fertility, fertilizer guides, soil nutrients, etc.) by crop type and region, which are available on its website. It has also developed the Composite Land Degradation Index (CLDI), an index for evaluating landslides and land degradation, and is promoting its use in land use planning in LGUs. In addition, soil salinity assessments in salt-prone coastal areas have been conducted at 40 sites across the country to provide basic information for infrastructure development planning.

DA-BSWM is also in charge of the National Soil Health Program (NSHP). As a future initiative, soil fertility and land suitability data will be updated regularly, and guidance on appropriate soil and water management will be provided to farmers through the RFO based on these results. For this purpose, soil and water management researchers in rural areas are particularly important, and the need for support for continuous capacity building was identified.

Since the late 1980s, JICA has provided grant assistance to DA-BSWM for the construction of soil research facilities, the introduction of appropriate soil and water management technology in hilly and steep slopes known as marginal lands, and technical cooperation projects for the development of agricultural information systems.

Utilization of soil carbon sequestration has been added as an additional NDC PaMs. Developing research and methodologies on the dynamics of methane and nitrogen dioxide in agricultural land is important for updating and monitoring GHG inventories.

DA-BSWM and DA-CRAO confirmed the need for support in verifying soil carbon sequestration. DA-BSWM is already cooperating with FAO in developing a global soil carbon sequestration potential map. The RothC model is used worldwide to estimate soil carbon sequestration potential, but it is necessary to improve the accuracy of the model by comparing estimated values using actual soil samples and the model.

Studies on the dynamics of soil carbon, methane, and nitrogen dioxide in paddy fields are already underway in collaboration with Japan's NARO, JIRCAS, PhilRice, and IRRI. It would be useful to extend the findings to agricultural lands for other crops.

a) Efforts in farmland management

Each research institute has been working on precision agriculture (digital agriculture, smart agriculture), and PCA and SRA are aware of the desire to use satellite data and remote sensing to monitor and manage growth conditions and to improve productivity.

In order to advance precision agriculture that balances productivity improvement and sustainability, it is desirable for agricultural organizations to share basic weather, soil, and farmland data and use it as the basis

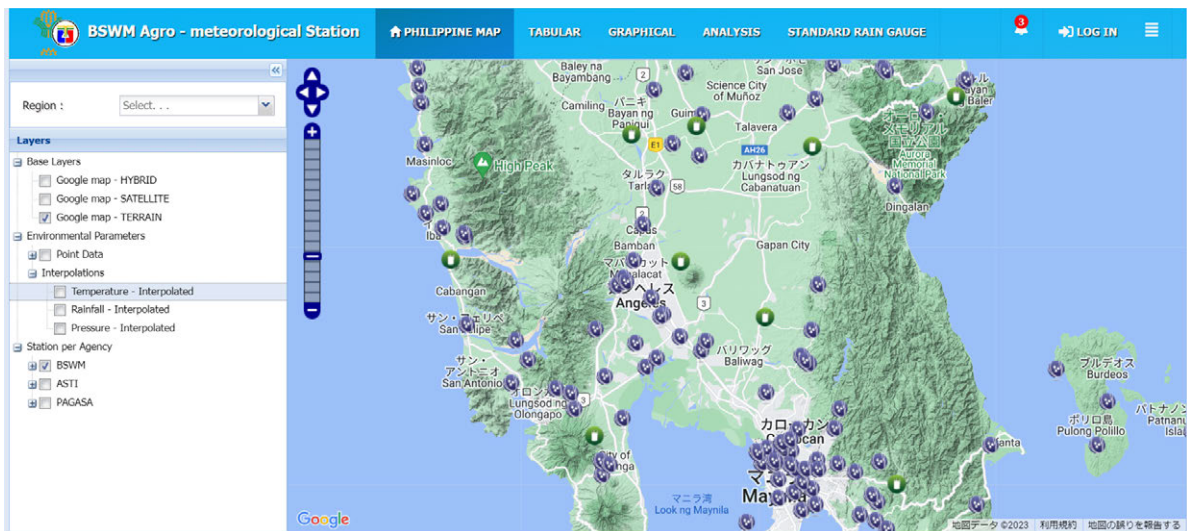
for research and development. In order to disseminate it at production sites, it is also necessary to strengthen the capacity of RFO and LGUs, which provide agricultural guidance.

DA-BSWM has jurisdiction over the management of agro-meteorological observation facilities (Agromet). Monitoring facilities for temperature, rainfall, solar radiation, soil moisture content, evaporation, etc. must be appropriately located, and data must be collected and accumulated for proper water management in agricultural lands. In the Philippines, which is a cluster of thousands of islands and has different geographical regions even within the same island, the weather often differs even within the same area, so it is important to properly select the areas where Agromets should be installed, but financial constraints limit the number of locations where it can be installed.

In the DA-BSWM, 100 automatic weather instruments were installed in 2012, and 84 of them have since been transferred to regional offices and LGUs. In addition, it has been more than 10 years since the introduction of the system, and the time has come for the equipment to be updated.

As mentioned above, yield forecasting requires data on precipitation, temperature and solar radiation, etc. Therefore, PAGASA, BSWM, PhilRice, UPLB and other related organizations should share data and establish a new mechanism for accumulation and forecasting of agricultural weather at high resolution.

In Japan, the National Agriculture and Food Research Organization (NARO), under the permission of the Japan Meteorological Agency for forecasting operations, compiles daily weather data across the country in units of about 1 km square (standard area mesh) as weather information for agricultural fields.



Source: DA. <http://agromet.da.gov.ph/>

Figure 2-54 Locations Agromets

Regarding the proper management of agricultural land, the Philippines is making progress in clarifying and registering information on agricultural land ownership. DA also has the Registry System for Basic Sectors in Agriculture (RSBSA) for agricultural workers, and as of December 31, 2022, 6.29 million agricultural

workers have been registered. This registration information also serves as basic data for various efforts by the DA, and it is necessary to continuously improve the system and ensure the accuracy of registration information (geo-referencing of registered farmers' land parcels). It is also necessary to promote interlinking with national statistical systems other than those of the DA.

4) **Status of donor support**

Climate change-related projects currently being implemented or under consideration by DA departments related to agricultural production and soil and water resources management with development partners include the following.

Table 2-92 Status of donor support (agricultural production/ soil and water resources management)

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
WB	Project name: Support to Parcellation of Lands for Individual Titling Project (Project SPLIT) Period: 2020-Dec 2024 Objectives and contents: The objective is to stabilize agricultural land ownership on 1.38 million hectares under the Agrarian Reform Law. Female farmers will become landowners to facilitate access to finance and compensation for climate disasters.	DA-DAR*	Ongoing
NARO/JIRC AS	Project name: Development of integrated cultivation management technology for GHG reduction in rice paddies in the Asian region Period: 2018-2022 Objectives and contents: Development of carbon, methane, and nitrogen dioxide dynamics models at PhilRice.	DA-PhilRice	Completed
JICA	Project name: SATREPS- The Project for Development of a hybrid water-related disaster risk assessment technology for sustainable local economic development policy Period: 2021 – 2026	UPLB	Ongoing

Source: JICA Survey Team

(4) **Irrigation Development**

1) **Status of the subsector**

The Philippines has a growing population, especially in Manila, and maintaining a stable food supply system and water security are important issues. Meanwhile, agriculture is the largest water consuming sector. Climate change has been changing rainfall patterns, making it difficult to produce rice and other crops with rainwater where rainfall has been sufficient in the past, and increasing rainfall intensity is likely to cause flooding and landslides in agricultural areas.

The status of irrigation facility development in the Philippines as of December, 2022, is as shown in Table 2-93. The percentage of the irrigable area that has facilities is 67.5% nationwide, with some areas having

more than 100% of the total irrigable area. In contrast, in the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) region, the irrigation development rate is 34%, which is low compared to the rest of the country.

Table 2-93 Irrigation development status (as of 2022)

REGION	ESTIMATED TOTAL IRRIGABLE AREA (ha)	TOTAL SERVICE AREA (ha)	PERCENTAGE (%)
CAR	111,296	114,187	102.6
REGION 1	264,491	187,005	70.7
REGION 2	457,247	331,446	72.49
REGION 3	483,830	351,945	72.74
REGION 4A	85,929	72,220	84.05
REGION 48	143,559	117,162	81.61
REGION 5	239,440	141,165	58.96
REGION 6	191,253	132,969	69.53
REGION 7	53,674	60,279	112.31
REGION 8	91,983	88,353	96.05
REGION 9	93,706	54,766	58.44
REGION 10	121,123	82,295	67.94
REGION 11	177,547	108,269	60.98
REGION 12	293,226	134,069	45.72
REGION 13	160,177	80,814	50.45
BARMM	160,150	54,819	34.23
Total	3,128,631	2,111,763	67.5

Source: NIA

2) Relevant policies and plans

The climate change related policies and plans of DA for irrigation development are summarized below.

(a) **Free Irrigation Service Act (RA10969)**

The Act was established in 2018 to reduce production costs for farmers and ensure the provision of irrigation services, including the construction, renovation, operation and maintenance of irrigation facilities to expand agricultural production. Irrigation water fees are waived for producers with farmland of 8 ha or less, while farmland owners of 8 ha or more, farmland owned by companies, plantations, aquaculture ponds, drainage purposes, and other irrigation users continue to be subject to irrigation water fees.

Irrigation services are provided by the NIA for National Irrigation Systems (NIS) with a scale of 1,000 ha or more, and by the Irrigation Associations (IAs) for Communal Irrigation Systems (CIS) with a scale of 1,000 ha or less. The operation and maintenance costs of the CIS will be borne by the NIA, and if the

NIS is implemented by IAs participating in the Irrigation Management Transfer (IMT) program, the operation and maintenance costs will be paid by the NIA. It stipulates that technical guidance be provided by the NIA to the IA.

(b) National Irrigation Master Plan (2020-2030)

The National Irrigation Master Plan 2020-2030 (NIMP) aims to realize food security and poverty alleviation by increasing the competitiveness of sustainable irrigation development and the diversification of agricultural production, the eight main components to be focused on are as follows.

- Develop a new geodatabase system and create a geographic information system of irrigable areas, water supply and demand, etc.
- Set targets and indicators in line with the PDP
- Set irrigation development targets in line with the PRIR and Rice Tariffication Act (RTA)
- Implement medium- and long-term irrigation development projects
- Develop guidelines for operation and maintenance planning, including strategies for asset management
- Integration of new water-saving technologies, climate change adaptation and mitigation measures, and disaster prevention and risk reduction into irrigation development
- Adaptation of irrigation development to agricultural diversification
- Organizational and institutional reforms for efficient implementation of the plan

The plan aims at approximately 680,000 ha of new irrigation development between 2020 and 2030 through new projects, rehabilitation projects, and multipurpose projects⁴⁸.

3) Implementation status of climate change measures

(a) Organizations Relevant to Climate Change Measures

The National Irrigation Administration (NIA) , an affiliate of the Department of Agriculture and DA - BSWM, are responsible for water resource management and irrigation facility development for agricultural production. The small development plans for small-scale irrigation projects by DA-BSWM have been integrated into the NIMP.

Both NIA and DA-BSWM are responsible for irrigation development, but their roles are divided according to the scale of irrigation. NIA is in charge of large-scale irrigation systems (more than 1000 ha is the national irrigation system and less than 1000 ha is the regional irrigation system)⁴⁹ , while DA-BSWM and RFOs

⁴⁸ NEDA, NIA, UPLBFI (2020). The National Irrigation Master Plan 2020-2030.

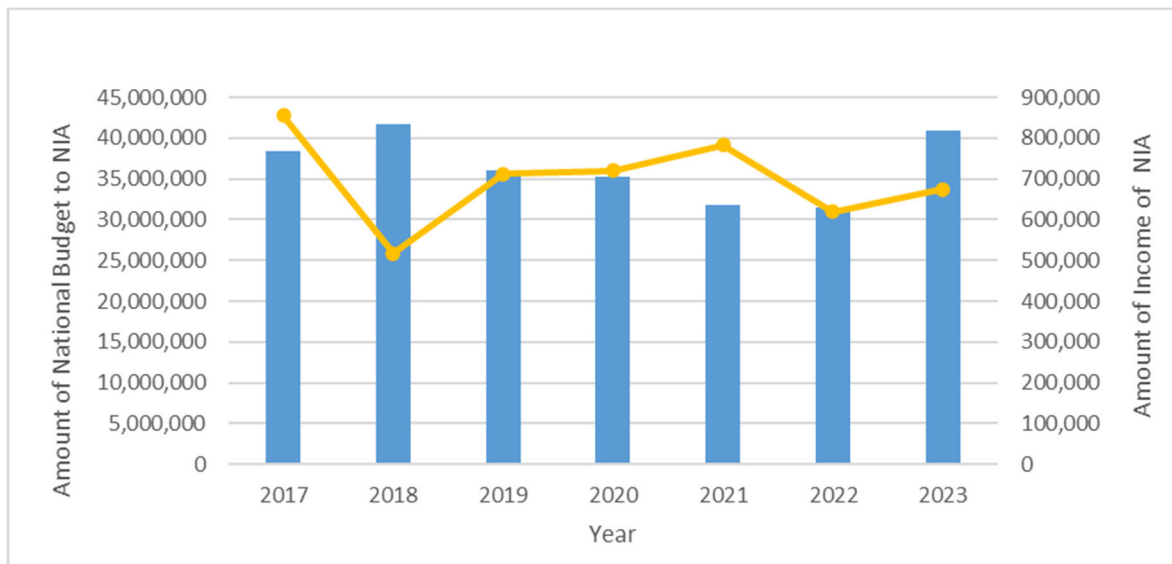
⁴⁹ NIA (N/A). Construction of Irrigation Systems. <https://www.nia.gov.ph/content/construction-irrigation-systems>

are responsible for small irrigation systems that NIA does not handle and Operation and management are carried out by the LGU and the Small Water Irrigation System Association (SWISA)⁵⁰.

(b) Climate Change Budget

The trends in the national budget for the development and maintenance of irrigation facilities and the income NIA receives from irrigation water usage fees are shown below.

In 2018, the above-mentioned Free Irrigation Service Law was enacted, and while NIA's income decreased, the national budget increased. This budget includes irrigation facility development projects, operation and maintenance costs, which averaged approximately PHP 36.5 billion for 2017-2023. Irrigation facility development projects account for approximately 70% of this. Apart from this NIA budget, the Small Scale Irrigation Project (SSIP) budget is allocated to the DA, which is approximately 1 to 1.5 billion PHP.



Source : NIA Corporate Operation Budget 2017-2023

Figure 2-55 Trends in irrigation-related budget

The national budget for 2024 is expected to double from approximately 40 billion PHP in 2023 to approximately 80 billion PHP, taking into account the aforementioned El Niño countermeasures.⁵¹

(c) Status of Climate Change related activities

a) Irrigation development based on NIMP considering climate change

As noted above, the NMIP aims at approximately 680,000 ha of new irrigation development between 2020 and 2030.

⁵⁰ DA-BSWM (N/A). Planning and Implementation of rainwater harvesting facilities and other related small scale irrigation infrastructures. <https://www.bswm.da.gov.ph/process/technical-assistance/small-scale-irrigation-infrastructures/>

⁵¹ <https://www.pna.gov.ph/articles/1210582>

Implementation is prioritized based on four indicators. These are: 1) technical feasibility, 2) organizational feasibility, 3) economic and financial feasibility, and 4) environmental and social feasibility.

The projects are classified into five major irrigation project types: 1) National Irrigation Projects (NIPs), 2) Rehabilitation of National Irrigation Systems (NIS), 3) New Communal or Small Irrigation Projects (SIPs), 4) Communal or SIPs rehabilitation, and 5) new multi-purpose projects (MPs:).

Irrigation projects by other government agencies with service areas less than 1000 ha are classified as SIPs.

Table 2-94 Breakdown of NMIP

YEAR	NIS/NIP (ha)		CIS/CIP/SIP (ha)		SUBTOTAL		MP (ha)	TOTAL (NIA)	OGA (ha)	GRAND
	New	Restore	New	Restore	New	Restore				
2020	5,400	5,400	8,100	8,100	13,501	13,501	21,935	48,936	4,840	53,776
2021	8,161	8,161	12,242	12,242	20,403	20,403	9,500	50,306	4,975	55,281
2022	9,426	9,426	14,139	14,139	23,565	23,565	4,585	51,715	5,115	56,829
2023	19,139	2,127	28,708	3,190	47,846	5,316	-	53,163	5,258	58,421
2024	9,570	1,063	14,355	1,595	23,925	2,658	28,068	54,651	5,405	60,056
2025	10,577	1,175	15,866	1,763	26,443	2,938	26,800	56,182	5,556	61,738
2026	11,828	1,314	17,741	1,971	29,569	3,285	24,900	57,755	5,712	63,467
2027	11,874	11,874	17,812	17,812	29,686	29,686	-	59,372	5,872	65,244
2028	12,207	12,207	18,310	18,310	30,517	30,517	-	61,034	6,036	67,070
2029	12,549	12,549	18,823	18,823	31,372	31,372	-	62,743	6,205	68,948
2030	18,339	7,461	19,350	19,350	37,689	26,811	-	64,500	6,379	70,879
TOTAL	129,070	72,757	185,446	117,295	314,516	190,052	115,788	620,357	61,353	681,709

Source: NMIP 2020-2030

The total cost for all irrigation projects for 2020-2030 is estimated to be PHP 438.4 B (PHP 99.4B for new NIPs, PHP 43.9 B for restoration of NISs, PHP 138.6 B for new CIPs/SIPs, PHP 25.7 B for restoration of CISs/SISs, PHP 101.9 B for MPs and PHP 28.9 B for OGA-projects).

In the NIA and DA-BSWM, the design and proper management of irrigation facilities in response to climate change was raised as their challenges for NIMP . Until water is actually delivered from large-scale irrigation facilities to farmland, it will pass through various organizations and water use groups. The ability to manage from upstream to downstream, taking into account appropriate water distribution and nature based solutions (NbS), is required.

In 2013, NIA, with support from donors including WB, developed a planning manual that takes climate change into consideration. The manual was officially adopted by the NIA in August 2021, but in December of the same year, the IPCC announced new climate change projections in its 6th report, which should be reviewed and reflected in the manual will be used. There is also a need to strengthen capacity for planning and design using the manual.

JICA implemented a technical cooperation project on irrigation facility management, as well as a project for technical cooperation with the NIA under a yen loan.

Regarding irrigation facility development, there are 28 projects listed on the Philippine government's list of Infrastructure Flagship Projects, of which 11 are currently underway, including restoration project. The remaining 17 projects are currently being prepared and the total required budget is estimated to be PHP 110.33 billion. Both NIA and DA-BSWM recognize the limited budget for the development of irrigation facilities planned in the NMIP as an issue. In particular, budget shortfalls for small-scale irrigation facilities were raised.

In particular, the budget for SSIP promoted by DA-BSWM is small, but SSIP also includes the development of rainwater utilization facilities (reservoirs, etc.) to supply water during dry periods, as well as drainage facilities (pumps, etc.) during high water periods. It is also necessary to proceed with regard to maintenance, etc.

DA-BSWM expressed a need for support for continuous capacity building and equipment upgrades for soil and water management. Specifically, these included designing small-scale irrigation facilities that take climate change into account, reviewing cultivation schedules that have been developed and disseminated as farming tools, and updating automated weather stations for this purpose.

b) Appropriate operation and maintenance of irrigation facilities

With the enactment of the Free Irrigation Service Act, the cost of irrigation facility management carried out by IAs will decrease, and as a countermeasure, NIA is providing subsidies to IAs for operation and maintenance costs.

In 2020, after the law went into effect, the basic facility management cost subsidy for IAs with which NIA signs management contracts was 150 PHP/ha per cultivation season, but it was later revised to 500 PHP/ha. It is also planned to increase to 1000 PHP/ha in 2024. In addition to this, there are also subsidies for waterway management, which are scheduled to increase by 2026.

According to the NIA, although such a basic subsidy system exists, there is no budget to immediately respond to the repair of irrigation facilities in the wake of weather disasters, and NIA's response tends to be delayed.

NIA and BSWM are also providing training for appropriate facility management for IAs, and NIA has provided training for IAs to improve irrigation facilities that will lead to adaptation to droughts and floods caused by climate change and mitigation measures such as intermittent irrigation (AWD). The need for support for capacity building regarding proper management was confirmed.

c) Strengthening cooperation among related organizations

Regarding water resource management, according to the PDP (2023-2028), there are more than 30 water resource-related organizations in the Philippines, and their authority overlap and their functions sometimes compete.

As the population increases, the water demand will increase, and there is a possibility that further competition will occur in water resource distribution (irrigation water, domestic water, power generation, etc.). In addition to strengthening communication among relevant agencies, a new master plan for integrated water resource management will be required.

Currently, the establishment of a Department of Water Resources (DWR) is under consideration in the Philippines, and as of 2023, organizations related to water resources are being surveyed to confirm the nature of their work and their intention to integrate into DWR, with a strong possibility that NIA will be transferred from the Department of Agriculture to the new organization.

In parallel with these movements, NIA is considering the formulation of a watershed master plan for planning and design that takes NbS into consideration, in conjunction with related organizations such as NEDA, DENR, and DPWH, as a measure to adapt to climate change and prevent disasters. JICA has also expressed its intention to provide technical cooperation support for the formulation of this plan, and discussions are underway within the DA and NIA towards a formal request for support.

4) **Status of donor support**

Climate change-related projects currently being implemented or under consideration by DA departments related to agricultural production and soil and water resources management with development partners include the following.

Table 2-95 Status of donor support (agricultural production/ soil and water resources management)

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
WB	Project name: Philippine Rural Development Project Additional Financing 2 Period: Sept 2021-Jul 2023 (started in 2015) Objectives and contents: Supporting the development of communal irrigation systems under 1000 ha. Introduction of irrigation systems using solar power	DA-FOS	Ongoing
KEXIM Bank	Project name: Jalaur River Multi-Purpose Project Stage II Implementing agency: 2012-2024 Business purpose and description: Construction of water storage dams and ancillary structures, rehabilitation/modernization of 5 existing irrigation systems, repair and improvement and construction of a new irrigation system covering 9,500 ha	NIA	Ongoing
AfD	Project name: Cascading Community Rainwater Catchment Systems in Micro-Watershed of Major River Basins (CCRWC) Period: N/A Objectives and contents: Construction of 40 reservoirs for flood control and rainwater harvesting in the tributaries of major rivers. ⁵²	DA-BAR	Under preparation

⁵² DA-CRAO Action Plan

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
ADB	Project name: Mindanao Irrigation Development Project Implementation period: to be completed after 2028 Business purpose and description: Strengthen irrigation planning, design, and management capacity to increase agricultural productivity in Mindanao.	NIA	Under preparation
JICA	Project name: SATREPS- The Project for Development of a hybrid water-related disaster risk assessment technology for sustainable local economic development policy Period: 2021 – 2026	UPLB	Ongoing
JICA	Project Name: National Irrigation System Operation, Maintenance and Management Improvement Project Implementation period: May 2013 - April 2017 Business purpose and description: To improve information collection, management methods, and monitoring systems related to operation and maintenance of the national irrigation system, and to support the formulation of appropriate plans to improve and modernize the efficiency of operation and maintenance management.	NIA	completion
JICA	Project Name: Irrigation Sector Rehabilitation and Improvement Project Implementation period: March 2012 - 2022 Business purpose and description: Supporting the rehabilitation of irrigation facilities, strengthening of water users' associations, and support for farmers' management in 11 locations throughout the Philippines, thereby strengthening the operation and maintenance system of irrigation facilities and contributing to stabilizing rice supply and increasing farmers' income.	NIA	completion
JICA	Project name: Mindanao Sustainable Agrarian Reform and Agricultural Development Project Implementation period: March 2012 - December 2020 Business purpose and description: Infrastructure development in Mindanao, including market access roads and small-scale irrigation facilities, and support for farmers to expand agricultural production and increase farmers' income in the target areas.	DAR	completion

Source: JICA Survey Team

(5) Fishery

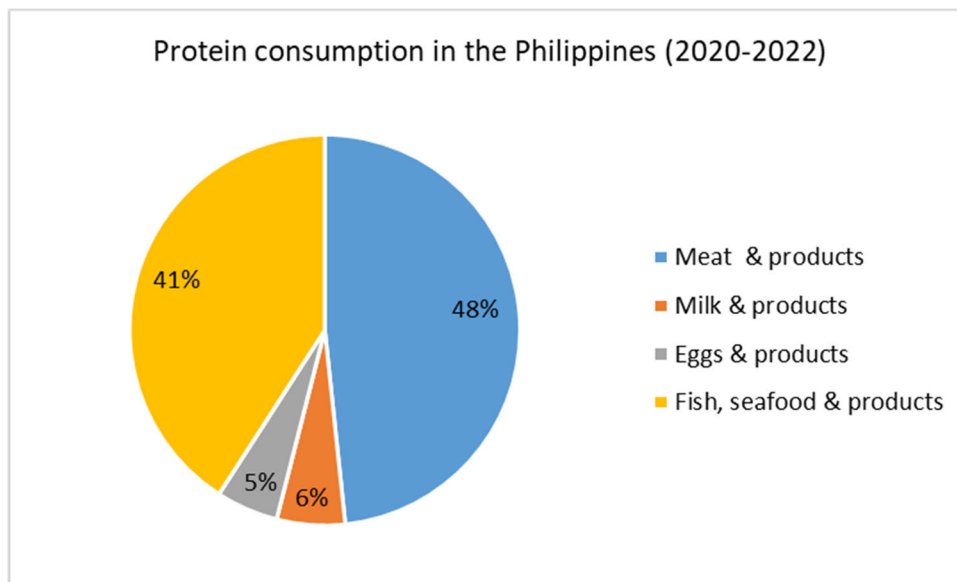
1) Current Situation and the Effects of Climate Change on the Subsector

The Philippines' economic zone is 2.2 million square kilometres, approximately 80% of which is ocean, and it has many fisheries resources⁵³. Fisheries accounted for 12% of the Gross Value Added in the agricultural sector, and in 2018, the fishery sector ranked eighth in the world and aquaculture ranked 11th in production⁵⁴, making it an important industry in the Philippines. The main fisheries products which are exported are tuna, seaweed, and shrimp accounting for around 70% of all seafood export.

⁵³ DA-BFAR (2021). Philippines Fisheries Profile 2021.

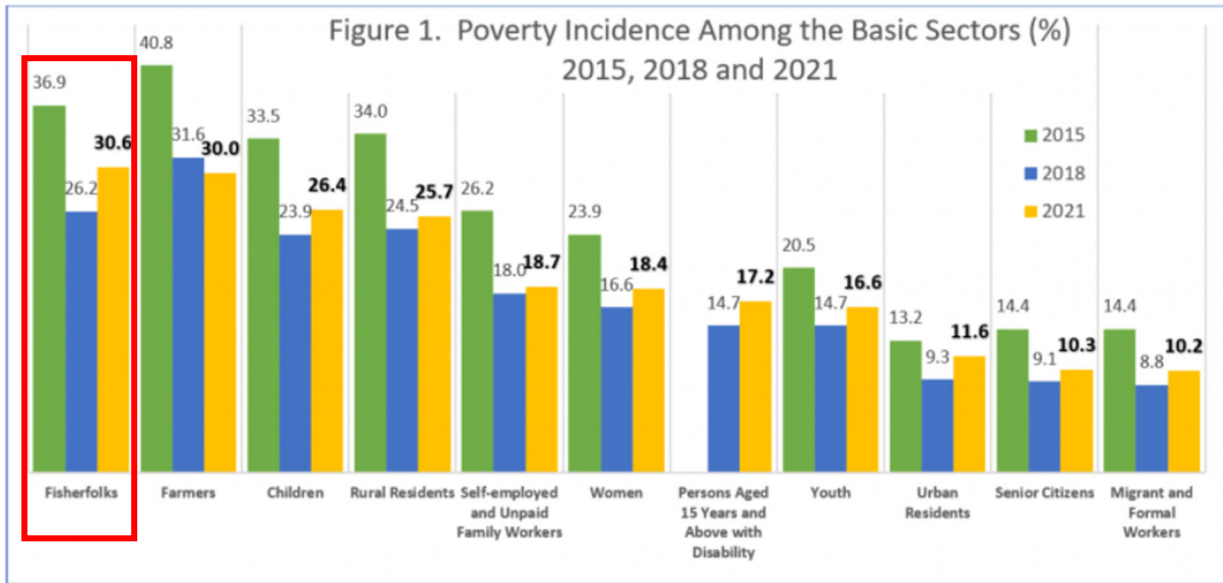
⁵⁴ Ditto

Fishery products account for 41% of the animal protein intake in the Philippines (Figure 2-56), and the intake of fish and other seafood by Filipinos comes next to rice, accounting for approximately 12% of their food intake. Therefore, it can be said that fishery products are an important food resource in the Philippines. On the other hand, the number of people engaged in the fishing industry is approximately 2.2 million people, or about 2% of the population, but as shown in Figure 2-57, it is the subsector with the highest poverty rate. Sources of GHG emissions from the fisheries subsector include fishing vessels, processing industries, and distribution, but compared to emissions from the agricultural sector as a whole it is small. On the other hand, the NAFMIP cites declining fishery resources and impacts on the poorest of the population as climate change impacts. As indicated in 2.2.5 (1), about 80% of the annual losses in the agricultural sector are due to typhoons and other weather-related disasters, and the fisheries sector accounts for about 13% of the agricultural sector's damage. The production of both aquaculture and capture fisheries (commercial and municipal) is on a declining trend between 2012 and 2021 (Figure 2-58).



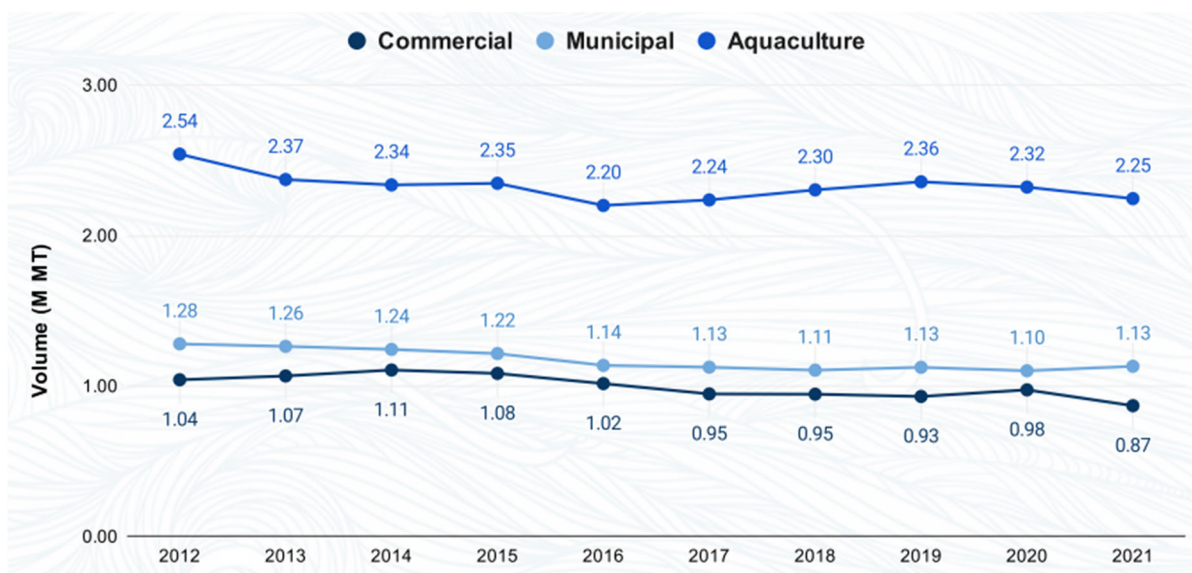
Source: prepared by JST based on Statistical Tables, 2020 to 2022 Food Balance Sheets for the Philippines of PSA

Figure 2-56 Animal protein intake in the Philippines (2020-2022)



Source: PSA (2023). Poverty Statistics. <https://psa.gov.ph/statistics/poverty>.

Figure 2-57 Poverty rate by sector in the Philippines



Source: BFAR (2021). Philippines Fisheries Profile 2021.

* Municipal fishery is allowed within 15km from the shoreline by a maximum of 3 ton ships. Commercial fishery is allowed outside of the municipal waters with ships larger than 3 tons.

Figure 2-58 Fishery production from 2012 to 2021 by volume in the Philippines

2) Relevant policies and plans

The policies and plans relevant to climate change in the fishery industry in DA are as follows.

(a) **National Agriculture and Fisheries Modernization and Industrialization Plan (2021-2030)**

The current fishing methods adopted by the fishery industry is not sustainable and does not bring prosperity and resilience to the producers. Thus, this plan aims to address (1) the deterioration of natural resources, (2) the loss of diversity in agriculture and fishery, (3) the efficiency of energy, water and carbon, and (4)

decreasing the food print of the food systems and prioritize the necessary actions to enable a sustainable and climate resilient food system.

The policies on fisheries are based on the following impact that the fishery sector will face due to climate change.

Table 2-96 Key Climate Change Impacts on Fishery Productive Systems

Impact type	Key Climate Change Impact
Fish catch potential	50% decrease of maximum fish catch potential by the years 2051-2060 compared to 2001-2010
Coral loss	Practical extinction by the end of this century with 98% of coral reefs to die by 2050
Higher sea level rise	Observed sea level rise highest at 60cm in the Philippines with an estimated 13.6 million Filipinos needing relocation
Poorest fishing communities could be plunged further into poverty	Poorest fisherfolk being often being hit the hardest making it more common for them to be farthest away from recovery after every climatic disaster and inequality to deepen

Source: JICA Survey Team (based on NAFMIP)

For agriculture and fishery to be more climate resilient, mainstreaming the use of the decision tools created by DA-CRAO and other organizations (e.g., CRVA, NCCAG Map) in each level during the planning, implementation, R&D, and extension will be promoted.

As strategies for the fishery sector, to increase the income of fisherfolk through the diversification of commodities and stabilizing their income through alternative livelihood activities during the closed fishing season and typhoons, DA will make interventions such as introducing the combination of coastal fishing and aquaculture, research and development support, development of working models for fishery-based systems for upscaling and nationwide replication.

(b) Comprehensive National Fisheries Industry Development Plan 2021-2025 (CNFIDP)

As strategies for the Philippine fisheries industry, in addition to enhancing the climate resilience of the fishery sector, securing quality seeds and fry through infrastructure development, establishing GAP for the main commodities for sustainable practices, securing quality and traceability in the fishery industry, investments on commercially high potential varieties, optimization of marine culture are listed out in this plan.

In all three regions of Luzon, Visayas and Mindanao, the major cause of the decrease of commercial fish catch is identified as climate change.

As measures against climate change, preparations against the effects of climate change are to be taken through early warning systems (EWS) and seminars/training. The following priority actions are to be taken for production, governance, funding, human resources and R&D.

Table 2-97 Priority Actions for the Climate and Disaster Resilience of the Fishery Industry

Production	Production taking regionality/locality in consideration Aquaculture with small-scaled pens
Governance	Mangrove restoration in abandoned, underdeveloped and underutilized (AUU) ponds Climate resilient seaweed nursery materials, guidelines and technologies Co-implementation and co-enforcement of environmental and fisheries laws and regulations
Funding	Funding for equipment and infrastructure
Human resources	Training on DRRM relevant to fisheries
R&D	Development of climate-smart production technologies

Source: Comprehensive National Fisheries Industry Development Plan 2021-2025 of DA

(c) Fisheries Administrative Order No.263: Establishment of Fisheries Management Areas (FMA) for the Conservation and Management of Fisheries in Philippines Waters

This objective of this order which was published in 2019 is the conservation and management of marine resources and it divides the Philippine waters into twelve Fisheries Management Areas (FMA). A 2018 memorandum of the DILG gives authority to the LGUs to manage the ocean and marine resources, and DA-BFAR has the responsibility to technically support the LGUS in terms of the development, management, regulation, protection and conservation of marine resources as well as to enact relevant laws and regulations. It is required that the FMAs are determined based on science and was supported by USAID in the Fish Right Program.

(d) Farm and Fisheries Clustering and Consolidation Program (F2C2)

The program is aimed to promote the unionization of the agricultural sector including the fisheries subsector, and has been underway since 2020 in collaboration with the Cooperative Development Authority (CDA). The FRO is in charge of the F2C2 management office, providing support to cooperatives according to their needs in terms of capacity building, provision of equipment and facilities, post-harvest technology and equipment support, distribution and marketing support, and financial acceleration support⁵⁵. As of December 2021, there are more than 30,000 cooperatives throughout the Philippines, and of which around 700 of them are related to fisheries⁵⁶.

(e) Commodity Roadmaps for the Fisheries Industry

Table 2-98 Fishery industry roadmaps and plans relevant to climate change

Roadmap	Plans and strategies related to climate change
Philippine Milkfish Industry Roadmap (2021-2040)	For the milkfish industry, the following actions are planned to be taken to increase its global competitiveness and to become resilience to climate change. <ul style="list-style-type: none"> Sustainable supply of eggs and fry: More public and private sector climate-resilient infrastructure investments such as establishment of fry production facilities within agribusiness corridors (ABCs) and rehabilitation and upgrading of government hatcheries

⁵⁵ DA (2022). Memorandum Circular No. 21 Series of 2022. https://www.da.gov.ph/wp-content/uploads/2022/06/mc21_s2022.pdf

⁵⁶ CDA (2021). Registered Cooperatives. <https://cda.gov.ph/wp-content/uploads/2023/01/2021-List-of-Cooperatives.pdf>

Roadmap	Plans and strategies related to climate change
	<ul style="list-style-type: none"> • Increase of productivity: Adoption of GAqP (Good Aquacultural Practices) through methods such as introducing science-based farming techniques • Technology transfer to the producers: establishment of technology demonstration on milkfish production <p>To enable the above actions, one of the long-term goals is to breed milkfish with enhanced growth, nutrition, disease resistance and climate resilience through R&D. enabling policies and environment is also important for the investment in equipment and facilities for fisheries.</p>
Philippine Seaweed Industry Roadmap (2021-2026)	Seaweeds are affected by events such as weather disruptions and typhoons, diseases and sea surface temperature increase which are related to climate change. Seaweed production today is not equipped with countermeasures and tools against the effects of climate change, and the current possible measure taken is an insurance for seaweed producers (access is limited especially for those who are located in remote areas). Improvement and extension on seaweed production and post-harvest methods as well as equipment are raised as a strategy in this roadmap.
Philippine Shellfish Industry Roadmap (2021-2025)	Mussels and oysters are the main focus for the roadmap for shellfish. Especially for oyster farming, as measures against the effect of climate change on seed availability, mid to long-term actions such as the development dissemination projects of climate smart aquaculture technology, including the recommendation on establishment of hatcheries are being planned in this roadmap.
Philippine Shrimp Industry Roadmap (2021-2040)	Stable and sustainable shrimp production, export of globally competitive shrimps, and an enabling environment to realize this are the goals of this roadmap. The effects of climate change is also listed as one of the issues to achieve these goals. Technology demonstration for GAqP adoption with viewpoints on mainstreaming climate adaptation and mitigation measures as well as DRRM to increase the productivity of aquaculture is indicated as a specific strategy.
Philippine Tilapia Industry Roadmap (2021-2025)	The tilapia industry aims to be globally competitive, resilient to climate change, private-oriented stable and sustainable. In the short term, research and development of hatchery technologies which are resilient to climate change, and in the mid to long-term, the development of climate resilient tilapia varieties are the strategies relevant to climate change.

Source: Prepared by JICA Survey Team based on the Commodity Industry Roadmaps for livestock.
<https://www.pcaf.da.gov.ph/index.php/commodity-industry-roadmap/>

3) Implementation status of climate change measures

(a) Organizations Relevant to Climate Change Measures

There are no internal organizations within DA-BFAR that plan and implement climate change measures in the fishery sub sector, and officials are gathered in an ad-hoc manner for necessary activities and considerations.

Table 2-99 Relevant organizations of the fisheries sub sector

Category	Organization	Roles
Policy development	DA Project Monitoring Service (DA-PMS)	Development of policies of the agriculture sector and monitoring
	DA Climate Resilient Agriculture Office (DA-CRAO)	Planning and promotion of climate change measures
Climate information	DOST Philippines Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA)	Provision of climate information

Category	Organization	Roles
Mechanization, infrastructure	DA Bureau of Agricultural and Fisheries Engineering (DA-BAFE)	Consideration of RE introduction
	Philippine Rural Development Project (DA-PRDP)	Implementation of fisheries related activities
Research and development	DA Bureau of Agricultural Research (DA-BAR)	R&D for genetic development
	University of the Philippines	R&D
Fisheries	DA Bureau of Fisheries and Aquatic Resources (DA-BFAR)	Development of policies of the fisheries subsector and monitoring
	National Fisheries Research and Development Institute (NFRDI)	R&D for fisheries
	Philippine Fisheries Development Authority (PFDA)	Development and operation of fisheries related post-harvest facilities and distribution
Main donors with projects	The World bank	Vulnerability assessment and projects in the fishery sector
	USAID	Support on marine resources management
	FAO	Livelihood improvement of fisherfolk communities

Source: Prepared by JICA Survey Team

(b) Budgets Relevant to Climate Change

Along with other DA agencies, all budgets for DA-BFAR are climate change expenditure tagged, and the budgets are being managed by DA as a whole in terms of climate change. However, there are still only a limited number of projects and activities for climate change adaptation and mitigation.

DA-BFAR plans to undertake activities for food security and ecosystem/biodiversity under the NAP (2023-2050), and aims to improve productivity under the effect of climate change as well as to improve the vulnerability of the fisheries industry.

(c) Status of Climate Change Mitigation

Fuel consumption in the fisheries subsector is included in the energy sector and is not accounted for in DA's specific activities. In DA-BFAR, only staff who are assembled in an ad-hoc manner are involved in climate change related activities, and although projects related to sustainable fisheries resource development and management have been implemented, the main climate change action DA-BFAR has led and implemented has been adaptation measures.

Currently, the NAP and NDC Implementation Plan are under finalization and actions to be taken in the fisheries sector is also being planned. The introduction and promotion of precision agriculture/fisheries is being included in the drafted version. Especially for fisheries, the introduction of fish finders to reduce the fuel consumption while looking for fish is one of the needs raised by DA-BFAR. Additionally, DA-BFAR researchers has limited capacity and equipment to carry out research and development in the context of climate change, leaving them with many needs.

(d) Status of Climate Change Adaptation

Fishery is a very important sub-sector as it generates the second most jobs after rice production with 1.9 million fisherfolk nationwide, as well as fishery being an important source of protein in a country where land and water resources are limited. The ratio of the population involved in capture fishery and aquaculture is 4:1, while aquaculture produced more than 50% in amount in 2018⁵⁷. Most fisherfolk in capture fishery are small-scaled in coastal fisher, with the most population in poverty. Therefore, it can be said that small-scaled capture fisherfolk would be most affected directly by climate change.

On the other hand, in case the fish catch decreases due to climate change, aquaculture is critical to meet the national food demand. According to the rapid assessment of the NAFMIP, for the way forward for capture fishing sustainability of marine resources is most important, and while there are already abundant policies, it is not necessarily regulated or managed. This is causing Illegal, Unreported and Unregulated (IUU) fishery. The added effect of climate change on the marine environment as going to affect the marine resources even more.

Considering the current marine environment, the Philippine Government is aiming for 50% of fishery for major cities to be supplied from inland aquaculture by 2030. However, the current inland aquaculture has various issues not taking climate change into account such as the commercial tilapia and milkfish farmers taking up most of Laguna Lake driving small pens into confines areas, and difficulty in restoring native species.

Also, diversification of commodities is promoted in fishery along with agriculture, but the history of aquaculture is not long in the Philippines, thus there is the need for research and development on new and innovative technologies such as optimization of aquaculture techniques, securing fish fry etc. which better suit the Philippine oceans, and R&D considering the effect of climate change. In addition, as mentioned in 2.2.5.(2), while vulnerability assessments have been conducted in the fisheries sector, there is yet to be assessments of impacts associated with climate change, and activity planning based on future impacts is inadequate.

a) Vulnerability Assessment for the Fishery Subsector and It's Use

DA-BFAR and the RFOs have been conducting livelihood projects targeting fishing communities which has the highest occurrence of poverty in the sector, and are also receiving support from donor agencies in the perspective that the fisheries communities will also be affected by climate change. The fishery sector has been assessed using the vulnerability assessment tool called FishVool of WB, and the results can be used for regional planning, but this does not include the considerations for future climate change projections. Similarly, the FishCORE project has been started by WB in 2 pilot sites in Luzon and Visayas for the

⁵⁷ DA-BFAR (2021). Comprehensive National Fisheries Industry Development Plan (2021-2025)

organizational capacity building and technical support for marine resource management.

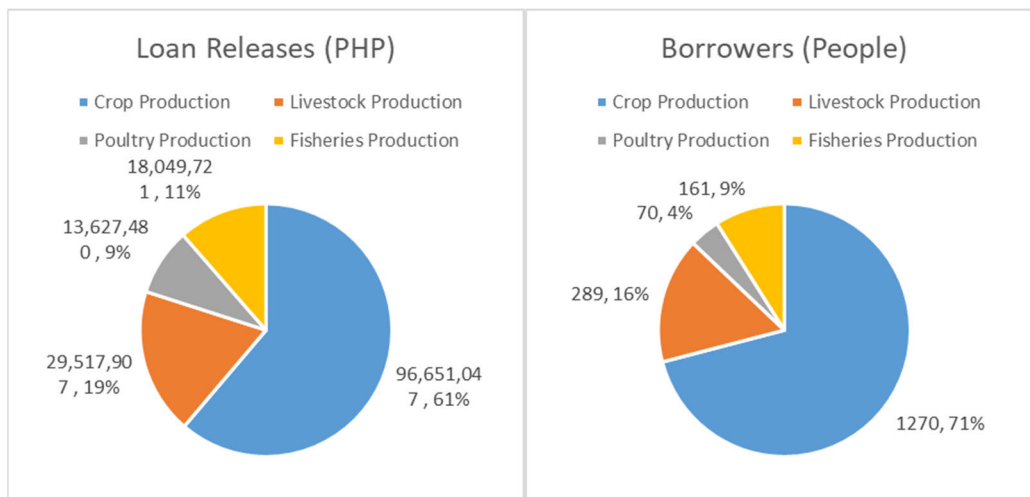
b) Introduction of the Integrated Marine Environment Monitoring System

The seas in the Philippines are divided into 12 Fisheries Management Areas (FMAs) based on the Fisheries Administrative Order No. 263, and marine and costal resources management, conservation of mangroves and seaweed in each area is conducted with close coordination between Da-BFAR and DENR. As for marine resources, with the main objective of measures against Illegal, Unreported and Unregulated fishing (IUU fishing) to prevent the depletion of resources, the UN has introduced the Integrated Marine Environment Monitoring System (IMEMS)⁵⁸. A system for monitoring climate information using the IMEMS, providing tablets to LGUs for reporting.

The Philippine government is currently considering the Blue Economy Act, which aims to promote the sustainable development and management of coastal and marine ecosystems, and is working toward institutionalizing IMEMS.

c) Utilization of Agricultural Insurance in the Fishery Subsector

The number of PCIC insurance borrowers in the fisheries sector is less than 1%, approximately 17,000 in 2021, of 1.9 million people engaged in the fisheries business. In addition, most of the insurance used by the fisheries sector in PCIC is fully subsidized, which provides a small amount of coverage but at no cost to the user⁵⁹. On the other hand, more than 70% of the borrowers of ACPC’s loan program in January-March 2023 were small-scale crop producers, and 9% were fisherfolk⁶⁰. This indicates that although the fisheries sector is an important industry, the number of borrowers of insurance and loans is very low.



Source: Prepared by the JST based on March 2023 DA-ACPC Monthly Monitoring Report on Credit & Institutional Capacity Building (ICB), ACPC (2023).

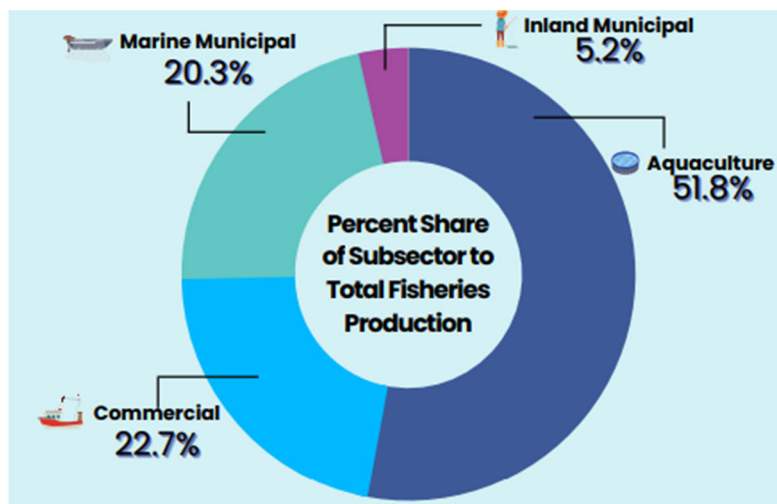
Figure 2-59 Loan release amount and number of borrowers by subsector (Jan-Mar, 2023)

⁵⁸ UN (N/A). Bureau of Fisheries and Aquatic Resources National Marine Data Center, Regional Fisheries Monitoring Centers (PFDA Fishports and BFAR Regional Fisheries Offices). <https://www.un.org/regularprocess/content/bureau-fisheries-and-aquatic-resources-national-marine-data-center-regional-fisheries>

⁵⁹ PCIC (2021). 2021 Annual Report.

⁶⁰ ACPC (2023). March 2023 DA-ACPC Monthly Monitoring Report on Credit & Institutional Capacity Building (ICB) Programs.

One of the factors that may have contributed to fisherfolk in particular remaining among the poor, have not matured as businesses and remains vulnerable to climate change and other impacts, is DA-BFAR's distribution of fry and other fish as a poverty reduction measure. The distribution of fry is an important part of DA-BFAR's operations in terms of supporting national production in the fisheries sector and poverty alleviation, but it may have hindered the autonomous activities of the fisherfolk, which is to raise funds and do their businesses while taking on risks by themselves. Other factors include priority given to fisherfolk, which account for about half of all fisheries production, based on Philippine Constitution, Philippine Fisheries Code of 1998/Republic Act 8550 (RA No. 10654), and Local Government Code (RA In accordance with the Philippine Constitution, the Municipal Fisheries Code of 1998/Republic Act 8550 (RA No. 10654) and the Local Government Code (RA No. 7160), but conversely, those wishing to engage in commercial fishing require a substantial investment and license/certification, which is a high hurdle to expanding their scale of operations.



Source: PSA (2023). Fisheries Situation Report July to September 2023.

Figure 2-60 Percent share of fishery type to total fisheries production

d) Distribution of Fishing Boats to the Vulnerable

DA-BFAR is also conducting a program which supports small-scale fisherfolks which are vulnerable to climate change to be organized as groups/cooperatives, provide them with a more modern fishing boat to use instead of the traditional small and wooden fishing boats to be used and managed by the cooperation. The aim is to prevent the fisherfolk to not be able to make a livelihood due to bigger climate events damaging their old wooden boats. Grouping the fisherfolk also helps them to be able to work as enterprises and become more stable. Since the social preparation for this program takes a lot of effort and time, and because the budget is limited, the goal for 2023 is to provide a total of 37 fishing boats to the fishing communities.

e) Support to the Fishing Communities Through the AMIA Program

In addition to the efforts of DA-BFAR, AMIA-VILLAGE being led by DA-CRAO also targets fishery communities, but the numbers are less compared to agricultural communities.

As mentioned above, vulnerability assessment and its utilization in the fisheries sector are limited, and it is necessary to implement CRVA at the provincial level, formulate a provincial agricultural and fishery product investment plan (PCIP) based on it, and disseminate CRA technology .

4) Support needs

For the fisheries sector, the DA-BFAR has begun to consider various activities that contribute to climate change mitigation and adaptation, with particular needs for human resource development and research, development, verification, demonstration and dissemination of technology which can contribute to adaptation and mitigation. The specific activities listed by the DA-BFAR that it would like to undertake in the future can be divided in to the following seven categories: 1) Climate-smart fisheries technology; 2) Sustainable fisheries resource management; 3) Development and modernization of facilities and equipment for fish farms and post-harvest; 4) Community-based adaptation measures; 5) Consumer awareness and education of fisheries stakeholders; 6) Early warning systems; and 7) Research and development.

There are budgetary constraints, particularly for projects related to infrastructure and facility development and research and development, and securing funding, including from donor budgets, is expected to be a challenge.

In Japan, smart fisheries initiatives are being promoted by the Fisheries Agency. The smart fishing industry in Japan is defined as “a next-generation fishing industry that utilizes cutting-edge technologies such as ICT and IoT to achieve both sustainable use of marine resources and sustainable growth of the fishing industry as an industry.” Specifically, the government is working on creating data on the marine environment and the amount of fish caught and share it widely with everyone from fishermen to market participants, as well as developing technology and equipment to improve fishing productivity.

JICA is also conducting dissemination demonstrations of technologies that can be used as climate change adaptation measures in the Typhoon Yolanda Disaster Emergency Recovery and Reconstruction Support Project and private sector collaboration projects. It is possible to extend such knowledge to the Asian region.

5) Status of donor support

Table 2-100 Status of donor support (fishery)

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
WB	Project name: Philippine Fisheries and Coastal Resiliency (FishCoRe) Project Period: Aug 2023-N/A	DA-BFAR	ongoing

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
	Objective and activities: regulations for marine resources management, capacity building, rehabilitation of coastal areas, development of fishery corridors, diversification of fishery sector ⁶¹ .		
FAO	Project name: Support to Agriculture and Agribusiness Enterprises in Mindanao for Sustainable Development Period: Jan 2019-Dec 2023 (3 extensions) Objective and activities: capacity building for people in small scaled agriculture, fishery and livestock in the conflict areas of Mindanao ⁶² .	RFO XII and BARMM	ongoing
USAID	Project name: Fish Right Program Period: Mar 2018-Mar 2025 (extended) Objective and activities: water resources and mangrove management in 3 pilot areas aiming for 10% marine resources increase and livelihood enhancement of local fisherfolk with the collaboration of Rhode University ⁶³ .	DA-FPOPD	finished
FAO/Japan	Project name: Restoring Livelihoods and Enhancing Resilience of Farmers and Fisherfolk Affected by Typhoon Rai (Odette) Period: Jun 2022-Jun 2023 Objective and activities: rehabilitation from typhoon damages, distribution of fry, seaweed seed and equipment to affected citizens ⁶⁴ .	DA-FPOPD	finished
WB	Project name: Philippine Rural Development Project Additional Financing 2 Period: Sept 2021-Jul 2025 (from 2015) Objective and activities: enterprise development of farmers and fisherfolk, improvement of market access, resilience of small-scaled producers	FOS	ongoing
IFAD	Project name: Fisheries, Coastal Resources and Livelihood Project (FishCORAL) Period: Oct 2015-Dec 2021 Objective and activities: poverty reduction and improvement of food supply, nutrition and livelihoods in the coastal communities	DA-BFAR	finished
UN	Project name: Bureau of Fisheries and Aquatic Resources National Marine Data Center, Regional Fisheries Monitoring Centers (PFDA Fish ports and BFAR Regional Fisheries Offices) Period: 2018-2021 Objective and activities: Improvement and expansion of the monitoring system	DA-BFAR, PFDA	finished

Source: JICA Survey Team

⁶¹ DA-BFAR (2023). DA-BFAR's FishCoRe Project Gets World Bank Approval, To Start Implementation in August.

<https://www.bfar.da.gov.ph/2023/06/13/da-bfars-fishcore-project-gets-world-bank-approval-to-start-implementation-in-august/>

⁶² FAO (N/A). Support to Agriculture and Agribusiness Enterprises in Mindanao for Sustainable Development (GCP/PHI/069/ROK). <https://www.fao.org/philippines/projects-profiles-container/gcpphi069rok/ru/>.

⁶³ University of Rhode Island (N/A). USAID Fish Right Program. https://www.crc.uri.edu/projects_page/usa-id-philippines-fish-right/

⁶⁴ FAO (2023). FAO, DA, Govt of Japan forge cooperation to restore agri-fishery-based livelihoods & promote climate resiliency of producers affected by TY Odette. <https://www.fao.org/philippines/news/detail/ru/c/1643646/>.

(6) Livestock

1) Current Situation and the Effects of Climate Change on the Subsector

The livestock subsector is an important industry supporting about 60% of the Philippines protein intake (Figure 2-61). The livestock sub sector is highly self-sufficient, exceeding 80% except for Carabeef (Figure 2-62). As shown in Figure 2-63, pork and poultry, in particular, have the highest production. Pork production declined until 2021 due to the outbreak of African Swine Fever (ASF) in 2019, but it is now gradually recovering.

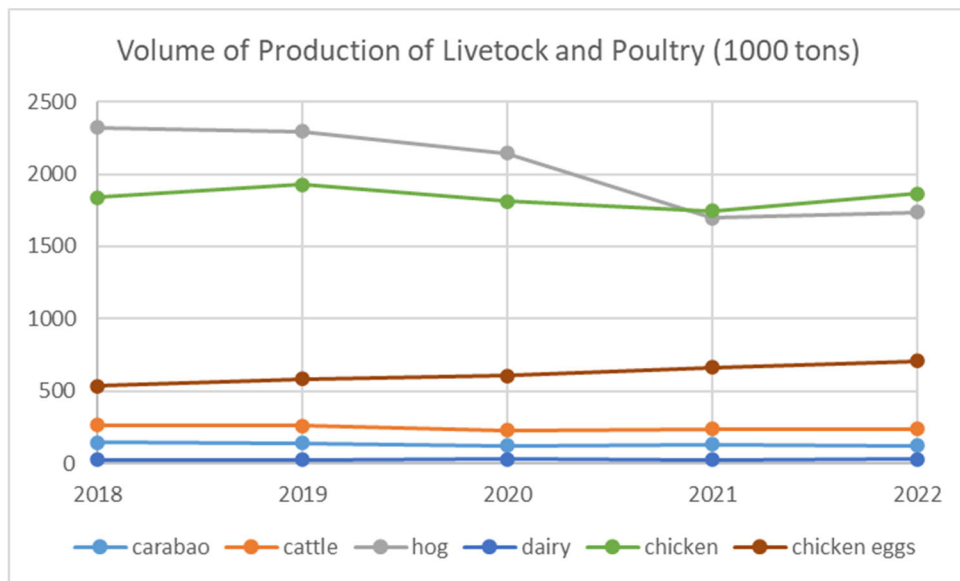
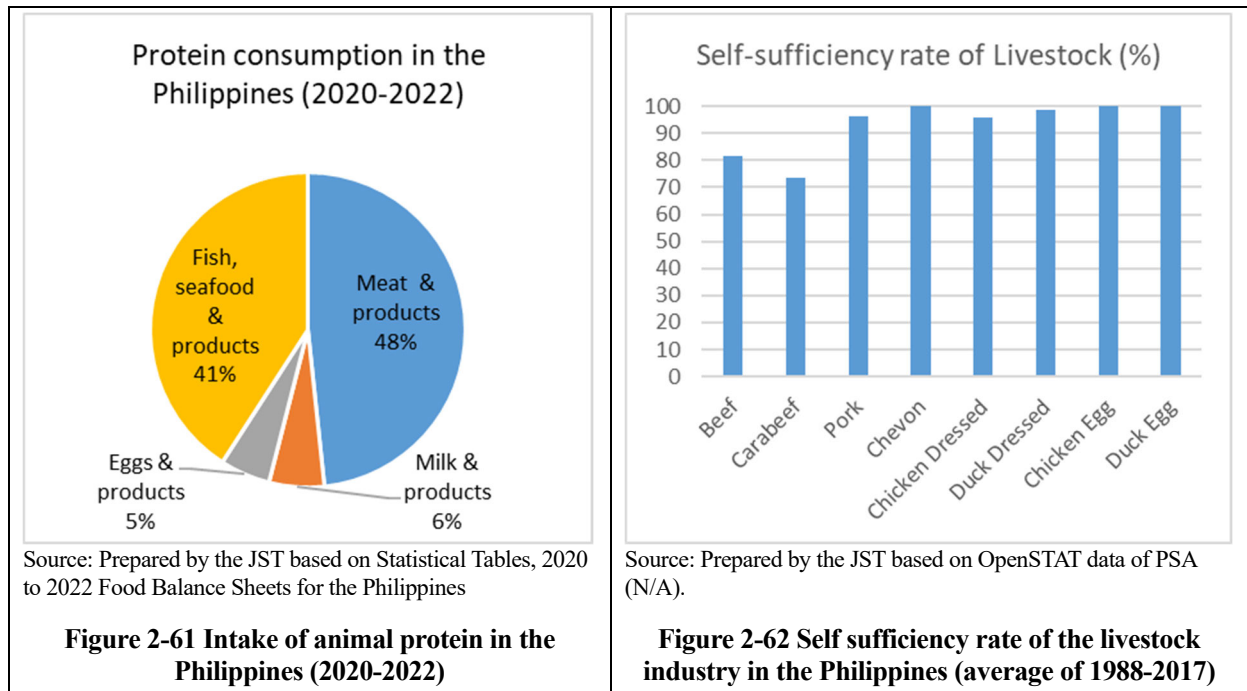
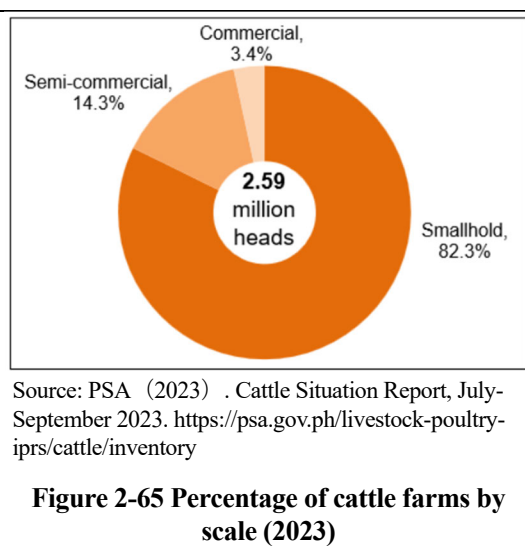
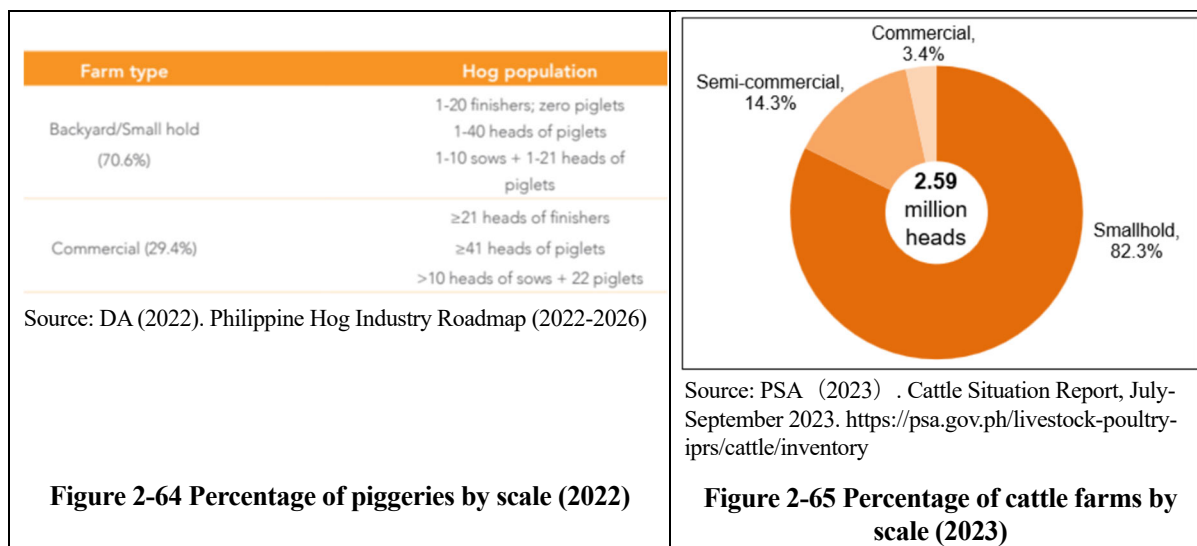


Figure 2-63 Volume of livestock production in the Philippines (2018-2022)

The livestock sector in the Philippines can be characterised as consisting of small producers, accounting for 70% for pork⁶⁵, 70% for chicken⁶⁶, 80% for cattle⁶⁷, and a whopping 99% for dairy⁶⁸. Commercial producers are able to invest in livestock housing to some extent and can control the temperature, but most small scale producers rear their livestock in their backyards, so the measures that they can adopt against climate change is limited. Even for commercial livestock producers, installing tunnel ventilation systems can be expensive, and can only install roofs with mist facilities. Some of the piggeries are designed to have the air flow in one direction to help the air from becoming too hot and to control diseases.



Climate change affects not only the health of livestock, but also feed production. Increased temperatures and humidity, as well as intensified typhoons and waves, cause effects on livestock growth, weight, and reproductive capacity, as well as diseases and pest damage, etc. According to a study by WFP, in 8 of the 11 regions surveyed, livestock reproductive capacity has declined due to climate change. Decreased access to feed and stunting have also been reported⁶⁹.

According to DA-BAI, rising temperatures are causing milk to deteriorate faster than before, and some small producers who do not have a cold chain are quitting the livestock industry. Some producers are struggling to secure drinking water for their livestock due to drought. In addition, climate change is causing increased damage from flooding where livestock are being swept away since they are not properly protected.

2) Relevant policies and plans

The policies and plans relevant to climate change in the livestock industry in DA are as follows.

⁶⁵ DA (2022). Philippine Hog Industry Roadmap (2022-2026)

⁶⁶ JICA (2016). Philippines Poultry Production and Processing Project Final Report

⁶⁷ PSA (2023). Cattle Situation Report, July-September 2023. <https://psa.gov.ph/livestock-poultry-ips/cattle/inventory>

⁶⁸ DA (2022). Philippine Dairy Industry Roadmap (2020-2025).

⁶⁹ Alliance of Bioversity International and CIAT & World Food Programme. (2021). Philippine climate change and food security analysis.

(a) National Agriculture and Fisheries Modernization and Industrialization Plan (2021-2030) (NAFMIP)

DA takes the Commodity System for prioritized agricultural and fisheries products, and commodity industry roadmaps are launched for 21 commodities. The NAFMIP provides strategies for investments and projects which should be included in each of the commodity roadmaps. Decreasing the food mileage is one of the strategies for the livestock industry. Specifically, investments on the construction of feed mills adjacent to the livestock and poultry production areas was recommended in the plan.

(b) Commodity Roadmaps for the Livestock Industry

Table 2-101 Livestock industry roadmaps and plans relevant to climate change

Roadmap	Plans and strategies for climate change
Philippine Carabao Industry Roadmap (2021-2025)	The probable increase of diseases is raised as climate change related issues, but there are no adaptation/mitigation measures planned in the roadmap.
Philippine Dairy Industry Roadmap (2021-2025)	As issues related to climate change in the dairy industry, the following are raised, but there are no adaptation/mitigation measures planned in the roadmap. <ul style="list-style-type: none"> • The impact of increased floods and droughts on grazing • Increase of incidents of diseases • GHG emissions from the dairy industry • The change in access to water resource due to the effect on rainfall patterns
Philippine Hog Industry Roadmap (2021-2025)	One of the missions of the hog industry is the emergence of small-scaled producers from poverty and their resilience to the effects of climate change. There are no specified plans indicated in this roadmap, as part of the modernization of agriculture and as adaptation measures, investment programs on new tunnel ventilated housing for piggery is included in the list of suggestions from the hog stakeholders.
Philippine Poultry Broiler Industry Roadmap (2021-2040)	As current and biggest challenge of the poultry industry is addressing the structure of the industry as there is an immense increase in demand of broilers and poultry farmers having to move out to the suburbs due to increased urbanization, there is almost no mention of the effects and plans for climate change issues for this roadmap.
Philippine Poultry Layer Industry Roadmap (2021-2040)	There is general information on the risks of climate change, but no specific indication of the effects on the poultry layer industry or the issues that may be caused by climate change. Promoting R&D and introduction of new technologies are indicated to address the issues of the industry as a whole. In addition, genetic diversity and the conservation of genetic resources is listed as one of the strategies to increase climate resilience.

Source: Prepared by JICA Survey Team based on the Commodity Industry Roadmaps for livestock. <https://www.pcaf.da.gov.ph/index.php/commodity-industry-roadmap/>

(c) National Livestock Program

The National Livestock Program is one of the national banner programs implemented by the Department of Agriculture to promote rice, maize, high value-added crops, livestock, and organic farming⁷⁰. DA budgets are allocated to each FRO to implement projects regionally. Although not aimed at climate change mitigation/adaptation, the program's main activities include: restore the hog population in response to

⁷⁰ NEDA (2019). Department of Agriculture (DA) Banner Programs (Rice, Corn, National High Value Crops, Livestock and Organic Agriculture Programs). <https://sdg.neda.gov.ph/department-of-agriculture-da-banner-programs-rice-corn-national-high-value-crops-livestock-and-organic-agriculture-programs/>.

African swine fever; livestock business development; genetic resource improvement; development, rehabilitation, and improvement of government farms; technical assistance to livestock farmers; establishment of a livestock database; and livestock hygiene management⁷¹.

(d) Good Animal Husbandry Practices (GAHP)

GAHP is a certification under the jurisdiction of the Bureau of Agriculture and Fisheries Standards (DA-BAFS) to promote good practices in food security and quality assurance, animal welfare, worker health and safety, and environmental management in the livestock sector. It covers hogs, poultry, goats, cattle, carabao, etc., and certification is being pursued mainly by large livestock producers.

Proper treatment of livestock waste is included as part of the environmental management and part of the environmental management set forth in the GAHP, which also contributes to the control of GHG emissions reductions. Appropriate treatment methods include the introduction of anaerobic digesters (the biogas produced can be used as fuel and the residue as fertilizer), solid-liquid separation practices, and composting, as outlined in the DA-BAFS guidelines⁷².

3) Implementation status of climate change measures

(a) Organizations and budget for climate change measures

Relevant organizations in the livestock subsector are as listed below.

Table 2-102 Relevant organizations of the fisheries sub sector

Category	Organization	Roles
Policy development	DA-Planning and Monitoring Service (DA-PMS)	Development of policies of the agriculture sector and monitoring
	DA Climate Resilient Agriculture Office (DA-CRAO)	Planning and promotion of climate change measures
Climatic information	DOST Philippines Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA)	Provision of climate information
Farmers information management	Registry System for the Basic Sectors in Agriculture (DA-RSBSA)*	Registration system for farmers
Mechanization and infrastructure	DA Bureau of Agricultural and Fisheries Engineering (DA-BAFE)	Joint activities for RE promotion
	DA Information & Communications technology Services (DA-ICTS)	Livestock data system development
	Philippine Rural Development Project (DA-PRDP)	Implementation of livestock related activities
R&D	DA Bureau of Agricultural Research (DA-BAR)	R&D for genetic development
	University of the Philippines	R&D
Livestock	DA Bureau of Animal Industry (DA-BAI)	Development of policies of the livestock sector and monitoring

⁷¹ DA (N/A). National Livestock Program-Major Programs and Projects. <https://livestock.da.gov.ph/major-programs-and-projects/>

⁷² DA-BAFS (2008). Good Animal Husbandry Practices (GAHP) (Illustrative Guide).

Category	Organization	Roles
	Philippine Carabao Center (PCC)	Administration on carabao
	National Dairy Authority (NDA)	Administration on dairy
	DA Bureau of Soil and Water Management (DA-BSWM)	Joint operation of livestock manure treatment
Main donors with projects	FAO	Livestock enterprise development
	USAID	Livestock registration system

Source: JICA Survey Team

Although the NDC Action Plan cites reduction of GHG emissions from enteric fermentation of livestock as a mitigation measure to address climate change, DA focuses on improving productivity in the livestock sector, and activities to address climate change in DA-BAI are limited in terms of both human resources and budget.

(b) Status of Climate Change Mitigation

DA-BAI's past efforts to mitigate climate change include: promotion of livestock waste disposal (composting, introduction of small-scale biogas facilities, etc.), research on measuring GHG emissions, organizing livestock head count data for GHG inventories and submitting to PSA, and the 2023 implementation of the joint research with New Zealand and UPLB on GHG emission factors from cattle, etc., but efforts have not made much progress due to limited budgets for climate change measures, partly in response to the ASF outbreak in 2019.

Small scaled biogas treatment equipment has been installed in 190 livestock-related facilities by 2022, with 50 new units planned to be provided in 2024. Although efforts have been made gradually, the scale of energy production from biogas, targets and expected effects have not been clarified. This has left the sector unable to formulate concrete plans for segments and regions that require focused support, as well as specifications for biogas facilities. This indicates the need for human resource development for the formulation of specific plans for GHG reduction in the livestock subsector.

The following needs have been identified for mitigation measures, some of which could be combined into one comprehensive program:

- Alignment and simplification of GAHP and other environment-related standards and certifications, and research on technical and financial bottlenecks at the farmer level for standards compliance and certification (that would lead to GHG emission reductions),
- FS on livestock farmers' access to carbon markets and study incentives to lower their carbon footprint,
- FS for technology dissemination to farmers using model livestock farmer adopting biogas facilities and sustainable livestock production practices,

(c) Master plan development for livestock production in response to climate change. Status of Climate Change Adaption

a) National Livestock Program

In the livestock sector, as mentioned above, the focus is on improving productivity, but projects related to adaptation measures include feed development and breed breeding. In addition, genetic research on high temperature tolerant feed crops and improvements to research facilities to adapt to climate change are being conducted, but are limited due to budget constraints.

Productivity improvement is a top priority for the government in the livestock subsector. Therefore, the National Livestock Program, which is directly under the DA, is implemented through the RFOs with the main objective of increasing productivity, and although not in the context of climate change, it also includes feed development and breeding. Most of the budget for the livestock subsector is allocated to this program.

Due to the situation as described above, there are budgetary and human resource limitations for DA-BAI to plan and implement climate change adaptation and mitigation measures, so it is necessary to consider the institutional and organizational structures to promote climate change actions.

a) Feed Improvement

With regard to livestock feed, although not in the context of climate change measures, there have been some efforts to improve forages and trials of feeds suited to each region have been conducted. However, few farmers have actually adopted them due to factors such as cost, logistics, labor (e.g., silage production), and customs. As corn production, a major feed crop, is expected to be affected by climate change in the future, incorporating alternative feeds is also important in terms of improving productivity, which is a top priority for DA. Therefore, it is essential to work with programs that are easily budgeted by DA, such as the National Livestock Program. Other bureaus within DA are working on the improvement of corn production with BAI as well.

b) Breed Improvement

Common issues in the livestock subsector due to climate change include the fact that domestic production of corn, the main feedstock, is currently not keeping up with demand, and the impact on corn production due to changes in temperature and rainfall patterns expected as a result of climate change. According to interviews with DA-BAI, the possibility of responding by selecting, breeding and promoting local breeds of chickens, pigs and buffaloes that are better suited to the climate in the Philippines are being explored, but capacity building in research and development, especially in view of climate change is still necessary.

Also, as DA is promoting the diversification of agricultural production as adaptation measures, the research and development of local livestock varieties, commercialization, branding, market development is highly recommended.

c) Adaptation to the Rising Temperature

The most significant impact of climate change is the direct effect of rising temperatures on livestock. Some commercial livestock enterprises have been installing air circulation and temperature control facilities in poultry houses, piggeries, and cowsheds to cope with rising temperatures, but it is difficult for livestock producers to invest in such facilities by themselves in the Philippines, where most of them are small-scale enterprises. Therefore, DA-BAI, through the RFO, is calling on livestock farmers to ensure drinking water and shade for their livestock, especially during periods when high temperatures are expected.

There is also concern about the impact of climate change on forage production and accessibility, but there have also been projects to improve forage, and trials of feeds suited to each region have been conducted. However, many farmers, do not decide to introduce such feeds because of, for example, the time and effort required to make silage, accessibility, cost, and other factors.

According to interviews with DA-BAI, egg production is most affected by climate change. The main factor is rising temperatures, and while commercial egg producers can invest in poultry houses with air circulation and temperature control equipment, such measures are difficult to implement for small-scale producers. The situation is similar for producers in the livestock sector other than poultry farming. Livestock will be directly affected by rising temperatures in the future, and small-scale producers will need to consider financial and other support measures to improve their livestock management environment.

The dairy sector accounts for about 17% of agricultural output, but as indicated in Figure 2-63, production is very small and is unable to meet domestic demand. The situation of the livestock industry in the Philippines is that it is supported by the majority of the livestock producers who raise 2-4 head of livestock, and most of the animals are raised for both dairy and meat purposes. Milk is the most important product for livestock farmers, and much of it is sold to cooperatives and local milk processors for processing into pasteurized milk, flavored milk, cheese, and other products for distribution. The biggest challenge the dairy sector faces is its inability to meet domestic demand. Milk production needs feed, management, cost, infrastructure, freshness, etc. to be considered⁷³. Climate change is expected to affect dairy farming as a whole, with rising temperatures leading to lower milk production for some varieties, effects on corn production, an important component of feed, and changes in water availability due to changing rainfall patterns, requiring technical assistance for small-scale dairy farmers.

d) Research and Development

Genetic research on high temperature tolerant feed crops and improvements to research facilities to adapt to climate change are also being conducted but are limited due to budget constraints.

⁷³ PCAARRD's Industry Strategic Science and Technology Plans (N/A). Dairy. <https://ispweb.pcaarrd.dost.gov.ph/dairy/>

4) **Status of donor support**

Table 2-103 Status of donor support (livestock)

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
USAID	Project title: Intensified Community-Based Dairy Enterprise Development Project Period: Aug 2019-Dec 2026 Objective/Activity: increase of heads and productivity of dairy goat, carabao and cattle, increase of producer income through enterprise development, distribution of kids and calves, technical assistance, support to be insured by PCIC ⁷⁴	NDA ⁷⁵ , PCC ⁷⁶	On-going
FAO	Project title: Technical support to develop Livestock and Poultry Traders and Transport Registry System Period: Nov 2022-Dec 2023	DA-BAI	On-going
New Zealand	Project title: N/A Period: N/A Objective/Activity: Feed characterization and improvement of GHG observation equipment to enable GHG inventorying in the livestock sector using the IPCC Teir 2 methodology.	PCC, UPLB	On-going

Source: JICA Survey Team (based on the Special Projects Portfolio as of July 2023 of DA)

⁷⁴ PCAF (2022). PCAF conducts onsite monitoring of dairy enterprise development in Isabela. [Projects.worldbank.org/en/projects-operations/project-detail/P132424](https://projects.worldbank.org/en/projects-operations/project-detail/P132424).

⁷⁵ NDA: National Dairy Authority

⁷⁶ PCC: Philippine Carabao Center

Table 2-104 Identified issues (Agriculture sector)

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
Common Issues (Adaptation)	<ul style="list-style-type: none"> Climate Change Impact <ul style="list-style-type: none"> The Philippines is exposed to weather events such as tropical typhoons, El Niño-related droughts, floods, and erratic heavy rains, and the agriculture and fisheries industries suffer losses and damage from these weather events every year. Damage in 2022 was 24.1 billion PHP, or 1.4% of the agricultural sector GDP for the same year (The GDP growth rate in 2022 compared to 2021 is 0.5%.) About 90% of this is due to typhoon damage. Climate Change Projections and Impacts <ul style="list-style-type: none"> Increased temperatures, changes in typhoon track and intensity, and rainfall patterns affect crop and livestock growth, farmland availability including soil and water conditions, outbreaks of pests and diseases, and damage to infrastructure facilities, which in turn affect agricultural and fishery production. 	<ul style="list-style-type: none"> National Climate Change Action Plan (NCCAP 2011-2028) <ul style="list-style-type: none"> Enhanced climate change resilience of agriculture and fisheries production and distribution systems Enhanced resilience of agricultural and fishing communities in the midst of climate change National Agricultural and Fishery Modernization and Industrialization Plan (NAFMIP 2021-2030) <ul style="list-style-type: none"> Resilience of agricultural and fishery businesses through diversification of production and processing activities and livelihood options in response to climate change, and consideration of energy, water, and carbon efficiency Main indicators of efforts: food security index, food self-sufficiency rate by commodity, poverty rate of farmers and fishermen, agricultural GDP growth rate etc. Philippines Medium-term Development Plan (PDP 2023-2028) <ul style="list-style-type: none"> Improvement of agricultural production efficiency Expanded access to markets and companies Improving the resilience of the value chain Main Initiatives Indicator: Agricultural GDP growth rate, Agricultural insurance coverage etc. 	<ul style="list-style-type: none"> Mainstreaming climate change measures in the DA (Institutionalization of climate-resilient agriculture : CRA) <ul style="list-style-type: none"> Establishment of DA-SWCCO by DA Memorandum (2013) to promote mainstreaming DA-SWCCO reorganized by DA Memorandum (2020); DA-CRAO established; Climate-Resilient Agriculture (CRA) promoted. <p><u>ADB support:</u> Strengthening of DA CRAO through CCAP-Sub program 2 (including hiring dedicated staff), evaluation and development of AMIA program, support for farmer corporatization, and planned support for CRA organization including information gathering analysis and recommendations for DA departments (<u>direct involvement and capacity building of DA departments is out of scope</u>)</p>	<p><u>System</u></p> <ul style="list-style-type: none"> DA-CRAO, which promotes mainstreaming of climate change measures in the DA, is an Ad hoc organization and is unable to take leadership in the Department. The limited budget for activities has delayed the rollout of the AMIA program to all provinces, including training for DA-related agencies. 	<p>*Possibility of support by Japan is low based on the support situation of other donors for DA-CRAO.</p>
		<ul style="list-style-type: none"> National Climate Change Action Plan (NCCAP 2011-2028) <ul style="list-style-type: none"> Resilience to climate change in agricultural and fisheries production and distribution systems 1 Understanding the vulnerability of the agricultural and fisheries industries to the impacts of climate change 2 Develop policies, plans, and programs for agriculture and fisheries that take climate change into account 	<ul style="list-style-type: none"> Promoting CRA through the AMIA Program <ul style="list-style-type: none"> Develop agricultural hazard maps and maps of suitable cultivation areas Maintenance of Automated Weather Stations (AWS) Implementation of agricultural schools Development of AMIA decision support tools (CRVA, CIS) Promote development and corporatization of AMIA Villages (55 /81 states) <p><u>FAO support:</u> CIS strengthening, CRA dissemination, and support for farmer entrepreneurship in 9 provinces through the GCF-APA are planned. (This <u>does not include the Visayas region, which is expected to be affected by climate change in the future.</u>)</p> <p><u>WB support:</u> Technical assistance on fisheries resource management in the FishCORE project. Targeted two locations in North Luzon and Visayas region (<u>future climate change impact assessment not yet conducted</u>).</p>	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Limited capacity of DA central staff regarding the development and implementation of agricultural and fisheries policies and measures in response to climate change (=> Limited climate change impact assessment, in particular) Insufficient capacity of DA RFO staff and LGU to formulate, obtain budgets for, and implement local development plans in response to climate change, and limited capacity of the same staff to provide CRA extension and agricultural guidance (shortage of extension staff and delays in training young staff hired to fill the shortage of human resources) Delay in CRA dissemination in the agro-industrial community (not rolled out to all states), limited knowledge on creating a profitable structure for corporatization, efficient input, access to finance, etc. 	<ul style="list-style-type: none"> Strengthening the capacity of DA central staff of climate change impact assessment in the subsector (climate change impact assessment and countermeasures study) Strengthening the capacity of RFO staff and LGUs in the subsector Supporting community livelihood improvement through smart technology support in the subsector

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
			<ul style="list-style-type: none"> Planning taking into account Climate Risk Vulnerability Assessment (CRVA) <ul style="list-style-type: none"> Implementation of CRVA (completed in 63/81 states) Application of climate risk assessment in banner programs (7 items: rice, maize, high-value crops, livestock, fisheries, organic farming, and halal) and major agricultural and fishery products roadmap (20 items + rice) CRVA application to state government development plans (11/81) <p><u>ADB support:</u> Automation of existing CRVA methodology, planned support for CRVA implementation for 5 states in the BARRM region</p> <p><u>WB support:</u> local development plan formulation, infrastructure development support</p> <ul style="list-style-type: none"> (Soil Degradation Index taken into account, CRVA not applicable) 	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Limited capacity of DA central officials regarding the development and implementation of agricultural and fisheries policies and measures in response to climate change (=> Differences occur in the consideration of climate change measures in the roadmap for major agricultural and fisheries products.) Limited capacity of DA RFO staff and LGUs to formulate, obtain budgets for, and implement local development plans in response to climate change <p><u>Technology</u></p> <ul style="list-style-type: none"> CRVA shortages in crops other than rice and corn, livestock and fisheries Multiple information and tools that can be used within the DA for climate change action studies for agro-industrial development planning by LGUs, however, they are mixed together and their uses (targets and situations of use) are unclear, leading to confusion at the local and farmer levels. 	<ul style="list-style-type: none"> Strengthening the capacity of DA central staff of climate change impact assessment and (climate change impact assessment and countermeasures in the subsector (support for revision of roadmap for major agricultural and fishery products) Strengthen the capacity of RFO staff and local government to utilize CRVA in the subsector (support for formulation of local development plans based on CRVA) <ul style="list-style-type: none"> CRVA support in the subsector Organize information within DA and Study of information sharing platform within DA and support for improving the accuracy of weather and soil information as the basis for various farming tools
			<ul style="list-style-type: none"> Providing information through the Climatic Information System (CIS) <ul style="list-style-type: none"> Provides daily, 10-day, and monthly agricultural weather information Advice for farms and fisheries, red tide alerts Provide detailed information (water demand according to growth stage) for rice and corn <p><u>FAO support:</u> Capacity building for PAGASA, Department of Science and Technology through GCF-APA, CIS localization for 9 provinces, CIS platform building support planned; AWS maintenance equipment for PAGASA is outside scope of support</p> <p><u>ADB support:</u> Support for regional departments of the Department of Agriculture to localize CIS and establish CIS platforms through CCAP-Sub program 2 is planned.</p>	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Limited capacity of DA RFO and LGU staff to provide agricultural guidance using CIS Limited capacity to utilize CIS in the agro-industrial community <p><u>Funds</u></p> <ul style="list-style-type: none"> Shortage of agricultural meteorological instruments and equipment and delays in updating them have resulted in a limitation of seasonal forecasts and agricultural weather information tailored to regional characteristics and crops grown. 	<p>*Possibility of support by Japan is low based on the support situation of other donors.</p> <ul style="list-style-type: none"> Agricultural meteorological observation equipment renewal and support for development of agricultural weather mesh information
		<ul style="list-style-type: none"> National Climate Change Action Plan (NCCAP 2011-2028) <ul style="list-style-type: none"> Climate resilience in agro-industrial communities under the impacts of climate change <p>1 Understanding the vulnerability of the agricultural and fisheries industries to the impacts of climate change</p> <p>2 Strengthen social security for agricultural and fisheries communities</p>	<ul style="list-style-type: none"> Financing support for climate risk avoidance <ul style="list-style-type: none"> Promotion of agricultural insurance Development of weather-indexed insurance Develop and offer agricultural finance programs (several unsecured and interest-free programs exist at the Department of Agriculture) <p><u>ADB support:</u> Through CCAP-Sub program 2, the Bank plans to support the formulation of a medium-term agricultural insurance roadmap and assist in the development of new insurance products.</p>	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Limited knowledge on access to finance and other issues in the agro-industrial community <p>(Although the number of users of agricultural insurance and loan programs linked to the Registration System for the Service of Agricultural and Fishery Workers (RSBSA) is increasing, the use of these programs is dominated by rice and corn farmers, who are highly unionized, and less by livestock and fisheries workers. (Mostly for damage recovery purposes, with limited equipment investment use)</p>	<p>*Possibility of support by Japan is low based on the support situation of other donors.</p>

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
			<p><u>GCF support</u>: GCF project under preparation by Land Bank, including activities related to the development of a financing package</p> <p><u>JICA assistance</u>: Capital investment and working capital assistance to agricultural enterprises and cooperatives in Mindanao region (HRVEST)</p>	<p><u>Technology</u></p> <ul style="list-style-type: none"> Inaccuracy of weather-indexed insurance policies under development due to lack of weather information (past and present) and other factors (discrepancy between actual rainfall and damage occurrence) 	<ul style="list-style-type: none"> Agricultural meteorological observation equipment renewal and support for development of agricultural weather mesh information
Common (Mitigation)	<ul style="list-style-type: none"> GHG Emissions <ul style="list-style-type: none"> ➢ 2010 43.152 Mt CO₂e emissions ➢ Second only to energy, accounting for about 30% of the country's total ➢ Rice production 22.3775 CO₂e emissions (50%) ➢ 12.271 CO₂e emissions from livestock (approx. 30%) ➢ Others (fertilizer application, soil management, etc.) GHG emission projections (BAU scenario at the time of NDC development) <ul style="list-style-type: none"> ➢ 2020 Next 49.5 Mt CO₂e emissions ➢ 2030 Next 48.2 Mt CO₂e emissions 	<ul style="list-style-type: none"> NDC Policy Measures (PaMs): <ul style="list-style-type: none"> ➢ 80% reduction in agricultural production losses due to climate change ➢ Reduction of GHG emissions from paddy fields (AWD + RE) ➢ Reduction of GHG emissions from livestock production ➢ Reduction of GHG emissions through proper soil and agricultural waste management (Additional Measures) <ul style="list-style-type: none"> ➢ Introduction of pest-resistant varieties and biological control ➢ RE introduction (agricultural machinery, post-harvest facilities, etc.) ➢ Farmland management using precision agriculture technology ➢ Sinkers measures (coconut, mangrove, bamboo plantations) 	<ul style="list-style-type: none"> Construction of GHG inventories (2015, 2020) Implementation of GHG mitigation measures <ul style="list-style-type: none"> ➢ Diffusion of intermittent water disruption (AWD) technology ➢ Introduction of irrigation facilities utilizing solar and wind power ➢ Bio-digester, etc. Carbon Credit Market (PETS) Preparation <ul style="list-style-type: none"> ➢ Methodology development for the diffusion and crediting of intermittent water disruption (AWD) technology <p><u>FAO support</u>: assistance in conducting cost-benefit analysis of major NDC-PaMs (completed)</p> <p><u>ADB support</u>: Support for implementation of NDC-MRV through CCAP-Sub program 2; PETS carbon credit system to be considered</p>	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Insufficient capacity of DA central staff to develop and implement agricultural and fisheries policies and measures in response to climate change (=> Monitoring and evaluation after implementation of measures is also insufficient and does not lead to further efforts). <p><u>Funds</u></p> <ul style="list-style-type: none"> Insufficient budget for implementation of measures planned in the NDC PaMs (estimated cost of measures is approximately 54 billion PHP, plus 4.4 billion PHP for RE implementation. Most of the NDC reduction targets are Conditional and depend on foreign assistance for technology and funds.) <p><u>Technology</u></p> <ul style="list-style-type: none"> In the construction of GHG inventory, there are items (GHG emissions and carbon sequestration from agricultural land, etc.) that cannot be calculated due to limited methodology and data collection. Insufficient consideration of applicable technologies in NDC PaMs (GHG emission reduction technologies from rice and livestock farming, introduction of new RE technologies such as Agrivoltaics, and sink measures such as coconut plantations and verification of soil carbon fixation potentials) <p><u>System</u></p> <ul style="list-style-type: none"> Lack of incentives for agricultural and fisheries workers to take action on climate change 	<ul style="list-style-type: none"> Strengthening the capacity of DA central staff in the subsector (e.g., support for cost-benefit evaluation of additional NDC measures) Financial assistance for implementation of NDC PaMs in the subsector Technical cooperation to improve the accuracy of GHG inventory in the subsector Technical cooperation for implementation of NDC PaMs in the subsector <p><i>*Based on the status of support from other donors, possibility of support for building PETS is low. Methodology development will be considered in the livestock subsector</i></p>
Common (Mitigation)	<ul style="list-style-type: none"> Energy consumption (2018/2019) <ul style="list-style-type: none"> ➢ Traffic 12.7 MTOE ➢ Home 9.7 MTOE ➢ Industry 7.4 MTOE ➢ Service 4.9 MTOE ➢ Agriculture and fisheries 0.5 MTOE (1.4% of national total) Actual and projected biodiesel production capacity (REF) <ul style="list-style-type: none"> ➢ 2020: 707.9 ML/Y ➢ 2025: 707.9 ML/Y ➢ 2030: 707.9 ML/Y ➢ 2035: 707.9 ML/Y ➢ 2040: 767.3 ML/Y 	<ul style="list-style-type: none"> RE Implementation Program in the Agriculture and Fisheries Sector (REPAFS 2022-2030) 32,805 hectares RE on agricultural land <ul style="list-style-type: none"> ➢ Promote existing RE technologies (biomass, biogas, biofuels, solar, wind, hydro, geothermal) ➢ Research and development related to RE (development of local RE technologies, enhancement of existing technologies) ➢ Creating standards for RE technology ➢ human resources development ➢ RE Technology Supplier Support National Biofuel Program 	<ul style="list-style-type: none"> RE implementation in the agro-industrial sector <ul style="list-style-type: none"> ➢ 4,288 installed between 1988 and 2021 (72% of which are biomass-related, 20% solar, 4% wind, and 3% hydro) ➢ The budget for the implementation of REPAFS is estimated at 7.9 billion PHP for the period 2023-2030, and is positioned as Infrastructure Flagship Projects (IFPs) by NEDA. Biofuel production <ul style="list-style-type: none"> ➢ Biodiesel from coconut (2022 domestic production of 202 million liters almost meets domestic consumption) ➢ Production of bioethanol using sugarcane as the main raw material (375 million liters to be produced domestically in 2022, 277 million liters to be imported, insufficient domestic production to meet demand) 	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Limited capacity of DA RFO staff and LGU on planning and obtaining budgets to proceed with RE implementation Lack of local companies supplying RE equipment, lack of maintenance technicians <p><u>Technology</u></p> <ul style="list-style-type: none"> Lack of showcasing of new RE technologies Insufficient supply to meet bioethanol demand and insufficient countermeasure technology to increase production (sugarcane production affected by drought, pests, soil degradation, etc.) 	<ul style="list-style-type: none"> Support for dissemination and demonstration of existing and new technologies for RE based on REPAFS 2022-2030 and development of new regulations and system for dissemination Continued technical assistance for sugarcane production by JIRCAS

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
	<ul style="list-style-type: none"> Actual and projected bioethanol production capacity (REF) <ul style="list-style-type: none"> ➢ 2020: 380.5 ML/Y ➢ 2025: 997.51 ML/Y ➢ 2030: 1,431.71 ML/Y ➢ 2035: 2,027.87 ML/Y ➢ 2040: 2,781.983 ML/Y 			<p><u>System</u></p> <ul style="list-style-type: none"> Limited standards for RE technology. Lack of incentives for RE developers Lack of incentives for biofuel producers Lack of land use guidelines and institutions for fuel crop production 	<ul style="list-style-type: none"> Support for dissemination and demonstration of existing and new technologies for RE based on REPAFS 2022-2030 and development of new regulations and system for dissemination
<p>Agricultural Production (Adaptation)</p>	<ul style="list-style-type: none"> Decline in agricultural productivity <ul style="list-style-type: none"> ➢ A 1° C increase in minimum temperature during the growing season in the dry season reduces yields by 10%. ➢ Outbreak of new pests and diseases 	<ul style="list-style-type: none"> National Agricultural and Fishery Modernization and Industrialization Plan (NAFMIP 2021-2030) <ul style="list-style-type: none"> ➢ Resilience of agricultural and fishery businesses through diversification of production and processing activities and livelihood options in response to climate change, and consideration of energy, water, and carbon efficiency Promoting the Rice Industry Roadmap (2020-2030) <ul style="list-style-type: none"> ➢ Agricultural insurance or bar rate of 60% or more for rice farmers ➢ Adoption of Climate Change Technologies ➢ Early recovery measures in case of weather disasters (seed distribution) ➢ Irrigation Facility Development Promoting the High Value-added Crop Industry Roadmap <ul style="list-style-type: none"> ➢ Yellow Corn Industry 2021-2040) ➢ Abaca Industry Roadmap (2021-2025) ➢ Banana Industry Roadmap (2021-2025) ➢ Cacao Industry Roadmap (2021-2025) ➢ Coconut Industry Roadmap (2021-2040) ➢ Coffee Industry Roadmap (2021-2040) ➢ Mango Industry Roadmap (2021-2025) ➢ Onion Industry Roadmap (2021-2040) ➢ Vegetable Industry Roadmap (2021-2040) Promote the National Agricultural and Fishery R&D Agenda (NAREA 2023-2028) Promoting the National Organic Agriculture Program 	<ul style="list-style-type: none"> Development and provision of climate resilient varieties <ul style="list-style-type: none"> ➢ Development of drought-tolerant, heat-tolerant, and flood waterlogging-resistant varieties ➢ Seed Distribution Project Development and provision of farm management support tools <ul style="list-style-type: none"> ➢ Development of agricultural technologies that conserve energy and water ➢ Dissemination of rice and other farming support tools such as Rice Crop Manager (banana, garlic, onion, etc.) ➢ Pest forecasting and diagnostic tools ➢ Fertilization Guidance Development and provision of maps of suitable cultivation areas Smart-Farm initiatives using ICT (rice-centered) <ul style="list-style-type: none"> ➢ Digitization of paddy field information ➢ Seeding, fertilization, etc. using drones <p><u>ADB/AfD support:</u> R&D projects on Abaca, Livestock Feed, and Seaweed are planned.</p> <p><u>Japan support:</u> JICA support for strengthening VC for horticultural crops, technical assistance to PhilRice and SRA by NARO and JIRCAS, support for agricultural equipment by PJEPA.</p>	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Limited capacity of DA central department officials regarding the development and implementation of agricultural and fisheries policies and measures in response to climate change (=> Differences occur in the consideration of climate change measures in the roadmap for major agricultural and fisheries products. Limited assessment of pest outbreaks and soil impact from a long-term climate change perspective) Insufficient capacity of DA RFO staff local government officials to conduct CRA dissemination and agricultural guidance using precision agriculture technology (delays in training young staff hired to make up for the lack of human resources) <p><u>Funds</u></p> <ul style="list-style-type: none"> Limitation of agricultural weather information according to regional characteristics and crops grown due to lack of maintenance equipment and delays in updating agricultural weather observation equipment. <p><u>Technology</u></p> <ul style="list-style-type: none"> Climate risk information for major cultivated crops such as rice, corn, and sugarcane is available to farmers, but horticultural crops have been slow to develop. Limited technology for monitoring growing environment and crop growth conditions (limosens) to assess and predict climate change impacts Delays in R&D and infrastructure development to promote precision agriculture that balances productivity improvement and sustainability Protection of species affected by climate change, conservation of genetic information and development of resistant varieties (other than rice) 	<ul style="list-style-type: none"> Strengthening the capacity of central department officials in the Department of Agriculture (climate change impact assessment and countermeasure consideration, support for major agricultural and fishery product roadmap revisions, etc.) Strengthening the capacity of local office staff and local government (support for formulating regional development plans based on CRVA, etc.) Agricultural meteorological observation equipment renewal and support for development of agricultural weather mesh information Smart agricultural technology development support <ul style="list-style-type: none"> ➢ Support for development of agricultural weather mesh information ➢ Support for implementation of growth management and soil monitoring using satellite data ➢ Support for the development of climate-responsive varieties

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
Agriculture Production (Mitigation)	<ul style="list-style-type: none"> GHG Emissions ➢ 2010 43.152 Mt CO₂e emissions Soil and fertilizer management XX CO₂e emissions (20%) 	<ul style="list-style-type: none"> NDC Policy Measures (PaMs) ➢ 80% reduction in agricultural production losses due to climate change ➢ Reduction of GHG emissions from paddy fields (AWD + RE) ➢ Reduction of GHG emissions through proper soil management 	<ul style="list-style-type: none"> Development of technology to reduce GHG emissions from rice paddies ➢ Intermittent irrigation (AWD) was found to reduce GHG by 30%. Water conservation benefits. Promotion of RE implementation in irrigation facilities Promote the National Soil Health Program ➢ Guidance on the balance of organic and inorganic fertilizer application according to soil type to reduce GHG emissions Validation of Soil Carbon Storage Potential ➢ Participation in FAO's mapping of soil carbon sequestration potential ➢ Model needs to be validated by comparison with actual soil samples 	<p><u>Funds</u></p> <ul style="list-style-type: none"> Insufficient budget for implementation of measures planned in NDC PaMs (estimated budget of 30 billion PHP required for AWD + RE implementation) <p><u>Technology</u></p> <ul style="list-style-type: none"> Limitation of verification of soil carbon storage potential 	<ul style="list-style-type: none"> Financial assistance for the implementation of NDC PaMs (development of small-scale irrigation facilities for AWD dissemination, support for RE introduction) Technical cooperation on evaluation methods for soil carbon, methane, and N₂O dynamics (support for updating soil maps, etc.)
Irrigation Development (Adaptation and Mitigation)	<ul style="list-style-type: none"> water shortage ➢ Predicted water shortages by 2040. ➢ Sea level rise of 60 cm was observed in some areas (more than three times the global average of 19 cm) 	<ul style="list-style-type: none"> Promotion of the National Irrigation Plan (2020-2030) ➢ Approximately 680,000 ha of new irrigation development by 2030 to accommodate population growth 	<ul style="list-style-type: none"> Promotion of the National Irrigation Plan (2020-2030) ➢ National irrigation facility development rate 67%. BARMM region 34%. ➢ NIA in charge of large facilities (90%), DA BSWM in charge of small facilities 	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Limited capacity of NIA and BSWM on planning and design of irrigation facilities and water resources management considering climate change Limited capacity of water users' associations and other entities to operate and manage irrigation facilities <p><u>Funds</u></p> <ul style="list-style-type: none"> Large-scale facilities are being developed as part of the national flagship project, but the budget has not been allocated for the development of small-scale facilities. (⇒ Delays in investment planning by regional offices and the government are the cause; irrigation facilities are essential for the diffusion of AWD) Insufficient budget for updating agro-meteorological observation equipment (⇒ negative impact on water resource management and provision of information on cultivation schedules) <p><u>Technology</u></p> <ul style="list-style-type: none"> Irrigation facility planning and design manuals are outdated and do not take climate change impacts into account. <p><u>System</u></p> <ul style="list-style-type: none"> Delays in organizing for water resources management and limited coordination among related organizations 	<ul style="list-style-type: none"> Capacity building of NIA and BSWM, (support for updating manuals) Capacity building of LGUs and water user associations Capacity building of LGUs and water user associations Agricultural meteorological observation equipment renewal and support for development of agricultural weather mesh information <p><u>Planning support for integrated management</u></p>

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
Fisheries Industry (Adaptation)	<ul style="list-style-type: none"> Impacts of Climate Change ➤ There is a projected 50% decrease in catch from 2051-2060 relative to 2001-2010 	<ul style="list-style-type: none"> National Agricultural and Fishery Modernization and Industrialization Plan (NAFMP 2021-2030) <ul style="list-style-type: none"> ➤ Building a food system that is sustainable and resilient to the effects of climate change through conservation of natural resources, emphasis on diversity of marine products, etc. Integrated National Fisheries Development Plan (CNFIDP 2021-2025) <ul style="list-style-type: none"> ➤ Conversion to localized production and aquaculture ➤ Development of fisheries technologies and guidelines for adapting to climate change ➤ Develop legal systems and regulations related to the environment and fisheries ➤ Securing financial resources for facility maintenance, materials and equipment, etc. 	<ul style="list-style-type: none"> Conduct vulnerability assessment of current fisheries resources and regions and promote countermeasures <ul style="list-style-type: none"> ➤ Development of FishVool vulnerability assessment tool ➤ Implementation of the FishCORE project Improvement of fishing ports and freezing/refrigeration facilities <ul style="list-style-type: none"> ➤ Implemented as Infrastructure Flagship Projects (IFPs) Conversion to aquaculture (adaptive technologies also introduced) Development of Climate Resistant Varieties <p><u>WB support:</u> Technical assistance on fisheries resource management in the FishCORE project. Targeted two locations in North Luzon and Visayas region (future climate change impact assessment not yet conducted).</p>	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Limited capacity of the DA BFAR and NFRDI to develop and implement climate change measures Lack of knowledge of fisheries associations and others to adapt to climate change <p><u>Funds</u></p> <ul style="list-style-type: none"> Lack of facilities for research and development of climate change adaptation and mitigation measures Lack of refrigeration and freezing facility development <p><u>Technology</u></p> <ul style="list-style-type: none"> Delayed climate change action for the fisheries industry; promotion and facilitation of best practices as a response to climate change <p><u>System</u></p> <ul style="list-style-type: none"> Laws and regulations for sustainable fisheries resource development and management are well developed but enforcement has not kept pace Delay in organizing small-scale agricultural and fishery workers (especially livestock and fisheries) 	<ul style="list-style-type: none"> Strengthening the capacity of DA central department officials Strengthening the capacity of DA local office staff and local government Strengthening the capacity of fishing communities
Livestock (Adaptation)	<ul style="list-style-type: none"> Impacts of Climate Change ➤ Rising temperatures are leading to livestock reproduction and lower product quality. ➤ Typhoon damage has caused livestock to be swept away and damage to barns. 	<ul style="list-style-type: none"> National Agricultural and Fishery Modernization and Industrialization Plan (NAFMP 2021-2030) <ul style="list-style-type: none"> ➤ NDC Policy Measures (PaMs) (Add) <ul style="list-style-type: none"> ➤ Use of fast-growing varieties that are resilient to the effects of climate change 	<ul style="list-style-type: none"> Promote Good Animal Husbandry Practices (GAHP) approval programs <ul style="list-style-type: none"> ➤ Approves farmers who promote environmentally friendly livestock production Breeding local varieties <ul style="list-style-type: none"> ➤ Protect and nurture native species rather than exotic species that are vulnerable to weather and pest damage 	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Insufficient human resources and capacity to study climate change measures, etc. Slow CRA diffusion in agro-industrial communities, slow organization of small livestock farmers <p><u>Technology</u></p> <ul style="list-style-type: none"> Delays in climate change measures for the livestock industry (e.g., temperature control in barns and storage facilities) 	<ul style="list-style-type: none"> Strengthening the capacity of DA central department staff Strengthening the capacity of DA local office staff and local government Strengthening the capacity of livestock communities Support for introducing and improving ventilation and temperature control equipment
Livestock (Mitigation)	<ul style="list-style-type: none"> GHG Emissions ➤ 2010 43.152 Mt CO₂e emissions ➤ 12.271 CO₂e emissions from livestock (approx. 30%) 	<ul style="list-style-type: none"> National Agricultural and Fishery Modernization and Industrialization Plan (NAFMP 2021-2030) <ul style="list-style-type: none"> ➤ Strategic placement of feed mills and other facilities to reduce GHG emissions in transportation NDC Policy Measures (PaMs) <ul style="list-style-type: none"> ➤ 0.77 MtCO₂e introduced for waste treatment for the entire livestock industry (expected to be reduced by about 0.91% in 2020-2040) ➤ Reduction of methane gas emissions through fermentation in the digestive tract by breeding 	<ul style="list-style-type: none"> Proper management of livestock waste <ul style="list-style-type: none"> ➤ Promotion of biogas projects Improved GHG inventory calculation methodology <ul style="list-style-type: none"> ➤ Development of emission factors <p><u>NZ support:</u> developing emission factors for cattle ruminations with UPLB (out of scope for other livestock)</p>	<p><u>Capacity Building</u></p> <ul style="list-style-type: none"> Insufficient human resources and capacity to study climate change measures, etc. Slow CRA diffusion in agro-industrial communities, slow organization of small livestock farmers <p><u>Technology</u></p> <ul style="list-style-type: none"> Delayed climate change measures for the livestock industry (rumen fermentation measures (feed improvement, breed improvement), livestock waste treatment, etc.) Delays in developing domestic emission factors in building GHG inventories 	<ul style="list-style-type: none"> Strengthening the capacity of DA central department staff Technical support such as improving feed production using satellite images Verification of technologies that contribute to reducing GHGs derived from livestock and manure processing Support for methodological studies for carbon credit system (livestock waste management)

Source: JICA Survey Team

2.2.8 Forestry and Biodiversity

The forestry sector is classified as Forestry and Other Land Use (FOLU) in the GHG inventory. According to the Philippine's 2015 and 2020 GHG inventory data, the FOLU sector shows net emission of an estimated 35.668 Mt-CO₂e in 2015 while net sequestration of an estimated 25.935 Mt-CO₂e in 2020. Additionally, in 2015, the forestry sector and other land sector show removal as 65.299 Mt-CO₂e and emission of 100.967 Mt-CO₂e, respectively while in 2020, the forest sector and other land sector show removal of 71.355 Mt-CO₂e and emission of 45.420 Mt-CO₂e, respectively. Thus, the forest sector continuously shows its sequestration as a sink in the FOLU sector.

Therefore, controlling deforestation and forest degradation and increasing carbon sinks through afforestation are important issues for this sector. Aside from the forests, conservation of blue carbon, which is carbon absorbed in marine ecosystems such as seaweed beds and shallow waters, will become an important issue in the future. In addition, the implementation of adaptation measures in the areas of forests, coastal and marine ecosystems, and biodiversity is specified in the NDC, and implementation of adaptation measures is also important.

(1) Sector Landscape

1) Sector Status and Climate Change Impacts

In the Philippines, 57% (17.8 million ha) of the country was covered by forests in 1934, but this rate decreased to 50% in 1970 and 26% in 1990 and the rate decreased by 23% in 2010. Since then, the forest covered area has been on a slight increase. In 2020, the forest area which covered the country's approximately 24% of total land area as 30 million ha as of 2020 is 7.18 million ha. In addition, only 30.7% of the total forest area as of 2020 is for closed forest, and nearly 70% of the area is for open forest, leaving vast areas of denuded land, and afforestation has been issued.

In the forest sector, PDP and NCCAP are policies that are related to forests in Climate change measures. PDP focuses on restoring ecosystems to protect communities from the effects of Climate change while NCCAP focuses on restoring ecosystem services. Also, the Philippine Master Plan for Climate Resilient Forestry Development (PMPCRFD) (2013) aimed to develop a forestry industry resilient to Climate change while the National Greening Program (NGP) (2011-2028) was aiming to restore degraded forestland. Further, the Philippine National REDD+ Strategy (PNRPS) (2011-2018) shows strategies for future REDD+ implementation.

The forestry sector is classified as Forestry and Other Land Use (FOLU) in the Philippine GHG Inventory Report. According to the report, the BAU is expected to increase due to increase due to the increase in wood consumption, which shows the shifting from 113.4 Mt-CO₂e as removal in 2020 to 3.8 Mt-CO₂e as emission in 2030.

2) Climate Change Impacts in the Future

The Climate change impacts are expected in the forestry and biodiversity sector in the Philippines as shown below.

Table 2-105 Climate change impact and indicators (Forestry and biodiversity section)

Climate change impact	Major indicator of Climate change impact
Ecosystem	Severe impacts on flora and fauna, with mangroves affected by sea level rise
Water supply	Pressure on the water resources available in regions, watershed also affected
Forest community	Incomes of communities depending on forest resources for their livelihoods, affected
Livelihood	Due to availability of traded forest resources, forestry affected
Species distribution of flora and fauna	Due to increased frequency and intensity of pest and disease outbreaks, species vulnerability to extinction and ecosystem productivity affected

Source : Philippine Master Plan for Climate Resilient Forestry Development (2016),
Philippine Biodiversity Strategy Action Plan 2015-2028 (2016)

3) Development Issues in the Sector

According to Philippine Master Plan for Climate Resilient Forestry Development (PMPCRFD) (2013) and Philippine Biodiversity Strategy and Action Plan 2015-2028 (PBSAP), the issues have been pointed out in the forest and biodiversity sector in the Philippines as shown below.

- To meet future domestic demand, the area of plantation forest need to increase to approximately 94,000 ha by 2028.
- While securing water supplies for multiple uses, the country is increasing allocations for watershed conservation to mitigate natural disasters and protect nature due to extreme weather conditions resulting from climate change.
- There are continuing threats to forests from illegal logging by local communities in open areas.
- Allowed mining rights, etc. overlap with designated areas as Protected Areas and ancestral land.
- Lack of natural resource management capacity is considered due to a lack of basic information, regarding national biodiversity and strategic management options.
- Biodiversity concerns are taken into account in landscape planning and development while problems in land use are resulting in insufficient results.
- Marine debris from land and sea has become an issue.

4) Stakeholder Analysis

Stakeholders of the climate change in the forestry and biodiversity section are as shown below. Stakeholder's analysis in subsector is mentioned in the following subsector section.

Table 2-106 Stakeholders in the forestry and biodiversity sector

Policy making	Technology development	Measure implementation	Funding
<ul style="list-style-type: none"> • DENR HQ • LGUs 	<ul style="list-style-type: none"> • DENR HQ • DENR regional office • DENR research institute • Department of Science and Technology • University • Private company 	<ul style="list-style-type: none"> • DENR local office • LGUs • Private company • NGO 	<ul style="list-style-type: none"> • Governmental banks • Private banks • Donors

Source: JICA Survey Team

This section reports the results of information collection for the two subsectors of forestry and coastal/marine biodiversity.

(2) Forestry

1) Relevant Policies and Plans

In the forest sector, PDP and NCCAP are policies that are related to forests in climate change measures. PDP focuses on restoring ecosystems to protect communities from the effects of climate change while NCCAP focuses on restoring ecosystem services. Also, the Philippine Master Plan for Climate Resilient Forestry Development (PMPCRFD) (2016) aimed to develop a forestry industry resilient to climate change while the National Greening Program (NGP) (2011-2028) was aiming to restore degraded forestland. Further, the Philippine National REDD+ Strategy (PNRPS) (2011-2018) shows strategies for future REDD+ implementation.

In the point of climate change adaptation measures, effort to protect and restore forests, and access result-based payment funds in forest conservation are included in the NDC. In DENR, NGP is a national tree plantation program that started in 2011 and further continued by then the new administration renaming it to Enhanced National Greening Program (E-NGP) in 2015. Since then, reforestation activities have been increased further contributing to the goal of restoring degraded forestland and increasing national forest cover. Illegal logging remains the major driver of deforestation and forest degradation due limited livelihood opportunities in the uplands. In order to address this situation, DENR is working to share knowledge and provide necessary equipment and tools to regional offices in order to enhance environmental laws and regulations enforcement. In the same year that NGP was launched, Presidential Executive Order No. 23 was also issued by former President Aquino, declaring the moratorium on the cutting and harvesting of timber in the natural and residual forests and the creation of anti-illegal logging task force. Moreover, there are activities for forest protection and anti-illegal logging. Biodiversity of Forest is under the jurisdiction of DENR-BMB.

Deforestation and forest degradation in the Philippines began with the leasing of publicly owned forests to companies under the Timber License Agreement (TLA) and permitting management of the grazing land in

the early 1950s. Furthermore, throughout the 1960s and 1970s, the granting of logging concessions expanded, and as a result of large-scale logging of forests and the intrusion of farmers into logging areas, deforestation and forest degradation progressed significantly. Subsequently, the Revised Forestry Code of the Philippines of 1975 accepted illegally occupying farmers, and the Integrated Social Forestry Program of 1982 established a forest agreement system for individuals and communities, and it promoted forest management by local residents. In 1992, the National Integrated Protected Areas System Act was enacted, and natural forests and secondary forests in good remaining condition were designated as national integrated protected areas. In 1995, the “Community-Based Forest Management” (CBFM) was established to protect and conserve remaining forests, and a forest management by local residents was adopted. Additionally, in 2011, a complete ban on logging in natural forests was decided, and the NGP was launched and large-scale greening efforts began.

As for the future issues of the forest sector, the FMB shows to first promote REDD+ initiatives while there is an issue of deforestation of natural forest, etc. Also, there are climate change mitigation measures as well as forest management in the Protected Areas which is targeted to vulnerability assessment as ecosystem conservation and Integrated Watershed Management, which are issues of adaptation measures’ part. Also, the FMB aims not only to increase forest cover through national forest plantation program, such as ENGP, to provide protection for communities affected by the negative impacts of climate change but also to play an important role of sink. At the forest sector it is needed to tackle with climate proofing policies on the implementation of the management.

This section explains policies and plans related to forestry in climate change policy.

(a) Philippine Development Plan (PDP) (2023-2028)

Enhancement of conservation, restoration and management of ecosystems is one of the outcomes related to the forestry sector of the PDP. It describes that the restoration of degraded ecosystems such as forests, mangroves and wetlands will be accelerated in order to protect communities from the negative impacts of climate change. PDP also mentions that strengthening sustainable land use and management through Ecosystem-based Adaptation (EbA) and Nature-based solutions (NbS). It also mentions watershed management of degradation caused by deforestation, improving community livelihoods through agroforestry, building a local carbon market, thorough private funds and so on.

(b) National Climate Change Action Plan (NCCAP) (2011-2028)

Enhancing the resilience and stability of natural systems and communities is a top priority in NCCAP for ecological and environmental stability. The immediate outcome is “Ecosystems protected, rehabilitated and ecological services restored.” The following five items are specified as outputs to achieve the above outcomes.

- 1) Climate change mitigation and adaptation strategies for key ecosystems developed and implemented
- 2) Management and conservation of protected areas and key biodiversity areas improved.
- 3) Environmental laws strictly implemented.
- 4) Capacity for integrated ecosystem-based management approach in protected areas and key biodiversity areas enhanced.
- 5) Natural resource accounting institutionalized.

In order to achieve the above outputs, activities are clearly explained for each output as shown below.

Table 2-107 NCCAP output and activities (forestry sector)

NCCAP Output	Activities related to Forestry sector
1) Climate change mitigation and adaptation strategies for key ecosystems developed and implemented	<ul style="list-style-type: none"> • Implement the National REDD Plus Strategy (NRPS)
2) Management and conservation of protected areas and key biodiversity areas improved.	<ul style="list-style-type: none"> • Expand the network of protected areas (PAs) and key biodiversity areas (KBAs).
3) Environmental laws strictly implemented.	<ul style="list-style-type: none"> • Implement moratorium on polluting and extractive industries in PAs, KBAs and other environmentally critical areas.
4) Capacity for integrated ecosystem-based management approach in protected areas and key biodiversity areas enhanced.	<ul style="list-style-type: none"> • Enhance knowledge and capacity for integrated ecosystem-based management at the national, local and community levels
5) Natural resource accounting institutionalized.	None

Source: Prepared by the JICA Survey Team based on the NCCAP

(c) Philippine Master Plan for Climate Resilient Forestry Development (2016)

The Philippines' first forest development master plan was formulated in 1990 as the Philippine Forestry Development Master Plan to revitalize the country's forestry sector, which continued to decline, and was updated in 2003. Furthermore, in 2013, it was updated as the Philippine Master Plan for Climate Resilient Forestry Development, taking into account the potential impacts of climate change on the forestry sector. The new Master Plan proposes programs and strategies to carry out the following activities:

Table 2-108 Objectives and programs of Philippine Master Plan for Climate Resilient Forestry Development (2016)

Objective	Program
1) Strengthening resilience of forest ecosystems and communities to climate change	Ecosystem-based vulnerability assessment
	Climate change adaptation planning
	Management of protection forests and protected areas
	Protection of existing forests
	Rehabilitation and conservation of mangroves
	Livelihood support to Community Based Forest Management Agreement (CBFMA) and Certificate of Ancestral Domain Title (CADT) holders

Objective	Program
	Formulation of integrated watershed management and forest land use plans and Philippine Master Plan for Climate Resilient Forestry Development xv
	Implementation of REDD+ for climate change adaptation and mitigation
2) Effectively responding to demands for forest ecosystem goods and services	Delineation and demarcation of forest management zones
	Commercial forest plantation development for round wood production
	Fuel wood plantation development
	Management of grazing lands
	Watershed management and rehabilitation
	Urban forestry
3) Promotive responding governance that can effectively and efficiently respond to demand	Inventory of forest occupants
	Issuance of tenure/management instruments to close open access forestlands
	Enhancement of forestry policies
	Institutionalizing collaborative management
	Mainstreaming climate change into the DENR's policy and institutional process
	Capability enhancement

Source: DENR

(d) Community-Based Forest Management (Presidential Executive Order (EO) No. 263)

In 1995, the Philippine government established Community-Based Forest Management (CBFM) as a national strategy for sustainable management of national forest land through Executive Order No. 263. Communities can manage and use their forests subject to approval from DENR.

(e) National Greening Program (NGP) (2011-2028)

NGP is a national program that started in 2011, with the initial goal of planting 1.5 billion trees on 1.5 million hectares of land by 2016. NGP was further continued and renamed to the Enhanced National Greening Program (E-NGP) in 2015 which aims to restore 7.1 million hectares of degraded and degraded forest land from 2016 to 2028. The objectives of the NGP are as follows.

- 1) Contribute to poverty reduction in highland and lowland poor households, indigenous peoples, and coastal and urban areas.
- 2) Sustainable management of natural resources through resource conservation, protection, and productivity improvement
- 3) Achieve mitigation of climate change by expanding products and services such as food, wood, fiber, and non-timber forest products, aesthetic value, air quality improvement value, water use value, and expanding forest cover that serves as a carbon sink.
- 4) Foster a common social and environmental awareness of the value of forests and watersheds, and promote public enlightenment.

- 5) Promote the formation of positive values among young people and other partners through shared responsibility in the sustainable management of plantations and forest resources.
- 6) Integrate and harmonize all greening efforts by governments, civil society, and private companies

(f) Philippine National REDD+ Strategy (PNRPS)

The Philippine National REDD+ Strategy (PNRPS) was created with the goal of advancing policies focused on Reducing emissions from deforestation and forest degradation (REDD+). The PNRPS was formulated in 2010 and updated by DENR-FMB in June 2017. The updating work was carried out as part of the National REDD+ System Philippines Project (Preparation of a National REDD+ Mechanism for Greenhouse Gas Reduction and Conservation of Biodiversity in the Philippines) supported by GIZ.

(g) Guidelines on the operationalization of the national forest monitoring system for the implementation of the Philippine REDD+ Strategy (DAO 2021-32)

As described above, this guideline was promulgated to establish National Forest Monitoring System due to its lack. The guideline consists of 5 points as follows;

- Establishing and operationalizing within 6 months from the issuance of this Order, the Satellite Land Monitoring System, and produce activity data on forestland use and land-use change every 2 years
- Adopting the Forest Resources Assessment as the National Forest Inventory of the Philippines, providing data on emission factors for the country every 5 years
- Enabling the Department to publish National GHG Inventories for the forestry sector containing emission and removal estimates every 2 years
- Developing and operationalizing within 6 months from the issuance of this Order, a Forest Information System or web portal where all verified data on Philippine forestlands are published, stored, and accessed for the consumption of various stakeholders, including but not limited to other national government agencies, local government units, research institutions, financial institutions, civil society organizations, and the academe
- Enabling the Department to produce data relevant to the generation and submission of the Biennial Update Reports, National Communications, and reporting requirements form other international commitments

Moreover, it is clearly described that this guideline's usage is not necessarily limited to REDD+ while the guideline assumes that NFMS will be constructed, operated, and maintained in order to implement plans and activities in accordance with the REDD+ Strategy.

The guideline stipulates two functions of NFMS: monitoring the current state of forests in the Philippines, and measuring, reporting and verifying qualitative and quantitative data on projects and activities related to forests in the Philippines for the purpose of result-based payment for REDD+.

(h) The Philippine National REDD-Plus Action Plan 2022-2031

The Action plan explains the required functional settings for REDD+ to achieve result based payment. The four requirements for the REDD+ implementation are the National REDD+ Strategy (NRS), Forest Reference Emission Level/Forest Reference Level (FREL/FRL), National Forest Monitoring System (NFMS), and Safeguard Information System (SIS). There are 10 priority areas towards result-based payments along with the relevant action targets.

- Defining the Scope and Scale of REDD+
- Managing/Administering REDD+ (Establishing the National FREL/FRL)
- Mainstreaming REDD+ (Forest Governance and Land use)
- Legal and Regulatory Measures
- Establishing the National FREL and/or FRL
- Approach to Forest Monitoring System and Measuring, Reporting and verification
- Operationalizing the SIS
- Financing REDD+ and Benefit-sharing
- Capacity- building and Communication
- Research and Development

A functioning of REDD+ system is within grasp in the Philippines with the promulgation of the policies on NFMS and CAVCS, the establishment of the REDD+ pilot and demonstration sites and the selection of a focal point to communicate with the UNFCCC Secretariat in relation to REDD+ implementation.

(i) Guidelines on the Establishment of the Carbon Accounting, Verification, and Certification System (CAVCS) for Forest Carbon Projects (DAO 2021-43)

CAVCS is a carbon accounting, verification and certification system for forest sector carbon credit projects to encourage and support investment in activities that sequester carbon and avoid emissions from deforestation and forest degradation. CAVCS targets forest carbon projects established in forests, ancestral territories, private lands, and protected areas. Individuals and organizations participating in forest carbon projects can use CAVCS to demonstrate their commitment to forest protection, afforestation, and restoration, contribute to carbon neutrality, and report on mitigation and/or corporate sustainability.

On the other hand, since CAVCS does not mention carbon trading methods, a technical working group set up within DENR is currently considering a carbon trading policy targeting both voluntary and compliance

markets, and it will be formulated by 2024. Although this policy targets only the forestry sector, it is planned to eventually expand its scope to sectors other than forests, such as energy and transportation.

(j) Guidelines in the preparation of Integrated Watershed Management Plans (DENR Memorandum Circular No.2008-05)

According to the DENR Administrative Order No. 2005-23, promoting Sustainable Forest Management in the Philippines, it is the policy of the DENR to ensure the attainment and optimization of environmental, socio-cultural, economic benefits from all watershed programs and projects. The objectives of the Memorandum Circular are shown in below.

- To ensure that watershed management plans are consistent with the Watershed and Ecosystem Management
- To strengthen convergence and collaboration between and among various agencies, and other stakeholders
- To develop and maintain an effective database management system for watershed information
- To upgrade the technical and operational capabilities of the DENR, LGUs and other stakeholders

(k) Revised Supplemental Guidelines and Procedures of Watershed characterization and Climate resilient vulnerability assessment of Watershed and Preparation of Integrated Watershed Management Plan (Technical Bulletin No. 16-A)

This technical bulletin provides the supplemental guidelines and procedures of watershed characterization and climate resilient vulnerability assessment of watershed using science-based GIS, Remote sensing and some commonly used biophysical and socio-economic processes and methods, pursuing DENR Memorandum Circular No. 2008-05. For watershed forest reserves that are initial components of the NIPAS, the Integrated Watershed Management Plan needs to be based and complementary to the Initial Protected Area plan. It also needs to apply to all components of all watershed management and development programs and projects.

2) Implementation Status of Climate Change Measures

(a) Implementation structure

In the forestry subsector in the Philippines, there are services, bureaus and related organizations, as shown in the figure below.

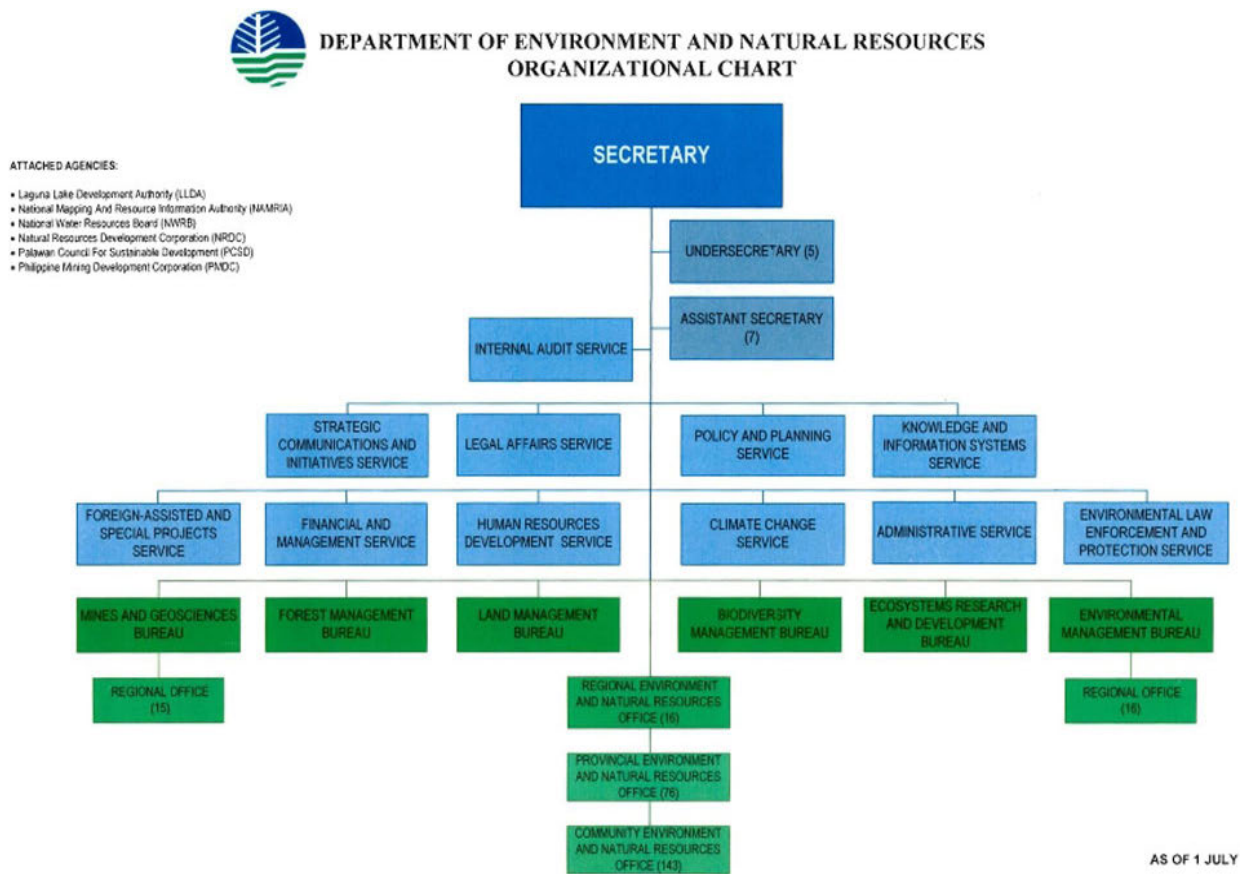
Table 2-109 Related departments and organizations in the forestry subsector

Category	Organization	Role
Policy making	DENR FMB	Policy making and monitoring in forestry section
Policy making	DENR-Climate Change Service (CCS)	Arrangement of carbon credit
Policy implementation	DENR BMB	Engagement of forest protection in Protected Areas

Category	Organization	Role
Research and development	DENR-Environmental Research and Development Bureau (ERDB)	Engagement of researching in DENR
Donors with ongoing projects	UNDP	Support for regarding CAVCS
Donors with ongoing projects	FAO	Ongoing Enhancing Biodiversity, Maintaining Ecosystem Flows, Enhancing Carbon Stocks through Sustainable Management of Forest Resources and the Restoration of Degraded Forestlands (FLR)
Donors with ongoing projects	JICA	Ongoing Forest Management Project (FMP)
Donors with ongoing projects	GIZ	Ongoing Ecosystem-based Management and Ecosystem Services Valuation in Two River Basins in the Philippines (E2RB)
Policy making	DENR FMB	Policy making and monitoring in forestry section

* Summary of analysis of published materials and donor interviews

DENR is in charge of forest policy in the Philippines. The DENR has 11 services and 6 bureaus under the Department. The DENR Forest Management Bureau (FMB) is responsible for climate change countermeasures related to forest policy.



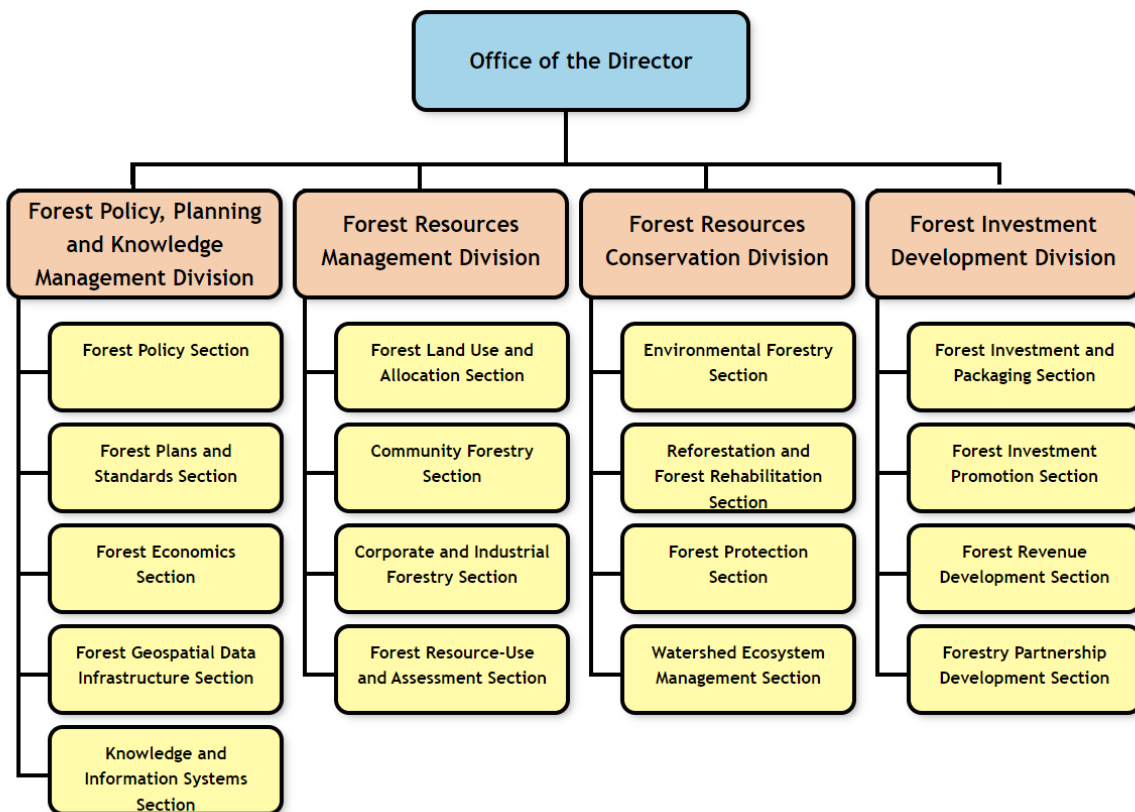
Source: DENR

Figure 2-66 Organization chart of DENR

FMB provides technical guidance for effective protection, development and conservation of forests and watersheds. It also recommends policies and programs to achieve sustainable forest management based on science and good forest governance. FMB has the following four divisions.

- Forest Policy, Planning and Knowledge Management Division
- Forest Resources Management Division
- Forest Resource Conservation Division
- Forest Investment Development Division

The organization chart of FMB is as below.



Source: DENR-FMB

Figure 2-67 Organization chart of FMB

(b) Climate-related budgets

The CCC organizes the climate change expenditures of each Department and agency, and the DENR’s forest-related climate change budget for 2017-2023 is PHP 4.6 billion. The breakdown is as follows.

Table 2-110 Climate budget (forestry sector)

Name of programs	Amount (million PHP)
Conduct of Special Studies, Design and Development in Support of Forestry, Mining and Environmental Management Operations, including Climate Change Resilience	192
Natural Resources management arrangement/agreement and permit issuance	1,073
Protected areas development and management	999
Forest Development, Rehabilitation, Maintenance and Protection	2,391
Total	4,655

Source: CCET

(c) Implementation status and identified issues of climate change mitigation measures

a) Promotion of REDD+

Currently, REDD+ is in the Readiness stage. There are four requirement for the implementation stage according to the Cancun Accords, such as National REDD+ Strategies, Forest Reference Level, National Forest Monitoring System (NFMS) and Safeguard Information System (SIS). In the Philippines, the first National REDD+ Strategy was formulated in 2010, and the revised in 2017. In addition, the Forest Reference Level was submitted to the UNFCCC in May 2023. Currently, NFMS and SIS are required to implement REDD+.

A REDD+ Action Plan has already been formulated in the Philippines. This plan details the configuration of functions required for REDD+ to result based payment. Until now, the contents and design concept of NFMS have been created in the National REDD+ System Philippines project by GIZ, in support of other donors regarding NFMS. Also, an NFMS action plan has been developed to address REDD+ policy measures and reporting obligations at the national and international levels with support from UN-REDD. Further, LAWIN Forest and Biodiversity Protection System was supported for monitoring forest and biodiversity by USAID and was not in implementation stage.

Related identified issues are shown as follows;

- National Forest Monitoring System (NFMS) including database has not yet been established

For the progress of REDD+, NFMS is needed for MRV and forest management. The data generated by forest remote sensing technology that is intended to be stored in the FMB includes data related to not only REDD+ but also GHG Inventories, FAO’s Forest Resource Assessment, etc. In addition, Ground survey data needs to be stored. Until now, in support of other donors regarding NFMS, capacity building was implemented by International Climate Initiative (IKI) for application of forest monitoring tool, such as COLLECT EARTH⁷⁷, United States Forest Services (USFS) supported for FRL setting with TerraPulse and

⁷⁷ <https://www.international-climate-initiative.com/en/project/national-forest-monitoring-and-information-systems-for-a-transparent-and-truthful-redd-13-iii-044-global-m-forest-monitoring/>

Google Earth Engine⁷⁸, and also the contents and design concept of NFMS have been created in the National REDD+ System Philippines project by GIZ. Further, an NFMS action plan has been developed to address REDD+ policy measures and reporting obligations at the national and international levels with support from UN-REDD. Moreover, The Philippine Space Agency (PhilSA) and the DENR signed a Memorandum of Agreement (MOA) to jointly implement a project related creating a geospatial database of natural resources and monitoring of NGP progress⁷⁹. However, currently there is no established system for forest monitoring and management in the whole country of the Philippines.

- Forest Remote Sensing Technology has not been established

The Philippines has the aforementioned Philippine National REDD Plus Strategy (PNRPS) and is preparing to implement REDD+. On the other hand, for the national forest monitoring systems required for REDD+, forest inventories (ground surveys) have been established while forest remote sensing technology using satellite images has yet been limited. There is an urgent need to establish forest remote sensing technology and prepare for the implementation of REDD+.

Related support needs are shown as below.

- Support for establishing forest remote sensing technology

There is a need for support to establish forest remote sensing technology using satellite images within the National Forest Monitoring System (NFMS) required for REDD+ implementation stage.

- Support for establishing National Forest Monitoring System (NFMS)

The monitoring data generated, such as not only REDD+, but also GHG Inventories, FAO's Forest Resource Assessment, etc. is intended to be stored in the NFMS. In addition, Ground survey data needs to be stored. It is necessary to establish a national forest monitoring system to store these data to carry out forest monitoring properly.

Currently, the Safeguard Information System (SIS) as one of four requirements for REDD+ implementation has not yet been established, however, the DENR has secured a budget for 2024 and also has the know-how to establish safeguards.

b) Promotion of voluntary market and carbon of trading

PDP describes that the establishment of local carbon market will be progressed. Also, according to the DAO 2021-43, CAVCS shows its meaning, such as a carbon accounting, verification and certification system. for forest sector carbon credit projects to encourage and support investment in activities that sequester carbon and avoid emissions from deforestation and forest degradation.

⁷⁸ Republic of the Philippines (2022) Philippines Forest Reference Level under the UNFCCC REDD+ Framework.
https://redd.unfccc.int/media/philippine_frl_document_final_6dec2022.pdf

⁷⁹ <https://philsa.gov.ph/news/philsa-denr-to-use-space-data-to-create-natural-resources-database-monitor-natl-reforestation-program/>

The Philippine government plans to formulate a carbon trading policy by 2024 that will allow carbon credits to be traded advantageously for the nation (as confirmed through interviews with CCS officials). In the voluntary market, certification by overseas carbon credit certification bodies, such as Verra's Verified Carbon Service (VCS) costs a large amount of money.

Currently, DENR plans to implement carbon trading in the forest sector in the Philippines. For this purpose, a technical working group set up within DENR is currently considering a carbon trading policy targeting both voluntary and compliance markets, and it will be formulated by 2024. Other initiatives in the voluntary market include encouragement of private companies to participate the market. A memorandum was signed by a Japanese trading company, such as Marubeni corporation to develop a carbon credit program through forest restoration through collaboration between industry, academia and government, and the project is scheduled to begin in the future.

Related identified issues are shown as follows;

- Limited know-how to establish carbon market

The participation of private companies into the voluntary market in the Philippines can be seen through the generation of carbon credit for major customers. For small scale carbon generated participants, it is necessary to establish a carbon market that can conduct carbon trading, taking into account the voluntary market system that will accompany the establishment of a domestic trading system in the future. Currently, there is a limited know-how for it.

- Limited policies for implementation of carbon trading

Currently, DENR is planning to implement carbon trading in the forest sector in the Philippines. To this end, a Technical Working Group has been established within the DENR and is proceeding with deliberations, with the aim of formulating policies regarding the implementation of carbon trading targeting the voluntary and compliance markets by next year. Until now, there has been a policy in the Philippines called CAVCS that stipulates carbon accounting, verification, and certification systems for forest carbon projects. However, there is no policy for implementing carbon trading, and knowledge is needed for policy formulation. Also, currently there are no third-party organizations that certify credits other than foreign auditing organizations, and consideration must be given to the establishment of a domestic certification entity. Furthermore, although private companies such as Marubeni are currently conducting their own carbon credit creation projects through tree planting, there is no obligation to report the details and effects of such projects to the DENR, such as the location and period in which credits were generated. Until now, DENR has not been able to grasp those information.

Related support need is shown as below.

- Support for carbon market establishment and Policies for implementing carbon trading

For small scale participants, it is necessary to establish a carbon market that can conduct carbon trading, taking into account the voluntary market system that will accompany the establishment of a domestic trading system in the future. Currently, Know-how for the establishment is required among small scale participants.

Targeting the forestry sector first, DENR plan to start carbon trading both in the voluntary market and compliance market. While UNDP provides policy planning support for the voluntary market, there is a need to support policy planning to implement carbon trading under the compliance market.

c) Development of GHG monitoring method

The Ecosystem Research and Development Bureau (DENR-ERDB) is considering introducing the Eddy Covariance method, which measures CO₂ flux per unit area based on carbon dioxide concentration and air flow. This is not only to make the GHG inventory more accurate, but also to be expected that more accurate carbon dioxide measurement will be required if carbon trading is implemented in the Philippines in the future. ERDB plans to receive equipment for the Eddy Covariance method from the Department of Science and Technology (DOST) within the next few years and implement it as a pilot project for the Eddy Covariance method. If the method proved to be useful after implementing the pilot project, ERDB is considering its expanding in nationwide.

Related support need is shown as below.

- Limited funds to purchase the equipment to introduce Eddy Covariance Method at the national level

The Ecosystem Research and Development Bureau (DENR ERDB) is considering introducing the Eddy Covariance method, which measures CO₂ flux per unit area based on carbon dioxide concentration and air flow. This is not only to make the GHG inventory more accurate, but also to be expected the possibility that more accurate carbon dioxide measurement will be required if carbon trading is implemented in the Philippines in the future.

ERDB plans to receive equipment for the Eddy Covariance method from the Department of Science and Technology (DOST) within the next few years and implement it as a pilot project. If the method proves to be useful after implementing the pilot project, ERDB is considering expanding it nationwide. Although there are staff within the ERDB who know how to implement the method, there is a limited funds to purchase equipment for nationwide deployment and a limited know-how to implement capacity building for staff.

There is a need for capacity building support for the staff for implementation and financial support.

(d) Implementation status and Identified Issues of climate change adaptation measures

a) National Adaptation plan is being prepared.

National Adaptation plan in the Philippines is preparing. According to multi-stakeholder consultations and workshops, forests will be included in the Ecosystems and Biodiversity sector in the plan.

b) Promotion of Integrated Watershed Management Plan

The DENR FMB has developed guidelines for Integrated Water Management Plan, ecosystem-based watershed management and Climate change vulnerability assessment associated with Protected Areas for sustainable forest management based on PDP and other documents. There are over 2,000 watersheds in the Philippines as a whole nation, and currently watershed management plans have been developed for approximately 70 of the 131 important watersheds.

In the watershed management plan, water yield assessments are required. DENR FMB monitors precipitation, soil moisture, etc. As the watershed management plan progresses data from other departments and agencies will be shared. However, it has been found that there are differences in data specifications. Equipment has been installed in 16 the 131 crucial watersheds.

Related identified issues are shown as follows;

- Limited climate proofing policies regarding Integrated Watershed Management Plan

Integrated Watershed Management Plan began with ecosystem-based watershed plan and is currently being developed in conjunction with Protected Areas, considering climate change vulnerability. While Comprehensive policies that are resilient to climate change are needed, coordination takes time due to the diversity of ministries and agencies relevant to that.

- Limited know-how to analyze precipitation and soil data collected by Automatic Weather Station (AWS) and remote sensing

FMB has experimentally installed automatic weather stations that collect real-time rainfall and soil data in 48 basins in 16 regions across the country while they lack the know-how to analyze the collected data. This pilot effort aims to provide rainfall and soil data necessary for more effective implementation of the Enhanced National Greening Program currently being implemented by FMB, is not being utilized effectively. Further, the use of data such as rainfall is supported by the DOST-PAGASA, DPWH, DILG, and the National Disaster Risk Reduction and Management Council (NDRRMC), though currently, the FMB has not confirmed in detail the efforts of other ministries and agencies. Further, recently, there is limitation of know-how to visualize collected data using remote sensing technology which supports watershed management.

- Limited Automatic Weather Station (AWS) Equipment and remote sensing equipment for Collecting Data on Precipitation and Soil, etc.

Integrated watershed management plans are currently being implemented in 16 watersheds. Due to a limited funding, the 131 planned basins lack Automatic Weather Station equipment to collect rainfall, soil and other data necessary to progress the plan. Also, remote sensing equipment for monitoring is limited.

Related support needs are shown as below.

- Support for Climate proofing policy making relevant to Integrated Watershed Management Plan

Integrated Watershed Management Plan began with ecosystem-based watershed plan and is currently being developed in conjunction with Protected Areas, considering climate change vulnerability. While Comprehensive policies that are resilient to climate change are needed, coordination takes time due to the diversity of ministries and agencies relevant to that. Existing policy, such as "Adoption and Implementation of Collaborative Approach to Watershed Management (DAO 2005-23)" needs to be revised and updated.

- Support for capacity building for Data analysis for Climate resilient water protection capacity

There is a support need to analyze rainfall and soil data in the basin collected by automatic weather observation devices and utilize it for the Enhanced National Greening Program. Currently, the DOST-PAGASA is also monitoring rainfall and soil moisture. Furthermore, according to FMB, data on rainfall and soil is also collected by the DPWH, the DILG, and the NDRRMC, thus it is necessary to clarify the division of roles among the agencies. Further, there is another support need to use remote sensing technology for monitoring of watershed management.

- Installation of equipment for Automatic Weather Stations (AWS) and remote sensing equipment

Integrated watershed management plans are currently being implemented in 16 watersheds. In order to progress of the plans, the installation of Automatic Weather Station equipment to collect rainfall, soil and other data is needed. Further, there is another support need to install remote sensing equipment for visualizing data of monitoring of watershed management.

(e) Implementation status and identified issues of climate change common mitigation and adaptation measures

a) Promotion of Afforestation, Reforestation and Revegetation

Afforestation, Reforestation and Revegetation (ARR) is being implemented for local residents as a response required in the forest sector to promote Climate change measures. National Convergence Initiative for Sustainable Rural Development has set up a forum for consultation.

Related identified issues are shown as follows;

- Limited understanding among local residents about the need for afforestation, revegetation, and climate change issues

Afforestation, Reforestation and Revegetation (ARR) are important as responses required in the forest sector in promoting climate change countermeasures. On the other hand, there are cases in which the local residents of the target area do not understand the purpose and importance of ARR, resulting in conversion of farmland after the implementation of ARR. It seems that this is not only due to the limited understanding of ARR by local residents, but also problems such as poverty and an increase in immigrants from the urban areas. According to interviews with FMB and the University of the Philippines Los Banos, one of the reasons for the results of conversion of farmland after the implementation is the limited understanding of the need to implement ARR and the issue of climate change. Therefore, it is necessary to implement measures to promote understanding of ARR among local residents.

- Difficulties in consultation among various stakeholders, including indigenous peoples, when planting trees and restoring vegetation

When implementing ARR, the land that is owned and lived by indigenous peoples may be targeted, and there are cases where consultation with indigenous peoples takes a long time, and ARR is not implemented sometimes. For this reason, the National Convergence Initiative for Sustainable Rural Development has set up a forum for consultation. However, it is difficult to reach a conclusion in the discussion because of the capacity of NCIP, which represents indigenous peoples, is limited, making it difficult to secure personnel who can respond to consultations and difficulty of aligning interests.

Related support needs are shown as below.

- Smooth consultation in the diversity of stakeholders

As consultations with indigenous peoples have been in difficulty when implementing ARR, it is necessary to establish a new platform to facilitate consultations.

In order to implement new afforestation, reforestation, and revegetation (ARR), support needs are also raised from the university regarding the implementation of environmental education for local residents to progress the understanding among local residents about the necessity of implementing ARR and climate change issues.

b) Promotion of National Greening Program (NGP)

As described above, the NGP aims to restore degraded and denuded forest land. As shown in the figure below, the goal is to plant trees on 2,035,407 ha of land, including the NGP from 2011 to 2016 and the E-NGP (Enhanced National Greening Program) from 2017 to 2022. As of August 2022, 2,181,684 ha of forests have been planted, achieving a 107% of the target achievement. According to the Forest Resource Assessment (2020), the forest cover area of the Philippines in 2020 was 7,189,000 ha. As of 2020, the area

of afforestation is 2,078,899 ha. This means that 28.9 % of the country’s forest cover area is planted by NGP and E-NGP. As described above, the forest cover area increased by 0.5% from 2010 to 2020. It is considered to be largely contributed by NGP and E-NGP. In addition, many of the tree-planting projects have been implemented for restoration of degraded forests by community organizations and NGOs commissioned by the government. On the other hand, E-NGP also encourages private companies to participate in tree planting, and private companies are also partly responsible for tree planting, maintenance and protection of existing plantations in-and-out of E-NGP target areas.

Table 2-111 Achievement of reforestation in National Greening Program

National Greening Program and Enhanced National Greening Program Accomplishment Report
as of August 12, 2022

YEAR	TARGET AREA	AREA PLANTED	% Accompl	SEEDLINGS PLANTED	JOBS GENERATED	PERSONS EMPLOYED
NATIONAL GREENING PROGRAM (NGP)						
2011	100,000	128,558	129%	89,624,121	335,078	47,868
2012	200,000	221,763	111%	125,596,730	380,696	55,146
2013	300,000	333,160	111%	182,548,862	466,990	65,198
2014	300,000	334,302	111%	205,414,639	1,079,792	152,008
2015	350,000	360,357	103%	351,014,239	915,729	123,519
2016	247,683	284,089	115%	415,564,211	842,792	114,584
SUBTOTAL (NGP)						
2011-2016	1,497,683	1,662,229	111%	1,369,762,802	4,021,077	558,323
ENHANCED NATIONAL GREENING PROGRAM (ENGP)						
2017	193,803	206,136	106%	182,185,530	582,070	84,315
2018	136,466	141,310	104%	138,020,616	393,903	62,375
2019	19,617	21,925	110%	25,851,359	268,171	46,313
2020	46,907	47,299	101%	37,206,581	367,195	55,141
2021	94,667	95,666	101%	70,751,170	225,588	38,547
2022	46,265	7,119	15.39%	6,089,153		
SUBTOTAL (ENGP)						
2017-2022	537,724	519,455	97	460,104,409	1,836,927	286,691
TOTAL (NGP & ENGP)	2,035,407	2,181,684	107	1,829,867,211	5,858,004	845,014

*updated total no. of seedlings planted after finalization of 2021 database

Source: DENR-FMB



Source: DENR-Annual Report 2020

Figure 2-68 Reforestation in NGP

c) Forest Protection and Anti-illegal logging

As mentioned above, illegal logging is a major driver of deforestation and forest degradation, and DENR is working to share knowledge and provide necessary equipment and tools to regional offices in order to comply with environmental laws and regulations. Also, there are three priorities for forest protection and anti-illegal logging activities, which are implementation of forest patrols, forest fire prevention, and neutralization of illegal logging hotspots.

d) JICA Forestland Management Project

The project has started since 2012 as JICA's Loans. The implementation period is prolonged until 2024. In the Philippines, due to the major deforestation, water protection capacity has declined and caused the floods. The project aims to community-based forest management and livelihood improvement in three river basin, such as Upper Magat and Cagayan river basin, Pampanga river basin and Jalur river basin. The objectives are shown as follows;

- Rehabilitation of 65,000 ha of degraded forestlands and forest conservation of 5,800 ha
- Improvement of socio-economic conditions of local people
- Contribution of disaster risk mitigation efforts in vulnerable areas
- Empowering people's organizations and enterprise development for food security and income

Related identified issues are shown as follows;

- Limited capacity for prevailing of watershed management

The JICA Forest Management Project, currently being implemented has located in highland areas, which are vulnerable to risks from watershed due to increases in rainfall, etc. Although design for implementation of watershed management projects is in place, capacity building necessary for prevailing of watershed management is limited for further improvement.

- Limited marketing capacity for agricultural products through agroforestry

The JICA Forest Management Project, currently being implemented is working to improve the livelihoods of highland communities through agroforestry. In order to improve productivities and livelihoods in agriculture, etc., it is necessary to develop marketing capabilities that take into account of market expansion and value chains development. The current situation is deficient of the organization strength of People's Organization and faces in a difficulty to expand its implementation.

DENR-FMB expressed support needs on a subsequent project following the above JICA Forest Management Project, as below.

- Support for Information, Education and Communication (IEC) for collaborative watershed management, and rehabilitation of degraded forest area and plantation

The JICA Forest Management Project, currently being implemented has located in highland areas, with vulnerability of risks from watershed. Toward implementation of watershed management projects, capacity building is required for prevailing of watershed management with knowledge of Integrated Watershed Management Plan and its practice. Also, for the IEC, there is a support need to support challenge of visualizing in watershed management, such as digital map using. Further, the NDC's future emission projection shows future trend of FOLU sector, and it will emit more GHG with economic development in 2030. So, it needs to consider how to address this emission from deforestation. It is needed to succeed of current project with rehabilitation and plantation in degraded forest area for enhancing the water protection capacity in collaborative watershed management.

- Support for reinvestment mechanisms for business development and sustainable business by local community

The JICA Forest Management Project, currently being implemented is working to improve the livelihoods of highland communities through agroforestry. In order to improve productivity in agriculture, such as coffee production, etc., it is necessary to develop marketing capabilities that take into account of market expansion and value chains development with strengthening of People's Organization.

3) Status of Donor Support

The following is an overview of climate change related projects that FMB is currently implementing or considering with partners.

Table 2-112 Status of donor support (forestry sector)

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
JICA (Loans)	Project name: Forest Management Project (FMP) Implementation period: Initial 2012-2021, 1st extension 2012-2023, 2nd extension 2012-2024 Activity purpose/content: Forest management through community-based forest management CBFM in three river basins implemented over a period of approximately 13 years. This project aims to restore degraded forest areas, conserve forests, and improve the socio-economic conditions of upland dwellers and biodiversity. The project components are 1. Comprehensive site development (CSD) of the target area and 2. Consulting services. Comprehensive site development includes survey mapping, and planning of CSDs, community organizing and capacity building of people's organizations, local enterprises development, implementation of afforestation and agroforestry activities, strengthening of watershed management bodies, and construction of agroforestry support facilities.	DENR-FMB	Ongoing

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
	Since the implementation period has just been extended to 2024, and FMB would like to consider the details of the project after the FMP ends later.		
FAO (Source: GEF)	<p>Project name: Enhancing Biodiversity, Maintaining Ecosystem Flows, Enhancing Carbon Stocks through Sustainable Management of Forest Resources and the Restoration of Degraded Forestlands (FLR)</p> <p>Implementation period: 2021-2025</p> <p>Activity purpose/content: It aims to provide multiple and integrated environmental, livelihood and development benefits by promoting the cost-effective and sustainable restoration of the biological and productive capacity of degraded forest ecosystems. There are three components, as follows.</p> <ol style="list-style-type: none"> 1) Creation of conditions that allow for improved forest and landscape restoration 2) implementation of restoration programs and complementary initiatives for forest landscape restoration, protected area management and biodiversity conservation 3) Knowledge, partnerships, monitoring and evaluation 	DENR-FMB	Ongoing
FAO (Funded by BUMV-IKI)	<p>Project name: Paris Agreement in Action: Upscaling Forest and Landscape Restoration to Achieve Nationally Determined Contributions Project</p> <p>Implementation period: 2021-2023</p> <p>Activity purpose/content: Improve GHG emission reduction targets from the forestry sector in the Philippines on the upcoming phase of the National Greening Program (NGP). Forest and landscape restoration (FLR) can make a contribution to the NDCs. And also, it has a potential for expanding forest resources and improving ecosystem services. Currently, the project of restoration is on going on Bohol Island (400 ha) and Bataan region (605 ha) with assisted natural regeneration techniques and firebreaks.</p>	DENR-FMB	Ongoing
FAO (Funded by BMEL)	<p>Project name: Forest for a Sustainable Future Educating Children Project (FAO)</p> <p>Implementation period: 2021-2023</p> <p>Activity purpose/content: This project aims to increase forest literacy and awareness among children aged 9 to 12 years, and also aims to improve forest knowledge and awareness, involve educators in the project, and prevail forest education materials nationally and regionally focused.</p>	DENR-FMB	Ongoing
AFoCO	<p>Project name: Promotion of Vertical Integration in Wood Processing (VIP) through People's Organizations in Community-Based Forest (CBFM) Management areas in the Philippines (AFoCo-VIP)</p> <p>Implementation period: 2021-2026</p> <p>Activity purpose and content: The project aims to support vertical integration in community-based forest management areas by promoting community-based livelihood opportunities through existing plantations. Promoting the sustainability of plantations managed by community organizations (POs) to generate income from wood use and processing. A summary of the specific project goals is as follows.</p>	DENR-FMB	Ongoing

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
	<ul style="list-style-type: none"> • Promote the involvement of the two participating community-based forest management organizations (CBFM POs) in value-adding activities in wood production • Provide appropriate market linkages for the two participating CBFM POs to operate their wood-based businesses. • Develop and recommend policy guidelines for introducing vertical integration as a business model for CBFM POs. 		
GIZ	<p>Project name: Ecosystem-based Management and Ecosystem Services Valuation in Two River Basins in the Philippines (E2RB) Implementation period: 2019-2024 Activity purpose/content: The project aims to improve river basins by supporting a variety of areas including endangered species and livelihoods through an ecosystem-based approach. The project focuses on reducing the number of hazard-prone households and improving water availability and quality in selected watersheds (Component 1). Additionally, improve governance of water use and management, encourage private sector participation in conservation, and strengthen knowledge and information management (Components 2, 3, and 4). The forest sector includes activities to increase the density of indigenous tree species in forest and riparian vegetation, thereby improving ecosystem services in watersheds.</p>	DENR-FMB	Ongoing
UNDP	<p>Project name: unknown Implementation period: August 2023-December 2023 Activity purpose/content:</p> <ol style="list-style-type: none"> 1. A review of the DENR policy, Carbon Accounting, Verification, and Certification System (CAVCS). Existing carbon accounting methods stipulated by CAVCS will be updated to meet international standards. 2. Carbon Trading Roadmap: A feasibility study (F/S) is scheduled to be conducted to develop a framework for implementing carbon trading. Blue carbon is also subject to be studied. 3. Carbon Finance Assessment: Examine cases in other countries to see if taxes can be levied when selling carbon credits. Necessary policy incentive mechanisms will also be considered. 	DENR	Ongoing

Source: JICA Survey Team

(3) Coast/Marine and Biodiversity

1) Relevant Policies and Plans

As for the Coastal/Marine and Biodiversity subsector, the Philippines is geographically at high risk of coastal disasters due to the effects of extreme weather events by climate change while the Philippine Coast/Marine belongs to the tropical area, and the ecosystem exists as a valuable habitat that supports to a diverse range of flora and fauna. The Convention on Biological Diversity (CBD) was ratified by the Philippine government in 1993. Following, the Kunming-Montreal Biodiversity Framework, which replaces the Aichi Targets, aims to turn the area into Protected Areas at least 30% of degraded terrestrial, inland waters, coastal and marine ecosystems by 2030, such as 30by30 as one of the targets of the

Framework. However, Marine Protected Areas (MPAs) in the Philippines as of 2023, account for 1.74% of the total Coastal/Marine areas. Mangroves, seaweed and coral are targeted by Blue carbon storage. In the future, they are also of interest as a source of carbon storage. In 2020, the scale of mangrove and seaweed was reported to be 259,037 and 1,500,015 – 2,726,200 ha, respectively⁸⁰.

As a policy and plan for the coastal/marine biodiversity subsector, PDP aims to protect, restore, and manage ecosystems in the coastal/marine biodiversity sector and protect communities from the negative impacts of climate change. The goal is to accelerate the restoration of degraded ecosystems such as forests, mangroves and wetlands. NCCAP points to the formulation and implementation of climate change mitigation and adaptation strategies related to ecosystems, the conservation of Protected Areas and capacity building for integrated ecosystem-based management. The Philippine Biodiversity Strategy and Action Plan 2015-2028 (PBSAP) is a national biodiversity strategy and action plan in line with the CBD, which aims to ensure biodiversity is restored, assessed, effectively managed and ecosystem services provided by 2028. The aim is to benefit all people, such as maintaining sustainable communities and maintaining resilient communities. As for, marine protection, the goal is to increase the number of Protected Areas in various aquatic habitats by 20% from 2015 levels by 2028. The Coastal and Marine Ecosystems Management Program (CMEMP) aims to effectively reduce the threats of drivers of coastal/marine ecosystem degradation through the establishment of a network of Marine Protected Areas and comprehensive coastal/marine management.

The NDC's adaptation measures include addressing loss and damage in the area of coastal/marine ecosystems and biodiversity, and addressing adaptation strategies accompanied with co-benefits with mitigation. However, there is no specific goals provided.

In the coastal/marine biodiversity sector, BMB conduct baseline assessments of corals, mangroves, and seaweed as challenges of climate change mitigation and adaptation measures. In addition, BMB also conduct target area patrols, monitoring, and repairing necessary equipment, etc in the National Integrated Protected Areas System Marine Protected Areas (NIPAS MPAs).

In issues of the coastal/marine ecosystem and biodiversity sector, as weather disasters from climate change become more severe, the BMB is working on adaptation measures, loss and damage response, strategies combined with mitigation measures and addressing climate change vulnerability by conserving and protecting ecosystems and expanding Marine Protected Areas. The BMB also needs to work on preserving marine biodiversity and sequestering carbon from the coastal/marine thorough Blue carbon policies.

(a) Philippine Development Plan (PDP) (2023-2028)

Similar to the forestry sector, outcomes that are relevant to the coastal/ marine and biodiversity sector are “2) Enhancement of conservation, restoration and management of ecosystems, and management”. It states

⁸⁰ Thorhang et al (2020) Coastal and estuarine blue carbon stocks in the greater Southeast Asia region: Seagrasses and mangroves per nation and sum of total. Marine Pollution Bulletin (Online)

that the restoration of degraded ecosystems such as forests, mangroves and wetlands will be accelerated in order to protect communities from the negative impacts of climate change. It also mentions enhancement of adaptation measures, such as restoring and protecting Blue carbon ecosystems towards a low-carbon economy.

(b) National Climate Change Action Plan (NCCAP) (2011-2028)

As with the forestry sector, priority activities are specified for each of the five outputs. Activities relevant to the coast/marine and biodiversity sector are below.

Table 2-113 NCCAP output and activities (coast/ marine and biodiversity sector)

NCCAP Output	Activities related to coastal/ marine and biodiversity sector
1) Climate change mitigation and adaptation strategies for key ecosystems developed and implemented	<ul style="list-style-type: none"> • Conduct a nationwide gendered ecosystem vulnerability and risk assessment. • Derive and implement mitigation and adaptation strategies for key biodiversity areas
2) Management and conservation of protected areas and key biodiversity areas improved.	<ul style="list-style-type: none"> • Establish ecosystem towns or ecotowns in protected areas and key ecosystems
3) Environmental laws strictly implemented.	<ul style="list-style-type: none"> • Implement moratorium on polluting and extractive industries in PAs, KBAs and other environmentally critical areas.
4) Capacity for integrated ecosystem-based management approach in protected areas and key biodiversity areas enhanced.	<ul style="list-style-type: none"> • Increase knowledge and capacity for integrated ecosystem based management at the national, local and community levels.
5) Natural resource accounting institutionalized.	<ul style="list-style-type: none"> • Review and revise policy on Phil. Economic Environmental and Natural Resources Accounting • Implementation of training programs on asset accounting or natural capital accounting for key government agencies

Source: Prepared by the JICA Survey Team based on the NCCAP

(c) Philippine Biodiversity Strategy and Action Plan (PBSAP) (2015-2028)

The Philippine government is a party to the Convention on Biological Diversity (CBD) and formulated the Philippine Strategy for the Conservation of Biological Diversity (PSCBD) in 1994 in line with the CBD's biodiversity strategy. In 1995, UNEP undertook a national biodiversity assessment and in 1997 developed the National Biodiversity Strategy and Action Plan (NBSAP). With the support of UNDP, the Philippine Biodiversity Strategy and Action Plan (PBSAP) was formulated in 2015 as a revision of NBSAP. PBSAP's vision is that by 2028, biodiversity is restored and rehabilitated, valued, effectively managed and secured, maintaining ecosystem services to sustain healthy, resilient Filipino communities and delivering benefits to all. PBSAP also aims to integrate and mainstream the CBD goals into national development and sectoral planning frameworks. Those goals are:

- 1) Conservation of biological diversity
- 2) Sustainable use of its components

- 3) Fair and equitable sharing of benefits arising out of the utilization of genetic resources

PBSAP has developed a number of programs to initially address drivers and threats to biodiversity loss across ecosystems and thematic areas. Some of these programs are:

- 1) Integrated Approach in the Management of Major Biodiversity Corridors in the Philippines
- 2) Maintaining Ecosystem Flows, Mainstreaming Biodiversity and Restoring Degraded Forestlands and Enhancing Carbon Stocks through an Integrated Landscape Approach
- 3) Capacity Building for the Ratification and Implementation of the Nagoya Protocol on Access and Benefit-Sharing in the Philippines
- 4) Combatting Environmental Organized Crime in the Philippines
- 5) Carbon-Resilient, Low-Carbon and Sustainable Cities.

Although there are no numerical targets for coastal ecosystems, PBSAP targets “By 2028, there will be no net loss in presence and area distribution of live coral cover, mangroves, and seagrasses”. On the other hand, it also targets “By 2028, there will be a 20% increase from 2015 levels in the coverage of established Marine Protected Areas (MPAs)/sanctuaries across various aquatic habitats.” for marine protection. The Philippines adopted the Coral Triangle Initiative (CTI) target of having at least 20% of each major marine and coastal habitat type across the region to be placed in strictly protected.

(d) Coastal and Marine Ecosystems Management Program (CMEMP)

CMEMP was developed in 2016 with the aim of effectively reducing and comprehensively managing the drivers and threats of coastal and marine ecosystem degradation. Specifically, it states that it aims to achieve the following five points.

- (1) Establish a well-connected network of MPAs to ensure the effective and sustainable management of coastal resources
- (2) Implement sustainable management of coastal and marine resources to contribute to food security and improve human-well-being of the coastal communities
- (3) Effectively reduce threats and factors of degradation on coastal and marine ecosystems
- (4) Enhance the formation of positive values among all stakeholders including the youth through shared responsibilities in sustainable management of coastal and marine resources and habitats, and
- (5) Develop and or enhance the skills and expertise of DENR concerned staff as well as other stakeholders on coastal and marine management.

(e) Climate Change Adaptation, Mitigation and Disaster Risk Reduction (CCAM-DRR) Cabinet Cluster Roadmap for 2018-2022

This roadmap aims to achieve "climate change and disaster resilient communities that support equitable and sustainable development. The four main outcomes are: improving the adaptive capacity of vulnerable communities; ensuring adequate supplies of air, water, and other natural resources; improving the resilience of critical infrastructure; and improving knowledge, access to information, and organizational capacity. Twenty-two vulnerable provinces, 822 coastal municipalities, and major urban areas have been selected as priority areas.

This includes 48 protected areas managed by the BMB.

2) Implementation Status and Identified Issues of Climate Change Measures

(a) Implementation structure

In the Coastal/Marine subsector in the Philippines, there are services, bureaus and related organizations, as shown in the figure below.

Table 2-114 Related services bureaus and organizations in the coastal/marine biodiversity subsector

Category	Organization	Role
Policy making	DENR BMB	Policy making and monitoring in coastal/marine and biodiversity
Research and development	DENR-Environmental Research and Development Bureau (ERDB)	Research institution under DENR
Research and development	University of Philippine Marine Science Institute (MIS)	Research institute regarding Coastal and Marine
LGU	Biodiversity related sector in LGUs	Collecting information and reporting regarding coastal/marine biodiversity
Donors with ongoing project	UNDP	Ongoing Integrated Approach in the Management of Major Biodiversity Corridors (BD Corridor) in the Philippines, etc.
	UNEP	Ongoing Implementing the Strategic Action Programme for the South China Sea (SAP-SCS)
	FAO	Ongoing Ensuring Sustainable Benefits from Peatland through Protection and Wise Use (ESBenePeat)
	JICA	Completed Project on Comprehensive Assessment and Conservation of Blue Carbon Ecosystems and their Services in the Coral Triangle (SATREPS)
	USAID	Ongoing Sustainable Interventions on Biodiversity, Oceans and Landscapes (SIBOL)
Private company	Construction material company	Considering NbS, etc. in Biodiversity field

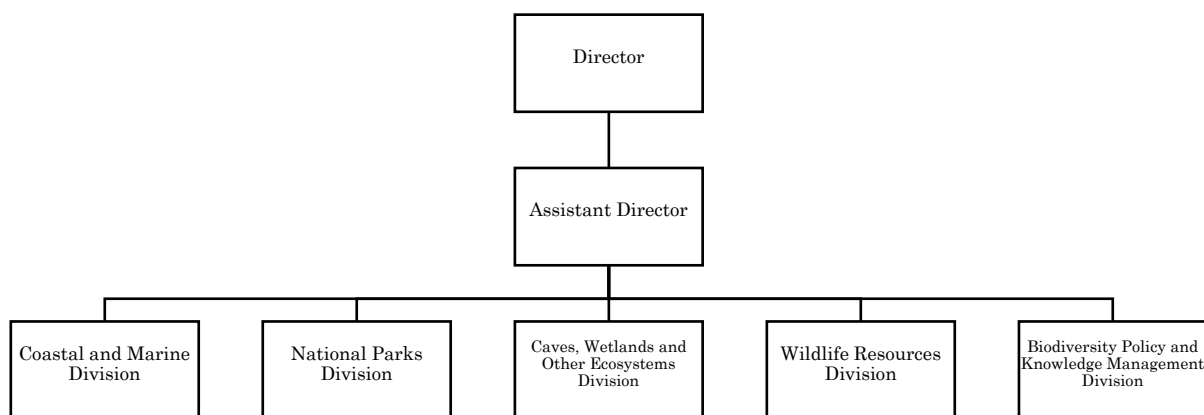
*Summary of analysis of published materials and donor interviews

The Biodiversity Management Bureau (BMB) of the DENR is in charge of marine protection and biodiversity policy in the Philippines. The BMB has the following eight mandates:

- 1) Establishing and Managing Protected Areas
- 2) Conserving Wildlife
- 3) Promoting and Institutionalizing Ecotourism
- 4) Managing Coastal Biodiversity and Wetlands Ecosystems
- 5) Conserving Caves and Cave Resources
- 6) Information and Education on Biodiversity and Nature Conservation
- 7) Managing Ninoy Aquino Parks and Wildlife Center
- 8) Negotiating biodiversity-related Multilateral Environmental Agreements and Monitoring National Implementation

There are five divisions and one center (Ninoy Aquino Park and Wildlife Center) within BMB as shown in the organization chart:

- 1) National Parks Division
- 2) Wildlife Resources Division
- 3) Coastal and Marine Division
- 4) Caves, Wetlands and Other Ecosystems Division
- 5) Biodiversity Policy and Knowledge Management Division



Source: JICA Survey Team edited from DENR-BMB Website

Figure 2-69 Organization chart of BMB

(b) Climate-related budgets

According to the Climate Change Service, Climate Change Expenditure Tagging⁸¹, the budget for climate change measures related to coastal and marine protection and biodiversity within the DENR for 2017-2023 is PHP 263 million. The breakdown is as follows.

⁸¹ Climate Change Service, Climate Change Expenditure Tagging: <https://niccdies.climate.gov.ph/climate-finance/ccet> (checked on 2023/8/25)

Table 2-115 Climate budgets (coastal and marine protection and biodiversity)

Name of the program	Budget (million PHP)
Management of Coastal and Marine Resources/Areas	246
Wildlife and Cave Management	17
Total	263

Source: Prepared by the JICA Survey Team based on CCC data

(c) Implementation status and Identified Issues of climate change adaptation measures

a) National Adaptation plan is being prepared

National Adaptation plan in the Philippines is preparing. According to multi-stakeholder consultations and workshops, forests will be included in the Ecosystems and Biodiversity sector in the plan.

b) Promotion of Marine Spatial Planning targeted management of Marine Protected Areas, etc.

In PDP, NCCAP and PBSAP, there is mention about protection regarding degraded coastal/marine ecosystems. Philippines government has not yet developed the public policy on Marine Spatial Plan (MSP) which is a plan that “involves appropriate spatial layout based on scientific knowledge and analysis in order to mutually adjust various socio-economic utilization activities in the ocean and to preserve and sustainably develop these marine ecosystems. In 2014, USAID conducted capacity building for BMB to formulate Coastal and Marine Spatial Plans (CMSP), and a module showing the steps to formulate a plan has been created. It is necessary to cooperate with various stakeholders such as local governments (LGUs) and the Department of Agriculture (DA) in formulating the actual plan, and considered that the plan will not proceed according to the module. BMB has already conducted a trial workshop for MSP formulation in municipalities around Laguna de Bay.

Related identified issues is shown as follows;

- Limited Strategic Conservation Planning (SCP) for the management of Marine Protected Areas

Philippines government has not yet developed the public policy on Marine Spatial Plan (MSP) which is a plan that “involves appropriate spatial layout based on scientific knowledge and analysis in order to mutually adjust various socio-economic utilization activities in the ocean and to preserve and sustainably develop these marine ecosystems.⁸²” However, a policy framework that comprehensively views Protected Areas, including stakeholders, has not been formulated due to the wide range of sectors with those interests. Therefore, it is necessary to formulate the Strategic Conservation Plan that encompasses relationships of stakeholders and the plan. There is a limited know-how and funds needed to formulate the plan. The targets of the plan include blue carbon ecosystems such as mangroves, corals, and seaweed, and in the sense of

⁸² Atmosphere and Ocean Research Institute, The University of Tokyo "Possibilities and Expectations for Japan's Ocean Spatial Plan" http://lemons.k.u-tokyo.ac.jp/symposium/5/1-4_%E3%80%8C%E6%97%A5%E6%9C%AC%E7%89%88%E6%B5%B7%E6%B4%8B%E7%A9%BA%E9%96%93%E8%A8%88%E7%94%BB%E3%81%AE%E5%8F%AF%E8%83%BD%E6%80%A7%E3%81%A8%E6%9C%9F%E5%BE%85%E3%80%8D.pdf (referred in 2023/9/1)

conserving and increasing carbon dioxide sinks, the formulation of the plan also contributes to the achievement of NDC.

In 2014, USAID conducted capacity building for BMB to formulate Coastal and Marine Spatial Plans (CMSP), and a module showing the steps to formulate a plan has been created. It is necessary to cooperate with various stakeholders such as local governments (LGU) and the Department of Agriculture (DA) in formulating the actual plan, and considered that the plan will not proceed according to the module. BMB has already conducted a trial workshop for MSP formulation in municipalities around Laguna de Bay, but as mentioned above, since it is necessary to coordinate with various stakeholders, MSP formulation has not progressed at this moment.

Related support need is shown as below.

- Support for formulation of Strategic Conservation Planning

When formulating the Strategic Conservation plan, collaboration with various stakeholders such as local governments and the DA is essential. There is a need to formulate the plan at national level, referring to the module for marine spatial plan that has already been implemented by USAID. For this purpose, know-how and financial support are needed.

c) Promotion of Ecosystem monitoring and evaluation in highly Climate change vulnerable areas

DENR selected states and urban area that is highly vulnerable to climate change in the Cabinet Cluster on Climate Change Adaptation, Mitigation and Disaster Risk Reduction (CCAM-DRR). This includes 48 protected areas managed by the BMB. Ecosystem monitoring and evaluation of these protected areas have been partially implemented.

Related identified issues is shown as follows

- Limited technology for ecosystem monitoring and assessment in areas highly vulnerable to climate change

DENR selected an area that is highly vulnerable to climate change, but due to limited funds, BMB has not been able to continuously monitor and evaluate the area. In the Cabinet Cluster on Climate Change Adaptation, Mitigation and Disaster Risk Reduction (CCAM-DRR) Cabinet Cluster Road Map (2018-2022) within the DENR, the following 24 states and 4 urban areas were selected as highly vulnerable to climate change. This includes 48 protected areas managed by the BMB, but due to limited technology and funds, Ecosystem monitoring and evaluation of these protected areas are not possible at this moment.

Table 2-116 Priority Climate-Vulnerable Provinces/Cities (CCAM-DRR Cabinet Cluster Roadmap)

Region	Priority Climate-Vulnerable Provinces/Cities
R5	Masbate, Sorsogon

Region	Priority Climate-Vulnerable Provinces/Cities
R7 R8 R12 R13	Negros Oriental Western Samar Saranggani Surigao del Norte, Surigao del Sur, Dinagat Islands
R5 R7 R8 R9 R10 R12 R13	Masbate, Sorsogon Negros Oriental Western Samar, Southern Leyte, Eastern Samar Zamboanga del Norte Bukidnon Saranggani, Sultan Kudarat, North Cotabato Surigao del Norte, Surigao del Sur, Dinagat Islands
CAR R5 R7 R8 R9 R10 R12 R13 BARM	Apayao, Kalinga, Ifugao, Mountain Province Masbate, Sorsogon, Catanduanes Negros Oriental, Siquijor Western Samar, Southern Leyte, Eastern Samar, Northern Samar Zamboanga del Norte Bukidnon Saranggani, North Cotabato, Sultan Kudarat Surigao del Norte, Surigao del Sur, Dinagat Islands Maguindanao, Sulu, Lanao del Sur
4 MUCs	Metro Manila, Metro Iloilo, Metro Cebu, Metro Davao

Source: DENR-CCS

Related support need is shown as below.

- Technical support for Monitoring and assessment of areas highly vulnerable to climate change

There is a need for support to provide technology, funds and know-how to continue monitoring and assessment of already selected areas highly vulnerable to climate change.

d) Promotion of data management regarding coastal/marine biodiversity

In PDP, NCCAP and PBSAP, there is mention about protection regarding degraded coastal/marine ecosystems. Data related to coastal and marine ecosystems and general biodiversity data (specifically, photographs, GIS data, temperature data, etc.) are stored in each regional office using Excel, Access, file storage services, etc. They are stored individually and cannot be managed in an integrated manner.

Related identified issue is shown as follows;

- Limited integrated data management on biodiversity, coastal and marine ecosystems

The CCC and the PSA are developing and operating knowledge sharing platforms. BMB require their own platform establishment with database. Data related to coastal and marine ecosystems and general biodiversity data (specifically, photographs, GIS data, temperature data, etc.) are stored in each regional office using Excel, Access, file storage services, etc. They are stored individually and cannot be managed

in an integrated manner. Currently, there are several issues, such as including technology, funds and human resources.

Related support need is shown as below.

- Building data platform for management of Protected Areas

There is a need to support the establishment of a knowledge-sharing platform for the integrated management of data on coastal and marine ecosystems, such as photographs on biodiversity in general, GIS data, data on temperature and other factors. UNDP supports creating platform for limited Protected Areas in the Biodiversity Finance Initiative, Phase II (BIOFIN II). However, further support for fulfilment of the platform is required. Proceeding Knowledges of ecosystems and Biodiversity in Japan and supports from experts such as IT engineers and data scientists are required to build the platform. In addition, it is necessary to build a new platform for BMB.

e) Baseline assessment of Protected Areas

BMB conduct baseline assessments of corals, mangroves, and seaweed to understand their current status and factors that pose threats to each ecosystem. In 2020, 18 reserves are under assessment.

Table 2-117 Coastal and marine habitat assessment implementing areas

Region	Name of Protected Area	Habitat	Habitat Extent (ha)	OGU/Location
R4A	-	Seagrass	2.20	Maragondon and Ternate
	-	Coral reefs	510.17	Regay Gulf (Guinayangan, Tagkawayan, San Andres, San Narciso, and Buenavista, Zuezon)
	-	For giant clams restocking	-	Mabini (Twin Rocks Sanctuary at Brgy. Bagalangit, San Teodoro, Mabini, Batangas)
R7	Olango Is Wildlife Sanctuary, Camotes Is PLS, Apo Is PLS, Tanon Strait PS, Panglao Is PS	Coral reefs	574.25	-
	Olango Is Wildlife Sanctuary, Camotes Is PLS, Apo Is PLS, Tanon Strait PS, Panglao Is PS	Seagrass	3,790.85	-
R10	Bacolod-Kauswagan PLS, Initao-Livertad PLS	Coral reefs	262.26	-
	Bacolod-Kauswagan PLS, Initao-Livertad PLS	Seagrass	524.87	-
R9	-	Mangroves, seagrass & coral reefs	1,966.20	Selected coastal areas in Zamboanga City
R4A	-	Mangroves	28.00	Brgy. San Rafael, Noveleta, Cavite
Total			7,658.79	

Source: JICA Survey Team edited from DENR-Annual Report 2020

f) Maintenance and management of coastal and marine ecosystem

In the PBSAP, there is mention of the strictly protection, etc., regarding marine protection. In addition to the baseline assessments mentioned above, BMB also conduct target area patrols, habitat monitoring, and damage assessment, restoring the damaged ecosystem and repairing necessary equipment in the 38 National Integrated Protected Areas System Marine Protected Areas (NIPAS MPAs).

g) Implementation status of blue carbon

Currently, the Philippines joins the Blue Carbon Action Partnership of the World Economic Forum, and the partnership agreement was signed at the COP28 in December 2023. The government of United Kingdom supports through UK Blue Planet Fund, the Climate and Ocean Adaptation and Sustainable Transition. Also, the ADB is in preparing a support of blue carbon and economy toward 2025. The “Comprehensive Assessment and Conservation of Blue Carbon Ecosystems and Their Services in the Coral Triangle (Blue CARES)” under JICA’s SATREPS (Science and Technology Research Partnership for Sustainable Development) program conducted from 2017 to 2023 with University of the Philippines Diliman.

Related identified issues are shown as follows;

- Blue carbon related policies

At present, there are no policies regarding accounting for emissions and absorption of blue carbon, and blue carbon trading. As of December 2023, the House of Representatives reviewed the proposed “Blue Economy Act,” seeking to establish a framework for blue economy and promote stewardship and sustainable development of coastal and marine ecosystems and resources. It is expected that the creation of new policies and systems related to blue carbon conservation will proceed.

- Limited know-how on measurement and calculation methods for Blue carbon storage and sequestration

The “Comprehensive Assessment and Conservation of Blue Carbon Ecosystems and Their Services in the Coral Triangle (Blue CARES)” under JICA’s SATREPS (Science and Technology Research Partnership for Sustainable Development) program conducted from 2017 to 2023 with University of the Philippines Diliman, developed effective mangrove mapping for calculation of carbon storage and sequestration in blue carbon ecosystems. However, these activities were only carried out in SATREPS target areas. Calculation of mangrove sequestration uses data from mangrove mapping, which consists of ground measurement and remote sensing technology. Also, the calculation require knowledge resulted from research and ground measurement technology. This shows that the results of SATREPS will be useful for future national-level blue carbon calculations. However, those research outputs are limited updating and structure for implementation at the level.

- Nationwide rollout of carbon storage prediction/evaluation and blue carbon ecosystem evaluation methods

The “Comprehensive Assessment and Conservation of Blue Carbon Ecosystems and Their Services in the Coral Triangle (Blue CARES)” under JICA’s SATREPS (Science and Technology Research Partnership for Sustainable Development) program conducted from 2017 to 2023 with University of the Philippines Diliman, developed a comprehensive assessment method for evaluating and predicting carbon storage and sequestration in blue carbon ecosystems and ecosystem services. However, these activities were only carried out in SATREPS target areas.

According to the University of Philippines Diliman, in order to conserve blue carbon ecosystems in the future, it is necessary to deploy the carbon storage/sequestration prediction/evaluation and ecosystem service evaluation methods developed by SATREPS throughout the Philippines, and funds are needed for this purpose.

Related support needs are shown as below.

- Support for formulation of Blue carbon related policies

There is currently no policy to support Blue carbon inventory and carbon trading that has initiatives for implementation, and related policies making support is required.

- Establishment of measurement and calculation method of Blue carbon storage and sequestration at National level

Updating of measurement and calculation method by the outputs of SATREPS is required for the Blue carbon at the National level. Further, the support for structure of implementation at the level is also required.

In addition, there is a need for support in prevailing the predicting and evaluation of carbon storage and sequestration in Blue carbon ecosystems developed by the SATREPS as well as a comprehensive assessment of ecosystem services throughout the Philippines.

3) Status of Donor Support

Table 2-118 Status of donor support (coast/ marine and biodiversity sector)

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
UNDP (Funded by GEF)	Project name: Integrated Approach in the Management of Major Biodiversity Corridors (BD Corridor) in the Philippines Implementation period: 2021-2027 Activity purpose/content: Operate integrated management of biodiversity corridors to effectively conserve globally threatened species and high conservation value forests, reduce deforestation and degradation, and contribute to local biodiversity. The aim is to generate multiple benefits, including improved livelihoods.	DENR-BMB	Ongoing

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
<p>UNDP (Funded by Germany, Norway, Switzerland, Flanders, EU)</p>	<p>Project name: Biodiversity Finance Initiative - Phase II (BIOFIN II) Implementation period: 2018-2025 Activity purpose/content: BIOFIN aims to help mobilize resources for the implementation of the Philippine Biodiversity Strategy and Action Plan (PBSAP) 2015-2028. An assessment conducted at BIOFIN I revealed that the government spends P5 billion on biodiversity conservation, while PBSAP requires P24 billion annually. Therefore, there is a funding shortfall of PhP19 billion. To address this gap, BIOFIN II implemented a financial solution (component 3). In addition, BIOFIN II will introduce effective advocacy and partnership strategies (component 1) and build a knowledge management infrastructure for the generation and sharing of knowledge on biodiversity finance (component 2).</p>	<p>DENR-BMB</p>	<p>Ongoing</p>
<p>FAO (Funded by BUMV-GIZ)</p>	<p>Project name: Ensuring Sustainable Benefits from Peatland through Protection and Wise Use (ESBenePeat) Implementation period: 2021-2023 Activity purpose/content: It aims to ensure the ecological functions and service delivery of peatlands through protection and sustainable management of peatlands. The main activities are as follows. 1) Establishing a state-of-the-art knowledge management system for peatlands in the Philippines 2) The national action plan on peatlands will be updated and peatland policies will be strengthened. 3) Capacity of concerned agencies and stakeholders on peatland management is strengthened. 4) measures of protection and rehabilitation measured carried out in suitable peatland sites 5) identifying and developing biodiversity-friendly practices for communities</p>	<p>DENR-FMB</p>	<p>Ongoing</p>
<p>UNEP (Funded by GEF)</p>	<p>Project name: Implementing the Strategic Action Programme for the South China Sea (SAP-SCS) Implementation period: 2021-2024 Activity purpose/content: The project aims to implement the Strategic Action Programme (SAP) for the South China Sea with the aim of reversing environmental degradation. Not only the Philippines but also Cambodia, China, Indonesia, Vietnam and Thailand are participating in this project. It supports participating countries achieve their SAP goals by providing technical assistance to countries and maintaining strong regional partnerships during the implementation process. Specifically, it consists of the following three components. 1) Reducing habitat degradation and loss via national and local reforms to achieve Strategic Action Programme targets for coastal habitat management in the South China Sea and Gulf of Thailand 2) Strengthening knowledge-based action planning for the management of coastal habitats and land-based pollution to reduce environmental degradation of the South China Sea and Gulf of Thailand 3) Facilitating regional and national level integration and cooperation for implementation of the South China Sea and Gulf of Thailand Strategic Action Programme</p>	<p>DENR-BMB</p>	<p>Ongoing</p>

Name of donor(s)	Project title and outline	Implementation agency	Status of the project
UNDP (Funded by GEF)	<p>Program name: Seventh Operational Phase of the GEF Small Grants Programme in the Philippines (SGP-7) Implementation period : 2022-2026</p> <p>Activity purpose and content: The project addresses habitat destruction, biodiversity loss and climate impacts in communities on Aurora Island, Samar Island, Siargao Island and Calamian Islands. With government support, it empowers communities and institutions to promote sustainable practices and biodiversity conservation in order to increase socio-ecological and economic resilience. The main components are as follows. 1) ecosystem services and biodiversity within the four target landscapes and seascapes are enhanced through multifunctional land use systems, 2) Enhance the sustainability of production systems in target areas through integrated agroecological practices, 3) Improve the livelihoods of communities in the target landscapes and seascapes by developing eco-friendly, climate-adaptive small-scale community enterprises with clear market linkages</p>	DENR-BMB	Ongoing
USAID	<p>Project name: Sustainable Interventions on Biodiversity, Oceans and Landscapes (SIBOL) Implementation period: 2020-2025</p> <p>Activity purpose/content: It aims to improve natural resource governance, stimulate public and private sector investment, reduce environmental crime, and promote ecological stability and inclusive green growth. The main components are as follows.</p> <ol style="list-style-type: none"> 1) Improving natural resource governance 2) Sustainable natural resource sector management 3) Reduction of environmental crimes 	DENR-BMB	Ongoing
JICA	<p>Project name: Comprehensive Assessment and Conservation of Blue Carbon Ecosystems and Their Services in the Coral Triangle (Blue CARES) Implementation period: 2017-2023</p> <p>Activity purpose/content: It conducted surveys and model analyzes on blue carbon (carbon stored in marine ecosystems) in the Philippines and Indonesia, which are located at the center of an area with extremely high biodiversity called the Coral Triangle. It developed strategies that contribute to the conservation of coastal areas, coastal wetlands, strengthening resilience, and improving the global environment. This project consists of the following research topics.</p> <ol style="list-style-type: none"> (1) Development of an innovative integrated monitoring and modeling system for blue carbon dynamics (2) Elucidation of blue carbon dynamics and related ecosystem processes based on the developed monitoring and modeling method (3) Developing an effective framework for blue carbon ecosystem conservation based on comprehensive assessment of ecosystem services (4) Deployment of the “Core-and Network” system (CNS) for nationwide monitoring, blue carbon strategy implementation, and capacity building (5) Recommendations for blue carbon strategies to policy-making organizations at the central and local levels 	Tokyo Institute of Technology and University of the Philippines Diliman	Completed

Source: JICA Survey Team

Table 2-119 Identified issues (forestry/ natural environment sector)

Sub Sector	Status of Climate change and sector	Related policies, plans and targets	Implementation status (Including donor's support)	Issues	Direction of supports for solving issues
Forestry (Mitigation)	<ul style="list-style-type: none"> Status of GHG emission and removal <ul style="list-style-type: none"> The FOLU sector emitted an estimated 35.668 Mt CO₂e in 2015 while absorbed 25.935 Mt CO₂e in 2020. Prediction of GHG emission and removal (NDC's BAU scenario) <ul style="list-style-type: none"> The scenario shows the trend of emission (3.8 Mt CO₂e) in 2030. 	<ul style="list-style-type: none"> National Climate Change Action Plan (NCCAP) <ul style="list-style-type: none"> Implementation of REDD+ Strategy DAO 2021-32 <ul style="list-style-type: none"> There is mention of specifying NFMS functions, facilitating reporting and clear understanding of accountability REDD+ Action Plan <ul style="list-style-type: none"> Contributing to achievement of NDC goals with transparency and consistency, there is mention of plans for implementation of REDD+. PDP <ul style="list-style-type: none"> There is mention of establishing a regional carbon market through private financing, including foreign investment. DAO 2021-43 <ul style="list-style-type: none"> DAO 2021-43 shows the role of CAVCS, such as carbon accounting, verification and certification system. 	<ul style="list-style-type: none"> Promotion of REDD+ <ul style="list-style-type: none"> The first National REDD+ Strategy published in 2010, and revised in 2017. Forest Reference Level in the Philippines was reported to UNFCCC in 2023. Other donors supports <ul style="list-style-type: none"> National Forest Monitoring and Information Systems for a transparent and truthful REDD+ <ul style="list-style-type: none"> The capacity building of application of forest monitoring tools, such as COLLECT EARTH was implemented. National REDD+ System Philippines project by GIZ <ul style="list-style-type: none"> The contents and design concept of NFMS was developed. UN REDD supports through FAO <ul style="list-style-type: none"> NFMS Action Plan was formulated. Promotion of voluntary market and carbon trading <ul style="list-style-type: none"> DAO 2021-43 shows the role of CAVCS, such as carbon accounting, verification and certification system. A policy of carbon trading is scheduled to be formulated in 2024. As an initiative for private companies to participate the market, a Japanese trading company, such as Marubeni corporation plans to begin an initiative to develop a carbon credit program through forest restoration in collaboration between industry, academia and government. DENR is planning to its implement in the forestry subsector. Development of GHG monitoring method <ul style="list-style-type: none"> ERDB plans to implement a pilot project. 	<ul style="list-style-type: none"> [Technology] <ul style="list-style-type: none"> Forest remote sensing technology has not been established. National Forest Monitoring System (NFMS) including database has not yet been established. Limited know-how to establish carbon market [Institution] <ul style="list-style-type: none"> Limited policies for implementation of carbon trading [Finance] <ul style="list-style-type: none"> Limited funds to purchase the equipment necessary to introduce the eddy covariance method at the national level 	<ul style="list-style-type: none"> Support for establishing forest remote sensing technology for REDD+ implementation Support for establishing national Forest Monitoring System aligned with policy implementation
Forestry (Adaptation)	<ul style="list-style-type: none"> Effect of climate change <ul style="list-style-type: none"> Geographically, coastal disasters, such as typhoons are high, and the country is exposed to increasingly severe and frequent extreme weather events, and is affected by climate change. Climate change future prediction and its effects Geographically, there is high risk of coastal disasters, such as typhoons, there is high possibility of exposure to increasingly severe and frequent extreme weather events, and there is a high risk of the effect of climate change 	<ul style="list-style-type: none"> Philippine Development Plan (PDP) <ul style="list-style-type: none"> Appropriate monitoring of the effects of watershed degradation, such as a decrease in water protection capacity due to deforestation Contribution to management of watershed degradation due to deforestation Philippine Master Plan for Climate Resilient Forestry Development <ul style="list-style-type: none"> There is mention of climate proofing, such as Sustainable management, vulnerability assessment and risk assessment, etc. DENR Memorandum Circular No.2008-05 <ul style="list-style-type: none"> There is mention for implementation about guidelines for the implementation of Integrated Watershed Management Plan 	<ul style="list-style-type: none"> Promotion of Integrated Watershed Management Plan <ul style="list-style-type: none"> Ecosystem-based watershed management has led to the creation of guidelines for integrated watershed management plans and climate change vulnerability assessments associated with Protected Areas. Coordination for the management with related ministries and agencies is required. In watershed management, DENR FMB monitors precipitation, soil moisture, etc. In order to advance the watershed management plan, data from other departments and agencies will be shared. However, it has not progressed due to differences in data specifications. DENR FMB monitors precipitation, soil moisture, etc. Only 16 out of 131 important watersheds, equipment have installed. 	<ul style="list-style-type: none"> [Institution] <ul style="list-style-type: none"> Limited climate proofing policies regarding Integrated Watershed management Plan [Technology] <ul style="list-style-type: none"> Limited know-how to analyze precipitation and soil data collected by Automatic Weather Station (AWS) and remote sensing [Finance] <ul style="list-style-type: none"> Limited AWS equipment and remote sensing equipment for collecting data on precipitation and soil, etc. 	<ul style="list-style-type: none"> Support for Climate proofing policy making relevant to Integrated Watershed Management Plan Support for capacity building for Data analysis for Climate resilient water protection capacity Installation of equipment for Automatic Weather Station (AWS)

Sub Sector	Status of Climate change and sector	Related policies, plans and targets	Implementation status (Including donor's support)	Issues	Direction of supports for solving issues
		<ul style="list-style-type: none"> Technical Bulletin 16-A <ul style="list-style-type: none"> There is mention of implementation of vulnerability assessment and guidelines for climate resilience. 			
Forestry (Mitigation and Adaptation)	<ul style="list-style-type: none"> Status of GHG emission and removal <ul style="list-style-type: none"> The FOLU sector emitted an estimated 35.668 Mt CO₂e in 2015 while absorbed 25.935 Mt CO₂e in 2020. Prediction of GHG emission and removal (NDC's BAU scenario) <ul style="list-style-type: none"> The scenario shows the trend of emission (3.8 Mt CO₂e) in 2030. Effect of climate change <ul style="list-style-type: none"> Geographically, coastal disasters, such as typhoons are high, and the country is exposed to increasingly severe and frequent extreme weather events, and is affected by climate change. Climate change future prediction and its effects Geographically, there is high risk of coastal disasters, such as typhoons, there is high possibility of exposure to increasingly severe and frequent extreme weather events, and there is a high risk of the effect of climate change 	<ul style="list-style-type: none"> PDP <ul style="list-style-type: none"> Contribution to management of watershed degradation due to deforestation There is mention of improvement of livelihood of highland communities through agroforestry, improving efficiency of agricultural production, expanding the market and improving the value chain, etc. PDP <ul style="list-style-type: none"> Restoration of degraded ecosystems, such as forests, mangroves and wetlands Strengthening sustainable land use and management using ecosystem-based climate change adaptation (EbA) and nature-based solutions (NbS) National Greening Program <ul style="list-style-type: none"> From 2016 to 2028, restore 7.1 million hectares of degraded forest land Philippine Master Plan for Climate Resilient Forestry Development <ul style="list-style-type: none"> Strengthening the resilience of forest ecosystems and communities to climate change Philippine Master Plan for Climate Resilient Forestry Development <ul style="list-style-type: none"> Strengthening forest management and forest governance 	<ul style="list-style-type: none"> <u>JICA'S support Promotion of JICA Forest Management Project</u> <ul style="list-style-type: none"> to highland areas, etc. It is vulnerable to the effects of increased rainfall, etc. and the prevailing of watershed management is required. The design for implementation has been completed. Promotion of afforestation, reforestation and revegetation <ul style="list-style-type: none"> There have been cases where local residents have not understood the project well and the projects is converted to farmland after implementation. Promotion of National Greening Program <ul style="list-style-type: none"> The NGP started in 2011, and E-NGP has strategic action, including afforestation, afforestation monitoring and its conservation. As of 2020, Trees have been planted in 2,078,899 ha, corresponding to 28.9 % of the country's total forest cover. <u>Other donors supports</u> <ul style="list-style-type: none"> Asian Forest Cooperation Organization (AFoCO) <ul style="list-style-type: none"> Ongoing project related livelihood improvement, such as Promotion of Vertical Integration in Wood Processing (VIP) through People's Organizations in Community-Based Forest (CBFM) Management areas in the Philippines (AFoCO-VIP) <p>The project promotes community-based forest management through afforestation and livelihood opportunities from timber use and processing.</p> <ul style="list-style-type: none"> Promotion of Forest Protection and Anti-illegal logging <ul style="list-style-type: none"> There are major activities, including conducting forest patrols, preventing forest fires, and neutralizing illegal logging hotspots. 	<ul style="list-style-type: none"> <u>[Technology]</u> <ul style="list-style-type: none"> Limited capacity for prevailing watershed management Limited marketing capacity for agricultural products through agroforestry <u>[Capacity building]</u> <ul style="list-style-type: none"> Limited understanding among local residents about the need for afforestation, revegetation, and climate change issues <u>[Institution]</u> <ul style="list-style-type: none"> Difficulties in consultation among various stakeholders, including indigenous peoples, when planting trees and restoring vegetation 	<ul style="list-style-type: none"> Support for Information, Education and communication (IEC) for collaborative watershed management and rehabilitation of degraded forest area and plantation Support for reinvestment mechanisms for business development and sustainable business by local community
Coastal/Marine (Mitigation)		<ul style="list-style-type: none"> UN Blue Carbon report (2009) <ul style="list-style-type: none"> The report aims to sustain the climate, help mainstream national and international climate action on the ocean agenda of policymakers, and highlight the importance of oceans and marine ecosystems. 	<ul style="list-style-type: none"> Currently, there is no implementation status. Currently, there is no implementation status. <u>JICA's support</u> <ul style="list-style-type: none"> Reporting the output, such as development of mangrove mapping in the "Project on Comprehensive Assessment and Conservation of Blue Carbon Ecosystems and their Services in the Coral Triangle (SATREPS)" from 2016 to 2021 with C/P, such as University of the Philippines Diliman, Marine Science Institute 	<ul style="list-style-type: none"> <u>[Institution]</u> <ul style="list-style-type: none"> Limited policies to support Blue carbon conservation <u>[Technology]</u> <ul style="list-style-type: none"> Limited know-how on measurement and calculation methods for Blue carbon storage and sequestration <u>[Finance]</u> <ul style="list-style-type: none"> Limited funds for nationwide rollout of carbon storage prediction and evaluation, and of Blue carbon ecosystem assessment methods. 	<ul style="list-style-type: none"> Support for formulation carbon of Blue carbon related policies Establishment of measurement and calculation method of Blue carbon storage and sequestration at National level

Sub Sector	Status of Climate change and sector	Related policies, plans and targets	Implementation status (Including donor's support)	Issues	Direction of supports for solving issues
Coastal/Marine Biodiversity (Adaptation)	<ul style="list-style-type: none"> High geographically, coastal areas affecting by climate change High risk of coastal areas affecting by climate change 	<ul style="list-style-type: none"> Kunming-Montreal Global Biodiversity Framework <ul style="list-style-type: none"> ➤ 30by30 goal to protect 30% of degraded coastal/marine ecosystems by 2030 PDP <ul style="list-style-type: none"> ➤ Ecosystem restoration in degraded forest mangrove and wetland ➤ There is mention about the consideration of effects from development on ecosystem interconnectivity, biodiversity, ecological processes and ecological function. ➤ There is mention about strengthening adaptation measures such as restoring and protecting Blue carbon ecosystems towards a low carbon economy. CCAM-DRR Cabinet Cluster Roadmap for 2018-2022 <ul style="list-style-type: none"> ➤ DENR have selected areas for climate change vulnerability. NCCAP <ul style="list-style-type: none"> ➤ There is mention about ecological and environmental stability as a strategic priority activity, also technical guidance capacity building for national ecosystem vulnerability assessments and risk assessments. ➤ Strengthening knowledge and capacity for integrated Ecosystem-based management at national, regional and community levels. Philippine Biodiversity Strategy and Action Plan (PBSAP) <ul style="list-style-type: none"> ➤ There will be no net loss in the survival and range of living corals, mangroves and seagrasses by 2028. ➤ The extent of Protected Areas (MPAs) in various aquatic habitats will increase by 20% from 2015 levels. ➤ Target of Coral Triangle Initiative (CTI) for strict protection of coastal/marine habitats ➤ PBSAP will be revised in 2024. Coastal and Marine Ecosystems Management Program (CMEMP) There is mention about effectively reduce threats and degradation factors to coastal/marine ecosystems. 	<ul style="list-style-type: none"> Promotion of Marine Spatial Planning targeted management of Marine Protected Areas, etc. <ul style="list-style-type: none"> ➤ The Philippines has been formulation this plan, which is a public policy that coordinates various socio-economic utilization activities in the ocean and makes appropriate spatial arrangements based on science, with the aim of sustainable developing marine ecosystem conservation. USAID support <ul style="list-style-type: none"> ➤ Implemented "NIPAS MPA Capacity Building Program" in 2014 targeted DENR BMB, Developing Marine Spatial Planning (MSP) modules and implementing of MSP formulating workshop targeted LGU around Lugna de Bay Promotion of Ecosystem monitoring and evaluation in highly climate change vulnerable areas <ul style="list-style-type: none"> ➤ The areas were selected by DENR. It is impossible to continue implementation. Promotion of data management regarding coastal/marine biodiversity <ul style="list-style-type: none"> ➤ Data related for management is stored in various locations due to limited integrated management. Baseline assessment of Protected Areas <ul style="list-style-type: none"> ➤ Performing baseline assessments of corals, mangroves, etc. and implementing to understand the current status and factors that pose threats to the ecosystem Maintenance and management of coastal and marine ecosystem <ul style="list-style-type: none"> ➤ Patrolling targeted areas, monitoring habitats, restoring damaged ecosystems and repairing equipment in Marine Protected Areas within the National Integrated Protected Area System (NIPAS MPAs). 	<ul style="list-style-type: none"> [Institution] <ul style="list-style-type: none"> Limited Strategic Conservation Planning (SCP) for the management of Marine Protected Areas, etc. [Technology] <ul style="list-style-type: none"> Limited technology for ecosystem monitoring and assessment in highly climate change vulnerable Marine Protected Areas Limited integrated data management on biodiversity and coastal/marine ecosystem 	<ul style="list-style-type: none"> Support for formulation of Strategic Conservation Planning Technical support for Monitoring and assessment of areas highly vulnerable to climate change Building data platform for management of Protected Areas

Source: JICA Survey Team

2.2.9 Urban Environment

(1) Sector Landscape

1) Current State of the Sector and Impact of Climate Change

According to the 2015 and 2020 censuses by the Philippine Statistics Authority (PSA), the population of the Philippines grew from 101 million in 2015 to 109 million in 2020, an increase of 8 million people in 5 years, with an average annual population growth rate of 1.47%. According to a UN study, population growth will continue until 2075, when the total population is expected to be more than 153 million⁸³. The urban population has increased from 51.73 million (51.2%) in 2015 to 58.93 million (54.0%) in 2020, indicating a continued population shift from rural to urban areas.

The amount of waste and wastewater is also increasing along with population growth, with the national average waste generation per capita of 0.40 kg/day⁸⁴ in 2010, and the national average wastewater generation per capita of 0.19m³/day⁸⁵ in 2011, but the value tends to be higher in urban areas (e.g., 0.61 kg/day in Metro Manila and 0.31 kg/day in provincial cities²). Therefore, further increase in generation of waste and wastewater can be expected as the population continues to migrate from rural to urban areas. The amount of waste generated nationwide has indeed increased from 13.48 million tons in 2010 to 16.63 million tons in 2020, with an average annual increase of over 0.3 million tons.

According to the Greenhouse Gas Inventory Report data by CCC for 2010 and 2020, waste and wastewater are identified as major fields in the urban environment sector.

According to the reports, the waste sector, including wastewater, is a significant contributor to carbon dioxide emissions, amounting to 15.559 Mt-CO₂e in 2010, ranking as the fourth-largest emission source. However, by 2020, emissions nearly doubled to 30,122 Mt-CO₂e, surpassing the transportation sector to become the third largest emission source.⁸⁶ The breakdown in 2010 reveals that wastewater accounts for approximately 70 % of sector emissions (10.562 Mt-CO₂e), while waste contributes about 30 % (4.996 Mt-CO₂e). In terms of wastewater treatment, another report disclosed the proportions in the year 2000, with domestic wastewater comprising 75%, industrial wastewater 15%, and human excreta 10%, indicating a high proportion from domestic wastewater⁸⁷. On the other hand, regarding waste composition, data from 2008 to 2013 illustrates the sources and composition of urban waste, with household waste constituting nearly 60% and biodegradable waste representing over half of the total. Consequently, it is inferred that the disposal of food residues from households contributes significantly to GHG emissions. Based on the above,

⁸³ United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition. Rev. 1.

⁸⁴ National Solid Waste Management Status Report CY 2008 – 2018, DENR-EMB

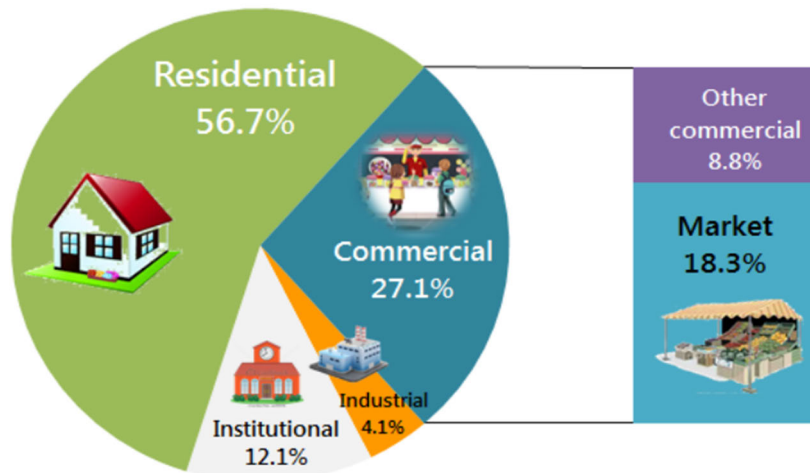
⁸⁵ https://www.ais.unwater.org/ais/pluginfile.php/501/mod_page/content/87/reports_philippines.pdf

⁸⁶ Commission resolution No.023-005, 2023, CCC

⁸⁷ Tracking Greenhouse Gases: An Inventory Manual

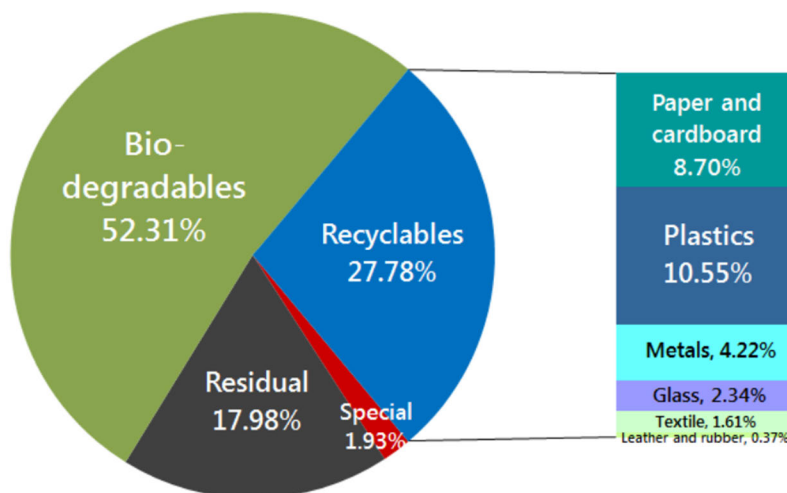
information was collected and analyzed mainly on domestic waste and household waste, as they significantly contribute to the sector’s GHG emissions. Industrial wastewater and industrial waste are primarily managed at individual company sites or industrial estates.

Moreover, recyclable materials such as paper, cardboard, plastic, and metal account for nearly 30% of urban waste, suggesting a substantial potential for waste reduction through recycling and reuse activities, and achieving such reductions is believed to prolong the lifespan of landfills.



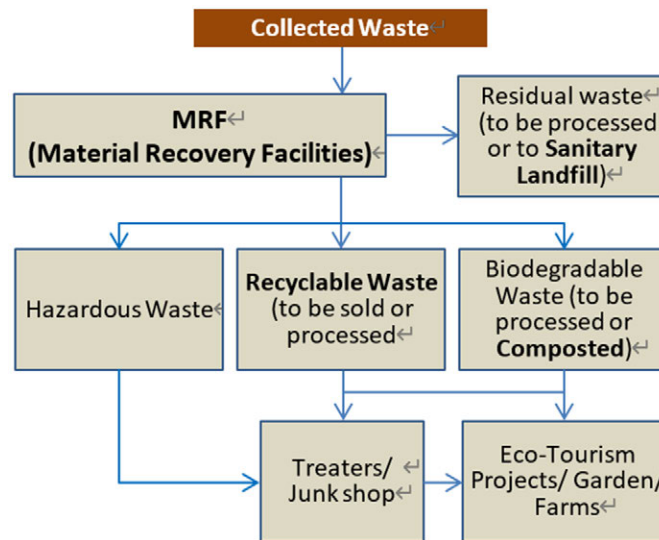
Source: National Solid Waste Management Status Report CY 2008 – 2018, DENR-EMB

Figure 2-70 Sources of municipal solid wastes in the Philippines, 2008-2013



Source: National Solid Waste Management Status Report CY 2008 – 2018, DENR-EMB

Figure 2-71 Composition of municipal solid wastes in the Philippines, 2008-2013



Source: Based on the 10-year Solid Waste Management Plan of Rizal City, Laguna Province, created by the JICA survey team

Figure 2-72 General flow of municipal solid waste in the Philippines

Furthermore, from the table below, it is evident that methane constitutes over 90% of GHG emissions. This is primarily due to the improper management of biodegradable waste accumulated in landfills, where it undergoes anaerobic decomposition, releasing methane gas. Regarding wastewater, it is believed that methane gas is generated due to the anaerobic conditions formed by sludge deposited in septic tanks, mainly because of the low frequency of transportation of sludge to wastewater treatment facilities using vacuum trucks. Additionally, a portion of the sludge, along with domestic wastewater, flows out, gradually accumulating in lakes and bays, forming anaerobic conditions, and producing methane, which is then released into the atmosphere. Supporting this claim, a greenhouse gas emission survey conducted by Iloilo City in 2015 provides evidence. The results indicate that 98% of GHG emissions from the waste sector are from open dumping sites, and 87% of GHG emissions from the wastewater sector are from septic tank emissions⁸⁸.

Table 2-120 Breakdown of GHG emissions in the waste sector in 2010 (Unit: Mt-CO₂e)

GHG emission source	CO ₂	CH ₄	N ₂ O	Total
Solid waste disposal	-	4.851	-	4.851
Biological treatment of solid waste	-	0.035	0.032	0.067
Incineration and open burning of waste	0.015	0.053	0.011	0.078
Subtotal				4.996
Wastewater treatment and discharge	-	9.558	0.974	10.562
Total				15.559

Source: 2010 Philippine Greenhouse Gas Inventory Report

⁸⁸ 2015 ILOILO City GHG Inventory report

The GHG emission projections following BAU scenario and the GHG reduction targets are described in the NDC Quick Facts document issued by the CCC and in the PDP, respectively, as shown in the table below. Until 2028, the year for which emissions are projected, the BAU scenario projects an increase of 0.5-0.6 Mt-CO₂e annually, based on the population growth rate of 1.15%-1.29% shown in the UN study mentioned above. On the other hand, the target reduction ratio to BAU emissions is low at 3.1% in 2023, but the ratio has been set higher year by year, and the ratio to BAU emissions is set at 3.8% in 2028. The PDP identifies the adoption and institutionalization of mechanisms to accelerate food waste reduction and the introduction of innovative and transformative low-carbon emission technologies as means of reduction. As previously mentioned, the GHG inventory data for 2020 indicated an increase in GHG emissions from the waste sector to 30.122 Mt-CO₂e, surpassing the projected amount for 2028 as listed in the table below. Therefore, urgent efforts to exceed the GHG reduction targets set in the PDP are imperative.

Table 2-121 GHG Emission Projections and Reduction Targets in the Waste Sector (Unit: Mt-CO₂e)

Year	2023	2024	2025	2026	2027	2028
(i) GHG emission projection following BAU scenario	24.9	25.5	26.0	26.5	27.1	27.6
(ii) GHG reduction target	0.76	0.80	0.83	0.89	1.04	1.08
Target/ projection	3.1%	3.1%	3.2%	3.4%	3.8%	3.8%

Source: PDP (2023-2028), Philippine NDC Quick Facts

2) Future Impacts of Climate Change on the Waste and Wastewater Sectors

In considering the future impacts of climate change on the waste and wastewater sectors, the following points are noteworthy.

【Waste - Final Disposal Sites】

- Outflow of waste due to coastal flooding and inundation in coastal areas.
- Increased overflow risk from retention ponds due to the rise in leachate resulting from excessive rainfall.
- Escalation in methane gas emissions through the promotion of anaerobic conditions induced by the increased moisture content in organic waste.
- Amplification of soil and groundwater contamination through underground percolation water.

【Wastewater】

- Damage to processing facilities such as pumping stations caused by excessive rainfall, floods, and the generation of disaster waste, leading to inadequate wastewater purification.
- Changes in water quality in wastewater due to floods and droughts, resulting in altered microbial activity (deterioration of water quality due to abnormal growth of algae and decreased oxygen concentration in the water column, among other factors).

Regarding measures in the wastewater sector, the budget allocation is outlined in the materials of the Department of Public Works and Highways (DPWH), the governing body. In 2023, these measures account for 14% of DPWH's total budget, according to the provided table. In discussions with the Flood Control Management Clustered, a department within DPWH, it was conveyed that they are advancing numerous flood control projects including donor supports and do not seek additional supports beyond the ones already in progress.

Table 2-122 Current status of mitigation measures and budget allocation in the wastewater sector

Implemented item	2022	2023	2024	2025	2026	2027
No. of flood mitigation structures and drainage systems constructed	968	1,753	-	-	-	-
No. of flood mitigation structures constructed/retrofitted in major river basins	334	841	-	-	-	-
Implementation Budget (billion PHP)	127.5	183.0	201.3	221.4	243.6	267.9

Source: DPWH data

3) Development Issues in the Sector

As mentioned earlier, with the anticipated continued population growth until 2075, it is expected that the volumes of waste and wastewater will increase. Therefore, there is a need for further implementation of waste disposal sites and wastewater treatment facilities to accommodate this growth. However, there are limits to the capacity and potential for expansion of these facilities. Hence, the challenge lies in how to achieve reduction in quantity and improvement in quality during the process of reaching these capacity limits. Therefore, as solutions to these challenges: for waste management, key mitigation measures include avoiding the landfilling of a significant portion of biodegradable waste, reducing the overall waste generation, and controlling methane gas emissions through aerobic management of landfill sites. Additionally, effective mitigation measures involve promoting waste separation and reuse awareness, particularly in households where waste generation is significant. Implementing awareness campaigns, educational programs, and environmental education are considered effective ancillary mitigation measures. For wastewater management, principal mitigation measures include improvement and maintenance of septic tanks and sewage systems, especially in households where the generation of sludge wastewater is high. The installation of sludge wastewater treatment facilities is also crucial in mitigating the impact.

4) Sector stakeholders

Stakeholders in the urban environment sector are listed below. The subsectors of waste and wastewater are composed of a number of different organizations and institutions and are therefore described in the respective subsector (waste and wastewater) sections.

Table 2-123 Stakeholders in the Urban Environment Sector

Policy making	Technological development	Implementation of countermeasures	Funding
<ul style="list-style-type: none"> DENR/DPWH LGUs 	<ul style="list-style-type: none"> DENR/DPWH DENR/DPWH local office DENR/DPWH research institute Universities Private companies 	<ul style="list-style-type: none"> DENR/DPWH local office LGUs Local Water Districts (LWDs) Private company NGO 	<ul style="list-style-type: none"> Government banks Private banks Donors

Source: JICA Survey Team

(2) Waste Management

1) Relevant Policies and Plans

(a) Laws and regulations

The "Philippine Environment Code (Presidential Decree No. 1152, s. 1977)" outlines general principles for environmental management in the Philippines. Part V of the code addresses "Waste Management." The central government establishes guidelines for effective waste management, and Local Government Units (LGUs) are mandated to create and implement waste management programs based on these guidelines. The "Philippine Clean Air Act of 1999 (RA8749)" prohibits the incineration of waste emitting toxic gases. It encourages and mandates waste segregation, recycling, composting, and other waste management practices among LGUs. The law also promotes the use of non-combustion technologies for the handling, treatment, and disposal of hazardous waste, considering their impact on climate change. The "Ecological Solid Waste Management Act of 2001 (RA9003)" mandates LGUs to reduce the total volume of solid waste. It specifies that at least 25% of all solid waste from waste disposal facilities should undergo reuse, recycling, composting, or other resource recovery methods. The law aims to transition from open dumping sites to sanitary landfills, reduce waste generation at the source, and increase recycling to minimize the final volume of disposed waste. While the fundamental laws related to waste and recycling in the Philippines are listed in the table below, none of these laws specifically address climate change mitigation measures.

Table 2-124 Laws and regulations related to waste and recycling in the Philippines

Code and Act	Overview
Presidential Decree No. 1152, Philippine Environment Code (June 1977)	Principles for overall environmental management. Part IV shows the principles for 'waste management'.
Philippine Clean Air Act RA8749 (June 1999)	Article 20 prohibits the incineration of municipal waste, medical waste and hazardous waste that emit toxic gases. The act requires local authorities to promote, encourage and implement comprehensive waste management, including waste segregation, recycling and composting.
Ecological Solid Waste Management Act RA 9003 (January 2001)	Act on solid waste management. Local government units are required to develop 10-year waste management plans under the Act. In accordance with the law's prohibition on the use and establishment of open dumping sites, the zero target of open dumping sites was achieved in May 2021.

Source: JICA survey team

(b) National strategies and plans

a) National Framework Strategy on Climate Change (2010-2022)

GHG emissions from the waste sector primarily result from the anaerobic decomposition of organic waste, which accumulates without proper management in landfills, emitting methane gas. According to the Strategy, full implementation of proper waste management is therefore listed as one of the objectives, and strategic priorities include (i) strengthening the implementation of the Ecological Solid Waste Management Act (RA9003), (ii) promoting best practices in waste management, and (iii) strengthening proper waste management, have been identified through dialogues with the public and behavior modification as a way to countermeasure climate change.

b) National Climate Change Action Plan (2011-2028)

Among the 7 outcomes of the National Climate Change Action Plan (2011-2028), under the topic “Climate-friendly industries and services,” the implementation of ecological solid waste management for climate change mitigation and adaptation is listed as one of the outputs. Specific actions include (i) Intensify waste segregation at source, discard recovery, composting, and recycling; (ii) Regulate the use of single-use and toxic packaging materials; and (iii) Close down polluting waste treatment and disposal facilities.

c) Philippines National Development Plan (2023-2028)

The Philippine National Development Plan identifies the obstacle to progress in effective solid and hazardous waste management as the limited capacity of LGUs in the waste sector. Therefore, it is imperative to ensure compliance and behavior modification not only at the LGU but also at the individual, household and societal levels for waste recycling and volume reduction. Effective waste management by LGUs through IEC (Information, Education, and Communication) activities and proper waste disposal by residents as well as waste management and proper waste disposal by the population are targeted. Another objective is to promote the establishment of clustered LGUs for further appropriate operation of communal waste facilities, such as the establishment of material recovery facilities and sanitary landfill sites. Regarding food loss and food waste reduction, installing of “intermediate” treatment facilities such as composting facilities and developing capacity in LGUs shall be continued, and IEC activities on effective use and reduction methods of organic waste shall be strengthened. Specific initiatives include environmentally friendly food choices, appropriate food preservation and storage methods (drying, freezing, salting, etc.) and composting of food and food waste at home.

Regarding waste-to-energy, one of the challenges highlighted is the need for legislation to facilitate the expansion and upgrade of infrastructure. There is a mention of the Waste-to-Energy Act, which has been submitted for consideration in the Senate's plenary session, aiming to address this challenge. However, concerns have been raised about the insufficient safeguards in place for potential environmental and health issues associated with waste-to-energy. Additionally, there are concerns about the ambiguity of government

agencies' roles and their inefficiency in fulfilling these roles, as well as a short of investor confidence in the sector, all contributing to the identified issues.

2) Status of Efforts to Combat Climate Change

(a) Stakeholder analysis

The table below lists the major stakeholders in solid waste management in the Philippines.

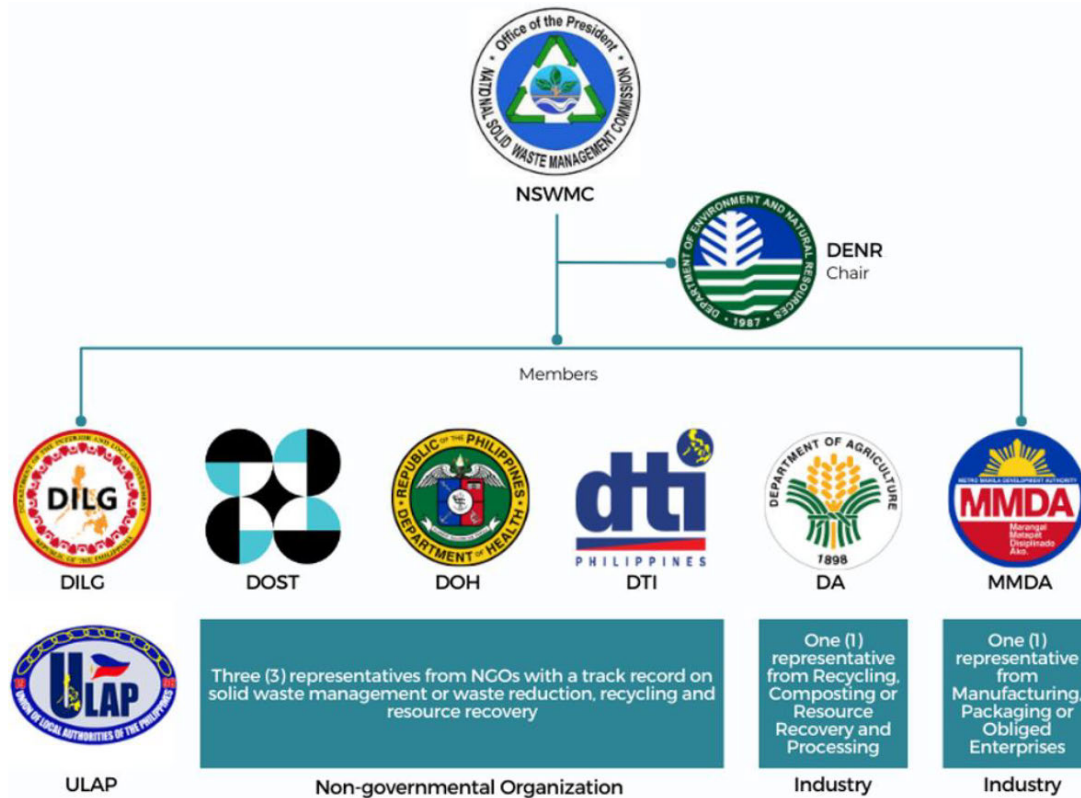
Table 2-125 Responsibilities and roles of each relevant agency/organization (waste management)

Institution / Organization	Responsibilities and roles
National level	
National Solid Waste Management Commission (NSWMC)	Highest national decision-making body that develops policies and guidelines to be implemented by LGUs to achieve the objectives of RA 9003 and approves solid waste management plans submitted by LGUs. It is chaired by the DENR Director and consists of nine other national government agencies, two private sector representatives, and one NGO representative.
Department of Environment and Natural Resources, Environmental Management Bureau (DENR-EMB)	Monitoring and enforcement agencies for provisions stipulated in RA 9003, including scrutiny of 10-year solid waste management plans submitted by LGUs
Department of Environment and Natural Resources, Climate Change Services (DENR-CCS)	The implementation and monitoring of climate change mitigation measures in DENR's policies, programs, and projects related to waste, including the development of investment initiatives for policy measures and climate change resilience enhancement.
National ecology center	Establishment and management of the solid waste database and provision of technical assistance to LGUs. It is chaired by the Director of the DENR-EMB, but also consists of the Department of Trade and Industry (DTI), the Department of Education (DOE), and others.
Local level	
DENR-EMB regional office	Monitoring for State/City/Municipality/Barangay compliance with regulations and guidelines.
Regional ecology center	Establishment and management of the regional solid waste database and provision of technical assistance to LGUs, barangays, etc. Led by the regional office of DENR-EMB, and consisting of the DTI regional offices, Department of Education regional offices, etc.
Provincial/City/ Municipal/Barangay Solid Waste Management Boards	Determination of strategies, policies and guidelines for solid waste management at State/City/Municipal level in accordance with policy and guiding decisions made by the NSWMC
Provincial/City/ Municipal Environment and Natural Resources Office	Implementation of solid waste management strategies, policies, and guidelines at t State/City/Municipal level
Barangay	Collection of solid waste and recyclables. Establishment of Materials Recovery Facility.
Private sector	
Private contractor for waste collection	Municipal waste collection outsourced from LGUs

Source: JICA survey team

The figure below also shows the organizational framework of the National Solid Waste Management Commission (NSWMC), chaired by the Secretary of DENR, with seven other national government agencies (Department of Science and Technology (DOST), Department of Health (DOH), Department of

Agriculture (DA), Department of Interior and Local Government (DILG), Department of Trade and Industry (DTI), Metro Manila Development Authority (MMDA), and the Director General of the Union of Local Authorities of the Philippines (ULAP)), two private sector representatives (one from manufacturing, packaging, and obliged companies, and one from the recycling, composting, and resource recovery industries), and NGO representatives from three organizations with enough experience in waste management, waste reduction, recycling, and resource recovery.



Source: Commission On Audit: Performance Audit Report on Solid Waste Management Program, May 2023

Figure 2-73 Organizational framework of National Solid Waste Management Commission

(b) NDC Policies and Measures (NDC-PaMs) and Investment Portfolio for Risk Resilience (IPRR)

DENR-CCS has compiled a list of "NDC Policy and Measures (NDC-PaMs)" and "Investment Portfolio for Risk Resilience (IPRR)". The NDC PaMs outline the policies aimed at achieving the Philippines' greenhouse gas emission reduction goals, as specified in the Nationally Determined Contributions (NDC). Meanwhile, the IPRR, where DENR assumes the chairmanship and determines budget support and funding sources from external partners, holds a high priority in project implementation.

Table 2-126 List of NDC Policies and Measures (Waste)

No.	NDC Policies and Measures	Issues	Support needs
1	Composting of organic wastes	Limited market for compost products, varying quality of compost, non-compliance to RA 9003, low cost of land-filling.	Assess different composting technologies and identify enabling mechanisms (i.e. incentives, strict enforcement of policy).

No.	NDC Policies and Measures	Issues	Support needs
2	Methane flaring in disposal facilities	Flaring of methane is currently not part of the measures to manage methane gas in landfill.	Need local research/study for policy recommendation and amendment to RA 9003. Demonstration and pilot implementation of flaring technologies is needed.
3	Methane recovery from sanitary landfills for electricity	The application of landfill gas to energy technology in the country is very minimal due to high investment cost.	Need technical and financial assistance to maximize the deployment of the technology. Acquisition of state-of-the-art technologies and its pilot implementation is needed.
4	MSW digestion of organic waste with methane capture	The use of MSW digestion technology in the country is very limited, weak compliance to waste segregation and collection.	Need technical and financial assistance to LGUs to maximize the deployment of the technology. Acquisition of appropriate technologies and pilot implementation in LGUs is needed.
5	Use of Eco-Efficient Soil Cover	The technology has not been adopted/implemented and could lead to erosion/siltation.	Need further study and demonstration in pilot areas to look at the feasibility and the overall impact of the measure and to develop policy and guidelines. Review and amendment to RA 9003.

Source: DENR Climate Change Services: NDC Policies and Measures (PAMs) for Waste Sectors, 2023

Table 2-127 List of DENR’s Investment Portfolio for Risk Resilience (Waste)

No.	Area	Project	LGUs
1	Catanduanes	Development of ecological waste management systems	All LGUs
2	Metro Iloilo	Construction of sanitary landfill and material recovery facilities	All LGUs
3	Eastern Samar	Site suitability studies for provincial sanitary landfill, municipal material recovery facilities	Province-wide
4	Northern Samar		
5	Surigao del Norte	Construction of centralized material recovery facility	Surigao City, Dapa, General Luna, Del Carmen, Claver, Mainit, Malimono and Socorro
6	Ifugao	Construction of sanitary landfill	Kiangan, Tinoc, Asipulo
7	Ifugao	Construction of bio-composting facilities	All LGUs
8	Mountain Province	Construction of an engineered sanitary landfill	Tadian, Bauko
9	Metro Manila	Preparation and development of solid waste management master plan	Metro-wide

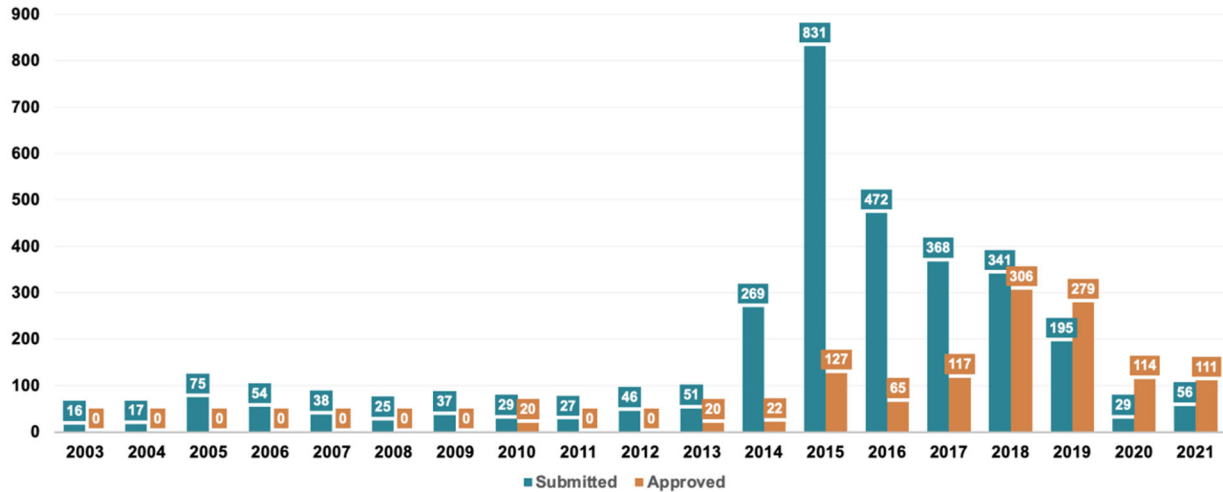
Source: DENR-CCS: ENR-related PAPs in the Investment Portfolio for Risk Resilience (IPRR) of Selected Climate-Vulnerable Provinces For Implementation by DENR Regional Offices in 2023 and/or 2024

3) Implementation Status of Climate Change Measures, Challenges, and Support Needs

Based on information obtained through interviews, questionnaires to relevant agencies and organizations, as well as publicly available documents and reports, the current status, challenges, and strategic priorities emerging in the aforementioned sector have been identified. The following enumerates the progress, challenges, support needs, and other relevant aspects concerning specific climate change mitigation measures, aligned with disclosed policies, plans, and strategic priorities.

(a) Development of 10-year Solid Waste Management Plans

The Ecological Solid Waste Management Act (RA9003) mandates LGUs to formulate a 10-year Solid Waste Management Plan respectively. As of 2023, 1,355 LGUs, equivalent to 85% of the total, have received approval from DENR. However, as depicted in the chart below, approvals for LGUs' 10-year Solid Waste Management Plans have been concentrated since 2014, indicating that many LGUs will soon enter the renewal phase. Therefore, to facilitate a higher renewal rate, it is deemed necessary to encourage updates by implementing DENR's technical assistance and capacity development for LGUs, as outlined below.



Source: Commission On Audit: Performance Audit Report on Solid Waste Management Program, May 2023

Figure 2-74 Submission and Approval Status of the 10-Year Solid Waste Management Plans

a) DENR to provide technical assistance and capacity building

The Ecological Solid Waste Management Act (RA 9003) provides for the development of a 10-year solid waste management plan (10Y-SWMP) for all cities, provinces, and municipalities. The development of the plan must focus on the implementation of all feasible reuse, recycling, and composting programs, while identifying the landfill sites and their treatment capacity required for solid waste that cannot be reused, recycled, or composted. The development of the plan is therefore in line with the above-mentioned focus of the National Framework Strategy on Climate Change and the National Climate Change Action Plan. The DENR-EMB is also providing technical assistance and capacity development to Municipal and City Environment and Natural Resources Officers (M/CENRO) of LGUs in the development of this plan.

b) Resolution of limited number of waste management officers in LGUs and disconnection or loss of technical knowledge and local information

The Local Government Code. (RA 7160) requires LGUs to provide services and facilities related to solid waste management systems, environmental management systems and general sanitation and public health, while stipulating that the appointment of Municipal and City Environment and Natural Resources

Officers (M/CENROs) in charge of these matters is at the arbitrary determination of the local authorities. According to the DENR-EMB, only 29% of LGUs have an M/CENRO as a full-time position, while 70% of LGUs have one officer having a main duty with other positions. The latter M/CENROs do not necessarily receive training in solid waste management operations, and most of them are busy with their original responsibilities, which represents a low policy priority for waste management in many LGUs. The tenure of officials responsible for the environment and natural resources is typically three years according to the Code. However, during the turnover of personnel, many LGUs often fail to facilitate the transfer of ongoing project information, knowledge, and technical expertise. As a result, organizational knowledge, including individual insights, is at risk of being lost.

(b) Public awareness and provide environmental education on waste management

a) National Zero Waste Month Campaign by DENR

Based on Presidential Proclamation No. 760 of 2014, declaring January as National Zero Waste Month annually, the campaign advocates for the promotion of a "circular economy" in the production and use of consumer products to reduce the quantity and harmfulness of generated waste. The theme for 2024 is "Sustainable Waste Management in Livable Communities: Zero Waste to Philippine Waters by 2040" aiming to achieve an environment free from plastics and waste, not only in water resources but also in air and land, through the elimination and avoidance of large quantities of toxic substances.

b) Community-Based Solid Waste Management (CBSWM) Program by MMDA

The MMDA's CBSWM program focuses on community ownership and includes the development of relevant policies, provision of equipment/tools for waste management facilities, and implementation of community capacity development and awareness campaigns to target waste reduction with the objective of activating, realizing, enhancing and sustaining the ideal community behavior modification. The project targets waste reduction. To date, the program has been implemented in 42 barangays, which is in line with the aforementioned National Framework Strategy on Climate Change, the NCCAP, and the focus areas of the PDP.

c) Improvement of low interest among Barangays/Residents in waste management

According to the Commission on Audit's survey⁸⁹, 71 of the 591 LGUs surveyed, had not yet enacted ordinances on waste segregation. In addition, a press release from the National Assembly⁹⁰ in 2020 revealed that 70% of barangays nationwide do not implement separate waste collection and that many barangays do not follow LGU ordinances. The survey also found that 88% of resident respondents indicated that they were aware of the mandatory waste segregation, while 34% said they had never

⁸⁹ Commission On Audit: Performance Audit Report on Solid Waste Management Program, May 2023

⁹⁰ https://legacy.senate.gov.ph/press_release/2020/0211_gatchalian1.asp

participated in awareness-raising programs on solid waste management conducted by barangays and LGUs.

Discussions with the DENR Climate Change Services (DENR-CCS) and the Solid Waste Management Office of the Metro Manila Development Authority (MMDA) in this Survey also identified the lack of interest of residents in waste as a challenge faced by the sector.

The above mentioned factors are: (1) waste management policies are not implemented at the barangay level to the extent that residents and communities modify their behavior due to low policy priority on waste management in LGUs, and (2) even if there are appropriate policies and ordinances to implement separate collection and recycling activities in LGUs, residents do not understand the need for separate collection and recycling and do not become aware of waste management until the issues of environmental pollution, health hazards, etc. become close to their hearts, (3) The absence of regulations concerning waste segregation.

(c) Establishment of Materials Recovery Facilities

In the formulation of each LGU’s 10-Year Solid Waste Management Plan, one of the key priorities is the enhancement of implementation for reuse and recycling programs. With this objective, it is mandatory to establish materials recovery facilities in the 42,046 districts (Barangays) nationwide. As of 2021, the installation status is as follows. However, as of 2022, the installation rate remains at 40%.

Table 2-128 The number and percentage of materials recovery facility installations in barangays.

Year	2017	2018	2019	2020	2021	2022
Percentage of materials recovery facility	31.7%	32.3%	33.3%	34.4%	39.1%	40.5%
Number of materials recovery facility	13,324	13,612	13,994	14,450	16,418	17,047

Source: DENR-EMB, National Development Plan of the Philippines (2017-2022)

Therefore, the DENR-EMB provides financial assistance to LGUs/barangays for the establishment of materials recovery facilities targeting recyclable and reusable materials such as paper, cardboard, glass, aluminum, tin, plastic containers, etc.

a) Resolution of Nationwide Shortage of Materials Recovery Facilities

The Ecological Solid Waste Management Act (RA 9003) requires barangays in LGUs to install material recovery facilities, but only about 40% of barangays have already installed the facilities (as of August 2022), a gap of about 20% from the target in the National Development Plan. The nationwide shortage of the facilities has not been resolved due to limited subsidies for the installation of the facilities provided by the DENR-EMB as financial assistance, with priority given to LGUs/barangays with active awareness for material recovery. LGUs/Barangays that meet the requirements, such as securing operational funds post-installation, land use, and possessing technical know-how on installation and

operation procedures, are prioritized. However, this approach has not completely resolved the nationwide shortage of facilities. Therefore, by combining the aforementioned "Technical assistance and capacity building for LGU M/CENROs" with "Raise public awareness and provide environmental education on waste management " it is believed that raising awareness of resource recovery across the entire region will lead to addressing the challenges.

Table 2-129 The number and percentage of materials recovery facility installations in barangays

Year		2017	2018	2019	2020	2021	2022
Percentage of material recovery facilities installed	Actual results	31.7%	32.3%	33.3%	34.4%	39.1%	40.5%
	Target at National Development Plan	35%	40%	45%	50%	55%	60%

Source: DENR-EMB, National Development Plan of the Philippines (2017-2022)

As mentioned earlier, the actual achievement rate of materials recovery facility installations falls significantly short of the targets set in the PDP. Additionally, materials recovery facility construction and site suitability surveys, particularly in the central and southern areas of the Philippines, are included in DENR's list of IPRR. This underscores the high demand for support. Regarding support needs for funding, it is not realistic to provide financial assistance to all areas. Therefore, considering the approach of regional management (clustering) aims to alleviate the financial burden on each LGU. In this regard, it is desirable to prioritize consideration of investment target regions outlined in the Investment Portfolio for Risk Resilience (IPRR).

Table 2-130 List of DENR's Investment Portfolio for Risk Resilience (Excerpt)

No.	Area	Project	LGUs
1	Metro Iloilo	Construction of sanitary landfill and material recovery facilities	All LGUs
2	Eastern Samar	Site suitability studies for provincial sanitary landfill, municipal material recovery facilities	Province-wide
3	Northern Samar		
4	Surigao del Norte	Construction of centralized material recovery facility	Surigao City, Dapa, General Luna, Del Carmen, Claver, Mainit, Malimono and Socorro

Source: DENR-CCS: ENR-related PAPs in the Investment Portfolio for Risk Resilience (IPRR) of Selected Climate-Vulnerable Provinces For Implementation by DENR Regional Offices in 2023 and/or 2024

(d) Improve waste diversion rate

In the CoA report, the waste diversion rate has been calculated at 46% based on the daily waste generation and waste diversion data publicly disclosed for each state in 2020. However, this falls significantly below the PDP's target rate of 70%.

The Ecological Solid Waste Management Act (RA 9003) defines waste diversion as 'activities which reduce or eliminate the amount of solid waste from waste disposal facilities', which includes reuse, recycling, composting and other material recovery activities. Each LGU is required to convert at least 25% of their

generated solid waste within five years after the Act entered into force, with this target ratio increasing every three years thereafter. The Philippine Development Plan (2017-2022) had a solid waste diversion target of 75% by 2021.

JICA is implementing the "Capacity development for improving solid waste management through Advanced/Leading Technologies" project in Quezon City, Cebu City, and Davao City. Additionally, in Legazpi City, there is an ongoing project for the investigation, promotion, and demonstration of a sustainable biodegradable waste composting system. The World Bank is advancing the adoption and expansion of waste management technologies with low greenhouse gas emissions, unrestricted by the Clean Water Act and the Ecological Solid Waste Management Act in 2023, while implementing methane recovery projects from waste disposal. Furthermore, the Asian Development Bank conducted feasibility and sustainability demonstrations for waste-to-energy projects in 2019, with ongoing verification of the construction and operation of two waste-to-energy projects in pilot cities as part of the outcomes.

a) Improvement of low waste diversion rate

The target average waste diversion rate, calculated from waste analysis and characterization surveys in Barangays within LGUs where the 10-year solid waste management plan was approved, fell below expectations at 72.6 %. However, the actual waste generation and diversion rates, as reported by DENR-EMB, revealed a nationwide average of 46.6 %, which is 26 % lower than the target average. Moreover, the collected data only represents responses from the 750 resource recovery facilities funded by DENR-EMB, accounting for a mere 1.8 % of the 42,046 Barangays. Therefore, it is inferred that the actual figures are significantly lower than this value, suggesting that waste diversion initiatives at the LGU/Barangay level are not progressing as planned. While financial and technical constraints within LGUs contribute to this issue, the limited capacity among waste management officers also plays a role in the overall lower prioritization of waste management initiatives within LGUs.

Table 2-131 Waste diversion targets

Year	2015	2016	2017	2018	2019	2020	2021	2022
10Y-SWMP	49.8%	54.6%	58.7%	61.8%	65.4%	68.7%	72.6%	-
PDP	-	-	55%	60%	65%	70%	75%	80%

Source: DENR-EMB, National Development Plan of the Philippines (2017-2022).

The need to improve the low waste diversion rate through intermediate processes such as composting has been identified by DENR. As mentioned earlier, the waste diversion rate significantly falls short of the PDP target, and the inclusion of organic waste composting in DENR's NDC PaMs contributes to enhancing waste diversion rates. The development of organic waste management systems and the construction of bio-composting facilities are also listed in DENR's IPRR, highlighting the high demand for support in this area. In addition, the need for compost market development has been identified by

DENR, alongside composting as an intermediate treatment process. Regarding financial assistance needs, considering the impracticality of providing funding support to all regions, a response focused on regional management (clustering) is under consideration to alleviate the financial burden on each LGU.

Table 2-132 List of DENR’s Investment Portfolio for Risk Resilience (Excerpt)

No.	Area	Project	LGUs
1	Catanduanes	Development of ecological waste management systems	All LGUs
2	Ifugao	Construction of bio-composting facilities	All LGUs

Source: DENR-CCS: ENR-related PAPs in the Investment Portfolio for Risk Resilience (IPRR) of Selected Climate-Vulnerable Provinces For Implementation by DENR Regional Offices in 2023 and/or 2024

b) Waste incineration

For Waste-to-Energy projects, the DENR enforced the Administrative Order “Guidelines governing Waste-to-Energy” in 2019, which requires written plans for assessment, construction, operation and decommission, as well as obtaining an Environmental Compliance Certificate (ECC), ETV (Environmental Technology Verification), and installation of a CEMS (Continuous Emissions Monitoring System) linked to the EMB system. In addition, the project will require considerable time and effort before the project can be implemented due to the opposition to waste incineration from local residents and NGOs, environmental and social considerations such as the location and surrounding land use patterns, the specific view by the local governor and mayor towards the project, and political issues such as their term limits of up to 9 years and the timing of elections.

In contrast, in Davao City where sanitary landfills are already at full capacity, waste-to-energy projects are being planned alongside the development of alternative sites⁹¹. To facilitate this initiative, a technical working group was established in December 2023, led by DENR, Davao City, and the City Environment and Natural Resources Office (CENRO). Upon realization, the waste-to-energy facility is projected to have a waste intake capacity of 600 tons and generate 12 megawatts of power⁹². Davao City stands out as one of the LGUs pioneering advanced initiatives in the domestic waste sector. This is attributed partly to the proactive roles played by waste management officers and the CENRO, addressing one of the challenges by elevating the priority of waste policies within LGUs.

(e) Capacity improvements of final disposal sites

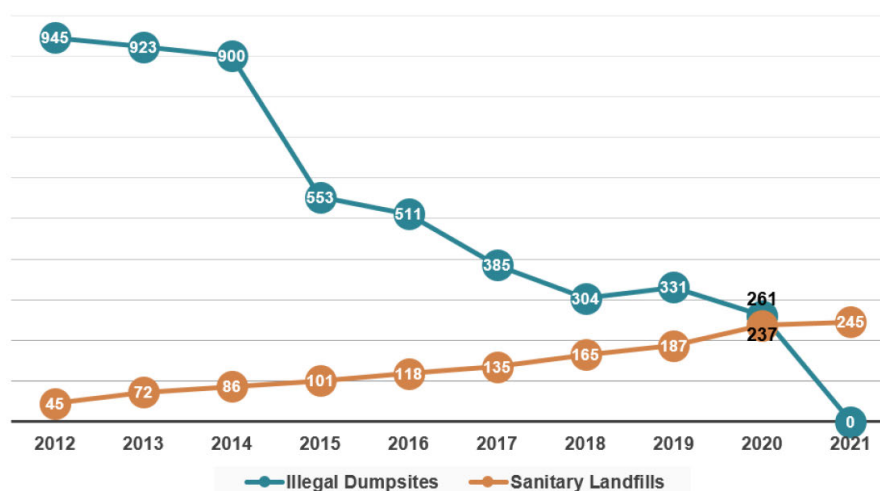
According to data from DENR-EMB, as of 2023, there are 299 operational sanitary landfill disposal sites nationwide, with 675 LGUs having access to them. However, this figure represents just over 40% of all LGUs.

⁹¹ <https://www.davaocity.gov.ph/solid-waste-management/davao-city-govt-develops-new-lot-near-new-carmen-sanitary-landfill-site-to-address-mounting-waste-volume/>

⁹² <https://edgedavao.net/latest-news/2023/12/23/hopes-revived-as-twg-created-for-citys-proposed-wte-project/>

a) DENR declaration to close open dumping sites

The Ecological Solid Waste Management Act (RA 9003) prohibits the continued use of open dumping sites and the opening of new ones. However, even after the Act was enacted, many LGUs have continued to use open dumping sites with inappropriate waste management. As a result, the deposited organic waste has become a source of GHG emissions, such as methane gas due to anaerobic decay and carbon dioxide through open burning. However, in May 2021, 20 years after the Act came into force, the Department of Environment and Natural Resources (DENR), which is responsible for formulating waste management policies, notified all LGUs of the order once more to close open dumping sites, thus achieving the zero target.



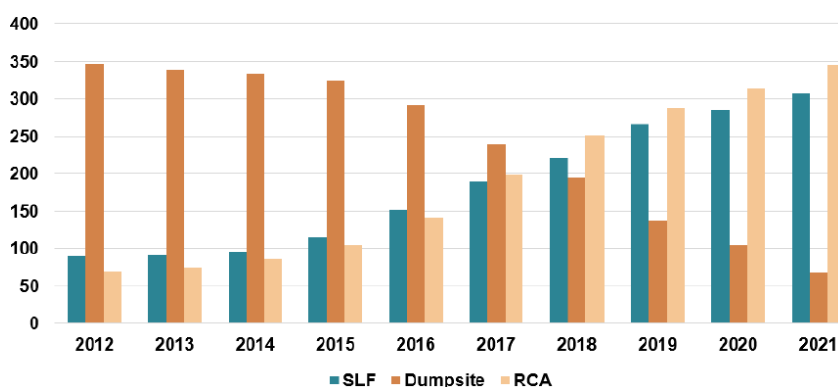
Source: DENR-EMB

Figure 2-75 Number of sanitary landfill sites and open dumping sites

Since the beginning of the 2020s, there have been private-sector-led waste management facility construction projects. In 2023, the Waste Management Facility Expansion Project in Cebu City, supported by the Hongkong and Shanghai Banking Corporation, and the Integrated Waste Management Facility Construction Project in Lapu-Lapu City, funded by the Philippine Development Bank, have been implemented.

b) Resolution of Nationwide shortage of sanitary landfill sites

According to data published by the DENR-EMB after the closure order, only 675 LGUs (41%, as of 2023) have access to their sanitary landfill, while other LGUs have established residual containment areas as a temporary measure until a sanitary landfill is established. Residual containment areas refer to temporary storage areas for waste residues after segregation, but there are no guidelines specifying conditions for their establishment (e.g. installation of liners and leachate ponds), so there is a risk that residual containment areas will be turned into open dumping sites due to lax regulation, increasing potential methane gas generation, etc.



Source: Commission On Audit: Performance Audit Report on Solid Waste Management Program, May 2023.

Figure 2-76 Number of LGUs using sanitary landfill sites (SLF), open dumping sites and residual containment areas (RCA)

There are five main reasons why LGUs cannot establish a sanitary landfill: (i) difficulty in finding a suitable site with strict criteria (e.g., LGUs with land use restrictions (island regions, steep land, protected areas) or geological restrictions (limestone), (ii) insufficient budget for establishing a sanitary landfill, (iii) planning regulations of the LGU, (iv) social non-acceptance of the project, and (v) political issues.

Anticipating climate change mitigation efforts, specific needs have been identified through consultations with DENR. These needs include the improvement and construction of sanitary landfills with methane recovery, especially for LGUs facing land or geological constraints that prevent compliance with the current sanitary landfill facility installation criteria. Additionally, there is a demand for technical support in implementing localized landfill management methods and waste collection strategies. Furthermore, DENR's NDC PaMs incorporate methane recovery from sanitary landfills and the environmentally efficient use of cover soil. The construction of sanitary landfill facilities and site suitability assessments are listed in DENR's IPRR, indicating particularly high support needs. Considering the financial aspect, it is acknowledged that providing funding assistance to every region may not be practical. Therefore, considering a broad management approach (clustering) aims to alleviate the financial burden on each LGU.

Table 2-133 List of DENR's Investment Portfolio for Risk Resilience (Final disposal site)

No.	Area	Project	LGUs
1	Metro Iloilo	Construction of sanitary landfill and material recovery facilities	All LGUs
2	Eastern Samar	Site suitability studies for provincial sanitary landfill	Province-wide
3	Northern Samar		
4	Ifugao	Construction of sanitary landfill	Kiangan, Tinoc, Asipulo
5	Mountain Province	Construction of an engineered sanitary landfill	Tadian, Bauko

Source: DENR-CCS: ENR-related PAPs in the Investment Portfolio for Risk Resilience (IPRR) of Selected Climate-Vulnerable Provinces For Implementation by DENR Regional Offices in 2023 and/or 2024

(3) Wastewater

1) Relevant Policies and Plans

(a) **Laws and regulations**

In the Presidential Decree 1152, “Philippine Environment Code”, Title II, “Water Quality Management, Chapter II, “Protection and Improvement of Water Quality”, and Title V, “Waste Management”, Chapter III, “Methods of Liquid Waste Disposal,” the regulation and monitoring by the national government and the responsibility of wastewater dischargers, including households, to dispose of wastewater are stated. The Code on Sanitation of the Philippines was enacted in 1975, which states in Chapter 17, the scope of supervision of responsible ministries, operational requirements for sewers and sewage treatment plants, specification requirements for septic tanks including effluent standards and capacity, and the responsibility of local authorities for wastewater treatment.

The Clean Water Act (RA 9275) administered in 2004, provides for the Department of Public Works and Highways (DPWH) to develop a National Sewerage and Septage Management Plan (NSSMP), with the latest version of the NSSMP being produced in 2013. It also requires that within five years from the effectivity of the Act (March 2004), existing sewage lines found in all institutions, including households, must be connected to available sewerage systems in highly urbanized cities, and septage or combined sewerage-septage management systems must be adopted in other areas.

Table 2-134 Main laws and regulations on domestic wastewater in the Philippines

Code and Act	Overview
Presidential Decree 856, Code on Sanitation of the Philippines (Dec 1975)	Defines scope of supervision of responsible ministries, operational requirements for sewers and sewage treatment plants, specification requirements for septic tanks, including effluent standards and capacity, and the responsibility of local authorities for wastewater treatment.
Presidential Decree 1152, Philippine Environmental Code (June 1977)	Presents principles for overall environmental management. Parts II and IV present the principles of 'Effluent management'.
Clean Water Act RA9275 (Mar 2004)	Comprehensive Water Quality Management Act. The Act requires connection of existing sewage lines to available sewerage systems in highly urbanized areas and adoption of septage or combined sewerage-septage management system in other areas.

Source: JICA survey team

(b) **National strategies, plans, etc.**

a) **National Climate Change Action Plan (2011-2028)**

Under one of the seven outcome themes set out in the National Climate Change Action Plan, “Water Sufficiency: Water resources sustainably managed and equitable access ensured”, outputs include “Water supply and demand management of water improved” and “Quality of surface and ground water improved”. Specific activities include (i) Study and adopt centralized wastewater treatment systems to improve quality

in highly urbanized and densely populated areas, (ii) Assess gaps in the implementation of the Clean Water Act and National Sewerage and Septage Management Program.

b) Philippines National Development Plan (2023-2028)

Similar to the waste sector, the challenge in the water quality is the fecal coliform bacteria exceeding standards due to inadequate wastewater treatment to deal with domestic wastewater, which is the origin of pollution, and it is concluded that the water quality of the monitored water bodies is still low, although many different programs have been implemented to improve water quality. The PDP therefore proposes to adopt an integrated water resource management approach to take measures for water pollution. Specifically, the measures include the use of the National Water Quality Management Fund to improve monitoring and enforcement capacity of applicable laws, expansion of the system for collecting environmental fees to non-polluted source areas, large-scale cleaning, monitoring industry, river restoration and continued implementation of multi-stakeholder initiatives to improve water quality. Cooperation between related LGUs on the clean-up of shared river ecosystems is being promoted, with the aim of institutionalizing the “Adopt-an-Estero/Water Body Program⁹³” at the LGUs and the barangays and establishing their ordinances of sewage management.

c) National Sewerage and Septage Management Program (NSSMP)

The program, launched in 2013, describes the project cycle and processes for efficient planning, design, selection of appropriate treatment technologies, necessary procedures, budgeting, and financing, for sewerage and septage management entities, which are LGUs, Local Water Districts⁹⁴ (LWD) and private companies. It also stipulates a national government subsidy scheme, which provided 40% of project costs and was limited to sewerage projects in 17 Highly Urbanized Cities (HUC) outside Metro Manila at the time of the program’s enactment. However, the program was revised in 2017, expanding the support to 50% of project costs and including septage and combined sewerage-septage projects in addition to sewerage projects. In addition to the 17 HUCs, 1st class municipalities and non-HUCs were also included in the target area. The targets for all LGUs, including the above-mentioned target areas, are as follows. Regarding Target 4, requires early achievement due to its contribution to GHG emissions through methane generation caused by high BOD concentrations. However, considering that ten years have passed since its inception in 2013, JST has confirmed that DPWH has already applied to JICA for support related to a technical cooperation project aimed at revising the Program Operation Manual and enhancing LGUs' capacity to prepare

⁹³https://water.emb.gov.ph/?page_id=45#:~:text=Adopt%2Dan%2DEstero%2FWater%20Body%20Program%20is%20a%20collaborative,government%20agencies%20and%20the%20DENR.

⁹⁴It became a government-owned and controlled corporation in 1973 by Presidential Decree No. 198 in local cities with more than 20,000 inhabitants. As such, it is an independent organization from LGUs, but it supplies and operates water treatment systems to one or plural local cities or municipalities. It is classified into four categories from A to D, according to the number of connections, total revenue, asset value, net income, and staff productivity index.

necessary documents for NSSMP applications. LGUs applying to the NSSMP should prepare and submit the following required items to the DPWH shown in the table below.

- Target 1: By 2020, all LGUs have developed septage management systems and the HUCs have developed sewerage systems.
- Target 2: By 2020, approximately 43.6 million people have access to septage treatment facilities and about 3.2 million will have access to sewage treatment facilities.
- Target 3: By 2020, PHP 26.3 billion has been invested in sanitation improvement projects.
- Target 4: By 2020, about 346 million kg of BOD is diverted from the environment per year as a result of the sewerage and septage management projects.

Table 2-135 Application Requirements for NSSMP subsidy

Required item	Contents
1. Local Ordinance for sewerage/septage management	Sets out the sanitation rationale, user fees, operation, management and penalties for the locality.
2. Master plans and feasibility study results	Single or separate documents that set out the technical and financial specifications for the design, construction and operation of the sanitation infrastructure.
3. Memorandum of Understanding (MoU)	Where a partnership is proposed, such as between a city government and a utility builder/operator, a MoU is needed to set out the obligations and responsibilities of all parties, e g billing, collection, operations management, fee sharing, etc.
4. Loan agreement(s)	This is the contract signed between the project owner(s) and the bank(s) providing loans to (partly) finance the project.
5. Building/occupancy permit	These are ancillary regulations that relate to the nature and amount of sewerage/septage produced by different dwellings.
6. Environmental permit(s) and other regulations	An Environmental Sanitation Clearance must be secured by the project proponent from the Centre for Health Development (of the DoH In addition, an Environmental Compliance Certificate and Discharge Permit must be obtained from DENR for proposed waste treatment facilities.
7. LWUA Exemption	Water Districts that have existing loans with LWUA are required to obtain a waiver from LWUA before they can avail of loans from other lenders.
8. Technical Working Group (TWG) and Community Participation Mandate	Successful projects will typically have a TWG established to oversee the project and assist with its implementation, as well as some formal community engagement process.
9. Duly filled up Application Form	found on p 181 of the NSSMP Program Operations Manual.

Source: DPWH

2) Status of Efforts to Combat Climate Change

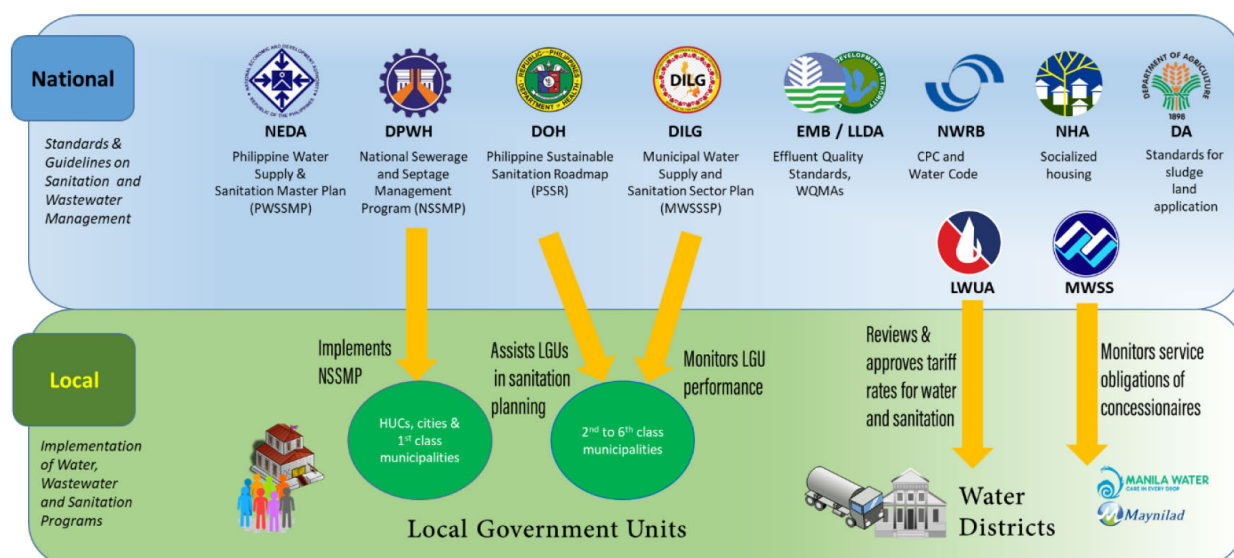
(a) Stakeholder analysis

The major stakeholders in domestic wastewater management in the Philippines are shown in the figure below. It consists of different national government agencies providing standards, guidelines and policies to the local implementers at the LGU and Water District level.

Table 2-136 Stakeholders in domestic wastewater management

Institution / Organization	Responsibility and role
National level	
NEDA	Provides direction and targets in addressing the challenges in the water supply and sanitation subsector to attain the desired short-term and long-term targets.
DPWH	Leads the implementation of the National Sewerage and Sanitation Program (NSSMP) which provides 50% subsidy to cities and 1st class municipalities for sewerage and septage infrastructure projects.
Department of Health (DOH)	Formulates guidelines and standards for the collection, treatment and disposal of sewage including guidelines for the establishment and operation of the centralized sewage treatment system
DILG	Provides guidance to the LGUs related to water supply and sanitation, and monitors their compliance to regulations
DENR	Environmental Management Bureau (DENR-EMB) - Manages the water quality in water bodies, abate and control pollution from land-based sources and enforce water quality standards, regulations and penalties.
	National Water Resources Board (NWRB) – coordinates and regulates all water resources and water-related activities thru enforcement of Certificate of Public Conveyance (CPC) and the water code.
Laguna Lake Development Authority (LLDA)	An attached agency of DENR which is responsible for the preservation, development and sustainability of Laguna de Bay and its 21 major tributary rivers.
National Housing Authority (NHA)	Implements comprehensive and integrated socialized housing for low-income families
Department of Agriculture (DA)	Regulates use of treated sludge for land application
Metropolitan Waterworks And Sewerage System (MWSS)	Ensures proper operation and maintenance of sewerage and sanitation systems in its service area which includes the whole of Metro Manila, and parts of Cavite and Rizal thru its two concessionaires Manila Water and Maynilad
Local Water Utilities Administration (LWUA)	Provides technical support and financial assistance to the water districts.
Local level	
LGU	Key implementers of domestic wastewater management and sanitation. LGUs should ensure that basic sanitation services are provided to their constituents
Local Water District (LWD)	Provides, maintains and operates wastewater collection, treatment and disposal facilities
Regional Offices of the National Government Agencies	Monitors compliance of LGUs and Water Districts on the regulations and guidelines
Private sector	
Manila Water Maynilad Water Services	Provides water supply and wastewater services in the municipalities that serve the Manila metropolitan area. Manila Water and Maynilad Water Services are responsible for the eastern and western regions, respectively, and have concession agreements with the MWSS.

Source: Policy Dialogue and Network Building of Multi-stakeholders on Integrated Domestic Wastewater Management in ASEAN Countries, Sep 2020



Source: Policy Dialogue and Network Building of Multi-stakeholders on Integrated Domestic Wastewater Management in ASEAN Countries, Sep 2020

Figure 2-77 Roles of different stakeholders in domestic wastewater management

(b) NDC Policies and Measures (NDC-PaMs) and Investment Portfolio for Risk Resilience (IPRR)

Regarding the wastewater sector, DENR-CCS has listed the NDC PaMs and IPRR in the table below. In the wastewater sector, there is a high demand for technical and financial support, including capacity development for LGU/LWD, technology acquisition, and support for the construction of wastewater treatment facilities. The regional needs are increasing, particularly in local cities outside the Metro Manila and Manila Bay.

Table 2-137 NDC policies and measures (wastewater)

No.	Policies and measures	Issues	Support needs
1	Expand septage and sewerage treatment facilities in HUCs and other cities outside Manila Bay Area. This measure aims to avail of support for the implementation of the government’s National Sewerage and Septage Management Program (NSSMP).	Low technical capacity of LGUs and local water districts and high investment cost for sewerage treatment facilities.	Technical and financial assistance are needed for the wide deployment of wastewater treatment facilities in the country. This would include capacity building for LGUs, acquisition of appropriate technologies and pilot implementation. Also need to review and amendment existing policies to require LGUs/Water Districts to develop wastewater treatment facilities.
2	Expand wastewater treatment facilities in compliance to the Supreme Court Mandamus to rehabilitate Manila Bay.	Limited space within Metro Manila to put-up wastewater treatment facilities	Assessment/Demonstration of various wastewater treatment technologies considering limited space availability.

Source: DENR-CCS: NDC Policies and Measures (PAMs) for Waste Sectors, 2023

Table 2-138 List of DENR’s Investment Portfolio for Risk Resilience (wastewater)

No.	Area	Project overview	Area of implementation
1	Siquijor	Construction of wastewater treatment facilities	Cang-adieng, Siquijor,
2	Northern Samar	Establishment of centralized / decentralized wastewater treatment	Catubig, Pambujan, Catarman Watershed

Source: DENR-CCS: ENR-related PAPs in the Investment Portfolio for Risk Resilience (IPRR) of Selected Climate-Vulnerable Provinces For Implementation by DENR Regional Offices in 2023 and/or 2024

3) **Implementation Status of Climate Change Measures**

Below are listed the initiatives, challenges, support needs, and the current status of efforts related to climate change adaptation identified within the domestic wastewater sector.

(a) **Promotion of sewerage and septage management in LGUs and Local Water District (LWDs)**

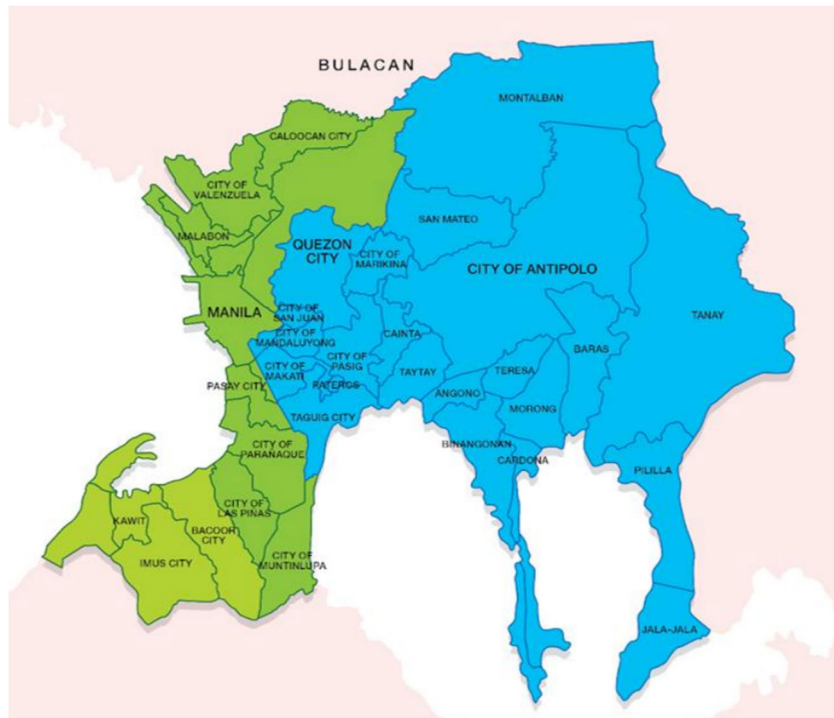
In the Manila Metropolitan Area, Manila Water Company, Inc. (Manila Water) and Maynilad Water Services, Inc. (Maynilad) have entered into concession agreements with the Metropolitan Waterworks and Sewerage System (MWSS). The sewerage coverage area, based on population ratio, for the combined operations of the two companies is 25.78%, and the coverage area of septage facilities is 82.36% (as of 2021). The covered population exceeds 14 million people, including parts of Cavite and Rizal provinces in addition to the Manila Metropolitan Area⁹⁵.

Table 2-139 Sewerage and sanitation service coverage status in the Manila Metropolitan Area (2021)

Item	Manila Water	Maynilad	Total
Total population	7,793,710	10,457,013	18,250,723
Sewerage-served	2,305,198	2,131,501	4,436,699
Sewerage coverage	31.46%	21.57%	25.78%
Sanitation offered	5,882,322	8,291,846	14,174,168
Sanitation coverage	80.27%	83.91%	82.36%
Number of wastewater treatment plants including sludge treatment	40	23	63
Length of sewerage network	Approx. 300 km	Approx. 600 km	Approx. 900 km

Source: Regulatory approach towards achieving CWIS in Metro Manila, Philippines, 2021, IWA

⁹⁵ Regulatory approach towards achieving CWIS in Metro Manila, Philippines, 2021, IWA



Source: Regulatory approach towards achieving CWIS in Metro Manila, Philippines, 2021, IWA

Figure 2-78 Service areas in Metro Manila: East zone (Right/Blue) - Manila Water, West zone (Left/Green) – Maynilad

Regarding areas outside the Metro Manila, only Zamboanga city has received national subsidies for sewerage or septage treatment projects under the NSSMP. In 2021, the city conducted a feasibility study for the construction of a sludge treatment plant. According to the study, in Phase 1 (initial stage), the plant is scheduled to be constructed with a processing capacity of 190 m³ per day by 2024, targeting the sludge volume to be treated until the completion of the second sludge removal cycle in 2032. By Phase 2 in 2032, construction is set to commence on an additional sludge treatment plant with a capacity of 70 m³ per day (total processing capacity: 260 m³ per day), with operations expected to commence in 2033⁹⁶.

(b) Technical and financial assistance from DPWH

The Environmental Social Safeguards Division (ESSD) of DPWH is the responsible division for formulating the NSSMP. As mentioned earlier, it oversees the review and approval of sewerage and septage management plans submitted by first-class cities and non-HUCs of each LGU/LWD. As of 2023, the status of national subsidies related to the aforementioned NSSMP application process is outlined in the table below. 16 LGUs have initiated the application procedures through the implementation of preparatory studies and consulting services, funded by DPWH. Among the 8 areas where DPWH conducted feasibility studies, none have submitted grant application documents to DPWH at present. While DPWH covers the expenses

⁹⁶ Pre-Feasibility study for the proposed septage management program for Zamboanga City, 2021, USAID

for feasibility studies and consulting services, only 3 LGUs/LWDs are currently receiving or have applied for national subsidies.

Table 2-140 Status of LGU initiatives for NSSMP

LGU/LWD	Year	Remarks
Subsidy received		
City of Zamboanga	2018	
Subsidy approved		
Cotabato City	2023	
Subsidy applied		
City of Tacurong		Re-application process underway due to incomplete documentation
Bacnotan Municipality, La Union Region		
Feasibility study conducted		
Butuan City	2016	Subsidy application documents not yet submitted.
City of Cagayan de Oro	2016	
Iloilo City	2018	
Bacolod City	2018	
City of Puerto Princesa	2019	
General Santos City	2019	
City of Olongapo	2020	
Iligan City	2020	
Consulting service provided		
City of Ozamiz	2021	
City of Los Baños	2021	
City of Alaminos	2022	
Pangasinan Municipality, Pangasinan Province	2022	

Source: DPWH

The climate change initiatives of the same department are as follows, and many of them fall under the category of adaptation measures related to disaster risk reduction, which is beyond the scope of focus for this survey.

Table 2-141 Climate change-related projects by the DPWH

Project name	Planned for FY2023
1: Ensure safe and reliable national road system	
Rehabilitation/reconstruction of roads with slips, slope collapse, and landslide	3,218,878m ² nationwide covered
Construction/upgrading/rehabilitation of Drainage along national roads	Approximately 350 km across the country
2: Protect lives and properties against major floods	
Construction/maintenance of flood mitigation structures and drainage systems	1,753 structures/drainage systems
Construction/restoration of flood mitigation facilities within major river basins and principal rivers	841 facilities
3: Convergence and special support program	
Rehabilitation of disaster-related infrastructure and other facilities	
Construction/rehabilitation of water supply/septage and sewerage/rainwater collectors	1,689 rainwater collectors

Source: DPWH

(c) Technical and financial assistance from Local Water Utilities Authority (LWUA)

The Local Water Utilities Authority (LWUA) is a government-owned and controlled corporation with specialized financing functions as stipulated by law for LWDs established throughout the country, whose main responsibility is to promote and supervise the development of water supply and sewerage systems in local cities and non-metropolitan municipalities. LWUA oversees the LGU/LWD of second-class and lower, which fall outside the scope of the NSSMP administered by DPWH. Within LWUA, feasibility studies for centralized sewerage projects are conducted for the targeted LGU/LWD under the approved budget from NEDA. As indicated in the table below, these studies have been completed in 15 areas to date, whose applications for funding during the project implementation stage have been submitted to DBM, but approval is pending. DPWH and LWUA attribute this situation to the following factors.

- The 1,163 LGUs falling below the second class, excluded from the NSSMP, exhibit a tendency of lower policy priority, leading to the absence of master plans and design standards/specifications for sewerage systems and drainage facilities in the sewage/septic tank sector.
- In the budget approval process by DBM, there is a preference for LGUs/LWDs influencing water quality in metropolitan areas such as Manila and Cebu or Manila Bay. As a result, other LGUs/LWDs face challenges in obtaining approvals.

Through the above-mentioned issues and challenges, the following support needs for LGUs/LWDs were identified.

- Technical support in the form of training on master planning for the sewage/drainage sector (master planning phase)
- Support for the development of design specifications and design criteria for sewerage systems and wastewater treatment facilities (feasibility study stage)
- Securing the financial resources needed to implement sewage/drainage projects

Table 2-142 Areas where feasibility studies have been conducted by LWUA

No.	Name of LWD (LGU)	No.	Name of LWD (LGU)	No.	Name of LWD (LGU)
1	Metro Bangued (Abra)	6	Moncada (Tarlac)	11	La Carlota City (Negros Occidental)
2	San Nicolas (Ilocos Norte)	7	Balayan (Batangas)	12	Silay City (Negros Occidental)
3	Naguilian (La Union)	8	Baao (Camarines Sur)	13	Tanjay (Negros Oriental)
4	Bayambang (Pangasinan)	9	Metro Roxas (Capiz)	14	Pagadian City (Zamboanga del Sur)
5	Metro Tuguegarao (Cagayan)	10	Kabankalan (Negros Occidental)	15	Tagum City (Davao del Norte)

Source: LWUA



Source: JICA survey team based on LWUA data

Figure 2-79 Areas where feasibility studies have been conducted by LWUA

As part of the authority’s climate change initiatives, it is working with LWDs to implement projects to elevate water supply tanks and pumphouses as a climate change adaptation measure in response to the frequent flooding that has occurred in recent years due to more intense typhoons.

(d) Resolution of Limited coordination among relevant agencies

As of 2023, there are over 30 water-related agencies with overlapping and sometimes even conflicting powers and functions over the country’s water resources. The limited coordination between these government agencies and the various water resource users results in “siloeed” policy and planning without integration. As a result, government interventions are made on a subsector-by-subsector, program-by-program, and project-by-project basis, such as water supply and sewerage, sanitation, irrigation, flood management, watershed management and coastal management, without proper consideration of the inter-use of water resources. In addition, decision-making and funding priorities for water resources are often driven by political impact and jurisdiction, without consideration of hydrological boundaries such as river basins and aquifer boundaries as planning and management units⁹⁷. In recent years, there have been moves to consolidate ministries and agencies: in April 2023, a Presidential Executive Order (Executive Order No.

⁹⁷ PDP (2023-2028)

22, 2023) was issued making the National Water Resources Board (NWRB), Metropolitan Waterworks and Sewerage System (MWSS), Local Water Utilities Administration (LWUA) and Local Water Districts (LWD), and Laguna Lake Development Authority (LLDA) attached organizations of the DENR. However, according to LWUA officials, the Clean Water Act of 2004 (RA 9275) clearly states that the LWUA is attached to the Department of Public Works and Highways (DPWH) and will be incorporated into the Department of Water Resource Management (DWRM), which is to be established in the future. The reorganization of ministries and agencies is still in the trial stage.

4) Donor support

The status of support from JICA and other donors is shown in the table below. The projects related to sewerage and wastewater treatment has not been active in recent years. Donor support for LWUA includes Local urban water supply project from 1988 to 2007 (JICA's technical cooperation and yen loan), Local water supply project from 1977-2015 (JICA's technical cooperation and yen loan), and World Bank and Asian Development Bank water supply projects from the 1990s to the 2000s. There is no precedent for donor support for sewage/wastewater treatment by LWUA.

Table 2-143 Status of donor support (wastewater)

Year	Project name	Project summary	Areas covered
JICA			
2023	Masterplan Study on Comprehensive Wastewater Management	Development of a master plan for sewage management through sewerage and decentralized sewage treatment, as well as support for the preparation and implementation of feasibility studies and capacity strengthening of Davao City and relevant agencies.	Davao
2019	Septage management project for Metro Cebu Water District's service area	Construction of septage tank sludge treatment facilities, procurement of sludge collection vehicles and dewatered sludge trucks, consultancy services.	Cebu City
2018	Investigation into the feasibility of introducing technology to improve sewage treatment using Hinode Microbubble System (HMBS)	Conducted a study on the use of technology to improve sewage treatment using HMBS in areas with underdeveloped sewage systems, and on the feasibility of ODA projects to improve sewage treatment and commercialization of the technology for private commercial facilities.	Cagayan de Oro City
2016	Pilot survey for disseminating SME's technologies for applicability of dewatering equipment for septage management	Verification of the effects of long-term operation of sludge dewatering equipment. Technical guidance and support for building a management system for the continuous operation of the installed equipment. Organization of training courses and seminars in Japan.	Cebu
2016	Data collection survey for sewerage systems in west metro Manila	Selection of applicable sewerage plans and presentation of the technical options for the current low sewerage coverage in Metro Manila.	Metro Manila
2015	Data collection survey on drainage system in metro Manila	Project is to collect and confirm information on the development of drainage facilities in Metro Manila, including consideration of rapid commercialization	Metro Manil.

Year	Project name	Project summary	Areas covered
		of the project using Japanese underground tunnel technology (shield tunneling, propulsion, etc.).	
2015	Septage management program	Introduce sludge treatment technology, strengthen linkages with SME support schemes and yen loan projects, and collect necessary information and conduct F/S in anticipation of environmental development commercialization.	Caramba, Angeles
2014	Special assistance for project sustainability (SAPS) (for Cagayan de Oro city water district) for provincial cities water supply project phase III	Confirm the current state of Non-Revenue Water (NRW) Investigate the technical, institutional arrangement and financial situation of current NRW reduction activities Identify problems and challenges of current activities Formulate recommendations and appropriate measures to address each issue	Cagayan de Oro
2013	Technical assistance on water supply operation and management for metropolitan Cebu water district	Improvement programs in various areas such as water treatment, water distribution management, leakage control and customer service.	Cebu
2012	The study for improvement of water supply and sanitation in Metro Cebu	Proposal to facilitate the implementation of an action plan with water source development, water supply system improvement, customer management and institutional strengthening by the Cebu Metropolitan Water District.	Cebu
WB			
2020	Metropolitan Manila Wastewater Management Project	Improve wastewater services in selected sub-catchments of Metro Manila and surrounding areas	Metro Manila
2013	Manila Sewerage Project	Essential adjustments to administrative, institutional and regulatory practices and existing legislation Increasing the efficiency of the water pollution control bodies through improvements. Promotion of innovative and effective wastewater treatment technologies.	Metro Manila
ADB			
2014	Metro Manila Water and Sanitation Development Project	Preparation of Metropolitan Waterworks and Sewerage System's investments program in the medium and long term Preparation of a full feasibility study on the identified priority investment (Construction of aqueduct)	Metro Manila

Source: JICA, World Bank, Asian Development Bank et al

Table 2-144 Identified issues (urban environment sector)

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
Waste Management	<ul style="list-style-type: none"> GHG Emissions <ul style="list-style-type: none"> According to the 2010 Sectoral GHG Inventory Report, the waste sector, including wastewater treatment, is the fourth largest source of emissions after the energy, agriculture, and transportation sectors, accounting for 15% (15.559 Mt-CO₂e) of the national total amount. The waste management sector emitted 4.996 Mt-CO₂e, of which more than 90% was released as methane gas. GHG emission projections for the waste sector, including wastewater treatment (BAU scenario in NDC) <ul style="list-style-type: none"> In 2023, 24.9 Mt-CO₂e emissions In 2028, 27.6 Mt-CO₂e emissions 	<p><u>National Framework Strategy on Climate Change [Strategic priorities in the waste sector]</u></p> <ul style="list-style-type: none"> Strengthen implementation of the Ecological Solid Waste Management Act (RA9003) Promote best practices in waste management <p><u>National Climate Change Action Plan</u></p> <p>Enhanced waste segregation, waste collection, composting, and recycling at the source of waste</p> <p><u>National Development Plan</u></p> <ul style="list-style-type: none"> Effective waste management by LGUs through IEC (Information, Education, and Communication) activities <p><u>Issue</u> : Progress in effective solid and hazardous waste management hampered by low capacity of LGUs</p>	<ul style="list-style-type: none"> Development status of 10-year Solid Waste Management Plan <ul style="list-style-type: none"> Approximately 85% of the total, equivalent to 1,355 LGUs, have received approval from the DENR. However, many LGUs are expected to approach the renewal period in the future. Technical assistance and capacity development by the DENR <ul style="list-style-type: none"> Technical assistance and capacity development are provided to waste management officers of the LGUs during the formulation of the 10-year solid waste management plan. DENR's Investment Portfolio for Risk Resilience <ul style="list-style-type: none"> Preparation and development of solid waste management master plan <p><u>WB support</u>: DENR support project (policy, planning, environmental management, monitoring, and evaluation capacity strengthening support) was implemented in 2014, but the LGU waste management officer is not eligible.</p>	<p>(Policy, Capacity development)</p> <ul style="list-style-type: none"> <u>Limited number of waste management officers in LGUs and disconnection or loss of technical knowledge and local information</u> <ul style="list-style-type: none"> Less than 30% of all waste management officers have been appointed. In cases of officer turnover, there is a limited transfer of technical and regional knowledge, including region-specific waste management issues, information, and appropriate waste collection and disposal methods for the region. This leads to a disruption in the flow of knowledge products and the loss of intangible information. 	<ul style="list-style-type: none"> Promote the development of technical knowledge and knowledge product flow for waste management officers in DENR (central/regional) and LGUs. <ul style="list-style-type: none"> Sharing of technical knowledge to LGU waste management officers through courses and training. The establishment and localization of the knowledge product flow between the DENR (central/local) and waste management officers of LGUs.
		<p><u>National Framework Strategy on Climate Change [Strategic priorities in the waste sector]</u></p> <ul style="list-style-type: none"> Strengthen implementation of the Ecological Solid Waste Management Act (RA9003) Promote best practices in waste management Strengthening proper waste management through dialogue with the public and behavior modification to address climate change <p><u>National Climate Change Action Plan</u></p> <ul style="list-style-type: none"> Enhanced waste segregation, waste collection, composting, and recycling at the source of waste Regulation of the use of toxic packaging materials and disposable purposes <p><u>National Development Plan</u></p> <ul style="list-style-type: none"> Effective waste management by LGUs through IEC (Information, Education, and Communication) activities Proper waste disposal by residents 	<ul style="list-style-type: none"> Waste Zero Month Campaign by DENR <ul style="list-style-type: none"> Every January, a campaign is conducted advocating for Zero Waste Month, promoting a "circular economy" in the production and use of consumer products to reduce the quantity and harmfulness of generated waste. Metro Manila Development Authority (MMDA) Community-Based Waste Management Program <ul style="list-style-type: none"> Emphasizing community ownership, the Community-Based Solid Waste Management Program (CBSWMP) is operational in 42 barangays, aiming to alter residents' waste management behaviors and practices. LGU ordinance enactment <ul style="list-style-type: none"> Prohibition of non-segregated waste collection outlined in Article 48 of RA 9003 and the corresponding ordinances enacted by LGUs. <p><u>JICA support</u>: Under the Grassroots Technical Cooperation (Special Framework for Regional Revitalization) project, Kitakyushu City has been leading the implementation of a comprehensive waste treatment system, encompassing public awareness and environmental education, for the city of Davao since 2017.</p> <p><u>UNDP support</u>: Electronic Cash for Recyclable Waste project was launched in Quezon City in 2021. This initiative is anticipated to enhance residents' awareness of appropriate waste management, disposal, and recycling practices.</p>	<p>(Capacity development)</p> <ul style="list-style-type: none"> <u>Low level of interest of the Barangay/local population in waste management</u> <ul style="list-style-type: none"> A press release from a 2020 congressman reveals that 70% of barangays nationwide doesn't still adopt segregated waste collection. According to a survey conducted by the Commission on Audit, 88% of resident respondents were aware of their waste segregation obligations; however, 34% did not participate in waste management awareness programs organized by Barangays and LGUs. While residents are conscious of their segregation obligations, only a few comprehend the necessity for such segregation. <p>(Policy)</p> <ul style="list-style-type: none"> <u>No ordinance on waste segregation in LGUs</u> <ul style="list-style-type: none"> Out of 591 LGUs, waste segregation ordinances were not enacted in 71 LGUs, accounting for 12%. 	<ul style="list-style-type: none"> Promote public awareness and environmental education for LGU waste management officers and local residents. <ul style="list-style-type: none"> Implementation of management policies focused on waste separation and the 3Rs Conduct seminars for local residents on waste management and the 3Rs. Environmental education for local children.

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
		<p><u>National Framework Strategy on Climate Change [Strategic priorities in the waste sector].</u></p> <ul style="list-style-type: none"> ➢ Strengthen implementation of the Ecological Solid Waste Management Act (RA9003) ➢ Promote best practices in waste management <p><u>National Climate Change Action Plan</u> Enhanced waste segregation, waste collection, composting, and recycling at the source of waste</p> <p><u>National Development Plan</u></p> <ul style="list-style-type: none"> ➢ Proper waste disposal by residents ➢ Clustering of LGUs for further appropriate operation of joint waste facilities, including the establishment of materials recovery facilities. 	<p>Status of resource recovery facility installations and the financial assistance provided by the DENR for their establishment</p> <ul style="list-style-type: none"> ➢ As of 2022, the installation rate remains at 40%. ➢ Financial assistance is provided to LGUs/barangays to establish materials recovery facilities for recyclable and reusable resources (paper, cardboard, glass, aluminum, tinsplate, plastic containers, etc.), but 60% of barangays nationwide have not established materials recovery facilities. <ul style="list-style-type: none"> • DENR's Investment Portfolio for Risk Resilience <ul style="list-style-type: none"> ➢ Construction of materials recovery facilities 	<p>(Capacity development and Finance)</p> <ul style="list-style-type: none"> • <u>Nationwide shortage of materials recovery facilities</u> <ul style="list-style-type: none"> ➢ There are barangays facing challenges in securing land for materials recovery facilities, and they are not provided establishment funds by the LGUs due to limited financial support from the DENR-EMB grant. Priority is given to LGUs/barangays that meet the requirements, such as securing operational funds post-installation, land use, and possessing technical know-how on installation and operation procedures, are prioritized. 	<p>Appropriate solid waste management will be carried out through collaboration between residents and municipalities.</p> <ul style="list-style-type: none"> ➢ Provide training to LGU staff on waste collection, segregation, recycling and reuse by Japanese municipalities/NGOs/citizen groups. ➢ Study of clustering of LGUs and implementation of pilot projects. ➢ Investigation into LGUs without ordinances on waste segregation, and considerations for ordinance enactment and compliance.
		<p><u>National Framework Strategy on Climate Change [Strategic priorities in the waste sector].</u></p> <ul style="list-style-type: none"> ➢ Strengthen implementation of the Ecological Solid Waste Management Act (RA9003) ➢ Promote best practices in waste management <p><u>National Climate Change Action Plan</u> Enhanced waste segregation, waste collection, composting, and recycling at the source of waste</p> <p><u>National Development Plan</u> Clustering of LGUs for further appropriate operation of joint waste facilities.</p>	<p>Waste diversion status</p> <ul style="list-style-type: none"> ➢ National waste diversion rate was 46% in 2000. <ul style="list-style-type: none"> • Establishment of waste diversion rate targets by LGUs <ul style="list-style-type: none"> ➢ In accordance with RA 9003, each Local Government Unit (LGU) is obligated to achieve a waste diversion rate of at least 25% in their 10-year solid waste management plan. This rate represents the percentage of waste diverted from conventional landfill disposal through activities under the 3R (Reduce, Reuse, Recycle) approach. After the initial five years following the enforcement of RA 9003 in 2006, LGUs were required to update their diversion rate targets every three years. PDP setting a target of 75% for 2021. • DENR's NDC Policy and Measures (PaMs) and Investment Portfolio for Risk Resilience <ul style="list-style-type: none"> ➢ Composting of organic waste ➢ Construction of bio-composting facility • DENR enforces "Waste-to-Energy Guidelines" through department orders. <ul style="list-style-type: none"> ➢ Promotion of waste-to-energy project plans in Davao City. <p><u>JICA support:</u> Capacity-building projects for proper waste management, incorporating advanced technologies for waste diversion, are underway in Quezon City, Cebu City, and Davao City. Additionally, the World Bank is actively executing a methane recovery project. In 2019, the Asian Development Bank initiated a waste value-added project focusing on waste diversion. Furthermore, in Legazpi City, a project involving a feasibility study and a dissemination/demonstration project for a sustainable organic waste composting system is currently being implemented.</p>	<p>[Policy, Capacity development, Finance, Technology].</p> <ul style="list-style-type: none"> • <u>Low waste diversion rate</u> <ul style="list-style-type: none"> ➢ PDP had a target of 75% for 2021, which was not reached (46.6%). ➢ The issue of financial and technical shortages within LGUs is one factor, but another contributing factor is the low priority for waste management measures in general within LGUs due to the limited capacity of waste management officers. • <u>High barriers to entry for waste-to-energy facilities</u> <ul style="list-style-type: none"> ➢ Comprehensive planning, including evaluation, construction, operation, and closure, along with obtaining various certifications, is necessary. ➢ Environmental and social considerations such as opposition from nearby residents and NGOs against waste incineration, as well as issues related to site location and surrounding land use patterns. ➢ Political challenges including the stance of governors or mayors towards the project, limitations due to terms of up to nine years, and timing concerning elections. 	<p>Capacity development for DENR (central/regional) and LGU waste management officers to improve intermediate waste treatment capacity.</p> <ul style="list-style-type: none"> ➢ Provide training on waste segregation/composting, potential for their market development and recycling. ➢ Exploration of the feasibility of introducing waste-to-energy facilities, considering legal frameworks. ➢ Technology will be provided by Japanese companies. ➢ Study of clustering of LGUs and implementation of pilot projects.

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
		<p><u>National Framework Strategy on Climate Change [Strategic priorities in the waste sector]</u></p> <ul style="list-style-type: none"> ➢ Strengthen implementation of the Ecological Solid Waste Management Act (RA9003) ➢ Promote best practices in waste management <p><u>National Climate Change Action Plan</u></p> <p>Closure of open dumping sites</p> <p><u>National Development Plan</u></p> <p>Clustering of LGUs for further appropriate operation of joint waste facilities, including the establishment of sanitary landfill sites</p>	<p>Final disposal site status</p> <ul style="list-style-type: none"> ➢ There are 299 operational sanitary landfill disposal sites nationwide, with 675 LGUs having access to them, which is just over 40% of all LGUs. <ul style="list-style-type: none"> • Declaration of Open Dumping Site Closure by DENR <ul style="list-style-type: none"> ➢ DENR declared the achievement of closing all open dumping sites nationwide in May 2021. • DENR's NDC PaMs and IPRR <ul style="list-style-type: none"> ➢ Development of organic waste management system ➢ Site suitability study and construction of a sanitary landfill ➢ Development of a solid waste management master plan ➢ Methane flaring in landfill ➢ Methane recovery from sanitary landfills ➢ Use of eco-efficient soil cover <p><u>Private sector support:</u> In the 2020s, private sector-led waste treatment facility construction projects are underway. (2023, Waste Treatment Facility Expansion Project: Cebu City, The Hongkong and Shanghai Banking Corporation) (2023, Integrated Waste Treatment Facility Construction Project: Lapu-Lapu City, Philippine Development Bank)</p>	<p>[Capacity development, Finance, Technology].</p> <ul style="list-style-type: none"> • <u>National shortage of sanitary landfill sites</u> <ul style="list-style-type: none"> ➢ While financial difficulties within LGUs and the challenge of non-succession of technology during the turnover of waste management officers are factors, another contributing factor is the presence of LGUs (e.g., island regions, steep areas, protected areas) facing land constraints and geological limitations (such as limestone). Many of these LGUs are unable to meet the conditions specified in the current siting criteria for establishment of sanitary landfill site. 	<ul style="list-style-type: none"> • Capacity strengthening and technical assistance will be provided to DENR (central/regional) and LGU waste management officers on improving final disposal site capacity. <ul style="list-style-type: none"> ➢ Provide technical assistance (master plans, preparation of design standards and specifications, etc.). ➢ Conduct training on final disposal site management. ➢ Study of clustering of LGUs and implementation of pilot projects. ➢ Exploration of potential improvements to sanitary landfill siting criteria.
Wastewater	<ul style="list-style-type: none"> • GHG Emissions <ul style="list-style-type: none"> ➢ According to the 2010 Sectoral GHG Inventory Report, the waste sector, including waste management, is the fourth largest source of emissions after the energy, agriculture, and transportation sectors, accounting for 15% (15.559 Mt-CO₂e) of the national total. ➢ The wastewater treatment sector emitted 10.56 Mt-CO₂e, of which more than 90% was methane gas. • GHG emission projections for the waste sector, including waste management (BAU scenario in NDC) <ul style="list-style-type: none"> ➢ In 2023, 24.9 Mt-CO₂e emissions ➢ In 2028, 27.6 Mt-CO₂e emissions 	<p><u>National Climate Change Action Plan</u></p> <ul style="list-style-type: none"> ➢ Research and adoption of centralized wastewater treatment systems to improve water quality in highly urbanized cities ➢ Gaps and needs assessment in the implementation of the Clean Water Act and the National Sewerage and Septic Sewage Management Plan <p><u>National Sewerage and Septage Management Program (NSSMP)</u></p> <ul style="list-style-type: none"> ➢ By 2020, all LGUs will develop septic tank management systems, and 17 advanced cities will develop sewer systems. ➢ By 2020, about 43.6 million people will have access to septic tank treatment facilities and 3.2 million people will have access to sewage treatment facilities. ➢ By 2020, PHP 26.3 billion has been invested in sanitation improvement projects ➢ By 2020, about 346 million kg of BOD is diverted from the environment per year as a result of the sewerage and septage management projects. 	<ul style="list-style-type: none"> • Status of Sewerage and Septage Management <ul style="list-style-type: none"> ➢ In Metro Manila, Manila Water and Maynilad have entered into concession agreements with MWSS. Sewerage coverage area, based on population ratio, for the combined operations of the two companies is 25.78%, and the coverage area of septage facilities is 82.36%. ➢ For areas outside the Metro Manila, only Zamboanga City has received national subsidies for sewerage or septage projects under NSSMP. In 2021, the city conducted a feasibility study for the construction of a sludge treatment plant. • Technical and financial assistance from DPWH <ul style="list-style-type: none"> ➢ Through the implementation of preparatory studies and consulting services at DPWH's expense, 16 LGUs are in the process of applying for national subsidy under the NSSMP. • Technical and financial assistance from LWUA <ul style="list-style-type: none"> ➢ Feasibility studies funded by NEDA were conducted in 15 areas below the second level. • DENR's NDC PaMs and IPRR <ul style="list-style-type: none"> ➢ Expansion of septic tanks and sewage treatment facilities in highly urbanized city and other cities outside the Manila Bay area for use of NSSMP subsidy ➢ Construction of wastewater treatment facilities <p><u>JICA support:</u> A master plan for the sewerage system in Davao City is currently in preparation. Simultaneously, feasibility studies are underway for the development of sewage infrastructure in Baguio City and the introduction of sewage treatment improvement technology in Cagayan de Oro City.</p>	<p>[Capacity development, technology, funds].</p> <ul style="list-style-type: none"> • <u>Low capacity and funding for implementation of sewerage and septage management projects in LGUs and LWDs</u> <ul style="list-style-type: none"> ➢ The 1,163 LGUs categorized as second-class or below, falling outside the scope of the NSSMP, tend to have lower policy priority. This has led to the absence of master plans in the field of sewerage and septage, as well as design standards and specifications for sewerage systems and treatment facilities. ➢ Within the budget approval process of the Department of Budget and Management (DBM), there is a tendency to prioritize LGUs/LWDs in metropolitan areas such as Manila and Cebu, as well as those affecting water quality in Manila Bay. This often results in a more challenging approval process for LGUs/LWDs outside of these areas. 	<ul style="list-style-type: none"> • Domestic wastewater treatment (facilities) will be improved. <ul style="list-style-type: none"> ➢ Conduct training on decentralized and centralized wastewater treatment systems and Johkaso treatment for capacity development of LWUA, LGU, and LWD officers. ➢ Provide technical assistance (master plans, preparation of design standards and specifications, etc.). ➢ Study and pilot project for clustering of LGUs/LWDs.

Sub Sector	Climate change status and sector status	Related sectoral policies	Status of climate countermeasures and donor support	Identified issues	Direction of possible support to resolve the identified issues
			<u>WB support:</u> In Metro Manila in 2020, a project aimed at enhancing wastewater services in selected sub-catchments within Metro Manila and its surrounding areas was initiated.		

Source: JICA Survey Team

2.2.10 Disaster Risk Reduction

(1) Sector Landscape

1) Sector status and climate change impacts

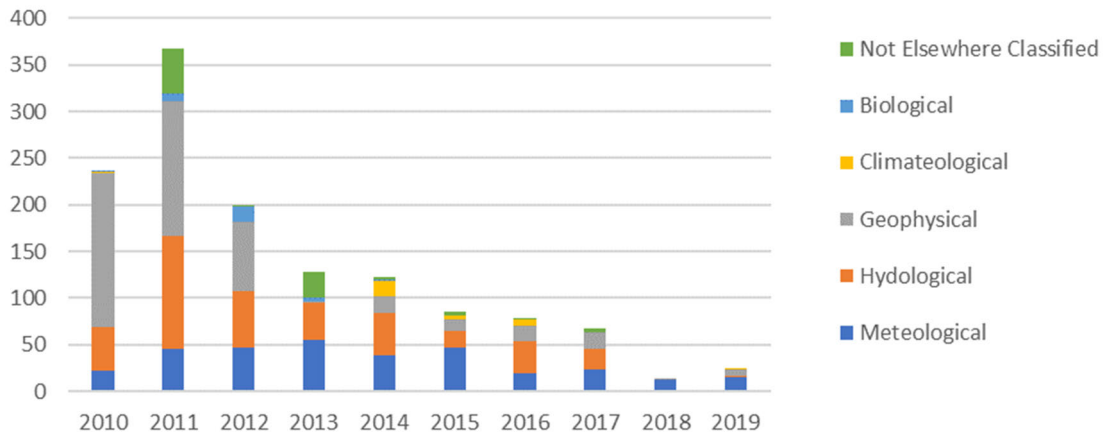
According to the Philippine Statistics Authority (PSA), the damages incurred due to extreme natural events and disasters amounted to PHP 462.58 billion from 2010 to 2019. It was also recorded a total 12,097 deaths due to natural disasters for the same periods. Comparing to the damage caused by human induced disasters such as building fires and armed conflicts, the damage caused by natural disasters was approximately 50 times that amount, with an average of approximately 1,500 people killed or missing each year. Approximately 10 million people have been affected by the disaster.

Table 2-145 Damage caused by natural disasters in the Philippines from 2010 to 2019

Type of disaster	Casualties (person)				Damaged Houses		Damage (Php million)
	Dead	Injured	Missing	Affected persons	Total	Part	
Meteorological	10,974	42,268	2,612	89,490,959	1,302,655	4,364,491	401,422
Hydrological	117	2	1	610	85	136	423
Geophysical	778	2,724	76	4,238,159	55,289	148,269	7,035
Climatological	6	-	-	9,395,531	-	-	51,003
Biological	125	-	-	-	-	-	0.14
Not Elsewhere Classified	97	-	-	-	-	-	2,693
Total	12,097	44,994	2,689	103,125,259	1,358,029	4,512,896	462,576.9

Source: PSA

A total of 1,322 natural disasters are recorded in the Office of Civil Defense (OCD) database, of which 35% are earthquakes and volcanic activity, 29% are floods and storm surges, and 25% are abnormal rainfall caused by seasonal winds such as typhoons and monsoons. The annual number of natural disasters is on the decline, as shown in the figure below.



Source: Asia Disaster Reduction Center

Figure 2-80 Occurrence of natural disasters in the Philippines from 2010 to 2019

Since 2010, approximately 15,000 people have died or missing due to natural disasters, and approximately 100 million people have been affected.

The breakdown of the causes of deaths was 92%, including abnormal rainfall caused by typhoons and monsoons, as well as floods and storm surge disasters. Furthermore, 87% of the population affected by disasters was due to abnormal rainfall caused by typhoons and monsoons, and approximately 9% was due to drought damage caused by El Niño.

Of all the natural disasters in the past 10 years, Typhoon Yolanda in 2013 caused the most significant damages.

2) Climate Change Impacts in the Disaster Risk Reduction Sector

As mentioned above, by the end of the 21st century, temperatures are projected to continue to rise by about 1-2°C, rainfall will not change significantly but will increase in variability and intensity, and extreme weather events will increase in intensity and frequency.

The Philippine National Panel of Technical Experts (NPTE) has identified the risks the Philippines faces from climate change as rising sea levels, coastal erosion, flooding, increased frequency and severity of typhoons, extreme droughts, rising temperatures and urban heat index, extreme rainfall, infectious diseases, changing wind patterns, and biodiversity loss. It is expected that damage caused by weather disasters will continue.

3) General challenges of the disaster risk reduction sector

Disaster prevention is positioned as an important cross-sectoral issue in the country's long-term vision for the year 2040, the AmBisyon Natin 2040 Program, and in the medium-term development plan PDP2023-2028 for the next five years.

According the Data Collection Survey for Strategy Development of Disaster Risk Reduction and Management Sector in the Republic of the Philippines in 2017 supported by JICA, the following disaster risks were pointed out, as a result of analyzing the history of natural disasters in recent years.

- Many assets in metropolitan areas and densely populated cities are exposed to disasters.
- The number of damage per capita is higher in regions where more typhoons pass through (II, CAR, etc.).
- There is a strong correlation between the strength of the typhoon and the number of people affected.
- Excluding the damage caused by the Yolanda disaster, human casualties and damage to properties are scattered throughout the Philippines.
- Regions that are relatively underdeveloped are often affected by even small-scale disasters.

Current status of policies and plans that are basis of the sectoral climate change initiatives are shown below.

(2) Related Policies and Plans

This section illustrates key policies and plans on Disaster Risk Reduction in the Philippines.

1) Republic Act 10121 Strengthening the Philippine Disaster Risk Reduction and Management System

The Philippines Disaster Risk Reduction and Management Act (RA10121) was enacted in May 2010. To implement comprehensive disaster risk management that includes not only conventional post-disaster response but also prevention and mitigation, the law established a basic framework based on a coherent, comprehensive, integrated and proactive approach to Disaster Risk Reduction and Management (DRRM). This provides for the National Disaster Risk Reduction and Management Framework and institutionalizing the National Disaster Risk Reduction and Management Plan, appropriating funds and for other purposes.

The DRRM Act intends to:

- Reorganize National Disaster Risk Reduction and Management Council (NDRRMC) which is the highest decision-making body on Disaster Risk Reduction and Management,
- Develop National Disaster Risk Reduction and Management Plan (NDRRMP), and
- Establish Local Disaster Risk Reduction and Management Office (LDRRMOs) in LGUs.

2) National Disaster Risk Reduction and Management Plan 2020-2030

As national level of the National Disaster Risk Reduction and Management (DRRM), the National Disaster Risk Reduction and Management Plan (NDRRMP) was developed in 2011 and updated in 2019.

The Updated NDRRMP establishes the linkage between disaster risk reduction and management (DRRM), climate change adaptation (CCA), and human security by focusing on climate and disaster risks. It aims to achieve the shared goals of Ambisyon Natin 2040, NDRRMP, NCCAP, and National Security Strategy (NSS) in risk reduction, resilience building, human security, and sustainable development.

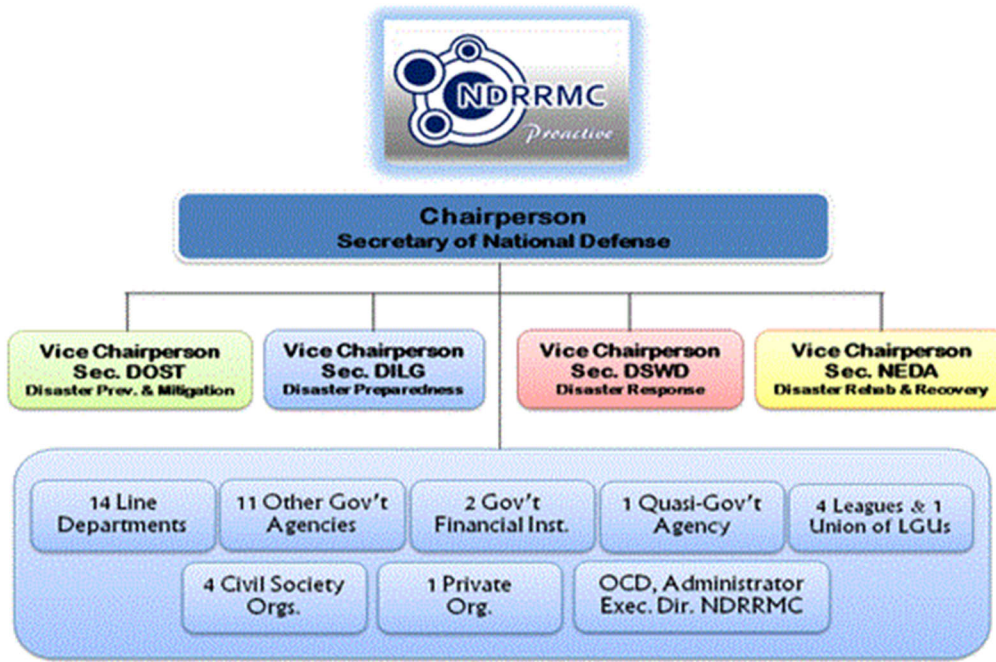
(3) Status of Climate Action Implementation

1) Implementation Structure

The National Disaster Risk Reduction and Management Council (NDRRMC), chaired by the Secretary of Department of National Defense and administrated by the Office of Civil Defense (OCD) for the national level, and have been newly established under RA10121. The vice-chair agencies, such as DOST, DILG, DSWD and NEDA, have been also designated in the council and mandated to promote their responsible DRRM activities including activities described in NDRRMP.

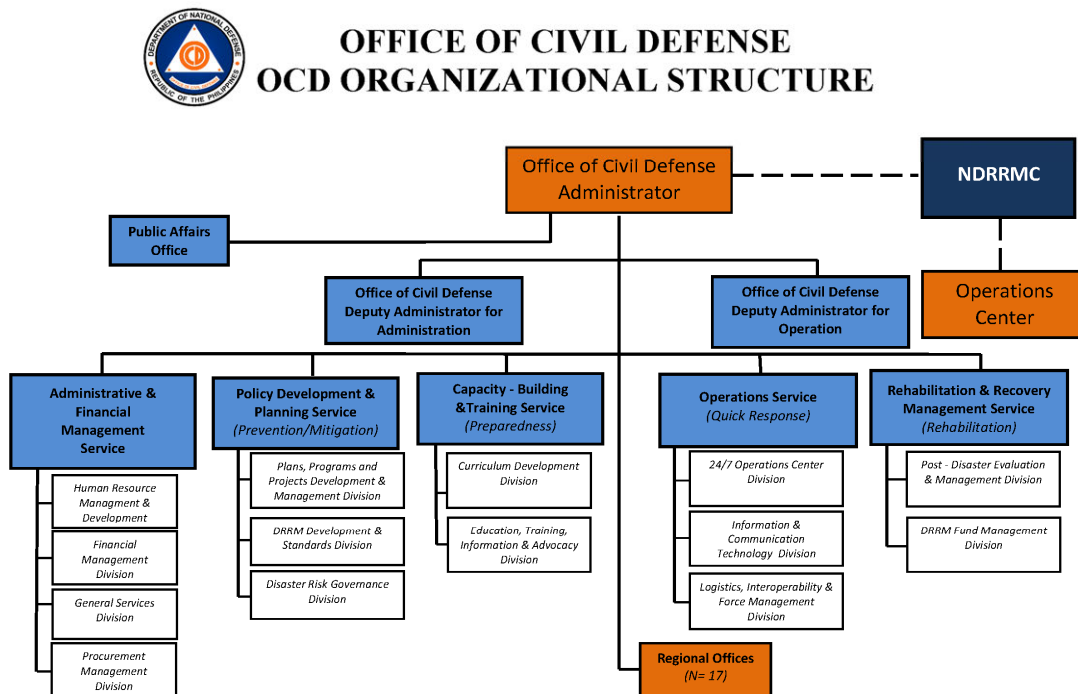
NDRRMC, being empowered with policy-making, coordination, integration, supervision, monitoring and evaluation functions, shall carry out 17 responsibilities as stipulated in the law. The NDRRMC Chairperson may call upon other instrumentalities or entities of the government and nongovernment and civic organizations for assistance in terms of the use of their facilities and resources for the protection and preservation of life and properties in the whole range of disaster risk reduction and management. This authority includes the power to call on the reserve force as defined in Republic Act No. 7077 to assist in relief and rescue during disasters or calamities.

The Office of Civil Defense (OCD), as the implementing arm of the National Disaster Risk Reduction and Management Council, shall have the primary mission of administering comprehensive national civil defense and disaster risk reduction and management program by providing leadership in the continuous development of strategic and systematic approaches as well as measures to reduce the vulnerabilities and risks to hazards and manage the consequences of disasters.



Source: Asia Disaster Reduction Center

Figure 2-81 Organization chart of National Disaster Risk Reduction and Management Council (NDRRMC)



Source: DND-OCD

Figure 2-82 Organization chart of the Office of Civil Defense (OCD)

The OCD is appointed as the Secretariat of the NDRRMC, which is the central and leading organization for DRRM activities in the Philippines under the DRRM Act. OCD is mandated to implement and promote various DRRM activities, not only post disaster emergency response but also disaster prevention and mitigation. Consequently, OCD is facing many challenges for strengthening the capacity of its organization and human resources.

JICA has supported the strengthening of the capacity of OCD as lead agency in the NDRRMC through the continuous dispatch of long-term experts and the implementation of the “Disaster Risk Reduction and Management Capacity Enhancement Project 2012-2015 (phase 1)”, which is implemented to coordinate with other related agencies of national DRRM planning and disaster responses at the national level was enhanced as well as the DRRM’s efforts in the Philippines. However, there are still many challenges such as the development of DRRM activities at the level of LGUs and strengthening of the monitoring system at the national level. Currently JICA supports OCD through the implementation of the “Disaster Risk Reduction and Management Capacity Enhancement Project (phase 2)” to further strengthen the implementation and coordination capabilities of OCD involving other related agencies and promote DRRM activities in LGUs.

2) Climate-related budgets

RA10121 established a disaster fund on the national level, called National Disaster Risk Reduction Management Fund (NDRRMF), which shall be used for disaster risk reduction or mitigation, prevention and preparedness activities. It can also be utilized for relief, recovery and reconstruction efforts that address the impact of calamities that occurred during the budget year or disasters that happened two years prior to the budget year. Quick Response Fund is also appropriated to serve as a stand-by fund to be used for relief and rehabilitation programs and projects in order that the situation and living conditions of people in communities or areas stricken by disasters, calamities, epidemics, or complex emergencies, may be normalized as quickly as possible.

RA10121 likewise mandated local governments to fund its DRRM activities from the following sources (herein referred as LDRRMF):

- At least five percent of their estimated revenue from regular sources to support DRRM activities;
- Unexpended balance of the LDRRMF in the preceding years within the five year validity period of the Special Trust Fund;
- Fund transferred from the NDRRMF upon the approval of the President; and
- Fund received from other LGUs and other sources

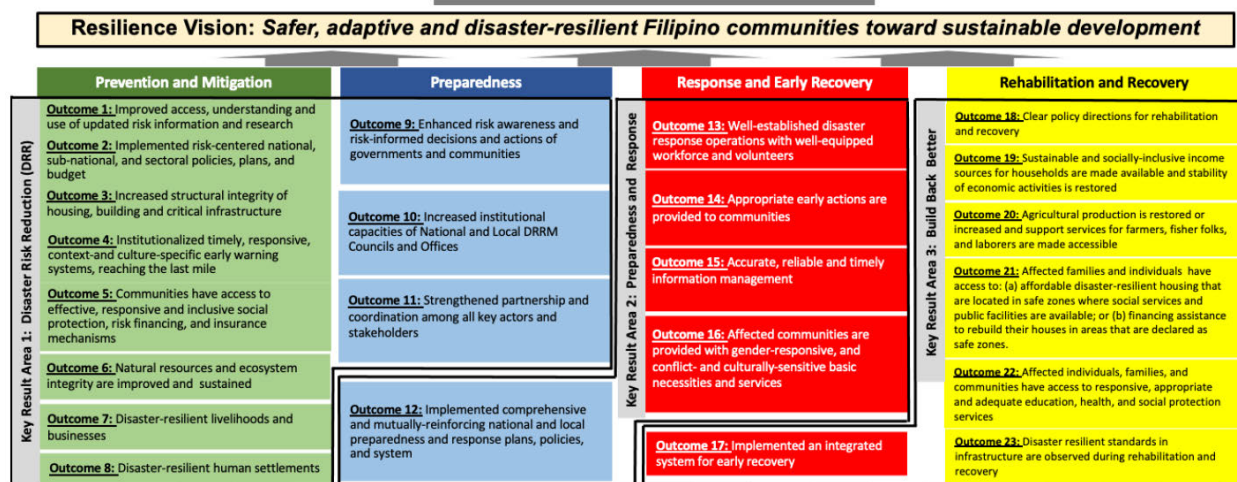
Preparation of LDRRMF and its conformity with the usage of LDRRMF are necessary for using LDRRMF.

The JICA-funded survey titled “Data Collection Survey for Strategy Development of Disaster Risk Reduction and Management Sector in the Republic of the Philippines ” was conducted in 2017 and pointed out that a major part of NDRRMF was used for the rehabilitation and recovery from major disasters such as the disaster caused by Typhoon Yolanda. As for LDRRMF, most of the vulnerable LGUs save the budget for emergency situations without using the budget for pre-disaster investment.

3) **DDR-CCA Planning**

As a national level plan on DRRM, there is the National Disaster Risk Reduction and Management Plan (NDRRMP, 2020-2030) in the Philippines. As a middle-term plan for 2030, in the four phases of the DRRM cycle, 23 outcomes, 50 outputs and 206 activities are described with their implementing agencies. Currently, the related agencies are implementing the activities in the plan based on their responsibility. Each agency reports its activities every quarter and OCD compiles them.

The Updated National Disaster Risk Reduction and Management Plan of the Philippines



23 outcomes, 50 outputs, 206 activities

locally-grounded and contextualised, globally aligned and responsive

Source: NDRRMP

Figure 2-83 The Summary of National Disaster Risk Reduction and Management Plan 2020 – 2030

As for the local level plans, a LDRRMP is formulated by all LGUs based on RA10121 and LDRRMP is the basis to use the LDRRMF. OCD is supporting LGUs to formulate LDRRMP by the preparation of guidelines and implementation of awareness activities for LGUs. DILG is also supporting LGUs to formulate LDRRMP together with the preparation of the Comprehensive Land Use Plan (CLUP). Through these efforts, almost all LGUs have formulated their own LDRRMPs.

Regarding the contents of LDRRMP, OCD has formulated a checklist based on the guideline, and DILG is establishing the evaluation system of LGU’s activities including the evaluation of LDRRMP. The national government tries to improve the contents of LDRRMP by these activities.

Through the on-going project titled “Disaster Risk Reduction and Management Capacity Enhancement Project Phase 2” supported by JICA, the Regional Disaster Risk Reduction Management Plan (RDRRMP)/ Local Disaster Risk Reduction Management Plan (LDRRMP) Formulation Guidebooks were consolidated.

4) Major Activities on Prevention and Mitigation

According to RA 10121, the DOST is the overall lead agency for disaster prevention and mitigation activities as Vice-Chairperson for disaster prevention and mitigation in the NDRRMC. The DOST works closely with the OCD and various government agencies and stakeholders to ensure that the outcomes, outputs and activities under the disaster prevention and mitigation pillar are achieved. Specifically, DOST plays a key role in providing oversight for the generation and dissemination of science-informed disaster and climate risk information to all sectors and levels, and the horizontal and vertical integration of DRRM-CCA in policy, planning and budgeting, among others.

The goal of the Disaster Prevention/ Mitigation in NDRRMP 2020-2030 is to address current and reduce future risks of communities and government through mainstreaming integrated risk management into science, policy and practice. Objectives include the improvement of access, understanding, and use of updated risk information, DRR-related statistics, and research; application of integrated risk management assessment tools; institutionalization of timely, responsive, context- and culture-specific early warning systems; and disaster-resilient human settlements, etc.

Climate and Hazard Information and risk assessment

As one of the mandates of the NDRRMC, a Disaster Risk Reduction and Management Information System and Geographic Information System-based national risk map as policy, planning and decision-making tools should be developed, updated and shared. In line with this article (RA10121, Section 6 (d)), agencies and organizations related to the DRRM activities in the Philippines have conducted a wide variety of hazard and risk assessments. Those achievements are summarized in the table below.

Table 2-146 Efforts and Achievements on Hazard/Risk Assessment in the Philippines

Implementing Agency	Description
DOST-PAGASA	Hold and provide historical climate data and statistics, climate monitoring/assessments (e.g. EWS of Tropical Cyclone), climate and ENSO Advisories, sub seasonal, seasonal forecasts, farm weather forecasts and climate projections
DOST-PILVOCS	Provide Geological hazard maps (e.g. earthquake, active fault, earthquake induced landslide, liquefaction, tsunami)

Implementing Agency	Description
	Hold GeoRiskPH ⁹⁸ , Rapid Earthquake Damage Assessment System (REDAS) ⁹⁹ , and lead coordinator of the READY Project hazard mapping
DENR-NAMRIA	Provision of topographic base maps, sea level rise susceptibility Data link with GeoPortalPH ¹⁰⁰
DENR-MGB	Provision of geological and Susceptibility hazard maps (flood and land slide)
DOST-ASTI and University of the Philippines Resilience Institute (UPRI)	Provide the floods, landslides, and storm surges hazard maps developed by Project NOAH (Nationwide Operational Assessment of Hazard) ¹⁰¹ Project NOAH seeks to be the country's primary disaster risk reduction and management program. Initially developed and hosted by DOST from 2012 to 2017, UPRI now manages the platform as part of their mission to be an information hub that aids the country with its climate change mitigation and adaptation initiatives.
DND-OCD	Hold National Loss and Damage Registry (NLDR), PhilAware

Source: JICA Survey Team

Early Warning System

As for monitoring and early warning systems, the systems for floods, sediment disasters, volcano, earthquake and tsunami have been established mainly by DOST-PAGASA and Department of Science and Technology Philippine Institute of Volcanology and Seismology (DOST-PHIVOLCS).

Table 2-147 Examples of early warning systems in the Philippines

Implementing Agency	Description
DOST-PAGASA	Weather & Flood Forecasting System <ul style="list-style-type: none"> • Location and intensity of the typhoon through PTV 4, PAGASA's website, Twitter and Facebook accounts and through SMS was issued hourly . • Flood Early Warning Systems have been installed in major river basins • Flood Forecasting and Warning System for Dam Operation (FFWSDO) for the telemetered Angat, Pantabangan, Ambuklao/Binga/San Roque and Magat dams/catchments.
DOST-PHIVOLCS	Tsunami Early Warning System (TeWS) <ul style="list-style-type: none"> • Tsunami Early Warning System (TeWS) is intended for providing quick and timely warning to coastal communities that are vulnerable to tsunami

Source: JICA Survey Team

The National Disaster Risk Reduction and Management Operations Center (NDRRMOC) serves as a central command center during disasters and monitor disasters that are occurring or will occur for some time to come.

It also plays the role of disseminating disaster-related information such as advisories, warnings, and disaster situation reports. It is operated on a 24/7 basis. NDRRMOC coordinates and collaborates with National Disaster Risk Reduction and Management Council (NDRRMC) member agencies, regional DRRMCs, local DRRMCs, and other stakeholders.

⁹⁸ <https://georisk.gov.ph/>

⁹⁹ <https://www.phivolcs.dost.gov.ph/index.php/information-tool/redas>

¹⁰⁰ <https://www.geoportal.gov.ph/>

¹⁰¹ <https://noah.up.edu.ph/>

5) **Major activities on preparedness**

According to RA 10121, the DILG, as Vice-Chairperson for disaster preparedness in the NDRRMC, is the overall lead for disaster preparedness interventions and activities at the national level. As the focal agency for this thematic pillar, DILG works closely with the OCD and various government agencies and stakeholders to ensure that the identified outcomes under disaster preparedness are realized. Specifically, DILG plays a fundamental role in facilitating synergy of activities and strategies designed for communities, local government, CSOs, private sector, and other relevant stakeholders in at-risk areas to effectively anticipate, avoid, respond to, and recover from disasters.

The goal of the Disaster Preparedness in NDRRMP 2020-2030 is to establish and strengthen capacities of governments, communities, CSOs, and private sector to anticipate, cope, and recover from the adverse impacts of hazards and potential cascading disasters, and minimize losses and disruption of daily life. Objectives are described as follows.

- Enhanced risk awareness and risk-informed decisions and actions of governments and communities
- Increased institutional capacities of National and Local DRRM Councils and Offices
- Strengthened partnership and coordination among all key actors and stakeholders
- Implemented comprehensive and mutually-reinforcing national and local preparedness and response plans, policies, and system

Capacity Development on DRRM

RA10121 puts importance on the capacity enhancement and human resources development of government officers including LGU officers and defines to establish the DRRM Training Institute (DRRM-TI). Through the project titled “Disaster Risk Reduction and Management Capacity Enhancement Project Phase 1” supported by JICA, a draft National DRRM and Civil Defense Education and Training Plan was developed and the policies and modules of human resources development for OCD and Local Disaster Risk Reduction and Management Officers have been formulated. OCD has formulated guidelines and training programs to implement Community-Based DRRM activities for the capacity enhancement of community people.

The Local Government Academy (LGA) of DILG is conducting a training session for LGU officers, and recently LGA has been implementing training on DRRM-CCAM. DILG has also formulated LCCAP Formulation Guidebooks and conduct training sessions in cooperation with CCC.

Through the data collection in this survey, DILG pointed out their challenge on capacity of LDRRM Offices to promote DRRM-CCAM activities at the level of LGUs. LDRRM Officers as critical personnel at the LGU level, but their offices remain lean and bereft of adequate manpower complement to support/fulfill its bloated mandate. DILG also pointed out that the process of LDRRMP development is already clarified with

the abundance of planning guidebooks and tools, however, it is difficult for LGUs to identify feasible solutions to the problems being observed during the planning process. DILG mentioned that this may be one of the primary reasons that led to the underutilization of the LGU’s LDRRMF.

6) Major activities on response

According to RA 10121, the DSWD, as Vice-Chairperson for disaster response in the NDRRMC, is the overall lead for the pillar’s interventions and activities at the national level. As the focal agency for this thematic pillar, DSWD works closely with the OCD and various government agencies and stakeholders to ensure that the identified outcomes under the pillar are realized.

The goal of the Disaster Response in NDRRMP 2020-2030 is to provide risk based, timely and anticipatory response actions to address basic, life preservation and immediate needs of communities and government. Also, affected communities/ populations are able to continue life with dignity and prevent or minimize exacerbation of emergency situations.

Preparation of National Disaster Response Plan (NDPR)

Three NDRPs were developed and published by the NDRRMC covering: hydro-meteorological hazards; earthquake and tsunami; and, consequence management and terrorism-related incidents. The NDRP aims to ensure the timely, effective and coordinated response by the national government including its instrumentalities by providing support assistance to the areas that will be affected by said hazard events. The NDRP acknowledges and supports the principles of the Local Government Code (RA 7160) wherein all LGUs are mandated to prepare and render response for all eventualities of disaster within their boundaries.



Source: NDRRMP

Figure 2-84 National Disaster Response Plans

7) **Major activities on disaster rehabilitation and recovery**

According to RA 10121, NEDA is the overall lead for disaster rehabilitation and recovery activities as Vice-Chairperson for disaster rehabilitation and recovery in the NDRRMC. NEDA works closely with the OCD and various government agencies and stakeholders to ensure that the outcomes, outputs and activities under the disaster rehabilitation and recovery pillar are achieved. Specifically, NEDA plays a key role in providing oversight to the activities on the development and implementation of rehabilitation and recovery programs.

The goal of the Disaster Rehabilitation and Recovery in NDRRMP 2020-2030 is to speed up recovery from disaster losses through rehabilitation and recovery programs that are aligned to sustainable development and “build back better” principle.

Among the Infrastructure Flagship projects promoted by the Philippine government, 12 are on-going or in preparation for flood countermeasures or water resource management. Of these, 11 are receiving support from overseas donors, five are in progress, including three with JICA support, two have been approved, and four are in preparation.

Table 2-148 The list of the Infrastructure Flagship projects related to flood control

PROJECT TITLE	SECTOR	IMPLEMENTING AGENCY	INDICATIVE PROJECT COST (IN PHP B)	FUND SOURCE	DEVELOPMENT PARTNER (IF ODA)	REGION/S	TARGET YEAR OF COMPLETION	STATUS / MILESTONE
Ambal Simuay River and Rio Grande de Mindanao River Flood Control and Riverbank Protection Project	Water Resources	DPWH	39.22	ODA	China	BARMM	2027	Approved for implementation
Cavite Industrial Area Flood Risk Management Project	Water Resources	DPWH	9.89	ODA	Japan	IV-A	2027	Ongoing
Central Luzon - Pampanga River Floodway Control Project	Water Resources	DPWH	115.05	ODA	TBD	III	Beyond 2028	Under project preparation
Davao City Flood Control and Drainage Project	Water Resources	DPWH	41.72	ODA	Japan	XI	Beyond 2028	Under project preparation
Flood Risk Improvement and Management Project for Cagayan De Oro River (FRIMP-CDOR)	Water Resources	DPWH	12.54	ODA	Japan	X	2024	Ongoing
Integrated Disaster Risk Reduction and Climate Change Adaptation (IDRR-CCA) Measures in the Low-Lying Areas of Pampanga Bay Project	Water Resources	DPWH	7.57	ODA	Korea	III	2024	Ongoing
Integrated Flood Resilience and Adaptation (InFRA) Project - Phase I	Water Resources	DPWH	20.02	ODA	ADB	CAR, BARMM, I, X, XI	Beyond 2028	Approved for implementation
Integrated Flood Resilience and Adaptation (InFRA) Project - Phase II	Water Resources	DPWH	53.67	ODA	ADB	II, VI, IX, XI, XII	Beyond 2028	Under project preparation
Metro Manila Flood Management Project, Phase I	Water Resources	DPWH	23.5	ODA	WB, AIIB	NCR	2026	Ongoing
Parañaque Spillway/Tunnel Project	Water Resources	DPWH	102.21	ODA	Japan	NCR, IV-A	Beyond 2028	For government approval
Pasig-Marikina River Channel Improvement Project (PMRCIP), Phase IV	Water Resources	DPWH	33.1	ODA	Japan	NCR, IV-A	2028	Ongoing
Pasig-Marikina River Channel Improvement Project, Phase V	Water Resources	DPWH	4.63	GAA	N/A	NCR	2024	Ongoing

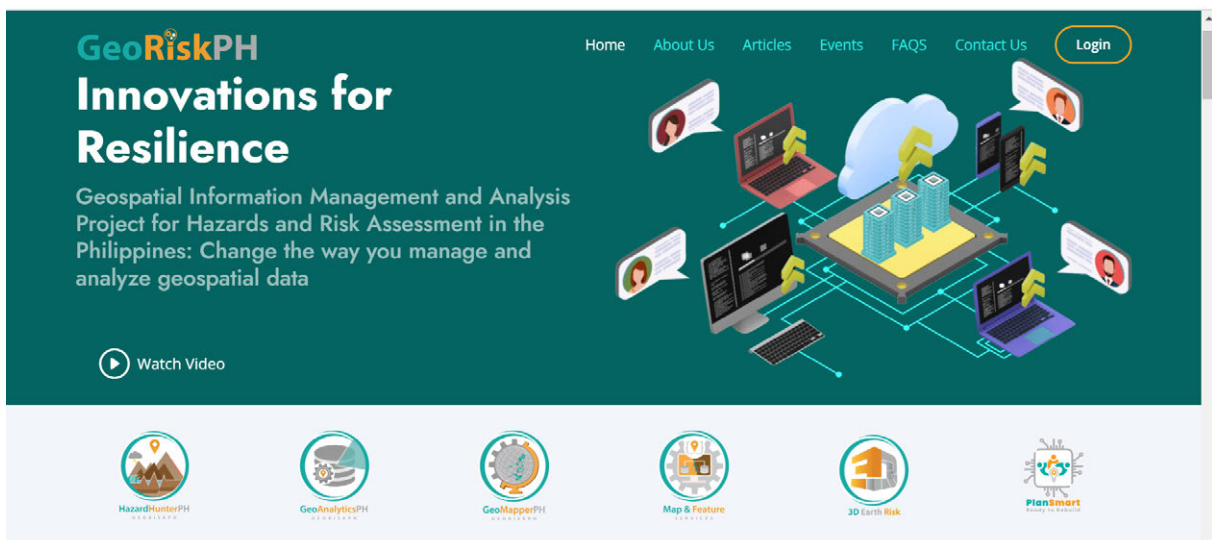
Source: Infrastructure Flagship Projects, NEDA

Planning support tool for disaster rehabilitation and recovery

The PlanSmart Ready to Rebuild planning tool is an automated planning tool for disaster rehabilitation and recovery developed by DOST-PHIVOLCS in collaboration with NDRRMC, OCD, and the World Bank. It aims at supporting LGUs in formulating a comprehensive Rehabilitation and Recovery Plan faster which will help them improve decision-making and planning for pre- and post-disaster events. It can systematically generate a Rehabilitation and Recovery Plan using science-based data, GeoRiskPH calculation tools, and putting results in a pro-forma planning document template.

GeoRiskPH is a multi-agency initiative led by PHIVOLCS, funded by DOST, which provides platforms to share hazards, exposure and other risk information. It features the HazardHunterPH, which generates initial hazard assessments in a selected location; GeoAnalyticsPH, which generates summaries of hazards and risk assessment and perform analysis and visualization of exposure and elements at risk; GeoMapperPH, which is the primary platform for data collection in building the country's National Exposure Database.

The analysis using GeoRiskPH calculates the estimated affected population and the estimated number of affected facilities for each disaster type. These data can be used for "PlanSmart Ready to Rebuild" to develop Rehabilitation and Recovery Plan and apply Disaster Risk Reduction Management Fund.



Source: GeoRiskPH website

Figure 2-85 GeoRisk Philippines

Through the above survey, it was found that multiple hazard maps, risk assessment tools and guidelines have been developed by various institutions and organizations. DILG pointed out that this situation sometimes confuses LGUs, leaving them not knowing when to use a specific tool. DOST mentioned that it needs to integrate hazard information and other statistic data maintained by NGAs to GeoRiskPH and provide it in a format that is easy for LGUs to use.

Same issue was also pointed out in the on-going JICA project, Disaster Risk Reduction and Management Capacity Enhancement Project (phase 2). Many LGUs did not know what kind of hazard information were maintained by NGAs or what kind of risk assessment tools were available. Even if they knew, they did not have the capability to obtain such information or how to use such tools.

Several comments were raised from the Philippines side such as the needs of the support on capacity development for LGUs to utilize Climate Disaster Risk Assessment and GIS as strategic inputs not only in the formulation of their LCCAPs but also CDPs, CLUPs, LDRRMPs, and others. The DOST also pointed out the needs of the expansion of the functions of GeoRiskPH.

(4) Status of JICA's Support

JICA's cooperation for disaster risk reduction management including meteorological forecast improvement is as presented in the table below. There are a lot of cooperation projects conducted in the Philippines after the year 2000.

Table 2-149 JICA's Cooperation in the Philippines (Disaster Risk Reduction)

Project title	Scheme	Project Duration/ Loan Agreement
The Project for Development of a hybrid water-related disaster risk assessment technology for sustainable local economic development policy	T/C	Jun 2021- Jun 2026
The Project for Capability Enhancement for High Quality Weather Observation, Forecast, Warning and Information in the Philippines	T/C	Feb 2021 - Feb 2024
Disaster Risk Reduction and Management Capacity Enhancement Project Phase 2	T/C	Sep 2019 - May 2025
The Project for Development of Extreme Weather Monitoring and Information Sharing System	T/C	Apr 2017 – Oct 2023
Project for Enhancing Capacity on Weather Observation, Forecasting and Warning	T/C	May 2014 -May 2017
The Project on Rehabilitation and Recovery from Typhoon Yolanda	T/C	Feb 2014 - Oct 2016
Disaster Risk Reduction and Management Capacity Enhancement Project Phase 1	T/C	Mar 2012 - Feb 2015
Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines	T/C	Feb 2010 - Feb 2015
Strengthening of Flood Forecasting and Warning System for Dam Operation	T/C	Oct 2009 - Nov 2012
The project for study on improvement of the bridges through large scale earthquakes disaster mitigating measures	T/C	Feb 2012 - Dec 2013
Post Ondoy and Pepeng Short-Term Infra. Rehab. Project	Loan	L/A: May 2010
Pinatubo Hazard Urgent Mitigation Project (Phase 3)	Loan	L/A : Dec 2007
The Project for Improving Flood Forecasting and Warning System for Cagayan de Oro River Basin	Grant	G/A : Jun 2018
The Project for Reconstruction of Municipal Halls in Lawaan and Marabut Municipalities	Grant	G/A : Dec 2015
The Programme for Rehabilitation and Recovery from Typhoon Yolanda	Grant	G/A : May 2014
The Project for Improvement of Equipment for Disaster Risk Management	Grant	G/A : Jun 2012
The Project for Evacuation Shelter Construction in Disaster Vulnerable Areas in Province of Albay	Grant	G/A : Aug 2011
The Project for Improvement of the Meteorological Radar System	Grant	G/A : Nov 2009
The Project for Flood Disaster Mitigation in Camiguin Island	Grant	G/A : Jun 2009
The Project for Improvement of Flood Forecasting and Warning System in the Pampanga and Agno River Basins Phase 2	Grant	E/N : Oct 2008
The Project for Improvement of Flood Forecasting and Warning System in the Pampanga and Agno River Basins Phase 1	Grant	E/N : Jul 2007
The Project for Improvement of Earthquake and Volcano Monitoring System (Phase 2)	Grant	E/N : Jun 2002

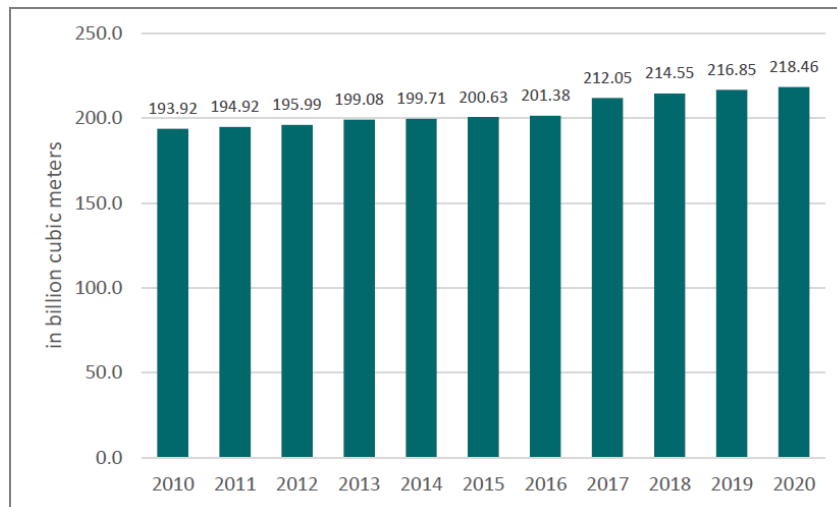
Source: JICA website

2.2.11 Water Resources

(1) Sector Landscape

1) Sector status and climate change impacts

The country's total water abstraction, or the amount of water that was removed from its source either permanently or temporarily, increased by 0.8 percent, from 216.85 billion cubic meters (bcm) in 2019 to 218.46 bcm in 2020. From 2010 to 2020, on the average, 98.1 percent of the total abstraction was from surface water such as lakes, artificial reservoirs, rivers and streams, and the remaining 1.9 percent came from groundwater reservoirs.



Source: PSA

Figure 2-86 Total Water Abstraction, 2010-2020

On the average, 98.6 percent of the abstracted water was for own use while the remaining 1.4 percent was intended for distribution to other economic units. From 2010 to 2020, the largest amount of self-abstracted water was for the power sector (58.6%). This was followed by the agriculture, forestry and fishing sector (33.8%), mining and quarrying, manufacturing, and construction (5.3%), and the services sector and households (2.4%). It should be noted that the power sector, specifically hydropower, uses water in a non-consumptive manner. That is, water remains in or is immediately returned to the location from which it was extracted. From 2010 to 2020, more than half of the distributed water was used by households (51.0%). This was followed by the services sector (36.7%) then mining and quarrying, manufacturing, and construction (11.1%). The smallest amount of distributed water was used by the sectors of agriculture, forestry and fishing, and power. Generally, the services sector and households are connected to municipal water systems that facilitate water collection, treatment, and distribution.

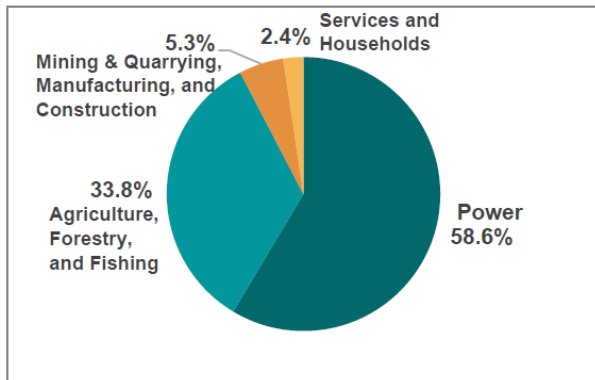


Figure 2-87 Share of Water Abstracted for Own Use by Sector, Average 2010-2020

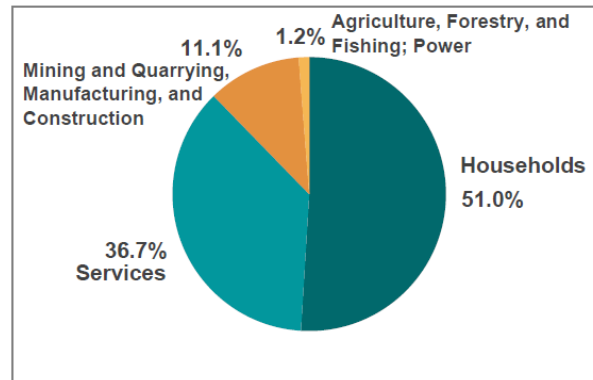
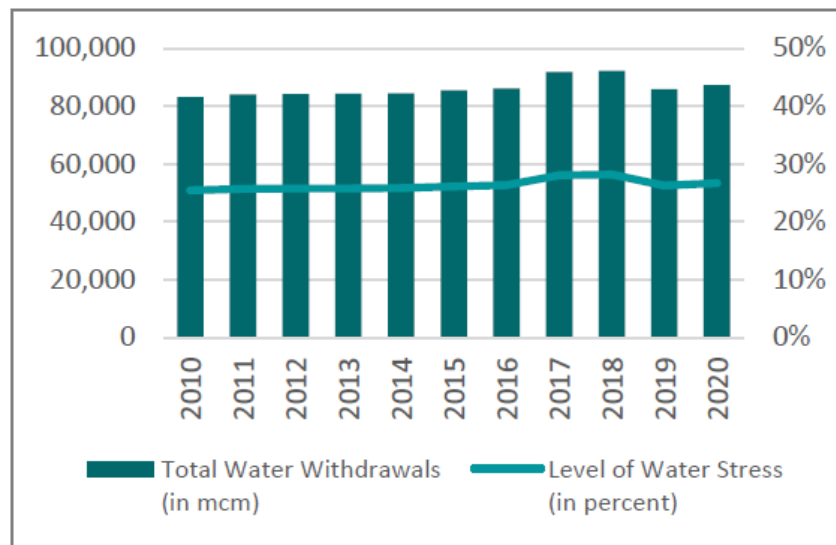


Figure 2-88 Share of Distributed Water by Sector, Average 2010-2020

Source: PSA

The level of water stress, or freshwater withdrawal as a proportion of available freshwater resources, slightly increased from 26.3 percent in 2019 to 26.7 percent in 2020. The highest level from 2010 to 2020 was observed in 2018 at 28.2 percent. The annual level of water stress since 2010 consistently fell within the low-level classification range of 25 to 50 percent.



Source: PSA

Figure 2-89 Level of the Water Stress, 2010-2020

2) Climate Change Impacts in the Water Resource Sector

Climate change, rapid urbanization, and population growth drives water scarcity worldwide. A study conducted by the World Resources Institute predicts that Philippines will experience a 'high' degree of water shortage by the year 2040. The country ranked 57th likely most water stressed country in 2040 out of 167 countries.

Global warming exacerbates the effects of El Niño the most recent of which was experienced in the country from 2015 to 2016, 2018-2019. The PSA reported that 6,962,727 peoples in 2015 and 2,432,804 peoples in 2019 have been affected by El Niño-associated drought and dry spells during the El Niño periods.¹⁰²

Current status of policies and plans that are basis of the sectoral climate change initiatives are shown below.

(2) Related Policies And Plans

1) National Climate Change Action Plan (2011-2028) Action plan II Water Sufficiency

The objective of the national strategic priority on water sufficiency is water resources sustainably managed and equitable access ensured. It focuses on three immediate outcomes:

1. Water governance restructured towards a climate and gender-responsive water sector;
2. Sustainability of water supply and access to safe and affordable water ensured;
3. Knowledge and capacity of the water sector to adapt to climate change enhanced.

The outcomes and activities planned for the three short term objectives are shown below.

Table 2-150 NCCAP outcomes, outputs and activities (water sufficiency)

Immediate outcome 1: Water governance restructured towards a climate and gender-responsive water sector	
Output 1.1 Enabling policy environment for IWRM and CCA created	Activity 1.1.1 Streamline water governance structure
Output 1.2 CC adaptation and vulnerability reduction measures for water resources and infrastructures implemented.	Activity 1.2.1 Complete the profiling of watershed and river basins Activity 1.2.2 Conduct gendered vulnerability and risk assessment of water resources and infrastructures (such as water impoundments, dams, water and wastewater treatment facilities, distribution systems, etc.) and identify adaptation measures. Activity 1.2.3 Develop and implement CCA plans for priority watersheds and river basins. Activity 1.2.4 Rehabilitate degraded watersheds and river basin areas and protect existing ones. Activity 1.2.5 Review and develop financing plan for water sector climate change action plan.
Immediate outcome 2: Sustainability of water supply and access to safe and affordable water ensured	
Output 2.1 Water supply and demand management of water systems improved.	Activity 2.1.1 Conduct water resource supply and demand analysis under various hydrologic conditions and climate scenarios. Activity 2.1.2 Review and modify, as appropriate, management processes of existing water supply systems and users to consider potential impacts of climate change. Activity 2.1.3. Implement water harvesting technologies.
Output 2.2 Quality of surface and ground water improved.	Activity 2.2.1. Implement the Clean Water Act and the National Septage and Sewerage program. Activity 2.2.2. Improve sanitation infrastructures.
Output 2.3. Equitable access of men and women to sustainable water supply improved.	Activity 2.3.1. Increase safe water coverage in waterless municipalities. Activity 2.3.2. Implement time-limited groundwater abstraction licenses to provide flexibility to respond to extreme climate conditions.

¹⁰² PSA Press Release: <https://psa.gov.ph/content/damages-due-natural-extreme-events-and-disasters-amounted-php-463-billion>

Immediate outcome 3: Knowledge and capacity of the water sector to adapt to climate change enhanced	
Output 3.1. Knowledge and capacity for IWRM and adaptation planning improved.	Activity 3.1.1. Develop the capacity of relevant government agencies on IWRM and adaptation planning. 3.1.2. Improve and update water resources database and information system. 3.1.3. Develop a gender-responsive R&D agenda for water and CC. 3.1.4. Develop gender responsive knowledge products on water and climate change. 3.1.5. Implement IEC nationwide in partnership with private sector, academe, and civil society organizations.

Source: JICA Survey Team based on Annex-A of the National Climate Change Action Plan 2011-2028

2) **Philippine Water Supply and Sanitation Master Plan (2021–2030)**

The Philippine Water Supply and Sanitation Master Plan (PWSSMP) is a national action plan that seeks to enable the government and its partners in the private sector to achieve universal access to water supply and sanitation (WSS). The PWSSMP sets the direction towards achieving the WSS-related targets stipulated in the Clean Water Act of 2004, Philippine Development Plan (PDP) 2017 - 2022, and the UN Sustainable Development Goals (SDGs). In setting the direction towards achieving the WSS targets, the PWSSMP:

- Proposes strategies and policy reforms based on current and potential issues,
- Identifies priority short-, medium-, and long-term programs and projects,
- Combines the investment for the Philippine Water Supply Sector Roadmap (PWSSR) and the Philippine Sustainable Sanitation Roadmap (PSSR) into one comprehensive plan, and
- Formulates a monitoring and evaluation (M&E) system.

It includes the detailed financing plan and investment program, 17 regional roadmaps including region-specific data, targets, and proposed projects; PWSSMP data book including maps showing the existing major WSS infrastructure; and WSS Management system.

3) **National Irrigation Master Plan (2020–2030)**

The National Irrigation Master Plan 2020-2030 (NIMP) aims to realize food security and poverty alleviation by increasing the competitiveness of sustainable irrigation development and the diversification of agricultural production. The plan aims at approximately 680,000 ha of new irrigation development between 2020 and 2030 through new projects, rehabilitation projects, and multipurpose projects.

4) **Philippines Development Plan (2023–2028)**

PDP 2023-2028 has set expected outcome as “Water security, ecological integrity of water systems, and resiliency to water hazards attained.” The strategy in the water sector is to implement effective water governance through IWRM as applied in the planning and management of land, water, and coastal resources. The major pillars in this strategy are as follows:

- a) Ensure water availability through efficient water infrastructures and management.
- b) Allocate and utilize water efficiently especially over competing water uses.

- c) Maintain and enhance surface and ground water quality.
- d) Ensure good sanitation and drainage (including proper disposal).
- e) Protect land, water, and coastal resources.
- f) Protect life and property from water and coastal hazards including dam-related hazards.
- g) Manage flood effectively (with sediment control) and mitigate droughts.

(3) Status of Climate Action Implementation

1) Implementation Structure

Institutions related to water resource development, management and usage and their legal bases are shown in table below.

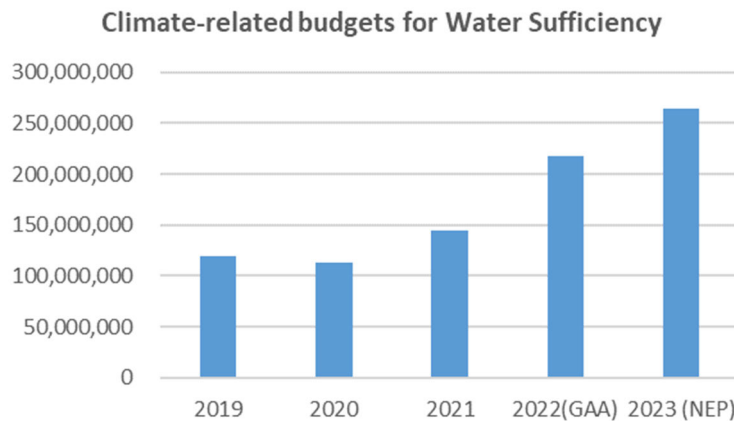
Table 2-151 Major institutions related to water resource development, management and usage

Sub sector	Institutions	Regulations
Water resource development and	National Water Resources Board (NWRB)	Water Code (Presidential Decree No.1067) Presidential Decree No.123 (2002) Presidential Decree No.860 (2010)
Water supply and Sanitation	Metropolitan Waterworks and Sewerage System (MWSS) Local Water Utilities Administration (LWUA) and the Water Districts Local Government Units (LGUs)	Republic Act No.6234 (1971) Presidential Decree No.198 (1973) Local Government Code (Republic Act No.7180 (1991)
Irrigation	National Irrigation Administration (NIA)	Free Irrigation Act (Republic Act No.10969) Agriculture and Fisheries Modernization Act of 1997 (Republic Act No.8435)
Flood control	Department of Public Works and Highway (DPWH) Local Government Units (LGUs)	Republic Act No.10121 Local Government Code (Republic Act No.7180 (1991)

Source: JST

2) Climate-related budgets

The CCET-tagged water sufficiency budgets are increasing. Investments in the water sector are related to incorporating climate change in design standards for flood control and drainage systems and related water infrastructures and constructing/expanding water supply infrastructure.



Source: National CCET PAPs Figures 2017-2023, CCC

Figure 2-90 Status of Climate-related budgets for Water Sufficiency

3) Status climate action implementation

Since the 1990's, the water shortage problem has been pointed out in the Philippines, but appropriate measures have not been taken, while the demand for water has increased year by year due to population growth and economic development. In 2019, water shortages worsened due to limited rainfall and drought caused by the El Niño, which became a major social issue. As climate-tagged activities in water sufficiency, Integrated Water Resource Management (IWRM) and water governance focused on action delivery like enhancements of flood mitigation infrastructure projects implemented by DPWH and MMDA. The DOST-PAGASA also contributed in this area by investing on flood forecasting, hydro-meteorological services, early warning system for dam operation, and establishment of Integrated Hydrological Data Management System.

The JICA study in 1998, “Master Plan Study on Water Resources Management in the Republic of the Philippines” analyzed and evaluated with a target year of 2025 the water balance in 12 Water Resources Regions (WRRs) across the country, and found that the water demand and supply situation would be tight in the near future in cities such as Manila and Cebu. The Philippine government utilized the results of the study and partly implemented reorganization of water related organizations, legal reform recommendations, and database creation of hydrological and water supply and sewage sector information. However, most of the large-scale projects proposed in the study have not been implemented.

As of 2022, there are over 30 water-related agencies with overlapping and at times conflicting mandates or functions over the country's water resources (PDP 2023-2028). The creation of the Department of Water Resources (DWR) as “Apex Body” was deliberated by the former President Duterte Administration, and the present President Marcos Jr. declared in the first State of Nations on 25th July 2022 that creation of DWR is one of the priorities. With the creation of DWR, it is directed to integrate various water-related organizations/bureaus/divisions belonging to different departments into one organization. In line with the creation of DWR, the creation of the Water Regulatory Commission (WRC) as independent and quasi-

judicial body is also being considered, which is placed under DWR. In such a situation, the Executive Order for creating the Water Resources Management Office (WRMO) was issued on 27 April 2023 (EO No.22, 2023)¹⁰³. WRMO, placed under the DENR, was created as the transitory body until DWR is established. WRMO is expected to be primarily responsible for the integration and harmonization of all government efforts and regulatory activities to ensure availability and sustainable management of water resources.

According to the DENR, the establishment of the DWR will be subject to the congress approval. As of October 2023, confirmation of intentions toward integration with the jurisdictional operations of water-related agencies/bureaus/divisions is underway, and the date of establishment of DWR has not yet been determined.

Among the Infrastructure Flagship projects promoted by the Philippine government, there are 15 projects approved related to water resource development and rehabilitation, of which 10 are funded by the Philippine government budget, 1 is PPP, and the remaining 7 are funded by the following international donors (ADB, China, South Korea).

Table 2-152 The list of the Infrastructure Flagship projects related to Water resources

PROJECT TITLE	SECTOR	IMPLEMENTING AGENCY	INDICATIVE PROJECT COST (IN PHP B)	FUND SOURCE	DEVELOPMENT PARTNER (IF ODA)	REGION/S	TARGET YEAR OF COMPLETION	STATUS / MILESTONE
Angat Water Transmission Improvement Project - Aqueduct No. 7	Water Resources	MWSS	7.42	ODA	ADB	III, NCR	2025	Ongoing
Jalaur River Multipurpose Project - Stage II	Water Resources	NIA	19.7	ODA	Korea	VI	2024	Ongoing
Mindanao Irrigation Development Project	Water Resources	NIA	4.51	ODA	ADB	X, XI	Beyond 2028	Under project preparation
New Centennial Water Source - Kaliwa Dam Project	Water Resources	MWSS	12.2	ODA	China	IV-A	2024	Ongoing
Panay River Basin Integrated Development Project	Water Resources	NIA	20.79	ODA	TBD	VI	TBD	Under project preparation
Tumauni River Multipurpose Project	Water Resources	NIA	8.58	ODA	TBD	II	2028	For government approval
Water District Development Sector Projects (WDDSP)	Water Resources	LWUA	2.61	ODA	ADB	II, III, VII, X, XII, BARMM	2025	Ongoing

Source: Infrastructure Flagship Projects, NEDA

(4) Status of JICA's Support

JICA's cooperation for water resource management including flood control is as presented in the table below. After 2000, there are a lot of cooperation projects conducted in Philippines.

In order to respond to challenges in the water sector, "Data Collection Survey for National Water Resources Development and Management Plan" funded by JICA was conducted in 2021. The goal of this survey is to collect necessary information and data to understand the water balance nationwide, formulate water resource development and management master plans for areas with large water balance gap, and propose effective countermeasures for such areas.

In addition, JICA will plan to dispatch a long-term expert for providing policy advice on national development plans, policy documents, laws and regulations, and formulating integrated water resource

¹⁰³ <https://www.officialgazette.gov.ph/downloads/2023/04apr/20230427-EO-22-FRM.pdf>

management master plans in order to respond to various issues related to water resource management and effectively implement proposals in basic information collection and confirmation surveys.

Table 2-153 JICA's Cooperation in the Philippines (Water Resource Management)

Project title	Scheme	Project Duration/ Loan Agreement
Project for Master Plan and Feasibility Study on Flood Control and Drainage in Davao City	T/C	Nov 2018- Oct 2020
Small Water Districts Improvement Project	T/C	Jul 2005 - Mar 2012
Strengthening the Flood Management Function of DPWH	T/C	Jul 2005 - Jun 2010
Pasig-Marikina River Channel Improvement Project (Phase 4)	Loan	L/A: Jan 2019
Cavite Industrial Area Flood Risk Management Project	Loan	L/A: Nov 2017
Flood Risk Management Project for Cagayan de Oro River	Loan	L/A: Mar 2015
Pasig-Marikina River Channel Improvement Project (Phase 3)	Loan	L/A: Mar 2012
Flood Risk Mgt. Project for Cagayan, Tagoloan & Imus Rivers	Loan	L/A: Mar 2012
Pasig-Marikina River Channel Improvement Project (Phase 2)	Loan	L/A: Feb 2007
ILOILO Flood Control Project (Phase 2)	Loan	L/A: Mar 2002
Agno River Flood Control Project (Phase2-B)	Loan	L/A: May 2001
The LAOAG River Basin Flood Control and Sabo Project	Loan	L/A: May 2001
The Project for the Improvement of Water Supply System in Metropolitan Cebu Water District	Grant	G/A: Apr 2014
The Project for Improvement of Water Quality in Local Areas (Phase 2)	Grant	E/N: Aug 2003
The Project for Improvement of Water Quality in Local Areas (Phase 1)	Grant	E/N: Jun 2002

Source: JICA website

2.2.12 Promotion of Engagement of Private Sector

The private sector is the driver of the Philippine economy, creating many jobs and contributing to the country's development. Without private sector initiatives, it would be impossible to achieve GHG reduction targets. Although it is difficult to precisely calculate GHG emissions from private sector activities, according to the Philippine's 2010 GHG inventory data, the total of 20.403 Mt-CO₂e (8.363 Mt-CO₂e recorded in the IPPU sector and 12.040 Mt-CO₂e in the manufacturing and construction sectors of the energy sector) accounts for 19% of total GHG emissions. In addition, the Philippines has been liberalizing its electric power industry, and many private companies are involved from power generation to transmission and distribution, and the private sector also plays a significant role in the introduction of renewable energy. Proactive efforts by the private sector to reduce GHG emissions are not only expected to help achieve NDC targets, but also to have a positive impact on the Philippine economy by creating new markets and technologies, improving international competitiveness, creating jobs, and attracting investment and financing.

At the same time, the economic activities of private companies are also a source of GHG emissions, and they are expected to make efforts to reduce GHG emissions through the adoption of new technologies and methods while protecting profits and employment in their economic activities. Specific examples include the introduction of renewable energy, adoption of energy-saving technologies and optimization of business processes, creation of sustainable supply chains, promotion of sustainable urban development, development of new markets such as provision of environmentally friendly products and services, promotion of sustainable business practices, and improvement of recycling rates.

(1) Relevant policies and plans

Although the Philippine government does not mandate private companies to take climate actions, and the measures currently taken are on a self-help basis by companies, various policies have been announced and enforced to comply or encourage efforts. This section outlines 1) the obligations imposed, 2) the incentives given, 3) Sustainable/ Green Finance 4) the activities of private organizations and private companies 5) Initiatives for achieving SDGs, 6) Initiatives in SEZs and 7) Challenges faced by Japanese companies operating in or having business with the Philippines. Some recommendations for the promotion of private sector introduction are listed in this section.

1) Obligations imposed on private companies

Private companies, large and small, are required to comply with Philippine national laws. In terms of the environment, the conduct of business requires compliance with general emission standards and environmental considerations as set forth in the following laws.

Table 2-154 Actions Required to Companies under Environmental Legislation in the Philippines

Title	Actions required by companies
Clean Air Act of 1999 (RA No. 8749)	A law on the prevention and control of air pollution with the aim of improving air quality. It establishes emission standards, clearly states the ‘Polluters Pay’ Principle whereby those who emit pollutants bear the cost of treatment or take preventive measures, and requires compliance with emission standards from facilities that are fixed sources of pollution, such as factories, refineries, and power plants.
Extended Producer Responsibility Act (EPR Act) (RA No. 11898)	A law requiring the collection, recycling, and proper disposal of plastics used for product packaging, transportation, etc. 20% of the previous year's usage in 2023, to be gradually increased to 80% by 2028 (See *2.2.6 for details)
Ecological Solid Waste Management Act of 2000 (RA No. 9003)	Ecological Solid Waste Management Act. A law designed to promote proper waste disposal and reuse and prevent illegal dumping. Companies must follow proper disposal of waste.
Philippine Mining Act of 1995 (RA No. 7942)	Philippine Mining Code. A basic law on mining that requires miners to protect the environment and care for society.
Water Code of the Philippines (RA No. 1067)	Philippine Water Resources Act. A law governing the sustainable management and use of water resources. It includes matters related to the protection of water resources and water bodies.
Philippine Environmental Impact Statement System (Presidential Decree 1586)	Philippine Environmental Impact Assessment System. A legal system for assessing the environmental impact of projects and activities and obtaining the necessary environmental permits.
National Integrated Protected Areas System (RA No. 7586)	National Integrated Protected Areas System Act. A law to protect the ecology and natural environment of the Philippines, specifically providing for activities in areas of ecological importance.

Source: JICA Survey Team

The details of the laws, regulations and issues regarding compliance with the EPR Law are mentioned in 2.2.6 (7), and possible cooperation programs are described in 3.1.2 (3), based on the interviews with the companies and relevant departments and agencies. In addition, although the efforts are mainly made by government agencies, the strengthening of the implementation of the above-mentioned Ecological Solid Waste Management Act is considered as a possible cooperation program in Urban Environment Sector of the Survey, namely a waste management improvement program, an intermediate waste treatment capacity improvement program and a final disposal site capacity improvement program (details provided in Chapter 3). In particular, the programs on waste management and waste intermediate treatment capacity aim to raise awareness on waste disposal, separation and recycling, involving not only the government but also the private sector and citizens.

Submission of Sustainability Report

In addition to the above-mentioned compliance with environmental legislation, the filing of Sustainability Reports is a mandate imposed by the Securities and Exchange Commission (SEC) on Publicly Listed Companies (PLCs) beginning in 2019 by SEC Memorandum 2019-4. Prior to the 2019 mandate, only 22% of PLCs had prepared Sustainability Reports, but according to the SEC's October 5, 2023 press release , 96% of the 286 PLCs submits Sustainability Report along with the Annual Report. The filing is made using

the SEC Electronic Filing and Submission Tool (eFAST, <https://efast.sec.gov.ph/user/login>) along with the Annual Report.

For the preparation of the Sustainability Report, instructions were published in SEC Memorandum 2019-4 for the PLCs, and the standard format is presented as an Appendix. The guidelines are based on the following four international frameworks:

- Global Reporting Initiative (GRI) Sustainability Reporting Standards
- Integrated Reporting (IR) Framework of the International Integrated Reporting Council (IIRC)
- Sustainability Accounting Standards Board (SASB) Sustainability Accounting Standards
- Recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)

If the report has already been prepared as part of an Annual Report using other international standards, the use of an original format is permitted. However, it is recommended that the items related to climate change be in accordance with the content covered in the SEC's standard format.

Disclosure Topics are organized into Economic, Environment, Social, and SDGs chapters, with the Environment chapter covering Resource Management, Environmental Impact Management, Solid and Hazardous Wastes, and Environmental Compliance.

Table 2-155 Disclosed Items of the Sustainability Report

Chapter	Disclosure Topics
Economic	<ul style="list-style-type: none"> • Economic Performance • Procurement Practices • Anti-Corruption
Environment	<ul style="list-style-type: none"> • Resource Management • Environmental Impact Management • Solid and Hazardous Wastes • Environmental Compliance
Social	<ul style="list-style-type: none"> • Employee Management • Workplace Conditions • Labor Standards • Human Rights • Supply Chain Management • Relationship with Community • Customer Management • Data Security
SDGs	Describe how the company can contribute to the 17 goals of the SDGs through its products and services

The Environment chapter is to include GHG emissions specifically under Environmental Impact Management, as shown also in the table below, as well as the amount of electricity, water, resources, and other resources used, and the amount of waste and wastewater discharged and treated.

Table 2-156 Items required in the environmental chapter of the Sustainability Report

Section	Main description
Resource Management	<ul style="list-style-type: none"> • Electricity usage (by energy source) and electricity savings • Water use and recycling volume • Resource use • land use
Environmental Impact Management	<ul style="list-style-type: none"> • GHG emissions (Scope 1 direct emissions and Scope 2 indirect emissions from energy procurement such as electricity) • Air pollutant emissions (NOx, SOx, etc.)
Solid and Hazardous Wastes Management	<ul style="list-style-type: none"> • Solid waste emissions and their respective treatment methods • Hazardous Waste Emissions • Volume of wastewater discharged and reused
Environmental Compliance	<ul style="list-style-type: none"> • Monetary and non-monetary penalties received for noncompliance

Source: Prepared by research team from SEC Format 17-A.

In addition, each chapter of the disclosure section is required to describe Materiality Assessment (identification of material issues) and Management Approach.

Materiality Assessment (identification of material issues) chapter describes the significant economic, environmental, and social impacts of the organization, information that would substantially affect the evaluation and decision-making of stakeholders, including investors, and matters that would substantially affect the organization's structure in the short, medium, and long term.

The Management Approach chapter requires specific descriptions of corporate actions for mitigation and adaptation in accordance with GRI standards.

- Company policies related to ESG
- Company commitments related to ESG (e.g., regulatory compliance and conformance with international standards)
- Goals and timelines to be achieved (baseline, expected results, timeline)
- The status of appointing responsible persons within the company and whether their responsibilities are linked to performance evaluations and incentives.
- Financial, human, and technical resources allocated to achieve the objectives
- Grievance Redress Mechanism
- Specific actions such as processes/projects to avoid or mitigate negative impacts and actions to improve

"Beyond the Bottom Line 2nd Edition: Sustainability Landscape in the Philippines"¹⁰⁴ published by SGV, an EY Group company, in 2022, reviewed published Sustainability Reports of 118 companies (73 companies in 2019, and same 73 companies plus 45 companies in 2020). According to the report, while

¹⁰⁴ https://d1rkvfx0u1hhdq.cloudfront.net/Publications/Publication_File_1656397462.pdf

more than 60% of the companies used the SEC's format, many companies prepared Sustainability Reports that included more information or included a summary of the Sustainability Report in their Annual Report. The analysis indicates that many companies are aware of the Sustainability Report as an effective tool for communicating their ESG performance to investors and rating agencies.

In SEC Press Release 2023-75 of October 5, 2023, the SEC announced that work is underway to revise the format to incorporate the latest international development in the sustainability reporting framework, including IFRS S1 (General Requirements for Disclosure of Sustainability-Related Financial Information) and IFRS S2 (Climate-related Disclosures) of the International Financial Reporting Standards ("IFRS") published in June 2023. While the SEC's current reporting format requires disclosure up to Scope 2, IFRS S2 will require disclosure of emissions up to Scope 3 (indirect emissions by other companies in the value chain). In addition, the disclosure of information on the potential impact of significant climate-related risks on a company's business model, value chain, strategy, decision-making, and finances, as well as information on a company's resilience, may be added to the new disclosure items.

The revised form will require companies to submit a new Sustainability Report (SuRe) in addition to the Sustainability Report (SR Narrative) currently being submitted. The draft of the form is a six-page Excel form that describes the key risks related to climate change and sustainability, as well as the impact on business models and value chains. Although one will have to wait and see how the revision process progresses, at the very least, it will be possible to extract and list GHG emissions and renewable energy utilization rates for each Scope of all PLCs side by side, which will enable data on environmental initiatives by private companies to be more visible and comparable, and play a major role in analysis and study of countermeasures. The draft also includes target setting, and if realized, the targets and achievement rates for each PLCs will also be listed, which is expected to serve as a driving force for corporate initiatives.

Although many companies have requested to delay the implementation of new reporting system, it is scheduled to take effect in 2024 (for filings in 2025)¹⁰⁵. Although the outline of the new system will be announced by the end of 2024, it is expected that some companies will not be able to comply with the new system for 1-2 years after its implementation due to the short preparation period. However, the number of companies that will be able to comply with the new system is expected to increase over the next few years, as sustainability reporting is limited to well-funded Publicly Listed Companies and many international consulting firms offer reporting support services.

One of the Japanese government supports related to sustainability reporting is the Partnership to Strengthen Transparency for Co-Innovation (PaSTI), which is implemented by the Ministry of the Environment of Japan. PaSTI was established as one of the climate action pillars of the Japan-ASEAN Environmental Cooperation Initiative, which was announced by the Prime Minister of Japan in 2017. In 2023, the

¹⁰⁵ <https://www.theasset.com/article-esg/50743/no-delay-on-philippine-sustainability-reporting>

Partnership supported the private sector to strengthen and incentivize GHG emissions accounting and reporting, supported the establishment of a GHG emissions accounting and reporting system, and held study sessions involving the private sector and local governments. The Partnership plans to continue its activities in the future and will support the promotion of GHG emissions accounting and reporting by the Philippine private sector and ensure transparency through such activities.

2) **Incentives for private companies**

Incentives to private companies are granted mainly in the form of reductions or exemptions from import duties and corporate taxes as per the below table.

Table 2-157 Incentives for private companies

Measure name	Overview	Beneficiary	Supervisory authorities	Note
Corporate Recovery and Tax Incentive for Enterprises Act (CREATE , RA No. 11534)	Corporate tax reductions and exemptions and tax incentives in specific investment areas	Private companies	DOF	Second Package of Comprehensive Tax Reform Packages (CTRP)
Strategic Investment Priority Plan (SIPP)	Detail description of the strategic investment priority areas for tax incentives under CREATE Act	Private companies	BOI	
Philippine Green Jobs Act (RA No. 10771)	A law designed to create economically viable jobs while reducing environmental impact. A reduction or exemption of import duties and corporate taxes for companies that promote green jobs.	Private companies	DOLE (Department of Labor and Employment) CCC DOF	
Public Utility Vehicle Modernization Program (PUVMP)	Includes a scheme whereby cooperatives that have replaced jeepneys through the PUVMP can obtain subsidies by scrapping them at a certified scrap yard.	Jeepney Cooperatives	DOTr	Currently only one certified facility; incentives suspended as of December 2023
Energy Efficiency and Conservation Act of 2019 (RA 11285)	Includes measures by BOI to reduce corporate tax rates for companies certified by DOE as implementing energy conservation projects	Private companies	DOE BOI	Only about one approval per year certified by DOE.

Source: JICA Survey Team

There are some schemes that are not widely used due to the complexity of the approval process before being granted or because the schemes themselves are not widely known. For example, subsidy program for the replacement of old jeepneys that are scrapped at certified scrap yards within the PUV Modernization Program, has been suspended because there is only one factory in the Philippines that is certified at the level required for the program. The other example is the incentive program under the Energy Efficiency and Conservation Act. The program itself was not well known, and as a result, only a few applications were made to DOE for certification

as an energy efficiency project. In FY 2022, only one project was granted certification by the DOE, and accordingly, only one corporate income tax reduction or exemption was granted by the BOI¹⁰⁶.

- **CREATE Act (Corporate Recovery and Tax Incentive for Enterprises Act, Republic Act No. 11534)**

CREATE is the second Package of the Comprehensive Tax Reform Packages (CTRP). The CTRP is one of the measures to realize AmBisyon Natin 2040, a national vision that aims to eradicate poverty and build a prosperous middle-class society by 2040, and is scheduled to be expanded to a fourth phase. The third phase, Real Property Valuation Reform (RPVAR), and the fourth phase, Passive Income and Financial Intermediary Taxation Act (PIFITA) are under discussion as of December 2023.

Table 2-158 Outline of CTRP

	Name of the Law/Bill	Outline of each package
Package 1 Effective from Jan 2018	TRAIN Act (Tax Reform for Acceleration and Inclusion Act, RA10963)	It reduces personal income tax and simplifies VAT
Package 2 Effective from Apr 2021	CREATE Act (Corporate Recovery and Tax Incentive for Enterprises Act, RA11534)	It seeks to amend several provisions in the old Tax Code, with a central focus on lowering corporate income tax rates and rationalizing fiscal incentives to better attract local and foreign investments in the Philippines
Package 3 (Under discussion)	RPVAR (Real Property Valuation Reform)	The bill aims to establish and maintain valuation standards to govern the valuation of real property in the country
Package 4 (Under discussion)	PIFITA (Passive Income and Financial Intermediary Taxation Act)	The bill aims to revitalize capital markets and capital inflows from abroad by simplifying the taxation of income and intermediation on financial transactions.

The law, enacted in April 2021, aims to revamp the economic recovery and tax incentives. The two pillars of the law are the reduction and exemption of corporate income tax and the consolidation and rationalization of investment incentives.

It provides tax incentives for the categories of businesses (Tier 1-Tier 3) that falls priority industry under Strategic Investment Priority Plan (SIPP), announced in May 2022. The preferential treatment is a corporate income tax exemption, with a 4-7 year income tax holiday and a special corporate income tax rate for the following 10 years or an additional deduction. The duration of the preferential treatment is stipulated according to whether the business is an export business or a domestic market enterprise, the location of the business, and its tier. The Tier 1-3 classification is shown in the table below.

¹⁰⁶ According to the JICA Survey Team's interview with BOI

Table 2-159 Tier classification of the business as defined by the CREATE Act

Tier	Points for Classification
Tier 1	(i) Projects with high potential for job creation (ii) Take place in sectors with market failures (iii) Generate value creation through innovation, upgrading, or moving up the value chain (iv) provide essential support for sectors that are critical to industrial development (v) Are emerging owing to potential comparative advantage
Tier 2	Business activities that produce supplies, parts and components and intermediate services that are not locally produced but are critical to industrial development and import-substituting activities including crude oil refining.
Tier 3	(i) Research and development resulting in demonstrably significant value-added, higher productivity, improved efficiency, breakthroughs in science and health, and high-paying jobs; (ii) Generation of new knowledge and intellectual property registered and/or licensed in the Philippines. (iii) Commercialization of patents, industrial designs, copyrights and utility models owned or co-owned by a registered business enterprise. (iv) Highly technical manufacturing (v) Are critical to the structural transformation of the economy and require substantial catch-up efforts

Source: Prepared by JICA survey team from BOI data.

• **Investment Priority Plan SIPP (Strategic Investment Priority Plan, Circular No. 61)**

Prior to the announcement of the SIPP, there was the 2020 IPP (Investments Priority Plan), which defined priority investment areas. The following is an example of the priority investment areas set out in the SIPP. Many of these areas are covered in this Survey.

Table 2-160 Example of a strategic investment priority area as defined by the SIPP

Field	Example of Priority Investment Areas
Energy	Renewable energy (biofuels, solar, wind, tidal power, etc.) (T2/T3), Battery, Hydrogen, Hydroelectric, Geothermal (T2) Smart Energy Systems, Smart Devices (T3) Waste to Energy (T2) Energy Saving (T2) Power Transmission & Distribution (T1)
Transport	Installation of charging station (T1)
Industry	EV-related industries and e-mobility-related technologies (T2) Smart factories (T3) Fully automated Integrated Steel Mill using Rotary Kiln Electric Furnace-Basic Oxygen Furnace (T3), End-of-Life Vehicle Treatment Facility (T1) Hazardous Waste Disposal (T1) Environmentally Friendly Metal Processing (T2)
Agriculture	Green agriculture (organic farming, farm diversification, etc.), farmland preservation agriculture (T2) Cold chain warehousing (T1) Automated warehousing (T2)
Forests and Biodiversity	Ecotourism facilities (T1)
Urban environment	Smart cities (T3) Waste treatment (T1/T2) and recycling (T2) Water treatment and water supply (T1) Clean water technologies such as algae-based sewage treatment and rainwater harvesting (T2)
Disaster Prevention Water Resources	Climate change countermeasures and disaster risk reduction and marine ecosystem management in terrestrial and coastal areas (T2/T3)
Other	PPP projects (T1) Development of industrial parks and ecozones (T1) ICT and telecom infrastructure (T1) AI, blockchain and other IT technologies and data centers (T3) Remote healthcare (T3)

Source: Prepared by JICA survey team from BOI data.

• **Philippine Green Jobs Act (Republic Act No. 10771)**

The law provides incentives for companies that develop and provide incentives for people to work in newly emerging fields, as some jobs and occupations are vanishing as technology advances and as society moves towards climate change-responsive. Examples of green jobs include those involved in the development, utilization, and commercialization of renewable energy resources and technologies; green engineering and management consultancy; and materials and resource recovery and circular economy, among others. The policy includes a 50% special deduction from corporate income taxes for skills training and R&D expenses, as well as exemption from import duties on related materials. To avail these incentives, a Certificate of Eligible Expense/Capital Importation Activities from the CCC must be obtained.

3) Sustainable Finance/ Green Finance

The Philippines is focusing on sustainable/green finance on a national scale.

The Central Bank of the Philippines (BSP, Bangko Sentral ng Pilipinas) has launched an 11-point Sustainable Central Banking Strategy (SCB, Sustainable Central Banking Strategy) for 2019, which includes green finance initiatives, require all banks to disclose financial risks related to climate change, and consider creating an incentive mechanism to encourage banks to lend to the green sector.

Also, in October 2021, the DOF with the support from UK government, developed the “Philippine Sustainable Finance Roadmap¹⁰⁷” and the “The Philippine Sustainable Finance Guiding Principles¹⁰⁸” based on the discussion at the Inter-Agency Technical Working Group for Sustainable Finance (ITSF) consisted of relevant agencies¹⁰⁹ in the Philippines. The roadmap includes guidelines and plans for the Philippine Government to revitalize sustainable finance in the Philippines.

Table 2-161 Contents of Sustainable Finance Roadmap

Pillar A (Policy): Creating a conducive environment	<ul style="list-style-type: none"> - Integrating sustainability considerations into macroeconomic policies and regulations - Strengthening coordinating efforts within the financial ecosystem - Embedding sustainability into the risk management of the banking, insurance, and asset management sectors - Encouraging sustainability and climate related disclosures - Conducting capacity building - Joining international initiatives on sustainable finance
Pillar B (Financing): Mainstreaming sustainable finance	<ul style="list-style-type: none"> - Promoting Sustainable Financial Products - Improving the Sustainable Finance definition and creation of a principles based taxonomy - Tracking Sustainable Finance flows

¹⁰⁷ <https://www.dof.gov.ph/wp-content/uploads/2021/10/ALCEP-Roadmap.pdf>

¹⁰⁸ <https://www.dof.gov.ph/wp-content/uploads/2021/10/ALCEP-Sustainable-Finance-Guiding-Principles.pdf>

¹⁰⁹ Bangko Sentral ng Pilipinas (BSP), Bases conversion Development Authority (BCDA), CCC, DA, DBM, DOE, DENR, DOF, DILG, DPWH, DOST, SOTr, DTI, Insurance Commission (IC), Mindanao Development Authority (MDA), NEDA, Public-Private Partnership (PPP), SEC

Pillar C (Investment): Developing a sustainable pipeline	<ul style="list-style-type: none">- Driving sustainable investments- Financing Low Carbon Energy- Establishing a sustainable pipeline database, both for public and private sector projects- Progress monitoring and regular updating, including linking sustainable pipeline to SDGs,- PDP, and NDC targets
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Source: Philippine Sustainable Finance Roadmap

- **Green Loan from the financial institutions**

The following financing programs are in place at each bank to help companies implement initiatives and projects that help combat climate change.

Table 2-162 Example of a Government Financing Agency Loan Program for Climate Change Related Projects

Loan program name	Summary	Subject (of taxation, etc.)	Financial institutions	Remarks
Green Financing Program	Scheme to provide long-term financing for up to 15 years for projects in the areas of air/water pollution control, waste and hazardous waste treatment, energy conservation, and disaster prevention	LGUs, private companies, public cooperatives, banks, microfinance institutions	DBP	
Green Energy Financing Program FUSED (Financing Utilities for Sustainable Energy Development Program)	Long-term 15-year financing (5-year grace period) for renewable energy and distribution projects connected to the grid	LGUs, private companies, power distribution companies	DBP	Financed 428.9 MW worth of solar, wind, and hydroelectric projects to date
Green Energy Financing Program SMPP (Solar Marchant Financing Program)	Long-term financing of 12 years (1 year grace period) for solar PV developer projects connected to the grid in Luzon and the Visayas. Covers 50-60% of project costs.	Solar power generation companies	DBP	Must meet specific technical requirements
Green Energy Financing Program E2SAVE (Energy Efficiency Savings Financing Program)	Long-term 10-year financing for renewable energy projects, including rooftop solar	public institution Private companies, DOE certified ESCOs	DBP	
Green Energy Financing Program PASADA (Program Assistance to Support Alternative Driving Approaches)	Loan program for PUVMP; 6%, 7-year loan and government subsidy up to 160,000 PHP per unit	PUV Operator	DBP	
Green Energy Financing Program SWEEP (Sustainable Waste Management for Enhanced Environmental Protection)	Long-term 15-year financing (5-year grace period) for solid waste, hazardous waste, and waste-to-energy projects	Public and private operators	DBP	
Go Green Inclusive Financing Program	Scheme to provide 90% financing for green projects such as renewable energy including roof-mounted solar panels, installation of energy-saving equipment, green buildings, rainwater reuse, etc.	LGUs, MSMEs, cooperatives, public corporations, universities	Land Bank	Large companies are not eligible

Loan program name	Summary	Subject (of taxation, etc.)	Financial institutions	Remarks
REAL (Renewable and Efficient Alternative) Energy Financing Program	Scheme to provide low-interest loans for research, design, and project costs for renewable energy projects, including the manufacture of renewable energy-related technologies and products.	LGUs, private companies, cooperatives	Land Bank	Approval from DOE and pre-FS required prior to credit appraisal by financial institutions
SMART (Sustainable Multi-dimensional Approach using Revolutionized Technologies) in City Development Lending Program	Financing for projects that integrate infrastructure and the latest technologies in urban areas, supporting solutions to overcrowding and poverty in urban communities through a scheme based on the ASEAN Smart Cities framework.	HUCs, private companies, cooperatives, public corporations, NGOs	Land Bank	

However, in the interviews with private organizations, it was observed that even if a loan scheme is available, it takes time for screening and requires real estate as collateral, making it difficult for SMEs to easily use the scheme. Some schemes require certification from government agencies such as the DOE, while others require three-year audit reports, making bank loans still a hurdle for small businesses. Financial institutions face additional challenges, notably the limited availability and complexity of climate-related information. Many private companies in the Philippines are hesitant to disclose information promptly, posing a challenge for foreign investment.

Two Step Loan (TSL), a financing scheme that addresses these various issues, was considered in several priority sectors of this Survey and identified as possible finance scheme for some of the cooperation programs. TSL can not only secure financial resources to implement specific policies and provide policy loans to the private sector at concessional rates, but also improve the credit appraisal system, including the complexity and length of the appraisal process, and encourage the active use of movable collateral other than immovable collateral. It is also expected that the creation of a successful TSL model case could have a ripple effect of similar support from other financial sources such as those from private banks and other development partners.

Table 2-163 List of TSL considered in this Survey

Sector	Program No.	Name of the cooperation program
Energy	E-3-2	Financial Cooperation Project for Renewable Energy Deployment (TLS, PSIF, PPP of JCM)
	E-5-3	Finance to promote EE &C and ZEB dissemination
	E-6-4	Financial Cooperation Project on Alternative Fuels Promotion
Industry	I-1-2	Financial assistance for AFR utilization and introduction of waste heat recovery facilities in the cement industry (TLS or JCM)
	I-1-4	Financial assistance for the introduction of waste heat recovery facilities in the iron and Steel industry (TLS or JCM)
	I-1-7	Financial assistance for the introduction of a Fluorocarbon gases destruction treatment facility
	I-2-3	Financial assistance for jeepney Cooperatives to purchase E-jeepney
	I-2-4	Capital Investment Financial assistance for EV manufacturing companies
	I-3-2	Financial Assistance for the Recycling Industry
	I-4-2	Financial assistance for the installation of Green equipment
Agriculture	A-3-5	Loan Assistance for the Development and Modernization of Fisheries Related Facilities and Equipment (Proposed as Sector loan to LGU with final beneficiaries being private companies)
	A-4-5	Loan Assistance for the Introduction of Smart Livestock Technology

The Survey team met with the DBP, which is a possible executing agency and potential Participating Financial Institution (PFI) of TSL, to discuss the potential TSL projects such as Financial assistance for jeepney Cooperatives to purchase E-jeepney and Financial assistance for the installation of Green equipment under MSMEs support to confirm their financial needs and obtained a positive feedback.

The final loan interest rate, etc., in the implementation of each TSL was not discussed in detail under this Survey because the terms of the yen loan from JICA to the Philippine government change every six months, and rendering rate

differs depending on the type of interest rate (fixed or floating) and repayment period. Final interest rate also depends on whether the PFI is open to the private sector or not, and what percentage of the interest rate is retained by the Philippine government.

• **Green Bond**

Around USD 4.5 billion of sustainability bonds have been issued in the Philippines since 2016. The green bonds have accounted for the largest share of USD 2.6 billion, while USD 0.4 billion of social bonds and USD 1.5 billion of sustainability bonds have been issued. It is assumed that the amount of sustainability bonds issued will continue to increase¹¹⁰.

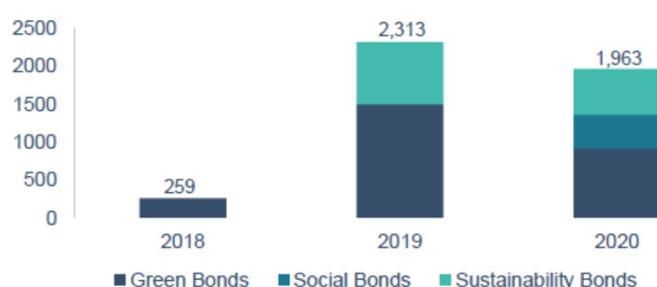


Figure 11. Philippine Sustainable Bond Issuance (in USD million)

Source: Philippine Sustainable Finance Roadmap

Figure 2-91 Status of issuance of sustainability bonds in the Philippines

The first green bond in Philippines was a US\$150 million green bond issued by BDO Unibank in 2017, which was fully financed by IFC; IFC subsequently financed another blue bond issued by BDO Unibank in 2022.

Table 2-164 Example of a Green Bond Issue

Bank name	Summary
BDO Unibank	Issued the country's first green bond in 2017 (\$150 million). Financed renewable energy, green building, and energy-efficient equipment purchase projects. Subsequently issued various sustainability bonds.
DBP	Issued 5 billion PHP of ASEAN Sustainability Bonds in 2019 to raise 18.025 billion PHP, triple the initial target. Financing green projects for climate change adaptation and mitigation, and social projects that address social issues.
Bank of the Philippine Islands (BPI)	2023 \$250 million green bond issue (IFC financing) - financing for renewable energy, EV projects, etc.
Rizal Commercial Banking Corporation (RCBC)	The country's first Sustainability Bond (8 billion PHP) compliant with ASEAN Sustainability Bond Standards will be issued in 2019. Followed by another 14.7 billion peso ASEAN Sustainability Bond in 2022. Financing projects in renewable energy, clean transportation, green building, air pollution control, sustainable land use, etc.
China Bank	In 2018, IFC issued its second domestic \$150 million green bond (IFC financing). Financing for renewable energy, green building, water conservation, and energy conservation projects.

¹¹⁰ **Sustainability Bonds:** Bonds issued to raise funds for projects that address both environmental and social issues
Green Bonds: Bonds issued to raise funds for projects that contribute to solving environmental issues such as global warming (green projects).

Social Bonds: Bonds issued to raise funds for projects that contribute to solving social issues such as sanitation, welfare, and education (social projects) (from the definition by Japan Securities Dealers Association)

• **Sustainability/Green Bond Issuance by Private Companies**

In addition to financial institutions, some private companies are also issuing their own green/sustainability bonds. For example, Manila Water, one of the core companies of the Ayala Group, and water/wastewater service provider in eastern Metro Manila, issued a USD 500 million sustainability bond in July 2020 for its water and wastewater projects. At the same time, the company established a Sustainable Financing Framework¹¹¹ and is investing the funds raised through the bond in the following categories of projects implemented solely by the company and its subsidiaries.

- Sustainable water and wastewater management
- Terrestrial and aquatic biodiversity conservation
- Affordable basic infrastructure

Manila Water's Sustainability Bond is the first bond issued by a private Philippine company that meets the ASEAN Sustainability Bond Standards and has been awarded the Best Sustainability Bond Award by "The Asset Triple A Sustainable Capital Markets Country & Regional Awards 2020".

The amount invested in the project, the balance, the progress of the project, and case studies will be included in the annual Integrated Report. According to the Manila Water's Integrated Report 2022, 90% of proceeds has already been invested in the project. In addition, a Second Party Opinion (SPO) report evaluating the green bond/sustainability bond framework according to ICMA (International Capital Market Association) principles was published by DNV GL (a risk management and certification service provider headquartered in Oslo, Norway) and is also available on the website¹¹².

Table 2-165 Sustainable/Green Bond Issuance by Private Companies

Year of Issuance	Issuer	Size of the bond	Project Category
2019	AC Energy (Ayala Group)	400 Mil USD + 410 Mil USD	Renewable Energy Projects
2020	AC Energy (Ayala Group)	300 Mil USD	Renewable Energy Projects
	Arthaland (Po Group)	3 Bil PHP	Building projects eligible for green building certification
	Manila Water (Ayala Group)	500 Mil USD	Sustainable water, sewage and sanitation projects, biodiversity protection projects, etc.
2021	AC Energy (Ayala Group)	400 Mil USD	Renewable Energy Projects
	EDC (Lopez Group)	5 Bil PHP	Renewable Energy Projects

Source : GREEN BOND MARKET SURVEY FOR THE PHILIPPINES(ADB,2022)

¹¹¹ <https://www.manilawater.com/storage/files/9/manila-water-investors/Sustainability/Manila%20Water%20Company%20Inc%20-%20Sustainability%20Financing%20Framework%20July%202020.pdf>

¹¹² <https://www.manilawater.com/storage/files/1/corporate/ckeditor-files/2020%20Second%20Party%20Opinion.pdf>

- **Challenges in the Philippine Green Bond Market**

As detailed earlier in the “Philippine Sustainable Finance Roadmap”, the DOF has established eligibility criteria for green bonds. The DOF acts as a coordinating body in the verification process, ensuring that projects and activities covered by the bonds align with these criteria. The coordinator's role is to verify the conformity of the projects and activities. However, there is currently no specific agreement or strategy in place for expanding the use of Sustainability Bonds, including Green Bonds, in the future.

The IMF estimates that the Philippines has USD 168 billion in green investment opportunities over the decade 2020-2030. This includes USD 39 billion for greening existing and future energy infrastructure, USD 104 billion for climate-smart cities (retrofit buildings for energy efficiency, invest in low-carbon municipal waste and water, expand green urban transport, and create nature-based urban infrastructure), and USD 104 billion for specific sectors (such as decarbonize heavy industry with CCUS and green hydrogen, scale climate-smart agriculture, reinvent textile and apparel value chain, and incentivize low-carbon airlines and shipping), with USD 25 billion for accelerating the green transformation¹¹³. However, between 2017 and 2021, the Philippines only received an estimated USD 600 million in foreign green investment, mostly in renewable energy. It is necessary to attract foreign green investment through measures such as the development of policies and regulations, including roadmaps, and transparency through information disclosure, as well as further increasing domestic investment through bonds and loans.

In a 2022 ADB and Global Green Growth Institute (GGGI) survey of institutional investors and underwriters¹¹⁴ (48 total responses), all respondents expressed interest in investing in and underwriting green bonds, but many investors/ underwriters did not have sufficient awareness of green bonds. Insufficient understanding of the benefits of green bonds compared to conventional bonds was identified as an obstacle to the expansion of the green bond market in the Philippines. Other issues and prospects pointed out for the future are as follows:

- **Tax incentives and subsidies:** Tax incentives and subsidies for green bond issuers and investors need to be considered to encourage more investment and issuance.
- **Public bond purchases:** Since market demand is important for underwriting by securities firms, public bond purchases by central banks, public pension funds, and other public funds would act as a priming call.
- **External review:** Bond review reports by external experts provide peace of mind to make investment decisions
- **Certification by an international rating agency:** Since there is no rating agency in the Philippines, bonds with a high rating by an international rating agency will attract more investors.

¹¹³ <https://www.worldbank.org/en/country/philippines/publication/philippines-country-climate-and-development-report>

¹¹⁴ Green Bond Market Survey for the Philippines

<https://www.adb.org/sites/default/files/publication/813001/green-bond-market-survey-philippines.pdf>

The report also surveyed investors and brokers on what they expect from a development partners like ADB. The responses fall into two main roles: one is as a knowledge partner - sharing knowledge and providing consultation, including international best practices, to financial institutions, corporations, and relevant government authorities that wish to issue green bonds. The second role is as an investor, providing subsidies for the green bond certification process, credit enhancement to green bond issuers, and becoming a major investor in the bonds.

4) **GHG reduction efforts by private organizations/industry associations**

In the Philippines, a number of private organizations and industry associations have been established to address environmental issues, including GHG reduction. The table below is a list of organizations that are implementing GHG reduction related initiatives.

Table 2-166 GHG Reduction Efforts by Private Organizations/Industry Associations

Corporate name	Members	Main activities related to climate change action
Philippine Chamber Of Commerce And Industry (PCCI)	30,000 private companies are members	PCCI is the Philippines' leading business association, representing various industry sectors. PCCI has various committees, including the environment and climate change committee, which reviews government environmental policies and makes recommendations on behalf of industry. The environment and climate change committee reviews government environmental policies and makes recommendations on behalf of industry.
Federation Of Philippine Industries (FPI)	Many private companies, mainly in the manufacturing industry, are members.	The organization represents the Philippine industrial sector, with a particular focus on manufacturing, and identifies environmental impacts and energy efficiency in manufacturing as important themes for policy review and input to the government.
Net Zero Carbon Alliance (NZCA)	Around 20 private companies including cement companies, energy companies, food companies, consulting companies, and manufacturers of daily necessities (established by EDC, a renewable energy company)	The NZCA brings together private companies that are voluntarily pursuing initiatives to achieve net zero carbon. Member companies will develop annual plans to achieve their net zero carbon goals, and the NZCA will support, review, and verify their activities.
Philippines Energy Efficiency Alliances	About 60 companies in the home appliance manufacturing industry, electric power companies, etc. (Daikin, Mitsubishi corporation, Siemens, Meralco, etc.)	Promotional activities through the dissemination of information on energy conservation, energy efficiency, and renewable energy initiatives, research, policy proposals, financing strategies, etc.
Philippine Alliance For Recycling And Materials Sustainability (Parms)	More than 20 food manufacturers and consumer goods manufacturers (Ajinomoto, P&G, Jollibee, Yakult, etc.) Collaboration with other industry associations, waste contractors,	Supporting the recycling of plastics used in products and academic research on the subject. Conducting activities to ensure compliance with the manufacturer's responsibility for the lifecycle of raw materials (EPR).

Corporate name	Members	Main activities related to climate change action
	universities and research institutions	
Philippines Business For Environment Stewardship	Ngo founded by scholars and researchers	Conduct research and provide policy recommendations on environmental management and business practices.
Business For Sustainable Development (BSD) (Formerly Philippine Business For Environment)	Currently 60 companies are members Honda, Dole, Unilever, Philips and others, banks, hotel utility companies, etc.	A non-profit industry association that provides a platform for companies to address critical social issues affecting their business. Provides advisory services on sustainability reporting, strategies and roadmaps, impact assessments, and project implementation to achieve the sustainable development goals (SDGs).
Philippines Business For Social Progress	260 companies, mostly major Philippine companies, will participate (Aboitiz, Jollibee, First Philippine Holdings, Shell, Nestle, etc.)	A corporate-led NGO that collects and manages about 0.6% of a company's pre-tax income. It uses the profits from its operations to implement a number of community projects, including poverty alleviation and environmental (access to safe water, waste disposal, reforestation, etc.). In the past, Panasonic has donated solar lanterns to Mindanao through this initiative.
National Ecolabelling Program-Green Choice Philippine (NEP-GCP)	Independent third-party institution	Conducts audits and provides eco-label certification for 42 different products, including cement, paint, tissue, led lights, detergents, and construction materials, based on iso 14024 (environmental labeling standard).
The Philippine Green Building Council (Philgbc)		An NGO dedicated to the promotion of green and sustainable building practices, established the building for ecologically responsive design excellence green building certification system in 2009, which assigns a 1-5 star rating to buildings based on the assessment of their design, construction, and operation stages. It is also a member of the world green building council.

Philippine companies, especially conglomerate groups, are also actively engaged in climate change initiatives. As an example, significant efforts by Ayala Corporation is illustrated below.

Ayala Corporation is one of the largest corporate groups in the Philippines, and as a group, it has pledged to achieve Net Zero by 2050. Ayala has invested heavily in renewable energy projects, energy efficiency, and projects that minimize environmental impact; the Ayala Renewables division is involved in wind and solar projects, and BPI Bank, another group company, has issued a US\$250 million green bond in 2023.

Ayala Land, a real estate developer, also pioneered the Ayala Land Sustainability Framework in 2008, and has received many LEED (Leadership in Energy and Environmental Design) certifications through environmentally conscious design and construction in urban development. In supply chain management, the company has set the ISO 20400:2017 Guidelines for Sustainable Procurement as a benchmark for its supply chain policies and processes.

Energy Group has linked climate change issues to its financial plans as it plans to divest completely of its coal power generation-related assets by 2030. Among the major companies in the group, Ayala Land and Energy Group have already achieved carbon neutrality ahead of the group-wide target.

Ayala has been incorporating TCFD recommendations into its annual reports since 2019 and became an official signatory to the Task Force on Climate-Related Financial Disclosures (TCFD) in 2021.

In terms of adaptation measures, the telecommunications company Globe, one of the group companies, has reconstructed its transmission antenna towers to withstand large typhoons, based on its experience with the damage caused by Typhoon Haiyan (Philippine name: Yolanda) in 2013, and even if one of its data centers is physically damaged by extreme weather events, the company has established a system to initiate automatic exchange at most of its sites. In the construction of base stations, base station cabinets are built high when construction is unavoidable in flood-prone areas or near river systems.

One unique initiative is that climate change initiatives are also reflected in salary evaluations, with the CEO and other top management receiving incentives for performance related to GHG emission reduction and behavior change activities. In addition, Ayala Land's business units are encouraged to use more energy-efficient technologies and procure renewable energy sources in their operations as internal carbon tax is imposed to each business unit based on annual fuel and electricity consumption in their respective project.

5) Commitment to the SDGs by Philippine Companies

In 2017, UNDP and Business for Sustainable Development (then called Philippine Business for the Environment) released the report “Transformational Business-Philippine Business Contributions to the United Nations Sustainable Development Goals”. The report examined the SDGs related activities of 75 companies, most of them are big foreign-owned or conglomerates companies. Many of these companies have been active in the SDGs since before the concept of SDGs was born, and by the time of the study, PHP 40.7 billion had been invested in the SDGs. The most heavily invested areas were SDG 11, Realization of inclusive, safe, resilient, and sustainable cities and human settlements, with PHP13.7 billion (34%); SDG 4, Quality education, with PHP11.3 billion (28%); SDG 7, Access to sustainable energy, with PHP11.3 billion (19%); SDG 9, Sustainable development, with PHP11.3 billion (19%); and SDG 10, Sustainable development, with PHP11.3 billion (19%). billion (19%), and SDG 3 on ensuring healthy lives and promoting well-being at PHP7 billion (17%), with these four areas accounting for 98% of the total investment. The largest number of initiatives was related to sustainable consumption and production under SDG 12, with PHP 88.6 million invested in 24 initiatives, including green procurement, efficient water use, and waste management of hazardous and other wastes, etc. As for SDG 13, which relates to specific measures to address climate change, the total amount of investment was not stated, but 7 initiatives were reported, mainly in the area of disaster prevention, such as disaster prevention education and weather information provision.

The table below shows examples of initiatives that were mentioned as contributing to GHG reduction and climate change countermeasures:

Table 2-167 Examples of SDGs related activities by Philippine Companies

Company Name	Activities
Mitigation	
Cebu Holdings	Contributed to solving the community's waste problem by donating a garbage truck and subsidizing its monthly gasoline bill. The company provides recyclable waste from the shopping mall it has developed as raw materials for crafts made by women in the neighboring community. Replacing streetlights in Cebu Business Park etc. with LEDs
Mondelez Philippine	Generates biomass power from rice husks and coconut shells for use in its own factories Installed a water treatment facility using osmosis and ultraviolet light at its plant to promote the use of reclaimed water
Honda Cars Philippines	Training and auditing dealers nationwide to be environmentally conscious in their retailers. Reducing CO2 emissions by optimizing demand management in the supply chain and manufacturing with lower power consumption.
Nestle	Installed rainwater harvesting facilities, sewage treatment facilities, and reclaimed water facilities at its factories. In addition, two factories have achieved zero-waste status.
Starbucks	Uses recycled paper for cups and sleeves and promotes recycling of product packaging. Reduced the amount of waste from its stores by offering coffee grounds to be used as compost for home gardens.
Unilever	Implemented a project in which it offers its products as a reward to street cleaners who collect plastic from neighboring homes in their spare time. The Philippine Business for Social Progress (PBSP) manages the project, while Earth Management and Recycling Technologies (EMRTI) handles the transportation of plastic waste and its conversion into paving materials. The company is also developing a reward program that allows customers to earn points by bringing plastic waste from their products to the store where they purchased them, and plans to expand the service to all of the Philippines by 2050..
Proctor & Gamble (P&G)	Financing and Conducting feasibility studies on waste-to-energy projects in Angeles City, Pampanga Province and Cabuyao City, Laguna Province with ADB. (Surveyor's note: The ADB study was completed in 2019, but the actual project had not been implemented by that time.)
Globe Telecom	Work with Coca-Cola, U.S. Embassy, Unionbank, Nestle, and others to collect e-waste from various establishments and recycle it in Singapore. Proceeds from recycling are used to donate additional classrooms and ICT classroom equipment to public schools.
PLDT	Collects lead-acid batteries and donates the proceeds to public schools and medical institutions
Adaptation	
Shell Philippines Exploration B.V.	Installed 16 weather stations in Palawan and provided disaster preparedness training to residents. Educate children on first aid, road safety, and disaster preparedness.
Aboitiz Group	Through the Weather Philippines Foundation, has installed more than 1,000 weather stations and developed an app that makes the data from these stations available free of charge.
Smart	Developed a free app that can let people know where they are in the event of a disaster. It also provides disaster forecasts linked to data from PAGASA and other sources, as well as a mapping function to determine where assistance is needed in the event of a disaster.
Globe Telecom	Provides free internet and charging services during disasters. Produced hazard maps for 54 of the 81 provinces in the Philippine

Source: extracted by JICA survey team from "Transformational Business-Philippine Business Contributions to the United Nations Sustainable Development Goals", 2017, UNDP

As previously mentioned, Publicly Listed Companies (PLCs) in the Philippines are required to file a Sustainability Report, which describes how they can contribute to the achievement of the SDGs through their products and services. The draft of the new SuRe Form, which is currently being finalized by the SEC, will include information on how much each company has invested in and contributed to the SDGs, which is expected to make it easier to collect data on the SDG efforts of Philippine PLCs.

6) Initiatives at Special Economic Zones (SEZs)

As of March 2022, there are 419 Special Economic Zones (SEZs) in the Philippines, housing more than 4,600 companies.

Table 2-168 Breakdown of Philippine’s SEZs

Types of SEZs	Numbers
Manufacturing Economic Zones	78
ITC Park/Centers	297
Tourism Economic Zones	17
Agro-industrial economic zones	24
Medical tourism parks/centers	3

Source: PEZA website

SEZs are under the jurisdiction of the Philippine Economic Zone Authority (PEZA), an agency attached to the DTI. Because SEZs offer preferential corporate and business taxes, many foreign companies, including Japanese companies, have moved into these zones, and many of these companies are export-oriented. An ECC (Environmental Compliance Certificate) issued by the DENR EMB is required to establish a SEZ.

Since many of the resident companies are engaged in the export business, environmental initiatives and meeting the requirements of export markets is an important part of their agenda, and PEZA has undertaken a number of initiatives. With the cooperation of the Swiss State Secretariat for Economic Affairs (SECO), PEZA has signed the MOU with the Global Reporting Initiative (GRI) to develop a framework for international standards and disclosure of information on sustainability. The MOU, signed in March 2022 and then upgraded again in January 2023, aims to (1) Raise awareness of sustainability reporting of the resident companies, most of which are export-related industries. (2) Create sustainability reporting guidelines specific to export-related industries (3) Strengthen the reporting capacity of export-related industry companies on their economic, environmental, and social impacts. PEZA will hold a meeting with the tenant companies with the aim of issuing a PEZA’s Memorandum Circular on Sustainable Trade and Investments Guidelines, and discuss what to include in the reporting requirements by the tenant companies. In addition, PEZA itself will submit their 2023 sustainability report to the SEC and the report will be positioned as a pioneering effort to incorporate trade and investment perspectives into sustainability reports

in cooperation with GRI, and will serve as a benchmark for public institutions, that are not currently required to submit sustainability reports, and private companies to follow the initiative.

As a result, SEZ tenants may be required to submit sustainability reports, which are currently only required for PLCs. The details of the subject companies and the contents of the reports will be discussed in the future, but the direction of the discussion attracts many stakeholders' attention, as the more than 4,600 resident companies vary in asset size, number of employees, and nationality, with some large companies already filing sustainability reports with the SEC and some relatively small companies. The future direction of the discussion is worth noting.

PEZA has also implemented measures such as exemption of import duties on solar panels and energy-saving equipment such as LED lights, support for tenant companies to obtain ISO 50001 (energy management) certification, and measures to allow companies to sell surplus electricity from rooftop solar power generation in the SEZ to other tenants as off-takers. In September 2022, PEZA signed an MOU with Upgrade Energy Philippines for the construction of 10 MW of solar power plants in the Cavite Economic Zone and Baguio City Economic Zone, respectively. Advantech, which is conducting the "Needs Assessment on Renewable Energy Supply and Disaster Mitigation Effectiveness of Solar Power and Battery Storage in the Philippines" as part of JICA's private-sector partnership project, also signed an MOU with PEZA in October 2023, and is planning to install 360 MW of solar power generation per annum in the Pampanga Economic Zone.

Many of the SEZ's developers and tenants are also involved in environmental initiatives, and PEZA awards prizes to companies that have made outstanding efforts. In 2020, the Green, Healthy, Smart, and Sustainable Ecozone Award was given to SEZs that meet strict requirements, such as obtaining ISO 50001 (energy management), installing recycled water systems, and obtaining LEED (Leadership in Energy & Environmental Design) certification for their buildings. First Philippine Industrial Park (FPIP) has received this award. In the past, Fujitsu, Advanced Energy, Samsung Electro-Mechanics, and Murata Manufacturing, among others, have received the PEZA's Outstanding Environmental Performance Award.

FPIP is promoting the use of renewable energy in the SEZ with the goal of achieving net-zero energy consumption by 2030, using sustainable materials in the construction of the perimeter wall, and partnering with companies that collect and recycle hazardous waste from the area. In addition, as part of its social contribution activities, the company conducts river cleanups, tree planting, and environmental awareness programs for elementary school students together with its tenant companies.

7) Challenges faced by Japanese companies operating in or having business with the Philippines

According to the Japan's Ministry of Foreign Affairs' survey on the number of Japanese companies doing business overseas in 2022, 1,434 Japanese companies had established operations in the Philippines as of

October 2022.¹¹⁵ In 2022, Japan accounted for 14.1% of Philippine exports, ranking second to the U.S., and 9% of imports, ranking third after China and Indonesia, making the Philippines and Japan an important trading partner for both imports and exports.

The table below summarizes the findings through the interviews with Japanese companies and organizations in the Philippines or doing business with the Philippines along with an intensive desktop survey on the situation and challenges in the Philippines with regard to climate change issues. Results and feedbacks of these studies and interviews were incorporated in possible cooperation programs presented in Chapter 3.

Table 2-169 Challenges faced by Japanese companies

Industry/ Organization Name	Issues faced by Japanese companies and organizations
Japanese Chamber of Commerce and Industry of the Philippines	<ul style="list-style-type: none"> • Many problems exist with industrial and hazardous waste treatment. For example, some items that cannot be processed must be exported to Japan and other countries for processing. • The majority of Japanese companies in the Philippines are export-oriented businesses. Products for Europe and the U.S. are often subject to strict environmental standards, especially during the production cycle, and the inability to properly treat these wastes domestically will result in costs and reduced competitiveness.
JETRO	<ul style="list-style-type: none"> • Japanese companies' efforts in the area of climate change are not limited to consideration of the environment in Japan headquarters, but have become increasingly aware of the need to consider the environment at all their locations around the world. • As part of the initiative, an increasing number of Japanese companies here are looking to install solar panels at their factories, but the installation process can take a long time and the quality of the panels installed can be poor. • Incentives for companies to install solar panels would boost the number of solar panel installment. • The number of proper disposal sites is insufficient and sanitary disposal is not carried out. Also, waste separation has not progressed.
energy (Gas)	<ul style="list-style-type: none"> • The nation has plans for an LNG import receiving terminal, but does not know exactly where it will be built. With the location of the power plant unclear, determining the site where the base will be built is a risk. The project risk will not be lowered unless three factors are identified: the potential site, the timing of development, and the scale of development. • As for natural gas-fired power, it will lose and go bankrupt because the cost structure of coal-fired power is better. It is not profitable because the spot procurement price is only about 10 pesos. In addition, with the current demand, electricity is purchased from coal-fired power plants with lower prices, and the remainder has to be filled by gas-fired power plants, which means that the operating rate can only be expected to be about 2 %. Especially in the Philippines, demand increases from April to June , and that is the only time when the entire amount of electricity can be sold, since there is a shortage at peak load. As a result, project financing is not available, which is a problem.
energy (Renewable Energy)	<ul style="list-style-type: none"> • When investing in a local company or project, foreign investment restrictions were previously limited to a 40% stake, but were eliminated last year, making it easier for foreign investors to invest. • In the process of acquiring shares when investing, if the investee company does

¹¹⁵ (1) Overseas branches of Japanese companies, (2) local corporations wholly owned by Japanese companies and their branches, (3) joint ventures (local corporations in which Japanese companies have a direct or indirect investment of 10% or more) and their branches, and (4) companies established by Japanese people overseas (in which Japanese people have an investment of 10% or more) are eligible for the count

Industry/ Organization Name	Issues faced by Japanese companies and organizations
	<p>not have an authorized limit of shares, it is necessary for the investee company to apply for and receive approval from the Securities and Exchange Commission for a capital increase. This is a risk for investors since there will be a period of time during which shares will not be issued despite the fact that they have already paid their investment in advance. There are hedging measures such as using an escrow account to protect the capital paid in advance, but they are time-consuming, costly, and difficult to negotiate.</p> <ul style="list-style-type: none"> • Japanese government funds can be used for feasibility assessments and FS, but not much financial support is available for the demonstration stage, so the project implementation cannot be fully decided. A subsidy system would enable cash-strapped businesses to participate in renewable energy projects and contribute to further promotion of renewable energy, but low interest loans to support initial investment are also considered effective to some extent. • Last year, the Philippines launched the Green Energy Auction Program, an auction system for renewable energy projects, which grants the winning bidder the right to conclude a feed-in tariff (FIT) contract with the state-owned transmission company. Offshore wind developers are granted a 5-year grace period to study the development of a particular site by concluding a service contract (SC) with the DOE for the development of a specific area. However, the price of FIT is essential in the calculation of profitability, and if the consideration of the revenue side is delayed, the consideration of the cost side will also be delayed, so it will be difficult to bring the SC into operation within the 5-year grace period considering the current situation. • The land required for solar is vast and DAR requires a permit for conversion from agricultural land, which is time-consuming, labor-intensive, and unreliable. • Land ownership is complex and can have hundreds of owners in one site. It can take 1 to 2 years to conduct a preliminary survey of the subject land, during which time lease fees and other costs can deteriorate the business feasibility of the project. • It takes time to conclude Service Contract with DOE. • Low-interest loans for business entities would be desirable. Japanese technological capabilities are important in the introduction of pumped storage power generation, and the availability of overseas investment and financing would further facilitate the path to business entry. • Some initiatives should be done at the national policy level, but most government-related entities do not seem to be committed enough to such policies, which is why people from Japan who come to the region to expand their business are exhausted by the search for appropriate counterpart. We would like to see these collaborations include the clarification of initiatives. For example, there could be a form of public-private task force. • Policies from the central government have not spread to the regions very well. Incentives may be a good way to break through these barriers, for DOE with few financial resources. As an incentive scheme, there may be institutional incentives, such as making it a point requirement for selecting operators.
energy (Power generation in general)	<ul style="list-style-type: none"> • There are many ministries with jurisdiction over the power generation sector, and approval by the Energy Regulatory Commission (ERC) is required, but approval is slow, sometimes taking years, which increases business risks, such as unnecessary expenses and loss of business potential. • The lack of strong evidence to make major decisions, such as investment, is sometimes a problem. For example, there are cases where development must proceed without a Power Purchase Agreement (PPA) being determined, making it difficult to make business decisions because there is no substitute. • When trying to conclude a PPA, a CSP (Competitive Selection Process) is required. Large-scale renewable energy projects must go through the CSP before they can be sold to power distribution companies, and because of the

Industry/ Organization Name	Issues faced by Japanese companies and organizations
	<p>competition in terms of price and other factors, they may not be as profitable as expected. In addition, after the CSP, the application must also go through the ERC, but there is a risk that the application will be rejected because of the low price to the public as the motto.</p> <ul style="list-style-type: none"> • The OPS (Optional Power Supply Scheme) is a scheme that shortens the CSP. If a company has a technology that has not yet been introduced, it can obtain a seed right in the CSP competition, but since there are few technologies that have not yet been introduced, it is quite difficult to apply. • If the distance from the power plant to the substation is long, the land for the transmission line is also subject to lease, which is costly. Furthermore, even if the line is connected to a nearby substation, there is not enough capacity, and the subsequent transmission line also lacks capacity. • One request to the local government is to expedite the land permitting process, as the NGCP cites inability to obtain permits on the part of the local government as the reason for the delay in implementation of the NGCP. • Subsidies for coal phase-out would be desirable. Incentive finance, such as funding for converting from coal power generation to gas power generation, would also be desirable. • Preferential taxation, tax exemptions, and exemptions for importing materials and equipment would be desirable. • In light of the NGCP's transmission line problem, it would be appreciated if a business model could be developed in which the private sector also installs transmission lines.
energy (New Technology)	<ul style="list-style-type: none"> • Even if ammonia co-firing is implemented in coal- and natural gas-fired power generation, the price of ammonia is too low compared to coal in the free electricity market, so there is no private commercial reason for ammonia co-firing. It would be helpful to have measures to recover ammonia investment costs, such as green certificates and carbon credits. • CCUS is not expected to have much storage potential in the Philippines and is not entering the market because other countries that are more institutionally advanced have more potential.
energy (Power distribution and electrification)	<ul style="list-style-type: none"> • Since the government has set a target of 100% electrification, microgrids that lead to the electrification of un-electrified areas are easy to implement. The government has designated QTP (Qualified Third Party) areas, and it is believed the situation is favorable for increasing the number of assets. On the other hand, QTP implementation requires approval from the DOE and the ERC, but it takes time, and until approval is obtained, subsidies for off-grid areas cannot be obtained, but on the other hand, local residents request early power supply if facilities are available and electricity can be generated. This is a dilemma that is forcing businesses to make a tough choice. In addition, the business environment is becoming more difficult due to reduced demand from COVID-19 and soaring fuel prices by war in Ukraine . • The risk is the slow movement on the part of the government and the uncertainty of future development plans. Since there is a high tendency to depend on diesel in remote islands, it is desirable that the introduction of renewable energy in remote islands properly considered as a national target for decarbonization. Or, if there is a national policy to introduce renewable energy in remote islands, it will be easier to develop and introduce it. • An Impact Assessment is required for the construction of the transmission line, but it takes time, at the earliest 1 year. In the meantime, the Engineering, Procurement, Construction (EPC) costs calculated during the preliminary study will change, making the project unprofitable. • Grid code modification by utilities is a certainty for the introduction of new technology, but it is a bit difficult to have high hopes when there are so many grid codes that are inadequate even at this point in time. The grid code will probably be in place 10-15 years after the technology becomes widely

Industry/ Organization Name	Issues faced by Japanese companies and organizations
	<p>available. On the other hand, since it is important for the technology to first become an option for utilities to introduce, the support such as recommendations in the technology guidelines for power supply investment, for example would be appreciated. In addition, it is necessary to have not only a mere introduction of the technology to be introduced, but also guidelines for its actual operation.</p>
ICT	<ul style="list-style-type: none"> • Weak logistics network and inability to track packages, etc., resulting in delayed or lost deliveries • Weather forecasts are not accurate. • Electricity rates are high compared to surrounding ASEAN countries • Data center recovery measures and cyber security measures in the event of a disaster are lagging behind
Manufacturing	<ul style="list-style-type: none"> • Although MEPS (Minimum Energy Performance Standards) have been introduced, the standards are lower than in other countries to begin with, so products with performance that cannot be sold in other countries can still be sold. The standards are to be reviewed gradually, and it is expected that stricter standards will be set. • Inspection is left to the manufacturer, and some manufacturers are making false declarations; DOE is supposed to conduct unannounced inspections, but has not done so.
Food	<ul style="list-style-type: none"> • EPR law has been enacted, requiring the collection of 20% of plastic product packages used in the previous year by the end of 2023, but there is no list of trusted collection and recycling companies, and we do not know which companies to use. • Many companies are required to prepare and submit an EPR plan but have not been able to do so because they have not been able to select a vendor. All companies are aware that they are still watching how other companies are handling the situation.
Finance	<ul style="list-style-type: none"> • No accreditation body in the Philippines for bonds, etc. • Many private companies in the Philippines are slow to disclose information, creating challenges for foreign investment.
Agriculture and Forestry	<ul style="list-style-type: none"> • Efforts are underway to commercialize JCM, but in some cases, land ownership is unclear in the boundary setting. • Local human resources for ongoing monitoring are needed. • In the case of credit sales, we anticipate that securing a sales destination will be an issue. • Irrigation facilities for water management are essential to implement intermittently irrigation that reduces paddy methane, and we hope that they will be developed.
Agriculture (Fisheries)	<ul style="list-style-type: none"> • While local autonomy is advanced and there is an advantage in being able to proceed with an aquaculture project if permission is obtained from the LGUs, there are often cases where regulations are imposed because of the protected area. • There are many unused fishing grounds, and from the perspective of preventing overfishing in offshore fisheries, there is a strong possibility that aquaculture projects will expand in coastal area. On the other hand, aquaculture projects are prone to water quality problems, and environmental regulations may become more stringent in the future. • Since they are prone to typhoon damage, there are free government insurance policies and subsidies and loans from LGUs to compensate for the damage. As a measure against climate change, Philippines promotes diversifying fishing grounds, and there is little awareness of spending money on materials and equipment. However, since the number of equipment installations has doubled so far since the end of the private-sector partnership project, more and more businesses are seeing the need and are installing such equipment. • When Japanese companies set up operations in the Philippines, they are sure

Industry/ Organization Name	Issues faced by Japanese companies and organizations
	<p>to face the challenge of cost-effectiveness. The only way to deal with this is to lower costs by cooperating with partners in the Philippines, or to secure customers who are willing to pay higher prices by providing value-added services.</p> <ul style="list-style-type: none"> • Through the deployment of smart fisheries technology (visualization of landings, marine environmental data, etc., improved access to information, equipment development, etc.) promoted by the Japanese Fisheries Agency, it is necessary not only to catch fish but also to manage coastal and marine resources.

(2) Recommendations on the utilization of private funds and promotion of private sector activities

As noted above, the Philippines has policies to encourage private sector climate change initiatives and a framework for financing and investing in green projects. However, incentives and capital flows to the private sector are not sufficient.

While the details of cooperation programs in each priority sector are provided in Chapter 3, the following recommendations are made to stimulate climate change actions from the perspective of promoting the private sector.

Use of Two Step Loans

As mentioned above, the use of TSLs is an effective tool that can bring in funds to address specific issues. For example, it can stimulate business activities by providing long-term financing at low interest rates compared to the market, focusing on specific industries, specific objectives, and sometimes promoting specific regions, such as greening and mechanization of manufacturing, SME promotion, agricultural mechanization, housing finance, small infrastructure development, and so on. In addition, by involving not only government financial institutions but also a wide range of private banks, it is possible to deepen the understanding of green project financing among private banks, and is also likely to serve as a catalyst for other types of financing. In addition, problems with existing loans from local banks, such as excessive time required for review and procedures, and the limitation of collateral to real estate, can also be improved through consulting services. While there are many advantages to have private banks involved as Participating Financial Institutions (PFIs), it is important to include measures in advance to deal with bankruptcy and funding crises.

Two Step Loans have already been implemented in the Philippines and are being used in many other countries, including India, Myanmar, Uzbekistan, Mongolia, Tanzania, and Senegal. Other environmental projects implemented to date include the "Environmental Development Project" in the Philippines, the "SME Development and Environmental Protection Two-Step Loan Project" in Mongolia, and the "Energy Efficiency and Conservation Promotion Loan Project" and "Energy Efficiency and Conservation Promotion Loan Project (Phase 2)" in Mongolia. In addition to JICA, the Japan Bank for International Cooperation

(JBIC) has also provided two-step loans, including “Two step loan to support renewable energy projects and energy efficiency projects” to Mexico, “Two-step loan under GREEN” (Global Action for Reconciling Economic Growth and Environmental Preservation) to Latin America, and “Two step loan to support renewable energy projects under GREEN” to Vietnam.

Establish a Green Desk

Experts are assigned to provide advice to companies that need to implement new or strengthen their green initiatives. For example, experts will be assigned to provide advice and liaison with relevant government agencies to companies that are having difficulty complying with the EPR Act, companies that want to implement climate change initiatives but do not know where to start, and companies that are considering issuing green bonds. In addition to responding to inquiries from companies, the experts will also conduct seminars and workshops, possibly through JICA's Expert Dispatch Scheme or technical cooperation projects, and may be dispatched to the BOI, PPP centers, or other ministries tasked with responding to the needs of the private sector at large. Although not a green related project, JICA has in the past dispatched experts to the Directorate of Investment and Company Administration (DICA) of Myanmar's Ministry of Planning and Finance in cooperation with JETRO to meet the needs of Japanese companies entering the Myanmar market.

Loans/Investments/Technical Cooperation/Yen Loans for Green SEZs

JICA can participate in the management of Green SEZs (SEZs planned and operated by Japanese companies and marketed as environmentally friendly) through loans and investments, provides one-stop services for government-related procedures (technical cooperation and dispatch of experts) for companies that have moved into SEZs, and provided TSL to companies that have moved into Green SEZs. Although not focused on GHG mitigation, JICA has made investment in and financing of SEZ operations in Myanmar, Bangladesh, and other countries, support infrastructure development through ODA Loan, provide Two Step Loans to the tenants, and participate in the development and management of the SEZs in Myanmar, Bangladesh, and other countries.

Injection of funds through PSIF (Private Sector Investment and Finance) scheme

Through indirect financing to companies engaged in green projects widely through the injection of funds into impact investment funds, green venture funds, and local banks that actively finance green projects, JICA can further support the green activities of private sector. The ADB report of 2022 also mentioned the need for market demand for green bonds, the purchase of large amounts of green bonds by public funds as an effective measure, and the role that investors and securities companies expect from international

institutions such as the ADB¹¹⁶. The participation of a public fund such as JICA is also expected to have the effect of priming private and foreign investment.

Utilization of Knowledge Co-creation Programs (KCCP)

The following Knowledge Co-creation Programs are expected to contribute to the improvement of the policy-making capacity of Philippine government officials through effective utilization of existing subject-specific training programs.¹¹⁷

Table 2-170 List of the Knowledge Co-creation Programs related to Private Sector Enhancement

Sector	Name of the program
Environmental Management	Enhancing Access to Climate Finance: Theory and Application for Practitioners
Economic Policy	Financial Regulation and Supervision
Economic Policy	Monetary Policy and Central Bank Operations-Sharing Practical Experiences
Economic Policy	Stock Exchange Development
Economic Policy	Finance for Regional Development including SME Finance and PPP
Urban/Regional Development	Sustainable Housing and Building Policy (Decarbonization Building, Green Housing Finance, Affordable Housing)

Source: Created by Survey Team from JICA Website

¹¹⁶ <https://www.adb.org/sites/default/files/publication/813001/green-bond-market-survey-philippines.pdf>

¹¹⁷ https://www.jica.go.jp/Resource/english/our_work/types_of_assistance/tech/acceptance/training/about/2023/index.html

Chapter 3 Consideration of Cooperation Programs

As shown in Chapter 2, the Philippines is extremely vulnerable to the impacts of climate change and suffers damages from natural disasters every year, and based on future climate change projections, this trend is expected to continue and worsen. On the other hand, the country's GHG emissions have nearly doubled from 107 Mt-CO₂e in 2010 to 204 Mt-CO₂e in 2020.

The Survey analyzed the current status as well as issues related to climate change countermeasures in the Philippines using the information collected from various stakeholders. The Survey also identified specific issues and challenges in priority sectors, based on climate-related policies and targets, that may not be solved solely with available domestic human and financial resources or even with the support from development partners. The Survey identified such issues as the potential area where the Philippine government could enhance climate change countermeasures to which JICA may provide support.

A possible direction of JICA's cooperation with the Philippines on climate change is shown in this Chapter considering the urgency to address the identified issues, the adaptation and mitigation effects, and the spillover effect on the relevant sector/ sub-sector or the entire society. Taking into account that possible supports are to be provided by the Government of Japan, possible cooperations are checked also with consistency with the Japan's and JICA's relevant policies and strategies and also the possibility of utilizing Japan's climate-related technologies and knowledge.

In this Chapter, the current situation and ideal state for each priority sector are summarized, and a detailed analysis of the issues that can be resolved through JICA's cooperation are presented, and then possible cooperation programs are explained.

Various support schemes have been hypothetically applied including Technical Cooperation (including dispatch of experts to the Philippines, Technical Cooperation Projects, Technical Cooperation for Development Planning, Science and Technology Research Partnership for Sustainable Development (SATREPS), Knowledge Co-Creation Program (KCCP) or acceptance of training participants), Loan, Grants, Public-Private Partnerships (PPP), Private Sector Investment and Finance scheme (PSIF), and Japan Overseas Cooperation Volunteers (JOCVs).¹¹⁸

¹¹⁸ Details of each support scheme can be found on JICA website.
https://www.jica.go.jp/Resource/philippine/english/activities/activity_01.html
For Public-Private Partnerships, see https://www.jica.go.jp/english/activities/schemes/priv_partner/index.html
For Private Sector Investment and Finance, see
<https://www.jica.go.jp/Resource/uganda/english/office/topics/210527.html>.

3.1 Examination of Challenges/ Issues and Consideration of Possible Cooperation Programs

3.1.1 Shortlisting of Issues and Challenges

As a result of the information collection and analysis, issues in the priority sectors that are already of high concern to the Philippine government and that require immediate improvement were identified.

This section summarizes the identified issues and support needs that need improvement in each of the six priority sectors, and the results of the survey toward the consideration of possible cooperation programs to be undertaken by JICA.

(1) Paris Agreement Implementation

1) Analysis of the identified issues

The Philippine government signed the Paris Agreement on April 22, 2016, and acceded to it on March 23, 2017. The Philippines government submitted an INDC in 2015 and stated reducing GHG emissions by 70% by 2030 compared to the 2000-2030 BAU scenario. For adaptation, it emphasized the need for climate change adaptation and disaster risk reduction. In addition, it emphasizes the need for technology transfer, innovation, and financial support for adaptation, loss and damage minimization, and mitigation capacity building.

The first NDC was submitted in April 2021, with a mitigation target of 75% GHG emission reduction between 2020 and 2030 compared to the BAU (72.29% GHG emission reduction with conditions and 2.71% without conditions). On the other hand, the Philippine government has not yet declared itself carbon neutral.

In addition, the Philippines is in a tropical area and extremely vulnerable to weather-related disasters, with various impacts on infrastructure, food, agriculture, and health sectors. In this circumstance, the government has declared the implementation of adaptation measures in the NDC to mitigate damages and losses in the areas of agriculture, forestry, coastal and marine ecosystems, biodiversity, health, and human security, and will promote the implementation of the Paris Agreement. Also, PSF is promoting adaptation programs and projects, with PHP 880 million allocated for 11 project implementation and 6 project development assistance as of November 2023.

From the perspective of decarbonization and building resilient societies, specific efforts should be made to implement the Paris Agreement, particularly regarding the following provisions.

Table 3-1 Relevant articles in the Paris Agreement and the current response of the Philippines

Provision	Main items to be addressed	Response in the Philippines
Article 4 Mitigation	• NDC development, submission, and maintenance	NDC was submitted in 2021 NDC Implementation plan is undergoing high-level technical vetting (ADB and UNDP support)
	Revised and submission of NDC every 5 years	Revised NDC will be submitted after 2025
	Implement mitigation measures based on NDC	Implementation is underway anchored on the NDC implementation plan.
	Accounting for GHG emissions and removals through NDCs under the principles of environmental integrity, transparency, accuracy, completeness, comparability, and consistency to avoid double-counting.	To be considered in the future
	Develop and submit a Long-Term low greenhouse gas emission development Strategy (LTS).	LTS has not yet been developed (to be supported by GEF, ADB, and the Department of the Environment of Japan).
Article 6 Market mechanism	Consideration of JCM utilization (especially avoidance of double counting of credits, ITMOs) as one of cooperative approaches	Ongoing cooperation with the Japanese Department of the Environment
	Link domestic emissions trading schemes to international markets	DENR and others are studying a domestic emissions trading system (supported by UNDP). DA is considering the establishment of a crediting system and market for soil organic absorption (supported by ADB).
Article 7 Adaptation	Gender, inclusion of all stakeholders, best science, traditional knowledge, use of indigenous peoples	Mainstreaming and strengthening gender-responsive approaches in the formulation and implementation of climate change policies, plans, programs, and activities pursuant to Commission Resolution No. 2019-002
	Strengthening adaptation actions (sharing good practices, institutional measures for knowledge integration, improving knowledge of climate science, support for developing countries, improving effectiveness and sustainability of adaptation actions)	National Adaptation Plan was developed (with UK support) and various initiatives are ongoing utilizing PSF
	Periodic submission of Adaptation communication (if appropriate)	National Adaptation Plan was developed (with UK support)
Article 13 Transparency	Improve and strengthen transparency	To be considered in the future
	Submission of Biennial Update Report (BUR) and being International Consultation and Analysis (ICA)	Working on submission of BUR by the end of 2023
	Submission of Biennial Transparency Report (BTR), including national inventory, progress toward implementing and achieving NDC, and information on receipt of and needs for financial, technology transfer, and capacity building assistance	Working to submit BTR by the end of 2024

Provision	Main items to be addressed	Response in the Philippines
Article 14 Global stock take	Responding to the first global stock take starting in 2023	Cooperation in the implementation of the Global Stock take, including the provision of information necessary for the Global stock take implementation

Table 3-2 Issue analysis (Paris Agreement Implementation)

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
Common					
Documents required to be developed and submitted under the Paris Agreement should be submitted in timely manner	<p>Paris Agreement</p> <ul style="list-style-type: none"> ➢ Article 4: Promoting Mitigation, Article 6: Market Mechanisms, Article 7: Promoting Adaptation, Article 13: Promoting Transparency, Article 14: Global Stocktaking ➢ Development and submission of LTS ➢ Development and submission of BTR (including national GHG inventories, etc.) <p>NDC</p> <ul style="list-style-type: none"> ➢ Targets for mitigation include 75% GHG emission reduction between 2020 and 2030 compared to the status quo with no action (Business as Usual (BAU)) (72.29% GHG emission reduction with conditions and 2.71% GHG emission reduction without conditions) ➢ Seven areas of adaptation have been identified: food security, water security, ecological and environmental stability, human security, climate smart industries and services, sustainable energy, and knowledge and capacity development, aiming to be consistent with the Sustainable Development Goals and the Sendai Framework for Disaster Reduction 	<p>The CCC, in coordination with the concerned government agencies, has finalized the GHGI for 2015 and 2020. The final report manuscript and summary report are undergoing editorial enhancements, in preparation for publication and mass dissemination by the first semester of 2024. The National Communication required to be submitted to the UNFCCC Secretariat has also not been updated since the second version was submitted in 2015. The BUR, which is required to be developed and submitted under the Paris Agreement, has also not been submitted. Furthermore, the BTR (the first BTR is due by the end of 2024) is currently being developed with the support of the GEF and FAO.</p> <p>The limitations encountered in the development of climate reports are on data collection. These are necessary for the preparation of materials from related organizations. Existing rules and procedures for consolidating necessary information and data from related organizations are still being developed, and thus information is yet to be collected and organized at the appropriate time and in the appropriate content. (according to the results of the interviews). There might be another reason that there were high-priority tasks such as NDC Implementation Plan and NAP formulation during 2023, so there was not enough human resources available for inventory and LTS formulation work. The GHG inventory data for 2015 and 2020 will soon be available on the website (https://niccdies.climate.gov.ph/).</p>	<p>The resolution of this issue will lead to the fulfillment of the obligations required of the Philippines under the Paris Agreement and will also demonstrate internationally the country's sincere commitment to climate change countermeasures. Furthermore, through the formulation and publication of the various documents that the Philippines is required to submit, the status and challenges of the country's climate change countermeasures will be clarified, and the activities that the country should focus on in the future will be made more concrete. It will also make it possible to set more specific goals and activities for international support, which will greatly contribute to the promotion of climate change countermeasures in the Philippines.</p>	<p>JICA has a track record of implementing capacity building projects related to support for the formulation of national GHG inventories in Indonesia, Vietnam, Papua New Guinea, and other countries in the past. Based on this knowledge, JICA can support the establishment of a system to facilitate the formulation and updating of national GHG inventories in the Philippines, as well as the establishment of an MRV system for mitigation activities.</p> <ul style="list-style-type: none"> ➢ Project of capacity development for climate change strategies in Indonesia ➢ Project to Support the Planning and Implementation of NAMAs in a MRV Manner ➢ Capacity Development Project for Operationalization of PNG Forest Resource Information Management System for Addressing Climate Change <p>In addition, the PaSTI (Partnership for Transparency for Co-Innovation) initiative is also being implemented by the Japanese Department of the Environment. The knowledge of transparency obtained through these activities could also be effectively used to ensure transparency in national and local policies. The Japanese Department of the Environment holds an annual Workshop on Greenhouse Gas Inventory Development in Asia (WGIA) regarding the development of GHG inventories, and collaboration with this workshop could also be effective. In dispatching experts to CCC, more effective support can be provided by conducting technical support activities for CCC staff and implementing technical cooperation projects after more detailed identification and analysis of items that need to be strengthened by CCC.</p>	<p>Technical cooperation (Dispatch of Experts) to CCC</p> <ul style="list-style-type: none"> ➢ Advice on formulation of documents to be submitted to UN ➢ Support for coordination with relevant organizations <p>Capacity Strengthening Project on Climate Change Preparedness under the Transparency Framework (Technical Cooperation)</p> <ul style="list-style-type: none"> ➢ Support for the development of a system and related policies for developing and updating GHG inventories, etc. ➢ Development of manuals for developing and updating GHG inventories ➢ Support for development of preparation of basic data for GHG inventory development ➢ Capacity development for data collection and examination necessary for GHG inventory development
Needs to strengthen ensuring transparency		<p>It is necessary to establish a system for accounting for GHG emissions and absorption in NDCs under the principles of environmental integrity, transparency, accuracy, completeness, comparability, and consistency to avoid double-counting, but efforts to do so are lagging. In addition, although the current NDC sets targets for mitigation, it does not specify the target percentage of reduction by sector, and thus it is not clear in which sector mitigation activities are planned to be focused.</p>	<p>The resolution of this issue is very important for the evaluation in terms of confirming the achievement of the targets indicated in the NDC submitted by the Philippine government under the Paris Agreement and confirming the progress of the initiatives. Among these, it is essential to set sector-specific mitigation targets based on the national GHG inventory and to confirm the achievement of such targets. This will greatly</p>		<p>Technical cooperation (Dispatch of Experts) to CCC (same support as mentioned above)</p> <ul style="list-style-type: none"> ➢ Organizing information on measures necessary to ensure transparency and provide advice on policy deliberations ➢ Support for coordination with relevant organizations

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
		<p>For adaptation, the NAP will present the adaptation measures to be implemented. However, it is assumed that the methodology and system to properly monitor and evaluate the implementation status of these measures have not been established at this point.. This may be partly since the investigation of arrangements for ensuring transparency in these areas has not progressed due to difficulty of securing human resources, as priority has been given to the development of NDC implementation plans, NAPs, and so on.</p> <p>In addition, there are needs to enhance understanding of the CCC and other relevant agencies for the methodologies, organizational structures, implementation procedures necessary to ensure transparency (including MRV for mitigation activities, M&E for adaptation actions, GHG inventories and BTR), as well as the needs to promote the progress in building a cooperative framework with various stakeholders.</p>	<p>contribute to the appropriate evaluation of the implementation and achievement of NDCs. In addition, by facilitating the understanding and clarification of the progress of mitigation and adaptation efforts covered in the NDC, it will also promote the strengthening of efforts based on the progress.</p>		<p>Capacity building project on climate change measures under the transparency framework (technical cooperation)</p> <ul style="list-style-type: none"> ➤ Development of systems and guidance on MRV and M&E of mitigation and adaptation activities
<p>Needs to strengthen knowledge and expertise of CCC staff on climate change measures, transparency, etc., and insufficient organizational and project management capacity</p>	<p>Climate Change Act</p> <ul style="list-style-type: none"> ➤ CCC is positioned as the lead policy making- body on climate change issues in the Philippines <p>Other policies related to promote implementation of other climate change related policies</p> <ul style="list-style-type: none"> ➤ NDC ➤ NCCAP ➤ National Framework Strategy on Climate Change 2011-2022 	<p>The number of CCC staff (34 technical staff) is not sufficient for the responsibilities required of the CCC, and the CCC is still unable to conduct sufficient activities to address the issues that need to be addressed at this stage.</p> <p>To continuously fulfill its responsibilities, it is necessary to increase the number of staff, but it is also necessary for the additional staff to understand and become proficient in the field of climate change. However, the CCC has not made progress in addressing these issues because due to the difficulty of securing human resources and strengthen its capacity. Because CCC has been busy with preparation for the NDC Implementation Plan, the NAP, and various international conferences and events.</p> <p>In addition, CCC has not been able to coordinate with and give instructions to related organizations and has not been able to obtain active and prompt cooperation from related organizations smoothly and appropriately.</p> <p>In order for CCC to exercise stronger leadership, it is necessary to strengthen its own structure, accelerate internal decision-making, and strengthen its authority regarding instructions with related organizations.</p>	<p>The CCC is the lead policy-making body for the Philippines in addressing climate change issues and plays an important role as a coordinating body among the various agencies involved. In addition, the CCC is in an important position in the formulation of documents that need to be submitted to the United Nations and other organizations. Therefore, the CCC has a very important role to play, and it is essential to strengthen the capacity of the CCC staff in charge of these activities. By resolving the shortage in the number and capacity of personnel relative to the content and workloads required, as well as by strengthening the coordination system and capacity with related organizations, the CCC will be able to better promote the implementation of the Paris Agreement and climate change countermeasures in the Philippines.</p>	<p>For Japan's support for the promotion of climate change measures in the Philippines, there would be strong needs to promote the implementation of the Paris Agreement, promote understanding of climate change measures and transparency among the staff of the CCC which is a key institution in achieving the NDC and provide support for improving management capacity including management of cooperation programs from various donors.</p> <p>It is also necessary to simultaneously strengthen the capacity and functions of the CCC as a coordinating entity. JICA will be able to provide capacity-building projects for government officials in the field of climate change which can contribute them sufficiently.</p> <ul style="list-style-type: none"> ➤ Project for Capacity Development to accelerate Low Carbon and Resilient Society realization in the Southeast Asia region ➤ The Project for Capacity Building on Climate Resilience in the Pacific <p>In addition, the training programs like the issue-specific training programs listed below could be utilized.</p> <ul style="list-style-type: none"> ➤ Environmental management: strengthening capacities to move forward with "nationally determined contributions" under the Paris Agreement ➤ Environmental management: adapting to climate change ➤ Environmental management: strengthening access to climate finance - theory and practice for practitioners <p>It is expected that the outputs of the PaSTI initiative conducted by the Department of Environment of Japan can also be utilized as mentioned above. Through the Technical cooperation (Dispatch of Experts) to CCC, it is possible to provide more</p>	<p>Technical cooperation (Dispatch of Experts) to CCC (same support as mentioned above)</p> <ul style="list-style-type: none"> ➤ Organize information on measures necessary to ensure transparency and provide advice on policy deliberations ➤ Support for coordination with relevant organizations <p>Project for strengthening human resources and organizational capacity for climate change action (technical cooperation)</p> <ul style="list-style-type: none"> ➤ Development of Guidance for Implementation of Measures to Ensure Transparency of Climate Change Measures (Draft) ➤ Development of project management guidance (draft) ➤ Organizational capacity enhancement program based on the institutional capacity assessment and technical assistance needs survey

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
				effective support by implementing technical cooperation projects after confirming and analyzing in more detail about the items that should be strengthen through technical support activities for the work to be conducted by CCC staff.	
Mitigation					
Needs to enhance understanding of GHG inventories and mitigation measures by local government officials	<p>Climate Change Act</p> <ul style="list-style-type: none"> ➤ Climate Change Act of 2009 requires Local Government Units (LGUs) to develop LCCAPs <p>LCCAP</p> <ul style="list-style-type: none"> ➤ Focusing on both climate change adaptation and mitigation and presents how local governments will respond to climate change impacts and integrate them into local development plans (land use plans, sectoral development plans, investment programs, etc.) 	<p>As of June 2023, 1,472 of the nation's 1,715 local governments (about 86%) had already developed LCCAPs.</p> <p>However, while many LCCAPs include information on impact assessment and measures for adaptation, few LCCAPs mention the status of GHG emissions and mitigation measures.</p> <p>It is assumed that it is necessary to enhance understanding of GHG inventories among local government officials and knowledge and capacity regarding GHG inventory preparation. Although CCC, DILG, and DGA have been holding training programs on LCCAP development for local government officials, the local government officials in remote areas are not able to participate in the training programs due to lack of funds to travel to the training sites.</p> <p>In addition, since government employees are periodically transferred, it is necessary to continue training and capacity building activities. It has not been identifying any donors who are providing capacity building support to local government officials.</p>	<p>To make steady progress in addressing climate change issues and achieving NDC in the Philippines, it is important that not only the central government agencies, but also local governments and other entities actively engage in climate change measures. No direct linkage exists between local GHG inventories and national GHG inventories.</p> <p>However, for local governments to implement appropriate mitigation activities, it is important to prepare local GHG inventories and take into account the trends of GHG emissions and sinks in the locality. The promotion of a proper understanding of the adaptation sector will promote the selection and implementation of appropriate and effective adaptation measures, which will help to ensure the resilience of the Philippines against climate change.</p> <p>The Climate Change Act of the country also mentions the need for local government initiatives, and it is very important to improve the capacity of local government officials to understand climate change, develop GHG inventories, select appropriate climate change mitigation and review and implement LCCAPs based on these inventories.</p>	<p>JICA has provided assistance to Indonesia, Vietnam, Thailand, Pacific Island countries and other countries to develop climate change action plans, support for review of mitigation and adaptation measures, and GHG inventory development, therefore, they can be used as the assets of Japan's assistance.</p> <p>It is better for providing support not only in the development of GHG inventories and review of mitigation actions, but also in the form of vulnerability and risk assessments and adaptation measures in rural areas.</p> <p>In addition, it is expected that training programs like the below could be utilized.</p> <ul style="list-style-type: none"> ➤ Environmental management: strengthening municipal capacity for decarbonized and sustainable urban and regional development 	<p>Project to Support Capacity Building of Local Governments for GHG Inventory and Mitigation Action Plan Review (Technical Assistance)</p> <ul style="list-style-type: none"> ➤ Technical assistance for updating and developing community-level GHG inventory tools and manuals ➤ Technical assistance to pilot LGUs in their GHG inventory development ➤ Technical assistance for review of mitigation actions of pilot LGUs and revision of LCCAP
Needs for institutional development on carbon pricing system at national level	No related policies	<p>Although carbon pricing introduction is considered, no national carbon pricing policy or system has been formally implemented.</p> <p>The DOF is conducting a study of Carbon Pricing Instruments with support from the World Bank. DENR is also studying a carbon trading scheme specific to the forest sector with support from ADB and UNDP.</p>	<p>Solving this issue would provide economic incentives for climate change mitigation efforts. And the development of these systems is expected to contribute significantly to promoting the implementation of GHG emission reduction or absorption projects, which will contribute significantly to achieving the NDC.</p>	<p>In Japan, discussions on the Carbon Pricing Instruments introduction have been continued. There are also many practical examples such as the J-Credit System and the emissions trading system of the Tokyo Metropolitan Government. In addition, Japan has very practical experience in managing the JCM credit registry, which is being operated in conjunction with the JCM scheme. Technical assistance can be provided by sharing these knowledge and assets through cooperative relationships with the World Bank and related donors.</p>	<p>Support project for Introduction of Carbon Pricing Instruments (Technical Assistance)</p>
Adaptation					
Needs to strengthen capacity to contribute to the promotion of adaptive behavior in local area	<p>Climate Change Act</p> <ul style="list-style-type: none"> ➤ Demonstrates a commitment to promote adaptation to climate change and establishes the PSF <p>NDC</p> <ul style="list-style-type: none"> ➤ Seven areas for adaptation are identified: food security, water security, ecological and environmental stability, 	<p>Local governments have focused on adaptation measures rather than mitigation measures in the Philippines due to the country's vulnerability to climate change impacts and the fact that it has been affected and damaged by various extreme weather events in the past.</p> <p>Many of the LCCAPs that have been developed by local governments so far have included an information on climate change vulnerability assessment and adaptation measures. On the other hand, many of the actions proposed as adaptation measures do not have a clear climate rationale, and</p>	<p>Philippines is highly vulnerable to the impacts of climate change, therefore, climate change adaptation is a higher priority than mitigation, and its promotion is clearly identified in the NDC.</p> <p>In promoting climate change adaptation, implementation of measures at the local government and community level is very important and should be set a high priority. In addition, since the implementation of adaptation measures often requires large amounts of money, the establishment and</p>	<p>When providing support for the promotion of adaptation measures in rural areas, it is necessary to have a high level of understanding of the target areas and communities. Since support activities will focus on dealing with local governments and community members, know-how based on experience in similar activities will be required. Therefore, it is desirable for JICA to provide technical support in close cooperation with CCC, DOF, DILG, LGA, and other related organizations that have been active in this field.</p>	<p>Project to Support Capacity Building of Local Governments for Promoting Adaptation Actions (Technical Cooperation)</p> <ul style="list-style-type: none"> ➤ Revision of Climate Risk and Vulnerability Assessment tool and training materials ➤ Organize training on climate change adaptation ➤ Facilitate selection and implementation of adaptation measures for pilot LGUs ➤ Review of adaptation actions of pilot LGUs and revision of LCCAP

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
	<p>human security, climate smart industries and services, sustainable energy, and knowledge and capacity development, make forward in a coherent manner with the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction</p> <p>LCCAP</p> <ul style="list-style-type: none"> ➤ Focusing on both climate change adaptation and mitigation, presents how local governments will respond to climate change impacts and integrate them into local development plans (land use plans, sectoral development plans, investment programs, etc.) <p>PSF</p> <ul style="list-style-type: none"> ➤ Aims to support adaptation activities of LGUs and accredited local/community organizations ➤ A budget of PHP 1 billion has been allocated 	<p>there seems to enhance proper understanding of the field of adaptation.</p> <p>As in the case of mitigation measures, training has been provided by the CCC and other organizations to local government officials on the development of LCCAPs, but it seems that proper understanding of adaptation measures have not been fully taken root. It is considered necessary to review training materials and other efforts to improve more appropriate understanding in adaptation.</p> <p>The PSF has also been established as a source of funding to promote adaptation actions in rural areas. Currently, six (6) adaptation projects supported by PSF are ongoing. Five (5) new projects were approved by the PSF Board in 2023.</p> <p>CCC, together with NPTE members and technical representatives of PSF Board members, review and evaluate PSF project proposal submissions</p> <p>Quality of project proposals submitted by LGUs needs to be improved, particularly in ensuring responsiveness of proposed interventions with the existent climate hazards and drivers in the locality.</p>	<p>effective use of PSFs and other financial resources that can be used for adaptation is also an important matter.</p> <p>Addressing these issues will greatly contribute to the implementation of the LCCAP, as well as to the promotion of adaptation measures positioned in the NDC.</p>	<p>Technical assistance could include review and implementation of training materials/programs on climate change for local government officials, technical assistance in identifying pilot LGUs and reviewing the selection of adaptation measures in the LCCAP and advising on the use of PSF and other funds and proposal preparation.</p> <p>In addition, training programs like the below could also be utilized.</p> <ul style="list-style-type: none"> ➤ Environmental Management: Adaptation to Climate Change 	<p>Capacity Building Project on Access to Finance to Facilitate Adaptation Action</p> <ul style="list-style-type: none"> ➤ Promoting understanding of access to climate finance and other resources
<p>Needs to enhance capacity of CCC and related agencies to review PSF proposals</p>	<p>PSF</p> <ul style="list-style-type: none"> ➤ Aims to support adaptation activities of LGUs and accredited local/community organizations ➤ A budget of PHP 1 billion has been allocated 	<p>With support from the National Panel of Technical Experts (NPTE), CCC leads the review and evaluation of PSF project proposals.</p> <p>Taking into account the volume of project proposal submissions received from various LGUs, potential improvement of human resources is necessary to strengthen the capacities of technical reviewers for faster and more efficient process.</p>		<p>Providing technical support for reviewing a wide range of adaptation actions and assistance in establishing a review system for CCC and DOF in reviewing proposals submitted to the PSF can be considered.</p>	<p>Technical cooperation (Dispatch of Experts) to CCC (same support as mentioned above)</p> <ul style="list-style-type: none"> ➤ Improvement of PSF's ability to review proposals by CCC and DOF, review of evaluation system, rationalization of PSF process

2) **Prioritization of the identified issues**

Table 3-3 Prioritization of the Identified Issues (Paris Agreement Implementation)

Identified issues	Urgency	Mitigation/Adaptation		Impact
		Mitigation	Adaptation	
Cross-cutting				
Documents required to be developed and submitted under the Paris Agreement should be submitted in timely manner	High These are official documents that are required to be developed and submitted under the Paris Agreement, an international agreement, and are intended to measure the seriousness of the Philippine government's efforts to tackle climate change.	✓	✓	+++ Provide opportunities for the Philippines to make its current situation and the implementation of climate change measures known internationally, and to serve as an important source of information for donors and others to consider support measures, such as technology and funding.
Needs to strengthen the ensuring transparency	Med Since transparency in reporting on the implementation of climate change measures is strongly required under the Paris Agreement, it is necessary to ensure transparency in the reporting of the progress of climate change measures.	✓	✓	+++ Ensuring transparency in the implementation of climate change measures and other information to the international community will make it easier to receive support from donors and other parties.
Needs to strengthen knowledge and expertise of CCC staff on climate change measures, transparency, etc., and enhance organizational and project management capacity	High Strengthening the capacity of CCC officials, who are in charge of formulating climate change-related policies and measures in the Philippines, is essential to promote domestic climate change measures, including the implementation of the Paris Agreement.	✓	✓	+++ Improving the technical, organizational, and management skills of CCC staff will make a significant contribution to solving the two issues mentioned above.
Mitigation				
Needs for institutional development on carbon pricing instruments at national level	High Since the urgent need to promote the implementation of mitigation projects that will contribute to the reduction of GHG emissions in the Philippines	✓		++ Promoting investments for emission reductions and low-carbon technologies development, behavioral change in the private sector and expand new markets would be expected.

Identified issues	Urgency	Mitigation/Adaptation		Impact
		Mitigation	Adaptation	
Needs to enhance understanding of GHG inventories and mitigation measures by local government officials	Low In reducing GHG emissions in the Philippines, local GHG emission reduction efforts must also be promoted as soon as possible.	✓		+ A developing local GHG inventory and facilitating the implementation of appropriate mitigation measures will be more effective in reducing GHG emissions in the Philippines.
Adaptation				
Needs to strengthen capacity to contribute to the promotion of adaptive behavior in local area	High As the Philippines is vulnerable to climate change, the promotion of adaptation actions is highly urgent as it will contribute significantly to the preservation of human lives and assets.		✓	++ Improvement of local officials' knowledge and technical skills in promoting adaptive behavior is highly effective because it increases the likelihood of implementation of adaptive measures.
Needs to enhance capacity of CCC and related agencies to review PSF proposals	Low Financial support measures for the implementation of adaptation actions in rural areas, which are highly urgent because they contribute significantly to the preservation of human lives and assets.		✓	+ This is an initiative to strengthen business and financial support measures that are directly linked to the implementation of adaptation measures and is highly effective because it leads to more appropriate implementation of adaptation measures.

(2) Energy

1) Analysis of the identified issues

Climate change that may affect the Philippine's energy sector includes precipitation and extreme weather events. For the former, while the average rainfall itself may not change much across the country, the seasonal variability and intensity are expected to increase, which will have a significant impact on the introduction and operation of hydropower, for example. Regarding the latter, there is a concern about damage to power and energy infrastructure as typhoons become more frequent and intense. Therefore, it is important to implement adaptation measures in anticipation of these impacts.

According to the 2020 national GHG inventory, energy sector emitted an estimated 129.286 Mt-CO₂e. Fuel combustion (excluding transportation) accounted for the majority of energy sector emissions at 99.854 Mt-CO₂e, or about 77% of total sector emissions.

The Philippines Energy Plan (2020-2040) outlines policies in the energy sector from various perspectives, including conventional energy, renewable energy, transmission, distribution, and electrification, energy efficiency and conservation, alternative fuels, and emerging technologies. The main measures include a moratorium on the construction of new coal-fired power plants, the large-scale introduction of natural gas-fired power plants as a transition energy source to meet the growing demand for electricity due to population growth, and the large-scale introduction of renewable energy sources.

In the Philippines, most of the energy industry is privatized, confirming that the promotion of investment in the industry will have a significant impact on the achievement of the government's plans. So far, the development of renewable energy sources such as solar and wind power has been progressing relatively well, but efforts to develop geothermal and hydroelectric power have not been sufficient. Efforts to utilize natural gas are also lagging behind. The power grid, which is important for promoting the development of power sources, is also privately owned and therefore difficult to control. On the other hand, the country has set very ambitious goals, such as aiming for total electrification by 2028, and has begun to consider the introduction of emerging technologies such as hydrogen and CCUS.

In this sector, there are various facilities and equipment that take time to develop. Therefore, it is necessary in the short term to form the foundation for accelerating further introduction of renewable energy sources, natural gas-fired power generation, and energy conservation with the 2040 targets indicated in the PEP, which will promote steady GHG emissions reductions. In addition, when introducing such facilities and equipment, it is necessary to consider in advance the reduction of damage caused by weather disasters and the reduction in the amount of natural energy available, and work in parallel from the perspective of adaptation measures to minimize the impact of such disasters.

Table 3-4 Issue analysis (energy sector)

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
Energy Statistics and Planning					
<p>Limitation of capacity to collect, analyze, and make energy data available</p>	<p>Philippines Energy Plan (2020-2040) Since the Energy Balance Table (EBT) is the underlying data for the PEP, the following are expected</p> <ul style="list-style-type: none"> ➢ Improved accuracy of PEP's future projections ➢ Presentation of measures that are more in line with the actual conditions of the region ➢ Promoting climate change action in rural areas using detailed regional data 	<p>Although energy statistics data are currently available, DOE departments are sucking up data in their own formats from private companies, etc. under the formulation of their own plans, policies, and systems, but since most of the data are raw data without uniformity, numerical errors and missing data are allowed, which is the basis for the formulation of PEPs, etc. This is the basis for the formulation of the PEP.</p> <p>Current energy statistics data can only identify domestic and international energy balances, and data on energy flows at the regional level and among regions such as Luzon, Visayas, and Mindanao have not been collected, making it impossible to analyze the current situation and issues and recommend measures at a deeper level.</p> <p>On the other hand, the data submitted manually to the EPPB by each DOE department in their own formats causes significant labor, cost, and delays in data processing and analysis within the EPPB. This has created a situation where further data collection and analysis is not feasible, and the development of internal data collection and analysis protocols and the implementation of a system have become issues.</p> <p>In addition, easy access to the extensive and detailed energy data needed for analysis is important to promote private sector investment and further climate change action in the region, but the current situation is limited to posting national statistics in PDF format and limited availability of the data required for planning.</p>	<p>The energy sector is the largest GHG emitting sector in the Philippines and considering that damage to power and energy infrastructure due to frequent and severe disasters widely affects the lives of citizens, it is very important to implement climate change adaptation and mitigation efforts in this sector.</p> <p>Although solving this issue will not directly lead to GHG emission reductions, it will not only deepen and facilitate data analysis within the DOE by increasing the detail and sophistication of data and improving accessibility of data but will also benefit local officials and private companies that use the data. This will encourage the development of plans (e.g., PEP) and measures based on solid data, as well as investments by related entities in general, and is expected to have a certain spillover effect in promoting climate change adaptation and mitigation activities in each sub-sector within the energy sector.</p>	<p>Considering the need for educational initiatives that take into account knowledge of energy data while introducing and initially operating information systems, it is necessary to dispatch several experts at the same time in the case of dispatching expert.</p> <p>It would also be effective to conduct issue-specific training on energy data management and utilization in parallel with the training. Since it is important to collaborate with field office staff and local government staff who manage the collection and use of energy data in the region, further cooperation impact can be expected by encouraging the participation of local government staff as well as central government staff in the issue-specific training to foster a common understanding of energy data. Further cooperative impact can be expected by encouraging local government officials to participate in training programs in addition to central government officials' participation in issue-specific training programs.</p> <p>In 2008, JICA conducted the "Study to Support the Formulation of an Energy Plan for the Philippines," in which various analytical tools were developed and proposed as a basis for the formulation of the initial PEP. The cooperation will be based on the efforts made here.</p>	<p>Development and implementation of Energy Balance Table Management System (EBTMS), cooperation project for regionalization of energy database (Technical Cooperation project or dispatch of multiple experts)</p> <ul style="list-style-type: none"> ➢ Development of energy balance table management system and online platform and data collection procedures/protocols ➢ Establishment of regional database ➢ Establish methods for energy data collection and processing at the local level ➢ Issue-specific training course in JICA Knowledge Co-Creation Program like training that contributes to energy data management and use
Conventional energy					
<p>Limitation of knowledge in technical, legal, and financial aspects of natural gas</p>	<p>Philippines Energy Plan (2020-2040)</p> <ul style="list-style-type: none"> ➢ Low-carbon power generation by expanding the introduction of gas-fired power generation is also necessary to achieve NDC ➢ 18,883 MW more natural gas-fired power generation by 2040 (3,453 MW in 2020) <p>Downstream Natural Gas Roadmap (2017-2040)</p>	<p>Efforts are underway to prepare for the depletion of the Malampaya gas field. On the other hand, the budget for climate change countermeasures shows that there is no budget for natural gas initiatives, and it is considered difficult to promote such initiatives on one's own. As long as the focus continues to be solely on the use of natural gas, there is no possibility of a budget for climate change measures.</p> <p>The gas business has become unattractive to private operators due to factors such as the fact that the entire process from extraction to distribution and utilization is left to private operators for development, and the risk is too high because the government has a policy of not providing subsidies to private operators.</p> <p>The DOE OIMB, which has jurisdiction over gas infrastructure and utilization other than gas field development, has limited knowledge of the technical,</p>	<p>Further introduction of gas-fired power generation is very important to ensure grid stability in the Philippines, which has declared a halt to new coal-fired power generation, to facilitate the transition to the future mass introduction of renewable energy, while ensuring grid stability in the face of increasing demand.</p> <p>The current Clean Energy Scenario of the PEP plans to achieve an energy mix of 15.93% by 2040, which is about half the carbon dioxide emissions of coal-fired power generation, so the reduction effect will be very large. In addition, since PEP's CES presents a future energy mix that anticipates the achievement of NDC, the introduction of the above gas-fired</p>	<p>While Technical Cooperation projects and dispatch of experts may be effective in resolving these issues, considering the wide range of needs from the OIMB, Technical Cooperation projects that facilitate coordination of each task are considered more appropriate.</p> <p>METI (JOGMEC) is implementing the LNG Value Chain Formation Promotion and Natural Gas Cooperation Training Program. Phase 3 of the Gas Policy Development Program, which is under the umbrella of AETI and led by the Agency for Natural Resources and Energy, is currently underway and is scheduled to start within 2023. Phase 3 of the program includes support for the formulation of regulations and legislation related to natural gas as well as human resource training.</p>	<p>Natural Gas Utilization Capacity Enhancement and Hydrogen Fuel Transition Program (Technical Cooperation Project)</p> <ul style="list-style-type: none"> ➢ Understanding the national outlook for natural gas utilization ➢ Roadmap for Hydrogen Utilization in Gas-Fired Power Plants ➢ Natural Gas Utilization Master Plan ➢ Strengthen capacity to promote natural gas-related businesses

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
	<ul style="list-style-type: none"> ➤ Creation of a healthy gas market and activation of market principles ➤ Prioritizing natural gas as a primary energy source contributes to climate change mitigation measures <p>Natural Gas Development Plan</p> <ul style="list-style-type: none"> ➤ Necessary gas infrastructure development as a natural gas importing country 	<p>legal, and financial aspects of natural gas, making it difficult to consider technical standards, systems, and financial incentives to make the project attractive to private operators.</p> <p>Support from other donors has been declining due to the international climate toward the use of fossil fuels, and there is no prospect for future support from other donors.</p>	<p>power generation will greatly contribute to the achievement of NDC.</p> <p>In addition, if the use of hydrogen related to gas-fired power generation can be promoted, it will further reduce carbon emissions, and further implementation of initiatives using the climate change budget is likely to be realized.</p>	<p>In the local market, Osaka Gas Co., Ltd. is introducing an LNG terminal in the Philippines, and some heavy industry manufacturers are developing a hydrogen gas turbine.</p> <p>The Asia Zero Emissions Community (AZEC) initiative, proposed by the Japanese government as a framework for Asian countries to cooperate toward decarbonization, is underway, and a joint statement committing to accelerating transitions related to hydrogen use and other areas toward decarbonization has been agreed upon. Sharing information and motivating decision makers in the Philippines in such an initiative will be effective in facilitating this effort.</p> <p>Furthermore, support for the introduction of gas infrastructure by the private sector through overseas investments and loans would also be effective.</p>	
Renewable energy					
<p>Limited private investment in renewable energy (especially hydroelectric and geothermal)</p>	<p>Philippines Energy Plan (2020-2040)</p> <ul style="list-style-type: none"> ➤ Total installed renewable energy capacity of 118,570 MW by 2040 (7,617 MW in 2020) <p>National Renewable Energy Program (2020-2040)</p> <ul style="list-style-type: none"> ➤ 35% renewable energy share in energy mix by 2030 (65,316 GWh) ➤ 50% renewable energy share in energy mix by 2040 (174,783 GWh) ➤ Expand new renewable energy capacity by 52,826 MW by 2040 <p>Renewable Energy Roadmap (2017-2040)</p> <ul style="list-style-type: none"> ➤ At least 20,000 MW of installed renewable energy capacity by 2040 	<p>The DOE has limited capacity in human, financial, technological, and institutional resources to promote renewable energy, due to an absence of effective human resources and education. This is due to the very limited financial resources for policy implementation at DOE, based on the common understanding throughout the government that the energy sector is private-sector driven.</p> <p>In order for the private sector to take the lead in renewable energy development, it is important to create an environment conducive to investment. While a considerable number of measures have been taken to improve the investment environment, including the reduction of barriers to foreign investment and the Green Energy Option Program, other measures to further reduce investment risk are still needed to achieve the goals described on the left. The most pervasive and significant issue at present is the limited capacity in the power grid and delays in its expansion, which will be discussed in more detail in the section on "Transmission, Distribution, and Electrification.</p> <p>By type of renewable energy, the PEP shows that solar PV, hydro, wind, geothermal, and biomass have the largest projected introduction volumes, in that order. For example, as far as the JCM is concerned, the introduction of solar power is considered to be relatively advanced due to the large number of cases adopted, and the ADB is proposing support for floating solar power generation. For wind power, the WB is providing support for offshore wind power, and geothermal power is also receiving support from the ADB. On the other hand, no particular cooperation from other donors was confirmed for hydropower.</p>	<p>The energy sector is the largest GHG emitting sector in the Philippines, emitting 53.105 Mt CO₂e in 2010.</p> <p>The introduction of renewable energy is aimed at 50% in the 2040 energy mix to meet the growing energy demand in the future and is considered to be the largest emission reduction measure in the energy sector. As such, it has the greatest impact on NDC contributions.</p>	<p>For renewable energy sources such as solar and wind power, which can be developed in a relatively short period of time and have already received support from other donors, JICA's support is not considered necessary at present.</p> <p>On the other hand, immediate improvement measures are needed for hydropower and geothermal power, which take a relatively long time to develop. In particular, investment risk reduction measures should be focused on hydropower, which does not receive support from other donors and has a large projected future introduction capacity.</p> <p>JICA conducted the "Republic of the Philippines Hydropower Resource Inventory Study" in 2012, and if the technology transfer of the hydropower database conducted here can be used as a basis for incorporating large-scale hydropower potential sites, it will shorten and cut costs for private sector preliminary surveys and reduce investment risk. The project is being conducted as part of the "Republic of Korea Hydropower Resource Inventory Study".</p> <p>A Technical Cooperation project or dispatch of experts would be effective, but considering the immediate measures and the fact that this is a national-level survey, a Technical Cooperation project would be more appropriate.</p> <p>In addition to Technical Cooperation projects, JICA Knowledge Co-Creation Program is also important for acquiring basic knowledge, and synergistic effects can be expected. 2022 issue-specific training includes closely related courses such as "Promotion of Hydropower Development " and "Acceleration/Promotion of Geothermal Energy Investment", so parallel training in these areas will facilitate capacity building.</p>	<p>Program for formulating large hydropower and pumped storage M/P for climate change adaptation (Technical Cooperation project)</p> <ul style="list-style-type: none"> ➤ Inventory of hydropower and pumped storage above 100 MW ➤ Master Plan for the Introduction of Large-Scale Hydroelectric and Pumped Storage Power Generation ➤ Strengthen capacity to promote investment in hydropower development <p>Implementation cooperation program (Technical Cooperation project or dispatch of experts) in line with the policy to be proposed after ADB geothermal power support</p> <ul style="list-style-type: none"> ➤ Study report of ongoing ADB project to be considered upon receipt. <p>JICA Knowledge Co-Creation Program</p> <ul style="list-style-type: none"> ➤ Promote hydropower development ➤ Investment promotion in geothermal development, etc. <p>Financial assistance programs such as JCM and overseas investments and loans</p>

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
		<p>Geothermal installed capacity was 1,847 MW in 2008, but by 2023 it had increased to 1,932 MW, an increase of only 85 MW, and is not on pace to achieve the CES future installation forecast of 2,408 MW (2040). The hydropower generation capacity will be 3,779 MW in 2020 and 20,176 MW in 2040, but the number of large hydropower projects under development or under study is 9,718 MW as of 2023, which is a large gap from the target. In particular, these types of renewable energies require a long period of time for development, and urgent measures are needed to meet the PEP's 2040 target, as the current forecast for the amount of installed capacity is still below the 2040 target.</p> <p>Climate change is also affecting the availability and production of renewable energy resources, and it is important to introduce renewable energy sources that are less susceptible to damage and more adaptable to weather changes caused by climate change. Especially in the Philippines, where it has been pointed out that rainfall, rain frequency, and rainfall areas may change due to climate change, there may be implementation issues such as hydroelectric power generation not satisfying the initially assumed water storage capacity.</p>		<p>Several requests from Japanese private companies to participate in the project if investment risks can be reduced. If investment is attracted from Japanese companies, comprehensive support that includes Japanese industry could be provided.</p> <p>In addition, continued support for private sector development through the use of JCM, two-step loans, and overseas investments and loans is likely to guarantee the implementation of private sector projects.</p>	
Power transmission and distribution, electrification					
<p>Delayed expansion and reinforcement of the power grid</p>	<p>Electric Power Industry Roadmap (2017-2040)</p> <ul style="list-style-type: none"> ➤ Ensure quality, reliability, affordability, and safe supply of electricity by 2040 ➤ Expanded power accessibility ➤ Ensure a transparent and fair electricity market <p>Transmission Development Plan (2022-2040)</p> <ul style="list-style-type: none"> ➤ Development of the power grid in line with PEP goals <p>POWER SECTOR ROADMAP (2021-2040)</p> <ul style="list-style-type: none"> ➤ Improve reliability and resiliency of key transmission networks ➤ Interconnection of power grids in Luzon, Visayas, and Mindanao ➤ Interconnect off-grid islands to the main grid. 	<p>TransCo, the state-owned power transmission company, has transferred most of its power transmission business to NGCP, a private power transmission company, through a concession agreement, and NGCP is fully responsible for the development and transmission of the power grid. On the other hand, delays in NGCP projects have led to capacity shortages in the grid and delays in its expansion, affecting the introduction of renewable and other energy sources due to the risk of not being connected to the grid as soon as possible after installation.</p> <p>Two causes of the delay were heard in this study: the prolonged eminent domain process by the NGCP and the delay in the planning permit process by the ERC.</p> <p>Eminent domain is also an issue related to the installation of renewable energy, and is likely to have an impact on overall development practices in the Philippines. This is due to the fact that while there is a legal cap on the amount of compensation for eminent domain for public corporations such as TransCo, the cap does not apply to private operators such as NGCP, making landowners' compensation claims more expensive than feasible for private companies such as NGCP, and also due to the time-consuming court procedures. The reason for this is that it takes a long time to go through the court process.</p>	<p>It is the most important infrastructure for facilitating the expansion of new renewable energy installations, and its drastic capacity and grid expansion will have a very high impact on achieving NDC.</p> <p>For example, based on the future energy mix in the NREP, a one-year delay in the introduction of renewable energy would result in a drop in renewable energy generation of less than 50,000 GWh in the final year, 2040.</p>	<p>Eminent domain is the most fundamental issue, and it applies to almost all development activities. However, because it requires a change in the legal system, it is a political issue, and Japanese assistance is unlikely.</p> <p>Regarding the response to the issue of delays in the expansion and strengthening of the power grid, Technical Cooperation projects and the dispatch of experts are considered effective, but considering the enormous impact of the delays, Technical Cooperation projects are considered appropriate since early and drastic improvements are needed. On the other hand, since it is considered necessary to confirm whether there are inefficiencies in the organizational structure and processes, as well as other issues that the ERC itself is not aware of, it is recommended that the process of exploring issues from the inside be followed upfront by conducting observations through short-term expert dispatch. This will enable Technical Cooperation projects to be implemented efficiently and effectively.</p>	<p>ERC (Energy Regulatory Commission) capacity building program (Technical Cooperation projects, expert dispatch, etc.)</p> <ul style="list-style-type: none"> ➤ Contents under consideration and adjustment

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
		<p>On the other hand, delays in ERC reviews are caused by human resources issues, such as insufficient staff to handle the enormous volume of reviews, and capacity issues, such as limited knowledge about the simulation software used by the NGCP for planning and the latest substation equipment, which makes the reviews difficult to conduct. While it is important to increase human resources, it is also important to check whether the current organizational structure and processes are optimized as a way to solve the problem without incurring significant costs. As for capacity issues, the acquisition of knowledge of new technologies is important, but even when knowledge is actually acquired, a system for sharing it within the organization is not in place, and the introduction of a system for continuously accumulating knowledge is also an issue.</p> <p>The ERC has received support from USAID and UNOPS, and based on the nature of its operations, it is likely that it is also developing capacity for new technologies for battery storage systems and power distribution equipment.</p>			
<p>Limitation of concrete policies and systems for smart grid realization</p>	<p>Electric Power Industry Roadmap (2017-2040)</p> <ul style="list-style-type: none"> ➢ Ensure quality, reliability, affordability, and safe supply of electricity by 2040 ➢ Expanded power accessibility ➢ Ensure a transparent and fair electricity market <p>Smart Grid Vision</p> <ul style="list-style-type: none"> ➢ Smart power distribution by 2040 ➢ Demand Response (DR) and Virtual Power Plant (VPP) realization by 2040 <p>POWER SECTOR ROADMAP (2021-2040)</p> <ul style="list-style-type: none"> ➢ Institutionalize continuous improvement in the reliability and resiliency of power distribution facilities. 	<p>While major power distribution companies such as Meralco have been implementing technologies in accordance with the Smart Grid Vision presented by EPIMB, other power distribution companies have not made any drastic progress toward a smart grid.</p> <p>Meralco is also trying to implement the latest Advanced Metering Infrastructure (AMI) and other technologies, but has not made adequate and timely improvements, with more recent technologies circulating while the ERC takes a long time to approve its plans. The challenges of this ERC are discussed in detail in Issues Related to Delays in Expanding and Strengthening the Transmission Grid.</p> <p>Institutional design is underway for a regulating power market, but as more diverse power sources are connected through the grid and electricity consumption increases in the future, there is a strong possibility that grid reliability will be affected due to supply-demand imbalance. The DOE has not yet started to study the concepts and necessary systems to realize VPP and DR as supply-demand adjustment, and it is hoped that private companies that invest in VPP and DR will formulate specific policies and systems to facilitate implementation of such projects.</p> <p>ADB plans to mainly implement smart power grid, so there is no overlap. However, support for power distribution projects by USAID, UNOPS, and USTDA is in preparation, and the timing and content of such support is currently unclear.</p>	<p>It is expected to indirectly contribute to NDC in that it will promote the use of renewable energy by supplying peak demand with renewable energy as a mitigation measure, thereby promoting the introduction of renewable energy.</p> <p>For example, based on the future energy mix in the NREP, it is estimated that the introduction of renewable energy one year earlier will increase the amount of natural gas power generation by less than 50,000 GWh in the final year of 2040. This will reduce the operating rate of gas-fired thermal power generation, which will contribute to GHG reductions by a considerable amount.</p> <p>The emergence of resource aggregation businesses is also expected to promote employment and provide economic benefits.</p>	<p>Since the formulation of systems related to VPP/DR will only be effective if it contributes to resolving the causes of the delay of progress in the implementation of the smart grid roadmap by the various distribution companies, while also understanding the causes of such progress, it would be effective if the same project were to include research and support for the distribution companies. For this reason, a Technical Cooperation project or the dispatch of several coordinated experts may be effective in resolving issues related to the limited specific policies and systems for smart grid implementation. However, if the cooperation results are required at an early stage or if the investigation and support to distribution companies are to be conducted over multiple projects, a Technical Cooperation project is considered appropriate.</p> <p>There is room for support for the content that may not be covered by ADB, USTDA, and USAID (materialization of higher level policies), and there is a need for support for capacity building of the 150 power distribution companies, as it is highly likely that even if each donor implements the plan, it will not be possible to implement all of the plan.</p> <p>In the private-sector collaborative projects, synergistic effects from technical support from Japanese companies can be expected through collaboration with "Republic of the Philippines: Project for Promotion and Dissemination of Power Distribution System Operation and Management Technology, TAKAOKA TOKO CO., LTD., TEPCO Power Grid".</p>	<p>Capacity building program for smart grid construction (Technical Cooperation project or dispatch of experts)</p> <ul style="list-style-type: none"> ➢ VPP/DR Vision ➢ Support for execution of smart grid roadmap by distribution utility ➢ DOE EPIMB Strengthens Capabilities of Electricity Distribution Companies on Smart Grid

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
<p>Limitation of sustainability of remote island power infrastructure</p>	<p>Missionary Electrification Development Plan (2021-2025)</p> <ul style="list-style-type: none"> ➤ Provide reliable, quality electricity service to off-grid regional users ➤ Pursue utilization of domestic and renewable energy sources to reduce dependence on imported fossil fuels ➤ Modernize the power transmission and distribution network and improve efficiency in off-grid power systems <p>Future Energy Scenario in Capsule</p> <ul style="list-style-type: none"> ➤ Building a resilient and climate resilient energy infrastructure 	<p>In off-grid areas, renewable energy sources will still be supplying 9% of electricity in 2020, a significant gap from the 30% required by the RPS. In addition, NPC has been reflecting the DOE EPPB's resiliency standards for power infrastructure in its private sector contracts for installation and operation of renewable energy for hybridization, but has the limited technical capacity to check whether operators are actually installing equipment and taking measures that comply with the standards. However, the technical capacity to check whether operators are actually installing equipment and taking measures to comply with the standards is limited, and compliance is not being properly managed.</p> <p>NPC is conducting a bidding process for the installation and operation of renewable energy sources for the hybridization of remote island power sources, but only about 50 of the 158 power plants have been hybridized because private operators are not bidding. The following factors can be cited as reasons for this, but it is believed that the small size of the project relative to the project environment is largely responsible for this.</p> <ul style="list-style-type: none"> ➤ Population and demand too small to be feasible without waiting for growth ➤ Renewable energy installations take time for ERC plan approval and DENR environmental impact assessment review, which greatly affects feasibility due to the small scale of the project. ➤ Considered a high-risk business and unable to obtain financing from banks <p>In light of this situation, NPC would like to further benefit the private sector through PPP projects and other means, but has not been able to proceed due to insufficient budget approval. In addition, NPC has never received cooperation or support from other donors in the past.</p> <p>Even on remote islands where hybridization has been implemented, diesel power generation cannot be shut down from the standpoint of stabilizing the power supply, and this has not led to substantial GHG reductions.</p>	<p>Through the hybridization of off-grid power sources, GHG reductions are expected from a mitigation perspective due to the reduced utilization of diesel power generation, but the contribution is relatively small when viewed across the energy sector as a whole because of the small grid size of the remote islands. Total electricity generation in off-grid areas is 1618 GWh in 2020, and its fuel source is 91% petroleum (diesel), which will contribute significantly to this reduction.</p> <p>From the perspective of adaptation, building a robust energy infrastructure that can withstand the frequency and severity of disasters caused by climate change is expected to contribute to NDC in terms of ensuring stable energy access in the region. In addition, reducing the proportion of diesel power generation on remote islands will reduce diesel procurement, which will reduce the impact of supply chain disruptions due to disasters, etc., and reduce fuel costs, thereby enhancing the overall sustainability of remote island power sources.</p>	<p>There are two possible ways to solve this problem: (1) promote hybridization and resiliency of off-grid power infrastructure, and (2) connect to a large-scale grid on the main island.</p> <p>For the first, the 30% renewable energy introduction target set in the RPS is likely to be set as the maximum amount that will not cause grid instability due to the introduction of variable renewable energy. On the other hand, in order to maximize the sustainability of remote island power sources, it is important to aim for more than 30% renewable energy introduction and RE100, which will boost electricity supply from renewable energy sources in off-grid areas.</p> <p>Under the Department of Economy, Trade and Industry's "Subsidy for Project Feasibility Study on Overseas Deployment of High-Quality Infrastructure (Study on Promotion of Overseas Deployment of Infrastructure by Japanese Companies)," "Republic of the Philippines and Malaysia/Virtual Synchronous Generator Control (VSG) Study Project Kawasaki Heavy Industries, Ltd." has been selected for 2023. The introduction of technologies related to this generator and switching technologies into the remote island power supply system will enable the introduction of more than 30% renewable energy, which is expected to boost the amount of renewable energy introduced by private companies bidding for the project.</p> <p>On the other hand, it is important to promote understanding through strengthening the technical capacity of NPC, which serves as the operator, ERC, which conducts technical review, and DOE, which evaluates microgrid system applications, in order to disseminate technologies similar to those described above.</p> <p>Based on the above, Technical Cooperation project and dispatch of experts are considered to be effective in resolving such issues. However, considering the wide range of needs from the OIMB, Technical Cooperation project that facilitate coordination of each task are considered to be more appropriate.</p> <p>In addition, based on the development of the power grid in the Philippines, one of the measures to solve the problem is to extend submarine cables and other means from the mainland power grid to off-grid islands to directly supply stable power.</p> <p>In Japan, which has many remote islands and frequent disasters in common, efforts to increase self-sufficiency in renewable energy are being made on several remote islands, for example, through the Ministry of the Environment's "Project to Promote the Use of Renewable Energy by the Private Sector</p>	<p>Program for Improving Sustainability of Remote Island Electricity Infrastructure (Technical Cooperation Project or Expert Dispatch)</p> <ul style="list-style-type: none"> ➤ Hybridization Technology Guidelines for Electric Power Utilities ➤ Establishment of a roadmap for improving the sustainability of remote island power sources with a view to introducing more than 30% renewable energy ➤ Technical capacity development related to VSG and switching technologies, microgrid system application evaluation, and power infrastructure disaster resilience assessment <p>Resilient x Hybrid Electric Power System Demonstration Program (Technical Cooperation Project)</p> <ul style="list-style-type: none"> ➤ Demonstration of Disaster Resilient Remote Island Hybrid Power Supply and Infrastructure ➤ Reflection in technical guidelines and support for institutional establishment ➤ Capacity building for system implementation, evaluation, and PPP project implementation <p>Feasibility study on interconnection of off-grid islands to the national grid (information gathering confirmation study or preparatory study for cooperation)</p> <ul style="list-style-type: none"> ➤ Feasibility Study and Site Selection ➤ Measures to integrate new technologies and solutions ➤ Calculation of the budget for the next phase of cooperation <p>Off-grid island interconnection project to the national grid (Technical Cooperation project and yen loan)</p> <ul style="list-style-type: none"> ➤ Implementation of Demonstration Project ➤ Reflection on Policies and Institutions <p>JICA Knowledge Co-Creation Program</p> <ul style="list-style-type: none"> ➤ Introduction of Renewable Energy and Optimal Operation of Diesel Power Generation Facilities in Island Countries ➤ Grid stabilization at the time of introduction of various renewable energies, etc.

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
				and Enhance Resilience," etc. The policy mechanisms and know-how that make this possible are likely to be effective in this case. Therefore, sharing the details of the Ministry of the Environment's efforts will further increase the impact of the cooperation.	
Limited funds for full electrification by 2028	<p>POWER SECTOR ROADMAP (2021-2040)</p> <ul style="list-style-type: none"> ➢ Based on the most recent census, the electrification rate of eligible specified households will be 100%. <p>Missionary Electrification Development Plan (2021-2025)</p> <ul style="list-style-type: none"> ➢ Achieve total electrification by 2022 <p>Total Electrification Program</p> <ul style="list-style-type: none"> ➢ Presidential Announcement to achieve total electrification by 2028. 	<p>The electrification rate in 2020 is 94.5%, and the following issues remain to be solved in order to electrify the remaining 1.26 million households. NEA is responsible for the implementation of this initiative, but it will not be able to meet the target even if it focuses on the expansion of the existing power grid, as it has done so far. The NEA is responsible for the implementation of this program, but since it will not be able to meet the current focus on expansion of the existing power grid in time, it has changed its policy to emphasize the installation of photovoltaic power generation in each household through the PVM (Photovoltaic Mainstreaming) program, and has established a plan for total electrification by 2028.</p> <p>WB is currently seeking loans and other financial support from other donors for this project. WB has been supporting the electrification project and is willing to contribute funds, but no agreement has been reached yet, and WB is still looking for a major financial contributor.</p>	<p>Electrification, which generally makes good quality and highly available energy cheap and accessible to many people, is also a strong adaptation measure to climate change impacts. From the perspective of adaptation measures, a 100% electrification rate will contribute greatly to the realization of sustainable energy as set forth in the NDC.</p>	<p>The NEA heard that there are no particular technical or institutional challenges to the implementation of the electrification plan by 2028, and that no support is needed. This is because the EU ASEP, which has been supporting the project, has accumulated know-how and established practical methods for electrification.</p> <p>Based on this, a certain amount of loan contribution is mentioned as support. The majority of the funds will be used to purchase PV equipment under the PVM program. (It is necessary to confirm whether this can be done with JCM.)</p>	<p>Loan contribution to NEA for the PVM program (totaling approximately \$655million)</p>
Energy Efficiency and Conservation					
Limited private investment in energy efficiency and conservation	<p>National Energy Efficiency & Conservation Plan and Roadmap (2023-2050)</p> <ul style="list-style-type: none"> ➢ Reduce greenhouse gas emissions by 2050 <ul style="list-style-type: none"> - Government (30.24MtCO₂e) - Commercial (121.29MtCO₂e) - Civilian (299.56MtCO₂e) - Electric utilities and end consumers (65.9MtCO₂e) <p>Future Energy Scenario in Capsule</p> <ul style="list-style-type: none"> ➢ Emerging Efficiency Technology Exploration 	<p>After the enactment of the 2019 EEC Act, the NEECP was developed in cooperation with USAID and the UK government. In addition, the government has been vigorously implementing government-led energy conservation through PELP (Philippine Energy Labeling Program), PEEP (Philippine Energy Efficiency Project), ESCO (Energy Service Company), and GEMP (Government Energy Management Program). The government has been vigorously implementing government-led energy conservation through the PELP (Philippine Energy Labeling Program), PEEP (Philippine Energy Efficiency Project), ESCO (Energy Service Company), and GEMP (Government Energy Management Program), and hopes to encourage the spread of independent energy conservation behavior through private sector investment.</p> <p>The following challenges exist in the proper implementation of the NEECP</p> <ul style="list-style-type: none"> ➢ Limited knowledge on energy efficiency and conservation in DOE, insufficient empirical know-how on energy efficiency and conservation in buildings by private architects and others 	<p>In order to achieve NDC, the NEECP has set a target of at least 10% emission reductions in most sectors against the BAU scenario, which will be important to achieve.</p> <p>Achievement of the National Energy Efficiency & Conservation Plan and Roadmap (2023-2050) targets will result in a total reduction of 516.99MtCO₂e by 2050 for government, commercial, consumer, electric utility, and end-use consumers, which is an average reduction of 19MtCO₂e per year. This is equivalent to a reduction of 19 MtCO₂e per year, or about 35% of the energy sector emissions of 53.105 MtCO₂e in 2010, which is considered very high.</p>	<p>In implementing energy conservation for government, commercial, and consumer use, it is essential to have an integrated energy conservation perspective for the entire building or residence.</p> <p>Energy conservation has long been developed in Japan, and equipment efficiency is outstanding, but recently the concept of Zero Energy Building (ZEB) has been published as a global standard ISO TS23764 with the cooperation of the Japanese public and private sectors. ZEB is the concept of reducing energy consumption and efficiency while reducing the initial investment by applying energy-saving and energy-creating measures to buildings in stages, ultimately achieving net-zero energy consumption in buildings. In addition, the components of ZEB include the introduction of high-efficiency air conditioning and lighting, and roof-mounted solar power, which are in harmony with existing EE initiatives for buildings in the Philippines. If it can be demonstrated that ZEB will lead to more effective building EE than the existing EE measures in the Philippines, it will be more effective in promoting private investment.</p> <p>Based on the above, from the perspective of supporting the implementation of the NEECP, it is desirable to formulate a project to investigate and</p>	<p>ZEB introduction feasibility study (information gathering confirmation study or cooperation preparation study)</p> <ul style="list-style-type: none"> ➢ Organize basic information for ZEB implementation ➢ ZEB introduction effect calculation ➢ Recommendations for reflecting ZEB in policies and support for the formation of the next program <p>Program for Strengthening Capacity to Promote ZEB Measures (Technical Cooperation Project)</p> <ul style="list-style-type: none"> ➢ ZEB Demonstration ➢ Understanding the applicability of ZEB, ZEH, ZED, etc. ➢ Establish roadmap for ZEB, etc. ➢ Strengthening the capacity of C/P (EUMB) and related institutions <p>JICA Knowledge Co-Creation Program</p> <ul style="list-style-type: none"> ➢ Promotion of high-efficiency energy use and energy conservation, etc.

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
		<ul style="list-style-type: none"> ➤ Difficulty in financing energy savings for small and medium-sized buildings and single-family homes ➤ Accumulation and establishment of know-how through the realization and expansion of technology demonstrations in public sector buildings, and promotion of private sector investment through awareness-raising of its effectiveness ➤ Limitation of basic energy efficiency and conservation data, dissemination and penetration of EEC laws, and strengthening of government monitoring capacity <p>The current NEECP program relies on GEMPs, PELPs, MEPPs, and Power Sector Efficiency, which may promote energy efficiency in equipment, but does not focus on overall energy efficiency in the entire building.</p>		<p>verify the feasibility of introducing ZEB using government buildings, and by addressing issues related to the implementation of the NEECP, the promotion of EE and the diffusion of ZEB in the Philippines can be realized in a two-wheeled manner. Since ZEB is a combination of various energy-saving and energy-creating technologies and the appropriate combination of these technologies is important, a Technical Cooperation project that can simultaneously assign experts in each field is considered appropriate. However, it is necessary to have the Philippine side recognize the benefits of ZEB and position it as a policy, so it is necessary to go through an information gathering and confirmation survey to measure the simple effects of ZEB.</p> <p>In addition, combining these efforts with JICA Knowledge Co-Creation Program on energy conservation is also effective from the perspective of achieving synergistic effects.</p> <p>The "Green Growth Strategy for Carbon Neutrality by 2050" formulated by the Ministry of Economy, Trade and Industry (METI) in December 2020 states that ZEB "will be further demonstrated and horizontally expanded for overseas deployment with ASEAN and other countries in mind through ISO and other activities," and the "Basic Policy for GX Realization" released in February 2023 states that "ZEB will be demonstrated and horizontally expanded for overseas deployment with ASEAN and other countries in mind". The Basic Policy for the Realization of GX also calls for "demonstration and horizontal development of ZEB for overseas deployment in ASEAN and other countries. CEFIA, under the jurisdiction of the Ministry of Economy, Trade and Industry (METI), has positioned the promotion of ZEB as one of its flagship projects, and is actively promoting the spread of ZEB to ASEAN countries. Collaboration with METI's efforts is expected to maximize the impact of the cooperation.</p>	
Alternative Fuels and Emerging Technologies					
<p>Limitation of private investment environment to promote supply of biofuels, etc.</p>	<p>Philippines Energy Plan (2020-2040)</p> <ul style="list-style-type: none"> ➤ National biodiesel production capacity of 1733.04 ML/Y by 2040 (CES) ➤ National biodiesel production capacity of 2579.34 ML/Y by 2040 (CES) 	<p>The 2006 Biofuels Act (RA 9367) and the 2008 Renewable Energy Act (RA 9513) have been enacted and implemented, and the previous Biofuels Roadmap had B10 (10% biodiesel blend) and E20 (20% bioethanol blend) in the 2026 - 2040 period in mind. The latest roadmap, however, only includes B2 and E10 due to the limited supply capacity and high costs. Although private sector investment is necessary to achieve further biofuel blending ratios, the environment is not yet conducive for private operators to actively invest due to limited basic data on the availability of fuel crops and other factors. Therefore,</p>	<p>Since GHG emissions from the transportation sector account for one-third of the total GHG emissions in the Philippines, the dissemination and expansion of this initiative will contribute significantly to the achievement of the NDC.</p> <p>In the Philippines, which cannot supply its own SAF, airlines that claim to be carbon neutral, etc., cannot receive fuel supplies, leading to a decrease in the number of flights in service and a decline in international competitiveness.</p>	<p>Although Technical Cooperation project and dispatch of experts are considered effective, since significant cooperation results can be expected from providing comprehensive support for feedstock surveys for biofuel production, supply chain and plant knowledge related to biofuel production, and upstream and downstream support for the production of SAF from bioethanol, a Technical Cooperation project that can function organically and collectively with those engineers is considered appropriate. The Technical Cooperation project is considered to be suitable because it is possible to</p>	<p>Support Program for the Introduction and Dissemination of Biofuels (Technical Cooperation Project)</p> <ul style="list-style-type: none"> ➤ Develop SAF implementation policy and roadmap ➤ Revised (detailed) biofuel roadmap ➤ Strengthening the capacity of government-related institutions <p>Biomass-derived SAF plant demonstration program (transaction advisory)</p>

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
	<p>Biofuels Roadmap (2017-2040)</p> <ul style="list-style-type: none"> ➤ B2,E10 improvement <p>Carbon Offsetting and Reduction Scheme for International Aviation (CORSA)</p> <ul style="list-style-type: none"> ➤ Domestic SAF production by 2025 	<p>it is necessary to identify biofuel feedstocks that are different from those conventionally used but do not conflict with food security, and to study a path toward their production and utilization. However, the DOE is not taking action due to financial issues such as technical capacity and funding constraints.</p> <p>The Philippines is a member of CORSIA, which has declared its intention to produce SAF domestically by 2025, but this has not been realized because there have been no requests from operators to commercialize the production of SAF. Therefore, it is said that a market will not be created without government involvement and policy guidance. On the other hand, the DOE has limited knowledge of SAF, and there are financial issues such as funding constraints within the DOE that have hindered the launch of the policy.</p>		<p>function those engineers collectively and organically.</p> <p>In addition, considering the situation where there have been no voluntary requests from operators to commercialize SAF production, one idea is to construct and operate a government-led production plant to clarify and address issues, thereby attracting further private investment. In addition, given the difficulty in obtaining financial assistance from the DOE, it would be appropriate to implement PFI/PPP projects with incentives such as the provision of land and procedural support. Therefore, transaction advisory is considered appropriate for Technical Cooperation project.</p> <p>Since Japanese private operators are also commercializing SAF production at their respective companies, the commercialization of SAF production in the Philippines by these operators can contribute to the materialization of SAF production.</p>	<ul style="list-style-type: none"> ➤ Demonstration of SAF domestic production plant ➤ Reflection of demonstration results in policies, plans, systems, technical guidelines, etc.
<p>Limited policies, institutions, and policies for hydrogen adoption</p>	<p>Philippines Energy Plan (2020-2040)</p> <ul style="list-style-type: none"> ➤ Pursuit of hydrogen availability 	<p>Although private companies in the Philippines (e.g., Aboitiz Power) have begun to take initiatives in the production and utilization of hydrogen and ammonia, the DOE has not yet decided on most of its policies, including related laws, policies, and the department in charge of them. The EPPB is currently formulating its own regulatory framework for hydrogen, and it is expected that various definitions and the department in charge will be decided, but the path toward the introduction of hydrogen remains uncertain.</p> <p>In addition, ERDB has initiated a geological survey project to confirm natural hydrogen potential.</p> <p>Until now, On 9 November 2023, DOE has promulgated the Department Circular (DC) No. DC2023-11-0031 otherwise known as “Guidelines on the Awarding of Service Contracts for the Exploration, Development and Production of Native Hydrogen”.</p> <p>On 12 January 2024, DOE issued DC2024-01-0001 otherwise known as “Providing a National Policy and General Framework, Roadmap, and Guidelines for Hydrogen in the Energy Sector”.</p> <p>Currently, NPC and the German-Philippine Chamber of Commerce are only conducting a feasibility study on green hydrogen production in off-grid areas, and no particular support from other donors has been confirmed.</p>	<p>Hydrogen and ammonia are not considered for contribution in the current NDC, and the early implementation of these technologies could be a game changer in contributing significantly to GHG emission reductions.</p> <p>Especially in the initial stage of introduction, green hydrogen production using surplus electricity from renewable energy sources and co-firing at coal- and gas-fired power plants are assumed, and considering the amount of fossil fuel-derived power generation (170,000 GWh/year) in the 2040 energy mix in the PEP, GHG reduction can be achieved by multiplying this by the co-firing rate. GHG reduction can be achieved by multiplying the co-firing rate by this amount.</p>	<p>Technical Cooperation project and dispatch of experts are considered effective, and since it is desirable to conduct a relatively large-scale study of hydrogen production and utilization throughout the Philippines in order to present a somewhat solid vision and roadmap, Technical Cooperation project that can address these issues are considered appropriate.</p> <p>In addition, in order to accelerate the production of green hydrogen, it is important for the government to take the lead in constructing and operating the production plant, and to clarify and address issues to attract further private investment. In addition, given the difficulty of obtaining financial assistance from the DOE, it is appropriate to implement PFI/PPP projects with incentives such as land donation and procedural support. For this reason, transaction advisory among the Technical Cooperation project is considered appropriate for the green hydrogen production plant.</p> <p>The Basic Hydrogen Strategy states that "Hydrogen is a field in which Japan has a technological advantage, and it is necessary to promote the development of hydrogen in overseas markets and to strengthen the international competitiveness of the hydrogen industry. If the Philippines becomes a hydrogen exporting country, this will be an important initiative not only from the perspective of climate change countermeasures for the Philippines, but also from the perspective of Japan's energy security in the future.</p> <p>Since Japanese private operators are also pursuing hydrogen-related commercialization at their respective companies, commercialization in the</p>	<p>Hydrogen Vision Roadmap Development and Capacity Building Project (Technical Cooperation Project)</p> <ul style="list-style-type: none"> ➤ Vision for Hydrogen and Ammonia Introduction ➤ Hydrogen and ammonia roadmap (assuming regional) ➤ Strengthening C/P capacity <p>Green Hydrogen Production Demonstration Program (Transaction Advisory)</p> <ul style="list-style-type: none"> ➤ Installation and demonstration of green hydrogen production plant ➤ Develop technical and institutional guidelines ➤ Strengthening C/P implementation capacity <p>JICA Knowledge Co-Creation Program</p> <ul style="list-style-type: none"> ➤ Promotion of Hydrogen Energy Use - Energy Policy toward CO2 Free Society - etc.

Issue	Relevant policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
				Philippines by such operators can contribute to climate change countermeasures.	
Absence of policies, institutions, and policies to implement CCUS	Philippines Energy Plan (2020-2040) ➤ Explore the availability of CCUS	As for CCUS, ERDB staff is still in the process of collecting basic information by attending training programs in Singapore and other countries, and no special efforts, including the preparation of a regulatory framework, have been made.	CCUS has not been considered for contribution in the current NDC and could be a game changer in contributing significantly to GHG emission reductions if these technologies are implemented sooner. In the PEP, the share of fossil fuel-derived power generation in the energy mix is still about 50% in 2040. If it becomes possible to install CCUS in gas- and coal-fired power generation, it will be possible to make power generation carbon-neutral, which would amount to about 170,000 GWh.	The identification of CCS potential sites with a high degree of certainty is necessary for M/P and institutional design for the introduction of CCS. Therefore, it is desirable for cooperation to include carbon storage site exploration, and Technical Cooperation project that enable relatively large-scale exploration activities are considered effective. This is because carbon storage site exploration, including the procurement of various necessary equipment, requires several hundred million yen in geophysical exploration costs and a considerable amount of labor, and thus requires a large number of expert personnel and expenses. On the other hand, since a preliminary investigation (analysis of geological survey data) is considered necessary to reduce the cost of the investigation, it is desirable to conduct this as an information gathering and confirmation investigation and to calculate the cost of geophysical exploration. The Asia CCUS Network was launched by METI in June 2021 as an international industry-academia-government platform to share knowledge and develop a business environment for the utilization of CCUS (CO2 capture, utilization, and storage) throughout Asia. Sharing information and motivating decision makers in the Philippines through such an initiative will be effective in facilitating this initiative.	CCUS feasibility study (information gathering confirmation survey or cooperation preparation survey) ➤ CCS Potential Site Survey ➤ Preparation for Potential Site Geophysical Exploration (consideration of budget for next Technical Cooperation program) ➤ CCUS Availability CCS Introduction M/P, Institutional Design and Capacity Building Program (Technical Cooperation Project) ➤ Carbon storage site potential study ➤ Proposal for CCS support system/system ➤ Formulation of M/P ➤ Improvement of C/P's CCS-related technical capacity

Source: JICA Survey Team

2) Prioritization of the identified issues

Table 3-5 Evaluation of Priority Issues (Energy Sector)

Issue	Urgency	Mitigation/ Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
Energy Statistics & Planning				
Limitation of capacity to collect, analyze, and make energy data available	Low It is necessary to increase the certainty of achieving PEP, but it is not urgent.	✓	✓	+ Spillover effects are qualitative and do not contribute to direct GHG emission reductions.
Conventional energy				
Limitation of knowledge in technical, legal, and financial aspects of natural gas	High In order to achieve the PEP's 2040 power supply structure, it will take time to install gas-related facilities, so it is necessary to start efforts as soon as possible.	✓✓		++ PEP's significant contribution to achieving the CES and promotion of hydrogen utilization will contribute to the future decarbonization of gas-fired power generation.
Renewable energy				
Limited private investment in renewable energy (especially hydroelectric and geothermal)	High In order to achieve the 2040 power source composition of the PEP, it will take time to install hydroelectric and geothermal facilities, so it is necessary to start efforts as soon as possible.	✓✓✓	✓	+++ Hydroelectric power can also be a climate change adaptation measure by addressing flood control and water utilization, and geothermal power can replace fossil fuel power generation as a base load power source. In addition, the promotion of investment by the private sector through risk reduction will also influence the expansion of private sector engagement.
Power transmission and distribution, electrification				
Delayed expansion and reinforcement of the power grid	High This is directly linked to delays in the introduction of renewable energy, and delays are still occurring at present.	✓✓✓		+++ Resolving this issue will not only relieving delay investment in renewable energy installations due to the limited grid capacity, but will also affect the resolution of

Issue	Urgency	Mitigation/ Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
				delays in licensing and approval of renewable energy installations, thus boosting and accelerating the introduction of renewable energy in a combined manner.
Limitation of concrete policies and systems for smart grid realization	Low This does not yet become significant problem at present, as it may be supplemented by assistance from the ADB, USTDA, and USAID. In addition, it is considered to be less urgent, as measures are expected to be taken relatively quickly.	✓✓		++ Expanding the use of renewable electricity will not only promote the introduction of renewable energy, but also reduce the introduction of gas-fired power generation. It is also expected to create new employment opportunities through resource aggregation, etc., and economic benefits will be realized.
Limitation of sustainability of remote island power infrastructure	Med There is no particular deadline in the plan, and the urgency level is relatively low from the perspective of the current efforts being made.	✓	✓✓	++ Although GHG reductions are expected due to a decrease in the utilization of diesel power generation, the contribution is relatively small because it is a small grid on a remote island, but in terms of adaptation, the contribution is high because it improves disaster resilience.
Limited funds for full electrification by 2028	High The NEA has already drafted a plan through 2028, which is highly urgent because it cannot begin until financial resources are determined.	✓	✓✓✓	+++ Total electrification is effective in terms of adaptation measures, and a 100% electrification rate will contribute significantly to the realization of sustainable energy as set forth in the NDC
Energy Efficiency and Conservation				
Limited private investment in energy	Med	✓✓	✓	++

Issue	Urgency	Mitigation/ Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
efficiency and conservation	Although relatively urgent in terms of reducing the increased energy demand associated with future population growth, it is not an urgent issue, as DOE has a certain budget for implementation.			Significant contribution to the realization of the National Energy Efficiency & Conservation Plan and Roadmap (2023-2050)
Alternative Fuels and Emerging Technologies				
Limitation of private investment environment to promote supply of biofuels, etc.	High One of the President's Socioeconomic Agenda is "Affordable and Clean Energy," which includes alternative fuels. In particular, the government had set a goal of domestic production of SAF by 2025, but since this goal has not yet been achieved, efforts to increase biofuel production and SAF production are relatively urgent.	✓✓		++ Solving issues in automotive fuels is highly effective since the transportation sector emits 1/3 of GHG. It could also greatly contribute to the diffusion of SAF and other products, as well as to the entry of companies into the market.
Limited directions, institutions, and policies for hydrogen adoption	Med The technology itself is not yet complete on a global scale, and there is no deadline for hydrogen-related initiatives, so the urgency is not high, but early action is effective in promoting its widespread use in the future.	✓✓✓		+++ It is related to the decarbonization of all industries, and the impact of its realization is very high. It may also contribute to solving the energy problem.
Absence of directions, institutions, and policies to implement CCUS	Med The technology itself is not yet complete worldwide, and there is no deadline for CCUS-related initiatives, so the urgency is not high, but early efforts will be effective in promoting its widespread use in the future.	✓✓✓		+++ It is related to the decarbonization of fossil fuel power generation, and the impact of its realization is very high. It could also contribute to carbon neutrality efforts in the Philippines.

(3) Industry

1) Analysis of the Identified Issues

The industrial structure of the Philippines, in terms of nominal GDP by industry in 2022, is 9% by Primary Industries (agriculture, forestry, and fisheries sector), 33% by the secondary industry sector, and 58% by the Tertiary Industry (services sector). A breakdown of the industrial sector shows that the manufacturing sector accounted for 19%, followed by the construction sector at 7%. The breakdown of the services sector shows trade and repair of motor vehicles, motorcycles, personal and household goods at 19%, followed by real estate at 13%. Based on these ratios, manufacturing in the Philippines accounts for only about 20% of GDP, and in particular, the weakness of the domestic automobile manufacturing industry has resulted in a thriving trade in automobiles.

The GHG emissions of the Philippine industrial sector in 2020 GHG Inventory were 16.772 MtCO₂e, or 8.2% of the national total, making it the fifth largest source of GHG emissions after energy, agriculture, transportation, and waste. By industry, the cement industry accounts for 77%, followed by the iron and steel industry at 13%, and the refrigeration & air conditioning (RAC) industry at 9%, with these three industries emitting 99% of the GHGs in the industrial sector, according to the 2010 GHG inventory report. Therefore, it is necessary to promote climate change countermeasures targeting these three industries with large GHG emissions, and these three industries and the petrochemical industry are targeted in NDC's implementation measures in the Industrial Processes and Product Use (IPPU) area.

The implementation of climate change measures in the industrial sector is largely left to the self-help efforts of industries and companies, with weak incentives or mandates for implementation based on policies and regulations. Publicly Listed Companies (PLCs) are required to prepare sustainability reports by the Securities and Exchange Commission (SEC) but are not mandated to promote climate change action. In addition, while large foreign-owned and conglomerate-owned companies in the top class of their respective industries are voluntarily investing and working on climate change measures with a commitment to zero emissions, smaller-sized domestic based companies do not voluntarily take measures that would put pressure on their corporate profits. Therefore, it is desirable to reduce GHG emissions in the industrial sector by providing economic incentives that encourage the green shift of companies with large GHG emissions.

On the other hand, the transportation sector accounts for 14.4% of the country's total GHG emissions in 2020, and among transportation modes, public transport vehicles (PUVs), including jeepneys, tricycles, and buses, in particular, account for about 80% of all travel distances, so GHG reduction measures for PUVs are expected to contribute significantly to reducing entire GHG emissions in the Philippines. Jeepneys, which are a unique type of vehicle in the Philippines, have no manufacturing standards or certification system due to the following issues: 1) Maintenance is difficult because there are more than 100 models with no unified standards, 2) Prices are not stable and mass production is not possible because each company

manufactures to order due to the absence of unified standards, and 3) The absence of safety standards has resulted in the existence of some safety problems, and there is an urgent need to establish manufacturing standards and certification systems that take into account safety, environmental friendliness, and other factors.

Therefore, although the industrial sector will not directly take measures to reduce GHG emissions from public transport vehicles (PUVs), it is hoped that supporting the establishment of a certification system for electric jeepneys, a unique type of vehicle in the Philippines, will encourage the expansion of domestic production of E-jeepneys, and in turn, through the development of the automobile industry, contribute to the transportation sector's. It is hoped that this will contribute to GHG reductions in the transportation sector by fostering the EV industry.

In addition, GHG emissions from solid waste in the waste sector account for 4.85% of the country's total GHG emissions in 2010, of which recyclable waste, including plastics, has great potential for energy reduction through resource reuse in the industrial sector, such as being used as alternative fuel and raw material in the cement industry. Although the introduction of the EPR law requires large companies to collect a portion of the plastic used in their product packages, much of the waste treatment in the country is left to the informal sector, and companies that are capable of proper treatment, including sorted collection and post-collection recycling, are limited, and the absence of an eco-system for recycling means that even after sorting and collection, the waste is mixed with other waste and landfilled.

Therefore, since the expansion of the recycling industry is a cross-industry-wide issue, the industrial sector should contribute to the reduction of GHGs from waste not only through legislation, but also through support from government agencies to target companies, such as through the preparation of directories of suitable recycling/processing companies.

Table 3-6 Issues analysis (industry sector)

Issue	Relevant Policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
Cement Industry					
<p><u>Delayed introduction of alternative fuels and raw materials (AFR) utilization and waste heat recovery in the cement industry</u></p>	<p><u>NDC PaMs (DENR)</u></p> <ul style="list-style-type: none"> ➢ Use of alternative fuels and raw materials (waste and biomass) in the cement co-firing process ➢ Installation of Waste Heat Recovery (WHR) facilities at a cement plant <p><u>DENR DAO 2010-006</u></p> <p><u>Guidelines for the Use of Alternative Fuels and Raw Materials in Cement Kilns.</u></p> <ul style="list-style-type: none"> ➢ Regulations on waste acceptance and emission standards to be followed in co-processing of alternative fuels and raw materials (AFR) for clinker for cement production, as well as on waste delivery management and documentation and reporting procedures. 	<p>In the Philippine Cement industry, four major companies, Holcim Cement Corporation, CEMEX Cement Corporation, and Republic Cement Corporation among 12 companies, have been working on the use of alternative fuels and raw materials in the cement production process based on the "Guidelines for the Use of Alternative Fuels and Raw Materials". They are working on the use of biomass waste, industrial waste from various industries, and municipal waste such as waste plastic, and plan to expand the scale of use in the future. EGEL Cement, a major company, plans to start using alternative fuels and raw materials in two years, but efforts by medium-sized companies other than the four major companies mentioned above (25% of the total of 12 companies in terms of cement production capacity) have not progressed.</p> <p>The reason is the reluctance on the part of the companies that borrow the funds to make investment decisions for the implementation of the measures. The challenge is not on the side of those who lend money to companies, such as local banks in the Philippines. The use of alternative fuels and raw materials in the cement production process initially requires a large capital investment. This is because this capital investment does not pay off immediately after the investment is made, and the payback period is long (5 years or more) and the economics are low, so the short-term commercial benefits are small. Therefore, medium-sized companies that do not have great financial strength will not be motivated to invest aggressively. Furthermore, medium-sized firms need to further improve experience and knowledge in introducing countermeasure technologies, which causes them to hesitate to invest in countermeasures in combined with the low economic potential.</p> <p>The financial challenge of not investing aggressively in waste heat recovery measures, which have GHG reduction potential, also applies because of the long payback period for such measures. 4 MW or more would be preferable, but many cement companies, including large companies, do not have plants large enough to recover enough heat, so with the exception of the large company Republic Cement (which plans to install a 6 MW waste heat recovery facility using JCM equipment subsidies in 2023), most companies have not taken any action.</p>	<p>The GHG emissions of the Philippines' industrial sector in 2020 were 16.772 MtCO₂e, or 8.2% of the country's total GHG emissions, referred to IPPU(industrial processes and product use) sector data of GHG inventory. The cement industry accounts for 77% of the industrial sector (IPPU) GHG emissions referred to data of 2010 GHG inventory. Solving this issue will lead to direct GHG reduction and contribute to the achievement of the NDC.</p> <p>Furthermore, the resolution of this issue will contribute to the achievement of the IPPU sector's 2028 CO₂ reduction target of 0.71 mt for the IPPU sector in the Philippine Development Plan (2023-2028) (GHG reduction effects are being estimated).</p>	<p>In order to solve the problem of the delay in the use of alternative fuels and raw materials and the introduction of waste heat recovery measures in the cement production process, financial support with low interest rates, which would minimize the financial investment required to install the equipment necessary to implement the measures and enable a quick payback of the investment, would facilitate companies' decision to invest in the measures and expand the implementation of the measures in the Cement industry. This will make it easier for companies to make investment decisions and expand the implementation of measures in the Cement industry.</p> <p>Therefore, as a preliminary step to provide financial support to each company, a technical cooperation project with DENR will be implemented to conduct a feasibility study on the use of alternative fuels and raw materials in the cement production process for eight medium-sized companies and a feasibility study on waste heat recovery for 11 companies including major companies.</p> <p>The technical cooperation project will clarify the technologies and equipment to be introduced in each company for the utilization of alternative fuels and raw materials and waste heat recovery measures, and at the same time, provide training on the technologies to be introduced to the personnel of each company. The project will also strengthen the capacity of DENR so that it can continue to provide training to company personnel on its own.</p> <p>The implementation of this project is expected to clarify the scale of equipment to be installed at plants in the Cement industry (11 companies) to implement GHG reductions, leading to the implementation of JICA two-step loans and company-specific JCM after this short-term program as financial support for equipment needed by the companies. The JCM program is expected to be implemented in the future.</p> <p>The waste heat recovery measure is expected to be implemented for the other 11 companies, as a JCM equipment subsidy is scheduled to be provided to Republic Cement, a major company, in 2023.</p>	<p>Feasibility study on AFR utilization and waste heat recovery in cement industry (technical cooperation)</p> <ul style="list-style-type: none"> ➢ AFR (alternative fuels and raw materials) utilization feasibility study (including AFR database creation) ➢ Feasibility study on introduction of waste heat recovery

Issue	Relevant Policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
<p><u>Negative Impact on the Blended Cement Market Due to Inconsistencies in DPWH Bluebook and Philippine National Standards (PNS) Standards on Blended Cement</u></p>	<p><u>Blended cement standards (PNS 63:2019)</u></p> <ul style="list-style-type: none"> ➢ Philippine National Standard (PNS) specifies the requirements of the standard (Loss of Ignition 8.0) for blended cements. <p><u>NDC PaMs</u></p> <ul style="list-style-type: none"> ➢ Use of supplementary cement materials (SCM) such as fly ash and steel slag as alternatives to clinker in cement production 	<p>The Philippine Cement industry is using alternative raw materials in the cement manufacturing process to produce blended cements with lower GHG emissions, and private projects are increasingly using them, including in high-rise building construction.</p> <p>On the other hand, public works projects use only conventional high-GHG emitting Portland cement and limit use of blended cement because DPWH does not permit the use of blended cement with a loss on combustion (LOI) of 8.0.</p> <p>In 2019, the Philippine National Standard approved a standard for blended cement with a loss of ignition (LOI) of 8.0. But DPWH insisted on a loss of ignition of 5.0 (DPWH Bluebook's standard) and has not settled the issue. This debate has been going on for nearly a decade between the two agencies, and although both standards have been tested for durability and other requirements for cement and no differences were found. But DPWH did not accept changing its standard.</p> <p>Against this background, the long-running debate between DPWH and the Philippine National Standard has prevented its use in public works projects and has led the cement industry to second-guess the expansion of production of blended cement, which has lower GHG emissions.</p>	<p>The GHG emissions of the Philippines' industrial sector in 2020 were 16.772 MtCO₂e, or 8.2% of the country's total GHG emissions, referred to IPPU(industrial processes and product use) sector data of GHG inventory.</p> <p>The cement industry accounts for 77% of the industrial sector (IPPU) GHG emissions referred to data of 2010 GHG inventory. Solving this issue will lead to direct GHG reduction and contribute to the achievement of the NDC.</p> <p>Furthermore, the resolution of this issue will contribute to the achievement of the IPPU sector's 2028 CO₂ reduction target of 0.71 mt for the IPPU sector in the Philippine Development Plan (2023-2028) (GHG reduction effects are being estimated).</p> <p>Allowing public works project to use blended cement with lower GHG emissions is expected to provide momentum for the Cement industry to expand blended cement production, which will have an impact on GHG reductions across the industry sector.</p>	<p>Since DENR-CCS believes that the resolution of this debate must be left to a high-level decision by the government, it is considered appropriate not to address this issue as a policy issue, but to support the Coordinating Committee on Blended Cement Standards by assisting in the collection of technical information (for example, figures of LOI).</p>	<p>Study on the feasibility of AFR utilization and waste heat recovery in the cement industry (technical cooperation)</p> <ul style="list-style-type: none"> ➢ Assistance in collecting technical information on blended cement
Iron and Steel Industry					
<p><u>Delayed measures to replace energy-efficient equipment in the Iron and Steel industry</u></p>	<p><u>NDC PaMs (DENR)</u></p> <ul style="list-style-type: none"> ➢ Reducing GHG emissions from the Iron and Steel industry 	<p>The Philippine Iron and Steel industry does not use blast furnaces to produce iron from iron ore, but rather uses electric arc furnaces and industrial furnaces to melt imported semi-finished steel products and scrap iron recovered domestically, which is then processed into finished products.</p> <p>To reduce CO₂ emissions, SteelAsia, a major steelmaker, has begun to implement initiatives such as technology to automatically optimize the mixing ratio of air and fuel in industrial furnaces to reduce fuel consumption, and Hot Charging Technology to reduce electricity consumption by preheating steel semi-finished products and steel scrap to be fed into electric arc furnaces to approximately 500 to 600 degrees by using waste heat from the furnace.</p> <p>However, from the perspective of the Iron and Steel industry as a whole, the use of fuel auto-optimization and waste heat recovery technologies is limited to major companies.</p> <p>The reason is the financial challenge that companies are not willing to invest aggressively in the introduction of waste heat recovery technologies, especially since they require a large initial capital investment, but the payback period is long (5 years or more) and the economics are low. Furthermore, companies need to further improve experience or knowledge for the introduction of these new technologies, which causes them to hesitate to invest in countermeasures in combined with the low economic efficiency.</p>	<p>Of the 16.772 MtCO₂e of GHG emissions from the industrial sector in the Philippines in 2020 referred to IPPU sector data of GHG inventory, the steel industry accounts for 13% (1.093 MtCO₂e) referred to data of 2010 GHG inventory. Solving this issue will lead to direct GHG reduction and contribute to the achievement of NDC.</p> <p>Furthermore, the resolution of this issue will contribute to the achievement of the IPPU sector's 2028 CO₂ reduction target of 0.71 mt for the IPPU sector in the Philippine Development Plan (2023-2028) (Estimation of GHG reduction effect is underway).</p>	<p>To solve the problem of the steel industry's reluctance to make investment decisions in waste heat recovery technology, which requires large capital investment, low interest rate financial support that allows companies to make as little capital investment as possible to install the equipment needed to implement the measures and to finish the payback as quickly as possible would make it easier for companies to make investment decisions for the measures, and the steel industry This is expected to lead to an increase in the implementation of measures in the steel industry.</p> <p>Therefore, as a preliminary step to provide financial support to each company, it is necessary to conduct a technical cooperation project with DENR to conduct a feasibility study on the introduction of waste heat recovery technology to plants in the steel industry.</p> <p>In the technical cooperation project, DENR will clarify the technologies and equipment to be introduced in each company in the field of waste heat recovery technology, and at the same time, educate the personnel of each company on the technologies to be</p>	<p>Feasibility Study on Introduction of Energy Reduction Measures in Iron and Steel Industry</p> <ul style="list-style-type: none"> ➢ Feasibility Study on Introduction of Waste Heat Recovery

Issue	Relevant Policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
				<p>introduced. The project will also strengthen the capacity of DENR so that it can continue to provide training to company personnel on an ongoing basis.</p> <p>It is expected that the implementation of this project will clarify the scale of equipment that should be installed in steel industry plants to implement GHG reductions, leading to the implementation of JICA two-step loans and company-specific JCMs after this short-term program as financial support for equipment needed by the companies.</p> <p>Since waste heat recovery technology is used in the Japanese steel industry, it is expected that Japanese technology will be applied to the Philippine steel industry.</p>	
Refrigeration and Air Conditioning (RAC) Industry					
<p><u>Delayed measures to use low global warming potential (GWP) refrigerants in the RAC industry</u></p>	<p><u>NDC PaMs (DENR)</u></p> <ul style="list-style-type: none"> ➤ Transition to low global warming potential (GWP) alternative refrigerants in the RAC (refrigeration and air conditioning) industry <p><u>Kigali Amendment to the Montreal Protocol</u></p> <ul style="list-style-type: none"> ➤ Reduce HFC consumption by 80% over 20 years ➤ Introduction of measures to encourage the industrial sector to shift to alternatives with lower global warming impacts 	<p>The importation of R22 (HCFC) refrigerants is already prohibited in the Philippines in accordance with regulations under the Montreal Protocol.</p> <p>The refrigerator industry in the Philippines is transitioning from R134a (HFC, GWP: about 1400) to R600a (isobutane, GWP: about 3), a natural refrigerant with much lower GWP, which is reducing GHG emissions.</p> <p>In the air conditioner industry of the RAC industry, the Philippine government provides subsidies for switching from non-inverter air conditioners to inverter air conditioners and from R22 (HCFC) refrigerant to R32 (GWP: 675) and R410a (GWP: 2090), which are HFC refrigerants with lower global warming potential. The Philippine government has provided subsidies to manufacturers in the country to help them switch to these new refrigerants.</p> <p>On the other hand, even when HFCs are used to replace HCFCs, as there are concerns about the impact of HFCs on global warming, the Kigali Amendment to the Montreal Protocol, which entered into force in 2019, set targets for HFC reductions in terms of CO2 equivalent.</p> <p>To comply with this target, a transition from R32, an HFC refrigerant, to a refrigerant with a lower GWP is required. Currently, natural refrigerants such as R290 (propane, GWP: 2 or less) are attracting attention, and local companies in the Philippines are importing and selling equipment using R290 produced in China.</p> <p>Production of equipment in the Philippines using the R290 is not yet underway. The reason for this is that using R290 requires changes in the production line, such as piping and copper tubing, requiring new investments. Since the refrigerant R290 is not produced domestically and has to be imported from overseas, the cost of procuring the refrigerant rises and the</p>	<p>The GHG emissions of the Philippines' industrial sector in 2020 were 16.772 MtCO₂e, or 8.2% of the country's total GHG emissions, referred to IPPU(industrial processes and product use) sector data of GHG inventory. The RAC industry accounts for 9% of the industrial sector (IPPU) GHG emissions due to Fluorocarbon gases emissions referred to data of 2010 GHG inventory. Solving this issue will lead to direct GHG reductions and contribute to the achievement of the NDC.</p> <p>Furthermore, the resolution of this issue will contribute to the achievement of the IPPU sector's 2028 CO₂ reduction target of 0.71 mt for the IPPU sector in the Philippine Development Plan (2023-2028) (GHG reduction effects are being estimated).</p>	<p>Joint Statement of the Japan-Philippines Environmental Policy Dialogue (March 2, 2022)</p> <p>The statement regarding the management of Fluorocarbons involves assessing the potential for the recovery and destruction of HFCs, developing the capacities of policymakers and technicians, and advancing cooperation on utilizing the JCM. This aligns with the Japanese government's policy of providing support towards resolving this issue.</p> <p>In order to respond to efforts to comply with the Kigali Amendment to the Montreal Protocol's goal of reducing HFC consumption by 80% over 20 years. It is necessary to create an environment in which companies are willing to invest in switching to the low-GWP refrigerant R290 (propane, GWP : 2 or less).</p> <p>Therefore, by dispatching short-term experts who can assist in the formulation of economic incentives and capital investment support programs, it will be possible to design support programs for companies, such as tax incentives for importing R290 from overseas and subsidy support for domestic companies to retrofit their production lines for R290.</p>	<p>RAC Industry Low Global Warming Potential (GWP) Refrigerant Utilization Promotion System Development Study Project (Short-term Expert Dispatch)</p> <ul style="list-style-type: none"> ➤ Consideration of preferential treatment for R290 import duties. ➤ Consideration of a subsidy program for the renovation of production lines to comply with R290

Issue	Relevant Policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
		<p>profitability of air conditioner sales declines, making the switch to R290 a second-guessing proposition.</p> <p>As for donor support, ADB will start in 2021,</p> <p>A technical cooperation project is underway with DENR with the aim of providing advanced technologies and innovative solution options for Fluorocarbon life cycle management; according to DENR, it will focus specifically on the policy aspects of overall life cycle management, rather than specific incentives for companies.</p>			
<p><u>Need to further improve registered companies for Fluorocarbon gases recovery and treatment</u></p>	<p><u>Chemical Control Order for Hydrofluorocarbons (HFCs), DAO No. 2021-31)</u></p> <ul style="list-style-type: none"> ➢ Proper handling of refrigerant during inspection work ➢ Require proper recovery and treatment of refrigerants emitted from discarded refrigeration and cooling equipment 	<p>In the Philippines, the HFC chemical control order explicitly states that gases emissions are prohibited and must be recovered, but there is little gases recovery process in place.</p> <p>In the Philippines, a large percentage of refrigerators and air conditioners are serviced by the informal sector, who do not have offices and do not have proper equipment for recovery. In most cases, when a refrigerant breaks or leaks in a home air conditioner, the technician from the air conditioner manufacturer is not called, and the technician from the informal sector is called to vent and refill the refrigerant gas because it is cheaper and faster.</p> <p>In addition, it is said that few companies are willing to own and collect gases recovery equipment because it costs 60,000 PHP per unit and does not generate much revenue for household air conditioners due to the small amount of gases recovered per unit.</p> <p>Currently, only Delsa has received approval from the DENR Ozone Office for a license to recover and store gases, but the company is required to meet quality and reliability requirements, such as already owning the necessary gases recovery equipment and other facilities and having personnel with gases recovery technology. (DENR-CCS Comments)</p> <p>Against this background, the profitability of gases recovery operations is poor, and the registration of companies itself may be attributed to the need to maintain equipment and personnel with recovery skills at the companies in advance.</p> <p>As for donor support, ADB will start in 2021,</p> <p>A technical cooperation project is underway with DENR with the aim of providing advanced technologies and innovative solution options for fluorocarbon life cycle management. According to DENR, it is not a specific topic of gases recovery in the private sector, but rather is dedicated to the policy aspects of overall life cycle management.</p>	<p>The GHG emissions of the Philippines' industrial sector in 2020 were 16.772 MtCO₂e, or 8.2% of the country's total GHG emissions, referred to IPPU(industrial processes and product use) sector data of GHG inventory. The RAC industry accounts for 9% of the industrial sector (IPPU) GHG emissions due to Fluorocarbon gases emissions referred to data of 2010 GHG inventory. Solving this issue will lead to direct GHG reductions and contribute to the achievement of the NDC..</p> <p>Furthermore, the resolution of this issue will contribute to the achievement of the IPPU sector's 2028 CO₂ reduction target of 0.71 mt for the IPPU sector in the Philippine Development Plan (2023-2028) (GHG reduction effects are being estimated).</p>	<p>Joint Statement of the Japan-Philippines Environmental Policy Dialogue (March 2, 2022)</p> <p>The statement regarding the management of Fluorocarbons involves assessing the potential for the recovery and destruction of HFCs, developing the capacities of policymakers and technicians, and advancing cooperation on utilizing the JCM. This aligns with the Japanese government's policy of providing support towards resolving this issue.</p> <p>In order to increase the number of companies registered for gases recovery and storage licenses, it is necessary to add economic incentives such as subsidies for the purchase of gases recovery equipment, and to create a system whereby companies are motivated to participate in gases recovery because it is profitable for them to do so.</p> <p>Even if companies do not have personnel with the recovery technology required for registration, they should be provided with educational support so that they can participate in DENR-approved training programs free of charge to acquire the knowledge and skills needed to recover gases.</p> <p>For this purpose, short-term experts who can provide guidance on knowledge and techniques to recover gases will be dispatched, and in cooperation with DENR, a gases recovery procedure manual will be developed, based on which gases recovery training will be provided to companies servicing refrigerators and air conditioners. In addition, economic incentives (e.g., subsidies for purchase of recovery equipment) for registered companies will be considered.</p> <p>These supports are expected to increase the number of companies registered for</p>	<p>Technical training for private companies on appropriate Fluorocarbon gases recovery and treatment (short-term expert dispatch)</p> <ul style="list-style-type: none"> ➢ Reexamination of registration requirements for Fluorocarbon gases recovery companies ➢ Fluorocarbon gases recovery procedure manual preparation ➢ Fluorocarbon gases recovery training ➢ Consideration of economic incentives for registered companies

Issue	Relevant Policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
<p>Limited experience and competence of Department of Environment and Natural Resources staff in selecting technologies for Fluorocarbon gases destruction treatment facilities and operating the facilities</p>	<p>Chemical Control Order for Hydrofluorocarbons (HFCs), DAO No. 2021-31)</p> <ul style="list-style-type: none"> ➢ Proper handling of refrigerant during inspection work ➢ Require proper recovery and treatment of refrigerants emitted from discarded refrigeration and cooling equipment 	<p>As for the destruction of Fluorocarbon gases, very little is done because the gas is not collected for processing.</p> <p>One company, Holcim Cement, is currently certified to destroy Fluorocarbon gases, and the recovered gas is destroyed using a cement kiln.</p> <p>The activity of destroying the Fluorocarbon gases recovered by Delsa, which has been certified for recovery and storage, in a cement kiln of Holcim Cement has been adopted as a "Demonstration Project for Establishing a Recovery Scheme for Fluorocarbon gases and Introducing a Mixed Combustion Type Facility" under the 2021 JCM equipment subsidy project, and according to DENR, the results of the project are being closely monitored.</p> <p>Against this background, DENR believes that since the system to recover Fluorocarbon gases has not been established at present, the facility to destroy and treat the gas will be handled by utilizing cement kilns of cement companies. However, in the future, as the amount of recovered Fluorocarbon gases may increase and cement kilns of cement companies may not be able to handle it, DENR believes it is necessary to construct a dedicated Fluorocarbon gases destruction and treatment facility.</p> <p>In this case, DENR believes that a non-incineration method is preferable, considering local residents' awareness of the safety of incinerating a large amount of Fluorocarbon gases in one place. However, DENR staff lacks experience and capabilities in selecting appropriate technologies, including other treatment technology options, and in operating the facility after it is installed.</p> <p>As for donor support, ADB will start in 2021,</p> <p>A technical cooperation project is underway with DENR with the aim of providing advanced technologies and innovative solution options for Fluorocarbon life cycle management. They are considering the use of a cement kiln for the Fluorocarbon gases destruction treatment facility.</p>	<p>The GHG emissions of the Philippines' industrial sector in 2020 were 16.772 MtCO₂e, or 8.2% of the country's total GHG emissions, referred to IPPU(industrial processes and product use) sector data of GHG inventory. The RAC industry accounts for 9% of the industrial sector (IPPU) GHG emissions due to Fluorocarbon gases emissions referred to data of 2010 GHG inventory. Solving this issue will lead to direct GHG reductions and contribute to the achievement of the NDC.</p> <p>Furthermore, the resolution of this issue will contribute to the achievement of the IPPU sector's 2028 CO₂ reduction target of 0.71 mt for the IPPU sector in the Philippine Development Plan (2023-2028) (Estimation of GHG reduction effect is underway).</p>	<p>Fluorocarbon gases recovery and storage licenses.</p> <p>Joint Statement of the Japan-Philippines Environmental Policy Dialogue (March 2, 2022)</p> <p>The statement regarding the management of Fluorocarbons involves assessing the potential for the recovery and destruction of HFCs, developing the capacities of policymakers and technicians, and advancing cooperation on utilizing the JCM. This aligns with the Japanese government's policy of providing support towards resolving this issue.</p> <p>Even if the number of registered companies increases as a result of training for Fluorocarbon gases recovery, for the time being, it is considered possible to respond by utilizing cement kilns of cement companies.</p> <p>It would be useful to dispatch short-term experts to DENR to provide assistance in the selection of technologies applicable to Fluorocarbon gases destruction treatment facilities, in assuming that the treatment response capacity of cement companies may exceed their limits in the future.</p> <p>It is expected that Japanese companies' technologies will be utilized for applicable technologies.</p> <p>There is no JICA subject-specific training on Fluorocarbon gases recovery and processing.</p>	<p>Implemented during technical training (short-term expert dispatch) for appropriate Fluorocarbon gases recovery and treatment for private companies.</p> <ul style="list-style-type: none"> ➢ Assistance in selecting technologies for Fluorocarbon gases destruction treatment facilities
Petrochemical Industry					
<p>Delayed measures to utilize bio naphtha in the Petrochemical industry</p>	<p>NDC PaMs (DENR)</p> <ul style="list-style-type: none"> ➢ Use of bio naphtha as a feedstock in ethylene production 	<p>The Petrochemical industry currently uses naphtha of fossil fuel origin, which emits CO₂ during the cracking process. Therefore, NDC has set a goal to reduce CO₂ emissions by using naphtha of plant origin. However, bio naphtha is produced by only a few companies in the world (such as Neste), and all of them import it from overseas, which makes the price of bio naphtha very high, 2 to 3 times that of fossil fuel origin naphtha. The price of bio naphtha is two to three times higher than that of fossil fuel naphtha, which increases the cost of procurement and reduces the profitability of companies.</p>	<p>The GHG emissions of the Philippines' industrial sector in 2020 were 16.772 MtCO₂e, or 8.2% of the country's total GHG emissions, referred to IPPU(industrial processes and product use) sector data of GHG inventory. The Petrochemical industry accounted for 0.2% of the industrial sector's (IPPU) GHG emissions referred to data of 2010 GHG inventory. Solving this issue will lead to direct GHG reductions and contribute to the achievement of the NDC.</p>	<p>In order to respond to GHG reduction efforts in the Petrochemical industry, it is necessary to create an environment in which companies believe that the use of bio naphtha is profitable and actively utilize it.</p> <p>Therefore, short-term experts who can assist in the formulation of economic incentives and capital investment support programs can be dispatched to design support programs for companies, such as</p>	<p>Project to Study the Establishment of a System to Promote the Use of Bio-Naphtha in the Petrochemical Industry (Short-term Expert Dispatch)</p> <ul style="list-style-type: none"> ➢ Consideration of preferential treatment for bio naphtha import duties

Issue	Relevant Policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
			Furthermore, the resolution of this issue will contribute to the achievement of the IPPU sector's 2028 CO2 reduction target of 0.71 mt for the IPPU sector in the Philippine Development Plan (2023-2028) (Estimation of GHG reduction effect is underway).	tax incentives for importing bio naphtha from overseas.	
EV Industry					
<p><u>Absence of manufacturing standards/certification system for E-jeepneys and low speed EVs</u> *</p> <p>*Low-speed EV, defined in the Philippines as a vehicle traveling at speeds of 40 kilometers per hour or less. There is a wide variety, from small golf cart-like vehicles to jeepneys and minibus-like vehicles.</p>	<p>RA No. 11697, The Electric Vehicle Industry Development Act (EVIDA) Regulates EV manufacturing, use, transactions, etc.</p> <ul style="list-style-type: none"> ➢ Various measures to promote EV use (exempting EVs from license plate number coding, requiring new facilities, etc. to install EV-only parking lots and charging stations, etc.) <p>Comprehensive Roadmap for the Electric Vehicle Industry (CREVI)</p> <ul style="list-style-type: none"> ➢ Roadmap to 2040 for EV Industry Promotion ➢ Aim to make EVs an export industry by 2040 in conjunction with domestic diffusion and industry promotion <p>Public Utility Vehicle Modernization Program PUVMP (Public Utility Vehicle Modernization Program, DOTr Department Order No. 2017-011)</p> <ul style="list-style-type: none"> ➢ Various measures to convert PUVs (jeepneys, tricycles, buses, etc.) in use for more than 15 years to vehicles that meet Euro 4 standards or EVs ➢ Forming the jeepney workers into cooperatives, loans for replacement funds, rout rationalization of PUVs, proper recycling and disposal of end-of-life vehicles, etc. 	<p>EV Industry Status: In the Philippines, the EVIDA Act, the Electric Vehicle Industry Development Act, was enacted in 2022 to develop the EV industry, and in 2023, the DOE enacted the Comprehensive EV Industry Roadmap CREVI, which provides a roadmap for EV manufacturing and utilization based on the EVIDA Act, and provides development targets and directions until 2040. The roadmap provides a roadmap for EV manufacturing and use by 2040. CREVI has established a clean energy scenario in which 50% of all vehicles will be EVs by 2040, with a goal of 2.45 million EV vehicles by 2028, 1.85 million by 2034, and more than 2 million by 2040, including private cars, and motorcycles. The number of EVs is expected to reach 1.85 million by 2034 and 2 million by 2040. It also requires public transportation operators and LGUs to make 5% of the vehicles they use by 2034 and 10% by 2040.</p> <p>Situation of the EV manufacturing industry: In the Philippines, the CARS program (Comprehensive Automotive Resurgence Strategy, Executive Order No. 182) has been in place since 2015 to prevent the decline of the country's automotive industry. The program selects companies that manufacture automobiles in the Philippines and provides them with an average of 4.5 billion PHP per company (two sedan models, the Toyota Vios and the Mitsubishi-Mirage, were selected). Discussions are underway to make EV version of CARS Program, and details are expected to be announced in 2024.</p> <p>Status of Jeepneys: As part of GIZ's worldwide support framework, DOTr has been providing technical assistance to the Philippines in the formulation of policies for the transition of jeepneys, tricycles, and buses to diesel-powered vehicles compliant with Euro 4 standards or higher or newer vehicles such as EVs, optimization of routes, and unionization of operators, etc., and DOTr has been implementing these policies in the Public Utility Vehicle Modernization Program since 2017. Jeepneys are unique to the Philippines and serve as commuter transport for the common people, especially in Metro Manila, but older types are also a source of GHG emissions. There are no manufacturing standards or certification systems for Jeepneys, which has led to the following problems</p> <ul style="list-style-type: none"> • Difficult to maintain because each manufacturer sells models of various sizes and shapes, and 	<p>In the GHG inventory, the transportation sector accounts for 14.4% (29.431 MtCO2e) of total emissions in 2020. In addition, PDP's annual GHG reduction target for the transportation sector in 2028 is 5.14 MtCO2e.</p> <p>Public transport vehicles (PUVs), including jeepneys, tricycles, and buses, account for about 80% of all travel distances, and their GHG reductions will contribute significantly to reducing emissions in the Philippines. The World Bank report¹¹⁹ also estimates that if 90% of PUVs and 72% of general vehicles can be electrified, the reduction in GHG emissions in 2050 will be 450MtCO2e even with the current power supply mix. The electrification of public transportation is considered to be a high priority in the context of both adaptation and mitigation.</p> <p>The effect of establishing standards for E-jeepneys is expected to be the mass production of cheaper and safer E-jeepneys, which will contribute to the policy of converting 50% of all vehicles to EVs, a goal set in the CREVI clean energy scenario.</p>	<p>Japan's vehicle type approval system is a process that verifies that vehicles meet specific safety, emission, and performance standards set by the government, which sets regulations for the manufacture and importation of vehicles. The Road Transport Bureau of the Department of Land, Infrastructure, Transport and Tourism handles the issuance of certificates and the certification process in general, conducting a series of tests and inspections to ensure that standards are met. The tests include performance verification of safety, fuel efficiency, and emissions on test courses and dedicated test tracks; fuel efficiency evaluation at fuel evaluation facilities and fuel efficiency test centers; engine and exhaust system testing and analysis of emissions volume and quality at emissions testing laboratories; and crash testing and safety performance verification at safety evaluation facilities.</p> <p>The Department of Land, Infrastructure, Transport and Tourism (MLIT) has been supporting the establishment and improvement of type certification, registration, inspection, maintenance, and inspection systems, laws, and systems in Vietnam, Cambodia, and Myanmar, because there are many issues in the development and operation of automobile infrastructure systems such as automobile standards certification systems, inspection, registration, inspection, and maintenance in the ASEAN countries. In the international community, Japan has demonstrated leadership as the vice-chair of the UN World Forum for Harmonization of Vehicle Regulations, which formulates international rules to ensure vehicle safety and environmental protection. Japan is leading the formulation of safety and environmental standards, focusing on advanced technologies in which Japan has a technological advantage.</p>	<p>Establishment of vehicle authentication system for EVs including E-jeepneys (technical cooperation)</p> <ul style="list-style-type: none"> ➢ Develop safety and performance criteria and standards for EVs including e-jeepneys ➢ Support for the establishment of a certification system <p>Installation of vehicle certification equipment (yen loan)</p> <ul style="list-style-type: none"> ➢ Construction of vehicle certification facilities and equipment <p>Financial assistance for Jeepney Modernization</p> <ul style="list-style-type: none"> ➢ Low-interest loans to Jeepney cooperatives and PUV operators for replacement financing to E-PUV

¹¹⁹ <https://openknowledge.worldbank.org/entities/publication/3f76eadd-4ab6-5250-ab4e-75f39593f1b3>

Issue	Relevant Policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
		<p>there are more than 100 models that are not standardized</p> <ul style="list-style-type: none"> The absence of uniform standards means that companies are manufacturing on a make-to-order basis, which makes prices unstable and mass production impossible. Some safety issues exist due to absence of safety standards EVIDA's goal is to develop the EV industry into an export industry by 2040, and e-jeepneys are included in the strategy, but without standards and certification systems, future exports cannot be expected <p>The government is also aiming to make the EV industry, including E-jeepneys, an export industry. For E-jeepneys, for which no such system currently exists, there is an urgent need to establish manufacturing standards and certification systems that take into account safety and environmental friendliness. Especially in the Philippines, where typhoons and floods are common, it is also important to design and establish standards for vehicles that can be used with peace of mind and that have a properly protected electrical system even in bad weather.</p>			
<p><u>Scrapping of current vehicles due to conversion to EVs</u></p>	<p>Public Utility Vehicle Modernization Program PUVMP (Public Utility Vehicle Modernization Program, DOTr Department Order No. 2017-011)</p> <ul style="list-style-type: none"> Various measures to convert PUVs (jeepneys, tricycles, buses, etc.) in use for more than 15 years to vehicles that meet Euro 4 standards or EVs Association of businesses, loans for replacement funds, proper routing of PUVs, proper recycling and disposal of end-of-life vehicles, etc. 	<ul style="list-style-type: none"> It is estimated that the number of ELVs (End of Life Vehicles) in the Philippines will reach 140,000 by 2025, but there are no laws and regulations regarding ELV disposal. They are often disposed of informally, and illegal dumping and improper disposal, such as dumping in back alleys, have become a problem. In addition, fluorocarbons used as refrigerants in car air conditioners can contribute to ozone layer depletion if they are not properly recovered and treated. Furthermore, it is predicted that the DOTr's current PUVMP will generate a large number of abandoned PUVs when the replacement of jeepneys continues. DOTr is promoting a certified scrap factory system as part of its PUVMP, but there are not much factories that can be certified and only one factory is currently certified. The goal is to eventually have at least one certified factory in all 17 regions. 	<ul style="list-style-type: none"> Most of the ELVs parts can be reused or recycled if properly processed. For example, engines, catalysts, nonferrous metals, and tires can be recycled, while engines, body parts, and electrical components can be reused The EU has set a target of using less than 3.5 tons of recycled plastic in new cars and light commercial vehicles by 2023, which is expected to reduce oil consumption by up to 4 million barrels by 2030, confirming the importance of proper treatment of ELVs both from the perspective of using scarce resources and reducing oil consumption through reduced use of new plastics. 	<p>In Japan, the ELV Recycling Law has been enacted, and a system has been established whereby companies properly collect Fluorocarbons, dismantle vehicles, and recover airbags, etc., and automobile manufacturers and importers take back the airbags, Fluorocarbons, shredder dust, etc. generated from the vehicles they manufacture/import when they are scrapped, and recycle them.</p> <p>Tsuruoka Corporation has conducted a basic survey as part of JICA's private-public partnership project, and is currently conducting a business verification survey to promote the use of the technology. In addition, the demand for rare earths used in motors and electronic devices is expected to increase in the near future, and with prices expected to skyrocket, this is one of the fields where Japanese companies have a chance to enter the market.</p>	<ul style="list-style-type: none"> Support for establishment of systems in ELV recycling (technical cooperation) Private partnership projects for ELV treatment and resource recycling Training for ELV factories (technical cooperation) Low-interest loans (yen loans) for capital investment in ELV plants
<p>Waste Management in Industry</p>					
<p><u>Absence of plastic collection and recycling system</u></p>	<p>Extended Producer Responsibility Act/EPR Act of 2022, RA 11898</p> <ul style="list-style-type: none"> Producers (producers of products with total assets of 100 million PHP or more that generate plastic packaging waste) assume certain responsibilities for the environmental impact of their products throughout their life cycle (raw material selection, manufacturing process, use and disposal) 	<ul style="list-style-type: none"> The EPR Law was passed in July 2022. Companies are obligated to recover plastics used for packaging their products by using schemes such as plastic waste recovery through partnerships with LGUs, processors, and others. The targets set are 20% of the previous year's use by the end of 2023, 40% by the end of 2024, and ultimately 80% by 2028 The EPR also required each company to develop an EPR plan and register it with the National Ecology Center of the National Solid Waste Management Commission by the end of February 2023. As of November 2023, only 709 of the 4,000 companies had submitted their EPR plans to the 	<p>Solid waste accounted for 4.851% of the 2010 GHG inventory. The 2028 reduction target for PDP is 1.08MtCO_{2e}. Of the waste generated in the Philippines, 45% comes from households, 21% from commercial facilities, 12.1% from government and educational/healthcare institutions, and 4.1% from manufacturing and industry. Already contributing to soil, water, and air pollution due to improper disposal and treatment, 35% of plastic waste leaks into the ground and ocean, according to WWF.</p>	<p>Japan has already implemented a number of cooperation projects in the area of recycling.</p> <p>JICA conducted a survey on the recycling industry promotion plan in the Philippines in 2006-. This was recognized as a step forward in the recycling of plastics, and now that the EPR Law has been enacted, it is conceivable to update the earlier survey by incorporating more concrete proposals and cooperation.</p>	<p>Project for Strengthening Capacity for Policy Formulation to Foster the Recycling Industry (Technical Assistance)</p> <ul style="list-style-type: none"> Training, directories creation and matching programs (technical cooperation) for vendors who recycle. <p>Financial assistance for recycling industry (yen loan)</p>

Issue	Relevant Policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
		<p>National Ecology Center of the National Solid Waste Management Commission¹²⁰. In July 2024, they are also required to submit an EPR audit report.</p> <ul style="list-style-type: none"> ➤ WWF's 2019 report puts the recycling rate for plastics at only 9%. These recycling rates are low compared to neighboring countries in ASEAN. ➤ While policies are being put in place, the actual collection, proper treatment, and reuse of waste remain a challenge. In addition, although LGUs are responsible for waste management, substantial portion is left to the informal sector, which the World Bank estimates to be more than 100,000 people involved in informal waste management. ➤ Companies find it difficult to select the reliable contractor when they want to collect, properly dispose of, or recycle plastic from their products, and the BOI, which is the window for investment, does not have directories and cannot make referrals. ➤ Little sorting is done except for high value-added high density polyethylene (HDPE, tanks and containers, etc.), polypropylene (PP, food containers, etc.), and polyethylene terephthalate (PET, plastic bottles, magnetic tape, etc.). 	<p>Plastics are made from petroleum and require processing at high temperatures during production, resulting in high energy consumption. The establishment of a recycling system will have a significant impact on the achievement of NDC because it will enable the use of new resources, reduce energy consumption, and reduce the impact of ocean dumping on the ecosystem.</p> <p>In particular, although EPR has been established for plastics, a path has not yet been created to collect and properly dispose of them. It is estimated that more than 40% of plastics discharged in Philippines could be recycled if all target companies could achieve the target values, which would greatly reduce the use of new resources.</p>	<p>The Japanese Department of Environment, in collaboration with the NSWMC, has also prepared a Waste Analysis and Characterization Study (WACS) Manual. This manual will be distributed to LGUs and used in solid waste management training, etc. The manual sets out technical criteria for analyzing waste characteristics to guide LGUs in developing and implementing waste reduction and management programs.</p> <p>In addition, since many Japanese companies in the Philippines have problems with proper local disposal of industrial/hazardous waste, and in particular, many Japanese companies doing B-to-C business are subject to the EPR Law, cooperation in this area in the Philippines will also contribute to the activities of Japanese companies entering the Philippines.</p>	
Assistance for MSMEs					
<p>Lagging efforts by MSMEs to address climate change, especially in the area of mitigation</p>	<p>Magna Carta for Micro, Small and Medium Enterprises, RA 6977, as amended by RA 8289 further amended by RA 9501)</p> <ul style="list-style-type: none"> ➤ National guidelines to support small and medium enterprises ➤ Establishment of MSMEs Development Council ➤ Assist MSMEs in accessing funds, training, and other aspects of the MSMEs' business environment <p>The Promoting Job Creation and Inclusive Growth through the Development of Micro, Small, and Medium Enterprises Act (otherwise known as the Go Negosyo Act, RA No. 10644)</p> <ul style="list-style-type: none"> ➤ Laws aimed at promoting small and medium-sized enterprises ➤ Establish Negosyo Centers in each municipality to provide training and marketing support for MSMEs <p>Greening the Philippine Manufacturing Industry Roadmap</p> <ul style="list-style-type: none"> ➤ DTI and GIZ's Roadmap for 	<p>Government support for SMEs is provided through Negosyo Centers established in each municipality. The OECD's Strengthening climate resilience report⁽¹²¹⁾ notes that the Negosyo Centers can play a significant role in providing training on disaster and climate change risk response measures.</p> <p>DTI is collaborating with the Asian Disaster Preparedness Center (ADPC) on the Asian MSME Disaster Resilience Enhancement Program to strengthen the resilience of MSMEs.</p> <p>While adaptation measures such as resilience enhancement and business support measures such as business start-up and expansion have been implemented, measures to reduce business emissions by MSMEs have been slow. This is due to the limited incentives and access to technology to encourage companies to save energy and replace equipment with less emitting ones, leaving them to help themselves.</p>	<p>Calculating emissions by MSMEs is difficult, but given that they represent 99.6% of Philippine businesses, generate 40% of GDP, and engage 63% of the workforce, climate change action in SMEs has a significant impact, both in terms of mitigation and adaptation.</p> <p>The Philippines, which is prone to natural disasters, has made progress in the area of adaptation, such as strengthening disaster response capabilities and creating business plans for emergencies, but considering exports to Europe and other countries that are working to reduce carbon emissions throughout the supply chain, adopting lower-emission manufacturing processes and business practices will also enhance international competitiveness..</p>	<p>JICA has been implementing projects to strengthen linkages between small and medium-sized enterprises (SMEs) in the Philippines and large overseas enterprises through the "Information Collection and Verification Study on Industrial Promotion Potential and Development Issues in the Central Luzon and Calabarzon Region" and the "Project to Enhance Industrial Competitiveness through Industrial Human Resource Development and Value Chain Enhancement", to strengthen human resource capacity, including the establishment of effective human resource development models that are not adequately covered by vocational training institutions and higher education institutions.</p> <p>In addition, raising the level of human resources in the Philippines will in turn benefit Japanese companies entering the country.</p> <p>NEDO's survey¹²² also positions the green manufacturing sector as an important area for the future, along with carbon recycling, EV industry, etc.</p>	<p>Capacity building project for introduction of green technology for MSMEs and LGUs (technical cooperation)</p> <ul style="list-style-type: none"> ➤ Conduct training/workshops for MSMEs and LGUs on green technology options, power saving benefits, etc. ➤ Business matching with green technology companies ➤ Low-interest loans (yen loans) for introduction of green technology (capital investment)

¹²⁰ <https://www.philstar.com/nation/2023/11/13/2311139/denr-709-4000-firms-manage-plastic-waste>

¹²¹ <https://www.oecd.org/dac/environment-development/climate-resilience-philippines-2021.pdf>

¹²² <https://www.nedo.go.jp/content/100946755.pdf>

Issue	Relevant Policies	Status of climate countermeasures, issue analysis	Impact on achieving NDC target and sectoral policies	Direction of possible support from Japan	Possible Cooperation Program and their outputs
	<p>Developing Philippine Manufacturing into a Greener Industry</p> <ul style="list-style-type: none"> ➤ Set pathways and milestones to enhance global competitiveness through disaster resilient and environmentally friendly business growth in six priority sectors: automotive, auto parts, paper, plastics, furniture, and mass housing construction <p>The Philippine Green Public Procurement Roadmap (GPP)</p> <ul style="list-style-type: none"> - Policies and processes for selecting environmentally friendly products and services for public procurement. - Require compliance with specific environmental standards and environmental commitments from bidders in bid documents and contracts. - <p>Impact on MSMEs:.</p> <ul style="list-style-type: none"> ➤ When MSMEs offer sustainable products and services, they have greater opportunities to enter new markets. ➤ The introduction of technologies and innovations required by the GPP, as well as certification, is expected to improve the competitiveness of MSMEs. <p>Government support measures:.</p> <ul style="list-style-type: none"> - Within the framework of the GPP, governments and financial institutions provide financing and support to help MSMEs comply with the GPP. - A mechanism will be put in place for MSMEs to obtain the funding and advice they need to develop sustainable businesses. 				

Source JICA Survey Team:

2) **Prioritization of identified issues**

Table 3-7 Evaluation of Priority Issues (Industry Sector)

Issue	Urgency	Mitigation/Adaptation		Spillover Effect
		Mitigation	Adaptation	
Cement industry				
Delayed introduction of alternative fuels and raw materials (AFR) utilization and waste heat recovery in the Cement industry	High The IPPU sector of the NDC has been targeted in the implementation measures of the IPPU sector and needs to be addressed as soon as possible in order to achieve the 2030 NDC target.	✓✓✓		+++ By promoting the use of alternative fuels and raw materials and the implementation of waste heat recovery, the Cement industry's energy savings will lead to a reduction in GHG emissions, which account for 77% of the industry sector's total GHG emissions, with a significant impact.
Inconsistency between DPWH Bluebook and Philippine National Standards (PNS) standards on blended cement	High The IPPU sector of the NDC has been targeted in the implementation measures of the IPPU sector and needs to be addressed as soon as possible in order to achieve the 2030 NDC target.	✓✓		++ Promoting the use of raw materials will have a significant impact by reducing GHG emissions during cement production, which accounts for 77% of the total GHG emissions of the industrial sector.
Iron and Steel industry				
Delayed measures to replace energy-efficient equipment in the Iron and Steel industry	High The IPPU sector of the NDC has been targeted in the implementation measures of the IPPU sector and needs to be addressed as soon as possible to achieve the NDC target of 2030.	✓✓		++ Promoting the implementation of waste heat recovery will reduce GHG emissions, which account for 13% of the industry sector's total GHG emissions, through energy savings in the Iron and Steel industry.
Refrigeration and Air Conditioning (RAC) Industry				
Delayed measures to use low global warming potential (GWP) refrigerants in the RAC industry	High The IPPU sector of the NDC has been targeted in the implementation measures of the IPPU sector and needs to be addressed as soon as possible to achieve the NDC target of 2030.	✓✓		++ Promoting the use of low global warming potential (GWP) refrigerants will reduce GHG emissions in the RAC industry, which accounts for 9% of the total industrial sector
Need to further improve registered companies for Fluorocarbon gases recovery and treatment	High Since there is only one company registered for	✓✓		++ Improving the current situation where refrigerants with high global warming potential (GWP)

Issue	Urgency	Mitigation/Adaptation		Spillover Effect
		Mitigation	Adaptation	
	HFC gas recovery treatment, HFC gas is being released into the atmosphere, and recovery treatment is rarely conducted, immediate action is needed.			in air conditioners produced in the past are not recovered and released into the atmosphere untreated will reduce GHG emissions in the RAC industry, which accounts for 9% of the entire industrial sector.
Need to further improve experience and competence of Department of Environment and Natural Resources staff in selecting technologies for Fluorocarbon gases destruction treatment facilities and operating the facilities	Med. Although it is covered by the NDC's implementation measures in the IPPU sector, DENR believes that it will respond for the time being by utilizing the cement company's kilns (about 3 locations), since the HFC gas recovery system has not yet been completed.	✓✓		++ In the short term, the impact is small because the treatment can be handled by utilizing the current cement kilns. On the other hand, it is necessary as a medium- to long-term measure because it is assumed that the HFC gas recovery system will be put into operation and the current treatment capacity with cement kilns may be needed to further improve in the future.
Petrochemical Industry				
Delayed measures to utilize bio naphtha in the petrochemical industry	High The IPPU sector of the NDC has been targeted in the implementation measures of the IPPU sector and needs to be addressed as soon as possible to achieve the NDC target of 2030.	✓		+ While the promotion of bio naphtha use will lead to GHG reductions in the petrochemical industry, the impact will be small, as the contribution to GHG emissions of the entire industrial sector is less than 1%.
EV-related industries				
Absence of manufacturing standards/certification system for E-jeepneys and Low Speed EVs*.	High While the PUVMP is proceeding with the replacement of old jeepneys, the government of the Philippines recognizes the urgent need to address the safety and price issues that have arisen due to the absence of a set of standards for E-jeepneys.	✓✓✓	✓	+++ The PDP's annual GHG reduction target for the transportation sector in 2028 is 5.14 MtCO _{2e} . According to World Bank estimates, the conversion of vehicles to EVs will have a greater reduction effect than other measures such as reducing the creation of mass transit systems such as railroads or encouraging telecommuting, and will contribute significantly to achieving the reduction target. It will also make a significant contribution to realize CREVI's clean energy scenario of converting 50% of the domestic fleet to EVs.
Scrapping of ELVs	Low Although the ELV (End of Life Vehicle) problem has already become more	✓		+ a little more than usual The EU has reaffirmed the importance of proper disposal of

Issue	Urgency	Mitigation/Adaptation		Spillover Effect
		Mitigation	Adaptation	
	pronounced regardless of EV adoption, the speed of EV adoption itself is currently not that fast, so the urgency is not so great at this point in time.			ELVs, and estimates that proper design and recycling can reduce oil consumption by up to 4 million barrels by 2030, which has a large impact. 92.5% of jeepney parts can be recycled, according to DOST's estimates.
Cross Industry - Product Waste				
<u>Absence of plastic collection and recycling system</u>	High While the EPR Law is already came into effect in 2022, many companies are not yet ready to comply with it, and measures are urgently needed.	✓✓		++ By promoting the collection and recycling of plastics, that are currently only 9% recycled, in line with the EPR law, 40% of the plastics consumed in the country could be collected, contributing to the reduction of methane emissions from waste and GHG emissions from the production of new plastics.
Cross Industry Sector - SME Support				
Lagging Climate Change Initiatives in SMEs	Med. MSMEs account for 99.6% of the total number of companies and need to be addressed, but the level of urgency is not so high as this issue needs to work in long term.	✓		++ It is likely that many MSMEs are using older equipment with high GHG emissions and power consumption, and the GHG reductions that would result from these companies adopting more environmentally friendly, energy-efficient equipment would be significant.

(4) Agriculture

1) Analysis of the Identified Issues

The agricultural sector accounted for approximately 9% of the Philippines' GDP in 2022 and approximately 25% of the working population. The Philippines is also exposed to weather events such as tropical typhoons, El Niño-related droughts, floods, and irregular heavy rains, and the agriculture and fisheries industries suffer losses and damage from these weather events every year. (The amount of damage in 2022 is 1.4% of the agricultural sector GDP)

The agricultural sector is more vulnerable to the negative impacts of climate change than other industries, as labor productivity and income are lower, and poverty rates are higher. Future predictions of climate change include increases in temperature, changes in typhoon course and intensity, and changes in rainfall patterns, which will affect the growth of crops and livestock, securing farmland including soil and water conditions, outbreaks of pests and diseases, infrastructure facilities, etc. It is expected that the negative impacts of this will have an impact on agricultural and fishery production. Climate change risk assessments have been conducted for major agricultural products such as rice and corn, but assessments for other agricultural products, livestock, and fisheries have been delayed.

As for policies in the agricultural sector, the Philippine National Development Plan (PDP2023-2028) and the National Agriculture and Fisheries Modern Industrialization Plan (NAFMIP 2021-2030) indicate improvements in agricultural production efficiency and resilience of the entire value chain. The National Climate Change Action Plan (NCCAP 2011-2028) also emphasized agriculture and fisheries production and distribution systems and agriculture and fisheries communities resilient to climate change as an initiative for food security.

On the other hand, the agricultural sector is one of the major sources of GHG emissions, and according to the GHG Inventory in 2020, agriculture is the second largest source of GHG emissions after energy, accounting for approximately 26% of the total. However, GHG emissions from this sector are not expected to increase as much as other sectors toward 2030, and PDP 2023-2028 also includes the agricultural sector. No emissions reduction targets have been set.

To date, interviews with related organizations have revealed that more emphasis has been placed on adaptation measures, but impact assessment and countermeasure consideration and implementation for future climate change has not been sufficient. In addition, NDC Policies and Measures (NDC PaMs) indicates measures to reduce GHG emissions in this sector, and research institutions are actively conducting demonstrations to disseminate measures to reduce GHG emissions, such as introducing intermittent irrigation and processing livestock waste management. However, efforts at the farmer level are not progressing due to the limited knowledge on climate resilient agriculture technologies and facilities.

The country's strategy for food security is to ensure safe and healthy food, stability, accessibility, and affordability, even under the effects of climate change. Therefore, for all the stakeholder in this sector, it is expected to mitigate climate change impacts by formulating and implementing development plan that take climate change risks into account, and aim to provide a stable supply of food and improve the livelihoods of people involved in agriculture and fisheries. It is also needed to work on effectively using resources such as water and reducing GHG emissions.

Table 3-8 Issue analysis (Agriculture Sector)

Issue	Related policies	Status of initiatives in the Philippines, donor support, challenges and their causes	Paris Agreement/NDC achievement and Impact on sector policy	Direction of support for Japan Possible support options	Possible Cooperation Program and their outputs
Common					
<p>Limited capacity of DA central staffs regarding the development and implementation of agriculture and fisheries policies and measures in response to climate change</p>	<p>National Agriculture and Fisheries Modern Industrialization Plan (NAFMIP 2021-2030)</p> <ul style="list-style-type: none"> ➢ Agricultural sector GDP growth rate: 3 % or more in 2030 <p>DA Memorandum (MC4. Series of 2020)</p> <ul style="list-style-type: none"> ➢ DA-SWCCO was reorganized and DA-CRAO was established to promote CRA. ➢ Implementation of farming guidance by DA- RFOs ➢ Strengthening major crop roadmaps <p>DA CRAO Action Plan</p> <ul style="list-style-type: none"> ➢ Dissemination of AMIA decision-making tools, etc. ➢ Capacity development for utilizing CRVA in regional development plans ➢ Strengthening capacity for providing and evaluating local CIS and climate risk maps <p>NDC policy measures (PaMs)</p> <ul style="list-style-type: none"> ➢ 80 % reduction in agricultural production losses due to climate change ➢ Reducing GHG emissions from rice fields (AWD+RE) for 3.21 million hectares of rice fields (expected to reduce by approximately 14% from 2020 to 2040) ➢ Introduction of excrement treatment for the entire livestock industry 0.77 MtCO₂e (expected to reduce by approximately 0.91% from 2020-2040) ➢ Reducing GHG emissions through proper soil management and agricultural waste management 	<p>The MC4. Series of 2020, the DA-CRAO is in charge of implementing capacity building activities for DA and LGU staff, but as it is an Ad hoc organization, human resources and budget are limited, and sufficient implementation is difficult.</p> <p>Climate Risk Vulnerability Assessments (CRVA), led by the DA CRAO, have been completed in 63 of 81 states in partnership with universities. The CRVA framework was developed in 2018 at the CGIAR Research Program in collaboration with CIAT.</p> <p>ADB plans to support five states in the BARRM region under CCAP Subprogram 2.</p> <p>The sensitivity of cultivated crops is evaluated based on temperature and rainfall conditions, with rice and corn being evaluated in almost all regions, and other priority crops in each region. For fisheries and livestock, the methods have not been established and are not being implemented.</p> <p>Regarding fisheries, a vulnerability assessment tool based on changes in fish catches from the past to the present has been developed with WB support, and assessments are being carried out. It does not take into account future climate projections.</p> <p>The central government requires roadmaps for major agricultural products industries to take climate change risks into consideration, but there are some items for which impact assessments and countermeasures have not been considered.</p> <p>In the subsector, various tools such as maps of suitable cultivation areas based on current weather conditions and cultivation environments are being developed, but future predictions and consideration of countermeasures are insufficient due to limitation of staff capacity and equipment, and efforts are still at the stage of proceeding.</p> <p>Regarding the promotion of institutionalization of CRA initiatives in the Department of Agriculture ADB's CCAP Subprogram 1 has been working to strengthen the organizational capabilities of the Department of Agriculture's CRAO. Subprogram 2 is scheduled to continue to strengthen CRAO and compile recommendations for strengthening the CRA organizational capacity of the Department of Agriculture as a whole. However, it does not include the content of directly considering and strengthening the capacity of climate change countermeasures with related departments other than the Department of Agriculture BAR, Department of Agriculture NOAP, and FOS.</p>	<p>The growth of the agricultural sector has been greatly affected by meteorological disasters (damages amounted to 1.4% of the sector's GDP in FY2022, exceeding the sector growth rate of 0.5%). In addition, GHG emissions from the agricultural sector accounted for approximately 30% of the total in 2010. Therefore, implementing climate change adaptation and mitigation efforts in this sector is extremely important.</p> <p>Although solving this issue will not directly reduce GHG emissions, it is expected to have a large spillover effect in promoting climate change adaptation and mitigation activities in each subsector within the agricultural sector.</p> <p>the CRAO Action Plan, which plans to disseminate the AMIA decision-making tool and reflect CRVA in local development plans, it is said that there is a lack of consideration regarding climate change. It can be used to review the industrial roadmap (2021-2025) for banana, cacao, sugarcane, etc., which seems to lack consideration regarding climate change.</p>	<p>An MOC was signed between Japan's Ministry of Agriculture, Forestry and Fisheries and the Philippine Department of Agriculture in February 2023, and cooperation is planned based on Japan's Midori Food System Strategy.</p> <p>Additionally, the Japan-ASEAN Midori Cooperation Plan was agreed upon in October 2023, and cooperation in human resource development to build resilient and sustainable agriculture, forestry, and food systems is planned.</p> <p>JICA 's technical cooperation project (dispatch of experts, etc.) can be utilized to strengthen the capacity of the Department of Agriculture as a whole to deal with climate change. A cooperative project is considered more appropriate.</p> <p>Further impact of cooperation can be expected by participating in JICA topic-specific training for central government officials in order to train local officials.</p>	<p>Program for capacity development on Mainstreaming Climate Change Countermeasures (Technical Cooperation)</p> <ul style="list-style-type: none"> ➢ Capacity development for staff of each DA central bureau regarding climate change countermeasure planning ➢ Evaluation of climate change-related information and tools within the DA ➢ Formulation and implementation of training programs ➢ CRVA for delayed subsector or commodities (livestock, fisheries, etc.) ➢ Review of roadmaps that lack consideration of climate change countermeasures
<p>Limitation of consideration of NDC PaMs and additional measures</p>	<ul style="list-style-type: none"> ➢ Promoting the introduction of RE on 32,805 hectares of farmland resulted in a reduction of 102.93 MtCO₂e (REPAFS) (from 2022-2030) (Additional measures) ➢ pest-resistant varieties and biological control 	<p>GHG emissions are not expected to increase toward 2030, and PDP2023-2028 does not have specific targets. No GHG reduction targets have been set.</p> <p>NDC PaMs and NAP, but no specific GHG reduction targets have been set (only estimates), and related departments are not sufficiently informed.</p> <p>the Department of Agriculture has already submitted NDC PaMs additional measures to the CCC, a cost-benefit analysis has not been conducted due to a limitation of</p>	<p>Solving this issue will provide basic data for reviewing the NDC, and is expected to have a large spillover effect in promoting climate change adaptation and mitigation activities in each subsector within the agricultural sector.</p>	<p>The Japan-ASEAN Midori Cooperation Plan aims to build resilient and sustainable agriculture and food systems through innovations such as smart/digital agriculture, circular economy, biomass energy, greenhouse gas (GHG) emission reduction, and integrated pest control (IPM). Cooperation is planned for the development, demonstration, and dissemination of technologies to achieve this goal.</p>	<p>Program for capacity development on mainstreaming Climate Change Countermeasures (Technical Cooperation/Expert Dispatch)</p> <ul style="list-style-type: none"> ➢ Verification of candidate technologies for introduction as additional measures for NDC ➢ Cost-benefit evaluation and implementation plan formulation

Issue	Related policies	Status of initiatives in the Philippines , donor support, challenges and their causes	Paris Agreement/NDC achievement and Impact on sector policy	Direction of support for Japan Possible support options	Possible Cooperation Program and their outputs
	<ul style="list-style-type: none"> ➤ RE introduction (agricultural machinery, post-harvest facilities, etc.) ➤ Farmland management using precision agricultural technology ➤ Carbon sequestration measures (coconut, mangrove, bamboo plantation) 	<p>human resources and capabilities, and a concrete implementation plan has not yet been formulated.</p> <p>existing NDC PaMs was conducted by FAO, but no continued implementation is planned.</p>		<p>In addition, the following achievements have been made as a private-sector collaborative extension demonstration project, which may be used to resolve the issue of capacity regarding mainstreaming climate change.</p> <ul style="list-style-type: none"> ➤ Feasibility study for introducing irrigation telemetry system using sensor network and cloud technology (2017) ➤ sustainable organic waste composting system in Legazpi City (2017) ➤ Dissemination and demonstration project of typhoon-resistant submerged aquaculture technology in typhoon-stricken areas (2014) ➤ Promotion and demonstration project for the use of solar power generation in milkfish farming business (2012) <p>In trying to materialize additional NDC measures, it is possible to consider the technologies envisioned for the above cooperation and link them to cooperative support.</p>	
<p>Insufficient verification of cropland carbon sequestration potential</p> <p>Limited GHG inventory methodology and data collection</p>	<p>NDC policy measures (PaMs)</p> <ul style="list-style-type: none"> ➤ Reducing GHG emissions from rice fields (AWD+RE) for 3.21 Million hectares of rice fields (expected to reduce by approximately 14% from 2020 to 2040) ➤ Reducing GHG emissions through proper soil management and agricultural waste management (Additional measures) ➤ Carbon sequestration measures (coconut, mangrove, bamboo plantation) 	<p>GHG inventory for the agricultural sector was estimated in 2015 and 2020 based on data from the Bureau of Statistics. The estimated items have not changed significantly from the 2010 inventory, and among the calculation items based on the IPCC 2019 guidelines, the calculation of 3B2 Cropland has not been performed.</p> <p>With FAO support, some studies have been carried out on the carbon storage potential of agricultural land such as coconuts, but this has not been integrated into GHG inventories.</p>	<p>Although solving this issue will not directly reduce GHG emissions, it will provide important basic data when considering climate change adaptation and mitigation measures in each subsector within the agricultural sector and reviewing NDC targets. Become.</p>	<p>To improve the GHG inventory, the results of the technical cooperation project to strengthen climate change capacity implemented by JICA to date can be utilized. (Thailand, Vietnam, etc.)</p> <p>In addition, the National Agriculture and Food Research Organization (NARO) has already implemented the development of comprehensive cultivation management technology for GHG reduction in rice fields (FY2018 to 2020). In order to develop cultivation management technology, it will (1) develop and evaluate GHG emission reduction technology based on field observations, (2) analyze the physical and chemical characteristics of soil carbon, and (3) predict GHG emissions and soil carbon storage. A model was developed.</p> <p>Utilizing this knowledge, it is possible to provide technical cooperation on methods for assessing the dynamics of carbon, CH₄, and N₂O in agricultural soils, as well as support for strengthening GHG inventories.</p>	<p>Program for verification of farmland carbon sequestration potential (technical cooperation/expert dispatch)</p> <ul style="list-style-type: none"> ➤ Collection of farmland fixed point observation data ➤ Verification of Roth-C model based on measured data ➤ Consideration of GHG inventory methodology ➤ Capacity development of DA BSWM staff
<p>Limited incentives for agriculture and fishery workers working on climate change countermeasures</p>	<p>NDC policy measures (PaMs)</p> <ul style="list-style-type: none"> ➤ Reducing GHG emissions from rice fields (AWD+RE) for 3.21 Million hectares of rice fields (expected to reduce by approximately 14% from 2020 to 2040) ➤ Introduction of excrement treatment for the entire livestock industry^{0.77} MtCO₂e (expected to reduce by approximately 0.91% from 2020-2040) ➤ Reducing GHG emissions through proper soil management and agricultural waste management ➤ Promoting the introduction of RE on 32,805 hectares of farmland resulted in a reduction of 102.93 MtCO₂e (REPAFS) (from 2022-2030) 	<p>NDC PaMs Among the climate change countermeasures listed in the above, the DA has been actively working on intermittent irrigation (AWD) and the use of biomass energy, but these efforts have not been widely adopted by the private sector and farmer associations.</p> <p>AWD has been confirmed to have an average 30% methane reduction effect in the Asian region, including the Philippines. However, as it is necessary to carry out mid-drying at a time when it does not affect the growth of the rice, it can only be carried out in paddy fields with well-developed irrigation facilities. For farmers who fear a decrease in yield due to drying out, it will be difficult to implement the initiative unless concrete benefits can be obtained from the initiative.</p> <p>Regarding AWD, research institutes such as IRRI and PhilRice are developing methodologies for crediting and providing measurement support at project sites, and NIA is also implementing the initiative.</p> <p>In the livestock sector, the Philippines is currently developing its own emission factors with support from New Zealand, but this only applies to cattle, and it has not been</p>	<p>Resolving this issue is extremely important in the agricultural sector, as it will lead to incentives for farmers' associations and agricultural companies to promote climate change mitigation activities.</p>	<p>In Japan, the J Credit System has been established, and the following methodologies have been developed and approved in the agricultural field.</p> <ul style="list-style-type: none"> ➤ Feeding amino acid balance improved feed to cows, pigs, and broilers ➤ Changes in livestock manure management methods ➤ Fertilizing tea garden soil with chemical fertilizers containing nitrification inhibitors or compound fertilizers containing lime nitrogen ➤ Agricultural land application of biochar ➤ Extension of mid-drying period (AWD) in wet rice cultivation ➤ Feeding bypass amino acids to beef cattle <p>Regarding AWD, Japanese companies are in the process of implementing business and creating credits in the Philippines, and this knowledge can be utilized in the PETS that the Department of Agriculture plans to consider.</p>	<p>Program for capacity development on mainstreaming Climate Change Countermeasures (Technical Cooperation/Expert Dispatch)</p> <ul style="list-style-type: none"> ➤ Added to above ➤ Consideration of carbon credit methodology

Issue	Related policies	Status of initiatives in the Philippines , donor support, challenges and their causes	Paris Agreement/NDC achievement and Impact on sector policy	Direction of support for Japan Possible support options	Possible Cooperation Program and their outputs
		<p>possible to develop emission factors for other livestock such as pigs and chickens.</p> <p>ADB's Subprogram 2 is scheduled to study the agricultural sector carbon market (PETS) in the Philippines, and once the framework is established, a methodology for specific project implementation and credit registration will be needed.</p>			
<p>Limited capacity of DA RFO staff and LGUs to formulate local development plans, secure budget, and implement in response to climate change, and limited capacity of the staff to disseminate CRA guidance.</p>	<p>DA CRAO Action Plan</p> <ul style="list-style-type: none"> ➢ Dissemination of AMIA decision-making tools, etc. ➢ Capacity development for utilizing CRVA in regional development plans ➢ Strengthening capacity for providing and evaluating local CIS and climate risk maps 	<p>The DA CRAO is in charge of implementing capacity building activities for LGU officials, it has not been fully implemented, and limited provinces have reflected CRVA in their local agricultural investment plans .</p> <p>LGUs has a limited number of staff and are responsible for many tasks, making it difficult to formulate and implement plans that take climate change into consideration. As a countermeasure, LGUs promotes the recruitment and training of young staff and engineers.</p>	<p>By resolving this issue and supporting the creation of concrete agricultural investment plans, it is expected to have a large spillover effect in promoting climate change adaptation and mitigation activities in each subsector within the agricultural sector.</p> <p>Developing irrigation facilities and post-harvest facilities that take climate change risks into account can contribute not only to climate change countermeasures, but also to directly improving productivity and stabilizing food supplies.</p>	<p>between Japan's Department of Agriculture, Forestry and Fisheries and the Philippine Department of Agriculture , and cooperation in human resource development to build resilient and sustainable agriculture, forestry and food systems is planned.</p> <p>It is envisaged that the results of the capacity building project for central government employees will be utilized to provide capacity building support for local government employees.</p>	<p>Program for strengthening the capacity of LGUs to mainstream climate change countermeasures (technical cooperation)</p> <ul style="list-style-type: none"> ➢ Formulation of training programs ➢ Investment plan formulation support using CRVA
<p>Delays in the introduction of renewable energy in the agriculture and fisheries sectors</p>	<p>NDC PaMs and REPAFS 2022-2030</p> <ul style="list-style-type: none"> ➢ RE introduced on 32,805 hectares farmland ➢ Promotion of existing RE technologies (biomass, biogas, biofuel, solar, wind, hydropower, geothermal) ➢ Research and development related to RE (local RE technology development, strengthening of existing technology) ➢ Creating standards for RE technology ➢ human resources development ➢ RE technology supplier support 	<p>NDC PaMs and REPAF2022-2030, which calls for promoting the introduction of RE technology to farmland.</p> <p>Regarding the introduction of RE in the agriculture and fisheries sector, the introduction of biomass energy, solar power, wind power, and hydropower has begun, but there are problems such as high initial costs, lack of local companies and engineers to supply technology and maintenance, and lack of RE equipment. Issues include delays in establishing standards and testing facilities.</p> <p>Biomass/biogas utilization facilities account for more than 70% of the RE facilities introduced in the agriculture and fisheries sector to date, but there is a lack of evaluation of the effects of introduction, and this has not led to expanded introduction.</p> <p>The construction of irrigation facilities using solar power (Solar Power Irrigation System) has received support from Israel, and is expected to receive support from China in the future.</p> <p>REPAF2022-2030 includes the research and development of new RE technologies as well as strengthening existing technologies, and requires the selection and demonstration of RE potential in the Philippines and technologies that can be introduced.</p>	<p>Energy consumption from the agriculture and fisheries industry is expected to increase as the DA promotes agricultural modernization and mechanization. (Leads to an increase in GHG emissions in the energy sector)</p> <p>Solving this issue will directly promote NDC and REPARE initiatives, and is expected to have a spillover effect in promoting GHG emission reductions.</p>	<p>Japan's Midori Food System Strategy lists technologies that will be more widely disseminated in Japan in the future, and includes initiatives related to local production and local consumption of energy.</p> <p>Since the Japan-ASEAN Midori Cooperation Plan plans to cooperate in the development, demonstration, and dissemination of technologies that are expected to be deployed in the ASEAN region in the future, it is possible to consider these technologies and link them to cooperative support .</p>	<p>Program on renewable energy utilization in the agriculture and fisheries sector (Technical cooperation)</p> <ul style="list-style-type: none"> ➢ Verification of renewable energy potential based on REPARE ➢ Applicable technical verification ➢ Pilot project planning (implementation) ➢ Policy/guideline creation ➢ Capacity development of staff of related agencies of the Department of Agriculture
Agricultural Production					
<p>Dissemination of CRA in response to climate change, dissipation of information for providing farming guidance, limitation of reliable farming tools, and delays in research and dissemination of agricultural technology that balances productivity improvement and sustainability.</p>	<p>Promoting the National Climate Change Action Plan (NCCAP 2011-2028)</p> <ul style="list-style-type: none"> ➢ Building resilience to climate change in agricultural and fishery production and distribution systems ➢ Climate resilience in agriculture and fisheries communities under the influence of climate change <p>National Agriculture and Fisheries Modern</p>	<p>As RFOs and LGUs have a limited human resources to disseminate CRA and provide farming guidance to farmers, it is important to utilize highly reliable farming tools based on scientific data and provide efficient farming guidance. It has been demanded .</p> <p>For major cultivated crops such as rice and corn, farming support tools (e.g., suitable cultivation area maps, CIS, CRVA, Rice Crop Manager, etc.) are being developed and disseminated. However, even within the Department of Agriculture, there are multiple pieces of information and tools, and their uses (targets and situations of use) are unclear, leading to confusion at the local and farmer level.</p>	<p>Considering the amount of damage to agriculture caused by weather disasters (damage amount exceeding the sector growth rate) and the status of GHG emissions from the agricultural sector (approximately 30% of the total in 2010), it is extremely difficult to implement climate change adaptation and mitigation efforts in this sector. is important.</p> <p>Information on weather, farmland, soil, etc. is useful basic data for any cultivated crop, and by digitizing this data, integrating it with various data held by the Department of Agriculture, and using it as a farming support tool. This is expected to have a significant</p>	<p>Since the Japan-ASEAN Midori Cooperation Plan plans to cooperate in the development, demonstration, and dissemination of technologies that are expected to be deployed in the ASEAN region in the future, it is possible to consider these technologies and link them to cooperative support .</p> <p>Under this cooperation plan, the "Smart Agriculture Pilot Project in Southeast Asia" is underway in the Philippines. It is also possible to apply Japanese technologies that are being demonstrated in other countries (soil diagnosis using satellite data and AI, development of growth models, growth monitoring, etc.).</p>	<p>Program on smart/digital agriculture (technical cooperation, private sector collaboration projects)</p> <ul style="list-style-type: none"> ➢ Organizing and digitizing information such as weather, farmland, and cultivation land maps held by the DA or related agencies ➢ Applicable technical verification ➢ Pilot project planning (implementation) ➢ Policy/guideline creation ➢ Capacity development of staff of related agencies of the DA

Issue	Related policies	Status of initiatives in the Philippines , donor support, challenges and their causes	Paris Agreement/NDC achievement and Impact on sector policy	Direction of support for Japan Possible support options	Possible Cooperation Program and their outputs
	<p>Industrialization Plan (NAFMP 2021-2030)</p> <ul style="list-style-type: none"> ➢ Agricultural sector GDP growth rate: 3 % or more in 2030 <p>Presidential order regarding El Niño countermeasures</p> <ul style="list-style-type: none"> ➢ Addressing food security and water security 	<p>Furthermore, for crops other than major crops (especially horticultural crops), the cultivation area was small, and the development of farming support tools was delayed. As multi-crop cultivation is recommended for the purpose of climate change adaptation and income stabilization, farming support tools are also needed for other crops.</p> <p>The Department of Agriculture is proceeding with the registration of workers, business activities, and property information in the Basic Information Registration System for Agriculture and Fisheries Workers (RSBSA). As of the end of 2022, RSBSA registrants account for approximately 60% of people working in the agriculture and fisheries industry, and it is conceivable that the registered information will be utilized for proper management of farmland.</p>	<p>spillover effect in promoting climate change adaptation and mitigation activities.</p>		
Irrigation Development					
Limited capacity to plan, operate, and manage irrigation facilities	<p>Promoting the National Climate Change Action Plan (NCCAP 2011-2028)</p> <ul style="list-style-type: none"> ➢ Building resilience to climate change in agricultural and fishery production and distribution systems ➢ Climate resilience in agriculture and fisheries communities under the influence of climate change <p>National Agriculture and Fisheries Modern Industrialization Plan (NAFMP 2021-2030)</p> <ul style="list-style-type: none"> ➢ Agricultural sector GDP growth rate: 3 % or more in 2030 <p>National Irrigation Development Plan 2020-2030</p> <ul style="list-style-type: none"> ➢ irrigation area Approximately 680,000 ha expanded _ <p>Presidential order regarding El Niño countermeasures</p> <ul style="list-style-type: none"> ➢ Addressing food security and water security 	<p>In order to respond to increased food production and water demand due to population growth, the National Irrigation Development Plan 2020-2030 has set a new goal of expanding irrigated area by approximately 680,000 hectares. As of the end of 2022, the irrigation facility development rate will be approximately 63 % nationwide . (The maintenance rate in the BARRM area is particularly low.)</p> <p>The NIA manual for planning and designing irrigation facilities was developed in 2013, which needs to be updated, considering the latest Climate change projection (IPCC AR6).</p> <p>In addition, Small-Scale Irrigation Projects (SSIPs) are under the jurisdiction of the DA-BSWM, and the technical guidelines for SSIPs also need to be reviewed in consideration of climate change.</p> <p>Agro-meteorological data including field water levels are required when planning, operating and managing irrigation facilities. The Department of Agriculture introduced 100 automatic weather stations in 2012, which are managed by BSWM and the RFOs, with PAGASA supporting equipment maintenance. The time has come to update sensors, etc., but the budget for updates has not been secured, which may affect proper operational management.</p> <p>A support project for large-scale irrigation facilities is currently being implemented in Korea, and ADB is also planning new irrigation projects and technical cooperation in the Mindanao region .</p>	<p>Agricultural damage is occurring due to weather disasters such as droughts caused by El Niño. Appropriate irrigation facilities are important in order to cope with future temperature rises and changes in rainfall patterns and to ensure yields.</p> <p>Furthermore, since GHG emissions from rice fields account for more than half of all agricultural emissions, NDC PAMs aim to reduce GHG emissions by 14.21% by implementing intermittent water cutoff (AWD) in areas with irrigation facilities. .</p> <p>In order to respond to climate change and improve productivity, it is extremely important to improve the ability to properly develop, operate, and manage irrigation facilities.</p>	<p>Japan's Department of Land, Infrastructure, Transport and Tourism has released a proposal for "Flood control planning in light of climate change" (revised in April 2021), and the Department of Agriculture, Forestry and Fisheries has suggested the following as climate change adaptation measures for irrigation facilities.</p> <ul style="list-style-type: none"> • Utilization of field water distribution/water management system using ICT • Utilization of underground irrigation system • Utilization of pipelines, etc. • Utilization of selective water intake facilities such as dam reservoirs <p>It is possible to support the updating of existing manuals by making use of the knowledge gained from reviewing Japan's technical guidelines in consideration of climate change.</p> <p>In addition, in the Philippines, SATREPS- "Utilization of Hybrid Water Disaster Risk Assessment for Policy Planning for Sustainable Regional Economic Development under Climate Change" (2021-2026) is currently being implemented, and the developed Technical cooperation on irrigation facility management methods using models developed by the government could be considered.</p>	<p>Program for updating the FS/DD planning design manual taking climate change into account (technical cooperation/expert dispatch)</p> <ul style="list-style-type: none"> ➢ Analysis of weather conditions, ➢ Update existing manual
Shortage of small-scale irrigation and water storage facilities	<p>NDC PaMs</p> <ul style="list-style-type: none"> ➢ GHG reduction from rice fields for 3.21 Million hectares of rice fields (expected to reduce by approximately 14% from 2020-2040) 	<p>In the Philippines, about 20 typhoons occur every year, and the annual rainfall is about 2,400 mm. However, due to a lack of water storage facilities, this rainfall cannot be fully utilized. Irrigation facilities and drainage facility are also important to prevent flood damage and soil erosion in farmland.</p> <p>Rice accounts for 32% of the country's farmland, and infrastructure development such as irrigation facilities has been focused on rice. As a result, the development of irrigation facilities for crops grown in highlands and upland areas is delayed.</p> <p>There is a need to develop facilities that effectively utilize rainwater and provide efficient irrigation.</p> <p>Support for small-scale irrigation facilities is provided through WB-PRDP, etc.</p>	<p>Appropriate irrigation facilities are important in order to cope with future temperature rises and changes in rainfall patterns and to ensure yields.</p> <p>Solving this issue is expected to not only reduce climate change risks by cultivating a variety of crops, but also have a spillover effect that will lead to increased income for farmers.</p>	<p>Japan's International Research Center for Agricultural Sciences (JIRCAS) and the National Agriculture and Food Research Organization (NARO) are developing economical greenhouse gas emission reduction technologies for small-scale farmers in Southeast Asia.</p> <p>The technology list also includes small-scale irrigation facilities and can be used to select irrigation methods according to farmland conditions and cultivated crops.</p>	<p>Program for small-scale irrigation facilities and flood countermeasures (technical cooperation/expert dispatch)</p> <ul style="list-style-type: none"> ➢ Organizing information on weather, farmland, etc. held by the DA or related ministries and agencies ➢ Applicable irrigation technology verification, plan design manual development ➢ Pilot project planning (implementation) ➢ Policy/guideline creation ➢ Capacity development of staff of related agencies of the Department of Agriculture

Issue	Related policies	Status of initiatives in the Philippines , donor support, challenges and their causes	Paris Agreement/NDC achievement and Impact on sector policy	Direction of support for Japan Possible support options	Possible Cooperation Program and their outputs
Fisheries					
<p>Limitation of initiatives and capacity of DA central offices for policy planning and implementation related to climate change adaptation measures in the fisheries sector</p>	<p>National Agriculture and Fisheries Modern Industrialization Plan (NAFMP 2021-2030)</p> <ul style="list-style-type: none"> ➢ Build a sustainable food system that is resilient to the effects of climate change by conserving natural resources and emphasizing the diversity of marine products <p>Integrated National Fisheries Development Plan (CNFIDP 2021-2025)</p> <ul style="list-style-type: none"> ➢ Production that takes regional characteristics into consideration, shift to aquaculture ➢ Fisheries technology development and guideline preparation adapted to climate change ➢ Developing environmental and fisheries-related legal systems and regulations ➢ Securing financial resources for facility development, materials and equipment, etc. 	<p>Most of the people working in the fisheries sector in the Philippines are small-scale and move frequently, making it difficult for them to receive technical and financial support.</p> <p>A decrease in commercial fisheries production due to climate change has been reported in three regions: Luzon, Visayas, and Mindanao. In response, NAFMIP aims to improve and stabilize the income of fisheries-related people by diversifying products, etc., and aims to introduce a combination of coastal fishing and aquaculture, support for research and development, and develop fisheries-based modeling.</p> <p>DA BFAR has been working closely with DENR regarding marine and coastal resource management and conservation of mangroves and seaweed. BFAR is also working with the Philippine National Police to crackdown on illegal fishing. However, until now, consideration and implementation of specific measures related to climate change have been delayed due to a limitation of human resources and capacity for policy consideration.</p> <p>the NDC PaMs, fuel consumption in the fisheries sector is included in the energy sector, so specific initiatives are not included. The Philippines is currently in the process of formulating a NAP and is currently considering initiatives in the fisheries sector.</p> <p>Regarding climate change impact assessment, the DA BFAR and NFRDI, with support from the World Bank, have developed a vulnerability assessment tool (FishVool) based on changes in fish catches from the past to the present, and assessments are being conducted. . However, this assessment tool does not take into account future climate change projections. Therefore, NFRDI intends to conduct vulnerability assessments that take future climate change risks into account.</p>	<p>It is predicted that the amount of fish caught between 2051 and 2060 will be halved compared to 2001-2010 due to the effects of climate change . (NAFMP)</p> <p>Small-scale capture fishers (approximately 1.9 million people) have a high poverty rate, and the effects of climate change may lead to further widening of inequality.</p> <p>Solving this issue is positioned as an NDC adaptation measure, and is expected to have a large spillover effect in identifying areas and items that are likely to be affected by climate change in the future, and considering and promoting climate change adaptation.</p>	<p>In Japan, the Japan Fisheries Research and Education Agency (Japan Fisheries Agency) is focusing on changes in the marine environment due to recent climate change, its impact on marine ecosystems and fisheries resources around Japan, adaptation to the effects of climate change, and mitigation of global warming. We have compiled knowledge about mitigation and are using it as basic material for considering climate change countermeasures.</p> <p>Additionally, in the Philippines, through SATREPS “Comprehensive Assessment and Conservation Strategy for Blue Carbon Ecosystems and Their Multifaceted Services in the Coral Triangle,” a national mangrove map and seaweed bed map have been created based on various surveys, model development, and analysis. It is being compiled.</p> <p>It is possible to utilize this knowledge in considering climate change countermeasures.</p>	<p>Program for climate change impact assessment and countermeasure consideration (Technical cooperation/ SATREPS)</p> <ul style="list-style-type: none"> ➢ Analysis of changes in the marine environment due to climate change and its impact on marine ecosystems and fisheries resources around the Philippines ➢ Consideration of assessment tools that take into account future climate change projections ➢ Creating guidelines ➢ Capacity development of staff of related agencies of the DA
<p>Delays in R&D, limited budget, and technology to implement climate change countermeasures in the fisheries sector</p>		<p>As mentioned above, it is necessary to move forward with new climate change implementation measures based on NAP , but there is a lack of both technology and budget. Until now, efforts have not been sufficiently considered, so climate finance has not been accessible.</p> <p>Based on the vulnerability assessment results, the FishCORE project has been launched with support from it is included strengthening and technical support related to fishery resource management in two locations: Northern Luzon and the Visayas region.</p>	<p>Solving this issue is positioned as an NDC adaptation measure, and is expected to have a large spillover effect in considering and promoting climate change countermeasures, taking into account the impact of climate change on the fisheries industry.</p>	<p>Japan's International Research Center for Agricultural Sciences (JIRCAS) and the National Agriculture and Food Research Organization (NARO) are developing economical greenhouse gas emission reduction technologies for small -scale farmers in Southeast Asia. The technology list also includes aquaculture technology and can be used to select technologies according to the cultivated item.</p>	<p>Program on aquaculture technology in regions vulnerable to climate change (Technical cooperation)</p> <ul style="list-style-type: none"> ➢ Analysis of the current status of aquaculture in coastal and inland areas ➢ Vulnerability assessment using CRVA tools ➢ Pilot project planning (implementation) ➢ Policy/guideline creation ➢ Capacity development of staff of related agencies of the DA
Livestock					
<p>Limited capacity of DA central and RFOs for planning and implementation in considering climate change mitigation measures, and securing budgets in the livestock sector</p>	<p>NDC PaMs</p> <ul style="list-style-type: none"> ➢ Introduction of excrement treatment for the entire livestock industry (expected to reduce by approximately 0.91% from 2020-2040) ➢ Reducing methane gas emissions through fermentation in the digestive tract through breeding 	<p>NDC PaMs and REPAF2022-2030, which calls for measures to reduce GHG emissions in the livestock sector and the promotion of RE technology introduction to farmland.</p> <p>Regarding the introduction of RE in the livestock sector, the use of biomass energy and biogas energy has begun, but there are high initial costs, a lack of local companies and engineers to supply technology and maintenance, and standards and testing of RE equipment. Delays in facility development are an issue.</p> <p>Regarding biogas energy, DA-BAI is gradually distributing biogas equipment that can be used at the household level using its own funds, but the issue is that plans for both GHG reduction and energy consumption are unclear.</p>	<p>GHG emissions from the livestock sector account for approximately 30% of all agriculture, and NDC PAMs is working to reduce methane gas emissions through proper management of livestock waste and fermentation in the digestive tract through breeding.</p> <p>Solving this issue will directly promote NDC and REPFAFE initiatives, and is expected to have a spillover effect in promoting GHG emission reductions.</p>	<p>The Japan-ASEAN Midori Cooperation Plan includes the dissemination and demonstration of the following GHG reduction technologies in the livestock sector.</p> <ul style="list-style-type: none"> ➢ Reducing livestock-derived GHGs through optimizing feed feeding by introducing a livestock information management system (Vietnam) ➢ Greenhouse gas emission reduction technology by combining methane fermentation digestive fluid and intermittent irrigation ➢ Technology to reduce greenhouse gas emissions derived from livestock manure ➢ Technology to reduce methane emissions from beef cattle by feeding cashew nutshell liquid 	<p>Program for circular economy and biomass energy utilization (Technical cooperation)</p> <ul style="list-style-type: none"> ➢ Estimation of biomass energy potential ➢ Applicable technical verification ➢ Pilot project planning (implementation) ➢ Policy/guideline creation ➢ Capacity development of staff of related agencies of the DA
<p>Limited capacity and facilities for research and development of climate change mitigation measures in the livestock sector</p>	<p>National Agriculture and Fisheries Modern</p>				

Issue	Related policies	Status of initiatives in the Philippines , donor support, challenges and their causes	Paris Agreement/NDC achievement and Impact on sector policy	Direction of support for Japan Possible support options	Possible Cooperation Program and their outputs
	<p>Industrialization Plan (NAFMP 2021-2030) Strategic location of feed mills, etc. to reduce GHG emissions in transportation</p> <p>NDC Policy Measures (PaMs) and RE Implementation Program in Agriculture and Fisheries Sector (REPAFS 2022-2030)</p> <ul style="list-style-type: none"> ➢ RE introduced on 32,805 hectares farmland ➢ Promotion of existing RE technologies (biomass, biogas, biofuel, solar, wind, hydropower, geothermal) ➢ Research and development related to RE (local RE technology development, strengthening of existing technology) ➢ Creating standards for RE technology ➢ human resources development ➢ RE technology supplier support 	<p>Regarding donor support related to reducing GHG emissions from the livestock sector , New Zealand government support to create national emission factor to enhance GHG inventory using the IPCC Tier 2 method.</p>			
<p>Delays in considering climate change adaptation measures, policies, plans, and securing budgets in the livestock sector (addressing productivity and feed crop productivity)</p>	<p>NDC PaMs</p> <ul style="list-style-type: none"> ➢ Use of fast-growing varieties that are resistant to the effects of climate change 	<p>NDC PaMs and REPAF 2022-2030 provide direction for mitigation measures in the livestock sector, but the future impacts of climate change on the livestock sector are not understood, so there is little recognition that appropriate livestock barn management and improvements in breeding and feed are necessary efforts to improve productivity.</p> <p>Commercial livestock producers are investing their own funds in livestock barns that can control temperature, etc., and are taking measures such as maintaining productivity, but small-scale producers don't have fund to take measures to prevent high temperatures. DA-BFAR has only been able to call on people in various locations to secure drinking water for livestock based on weather forecasts.</p>	<p>The effects of climate change (rising temperatures) are causing a decline in livestock reproduction, damage to health, and a decline in product quality. In addition, damage to livestock and livestock barns has occurred due to weather disasters.</p> <p>Solving this issue is positioned as an NDC adaptation measure, and is expected to have a large spillover effect in identifying areas and items that are likely to be affected by climate change in the future and promoting climate change adaptation.</p>	<p>The Japan's Midori Food System Strategy lists the following technologies for future adaptation to climate change in the livestock sector.</p> <ul style="list-style-type: none"> ➢ Expansion of planting and use of low-cost, high-yielding factories such as child corn ➢ Dissemination of mixed sowing and variety selection technology for existing grass species using big data and AI <p>Japan's climate change response plan describes the expected impacts of climate change on the livestock sector, the basic concept and measures for adaptation measures, and is useful for considering the direction of climate change adaptation measures for the livestock sector in the Philippines. Can be used.</p>	<p>Program for climate change risk assessment and consideration of countermeasures in the livestock sector (Technical cooperation)</p> <ul style="list-style-type: none"> ➢ Current status analysis and future risk assessment of climate change impacts in the livestock sector ➢ Applicable technical verification ➢ Pilot project planning (implementation) ➢ Policy/guideline creation ➢ Capacity development of staff of related agencies of the Department of Agriculture
<p>Limited capacity and facilities for research and development of climate change adaptation measures in the livestock sector</p>		<p>Concerning climate change mitigation measures in the livestock sector, there is a limited donor support, initiatives. There are projects on community-based dairy industry development by USAID and establishment of a livestock information registration system by FAO .</p>		<p>The Midori Food System Strategy lists the following technological developments for future adaptation to climate change in the livestock sector.</p> <ul style="list-style-type: none"> ➢ Advancing feed management technology using AI, ICT, etc. ➢ Development of animal welfare-friendly breeding technology for livestock using smart technology ➢ Improvement of livestock with high feed utilization ➢ Development of breeding technology using high-speed phenomics <p>Japan's efforts and knowledge can be utilized in research on climate change adaptation measures in the Philippines.</p>	

Source: JICA Survey Team

2) **Prioritization of identified issues**

Table 3-9 Evaluation of Priority Issues (Agriculture Sector)

Issue	Urgency	Mitigation/Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
common				
Limited capacity of DA central staff regarding the development and implementation of agriculture and fisheries policies and measures in response to climate change	High Due to the impact of climate change, it is necessary to take early action to achieve the goals of the Medium Term Development Plan (PDP), Agricultural Modernization Plan (NAFMIP), etc.	✓✓	✓✓	++ The formulation and implementation of Department of Agriculture policies and programs that take into account climate change risks will be promoted, leading to food security for the entire country while suppressing GHG emissions.
Limitation of consideration regarding additional measures for NDC PaMs	Med Although the urgency is not high as there is little prospect of an increase in GHG emissions towards 2030, it is important in the selection of climate change countermeasure technologies that the Department of Agriculture will promote in the future.	✓✓	✓✓	+ Initiatives that contribute to improving the profits of agricultural and fisheries industry businesses have been selected as additional measures, and a large number of beneficiaries are expected to benefit from implementation.
Insufficient verification of farmland carbon sequestration potential Limited GHG inventory methodology and data collection	Med The urgency is not high as the methodology for major emission sources has been established and GHG inventory have been completed. In order to further improve the accuracy of the inventory, it is desirable to develop country-specific emission factors for evaluation of items for which trial calculations have not been made.	✓✓		++ An item not included in the current GHG inventory is the high carbon storage potential of coconut plantations, which impacts the country's overall emissions.

Issue	Urgency	Mitigation/Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
Limited incentives for agriculture and fishery workers working on climate change countermeasures	Med There are many small-scale farmers, making it difficult to implement climate change mitigation measures that do not directly lead to production and profits. Providing incentives for unions, etc. is expected to promote adoption.	✓✓	✓	++ Providing incentives will advance the development of facilities for climate change countermeasures (mitigation and adaptation), which will lead to the modernization of agriculture and the resilience of communities, which is the goal of the Department of Agriculture.
Insufficient capacity of DA RFO staff and LGU to formulate, obtain budget, and implement local development plans in response to climate change Limited capacity of the staffs to disseminate CRA technologies	High As agricultural and fishery production in various regions is affected by climate change, the central government's policies and the results of technological development by research institutes will be disseminated to the local level to strengthen local resilience and quickly achieve national goals.	✓✓	✓✓	+++ The formulation and implementation of local development plans that take climate change risks into consideration will be promoted, leading to food security for the entire country.
Delays in the introduction of renewable energy in the agriculture and fisheries sectors	Low Due to delays in mechanization, the energy consumption of the agriculture and fisheries sector is small compared to the entire country, so the urgency is not high, but it is expected to increase with the promotion of modernization, and it is necessary to proceed with the selection and introduction of	✓✓		+ The impact is not large as the proportion of energy consumption in the agriculture and fisheries sector in the entire country is small.

Issue	Urgency	Mitigation/Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
	appropriate technologies.			
Agricultural production				
Dissemination of CRA in response to climate change, dissipation of information for providing farming guidance, Limitation of reliable farming tools, and delays in research and dissemination of agricultural technology that balances productivity improvement and sustainability.	High As agricultural and fishery production in various regions is affected by climate change, technological development results from the central government, research institutes, etc. will be disseminated locally to strengthen local resilience and respond quickly to achieve national goals.		✓✓✓	+++ Poverty rates are high for people working in agriculture and fisheries, and the poverty rate is higher in rural areas than in urban areas. Dissemination of CRA that responds to climate change in rural areas will lead to improvements.
Irrigation development				
Limited capacity to plan, operate, and manage irrigation facilities	High The possibility of water shortages due to climate change and population growth has been pointed out, and it is necessary to proceed with the National Irrigation Plan (2020-2030).	✓✓✓	✓✓✓	+++ By planning, design, facility development, and operational management that take climate change into consideration, it will contribute not only to agricultural productivity but also to the appropriate distribution of water.
Shortage of small-scale irrigation and water storage facilities	High The possibility of water shortages due to climate change and population growth has been pointed out, and it is necessary to proceed with the National Irrigation Plan (2020-2030).	✓✓✓	✓✓✓	+++ The development of irrigation and water storage facilities in highlands, which has been delayed, will lead to the expansion of high value-added crop cultivation.
Fisheries				
Lack of initiatives for climate change adaptation measures, limited capacity of central government officials in DA to formulate and implement policies	High NAFMIP's fisheries subsector growth rate target is 3.0% or		✓✓	+ Since the poverty rate of fisheries businesses is high and their vulnerability to climate

Issue	Urgency	Mitigation/Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
	more in 2030, and there is a large discrepancy from the current 2021/2022 (-3.5%), so the urgency of the initiative is high.			change is high, the benefits of promoting adaptation policies are high. However, the impact of the fishing industry on the Philippine economy is limited due to the amount of added value production and the number of workers.
Delays in R&D, limited budget and technology to implement climate change measures in the fisheries sector	High Fishery production has been on the decline in recent years, and it is predicted that the current production will be halved by around 2050. There is a high degree of urgency to develop and introduce specific adaptive technologies, including aquaculture technologies.		✓✓	+ Since the poverty rate of fisheries businesses is high and their vulnerability to climate change is high, the benefits of implementing specific adaptation measures (techniques) are high. However, the impact of the fishing industry on the Philippine economy is limited due to the amount of added value production and the number of workers.
Livestock				
Limited capacity of DA central and RFOs for planning and implementation in considering climate change mitigation measures, and securing budgets in the livestock sector	High This is a target of NDC implementation measures in the agricultural sector, and it is necessary to take early action to achieve the 2030 NDC goals.	✓✓✓		++ The livestock subsector accounts for approximately 30% of agricultural sector GHG emissions, and progress in planning and implementing mitigation measures will lead to reductions in this amount.
Limited capacity and facilities for research and development of climate change mitigation measures in the livestock sector	High This is a target of NDC implementation measures in the agricultural sector, and it is necessary to take early action to achieve the 2030 NDC goals.	✓✓		++ The livestock subsector accounts for approximately 30% of agricultural sector GHG emissions, and progress in research and development of mitigation measures will lead to reductions in this amount.
Delays in considering climate change adaptation measures, policies, plans, and securing budgets in the livestock sector	Med The livestock subsector growth rate		✓✓	++ The livestock subsector accounts for approximately 20% of

Issue	Urgency	Mitigation/Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
(addressing productivity and feed crop productivity)	target in NAFMIP is 4.0% or more in 2030, and currently the growth rate for chickens is 6.7% and livestock 2.3% in 2021/2022 , and the level of urgency is medium as it has largely been achieved.			value-added production in the agricultural sector, and progress in research and development of adaptation measures will lead to improved livestock productivity.
Limited capacity and facilities for research and development of climate change adaptation measures in the livestock sector	Med The livestock subsector growth rate target in NAFMIP is 4.0% or more in 2030, and currently the growth rate for chickens is 6.7% and livestock 2.3% in 2021/2022, and the level of urgency is medium as it has largely been achieved.		✓✓	++ The livestock subsector accounts for approximately 20% of the agricultural sector's value-added production, and progress in research and development of mitigation measures will lead to improved livestock productivity.

(5) Forestry and Natural Environment

1) Analysis of the Identified Issues

In the Philippines, forest cover will account for 7.18 million ha (about 24%) of the total national land area of about 30 million ha in 2020, with closed forests accounting for 30.7% of the total forest area in 2020, leaving vast areas of degraded land as nearly 70% of the forest is open forest. The Philippine Master Plan for Climate Resilient Forestry Development (PMPCRFD) (2016) was developed for climate resilient forestry development, while the National Greening Program (NGP) is promoting restoration of degraded forest land and the JICA forest management projects is being implemented in areas bordering highland watersheds, where afforestation is managed in a manner that improves the livelihoods of local people. Sustainable management requires support for the agricultural sector to further improve livelihoods as well as efforts to implement watershed management. The REDD+ initiative, which is part of the climate change mitigation measures, has been discussed in the Philippine National REDD+ Strategy (PNRPS) (2011-2018), REDD+ Action Plan 2022-2031, DAO 2021-32, and other documents, and the need for an NFMS has been mentioned as multifunctionally useful system for forest management. The need for an NFMS is stated in the PNRPS (2011-2018), REDD+ Action Plan 2022-2031, and DAO 2021-32, and its early establishment is required. However, at present, an NFMS utilizing remote sensing technology has not yet been established, and this remains a challenge for the future. Furthermore, geographically, the Philippines is vulnerable to frequent extreme weather events such as typhoons, which will increase in intensity due to climate change. Although Integrated Watershed Management Plan supported by policies such as the PDP have been implemented, there are still issues to be addressed, such as the need for climate proofing policies and watershed management methods.

In the coastal/marine and biodiversity subsector, the challenge is to address strategies for adaptation and response to loss and damage, coupled with mitigation measures, in the face of increasingly severe weather-related disasters from climate change. As a policy and plan for the coastal/marine and biodiversity subsector, the PDP seeks to protect, restore, and manage ecosystems in the coastal/marine and biodiversity subsector and to accelerate the restoration of degraded ecosystems, such as forests, mangroves, and wetlands to protect communities from the negative impacts of climate change. The plan also aims to accelerate the restoration of degraded ecosystems, such as forests, mangroves and wetlands to protect communities from the negative impacts of climate change. The Philippine Biodiversity Strategy and Action Plan 2015-2028 (PBSAP) is a CBD-aligned national biodiversity strategy and action plan to ensure that by 2028 biodiversity restoration and assessment, effective management and maintenance of ecosystem services, benefits to all, including restoration, assessment, effective management, maintenance of ecosystem services, and maintenance of resilient communities. With regard to marine protection, the goal is to "increase Protected Areas in various aquatic habitats by 20% from 2015 levels by 2028." Requiring expanding marine Protected

Areas, comprehensive coastal/marine management through Strategic Conservation Planning of Protected Areas, monitoring and assessment of ecosystems in areas vulnerable to climate change, and establishment of information management platforms, etc., is a challenge. Furthermore, there is no policy on carbon sequestration of blue carbon, which belongs to coastal/marine ecosystems and is expected to be a new sink.

Table 3-10 Issue analysis (Forestry and Natural Environment Sector)

Issue	Related Policies (Policies that can be implemented/facilitated by resolving issues)	Status of efforts in the Philippines (including donor support) and causes of issues	Achievement of the Paris Agreement and NDC, Impact on sector policies, etc.	Direction of Japan Support Possible forms of support	Possible Cooperation Program and their outputs
<p>Forestry</p> <p>Forest remote sensing technology has not been established.</p> <p>National Forest Monitoring System (NFMS) including database has not yet established.</p>	<p>DAO 2021-32 The NFMS functions will be identified in the DENR in 2021, contributing to facilitating reporting and deepening accountability.</p> <p>REDD+ Action Plan Contribute to achieving NDC goals, providing data with transparent, consistent, and available to implement MRV</p>	<p>In order to realize GHG inventories, Forest Resource Assessment, and REDD+, it is necessary to establish an NFMS that can also serve as a basic system for climate change countermeasures and planning in the forest sector. In particular, remote sensing technology is lacking, and there is a need to shorten the data acquisition period. Although there is a track record of using remote sensing data such as LANDSAT, MODIS, and LiDAR in setting Forest Reference Levels submitted to the UNFCCC, there is no established system or structure utilizing remote sensing technology that would allow for regular monitoring of the condition of the country's forests. However, there is no system or structure in place to utilize remote sensing technology to regularly monitor the status of the country's forests. The NFMS includes ground surveys and forest remote sensing data. The NFMS as a platform that includes the construction of Forest Information system (FIS) with the database has also not yet been established.</p> <p>In the National REDD+ System-Philippines Project implemented by GIZ from 2012 to 2017, a draft of the contents and design concept of the NFMS was prepared, but the issue has not been resolved due to limited remote sensing technology for implementation.</p> <p>In 2015, with support from FAO through UN-REDD, an NFMS Action Plan was developed based on consultations and group work to support NFMS policy measures.</p>	<p>REDD+ will reduce deforestation and forest degradation, increase carbon sinks, and contribute to the prevention of landslides and floods. Thus, both adaptation and mitigation are essential for the Philippines to achieve its NDC.</p> <p>Transparency and consistency of the calculation of emissions and sinks from forests and Forest Reference Levels can be improved in GHG inventories submitted by the government.</p> <p>Article 5.2 of the Paris Agreement encourages the implementation of and support for REDD+, and the construction of the NFMS is an important step towards REDD+.</p> <p>It is the foundation for the realization of the project.</p>	<p>JICA has been supporting the establishment of NFMS in Laos, Botswana, Congo, and other countries through remote sensing technology using Japan's excellent data analysis technology as well as the development of satellite technology.</p>	<p>Support for establishment and capacity building of the National Forest Monitoring System (NFMS) (Technical Cooperation Project)</p> <ul style="list-style-type: none"> ● Establishment of remote sensing technology ● Establishment of NFMS <p>(Issue-specific training)</p>
<p>Limited climate proofing policies regarding Integrated Watershed Management Plan</p> <p>Limited know-how to analyze precipitation and soil data collected by Automatic Weather Station (AWS) and remote sensing</p> <p>Limited AWS equipment and remote sensing equipment for collecting data on precipitation, soil, etc.</p>	<p>PDP Contribute to appropriate monitoring of watershed degradation impacts, such as reduction of water protection capacity due to deforestation.</p> <p>Philippine Master Plan for Climate Resilient Forestry Development Contribute to the development of policies to ensure durability against climate change, including sustainable forest management, vulnerability assessment, and risk assessment.</p> <p>Technical Bulletin 16-A The pace of policy development will be in line with the vulnerability assessment for climate resilience.</p> <p>This will be the pace at which the analytical capacity will improve for the implementation of the guidelines described in the Bulletin.</p>	<p>Integrated Watershed Management Plans have started with ecosystem-based watershed plans, which, coupled with Integrated Watershed Management Plan guidelines and Protected Areas, have formulated policies for climate change vulnerability assessment, etc., however lack of comprehensive and climate resilient policies due to time-consuming coordination and the diversity of relevant ministries and agencies involved in climate change. The government has been working on the development of a comprehensive climate change resilience policy.</p> <p>In watershed management, the DENR FMB conducts monitoring of precipitation, soil moisture, etc. The Department of Science and Technology-Philippine Atmospheric, Geophysical and Astronomical Service (DOST-PAGASA) also conducts similar monitoring. Data on precipitation and soil are also collected by the Department of Public Works and Highways (DPWH), the Department of Interior and Local Government (DILG), and the National Disaster Risk Reduction and Management Commission (NDRRMC), but information sharing is difficult due to differences in data specifications, making it difficult to make progress in watershed management planning. The</p>	<p>It is consistent with the adaptation measures in the forestry sector described in the NDC for ecological and environmental stability. Data collected by AWS and remote sensing, such as precipitation and soil data, will be used as a basis for watershed management. The data collected by AWS and remote sensing will be used for reforestation under the Enhanced National Greening Program, leading to an increase in the success rate of planted trees. Therefore, strengthening policies and management capacity for watershed management will contribute to both climate change mitigation and adaptation measures.</p> <p>Contribute to the Philippine Master Plan for Climate Resilient Forestry Development through sustainable forest management in terms of water recharge function, vulnerability assessment, risk assessment, etc. to ensure climate proofing.</p>	<p>Japan has high precipitation and has implemented policies that take into account the water protection capacity in forest management, and policy support is possible. In addition, as the Philippines, like Japan, is prone to natural disasters, support for watershed management planning from the perspective of Eco-DRR (disaster prevention and mitigation using forests and other ecosystems) is also possible.</p> <p>Analysis of precipitation and soil data that can be used to assess the impact of mountain areas on water protection capacity has been conducted in the past in JICA's "Project for Capacity Improvement of Weather Observation, Forecasting and Warning" in the Philippines and in the "Study on Integrated Watershed Management and Flood Control in Consideration of Climate Change Impacts on the Mejerda River" in Tunisia. It is considered feasible to implement.</p> <p>In addition, targeted counterpart is familiar with the handling of equipment since he used AWS to provide support for the same project conducted in the Philippines, and we believe that he is experienced in the knowledge and installation and use of the equipment.</p>	<p>Policy making support and management capacity development/enhancement for implementation of the Integrated Watershed Management Plan (Technical Cooperation Project)</p> <ul style="list-style-type: none"> ● Support for the development of climate resilience policy for Integrated Watershed Management Plan ● Installation of measurement equipment ● Capacity building for watershed data analysis for climate resilient water protection capacity management <p>(Issue-specific training)</p>

Issue	Related Policies (Policies that can be implemented/facilitated by resolving issues)	Status of efforts in the Philippines (including donor support) and causes of issues	Achievement of the Paris Agreement and NDC, Impact on sector policies, etc.	Direction of Japan Support Possible forms of support	Possible Cooperation Program and their outputs
		<p>division of roles between ministries and commissions needs to be considered.</p> <p>Integrated Watershed Management Plans are currently being implemented in 16 watersheds, but 131 planned watersheds limited AWS equipment and remote sensing equipment for precipitation, soil, and other data collection due to lack of funding</p>		<p>Remote sensing technology of Japan is available to use in watershed management.</p>	
Limited capacity for prevailing watershed management	<p>PDP Contribution to manage watershed degradation caused by deforestation</p>	<p>Designs are in place for implementation of watershed management projects. However funds for capacity building necessary for dissemination are lacking.</p> <p>The areas where JICA forest management projects are currently being implemented are located in highlands and other areas that are vulnerable to negative impacts from watersheds due to increased rainfall and other factors.</p>	<p>Consistent with the objectives of forest protection and restoration and forest conservation, etc., as set forth in the NDC adaptation measures and the PDP.</p>	<p>Forest management and watershed management are good examples of how to utilize the multifaceted functions of forests, and Japan's knowledge from the JICA Uttarakhand Mountain Disaster Project and other projects can be utilized. As this is a follow-up project, we believe that it is appropriate to implement the project through Loan, as the continuation of support has the merit of easily becoming an achievement through synergy effects with previous activities after the period of support.</p>	<p>Subsequent JICA forest management project (Loan)</p> <ul style="list-style-type: none"> Promote information, education, and communication (IEC) for Collaborative watershed management and rehabilitation of degraded forest area and plantation Creation of a new forest conservation strategy
Limited marketing ability for agricultural products through agroforestry	<p>PDP Contribution to improving the livelihoods of highland communities through agroforestry and other means. Contribution to more efficient production, expansion of markets, and improvement of value chains in agriculture and other sectors.</p>	<p>Although there are policies that take climate change measures into account, implementation to strengthen agriculture and ecosystem resilience is difficult to expand due to weak community organizations and limited funds.</p> <p>A similar livelihood enhancement afforestation project, the Promotion of Vertical Integration in Wood Processing (VIP) through People's Organizations in Community -Based Forest (CBFM) Management areas in the Philippines (AFoCO-VIP) by the Asian Forestry Cooperation Organization (AFoCO), is currently underway. The similar afforestation project on livelihood improvement is the AFoCO's Promotion of Vertical Integration in Wood Processing (VIP) through People's Organizations in Community -Based Forest (CBFM) Management areas in the Philippines (AFoCO-VIP).</p>	<p>Consistent with NDC's and PDP's to take adaptive measures in the agricultural sector.</p>	<p>Agricultural management support for livelihood improvement is an area in which Japan has a proven track record and can contribute to development assistance.</p> <p>As this is a follow-up project, we believe that it is appropriate to implement the project through paid financial assistance because it has the merit of effectively contributing to livelihood improvement by identifying issues and providing ongoing support based on the support provided to date.</p>	<p>Subsequent JICA forest management project (Loan)</p> <ul style="list-style-type: none"> Improvement of financial mechanism for business development and sustainable business by local community
Coastal/Marine and Biodiversity					
Limited Strategic Conservation Planning (SCP) for the management of Marine Protected Areas, etc.	<p>Kunming-Montreal Biodiversity Framework Goal The pace at which the Strategic Conservation Planning will be developed/implemented to achieve the 30 by 30 target of 30% Protected Areas by 2030.</p> <p>PDP Consideration of impacts from development on ecosystem interconnectedness, biodiversity, ecological processes and ecological functions will be promoted.</p>	<p>The reason why a policy framework that comprehensively considers Protected Areas, including stakeholders, has not been developed due to the wide range of interests involved in the field, etc., this has not led to initiatives related to blue carbon, such as mangrove forests included in Protected Areas.</p> <p>BMB is preparing a module on Marine Spatial Planning (MSP) with the support of USAID, and has already conducted a workshop for municipalities around Lake Bae to develop a Marine Spatial Plan (MSP). However, it has not progressed because it requires coordination across sectors with various stakeholders such as municipalities and the Department of Agriculture. In addition, there is a limited funds within the BMB for planning and there are no donors. As a result, the MSP formulation is not progressing.</p> <p>USAID has already implemented the NIPAS MPA Capacity Building Program for DENR BMB since 2014.</p>	<p>It is consistent with the NDC description of adaptation measures in the areas of coastal/marine ecosystems and biodiversity. The Strategic Conservation Plan, designed to be transparent, participatory, and inclusive of stakeholder input, will include coastal/marine management plans and Marine Spatial planning, and will contribute to the management planning of Marine Protected Areas for the 30 by 30 and PDP. The mangrove forests in the Protected Areas will also contribute to adaptation measures through Eco-DRR and other functions for disaster prevention and mitigation. The target ecosystems also include blue carbon such as mangroves, corals, and seaweeds, which are carbon sinks (mangroves estimated at 1.25 million tons CO₂/year (Taillardat et al. 2018), seaweeds estimated at 16.01-18.61 million tons CO₂/year ((Stankovic 2020)), meaning that they will be conserved and increased, which will have a significant impact on the achievement of NDCs.</p>	<p>Japan has already formulated "Guidelines for the Consensus Building Process on Ocean Use," a set of guidelines for domestic local governments for the formulation of marine spatial plans. Although there is currently no track record of overseas assistance, technical cooperation projects such as providing assistance in formulating policies that take into account the conservation of Marine Protected Areas based on Japan's findings could be considered as a potential source of support.</p>	<p>Support for the formulation of Strategic Conservation Planning for the management of Marine Protected Areas, etc.</p> <p>Technical Cooperation (Dispatch of experts)</p> <ul style="list-style-type: none"> Support will be provided in formulating Strategic Conservation Planning.

Issue	Related Policies (Policies that can be implemented/facilitated by resolving issues)	Status of efforts in the Philippines (including donor support) and causes of issues	Achievement of the Paris Agreement and NDC, Impact on sector policies, etc.	Direction of Japan Support Possible forms of support	Possible Cooperation Program and their outputs
<u>Limited technology for ecosystem monitoring and assessment in highly climate change vulnerable Marine Protected Areas</u>	NCCAP Ecosystem and environmental stability as a strategic priority activity deserves The pace at which technical guidance and human resource development for the assessment of ecosystem vulnerability and risk assessment at the national level and for human resource development is on pace to be implemented.	Twenty-four provinces and four cities have already been selected as highly vulnerable areas to climate change in the CCAM-DRR Cabinet Cluster Road Map (2018-2022) within DENR. However, due to budget shortfalls within the DENR, monitoring and assessment to the targeted areas has not been conducted. This has caused problems such as delays in ecosystem conservation.	Contribute to ecosystem and environmental stability as a strategic priority activity of the NCCAP. Monitoring and assessment of areas of high vulnerability to climate change, so that appropriate methods of adaptation and mitigation measures, such as vegetation restoration, can be considered.	In the Philippines, he has experience in conducting ecosystem vulnerability and restoration assessments in the SATREPS "Integrated Coastal Ecosystem Conservation and Adaptive Management Project" and can contribute to supporting monitoring and assessment of coastal ecosystems at the national level.	Project to improve Protected Area management capacity through technical assistance for monitoring and assessment of local ecosystems in Marine Protected Areas vulnerable to climate change (Technical Cooperation) ● Improvement of local ecosystem monitoring and assessment techniques in Marine Protected Areas vulnerable to climate change (Issue-specific training)
<u>Limited integrated data management on biodiversity and coastal and marine ecosystems</u>	Kunming-Montreal Biodiversity Framework Goal The pace at which data management platforms are being built to achieve the 30 by 30 target of 30% protected area by 2030.	Although the CCC and the Statistics Authority (PSA) have developed and are operating a knowledge sharing platform in building a data platform for protected areas related to biodiversity, the BMB is seeking to build a platform that includes its own database. Currently, there are issues, such as limited technology, funds, and human resources, and it is necessary to distinguish or to consider integration into the platform. As a result, it is difficult to expand the scope of protection.	This is in line with the NDC description of adaptation measures in the areas of coastal/marine ecosystems and biodiversity and the progress of 30 by 30. In order to efficiently implement coastal and marine ecosystems and biodiversity initiatives, including the possibility that blue carbon initiatives may be interrelated with ecosystem and biodiversity conservation in the future, more appropriate data management is considered necessary in terms of improving Protected Areas management and the conservation and restoration of mangrove forests and other areas belonging to blue carbon in Protected Areas. Data management is considered necessary in order to improve Protected Area management and to conserve and restore mangrove forests and other areas belonging to the blue carbon in Protected Areas.	Japan's Department of the Environment has created a platform for sharing information on biodiversity, including making data available to the public at the Center for Biodiversity. In building a knowledge-sharing platform, Japan could provide prior knowledge on ecosystems and biodiversity in Japan and dispatch experts in IT, data management, etc.	Project to improve Protected Areas management capacity by developing a technology and knowledge sharing platform for monitoring and assessment of local ecosystems in Marine Protected Areas vulnerable to climate change (Technical Cooperation) ● Establishment a data platform for Protected Area management (Issue-specific training)
<u>Limited policies to support blue carbon conservation</u>	PDP Adaptation measures such as restoration and protection of blue carbon ecosystems toward a low-carbon economy will be strengthened. Philippine Biodiversity Strategy and Action Plan 2015-2028 (PBSAP) This will be the pace at which the policy will be developed/implemented to meet the Coastal Triangle Initiative's (CTI) 20% Strict Protection of Coastal/Marine Habitat goal.	Currently, there is no inventory for blue carbon and no policy to support carbon trading of blue carbon in the Philippines, due to a limited knowledge and technology in the legal system. This makes it difficult to launch initiatives for implementation.	Blue carbon conservation and restoration will secure and increase carbon dioxide sinks. It means conserving and increasing carbon dioxide sinks of mangroves and seaweeds (1.25 million tons CO2/year for mangroves (Taillardat et al. 2018) and 16.01-18.61 million tons CO2/year for seaweeds (Stankovic 2020)), which will have a significant impact on achieving NDCs. The impact on the Blue carbon in mangrove forests and other areas will also contribute to the PDP and PBSAP as it will increase in combination with the expansion of protected areas.	Japan is ahead of other countries in the field of blue carbon accounting, and has knowledge of the legal system and other relevant matters. In Japan, the amount of GHG removal and fixation by mangrove forests was added to the blue carbon in this year's National GHG Inventory. We believe that this information can be useful in assisting the Philippines in formulating a blue carbon policy in the future.	Blue Carbon Conservation Support Technical Cooperation (Dispatch of experts) ● Support will be provided for the development of relevant policies that will encourage blue carbon conservation. ● Methods for measurement and calculation blue carbon storage and sequestration will be established. (Issue-specific training)
<u>Limited know-how on measurement and calculation methods for blue carbon storage and sequestration</u>	PDP Adaptation measures such as restoration and protection of blue carbon ecosystems toward a low-carbon economy will be strengthened. PBSAP The pace at which know-how in isolation methods will be established to meet the Coastal Triangle Initiative's (CTI) 20% Strict Protection of Coastal/Marine Habitats goal.	From 2016 to 2021, mangrove mapping has been conducted under the SATREPS "Comprehensive Assessment and Conservation Strategy of Blue Carbon Ecosystems and their Multidimensional Services in the Coral Triangle" with the University of the Philippines Diliman, Marine Science Institute as counterpart. Mangrove mapping has been conducted under the SATREPS "Comprehensive Assessment and Conservation Strategy of Blue Carbon Ecosystems and their Multidimensional Services in the Coral Triangle" with the University of the Philippines Diliman, Marine Science Institute as a counterpart. Mangrove mapping data, consisting of ground-based surveys and remote sensing techniques, will be used to calculate mangrove carbon sequestration. However, the calculation requires mangrove mapping knowledge from research and ground measurement techniques. There is a limited technical updating of such research results and the creation of an implementation system for future national-level blue carbon calculations.	The deployment of the mangrove carbon sequestration methodology will lead to the future conservation and increase of blue carbon dioxide sinks throughout the Philippines. The implications of preserving and increasing mangrove carbon dioxide sinks (1.25 million tons CO2/year for mangroves (Taillardat et al., 2018), calculated from the amount of carbon dioxide) are significant for achieving NDCs. blue carbon in mangrove forests and other areas will also contribute to the PDP and PBSAP as it will increase in combination with the expansion of protected areas.	In Japan, measurement and calculation methods for GHG sequestration and fixation by blue carbon are well established for mangroves and seaweeds. Mangroves have been added to the inventory of greenhouse gas emissions and sinks this year. In the future, Japan's knowledge could be used to provide technical assistance in the Philippines. SATREPS has experience and knowledge in the assessment and prediction of carbon storage and sequestration, and in the comprehensive assessment of ecosystem services, as SATREPS has conducted such assessments.	

Source: JICA Survey Team

2) **Prioritization of the Identified Issues**

Table 3-11 Evaluation of Priority Issues (Forest and Biodiversity Sector)

Issue	Urgency	Mitigation/Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
Forest				
Forest remote sensing technology has not yet established.	High One of the requirements for the REDD+ implementation phase is essential for the establishment of NFMS. The role of establishment of NFMS to promote sustainable forest management is significant and urgently needed.	✓✓		++ Contribute to the advancement of policies such as DAO 2021-32 and the REDD+ Action Plan that contribute to the identification of NFMS functions, facilitate reporting and deepen accountability, contribute to the achievement of NDC targets, and provide data with transparency, consistency and availability to implement MRV
National Forest Monitoring System (NFMS) including database has not yet established	High One of the requirements for the REDD+ implementation phase, the role of establishment of NFMS to promote sustainable forest management is significant and urgently needed.	✓✓		++ Contribute to the advancement of policies such as DAO 2021-32 and the REDD+ Action Plan that contribute to the identification of NFMS functions, facilitate reporting and deepen accountability, contribute to achieving NDC targets, and provide data with transparency, consistency, and availability to implement MRV and forest management. Cover requirements for the REDD+ implementation phase.
Limited climate proofing policies regarding Integrated Watershed Management Plan	Med. In addition to developing policies in line with the vulnerability assessment for climate resilience in Technical Bulletin 16-A, comprehensive policies related to climate change are needed. Comprehensive watershed management in coordination with other departments is also required.		✓✓✓	++ Policies and implementation of sustainable forest management in terms of watershed functions, such as PDPs and Forest Development Plan Master Plans, and appropriate measures to address watershed degradation will be facilitated. It will also contribute to the smooth implementation of watershed management plans that ensure climate proofing.
Limited know-how to analyze precipitation and soil data collected by Automatic Weather Station (AWS) and remote sensing	High As an example of the impact on water protection capacity in mountainous areas, the assessment of water source recharge function measured from precipitation to water transfer to rivers, as seen in water yield assessment, is an		✓✓	++ The evaluation of water protection capacity will be advanced, and human resource development and capacity building in the FMB will be enhanced in order to contribute to sustainable forest

Issue	Urgency	Mitigation/Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
	important point that requires immediate action in terms of the importance of future watershed management.			management in terms of watershed management, which is expected in the policies and implementation of the PDP and the Master Plan for Forest Development.
Limited AWS equipment and remote sensing equipment for collecting data on precipitation, soil, etc.	High Lack of equipment makes it difficult to make progress in data collection in the planned critical watersheds. The installation of equipment is essential to make progress on the plan.		✓✓	++ The assessment of watershed protection capacity will progress and contribute to sustainable forest management in terms of watershed management, which is expected in the policies and implementation of the PDP and the Master Plan for Forest Development Planning. Data collection per watershed will be facilitated, which will enable the FMB to make progress in this work over a wide area.
Limited capacity for prevailing watershed management	Med. The current project contributes to reducing soil degradation and siltation into rivers and other bodies of water, among other participatory watershed management practices by the local residents. By improving capacity, the project has the effect of raising the awareness of the entire population. Progress also needs to be made in relation to the Integrated Watershed Management Plan.	✓	✓	+ The current project contributes to the reduction of soil degradation and siltation in rivers and streams, among other watershed management activities with the participation of local people. The design of watershed management is ready, and the project is expected to be effective in raising the awareness of the entire population through capacity building. It will also contribute to the management of watershed degradation along the PDP.
Limited marketing capacity for agricultural products through agroforestry	Med. In order to promote sustainable forest management in upland sites facing watersheds, such as this project, it is necessary to reduce deforestation by enabling the local people to improve their livelihoods. Therefore, it is necessary to improve the livelihoods of the local people by marketing the agricultural products produced and selling them through appropriate channels of distribution and use.	✓	✓✓	++ It will also contribute to the management of degradation in the watersheds described in the PDP and contribute to policy progress. The distribution channels for agricultural products in local communities obtained through marketing will contribute to improving the livelihoods of local people and reduce deforestation due to conversion of forests to agricultural land.

Issue	Urgency	Mitigation/Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
Coastal/Marine/Biodiversity				
Limited a Strategic Conservation Plan (Plan) for the management of Marine Protected Areas, etc.	High In PDPs, the impacts of development on ecosystems and biodiversity are to be considered. In addition, in the marine space, there is an urgent need to formulate policies that comprehensively address protected areas, etc., due to the wide range of related fields and the many conflicts of interest among stakeholders.	✓✓	✓✓✓	++ The development of the plan will provide the basis for policies for the management of Marine Protected Areas, etc., consistent with the Kunming-Montreal Biodiversity Framework and the PDP, and will advance the conservation of coastal/marine ecosystems and biodiversity. It is also expected to have a high spillover effect on efforts related to blue carbon storage, which is expected to progress in the future. Therefore, the project is expected to have a spillover effect on a wide range of sectors, including government, private sector, and research institutions.
Limited know-how on measurement and calculation methods for blue carbon storage and sequestration	High Mangrove mapping has already been conducted in the SATREPS "Project on Comprehensive Assessment and Conservation of Blue Carbon Ecosystems and their Services in the Coral Triangle". Technical updates of these research results are needed for future national-level blue carbon calculations.	✓✓	✓	++ The renewal of the mangrove carbon sequestration methodology will lead to the securing and increasing of blue carbon sinks throughout the Philippines in the future, and will have a significant impact on the achievement of the NDC. Blue carbon from mangrove forests and other sources will also contribute to the PDP and PBSAP by increasing carbon sequestration as well as the expansion of Protected Areas.
Limited technology for ecosystem monitoring and assessment in highly climate change vulnerable Marine Protected Areas	Med. Human resource development for monitoring and assessment of vulnerable areas and risk assessment will be necessary for the future conservation and management of climate change-related ecosystems.	✓	✓	++ The prevailing of monitoring and assessment techniques that contribute to ecological and environmental stability as a strategic priority activity will also increase the management capacity of government officials and still increase public appreciation and recognition in Protected Areas in highly vulnerable areas.
Limited integrated data management on biodiversity and coastal and marine ecosystems	Med. The establishment of this platform is essential for the achievement of the 30 by 30 framework of the Kunming-Montreal Convention on	✓	✓✓	++ Progress in data management of Marine Protected Areas, a goal of the Kunming-Montreal Biodiversity Framework,

Issue	Urgency	Mitigation/Adaptation		Spillover Effect Impact
		Mitigation	Adaptation	
	Biological Diversity. Since the establishment of BMB's own platform will advance information management for the expansion of Protected Areas.			will help to make progress toward achieving the Framework. In addition, by promoting information management at the national, provincial, and local levels, the importance of Marine Protected Areas in public administration will be made known over a wide area.
Limited policies to support blue carbon conservation	Low There is a need to strengthen adaptation measures such as restoration and protection of blue carbon ecosystems through the development of this policy. It will also play a role in encouraging the creation of an implementation framework in order to trigger initiatives for implementation.	✓✓✓	✓✓	++ Contribution to the progress of the 30 by 30 and in line with adaptation measures in the areas of coastal/marine ecosystems and biodiversity as described in the NDC. It will also contribute to future progress on blue carbon and related ecosystem and biodiversity conservation. It will also improve the management of protected areas by the government and provide a policy basis for better data management in terms of conservation and restoration of mangrove forests and other areas belonging to the blue carbon in Protected Areas.

(6) Urban Environment

1) Analysis of the Identified Issues

According to the GHG Inventory Report released by CCC in 2010, the waste sector including wastewater was the fourth largest source of GHG emissions in 2010 after the energy, agriculture, and transportation sectors, with 15.559 Mt-CO₂e emissions. However, by 2020, emissions nearly doubled to 30,122 Mt-CO₂e, surpassing the transportation sector to become the third largest emission source. The breakdown in 2010 is mainly due to wastewater treatment and waste disposal, with the wastewater accounting for about 70% of sector emissions (10.562 Mt-CO₂e) and the waste disposal about 30% (4.996 Mt-CO₂e). More than 90% of GHGs are methane, which is mainly released as methane gas when organic wastes deposited without proper management at waste disposal sites become anaerobic. Many domestic wastewater is discharged untreated and deposited in lakes and bays to form anaerobic ponds, where methane, a GHG, is produced and released into the atmosphere.

GHG emission projections (BAU scenarios) and GHG reduction targets have been set from 2023 to 2028. The reduction target for BAU emissions is set at 3.1% (0.76 Mt-CO₂e) in 2023, a low percentage, but the percentage increases with each passing year, and the target has been set at 3.8% (1.08 Mt-CO₂e) in 2028.

Based on the above, the main mitigation measures that will contribute to achieving the reduction target are avoidance of landfill disposal of organic wastes, reduction of disposal volume, and reduction of methane gas generation through aerobic management of landfill sites. Increasing residents' awareness of waste segregation and diversion, and providing awareness and environmental education are also effective ancillary mitigation measures that can be linked to these mitigation measures. For domestic wastewater, the main mitigation measures include the improvement and maintenance of septic tank sludge treatment facilities and sewage systems in each household, which are the source of sludge wastewater.

There are several government agencies in charge of the waste sector in the Philippines, including DENR, DPWH, and LWUA, whose NDC efforts include implementation of feasible waste reuse, recycling, and composting programs, as well as centralized and decentralized wastewater treatment systems, which are the focus of the NCCAP.

The ideal state of the waste sector is to strengthen the capacity of waste management/wastewater treatment system operators and appropriate management through the development of systems and regulations, as well as to promote the effective use and reuse of recyclable resources. It is important for waste management to promote waste generation control, reduction, and diversion through reuse and recycling, and for wastewater to establish an appropriate sludge and wastewater treatment system centralized/decentralized, as well as a system that includes the financial foundation necessary for its sustainable operation and maintenance, including LGU clustering.

Table 3-12 Issue analysis (Urban Environment Sector)

Issue	Related Policies (Policies that can be implemented/facilitated by resolving issues)	Status of efforts in the Philippines (including donor support) and causes of issues	Achievement of the Paris Agreement and NDC, Impact on sector policies, etc.	Direction of Japan Support Possible forms of support	Possible Cooperation Program and their outputs
Waste					
<p>Limited number of waste management officers in LGUs and disconnection or loss of technical knowledge and local information</p>	<p><u>National Framework Strategy on Climate Change [Strategic priorities in the waste sector].</u></p> <ul style="list-style-type: none"> ➢ Strengthen implementation of the Ecological Solid Waste Management Act (RA9003) ➢ Promote best practices in waste management <p><u>National Climate Change Action Plan</u> Enhanced waste segregation, waste collection, composting, and recycling at the source of waste</p> <p><u>National Development Plan</u> Effective waste management by LGUs through IEC (Information, Education, and Communication) activities</p> <p><u>Issue :</u> Progress in effective solid and hazardous waste management hampered by limited capacity of LGUs</p>	<ul style="list-style-type: none"> ➢ The DENR-EMB provides technical assistance and capacity development for waste management officers of the LGU concerned during the development of the 10-year solid waste management plan. ➢ The WB implemented a DENR support project (Policy, Planning, Environmental Management, Monitoring and Evaluation Capacity Strengthening Support) in 2014, but the LGU's waste management officer is not eligible. ➢ Due to the low policy priority in LGUs, the appointment of waste management officers falls short of 30%, with over 70% of LGUs either having no appointed officers or officers holding dual positions. Consequently, faithful execution of the 10-year solid waste management plan is hindered, leading to a low waste diversion rate (the percentage of waste diverted from conventional landfill disposal through activities under the 3R approach) and a nationwide shortage of materials recovery facilities and sanitary landfills. ➢ During the turnover of officers, there is a limited transfer of technical expertise (region-specific waste management issues/information, appropriate waste collection and disposal methods for the region, etc.), resulting in a disconnection of the knowledge product flow and loss of intangible information. 	<p>In the 2010 GHG inventory report, the waste sector emitted 4.996 Mt-CO₂e, with over 90% being released as methane gas. Addressing the challenges associated with this issue is crucial, as resolving them can lead to significant impacts on mitigating GHG emissions. By ensuring an adequate number of waste management officers and sufficient technical expertise, the fulfillment and improvement of the 10-year solid waste management plan can be achieved. This, in turn, contributes to mitigation measures such as avoiding landfill disposal of organic waste, reducing waste generation, and suppressing methane gas emissions through aerobic management of landfill sites. The substantial impact on NDCs and sector policies is anticipated as a result.</p>	<p>In the MoFA's focus areas for country-specific development cooperation policies, ensuring "human security for inclusive growth" is emphasized, encompassing the overcoming of vulnerabilities related to environmental issues, including waste management, and aiming for the stability and enhancement of livelihoods. Under JICA's Global Agenda (Issue-specific Project Strategy) No. 18 on Environmental Management, JICA is advancing a project strategy titled "Clean City Initiative." The initiative is based on efforts to "develop facilities and legal frameworks, and cultivate human resources responsible for enhancing societal awareness," with a particular emphasis on supporting human resource development. As part of the international deployment project by the MoE, the focus on "Contribution to the asia zero emission community concept" highlights the prioritization of "promotion of transition to a circular economy," specifically emphasizing cooperation in "institutional, technological, and human resource development related to waste management and recycling." JICA is actively engaged in dispatching experts with expertise in waste management, conducting issue-specific training, and compiling training contents into booklets, web tools, etc. These efforts are aimed at establishing a knowledge product flow from DENR to regional DENRs and, subsequently, to each dedicated official in local government units (LGUs). Attention is also given to localizing the flow during its segmentation.</p>	<p>Waste management improvement program Project for building technical expertise and knowledge product flow (Specialized training/Expert dispatch)</p> <ul style="list-style-type: none"> ➢ DENR, both at the central and local levels, will disseminate technical expertise to waste management officials in LGUs. ➢ DENR, at both central and local levels, will establish a knowledge product flow with waste management officials from LGUs. ➢ The experts will provide guidance to waste management officials at the DENR (central/local) and LGUs on localizing knowledge products, ensuring effective dissemination and utilization.
<p>Low level of interest of the Barangay/local population in waste management</p>	<p><u>National Framework Strategy on Climate Change [Strategic priorities in the waste sector].</u></p> <ul style="list-style-type: none"> ➢ Strengthen implementation of the Ecological Solid Waste Management Act (RA9003) ➢ Promote best practices in waste management ➢ Strengthening proper waste management through dialogue with the public and behavior modification to address climate change <p><u>National Climate Change Action Plan</u></p> <ul style="list-style-type: none"> ➢ Enhanced waste segregation, waste collection, composting, and recycling at the source of waste ➢ Regulation of the use of toxic packaging materials and disposable purposes <p><u>National Development Plan</u></p> <ul style="list-style-type: none"> ➢ Effective waste management by LGUs through IEC (Information, Education, and Communication) activities ➢ Proper waste disposal by residents 	<ul style="list-style-type: none"> ➢ Every January, a campaign is conducted by DENR, advocating for Zero Waste Month, promoting a "circular economy" in the production and use of consumer products to reduce the quantity and harmfulness of generated waste. ➢ MMDA implemented the Community-Based Solid Waste Management Program (CBSWMP) in 42 barangays, focusing on community ownership and aiming to change residents' behaviors and practices regarding waste management. ➢ RA9003 Article 48 prohibits non-segregated waste collection, and LGUs have enacted ordinances in compliance with this provision. However, out of 591 LGUs, waste segregation ordinances were not enacted in 71 LGUs, accounting for 12%. ➢ Under the Grassroots technical cooperation (Special framework for regional revitalization) project by JICA, Kitakyushu city has been leading the General waste treatment system construction project in Davao City since 2017. ➢ UNDP conducted an Electronic cash for recyclable waste project in Quezon City in 2021. Through this initiative, improved waste 	<p>Improvements in Community/Barangay/LGU-level environmental education and awareness activities are expected to enhance local waste segregation, recycling, and waste diversion rates. These enhancements contribute to the overall improvement of waste management practices, serving as mitigation measures for avoiding landfill disposal of organic waste, reducing waste generation, and suppressing methane gas emissions through aerobic management of landfill sites. Considering these factors, the impact on NDCs and sector policies is deemed significant.</p>	<p>In the MoFA's prioritized areas for country-specific development cooperation policies, the assurance of "human security for inclusive growth" is declared, addressing vulnerabilities related to environmental issues, including waste management, and aiming to overcome these vulnerabilities while stabilizing and strengthening livelihoods. Under JICA's Global Agenda (Issue-specific Project Strategy) No. 18 on Environmental Management, JICA is executing a project strategy titled the "Clean City Initiative." In this initiative, the 1st stage of waste management improvement emphasizes the enhancement of public health, advocating for improved waste segregation and collection methods through community participation. The 3rd stage focuses on building a circular society through the 3Rs (Reduce, Reuse, Recycle) and highlights the importance of civic awareness campaigns. Furthermore, in JICA support, a waste management improvement project was implemented in Davao City. This included the creation of waste segregation processing sheets and awareness-raising booklets for businesses, along with workshops to empower Barangays (districts) in Davao City to engage in autonomous activities.</p>	<p>Waste management improvement program Community awareness and environmental education promotion project (Expert dispatch/Overseas cooperation volunteers)</p> <ul style="list-style-type: none"> ➢ DENR/LGU will implement waste management policies with a focus on waste separation and the 3R (Reduce, Reuse, Recycle) principles. ➢ DENR/LGU will conduct seminars on waste management and the 3R principles targeting local residents. ➢ DENR/LGU will organize environmental education programs for local children.

Issue	Related Policies (Policies that can be implemented/facilitated by resolving issues)	Status of efforts in the Philippines (including donor support) and causes of issues	Achievement of the Paris Agreement and NDC, Impact on sector policies, etc.	Direction of Japan Support Possible forms of support	Possible Cooperation Program and their outputs
		<p>management practices and increased awareness among residents regarding waste disposal and recycling are anticipated (project results and effects are currently under evaluation and undisclosed).</p> <ul style="list-style-type: none"> ➤ In a survey by the Commission on Audit, among 591 LGUs examined, 71 LGUs (12%) did not have enacted ordinances. However, a press release from a 2020 congressman stated that in 70% of barangays nationwide, waste segregation was not being practiced, and many barangays were not complying with ordinances. ➤ According to a survey by the Commission on Audit, 88% of resident respondents are aware of their waste segregation obligations. However, 34% do not participate in waste management awareness programs conducted by Barangays and LGUs, indicating that while residents understand their segregation duties, there is a low awareness about the necessity for such segregation. ➤ One contributing factor to the challenge is the low policy priority in LGUs, resulting in a limited implementation of waste management policies at Barangay/LGU level that could bring about behavior modification in residents and communities. 		<p>These experiences underscore JICA's commitment to organizational and operational capacity building. Additionally, drawing from the expertise of over 1,600 dispatched JOCV, particularly waste management and environmental education volunteers, instructional materials in English and Tagalog created based on Japanese experiences can be utilized for support. While private sector collaboration is not anticipated due to the perceived lack of profitability in public services and education, sharing Japan's waste disposal and management technologies, as well as expertise in waste segregation, is feasible as part of the cooperation program.</p>	
<p>Nationwide shortage of material recovery facilities</p>	<p><u>National Framework Strategy on Climate Change [Strategic priorities in the waste sector].</u></p> <ul style="list-style-type: none"> ➤ Strengthen implementation of the Ecological Solid Waste Management Act (RA9003) ➤ Promote best practices in waste management <p><u>National Climate Change Action Plan</u> Enhanced waste segregation, waste collection, composting, and recycling at the source of waste</p> <p><u>National Development Plan</u></p> <ul style="list-style-type: none"> ➤ Proper waste disposal by residents <p>Clustering of LGUs for further appropriate operation of joint waste facilities, including the establishment of materials recovery facilities</p>	<ul style="list-style-type: none"> ➤ DENR-EMB provides financial assistance to LGUs/Barangays for the establishment of materials recovery facilities targeting recyclable and reusable materials such as paper, cardboard, glass, aluminum, tin, plastic containers, etc. ➤ DENR's Investment Portfolio for Risk Resilience focuses on the construction of material recovery facilities. ➤ Nationwide, over 60% of Barangays do not have established materials recovery facilities. This is due to various reasons, including the inability to secure land for these facilities and the limited funding from LGUs. The reason for the limited funding from LGUs is that financial support from DENR-EMB grants is limited, and therefore, LGUs/barangays that meet the requirements, such as securing operational funds post-installation, land use, and possessing technical know-how on installation and operation procedures, are prioritized. 	<p>The establishment of materials recovery facilities is anticipated to lead to the avoidance of mixed waste collection, a reduction in illegal dumping, and a decrease in the disposal volume to final disposal sites. This, in turn, contributes to the extension of the lifespan of disposal sites. The reduction and deferral of methane gas generation potential at disposal sites through these measures significantly contribute to GHG emission reduction and make a substantial contribution to sector policies.</p>	<p>In the MoFA's prioritized areas for country-specific development cooperation policies, the focus is on ensuring "human security for inclusive growth," addressing vulnerabilities related to environmental issues, including waste management, and aiming to overcome these vulnerabilities while stabilizing and strengthening livelihoods.</p> <p>Within JICA's Global Agenda (Issue-specific Project Strategy), specifically No. 18 on Environmental Management, JICA is implementing a project strategy known as the "Clean City Initiative." Under cooperation policy 1, "Improving the waste management system towards a circular society," the initiative emphasizes "waste reduction through the introduction of segregation and recycling."</p> <p>To enhance understanding of the legislation and implementation status of waste segregation and recycling in Japanese local governments, as well as the residents' practices in waste sorting and collection, visits and training sessions are conducted. The goal is to deepen awareness regarding the reduction in waste generation and disposal resulting from waste segregation and recycling, along with the cost-cutting benefits for local governments in waste management expenses.</p>	<p>Waste management improvement program Collaborative solid waste management through citizen and administrative partnership (Specialized training)</p> <ul style="list-style-type: none"> ➤ Training sessions, facilitated by Japan local governments, NGOs, and citizen organizations, will address waste collection, segregation, and recycling/reuse practices. The training includes site visits to collection and processing facilities, showcasing examples of regional management (clustering), providing technical insights, and demonstrating the cost-saving effects of waste management. ➤ Investigation into LGUs without ordinances on waste segregation, and considerations for ordinance enactment and compliance.
<p>Low waste diversion rate</p>	<p><u>National Framework Strategy on Climate Change [Strategic priorities in the waste sector].</u></p> <ul style="list-style-type: none"> ➤ Strengthen implementation of the Ecological Solid Waste Management Act (RA9003) ➤ Promote best practices in waste management <p><u>National Climate Change Action Plan</u> Enhanced waste segregation, waste collection, composting, and recycling at the source of waste</p>	<ul style="list-style-type: none"> ➤ In compliance with RA9003 enacted in 2001, each LGU is obligated to achieve a waste diversion rate of at least 25% in their 10-year solid waste management plan. However, since the implementation of RA9003, the rate have been required to update every three years after the initial five years passed in 2006. As part of the PDP, a target rate of 80% was set for 2022. Nevertheless, the average diversion rate 	<p>The promotion of waste segregation/composting and recycling leads to the mitigation measure of avoiding landfilling of organic waste and reducing the volume of waste, which, in turn, suppresses methane gas emissions. Considering these factors, the impact on NDCs and sector policies is deemed significant.</p>	<p>In the MoFA's country-specific development cooperation priorities, there is a commitment to overcoming vulnerabilities related to environmental issues, including waste management, to ensure "human security for inclusive growth" and to stabilize and enhance livelihoods.</p> <p>Under JICA's Global Agenda (Issue-specific Project Strategy), particularly in the field of</p>	<p>Intermediate waste treatment capacity improvement program (Specialized training/Expert dispatch)</p> <ul style="list-style-type: none"> ➤ Specialized training conducted by experts and local companies for LGU officials on waste segregation/composting, potential for their market development and recycling. The training includes facility visits, showcasing operational conditions, presenting case

Issue	Related Policies (Policies that can be implemented/facilitated by resolving issues)	Status of efforts in the Philippines (including donor support) and causes of issues	Achievement of the Paris Agreement and NDC, Impact on sector policies, etc.	Direction of Japan Support Possible forms of support	Possible Cooperation Program and their outputs
	<p><u>National Development Plan</u> Clustering of LGUs for further appropriate operation of joint waste facilities</p>	<p>submitted by LGUs in the states with reported figures is stagnant at 46.6%, and it is anticipated to be even lower on nationwide.</p> <ul style="list-style-type: none"> ➢ Under the DENR's NDC policy and measures (PaMs), composting of organic waste is being promoted. ➢ DENR has implemented the "Waste-to-Energy Guidelines" through a department order. Waste-to-energy projects are being promoted in Davao City. ➢ JICA has conducted capacity-building projects for proper waste management, including waste diversion through advanced technologies, in Quezon City, Cebu City, and Davao City. WB also implemented a methane recovery project. Additionally, the ADB carried out a waste value-added project through waste diversion in 2019. ➢ In Legazpi City, a feasibility study and dissemination/demonstration project for a sustainable organic waste composting system has been implemented as part of a JICA project. ➢ The waste diversion rate target set in the NDP (2017-2022) for 2022 (80%) was not achieved (46.6%). This can be attributed to financial and technical challenges within LGUs, but also to the overall low policy priority for waste management measures within LGUs. ➢ There are significant hurdles to the introduction of waste-to-energy facilities. These include the necessity for submission of comprehensive plans spanning evaluation, construction, operation, and closure, as well as obtaining various certifications. Opposition from neighboring residents and NGOs against waste incineration, concerns regarding environmental and social considerations such as site location and surrounding land use patterns, and the political landscape including the attitudes of governors and mayors toward such projects, term limits of up to nine years, and electoral timing, constitute the primary factors. 		<p>Environmental Management (No. 18), JICA has introduced a project strategy called the "Clean City Initiative." Cooperation Policy 1 emphasizes "improving waste management systems towards a circular society" and advocates waste reduction through the introduction of segregation and recycling as a means to reduce environmental impact and prevent pollution.</p> <p>As part of the MoE's international initiatives, under the "Contribution to the Asia zero emission community concept" and the "promotion of circular economy transition project," a sub-project focuses on "international expansion of circular industries and infrastructure for international resource circulation." This project aims to support ASEAN developing countries by providing assistance based on Japan's advanced waste management, recycling systems, and experiences in areas such as institution-building, technology transfer, and human resource development. The goal is to contribute to appropriate waste management and the development of circular infrastructure, ultimately promoting the international expansion of Japan's circular industries.</p> <p>In the field of waste segregation and composting, there are local companies with proven track records, utilizing Japanese technology for composting in Davao City and Legazpi City. Leveraging private sector technology and expertise (technology application and localization), it is possible to extend support to other regions' local governments. For small-scale projects, targeted training or expert dispatch is feasible. However, for larger-scale initiatives involving design, equipment procurement, and multiple areas of expertise such as environmental and social considerations, it is recommended to conduct technical cooperation projects or feasibility studies.</p>	<p>studies on regional management (clusterization), and offering technical insights.</p> <p>(Technical cooperation project/Feasibility study)</p> <ul style="list-style-type: none"> ➢ Specialized training conducted by experts and local companies for LGU officials on waste segregation/composting, potential for their market development and recycling. The training includes facility visits, showcasing operational conditions, presenting case studies on regional management (clustering), facility construction, and offering technical insights. ➢ Exploration of the feasibility of introducing waste-to-energy facilities, considering legal frameworks. ➢ A pilot project on waste segregation/composting, potential for their market development and recycling, including considerations for regional management (clustering), is implemented in the selected target area. ➢ Methods for dissemination and expansion to other regions are explored.
<p>Nationwide shortage of sanitary landfill sites</p>	<p><u>National Framework Strategy on Climate Change [Strategic priorities in the waste sector].</u></p> <ul style="list-style-type: none"> ➢ Strengthen implementation of the Ecological Solid Waste Management Act (RA9003) ➢ Promote best practices in waste management <p><u>National Climate Change Action Plan</u> Closure of open dumping sites</p> <p><u>National Development Plan</u> Clustering of LGUs for further appropriate operation of joint waste facilities, including the establishment of sanitary landfill sites</p>	<ul style="list-style-type: none"> ➢ In May 2021, DENR declared the closure of open dumping sites. ➢ DENR's NDC policy and measures (PaMs) and Investment Portfolio for Risk Resilience include the development of organic waste management systems, site suitability surveys and construction of sanitary landfills, development of solid waste management master plans, methane flaring at disposal sites, methane recovery from sanitary landfills, and the environmentally efficient use of cover soil. ➢ In the 2020s, private-sector-led projects are underway to construct waste treatment facilities. (Waste Disposal Facility Expansion Project in Cebu City in 2023, Hongkong and Shanghai Banking Corporation, and Integrated Waste Management Facility Construction Project in Lapu Lapu City in 2023, Philippine Development Bank). 	<p>The establishment of Sanitary Landfill Facilities (SLFs) and the resolution of alternative utilization for Residual Containment Areas (RCAs) contribute significantly to achieving NDCs. The reduction in methane gas potential is an additional benefit. Additionally, addressing these challenges enables the effective implementation of 10-year solid waste management plans developed by LGUs, reinforcing compliance with RA9003, promoting best practices in waste management, and aligning with sector policies such as the National Framework Strategy on Climate Change and the NCCAP, which prioritizes the closure of open dumping sites.</p>	<p>In the MoFA's country-specific development cooperation priorities, there is a commitment to overcoming vulnerabilities related to environmental issues, including waste management, to ensure "human security for inclusive growth" and to stabilize and enhance livelihoods.</p> <p>Under JICA's Global Agenda (Issue-specific Project Strategy), particularly in the field of Environmental Management (No. 18), JICA has introduced a project strategy called the "Clean City Initiative." The first stage of waste management improvement focuses on enhancing public health, and it advocates for the enhancement of final disposal sites (transitioning from open dumping to sanitary landfill).</p> <p>Additionally, the MoE aims to promote the international expansion of Japan's circular industries. Under the international methane emission reduction contribution fund project,</p>	<p>Final disposal site capacity improvement program</p> <p>(Specialized training/Expert dispatch)</p> <ul style="list-style-type: none"> ➢ Specialized training provided by experts, local authorities, and domestic companies offering technical insights and information. The training, conducted through site visits and lectures, covers disposal site operational and management methods, case studies on regional management (clustering), waste collection and management techniques. ➢ Exploration of potential improvements to sanitary landfill siting criteria. <p>(Technical cooperation project/Feasibility study)</p> <ul style="list-style-type: none"> ➢ Technical insights and information are provided by experts, local authorities, and domestic companies through site visits and lectures, covering disposal site operational and management methods, case studies on

Issue	Related Policies (Policies that can be implemented/facilitated by resolving issues)	Status of efforts in the Philippines (including donor support) and causes of issues	Achievement of the Paris Agreement and NDC, Impact on sector policies, etc.	Direction of Japan Support Possible forms of support	Possible Cooperation Program and their outputs
		<ul style="list-style-type: none"> Some LGUs, in response to the closure declaration of open dumping sites, were unable to secure alternative locations. Consequently, they resorted to establishing Residual Containment Area (RCA), resulting in a situation where effective management is equivalent to that of open dumping sites. This lack of a fundamental resolution contributes to an inability to reduce GHG emissions. The financial constraints within LGUs and the problem of non-succession of technology during the turnover of waste management officers are factors. Additionally, the current sanitary landfill siting criteria pose challenges, particularly for LGUs with land restrictions and geological limitations (e.g., islands, steep areas, protected areas, and limestone). 		<p>support is provided for the reduction of methane emissions in urban sanitation environments, including waste management, in developing countries.</p> <p>Introduction of the Fukuoka method, which has proven successful in multiple developing countries, is feasible. However, considering challenges such as the financial constraints and technical limitations of LGUs and the non-fulfillment of installation criteria, it is necessary to employ localized specifications.</p> <p>For small-scale projects, targeted training or expert dispatch is feasible. However, for larger-scale initiatives involving design, equipment procurement, and multiple areas of expertise such as environmental and social considerations, it is recommended to conduct technical cooperation projects or feasibility studies.</p>	<p>regional management (clustering), and waste collection and management techniques.</p> <ul style="list-style-type: none"> DENR conducts training on final disposal site management for LGUs. A pilot project, including considerations for regional management (clustering), is implemented in the selected target area. Methods for dissemination and expansion to other regions are explored.
<p>Wastewater</p> <p>Low capacity and funding for implementation of sewerage and septage management projects in LGUs and LWDs</p>	<p><u>National Climate Change Action Plan</u></p> <ul style="list-style-type: none"> Research and adoption of centralized wastewater treatment systems to improve water quality in highly urbanized cities Gaps and needs assessment in the implementation of the Clean Water Act and the National Sewerage and Septic Sewage Management Plan <p><u>National Sewerage and Septage Management Program (NSSMP)</u></p> <ul style="list-style-type: none"> By 2020, all LGUs will develop septic tank management systems. Seventeen advanced cities will develop sewer systems. By 2020, about 43.6 million people will have access to septic tank treatment facilities and 3.2 million people will have access to sewage treatment facilities. By 2020, PHP 26.3 billion has been invested in sanitation improvement projects. By 2020, about 346 million kg of BOD is diverted from the environment per year as a result of the sewerage and septage management projects. 	<ul style="list-style-type: none"> Through the implementation of feasibility studies and consulting services facilitated by DPWH, 16 LGUs are undergoing the national subsidy application process based on the NSSMP. Feasibility studies funded by NEDA were conducted in 15 areas below the second level. DENR's NDC PaMs and IPRR (Expansion of septic tanks and sewage treatment facilities in highly urbanized city and other cities outside the Manila Bay area for use of NSSMP subsidy, and Construction of wastewater treatment facilities In Baguio City, a project feasibility study for sewage infrastructure development is being conducted, and in Cagayan de Oro City, a project feasibility study for the introduction of sewage treatment improvement technology is being carried out, both as part of JICA initiatives. The 1,163 LGUs excluded from the NSSMP tend to have low policy priorities. This results in the absence of master plans for the sewage/drainage sector and design standards and specifications for sewer systems and drainage treatment facilities. Within the budget approval process of the Department of Budget and Management (DBM), there is a tendency to prioritize LGUs/LWDs in metropolitan areas such as Manila and Cebu, as well as those affecting water quality in Manila Bay. This often results in a more challenging approval process for LGUs/LWDs outside of these areas. 	<p>In the 2010 GHG Inventory report, the wastewater treatment sector emitted 10.56 Mt-CO₂e, with over 90% of this being methane gas. Methane gas is generated in anaerobic conditions, such as septic tanks and anaerobic ponds (stabilization ponds), used in household and commercial wastewater treatment. Improving the water quality in septic tanks is expected to reduce the potential methane gas generation, making it a significant impact and contribution to NDCs. Additionally, it aligns with the goals outlined in the NMMSP. Although the target year is 2020, it is acknowledged that the achievement of goals has been delayed, and a revision of the NMMSP is anticipated within the next few years.</p> <p>The four goals of the NMMSP are as follows:</p> <ul style="list-style-type: none"> Goal 1: By 2020, all LGUs are expected to develop Johkaso management systems, and 17 Highly Urbanized Cities (HUCs) are to develop sewage systems. Goal 2: By 2020, 43.6 million people should have access to Johkaso treatment facilities, and 3.2 million people should have access to sewage treatment facilities. Goal 3: By 2020, an investment of 26.3 billion PHP is targeted for sanitation improvement projects. Goal 4: By 2020, as a result of sewage and septage management projects, an annual transfer of 34.6 million kg of BOD from the environment is expected. 	<p>In the MoFA's country-specific development cooperation priorities, there is a commitment to overcoming vulnerabilities related to environmental issues, including water supply and sanitation, to ensure "human security for inclusive growth" and to stabilize and enhance livelihoods. Under JICA's Global Agenda (Issue-specific Project Strategy), particularly in the field of Environmental Management (No. 18), JICA has introduced a project strategy called the "Clean City Initiative." As part of the second cooperation policy, it emphasizes achieving a "sound water, air, and soil environment through environmental regulations and pollution prevention measures." It underscores the indispensable need for sustainable operational frameworks and long-term substantial investments in the development and operation of sewage treatment facilities.</p> <p>The MoE also advocates for methane emission reduction support in the urban sanitation environment of developing countries, addressing issues such as water quality pollution.</p> <p>With the past experience in implementing the Master Plan formulation project for sewerage development in Davao City, JICA has the capability to extend support to other localities, applying technology and localization. Additionally, given the track record of Japanese companies in sewage treatment technology (such as Johkaso and decentralized wastewater treatment) in cities like Baguio, supporting other municipalities is feasible. While small-scale initiatives may be addressed through targeted training or expert dispatch, for larger-scale projects involving design, equipment procurement, and various areas of expertise, undertaking technical cooperation projects or feasibility studies is advisable.</p>	<p>Wastewater treatment (facility) improvement program (Specialized training/Expert dispatch)</p> <ul style="list-style-type: none"> Specialized training provided by experts and domestic companies to LWUA, LGU, and LWD officials. The training focuses on decentralized and centralized wastewater treatment systems, septic tank treatment, including site visits to observe operational management conditions, case studies on regional management (clustering), and technical support for creating master plans, design specifications, and design criteria. <p>(Technical cooperation project/Feasibility study)</p> <ul style="list-style-type: none"> Training on decentralized and centralized wastewater treatment systems, and septic tank treatment is conducted by experts and domestic companies for LWUA, LGU, and LWD officials. The training includes site visits to observe operational management conditions, case studies on regional management (clustering), and technical support for creating master plans, design specifications, and design criteria. LWUA conducts training for LGU/LWD officials on decentralized and centralized wastewater treatment systems, and septic tank treatment. The training covers facility operational management, case studies on regional management (clustering), and technical support for creating master plans, design specifications, and design criteria. Technical support provided by experts and domestic companies, including facility design, construction, and operational management, is implemented. A pilot project, including considerations for regional management (clustering), is implemented in the selected target area. Methods for dissemination and expansion to other regions are explored.

Source: JICA Survey Team

2) **Prioritization of Identified Issues**

Table 3-13 Evaluation of Priority Issues (Urban environmental sector)

Issue	Urgency	Mitigation/Adaptation		Spreading effect/Impact
		Mitigation	Adaptation	
Waste				
Limited number of waste management officers in LGUs and disconnection or loss of technical knowledge and local information	High The low proportion of dedicated waste management officers has been a hindrance to the faithful execution of the ten-year solid waste management plan and contributes to the low rate of waste diversion.	✓		+++ Adequate staffing of waste management officers and the availability of technical expertise are crucial for the fulfillment and improvement of the 10-year solid waste management plan. This has a significant impact, leading to the avoidance of landfilling for organic waste, reduction in waste generation, and mitigation of methane gas emissions through aerobic management of landfill sites. Furthermore, extending the scope to cover officers nationwide enhances the spreading effect.
Low level of interest of the Barangay/local population in waste management	Med. While many LGUs have enacted ordinances for waste segregation, it has not yet been implemented in 70% of Barangays. Furthermore, although a majority of residents are aware of the obligation for waste segregation, there is a limited understanding of its necessity.	✓		++ Improvements in waste management, such as increased segregation rates, recycling rates, and waste diversion rates in the community through environmental education and awareness campaigns, contribute to overall waste management enhancement. This, in turn, leads to avoiding the burial of organic waste, reducing waste volume, and suppressing methane gas generation through aerobic landfill management, resulting in significant positive impacts. However, it is desirable to conduct practical training, including hands-on sessions, with each Barangay for a more effective and phased expansion of the spreading effect.
Nationwide shortage of material recovery facilities	High Due to the failure to achieve the waste diversion target set in the PDP for 2022, which aimed for a 60% waste diversion rate, the current status remains below the goal at 40.5%.	✓		++ The installation of materials recovery facilities is expected to result in the avoidance of mixed waste collection, reduction in illegal dumping, and decreased disposal to landfills. This, in turn, contributes to the extension of landfill lifespan and a reduction in methane gas generation potential. The impact is substantial. However, given that the introduction of resource recovery facilities is on a per LGU (including clustered LGUs) basis, achieving nationwide spreading effects will take time.
Low waste diversion rate	High Due to the failure to achieve the target waste recycling rate set in the 2022 PDP, which was 80%, and the actual rate standing at 46.6%, there is a discrepancy that needs to be addressed.	✓		++ The promotion of waste separation/composting and recycling has a significant impact on avoiding landfilling of organic waste, reducing waste volume, and thereby suppressing methane gas emissions. However, the introduction of facilities for waste separation/composting, recycling, and similar practices is specific to each LGU (including Cluster LGUs), requiring time to achieve nationwide spreading effects.
Nationwide shortage of sanitary landfill sites	High Access to sanitary landfill disposal sites is currently limited to only 35% of LGUs as of 2022.	✓✓✓		+++ The establishment of sanitary landfill disposal sites holds significant potential for reducing the methane gas potential through the resolution of alternative utilization of

Issue	Urgency	Mitigation/Adaptation		Spreading effect/Impact
		Mitigation	Adaptation	
				residual waste sealing areas. However, since the installation of sanitary landfill disposal sites is specific to each LGU (including clustered LGUs), achieving nationwide spreading effects will take time.
Wastewater				
Low capacity and funding for implementation of sewerage and septage management projects in LGUs and LWDs	High In the NSSMP, the goal of achieving the development of a septic tank management system by all LGUs by 2020 remains unrealized.	✓✓		+++ Methane gas is generated in anaerobic conditions within septic tanks and anaerobic ponds installed for domestic and commercial wastewater treatment. Improving the water quality of septic tanks and sewage systems (including addressing issues like foul odors and health concerns) is expected to reduce the potential generation of methane gas, leading to a significant impact. However, the installation of septic tanks and sewage systems is a matter for each LGU (including clustered LGUs), and achieving nationwide spillover effects will take time.

3.1.2 Possible Cooperation Programs

To address the identified issues of the priority sectors, the following cooperation programs were considered.

(1) Paris Agreement Implementation

1) Possible program concept

Four cooperation programs were considered in the Paris Agreement Implementing Sector, as listed below.

Table 3-14 Possible cooperation programs and scenario (Paris Agreement Implementation)

Cooperation program	Project	
	Short-term	Mid - Long term
P-1 Program to establish a transparency framework and strengthen response capacity	Dispatch of the Climate change experts PA-1-1 Project for Strengthening Human Resources and Organizational Capacity for Climate Change PA-1-2	Project to establish a transparency framework for climate change action and strengthen response capacity PA-1-3
P-2 Program to strengthen local government greenhouse gas emission reduction activities	Project to strengthen local government capacity to develop and update GHG inventory development and mitigation action plans P-2-1	Capacity building support project for local governments to update and strengthen implementation of LCCAP P-2-2 Financing the implementation of pilot projects to promote low-carbon technologies in rural areas P-2-3
P-3 Program to promote the establishment of Carbon Trading Schemes	Support Project for establishing Carbon Trading Framework P-3-1	Project to support the establishment of a carbon trading system and market P-3-2
P-4 Program to Promote Climate Resilience	Project for supporting the implementation of the National Adaptation Plan and its M&E P-4-1 Project to Support the Promotion and Promotion of Adaptation Project Development utilizing the PSF P-4-2	Support Project for Development of Adaptation Projects utilizing Climate Funds P-4-3 Support for adaptation projects utilizing GCF funds P-4-4

P-1	Program to establish a transparency framework and strengthen response capacity			
Objective	To strengthen the organizational capacity and capability of CCCs, collect and maintain climate change-related data, support the establishment of MRV and M&E systems for the implementation of climate change measures, and promote the strengthening of response capacity. In this way, the program will support the establishment of a transparent framework for climate change-related measures in the Philippines and improve the response capacity of relevant parties, thereby contributing to the implementation of the Paris Agreement in the Philippines.			
Impacts	The preparation of official documents such as GHG inventories, NCs, and BTRs, which have been delayed in their formulation and submission, will be smoothly implemented and their submission to the UN will be facilitated. Monitoring and evaluation of the implementation of climate change measures (mitigation and adaptation) will be implemented to ensure transparency and progress in meeting the Paris Agreement.			
	Candidate of cooperation project	Expected scheme	Issues to be solved	Period
P-1-1	Dispatch of the climate change experts	Technical cooperation (Dispatch of Experts)	Timely submission to UN; Needs to improve the coordination and collaboration between CCC and relevant ministries and agencies	Short
P-1-2	Project for Strengthening Human Resources and Organizational Capacity for Climate Change	Knowledge Co-Creation Program	Needs to enhance climate change-related knowledge and expertise of CCC staff (new and existing)	Short
P-1-3	Project to establish a transparency framework for climate change action and strengthen response capacity	Technical Cooperation Project	Needs to establish institutions and systems to ensure transparency related to climate change measures	Short /Mid

P-1 Dispatch of the climate change experts

Tentative program title	Program to establish a transparency framework and strengthen response capacity
Applicable JICA scheme	Technical cooperation (Dispatch of Experts)
Background	Documents required to be submitted to UN (NC, BUR, BTR, etc.) should be submitted in timely manner Needs to improve smooth cooperation and coordination with relevant ministries and agencies Needs to enhance capacity for review of PSF proposals
Project Outline Overall goal	Enhanced CCC capacity will facilitate implementation of climate change measures (mitigation and adaptation) and promote decarbonization and resilience in the Philippines.
Purpose, outcomes	Strengthening the organizational capacity of CCCs and ensuring transparency in the implementation of climate change measures Rules and procedures necessary for the maintenance of documents to be submitted to the UN will be established Coordination between the CCC and relevant ministries and agencies will be facilitated. The review system for PSF proposals will be established and strengthened.
Expected outputs	Results of CCC's organizational capacity assessment, technical assistance needs assessment, and proposal on organizational capacity building program Development of guidelines for the formulation of required documents such as BTR and NC

	Development of a manual for liaison and coordination between CCC and relevant ministries and agencies, and establishment of a system Development of PSF proposal review guidebook and review group
Expected duration	3 years
Expected counterpart agency	CCC

P-2 Project for Strengthening Human Resources and Organizational Capacity for Climate Change

Tentative program title	Program to establish a transparency framework and strengthen response capacity
Applicable JICA scheme	Knowledge Co-Creation Program (KCCP) for Group and Region Focus Program
Background	It is necessary for CCC to increase the number of staff and to strengthen the capacity of newly hired staff (it is also necessary to raise the capacity of existing staff).
Project Outline Overall goal	Enhanced capacities of climate change policymaking and promotion in the Philippines, and progress in the country's decarbonization and resilience.
Purpose, outcomes	Executing a comprehensive institutional capacity assessment to identify the needs of improvement Utilize KCCP (environmental management: strengthening capacities to move forward with "nationally determined contributions" under the Paris Agreement, climate change adaptation, strengthening access to climate finance - theory and practice for practitioners, strengthening municipal capacity for decarbonized and sustainable urban and regional development) Increased understanding, knowledge and expertise on climate change of newly hired personnel as CCC staff Existing CCC staff will have a better understanding of climate change Project management capacity of CCC staff will be enhanced
Expected outputs	Improving the capacity of CCC staff
Expected duration	3 years
Expected counterpart agency	CCC

P-3 Project to establish a transparency framework for climate change action and strengthen response capacity

Tentative program title	Program to establish a transparency framework and strengthen response capacity
Applicable JICA scheme	Technical Cooperation Project
Background	Needs to establish institutions and systems to ensure transparency related to climate change measures
Project Outline Overall goal	Improving climate change policymaking and momentum in the Philippines to advance the country's decarbonization and resilience.
Purpose, outcomes	Institutions and systems necessary to ensure transparency of efforts related to climate change measures (mitigation and adaptation) by the CCC and related agencies in the Philippines will be established and formally institutionalized. In addition, support will be provided for the establishment of a tracking system for the CCET system in the Philippines, including linkage with budget execution status and tracking of external financial support. Understanding of transparency assurance will be improved, and procedures for MRV, M&E will be clarified and formally institutionalized. In addition, develop educational materials that will enable CCC staff to provide transparency education to their staff on their own and on a sustained basis.

Expected outputs	<p>Developing draft policies and guidelines on transparency through implementation of the proposed organizational capacity building program developed through the expert displacements, and implementing efforts to formalize the policies/guidelines</p> <p>Developing draft guidelines and standards for data preparation necessary for GHG inventory development, and implanting efforts to formalize the guidelines/standards</p> <p>Developing guidelines and guidance on MRV and M&E of mitigation and adaptation measures and establish an implementation system, and implanting efforts to formalize the guidelines</p> <p>Strengthening of the CCET system (tracking system development in coordination with budget execution status and external funding)</p> <p>Establish agreements, rules, etc. for transparency between CCC and relevant ministries and agencies</p> <p>Training materials to provide sustainable education to CCC staff</p>
Expected duration	3 years
Expected counterpart agency	CCC

<Reasons for the project selection>

P-1 Program to establish a transparency framework and strengthen response capacity

Indicator	Contents
Contribution to achievement of the Paris Agreement and NDC targets	<ul style="list-style-type: none"> - Promote the development and submission of documents related to the Paris Agreement, etc. - Establishment of a transparency framework required for the implementation of the Paris Agreement - Promote implementation of climate change measures (mitigation and adaptation) under the transparency framework, and promote reporting to the UN based on such measures.
Consistency with sector policies	<ul style="list-style-type: none"> - Strengthening the capacity of the CCC, the only climate change policy making body in the Philippines under the Climate Change Act, is essential to achieving the sector's policy goals and other objectives. - Transparency is an important element in the implementation of the Paris Agreement.
Urgency	It is necessary to proceed with the preparation and submission of documents required by the Paris Agreement and other agreements. For this purpose, it is necessary for the CCC to receive prompt and accurate information and data necessary for the preparation of these documents, etc., from the organizations concerned, and thus the urgency is high.
Status of support from other donors	No duplication with other donors, however, there is an initiative named Capacity-building Initiative for Transparency - Global Support Programme It is necessary to work close together to avoid duplication.
DAC evaluation criteria	<p>Relevance: High (Complementing the shortage of personnel and capacity on the CCC side, it meets the needs and is highly appropriate.)</p> <p>Coherence: Consistent with Paris Agreement compliance and national climate change promotion policies</p> <p>Effectiveness: to be verified</p> <p>Impact: High. Significant contribution to the implementation of the Paris Agreement in the Philippines</p>

Indicator	Contents
	Efficiency: Low (Since human resources development takes time) Sustainability: High (however, need to ensure sustainability by forming a foundation for maintaining CCC's organizational and human resource capacity during the expert dispatch period)
Consistency with Japanese government and JICA's policies	This cooperation will strengthen the human resources and organizational capacity of the CCC for the implementation of the Paris Agreement and NDC, thereby contributing to climate change mitigation. It will also contribute to the achievement of "the number of countries supported in the formulation/update of various climate change action plans and implementation by 2030" and "human resource development" in the cluster of "promotion of implementation of the Paris Agreement" in JICA's Global Agenda No. 16 on Climate Change Measures.
Inclusion of socially vulnerable population and gender perspective	Gender considerations in the composition of experts and trainees from CCC

P-2	Program to strengthen local government greenhouse gas emission reduction activities			
Objective	Improve the capacity of local governments to develop GHG inventories, select appropriate mitigation actions and calculate GHG emission reductions based on GHG inventories, and thereby facilitate a review of the targets and activities of mitigation actions in the LCCAP.			
Impacts	Grasping local GHG emissions will facilitate the selection of more appropriate mitigation actions and their implementation, leading to a reduction of GHG emissions in local areas. This will reduce GHG emissions in the Philippines as a whole and contribute to the achievement of the NDC; it will also enhance the effectiveness of the LCCAP and contribute to expanding the content of the current LCCAP, which tends to focus on adaptation activities (i.e., enhancing mitigation activities).			
	Candidate of cooperation project	Expected scheme	Issues to be solved	Period
P-2-1	Project to strengthen local government capacity to develop and update GHG inventory development and mitigation action plans	Technical Cooperation Project	Needs to strengthen capacity of local government to develop GHG inventories and select appropriate mitigation actions	Short
P-2-2	Capacity building support project for local governments to update and strengthen implementation of LCCAP	Technical Cooperation Project	Needs to strengthen local government capacity to update and implement LCCAP	Mid
P-2-3	Financing the implementation of pilot projects to promote low-carbon technologies in rural areas	Grant, Loan, JCM	Demonstration and dissemination of decarbonization technologies	Mid/Long

P-2-1 Project to strengthen local government capacity to develop and update GHG inventory development and mitigation action plans

Tentative program title	Program to strengthen local government greenhouse gas emission reduction activities
Applicable JICA scheme	Technical Cooperation Project
Background	Needs to make progress well in the GHG inventories preparation by local governments Needs to promote GHG inventories development, efficient and effective identification and review of mitigation actions in the LCCAP have not progressed well.

	Relative tools have been developed, but they are difficult to use for local government officials.
Project Outline Overall goal	Community-level GHG quantification sheets will be enhanced through expert technical assistance, and entity-level GHG quantification sheets and mitigation action identification and selection tools will be developed.
Purpose Outcomes	Improved user interface and experience design. Enhanced learning model within the CCC's capacity building program to include roll-out, retooling, capture of wider audience, and training of trainers. Enhanced capacity of LGUs to conduct GHG Inventory and to identify and develop mitigation actions.
Expected outputs	Community-Level GHG Inventory (Tool, Manual, and Learning Module) Entity-Level GHG Inventory Tool (Tool, Manual, and Learning Module) Community-Level Mitigation Action Identification and Selection Tool (Tool, Manual, and Learning Module) GHG inventories of the pilot LGUs will be developed using the tools. Mitigation actions of pilot LGUs will be reviewed and updated, based on the GHG inventories developed using the tools Enhanced Local Climate Change Action Plan of pilot LGUs Annual Investment Programs with identified mitigation actions of LGUs
Expected duration	3 years
Expected counterpart agency	CCC

P-2-2 Capacity building support project for local governments to update and strengthen implementation of LCCAP

Tentative program title	Program to strengthen local government greenhouse gas emission reduction activities
Applicable JICA scheme	Technical Cooperation
Background	Needs to select and promote the implementation of appropriate mitigation and adaptation measures in the development and updating of local government LCCAPs
Project Outline Overall goal	GHG inventories of local governments are developed and appropriate mitigation actions are selected to advance the decarbonization and resilience of the Philippines as a whole.
Purpose Outcomes	LCCAPs of selected pilot municipalities are updated, appropriate mitigation measures are selected, and implementation plans are developed
Expected outputs	Updating the LCCAP for the pilot local governments Implementation plan for appropriate mitigation measures
Expected duration	3 years
Expected counterpart agency	CCC
Other relevant agencies	DILG, LGA, pilot local governments

P-2-3 Financing the implementation of pilot projects to promote low-carbon technologies in rural areas

Tentative program title	Program to strengthen local government greenhouse gas emission reduction activities
Applicable JICA scheme	Grant, loan, JCM
Background	CCC is implementing the afforestation project as a pilot activity and using it as a model project to demonstrate to other agencies. In the future, CCC intends to implement pilot activities in areas other than forestry, and there are possibilities in areas such as energy conservation.

	Needs of local governments to strengthen information and knowledge about new technologies and measures and the effectiveness of mitigation actions, and to promote consideration of appropriate mitigation activities.
Project Outline	
Overall goal	Facilitate the introduction of low-carbon technologies and measures to decarbonize the country
Purpose	LCCAPs of selected pilot municipalities are updated, appropriate mitigation measures are selected, and implementation plans are developed
Outcomes	
Expected outputs	Pilot projects utilizing Japanese low-carbon technologies will be implemented. The effects of Japanese low-carbon technologies and points to keep in mind when introducing them will be shared, and a plan will be formulated for their dissemination
Expected duration	3 years
Expected counterpart agency	CCC
Other relevant agencies	DILG, pilot local governments

<Reasons for the project selection>

P-2 Program to strengthen local government greenhouse gas emission reduction activities

Indicator	Contents
Contribution to achievement of the Paris Agreement and NDC targets	By ensuring transparency of GHG emissions in local areas and promoting GHG emission reductions, it will lead to GHG emission reductions in the Philippines as a whole. This will contribute to a significant contribution to the achievement of the DC and compliance with the Paris Agreement.
Consistency with sector policies	The program is highly consistent as it is an initiative that contributes to the development and implementation of the LCCAP, which is required to be developed under the Climate Change Act. Promotion of climate change mitigation in other sectors, such as energy and industry, is essential for implementing the Paris Agreement and achieving NDC targets and is highly consistent with related sector policies.
Urgency	The actual mitigation actions will be based on the results of the GHG inventory development, and the review of mitigation actions based on the inventory. The urgency of this initiative is high with only a few years remaining until 2030.
Status of support from other donors	No duplication with other donors.
DAC evaluation criteria	Relevance: High (It is highly appropriate as it supports the promotion of climate change mitigation in the country to be implemented in local areas) Coherence: Consistent with the sector's climate change mitigation policies Effectiveness: It is necessary to consider how to improve capacity in local government and ensure reliable implementation before implementing the program. Impact: to be verified Efficiency: Low (Capacity building in rural areas takes time and takes longer to take effect) Sustainability: Systems to ensure the maintenance of capacity and implementation systems in local government need to be considered before implementation
Consistency with Japanese government and JICA's policies	This program will promote GHG emission reduction actions in local communities and may lead to the introduction and deployment of technologies and initiatives of Japanese companies that contribute to mitigation activities, which is consistent with the Japanese government's climate change measures. It will also contribute to the achievement of "the number of countries supported in the formulation/update of various climate change action plans and implementation

Indicator	Contents
	by 2030" and "human resource development" in the cluster of "promotion of implementation of the Paris Agreement" and "GHG emission reduction and absorption enhancement [mitigation measures]" in the "Co-benefits Climate Change Measures" cluster in JICA's Global Agenda No. 16 on Climate Change Measures.
Inclusion of socially vulnerable population and gender perspective	Inclusion of vulnerable groups and women in the review and implementation of mitigation actions at the local government and community levels

P-3	Program to promote the establishment of Carbon Trading Schemes			
Objective	Establish a carbon trading system in the Philippines by developing a framework and guidelines for carbon trading as well as supporting the establishment of a carbon trading market.			
Impacts	By indicating the national direction for carbon trading, it will be possible to promote the use of carbon credits investigations in other sectors in a unified manner and contribute to GHG emission reductions by promoting the introduction of a carbon trading system in the Philippines.			
	Candidate of cooperation project	Expected scheme	Issues to be solved	Period
P-3-1	Support Project for establishing Carbon Trading Framework	Technical cooperation (Dispatch of Experts)/Technical Assistance project	Needs to unify national approach to carbon trading	short
P-3-2	Project to support the establishment of a carbon trading system and market	Technical cooperation (Dispatch of Experts)/Technical Assistance project	Carbon trading system or carbon market should be in place	Mid

P-3-1 Support Project for establishing Carbon Trading Framework

Tentative program title	Program to promote the establishment of Carbon Trading Schemes
Applicable JICA scheme	Technical cooperation (Dispatch of Experts)/Technical Assistance project
Background	In the Philippines, studies and efforts to utilize carbon credits are underway in individual sectors, such as the forestry sector. A framework for carbon trading should be established at the national level, and those efforts have should be unified as a country.
Project Outline	Carbon trading frameworks will be established, and carbon credit trading will be promoted to enhance decarbonization efforts
Overall goal	
Purpose	A framework for carbon trading in the Philippines will be established, and efforts to create a national carbon trading market will begin, organically linking with carbon trading mechanisms that have been studied in various sectors.
Outcomes	
Expected outputs	Establishment of a Carbon Trading Framework Develop a roadmap for establishing a carbon trading market
Expected duration	3 years
Expected counterpart agency	CCC
Other relevant agencies	DOF, DENR, DA, DOE, DTL, DOTr

P-3-2 Project to support the establishment of a carbon trading system and market

Tentative program title	Program to promote the establishment of Carbon Trading Schemes
Applicable JICA scheme	Technical cooperation (Dispatch of Experts)/Technical Assistance project

Background	Carbon trading system or carbon trading market should be developed in the Philippines.
Project Outline Overall goal	The establishment of a carbon trading system and carbon market will activate carbon trading in the Philippines, thereby promoting GHG emission reduction projects and other initiatives that will contribute to the achievement of the NDC.
Purpose Outcomes	Carbon trading scheme and carbon trading market will be established and carbon trading will start in the Philippines.
Expected outputs	Establishment of carbon trading scheme (development of laws, guidelines, etc.) Establishment of a domestic carbon market
Expected duration	3 years
Expected counterpart agency	CCC
Other relevant agencies	DOF, DENR, DA, DOE, DTI, DOTr

<Reasons for the project selection>

P-3 Program to promote the establishment of Carbon Trading Schemes

Indicator	Contents
Contribution to achievement of the Paris Agreement and NDC targets	The introduction of carbon trading will create incentives to implement GHG emission reduction projects and promote project formation, which will lead to GHG emission reductions in the Philippines as a whole, thus contributing to the achievement of the NDC.
Consistency with sector policies	Studies have been ongoing in the Philippines to institute an appropriate carbon pricing instrument (CPI) to address climate change. DOF is also working on a study to introduce carbon pricing, including carbon trading, consistent with sector policies
Urgency	In other sectors, such as forestry and agriculture, studies on the use of sectoral carbon credits are in progress. On the other hand, the urgency is high because the national policy has not been decided and therefore studies are not being conducted in a unified manner.
Status of support from other donors	WB provides assistance to DOF on carbon pricing UNDP provides support to DENR to study carbon credit system in forest sector ADB supports DA to study carbon trading using credits for CO ₂ sequestration by soil
DAC evaluation criteria	Relevance: The effectiveness of carbon trading schemes has been internationally recognized and is highly justified. Coherence: Highly consistent with the sector's climate change mitigation policies. Impact: to be verified Efficiency: Middle (It will take time to develop laws, systems, etc.) Sustainability: There will be sustainability if the carbon market is up and running sustainably.
Consistency with Japanese government and JICA's policies	It is possible to utilize the knowledge and experience of the Japanese domestic carbon trading system that has been implemented to date. Also, knowledge on preventing double counting, which is under consideration by JCM, can be effectively utilized. This program will strengthen the capacity of local governments and communities to implement the Paris Agreement and NDC, thereby contributing to climate change mitigation. It will also contribute to the achievement of "the number of countries supported in the formulation/update of various climate change action

Indicator	Contents
	plans and implementation by 2030" and "human resource development" in the cluster of "promotion of implementation of the Paris Agreement" and "GHG emission reduction and absorption enhancement [mitigation measures]" in the "Co-benefits Climate Change Measures" cluster in JICA's Global Agenda No. 16 on Climate Change Measures.
Inclusion of socially vulnerable population and gender perspective	-

P-4	Program to Promote Climate Resilience			
Objective	Promote adaptation to climate change. Support the resilience of the Philippines to climate change by supporting the implementation of adaptation activities and their M&E as identified in the National Adaptation Plan, strengthening local adaptation actions by promoting the use of the PSF, and supporting the use of climate finance for the implementation of larger or broader adaptation actions.			
Impacts	It can contribute to the promotion of adaptation actions in NAPs and LCCAPs, which can mitigate current climate change impacts, advance preparedness for possible future climate change impacts, and contribute to the protection of human life and property.			
	Candidate of cooperation project	Expected scheme	Issues to be solved	Period
P-4-1	Project for supporting the implementation of the National Adaptation Plan and its M&E	Technical Cooperation Project	Needs to enhance knowledge and experience in ensuring implementation and monitoring and evaluation of adaptation actions positioned in the NAP released in December 2023	Short
P-4-2	Project to Support the Promotion and Promotion of Adaptation Project Development utilizing the PSF	Technical Cooperation Project	Needs to improve quality of proposals and project itself submitted to PSF	Short
P-4-3	Support Project for Development of Adaptation Projects utilizing Climate Funds	Technical Cooperation Project	Needs to enhance knowledge to utilize climate funds	Middle
P-4-4	Support for adaptation projects utilizing GCF funds	Technical Cooperation Project	Needs to enhance f capacity to access climate funds	Middle

P-4-1 Project for supporting the implementation of the National Adaptation Plan and its M&E

Tentative program title	Program to Promote Climate Resilience
Applicable JICA scheme	Technical Cooperation
Background	For the NAP, which will be released at the end of 2023, steady implementation based on the plan is required. In addition, an M&E scheme should be established and implemented to ensure transparency
Project Outline	By implementing the individual adaptation activities described in the NAP, the project will contribute to overcoming vulnerability to climate change. In addition, the implementation of M&E will contribute to ensuring transparency
Overall goal	
Purpose	A framework is in place for implementing entities to review, select, and implement the various adaptation actions outlined in the NAP, including the formulation of implementation plans and access to funds necessary for implementation.
Outcomes	M&E guidelines and procedures will be developed.

Expected outputs	Implementation plans and funding necessary for implementation will be identified for pilot activities selected from the various adaptation actions in the NAP. M&E guidelines and procedures
Expected duration	3 years
Expected counterpart agency	CCC
Other relevant agencies	DENR, DA, DOE

P-4-2 Project to Support the Promotion and Promotion of Adaptation Project Development utilizing the PSF

Tentative program title	Program to promote the establishment of Carbon Trading Schemes
Applicable JICA scheme	Technical Cooperation
Background	Needs to improve quality of proposals submitted to the PSF, with significant differences between on-site and proposal content, necessity of progress in preparation, etc. Needs to strengthen expertise in reviewing proposals conducted by CCC and DOF, which hinders review activities
Project Outline Overall goal	Adaptation activities carried out in local areas will be facilitated by the implementation of the PSF, making the region and the nation more resilient to climate change.
Purpose Outcomes	Improve the quality of PSF proposals Establish a system for reviewing proposals and summarize key points to consider when reviewing proposals Improvement of the PSF scheme to make it easier to utilize
Expected outputs	Develop guidance and collection of tips on proposal preparation Development of implementation guidelines and structure for review Review of target scope with a view to expanding the size of the fund (including M&E of previously approved projects), review of the system and proposals for improvement
Expected duration	3 years
Expected counterpart agency	CCC
Other relevant agencies	DOF, DILG, LGUs, LGA

P-4-3 Support Project for Development of Adaptation Projects utilizing Climate Funds

Tentative program title	Program to promote the establishment of Carbon Trading Schemes
Applicable JICA scheme	Technical Cooperation
Background	Philippine is vulnerable to climate change, and adaptation measures need to be implemented in various sectors and regions, but there are needs to secure more funds to promote the implementation of adaptation measures.
Project Outline Overall goal	Philippine is vulnerable to climate change, and adaptation measures need to be implemented in various sectors and regions, but there are needs to secure more funds to promote the implementation of adaptation measures.
Purpose Outcomes	Climate change adaptation projects utilizing GCF are formulated and approved as GCF projects
Expected outputs	Funding proposal to be submitted to GCF
Expected duration	3 years
Expected counterpart agency	CCC
Other relevant agencies	Pilot project implementing entity

P-4-4 Support for adaptation projects utilizing GCF funds

Tentative program title	Program to promote the establishment of Carbon Trading Schemes
Applicable JICA scheme	Technical Assistance Project
Background	Philippine is vulnerable to climate change, and adaptation measures need to be implemented in various sectors and regions, but there are needs to secure more funds to promote the implementation of adaptation measures.
Project Outline Overall goal	Facilitate the implementation of climate change adaptation measures and increase the country's resilience to climate change
Purpose Outcomes	Improve the quality of PSF proposals Establish a system for reviewing proposals and summarize key points to consider when reviewing proposals Improvement of the PSF scheme to make it easier to utilize
Expected outputs	GCF projects are implemented in sectors lacking funds
Expected duration	5 years
Expected counterpart agency	CCC
Other relevant agencies	Pilot project implementing entity, JICA (AE)

<Reasons for the project selection>

P-3 Program to promote the establishment of Carbon Trading Schemes

Indicator	Contents
Contribution to achievement of the Paris Agreement and NDC targets	Promoting climate change adaptation actions will help reduce vulnerability to climate change and protect lives and assets, thereby contributing significantly to the achievement of the NDC.
Consistency with sector policies	Climate change adaptation is a high priority for the Philippines which is highly vulnerable to climate change impacts, and is highly consistent with the various policies of the sector.
Urgency	It is urgent because the climate change impacts are already occurring in many places and responding to them is an urgent task.
Status of support from other donors	Various donors and MDBs are providing assistance in adaptation-related areas such as disaster management, agriculture, and ecosystem conservation
Economy	The adaptation project requires a lot of money to implement, but it is essential from the viewpoint of protecting human lives and assets.
DAC evaluation criteria	Relevance: Highly relevant as the activity is designed to attract adaptation actions to climate change Coherence: Consistent with the sector's policies on climate change adaptation policies. Impact: Ensuring effectiveness by promoting efforts to plan and implement climate change adaptation measures, as well as supporting the establishment of M&E mechanisms Efficiency: Middle (It takes some time to realize the effects of implementing adaptation projects.) Sustainability: Highly sustainable because adaptation measures take into account medium- and long-term climate change impacts.
Consistency with Japanese government and JICA's policies	Regarding climate change adaptation measures, Japan's past activities and measures in the field of disaster prevention and water resources are likely to be effective, leading to the transfer of Japanese technologies and measures, which is consistent with the Japanese government's climate change measures.

Indicator	Contents
	This program will contribute to supporting adaptation to climate change. It will also contribute to the achievement of “the number of countries supported in the formulation/update of various climate change action plans and implementation by 2030” and “number of projects that use climate change support tools and promote co-benefits-based measures by 2030” “Double the contribution to adaptation measures by 2030” “Beneficiary population (380 million people)” in the “Co-benefits Climate Change Measures” cluster in JICA’s Global Agenda No. 16 on Climate Change Measures.
Inclusion of socially vulnerable population and gender perspective	Promotion of climate change adaptation measures should be implemented with consideration for socially vulnerable groups and gender. Since this cooperation can be implemented in a socially vulnerable and gender-sensitive manner, and can make a significant contribution to these issues

2) Evaluation of the cooperation program

Table 3-15 Evaluation of the possible programs (Paris Agreement Implementation)

Cooperation program	Climate change impact		Impacts	Possibility of utilizing Japanese knowledge and technology
	Mitigation	Adaptation		
P-1 Program to establish a transparency framework and strengthen response capacity				
Dispatch of the Climate change experts	By improving the understanding and knowledge of climate change-related issues of CCC and related organizations, mitigation actions will be promoted and contribute to GHG emission reductions. Transparency will also ensure a high level of confidence in the effectiveness of GHG emission reductions.	Improvement of climate change-related understanding and knowledge of CCC and related institutions will promote adaptation actions, reducing vulnerability of human lives, assets and reducing climate risks.	Facilitate the smooth implementation and submission to the UN of official documents such as GHG inventories, NCs, BURs and BTRs, which have been delayed in their development and submission. Monitoring and evaluation of the implementation of climate change measures (mitigation and adaptation) will be carried out to ensure transparency and progress in meeting the Paris Agreement.	By dispatching experts who understand Japan's technology and policies, it is possible to share the knowledge that Japan has accumulated to date.
Project for Strengthening Human Resources and Organizational Capacity for Climate Change				By providing educational materials that incorporate knowledge and information on Japanese technologies and policies, including site visits, networking with Japanese stakeholders, it is possible to share the technologies, knowledge, etc. that Japan has accumulated to date.
Project to establish a transparency framework for climate change action and strengthen response capacity				It is possible to utilize the results of technical cooperation that the Japanese government and JICA have conducted in other developing countries.

Cooperation program	Climate change impact		Impacts	Possibility of utilizing Japanese knowledge and technology
	Mitigation	Adaptation		
P-2 Program to strengthen local government greenhouse gas emission reduction activities				
Project to strengthen local government capacity to develop and update GHG inventory development and mitigation action plans	Promoting mitigation actions in rural areas will promote GHG emission reductions.	N/A	By grasping local GHG emissions, more appropriate mitigation actions can be selected and implemented, leading to a reduction in local GHG emissions, which in turn will reduce GHG emissions in the Philippines as a whole and contribute to the achievement of the NDC.	It is possible to utilize the results of technical cooperation that the Japanese government and JICA have conducted in other developing countries. It is also possible to promote technologies and initiatives of Japanese companies that contribute to mitigation activities.
Capacity building support project for local governments to update and strengthen implementation of LCCAP		N/A		
Financing the implementation of pilot projects to promote low-carbon technologies in rural areas	GHG emission reductions will be realized through pilot projects	N/A		
P-3 Program to promote the establishment of Carbon Trading Schemes				
Support Project for establishing Carbon Trading Framework	Establishment of a carbon trading system and market which will provide incentives for mitigation actions and contribute to GHG emission reductions.	N/A	The project will enable the Philippines to promote a unified approach to the utilization of carbon credits, which are currently under consideration in other sectors. At the same time, it will contribute to GHG emission reductions by promoting the introduction of a carbon trading system in the Philippines.	By cooperating with Japan's Department of the Environment, effective use can be made of Japan's knowledge and experience, including knowledge of the J-Credit System and the prevention of double counting that is being considered under the JCM.
Project to support the establishment of a carbon trading system and market		N/A		
P-4 Program to Promote Climate Resilience				
Project for supporting the implementation of the National Adaptation Plan and its M&E	N/A	Reducing climate risks by promoting the implementation of adaptation measures positioned in the NAP	It can contribute to promote the adaptation actions identified in the NAP and LCCAP, which can mitigate current climate change impacts, promote preparedness for possible future climate change impacts, and contribute to the protection of human life and property.	Regarding climate change adaptation measures, Japan's past activities and measures in the disaster prevention and water resources sectors are likely to be effective.
Project to Support the Promotion and Promotion of Adaptation Project Development utilizing the PSF	N/A	Reducing climate risks by promoting PSFs		
Support Project for Development of Adaptation Projects utilizing Climate Funds	N/A	Reducing climate risks through GCF Project Implementation		
Support for adaptation projects utilizing GCF funds	N/A			

(2) Energy

1) Possible program concepts

In the energy sector, the total of 6 cooperation programs were considered in each six subsectors: energy statistics and planning, conventional energy, renewable energy, transmission, distribution, and electrification, energy efficiency and conservation, and alternative fuels, emerging technologies.

Table 3-16 Possible cooperation programs and scenario (energy sector)

Cooperation Program	Cooperation Project	
	Short term	Mid-to-long term
E-1 Energy Data Management Capacity Improvement Program	Development and implementation of Energy Balance cooperation in regionalizing energy database E-1-1	Table Management System (EBTMS) and energy data management and utilization
	JICA Knowledge Co-Creation Program for E-1-2	
E-2 Energy Transition Capacity Enhancement Program	Natural Gas Utilization Capacity Enhancement and Hydrogen Fuel Transition Project E-2-1	Funding Project for Natural Gas Infrastructure and Hydrogen Fuel Transition for Gas-Fired Power Plants E-2-2
	Project to develop hydropower (Large Impounding) and pumped storage M/P for climate change adaptation including the aspect of climate change adaptation in the Philippines E-3-1	Financial Cooperation Project for Renewable Energy Deployment E-3-2
E-3 Renewable Energy Investment Promotion Program	Cooperative Project for implementation in line with policy after ADB assistance in geothermal power E-3-3	
	JICA Knowledge Co-Creation Program on: Promotion of Hydropower Development Acceleration/Promotion of Geothermal Energy Investment E-3-4	
E-4 Transmission and Distribution and Electrification Capacity Enhancement Program	Energy Regulatory Commission (ERC) capacity enhancement Project E-4-1	
	Capacity development Project to establish smart grid E-4-2	
	Improvement of sustainability for remote island power infrastructure E-4-3	Resilient x hybrid power supply demonstration Project E-4-4
	Feasibility study on interconnection of Off-Grid islands into the National Transmission Grid E-4-5	Project for interconnection of Off-Grid islands into the National Transmission Grid E-4-6
	JICA Knowledge Co-Creation Program on Renewable Energy and Diesel Power Operation in Small Islands Stabilizing Power Systems to Introduce Various Kinds of Renewable Energy etc., E-4-7	
	Financial support for total electrification E-4-8	
E-5 Energy Efficiency and Conservation Capacity Enhancement Program	Feasibility Study on ZEB E-5-1	Project to strengthen the capacity to promote ZEB measures E-5-2
	JICA Knowledge Co-Creation Program on: Promotion of Energy Efficiency and Conservation etc. E-5-4	Finance to promote EE&C and ZEB dissemination E-5-3
E-6 Programs to promote the introduction and diffusion of alternative fuels and emerging technologies	Policy and roadmap formulation on E-6-1	Demonstration Project on biomass-derived SAF plants E-6-2
		PTL SAF Plant Demonstration Project E-6-3
		Financial Cooperation Project on Alternative Fuels Promotion E-6-4
	Development of hydrogen vision/roadmap and capacity enhancement project E-6-5	Green Hydrogen Production Demonstration Project E-6-6
	JICA Knowledge Co-Creation Program on: Promotion of Hydrogen Energy Use -Energy Policy Towards Hydrogen-Based CO2 Free Society- etc. E-6-7	
	Feasibility study to introduce CCUS E-6-8	Master plan for introducing CCS, institutional design, and capacity enhancement Project E-6-9

In the Philippines, which has a policy of private sector-led development in the energy sector, the entry of Japanese private companies and technologies into the Philippines is an important item for consideration. The Japan Green Investment Corp. for Carbon Neutrality (JICN), a semi-private fund led by the Ministry of the Environment Japan, provides financial support for climate-related energy projects. Collaboration can be sought in some of the cooperation projects in introducing technologies such as renewable energy, energy efficiency, SAF, ZEB, hydrogen, ammonia, and CCUS.

E-1 Energy Data Management Capacity Improvement Program				
Objective	Based on the knowledge gained from the "Philippines Energy Planning Support Study" conducted by JICA in 2008, an energy balance sheet management system (EBTMS) will be developed to detail and localize the energy database, and to establish and facilitate its operation system.			
Spread effect	Although solving this issue will not directly lead to GHG emission reductions, it will not only deepen and facilitate data analysis within the DOE by increasing the detail and sophistication of data and improving accessibility of data, but will also benefit local officials and private companies that use the data. This will encourage the development of plans (e.g., PEP) and measures based on solid data, as well as investments by related entities in general, and is expected to have a certain spillover effect in promoting climate change adaptation and mitigation activities in each sub-sector within the energy sector.			
	Possible cooperation projects	Applicable JICA support scheme	Issues to be solved	Implementation period
E-1-1	Development and implementation of Energy Balance Table Management System (EBTMS) and cooperation in regionalizing energy database	Technical Cooperation or Technical Cooperation (Dispatch of Experts)	Limitation of capacity to collect, analyze, and make energy data usable; limitation of institutions related to proper planning, implementation, and monitoring; data collection in non-uniform formats	short term
E-1-2	JICA Knowledge Co-Creation Program for energy data management and utilization	Knowledge Co-Creation Program	Limited capacity to collect, analyze, and make energy data usable; limited capacity related to energy modeling and other analytical methods; data collection in non-uniform formats	short term

A project mentioned below was considered as a potential candidate for an individual cooperation project within the aforementioned cooperation program.

E-1-1 Development and implementation of Energy Balance Table Management System (EBTMS) and cooperation in regionalizing energy database

Name of Cooperation Program (tentative)	Energy Data Management Capacity Improvement Program
Anticipated JICA Scheme	Technical Cooperation or Technical Cooperation (Dispatch of Experts)
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> • Limitation of capacity to collect, analyze, and make energy data usable
Project Outline Overarching Goals	<ul style="list-style-type: none"> • Prepare EBTs based on inputs from technical bureaus and services within the DOE to serve as inputs to the components of the PEP, especially the energy situation and energy supply and demand outlook for the Philippines. • Facilitate and strengthen the implementation and update of the Philippine Energy Plan (PEP) to enhance confidence in the path to energy security.

Objectives and Outcomes	Improve energy statistics and analysis capacity by government agencies and regional institutions
Outputs	<ul style="list-style-type: none"> • Develop energy balance table management system and online platform and data collection procedures/protocols • Regional database • Establish methods for energy data collection and processing at the regional level
Cooperation period	3 years
Anticipated C/P Institutions	DOE EPPB
Other related institutions	DOE and other government agencies, energy companies
Matters to be considered in implementation	In considering an energy balance table management system, a mechanism for regularly updating the energy balance table should also be considered.

<Reasons for selecting this program>

Contribution to support achievement of Paris Agreement and NDC	Although it does not directly reduce GHG emissions, and it is difficult to quantitatively estimate the effect, it is considered to make a certain contribution by ensuring the certainty of the plan to achieve the NDC and improving its implementation capacity, which will spill over to the regional level.
Consistency with sector policies	Although not consistent with the policy itself, it will contribute to the plan feasibility of the Philippine Energy Plan (2020-2040), which is the basis of the policy.
Urgency	It is also necessary to increase the certainty of achieving the PEP, but it is not considered urgent.
Status of support from other donors	Support from ETC is available, but limited as it only provides a platform.
DAC 6 items	<p>Relevance: Relatively high (meets the needs)</p> <p>Consistency: High (consistent with "(1) Strengthening the Foundations for Sustainable Economic Growth" in the Priority Areas (Medium-term Objectives) of the Development Cooperation Policy)</p> <p>Effectiveness: Under consideration</p> <p>Impact: Low (spillover effects are qualitative and do not contribute to direct GHG emission reductions)</p> <p>Efficiency: Under consideration</p> <p>Sustainability: High (as PEP renewal will continue)</p>
Consistency with Japanese government and JICA policies	Consistent with the promotion measures to make renewable energy the main source of power in GHG emission reduction and absorption enhancement [mitigation measures].
Socially vulnerable groups, gender	Project content should take into consideration the GAD CHECKLIST FOR THE ENERGY SECTOR, which is applicable to DOE project selection.

E-2	Energy Transition Capacity Enhancement Program
Objective.	METI (JOGMEC) will support natural gas infrastructure development that contributes to smooth energy transition in collaboration with the LNG Value Chain Formation Promotion and Natural Gas Cooperation Training Program, AETI, and the Asian Zero Emission Community (AZEC) Initiative. DOE capacity building will be implemented in conjunction with institutional and policy support as exemplified by the development of a master plan for natural gas utilization and a roadmap for hydrogen utilization in gas-fired power generation, as well as support for the promotion of private sector investment in terms of financial cooperation.
spread effect	In the current Clean Energy Scenario of PEP, gas-fired power generation is expected to account for 15.93% of the energy mix by 2040, which is about half the amount of carbon dioxide emissions of coal-fired power generation, so its reduction effect is very large. In addition, since PEP's CES presents a future energy mix that anticipates the achievement of NDC, the introduction of the above gas-fired power generation will greatly contribute to the achievement of NDC. In addition, if the use of hydrogen related to gas-fired power generation can be promoted, further low-carbon emissions will be realized, and further implementation of initiatives using the climate change budget is highly likely to be realized.

	Possible cooperation projects	Applicable JICA support scheme	Issues to be solved	Implementation period
E-2-1	Natural Gas Utilization Capacity Enhancement and Hydrogen Fuel Transition Project	Technical Cooperation	Limitation of knowledge in technical, legal, and financial aspects of natural gas, expansion of introduction of natural gas-fired power generation, smooth implementation of LNG imports, expansion of natural gas utilization and development of necessary infrastructure	short term
E-2-2	Funding Project for Natural Gas Infrastructure and Hydrogen Fuel Transition for Gas-Fired Power Plants	Overseas investments and loans, PPP	Limitation of private investment in the implementation of natural gas downstream infrastructure	medium-term

A project mentioned below was being considered as a potential candidate for an individual cooperative project within the aforementioned program.

E-2-1 Natural Gas Utilization Capacity Enhancement and Hydrogen Fuel Transition Project

Name of Cooperation Program (tentative)	Energy Transition Capacity Enhancement Program
Anticipated JICA Scheme	Technical Cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> Malampaya, the only gas field in the country, will be utilized until the late 2030s but is limited to meet all future domestic demand Philippine Energy Plan (PEP) projects significant penetration by 2040 of gas-fired power generation, which has about half the GHG emissions of coal and can be used as a base load replacement for coal Limitation of knowledge in technical, legal, and financial aspects of natural gas
Project Outline Overarching Goals	Gas-fired power generation will be promoted as a power source for energy transition
Objectives and Outcomes	Capacity for planning and implementation of natural gas utilization will be strengthened.
Outputs	<ul style="list-style-type: none"> Understanding of national prospects for natural gas utilization Roadmap for hydrogen utilization in gas-fired power generation Master Plan for Natural Gas Utilization Capacity strengthening to promote natural gas related projects
Cooperation period	3 years
Anticipated C/P Institutions	DOE OIMB
Other related institutions	PNOC/ DOE EPPB
Matters to be considered in implementation	<p>Roadmap for transition to hydrogen-only firing in gas-fired power plants, etc., should be considered when implementing support, whether it should be done through cooperation on hydrogen or through this program.</p> <p>Incorporate Capacity building project to OIMB on improving biofuel blending ratio in petroleum products as needed (see below).</p> <ul style="list-style-type: none"> ➤ Economic analysis of the impact of higher biofuel blends on petroleum products ➤ Exploration of alternative biofuel sources beyond coconut, molasses, and sugarcane ➤ Innovation in feedstock production for biofuel sources through collaboration with DOE-REMB and the Department of Agriculture ➤ Capability training to stay updated on standards and trends in the harmonization of the petroleum industry.

<Reasons for selecting this program>

Contribution to support achievement of Paris Agreement and NDC	The introduction and expansion of 18,883 MW of natural gas-fired power generation by 2040 will contribute directly to NDC. The introduction and expansion of natural gas-fired power generation is planned to account for 15.93% of the energy mix, and its GHG emission reduction effect will be very large, as its CO2 emissions will be about half of those of coal-fired power generation. If the use of hydrogen in gas-fired power generation advances at an early stage, it will lead to further GHG emission reductions.
Consistency with sector policies	This is consistent with the Philippines Energy Plan (2020-2040), Downstream Natural Gas Roadmap (2017-2040), and Natural Gas Development Plan.
Urgency	In order to achieve the PEP's 2040 power supply structure, it will take time to install gas-related facilities, so it is necessary to start early. Therefore, the urgency is high.
Status of support from other donors	One project from METI/USTDA and one from ADB are under implementation, and although one project from METI and one from ADB are scheduled to be supported, there is no significant contact between this initiative and ADB.
DAC 6 items	Relevance: High (consistent with needs and policies) Consistency: High (consistent with "(1) Strengthening the foundations for sustainable economic growth" in the priority areas (medium-term objectives) of the Development Cooperation Policy) Effectiveness: Under consideration Impact: High (will contribute significantly to the achievement of the NDC) Efficiency: Under consideration Sustainability: Relatively high (however, the introduction of gas-fired power generation may taper off in the future, depending on whether CCS and other technologies can be introduced)
Consistency with Japanese government and JICA policies	It is in line with various Japanese frameworks for foreign cooperation, such as the Asian Zero Emission Community (AZEC) concept and the Strategy for Overseas Deployment of Infrastructure Systems 2025, and is consistent with Japan's policies. For example, the "LNG Market Strategy (Department of Economy, Trade and Industry)" positions the expansion of LNG use in Asia and other emerging economies as a key objective of the "Enevolution Initiative" and calls for the maximization of Japan's experience and technology in energy policy and the development of a system for LNG use. The Energy and Natural Resources Development Agency (ERCA) is a non-profit organization that provides financial and human resources development support for LNG receiving terminal projects and natural gas power plant projects. The following is a summary of the GHG emission reduction/absorption measures. Consistent with the introduction and diffusion of low-carbon facilities and equipment to improve energy use efficiency in society as a whole in the promotion of GHG emission reduction and absorption [mitigation measures].
Socially vulnerable groups, gender	The project content should take into consideration the GAD CHECKLIST FOR THE ENERGY SECTOR, which is applicable to DOE project selection. In particular, the energy sector in the Philippines, as in other countries, favors male workers, possibly due to the notion that the work in this sector is more suited to men than women because it is demanding and dangerous. Efforts should be made to keep in mind that the persistent gender segregation in education and training limits women's access to technical and skills training opportunities.

E-3	Renewable Energy Investment Promotion Program
Objective	In addition to collecting, analyzing, and disclosing basic information on renewable energy such as large hydropower and geothermal power generation, which take a relatively long time to develop, a master plan will be formulated that outlines a concrete path forward, reduces private investment risk from a comprehensive perspective through capacity building and financial support, and aims to quickly make self-sustaining development environment.
spread effect	The introduction of renewable energy is aimed at 50% in the 2040 energy mix to meet the growing energy demand in the future and is considered to be the largest GHG emission reduction measure in the energy sector. For this reason, it has the greatest impact on achieving the NDC target . Hydropower can also be a climate change adaptation measure by addressing flood control and water utilization, and has spillover effects such as development of the agricultural

	sector and securing water supply for citizens. Geothermal can replace fossil fuel power generation as a base-load power source. In addition, the promotion of investment by the private sector through risk reduction is expected to influence the expansion of companies and create employment.			
	Possible cooperation projects	Applicable JICA support scheme	Issues to be solved	Implementation period
E-3-1	Project to develop hydropower (Large Impounding) and pumped storage M/P for climate change adaptation including the aspect of climate change adaptation in the Philippines	Technical Cooperation	Limitation of institutions related to proper planning, implementation, and monitoring; limitation of basic understanding of mitigation measures at the local government level; limitation of knowledge of mitigation opportunities and benefits, technical operations, and potential financing mechanisms in industry, commercial facilities, and communities; high costs of renewable energy deployment; introduction of pumped storage power Establishment of a market structure that encourages various types of subsidies and installations related to	short term
E-3-2	Financial Cooperation Project for Renewable Energy Deployment	Overseas investments and loans, PPP, Two-step Loans, JCM	Weak private investment in renewable energy	mid-term
E-3-3	Cooperative Project for implementation in line with proposed policy after ADB assistance in geothermal power	Technical Cooperation	Implementation of geothermal power generation project after ADB support	short term
E-3-4	JICA Knowledge Co-Creation Program on: <ul style="list-style-type: none"> Promotion of Hydropower Development Acceleration/Promotion of Geothermal Energy Investment 	Knowledge Co-Creation Program	High cost of introducing renewable energy, establishment of market structure to encourage various subsidies and introduction of pumped storage power generation, implementation of geothermal power projects after ADB support, weak private investment in renewable energy	short term

A project mentioned below was being considered as a potential candidate for an individual cooperative project within the aforementioned program.

E-3-1 Project to develop hydropower (Large Impounding) and pumped storage M/P for climate change adaptation including the aspect of climate change adaptation in the Philippines

Name of Cooperation Program (tentative)	Renewable Energy Investment Promotion Program
Anticipated JICA Scheme	Technical Cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> There is a limitation of basic information on large-scale hydropower that would contribute to future development. In the power generation business in the Philippines, which depends on investment by the private sector, especially hydroelectric power generation, which takes more than 10 years to develop, the potential map is an important document for the private sector to

	<p>refer to, including for selecting suitable sites. However, at present, only small-scale hydropower is available, and large-scale hydropower has not been developed.</p> <ul style="list-style-type: none"> Weak private investment in renewable energy (especially hydropower and geothermal)
Project Outline Overarching Goals	Promote the development of renewable energy in the Philippines, particularly hydropower and pumped storage with a capacity of 100 MW or more, to reduce greenhouse gas emissions and contribute to NDC.
Objectives and Outcomes	Contribute to the ambitious goal of a 50% renewable energy share by 2040 by identifying and supporting the deployment of large hydropower and pumped storage potential
Outputs	<ul style="list-style-type: none"> Inventory of hydropower and pumped storage above 100 MW Master Plan for the Introduction of Large Hydropower and Pumped Storage Capacity building for investment promotion of hydropower development
Cooperation period	3 years
Anticipated C/P Institutions	DOE REMB
Other related institutions	DOE EPPB, DA
Matters to be considered in implementation	<p>The DOST and NEDA expressed the hope that the program will also take into account the flood control and water utilization aspects. DENR-Climate Change Service (CCS) also requested that the vulnerability of the land as well as rainfall fluctuation and regional migration be considered in order to incorporate the aspect of adaptation into the implementation of the program.</p> <p>To be considered in the project, as it has been pointed out by UNDP that the need to take indigenous peoples into consideration is a barrier to expansion due to the uncertain feasibility of the project.</p>
Status of discussions with counterparties	This is a project that was proposed by the other DOE/Philippine government in 2023 JICA needs survey and under review by Japanese government as of this writing

E-3-3 Cooperative Project for Implementation in Line with Proposed Policy after ADB Assistance in Geothermal Power

Name of Cooperation Program (tentative)	Renewable Energy Investment Promotion Program
Anticipated JICA Scheme	Financing & Establishment of Geothermal Risk Mitigation Facility
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> Acquisition of seed funds for the establishment of the facility Third-party evaluators for screening of eligible RE Developers for the facility Training for DOE personnel that will be involved in the management and/or technical working group of the facility
Project Outline Overarching Goals	Reduce risks of the private sector's investment in geothermal power generation and promote the introduction of renewable energy
Objectives and Outcomes	Successful establishment and operations of a geothermal risk mitigation facility
Outputs	<ul style="list-style-type: none"> Training of DOE personnel that will be involved in the facility Establishment of accreditation criteria and process for third party evaluators Introduction to possible funding sources for the facility
Cooperation period	2-3 years
Anticipated C/P Institutions	DOE REMB
Other related institutions	DOF, ADB, CCC
Matters to be considered in implementation	It is necessary to begin by materializing the above content.
Status of discussions with counterparties	Only the first draft was shared by the DOE REMB, so it is listed in its original form.

<Reasons for selecting this program>

Contribution to support achievement of Paris Agreement and NDC	The energy sector is the largest GHG emitting sector in the Philippines, emitting 53.105 Mt CO ₂ e in 2010. The introduction of renewable energy is aimed at 50% in the energy mix in 2040 to meet the growing energy demand in the future, and is considered to be the largest emission reduction measure in the energy sector. In addition, the PEP's CES targets the introduction of an additional 500 MW of geothermal power and 16,000 MW of hydroelectric power by 2040, and achieving this goal is essential to achieving the NDC.
Consistency with sector policies	This goal is consistent with the Philippines Energy Plan (2020-2040), the National Renewable Energy Program (2020-2040), and the Renewable Energy Roadmap (2017-2040).
Urgency	The PEP and NREP have set a goal of doubling the current level of renewable energy by the year 2040. The PEP and NREP have set a goal of doubling the current level of renewable energy by 2040. Since large hydropower development generally takes more than 10 years in the Philippines due to complex land ownership and other obstacles, this project to conduct an initial study is highly urgent.
Status of support from other donors	Various donors such as UNDP, USTDA, WB, etc. are currently supporting or planning to support the project. ADB is supporting geothermal power and UNOPS is planning to support pumped storage power generation.
Economic efficiency	Not applicable
Investment Effectiveness	Not applicable
DAC 6 items	Relevance: High (consistent with needs and policies) Consistency: High (consistent with the improvement of the energy situation in "(1) Strengthening the Foundations for Sustainable Economic Growth" in the Priority Areas (Medium-term Objectives) of the Development Cooperation Policy) Effectiveness: to be verified Impact: to be verified Efficiency: to be verified Sustainability: High (because changes in precipitation areas are expected in terms of adaptation)
Consistency with Japanese government and JICA policies	It is consistent with various Japanese external cooperation frameworks, and is also consistent with policy, as it is expected to be used for emission reductions in developing countries, etc. (Bilateral Crediting Mechanism: JCM), as indicated in the Global Warming Prevention Plan. It is consistent with the promotion measures to make renewable energy a main source of power in the "Promotion of GHG Emission Reduction and Absorption [Mitigation Measures]".
Socially vulnerable groups, gender	The project content should take into consideration the GAD CHECKLIST FOR THE ENERGY SECTOR, which is applied to DOE project selection. In particular, gender mainstreaming in planning and policy making will be promoted, taking into consideration the male-dominated employment gap in the power industry, the limited influence of women in policy making, and women's participation in the development, use, and promotion of renewable energy.

E-4	Transmission and Distribution and Electrification Capacity Enhancement Program
Objective.	Accelerate the development of the main grid by expanding and strengthening the power grid, enhancing capacity to build smart grids, and supporting institutional formulation. In off-grid areas, the project will also realize the hybridization of power sources and improve disaster resilience through technology demonstration and capacity building, thereby improving sustainability from both climate change mitigation and adaptation measures.
spread effect	For the main grid, based on the future energy mix in the NREP, it is estimated that a one-year delay in the introduction of renewable energy will result in a decrease in renewable energy generation by less than 50,000 GWh in 2040, the final year of the project. Similarly, if the development of the power transmission and distribution network becomes more efficient and earlier, investment by companies that have been holding off on investment will be promoted, and if the introduction of renewable energy is accelerated by one year, the amount of natural gas generation in 2040 will increase by slightly less than 50,000 GWh. This will reduce the operating rate of natural gas-fired power generation and contribute to GHG reductions by a considerable amount. In addition, the emergence of resource aggregation businesses is expected to promote employment and provide economic benefits.

	Total power generation in off-grid areas will be 1618 GWh in 2020, and since the fuel source is 91% petroleum (diesel), it will contribute significantly to this reduction. From the perspective of adaptation, if a robust energy infrastructure can be built against the frequent and severe disasters caused by climate change, it can contribute to NDC in terms of ensuring stable energy access in the region. In addition, reducing the proportion of diesel power generation on remote islands will reduce diesel procurement and mitigate the impact of supply chain disruptions due to disasters, etc., while reducing fuel costs, thereby enhancing the overall sustainability of remote island power sources.			
	Possible cooperation projects	Applicable JICA support scheme	Issues to be solved	Implementation period
E-4-1	Energy Regulatory Commission (ERC) capacity enhancement Project	Technical Cooperation, Technical Cooperation (Dispatch of Experts)	Delays in expansion and reinforcement of the power grid, delays in issuance of permits and licenses (transmission and distribution, renewable energy) by the ERC	short term
E-4-2	Capacity development Project to establish smart grid	Technical Cooperation, Technical Cooperation (Dispatch of Experts)	Limitation of concrete policies and systems for smart grid realization, delays in smart grid roadmap efforts by power distribution companies	short term
E-4-3	Improvement of sustainability for remote island power infrastructure	Technical Cooperation, Technical Cooperation (Dispatch of Experts)	Limitation of sustainability of remote island power infrastructure, limitation of resiliency compliance status management by NPC, delays in the permitting process for hybridization of small remote island power sources, attracting investment for hybridization of off-grid local power sources, and outages due to hybridization of remote island diesel generation, Failure to exceed 30% renewable energy electricity supply rate due to concerns about power instability; limited access to project financing for small independent power producers for renewable energy installations	short term
E-4-4	Resilient x hybrid power supply demonstration program	Technical Cooperation		medium-term
E-4-5	Feasibility study on interconnection of Off-Grid islands into the National Transmission Grid	Data Collection Survey or Cooperation Preparation Survey	Limitation of sustainability of remote island power infrastructure, interconnection of off-grid islands to the national grid	short term
E-4-6	Project for interconnection of Off-Grid islands into the National Transmission Grid	Technical Cooperation and Yen Loans	Limitation of sustainability of remote island power infrastructure, interconnection of off-grid islands to the national grid	medium-term
E-4-7	JICA Knowledge Co-Creation Program on <ul style="list-style-type: none"> • Renewable Energy and Diesel Power Operation in Small Islands • Stabilizing Power Systems to Introduce Various Kinds of Renewable Energy etc., 	Knowledge Co-Creation Program	Limitation of sustainability of remote island power infrastructure, attracting investment for hybridization of off-grid local power sources, outages due to hybridization of remote island diesel generation, and failure to exceed 30% renewable energy power supply rate due to concerns about power instability.	short term

	Renewable Energy etc.,			
E-4-8	Financial support for total electrification	Yen Loan	Insufficient funds for full electrification by 2028	short term

The following six projects were considered as candidates for individual cooperative projects in the above program.

E-4-1 Energy Regulatory Commission (ERC) Capacity Building Project

Name of Cooperation Program (tentative)	Transmission and Distribution and Electrification Capacity Enhancement Program
Anticipated JICA Scheme	Technical Cooperation or Technical Cooperation (Dispatch of Experts)
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> • ERC approves NGCPs' transmission and distribution plans, but delays in the approval process may be limiting transmission and distribution capacity expansion. • ERC also approves proposals from developers of renewable energy, but similar delays in the process could delay the introduction of renewable energy.
Project Outline Overarching Goals	GHG emissions will be reduced as transmission and distribution capacity is strengthened and renewable energy is introduced.
Objectives and Outcomes	Facilitation of the approval process on ERC will take place.
Outputs	<ul style="list-style-type: none"> • Examination of countermeasures regarding delay factors (dispatch of a few experts) • Implementation of measures (dispatch of multiple experts)
Cooperation period	1.5year
Anticipated C/P Institutions	ERC
Other related institutions	DOE EPIMB, TransCo/NGCP, Utilities
Matters to be considered in implementation	<p>Although the delay factors are currently recognized as those listed below, there are countless countermeasures for them, and JICA needs to determine what kind of countermeasures are appropriate. For this reason, a survey including the organizational structure of ERC will be conducted under first Output, and the process will proceed to second Output for cooperation.</p> <ul style="list-style-type: none"> ➢ Insufficient human resources in relation to the number of applications for permits and licenses ➢ Limited technical capacity required for screening ➢ Absence of technology sharing and transferring system
Status of discussions with counterparties	ERC generally approved the project.

E-4-2 Capacity development project to establish smart grid

Name of Cooperation Program (tentative)	Transmission and Distribution and Electrification Capacity Enhancement Program
Anticipated JICA Scheme	Technical Cooperation or Technical Cooperation (Dispatch of Experts)
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> • Limitation of specific policies and systems for smart grid realization
Project Outline Overarching Goals	Promote the introduction and utilization of variable renewable energy sources such as solar and wind power generation.
Objectives and Outcomes	Market formation for VPP/DR will be promoted, and smart grid construction by power distribution companies will be promoted
Outputs	<ul style="list-style-type: none"> • VPP/DR Vision • Support for smart grid roadmap implementation by distribution utility • DOE EPIMB, Capacity Building for Distribution Providers on Smart Grid
Cooperation period	3 years
Anticipated C/P Institutions	DOE EPIMB
Other related institutions	policy formulation committee, National Power Corporation (NPC), the National Transmission Corporation (TransCo) and the National Grid Corporation of the Philippines (NGCP) of the Philippines (NGCP), ERC, NEA, other power distribution companies, etc.

Matters to be considered in implementation	Need to understand and coordinate with USAID, USTDA, and UNOPS on cooperation trends. DUs encounter challenges in rendering smart grid projects cost-effective to secure ERC approval, leading to delays in implementation. To address this, the preparation of project plans by DUs might require technical assistance from JICA.
Status of discussions with counterparties	EPIMB generally approved the program.

E-4-3 Improvement of sustainability for remote island power infrastructure

Name of Cooperation Program (tentative)	Transmission and Distribution and Electrification Capacity Enhancement Program
Anticipated JICA Scheme	Technical Cooperation or Technical Cooperation (Dispatch of Experts)
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> Improving disaster resilience of the grid in response to more frequent and severe typhoons and other disasters Promoting the introduction of renewable energy in off-grid areas (areas with micro-grids) Limitation of sustainability of remote island power infrastructure
Project Outline Overarching Goals	Improving the sustainability of power sources and power supply infrastructure in remote islands and other rural areas
Objectives and Outcomes	Paving the way for improved disaster resilience and hybridization of power sources on remote islands
Outputs	<ul style="list-style-type: none"> Hybridization technology guidelines for electric utilities Development of a roadmap for improving the sustainability of isolated island power sources with a view to introducing more than 30% renewable energy Technical capacity development for VSG and switching technologies, micro-grid system application evaluation, and power infrastructure disaster resilience assessment
Cooperation period	3 years
Anticipated C/P Institutions	NPC, DOE EPIMB, ERC
Other related institutions	NEA, DOE EPPB, Electric Cooperatives (EC)
Status of discussions with counterparties	NPC, DOE EPIMB, and ERC generally approved the program.

E-4-4 Resilient x hybrid power supply demonstration project

Name of Cooperation Program (tentative)	Transmission and Distribution and Electrification Capacity Enhancement Program
Anticipated JICA Scheme	Technical Cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> Improving disaster resilience of the grid in response to more frequent and severe typhoons and other disasters Promoting the introduction of renewable energy in off-grid areas (areas with micro-grids) Limitation of sustainability of remote island power infrastructure
Project Outline Overarching Goals	Increased sustainability of power supplies and electricity supply infrastructure in remote islands and other rural areas
Objectives and Outcomes	Increased deployment of disaster resilient remote island hybrid power sources and infrastructure
Outputs	<ul style="list-style-type: none"> Demonstration of Disaster Resilient Remote Island Hybrid Power Sources and Infrastructure Reflection on technical guidelines and support for institutional establishment Capacity building for system implementation, evaluation, and PPP project implementation
Cooperation period	3-5 years
Anticipated C/P Institutions	NPC, DOE EPIMB, ERC
Other related institutions	NEA, DOE EPPB, Electric Cooperative (EC)
Status of discussions with counterparties	NPC, DOE EPIMB, ERC generally approve the program.

E-4-5 Feasibility study on interconnection of Off-Grid islands into the National Transmission Grid

Name of Cooperation Program (tentative)	Transmission and Distribution and Electrification Capacity Enhancement Program
Anticipated JICA Scheme	Data Collection Survey/Cooperation Preparation Survey
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> Improving disaster resilience of the grid in response to more frequent and severe typhoons and other disasters Promoting the introduction of renewable energy in off-grid areas (areas with micro-grids) Limitation of sustainability of remote island power infrastructure
Project Outline Overarching Goals	Increased sustainability of power supplies and electricity supply infrastructure in remote islands and other rural areas
Objectives and Outcomes	The prospects for improving the sustainability of remote island power infrastructure are presented.
Outputs	<ul style="list-style-type: none"> Feasibility Study and Site Selection Measures to integrate new technologies and solutions Budget estimation for the next phase of cooperation
Cooperation period	1-1.5 years
Anticipated C/P Institutions	DOE EPIMB, TransCo
Other related institutions	NPC,NEA
Status of discussions with counterparties	Received concept sheet from EPIMB and reviewed this project; EPIMB has not yet approved.

E-4-6 Project for interconnection of Off-Grid islands into the National Transmission Grid

Name of Cooperation Program (tentative)	Transmission and Distribution and Electrification Capacity Enhancement Program
Anticipated JICA Scheme	Yen loans & Technical Cooperation Project
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> Improving disaster resilience of the grid in response to more frequent and severe typhoons and other disasters Promoting the introduction of renewable energy in off-grid areas (areas with micro-grids) Limitation of sustainability of remote island power infrastructure
Project Outline Overarching Goals	Increased sustainability of power supplies and electricity supply infrastructure in remote islands and other rural areas
Objectives and Outcomes	The prospects for improving the sustainability of remote island power infrastructure are presented.
Outputs	<ul style="list-style-type: none"> Implementation of Demonstration Project Reflection on Policies and Institutions
Cooperation period	3 years
Anticipated C/P Institutions	DOE EPIMB, TransCo
Other related institutions	NPC,NEA
Status of discussions with counterparties	Received concept sheet from EPIMB and reviewed this project; EPIMB has not yet approved.

<Reasons for selecting this program>

Contribution to support achievement of Paris Agreement and NDC	It is the most important infrastructure to facilitate the expansion of new renewable energy installations, and its drastic capacity and grid expansion will have a very high impact on achieving the NDC. For example, based on the future energy mix in the NREP, a one-year delay in the introduction of renewable energy would result in a drop in renewable energy generation of less than 50,000 GWh in the final year of 2040.
Consistency with sector policies	This is consistent with the Electric Power Industry Roadmap (2017-2040), Transmission Development Plan (2022-2040), and Power Sector Roadmap (2021-2040).
Urgency	The current delays are highly urgent, as they are directly linked to delays in the introduction of renewable energy.

	<p>Smart Grid: This may be supplemented by support from ADB, USTDA, and USAID, and is not a particular problem at present. The level of urgency is low, as measures are expected to be implemented relatively quickly.</p> <p>Off-grid areas: There is no particular deadline in the plan, and the level of urgency is relatively low, given the current status of the project.</p> <p>Electrification: The urgency is high because the NEA has already drawn up a plan for the period up to 2028, which is the year announced by the President, and the project will not start until the financial resources have been decided.</p>
Status of support from other donors	Support from ADB and USAID is underway, and support from ADB, UNOPS, and USTDA is planned.
Economic efficiency	Interconnection projects of off-grid islands to the national power grid are eligible, but currently it is difficult to calculate the project because the installation points have not yet been determined.
Investment Effectiveness	Projects for interconnection of off-grid islands to the national grid are eligible, but currently difficult to calculate due to the undetermined locations where they will be deployed.
DAC 6 items	<p>Relevance: High (consistent with needs and policies)</p> <p>Consistency: High (consistent with the improvement of the energy situation in "(1) Strengthening the Foundations for Sustainable Economic Growth" in the Priority Areas (Medium-term Objectives) of the Development Cooperation Policy)</p> <p>Effectiveness: Under consideration</p> <p>Impact: under consideration</p> <p>Efficiency: Under consideration</p> <p>Sustainability: High (due to the perspective of adaptation, such as disaster resistance and electrification)</p>
Consistency with Japanese government and JICA policies	<p>In the "Strategy for Overseas Deployment of Infrastructure Systems 2025", the Philippines in "Country Initiatives" is to "promote cooperation in the power and LNG sectors in line with energy policy", which is consistent with the policy.</p> <p>It is consistent with the promotion measures to make renewable energy the main power source in the power grid system and to strengthen grid flexibility in the "Promotion of GHG Emission Reduction and Absorption [Mitigation Measures]".</p>
Socially vulnerable groups, gender	<p>Project content should be consistent with the GAD CHECKLIST FOR THE ENERGY SECTOR, which is applied to DOE project selection.</p> <p>In particular, the project will take into account the male-dominated employment gap in the power industry, the limited influence of women in policy making, and women's participation in renewable energy development, utilization, and promotion, and will promote gender mainstreaming in planning and policy making.</p>

E-5	Energy Efficiency and Conservation Capacity Enhancement Program
Objective	The National Energy Efficiency & Conservation Plan and Roadmap (2050-2050) will improve the feasibility of the ZEB concept by integrating measures such as roof-mounted solar power, high-efficiency air conditioning, and high-efficiency lighting, which have been implemented separately in the past, and by confirming the feasibility of introducing the ZEB concept for overall building optimization and providing comprehensive support in terms of technology, finance, and capacity development for its diffusion. The National Energy Efficiency & Conservation Plan and Roadmap (2023-2050) will be made more feasible by providing comprehensive technical, financial, and capacity-building support for the spread of the ZEB concept.
Spread effect	Achievement of the National Energy Efficiency & Conservation Plan and Roadmap (2023-2050) targets will result in a total reduction of 516.99MtCO ₂ e by 2050 for government, commercial, consumer, utility, and end-use consumers, which is an average reduction of 19MtCO ₂ e per year. This is equivalent to a reduction of 19 MtCO ₂ e per year, or about 35% of the energy sector emissions of 53.105 MtCO ₂ e in 2010, and its effect is considered to be very high. In addition, the promotion of energy conservation contributes to a reduction in the construction of new power plants by reducing future energy demand, which in turn reduces the environmental burden, and the expansion of companies through the activation of the energy conservation market encourages job growth.

	Possible cooperation projects	Applicable JICA support scheme	Issues to be solved	Implementation period
E-5-1	Feasibility Study on ZEB	Data Collection Survey or Cooperation Preparation Survey	Limitation of emerging technologies to enhance implementation of the National Energy Efficiency & Conservation Plan and Roadmap (2023-2050)	short term
E-5-2	Project to strengthen the capacity to promote ZEB measures	Technical Cooperation	Limitation of government monitoring capacity for energy efficiency compliance; Limitation of capacity for energy efficiency-related data collection; Limitation of implementation capacity of ESCO operators and others; Limitation of know-how from practical experience of private architects and others; Low accessibility of finance for small and medium building EE projects; National Energy Efficiency & Conservation Plan and Roadmap (2023-2050); limitation of emerging technologies to enhance implementation; limitation of penetration of EEC law; absence of EE incentive and mandatory systems to promote private demand	short term
E-5-3	Finance to promote EE&C and ZEB dissemination	Two-step Loan	Weak private investment in energy efficiency and energy conservation; low accessibility of financing for small and medium building EE projects	mid-term
E-5-4	JICA Knowledge Co-Creation Program on: <ul style="list-style-type: none"> Promotion of Energy Efficiency and Conservation etc. 	Knowledge Co-Creation Program	Limitation of government monitoring capacity for energy efficiency compliance, limitation of energy efficiency-related data collection capacity, and absence of EE incentive or mandatory systems to promote private demand	short- to medium-term

2 projects mentioned below were being considered as a potential candidate for an individual cooperative project within the aforementioned program.

E-5-1 Feasibility Study on ZEB

Name of Cooperation Program (tentative)	Energy Efficiency and Conservation Capacity Enhancement Program
Anticipated JICA Scheme	Data Collection Survey or Cooperation Preparation Survey
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> Limitation of consistent monitoring and data collection Energy efficiency improvements in buildings, spillover of energy conservation efforts to private facilities Weak private investment in energy efficiency and energy conservation
Project Outline	Energy savings in buildings and facilities will be promoted, reducing GHG emissions and improving disaster resilience through reduced energy use.
Overarching Goals	
Objectives and Outcomes	The feasibility of ZEB implementation in the Philippines will be determined.
Outputs	<ul style="list-style-type: none"> Organizing basic information for ZEB introduction Calculation of the effect of ZEB introduction Recommendations for reflecting ZEB in policies and support for the formation of the next program
Cooperation period	2 years
Anticipated C/P Institutions	DOE EUMB

Other related institutions	IAEECC (Interagency Energy Efficiency and Conservation Commission), ESCO Association, Philippine Institute of Architects, Green Building Council, private operators (builders and developers)
Matters to be considered in implementation	Technical assistance and capacity building for the implementation of the VFELP and the establishment of the VPAF should be considered in this project or another project.

E-5-2 Project to strengthen the capacity to promote ZEB measures

Name of Cooperation Program (tentative)	Energy Efficiency and Conservation Capacity Enhancement Program
Anticipated JICA Scheme	Technical Cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> • Limitation of consistent monitoring and data collection • Energy efficiency improvements in buildings, spillover of energy conservation efforts to private facilities • Weak private investment in energy efficiency and energy conservation
Project Outline Overarching Goals	Energy conservation in buildings and facilities will be promoted, reducing GHG emissions and improving disaster resilience through reduced energy use.
Objectives and Outcomes	Data for quantification of energy efficiency and conservation measures will be developed, strengthening the capacity of C/P and the private sector to implement EE&C.
Outputs	<ul style="list-style-type: none"> • ZEB demonstration • Understanding the applicability of ZEB, ZEH, ZED, etc. • Establishment of roadmap for ZEB and others • Capacity building of C/P (EUMB) and related institutions
Cooperation period	5 years
Anticipated C/P Institutions	DOE EUMB
Other related institutions	IAEECC (Interagency Energy Efficiency and Conservation Committee), DPWH, ESCO Association, Philippine Institute of Architects, Green Building Council, private operators (builders and developers)
Matters to be considered in implementation	Technical assistance and capacity building for the implementation of the VFELP and the establishment of the VPAF should be considered in this project or another project. Also, consider the possibility of integrating ZEB principles into building codes to further maximize benefits.

<Reasons for selecting this program>

Contribution to support achievement of Paris Agreement and NDC	In order to achieve NDC, the NEECP has set a target of at least 10% emission reductions in most sectors against the BAU scenario, which will be important to achieve. Achievement of the National Energy Efficiency & Conservation Plan and Roadmap (2023-2050) targets will result in a total reduction of 516.99MtCO ₂ e by 2050 for government, commercial, consumer, and electric utilities and end-use consumers, which is an average This is equivalent to a reduction of 19 MtCO ₂ e per year, or about 35% of the energy sector emissions of 53.105 MtCO ₂ e in 2010, which is considered very high.
Consistency with sector policies	It is consistent with the National Energy Efficiency & Conservation Plan and Roadmap (2023-2050) and the Future Energy Scenario in Capsule.
Urgency	Although it is relatively urgent in terms of reducing the increase in energy demand due to future population growth, it has a certain budget for implementation and is not an urgent issue.
Status of support from other donors	Support from ADB, WB, and OECD is underway, and UNOPS support is planned. Currently, there is no overlap with planned support.
DAC 6 items	<p>Relevance: High (consistent with needs and policies)</p> <p>Consistency: High (consistent with the improvement of the energy situation in "(1) Strengthening the Foundations for Sustainable Economic Growth" in the Priority Areas (Medium-term Objectives) of the Development Cooperation Policy)</p> <p>Effectiveness: Under consideration</p> <p>Impact: under consideration</p> <p>Efficiency: Under consideration</p> <p>Sustainability: High (because energy consumption will be reduced in the future)</p>

<p>Consistency with Japanese government and JICA policies</p>	<p>The "Green Growth Strategy for Carbon Neutrality in 2050" states that ZEBs "will be further demonstrated and horizontally deployed for overseas expansion with ASEAN and other countries in mind through ISO and other activities," and the Basic Policy for the Realization of GX, released in February 2023, also states that " In addition, the Basic Policy for the Realization of GX, released in February 2023, also calls for "the verification and horizontal development of ZEB for overseas deployment in ASEAN and other countries. In addition, CEFIA, under the jurisdiction of the Global Environment Policy Office, Industrial Science and Technology Policy and Environment Bureau, Department of Economy, Trade and Industry, has positioned the promotion of ZEB as one of its flagship projects, which is in line with its policy.</p> <p>Consistent with the introduction and diffusion of low-carbon facilities and equipment to improve the energy use efficiency of society as a whole in GHG emission reduction and absorption enhancement [mitigation measures].</p>
<p>Socially vulnerable groups, gender</p>	<p>The project contents should take into consideration the GAD CHECKLIST FOR THE ENERGY SECTOR, which is applicable to DOE's project selection.</p> <p>In particular, the energy sector in the Philippines, as in other countries, favors male workers, possibly due to the notion that the work in this sector is more suited to men than women because it is demanding and dangerous. Efforts should be made to keep in mind that the persistent gender segregation in education and training limits women's access to technical and skills training opportunities.</p>

E-6	Programs to promote the introduction and diffusion of alternative fuels and emerging technologies			
Objective	The program aims to promote the diffusion of alternative fuels mainly through basic research, institutional and policy formulation, technical demonstration, and capacity building related to these efforts. In addition, the feasibility of introducing CCUS in the Philippines will be confirmed, and institutional design, capacity building, and policy formulation will be conducted to lay the foundation for efforts related to the introduction of CCS, thereby supporting the early realization of the introduction of CCS.			
Spread effect	In the Philippines, GHG emissions from the transportation sector account for one-third of total GHG emissions, so the spread and expansion of this initiative will make a high contribution to achieving NDC. Since airlines that claim to be carbon neutral cannot receive fuel supply in the Philippines if they cannot supply SAF in their own country, securing production in their own country will improve their international competitiveness.			
	Possible cooperation projects	Applicable JICA support scheme	Issues to be solved	Implementation period
E-6-1	Policy and roadmap formulation on biofuels	Technical Cooperation	Limited private investment environment to promote supply of biofuels, etc.; Limited supply of feedstock crops for biofuel production; High cost of alternative fuel production	short term
E-6-2	Demonstration Project on biomass-derived SAF plants	Technical Cooperation (Transaction Advisory)	Limited private investment environment to promote supply of biofuels, etc.; high cost of alternative fuel production;	short term
E-6-3	PtL SAF Plant Demonstration Project	Technical Cooperation (Transaction Advisory)	limitation of institutions related to proper planning, implementation, and monitoring; policy research on new and emerging technologies	short term

E-6-4	Financial Cooperation Project on Alternative Fuels Promotion	Two-step Loan	Limitation of private investment environment to promote supply of biofuels, etc.	mid-term
E-6-5	Development of hydrogen vision/roadmap and capacity enhancement Project	Technical Cooperation	Absence of policies, institutions, and policies for the introduction of hydrogen, policy research on new and emerging technologies, and limitation of institutions related to proper planning, implementation, and monitoring	short term
E-6-6	Green Hydrogen Production Demonstration Project	Technical Cooperation (Transaction Advisory)	Limitation of private investment environment to promote supply of biofuels, etc.; absence of policies, institutions, and policies to introduce hydrogen; policy research on new and emerging technologies; limitation of institutions related to proper planning, implementation, and monitoring	short term
E-6-7	JICA Knowledge Co-Creation Program on: · Promotion of Hydrogen Energy Use -Energy Policy Towards Hydrogen-Based CO2 Free Society- etc.	Knowledge Co-Creation Program	Limitation of institutions related to policy research, proper planning, implementation, and monitoring of new and emerging technologies	short term
E-6-8	Feasibility study to introduce CCUS	Data Collection Survey or Cooperation Preparation Survey	Absence of policies, institutions, and policies for CCUS implementation, policy research on new and emerging technologies	short term
E-6-9	Master plan for introducing CCS, institutional design, and capacity enhancement Project	Technical Cooperation	Absence of policies, institutions, and policies for CCUS implementation, policy research on new and emerging technologies, and limitation of institutions related to proper planning, implementation, and monitoring	short term

The following five projects were considered as candidates for individual cooperative projects in the above program.

E-6-1 Policy and roadmap formulation on biofuels

Name of Cooperation Program (tentative)	Programs to promote the introduction and diffusion of alternative fuels and emerging technologies
Anticipated JICA Scheme	Technical Cooperation

Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> Limited bioethanol and biodiesel production for blending into vehicle fuels, making it difficult to improve fuel blending rates. Limitation of progress in the introduction of Sustainable Aviation Fuel (SAF). Limited private investment environment to promote supply of biofuels, etc.
Project Outline Overarching Goals	Expanded use of biofuels will reduce greenhouse gas emissions.
Objectives and Outcomes	Outlook for expansion of biofuel use is presented.
Outputs	<ul style="list-style-type: none"> Revised (refined) biofuels roadmap Develop SAF implementation policy and roadmap Strengthen capacity of government related agencies
Cooperation period	3 years
Anticipated C/P Institutions	DOE REMB/EUMB
Other related institutions	Other DOE departments, National Biofuel Board (NBB), Department of Environment and Natural Resources (DENR)
Matters to be considered in implementation	<p>Support for the introduction of SAF production plants is expected to be provided after or during the project implementation.</p> <p>Consider incorporating the following into the project as institutional design support;</p> <ul style="list-style-type: none"> ➤ Development of policies and standards for cost-effective conversion pathways based on feedstock, farm practices, and international policies on fuel blending involving SAF ➤ Global quality requirements for Philippine National Standards (PNS) adoption ➤ Capacity building initiatives that focus on understanding, developing, and implementing SAF technologies and practices ➤ Development of "use cases" for Hydrogen
Status of discussions with counterparties	Both REMB and EUMB generally agreed on the program.

E-6-2 Demonstration project on biomass-derived SAF plants

Name of Cooperation Program (tentative)	Programs to promote the introduction and diffusion of alternative fuels and emerging technologies
Anticipated JICA Scheme	Technical Cooperation (Transaction Advisory)
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> The Philippines is also participating in the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) of the International Civil Aviation Organization (ICAO). The Philippines has also participated in the International Civil Aviation Organization's (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which aims for domestic production of SAF by 2025. Limitation of private investment environment to promote supply of biofuels, etc.
Project Outline Overarching Goals	SAF adoption will be promoted and the prospect of establishing and expanding domestic SAF production will be gained.
Objectives and Outcomes	Domestic SAF production facilities are demonstrated, reducing private investment risk
Outputs	<ul style="list-style-type: none"> Demonstration of SAF domestic production plant Reflection of demonstration results in policies, plans, systems, technical guidelines, etc.
Cooperation period	6 years
Anticipated C/P Institutions	DOE REMB/EUMB
Other related institutions	DOE and other departments, National Biofuel Board (NBB), Department of Environment and Natural Resources (DENR)
Matters to be considered in implementation	Support for the introduction of SAF production plants is expected to be provided after or during the project implementation.
Status of discussions with counterparties	Both REMB and EUMB generally agreed on the program.

E-6-5 Development of hydrogen vision/roadmap and capacity enhancement project

Name of Cooperation Program (tentative)	Programs to promote the introduction and diffusion of alternative fuels and emerging technologies
Anticipated JICA Scheme	Technical Cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> The government has limitation on knowledge about the utilization of hydrogen, which is a new technology. There are no plans including policies for hydrogen utilization (including ammonia co-firing, etc.). Absence of policies, institutions, and policies for the introduction of hydrogen
Project Outline Overarching Goals	Hydrogen production and use will become widespread in the Philippines
Objectives and Outcomes	A vision for hydrogen adoption and a roadmap for related infrastructure will be developed
Outputs	<ul style="list-style-type: none"> Vision for Hydrogen and Ammonia Introduction Hydrogen and ammonia roadmap (assuming regional) Strengthening C/P capacity
Cooperation period	4 years
Anticipated C/P Institutions	DOE EUMB/REMB
Other related institutions	All ministries
Matters to be considered in implementation	METI: To coordinate and collaborate with efforts such as the Asian Zero Emissions Community (AZEC) This roadmap should include not only hydrogen but also hydrogen derivatives (compounds and substances that contain hydrogen atoms and/or are produced through reactions involving hydrogen such as but not limited to ammonia (NH ₃) and liquid organic hydrogen carriers)
Status of discussions with counterparties	DOE EUMB/REMB generally approved the program.

E-6-6 Green Hydrogen Production Demonstration Project

Name of Cooperation Program (tentative)	Programs to promote the introduction and diffusion of alternative fuels and emerging technologies
Anticipated JICA Scheme	Data Collection Survey or Cooperation Preparation Survey
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> The government has limitation on knowledge and other information on the utilization of hydrogen as a new technology. Implementation and realization of the hydrogen vision
Project Outline Overarching Goals	Hydrogen Production and Utilization to Become Popular in the Philippines
Objectives and Outcomes	The path to green hydrogen production in the Philippines will be clarified and private investment will be encouraged through risk reduction.
Outputs	<ul style="list-style-type: none"> Installation and demonstration of green hydrogen production plants Development of technical and institutional guidelines Strengthening C/P implementation capacity
Cooperation period	6 years
Anticipated C/P Institutions	DOE EUMB/REMB
Other related institutions	All ministries
Matters to be considered in implementation	METI: To coordinate and collaborate with efforts such as the Asian Zero Emissions Community (AZEC)
Status of discussions with counterparties	DOE EUMB/REMB generally approved the program.

E-6-8 Feasibility study to introduce CCUS

Name of Cooperation Program (tentative)	Feasibility study to introduce CCUS
Anticipated JICA Scheme	Information Collection Confirmation Survey or Cooperation Preparation Survey
Background (issues related to climate change measures to be addressed by this cooperation program)	<ul style="list-style-type: none"> Based on the Philippine Energy Plan (PEP) and local interviews, the Philippines plans to keep the current installed capacity of coal-fired power generation in the future, so decarbonizing its emissions is a challenge.

addressed by this cooperation program)	<ul style="list-style-type: none"> Absence of policies, institutions, and policies for CCUS deployment
Project Outline Overarching Goals	The feasibility of CCUS implementation in the Philippines is determined and the prospects for implementation of a continuing Technical Cooperation project on CCUS implementation are presented.
Objectives and Outcomes	Prospects for the introduction of CCUS are presented, and a system to support and regulate private sector introduction is proposed.
Outputs	<ul style="list-style-type: none"> CCS Potential Site Survey Preparation for Potential Site Geophysical Survey (next Technical Cooperation program budget review) CCUS Availability
Cooperation period	1-1.5 years
Anticipated C/P Institutions	DOE ERDB
Other related institutions	DOE OIMB/EPPB
Matters to be considered in implementation	Technical Cooperation project to continue when CCS sites are prospective.
Status of discussions with counterparties	ERDB generally approves the program.

<Reasons for selecting this program>

Contribution to support achievement of Paris Agreement and NDC	<p>[Biofuel/SAF] Since transportation accounts for a large portion of GHG emissions in the Philippines, the diffusion and expansion of this initiative to reduce GHG emissions by blending biofuel with gasoline and diesel will contribute significantly to achieving the NDC.</p> <p>[Hydrogen/CCUS] Hydrogen and CCUS have not been considered for contribution in the current NDC, and the early introduction of these technologies could be a game changer that will contribute significantly to GHG emission reductions.</p>
Consistency with sector policies	<p>[Biofuels/SAF] There is policy alignment in terms of setting and improving biofuel blending targets and the need to introduce SAF through accession to CORSIA.</p> <p>[Hydrogen/CCUS] Although there is no specific policy yet, the PEP envisages maintaining coal-fired power generation and expanding the introduction of gas-fired power generation, which will contribute to reducing their GHG emissions.</p>
Urgency	<p>[Biofuels/SAF] Alternative fuels are listed as a component of "Affordable and Clean Energy," one of the President's Socioeconomic Agenda. In particular, domestic production of SAF was targeted by 2025, but this has not yet been achieved, so efforts to increase production of biofuels and SAF production are relatively urgent.</p> <p>[Hydrogen/CCUS] The urgency for hydrogen is not high because the technology itself is not yet complete worldwide and there is no deadline for hydrogen-related initiatives, but early initiatives will be effective in promoting the spread of hydrogen in the future. The timing of the project is considered good, as there have been specific requests to search for suitable sites for CCS, although the urgency for CCUS is not as pronounced for the same reason.</p>
Status of support from other donors	Other than the Ammonia/Hydrogen Co-Firing Coal Plants to be implemented by ADB and the ongoing Biofuels Annual Report by USDA/GAIN, no significant assistance or planned assistance from other donors was identified.
Economic efficiency	Not applicable
Investment Effectiveness	Not applicable
DAC 6 items	<p>DAC 6 items Relevance: High (meets needs)</p> <p>Consistency: High (consistent with the improvement of the energy situation in "(1) Strengthening the Foundations for Sustainable Economic Growth" in the Medium-term Objectives of the Development Cooperation Policy)</p> <p>Effectiveness: to be verified</p> <p>Impact: to be verified</p> <p>Efficiency: to be verified</p> <p>Sustainability: High (for transition to decarbonized fuels and decarbonization of conventional energy)</p>
	[Biofuel/SAF] Mainly in line with Japan's framework for external cooperation (with the Philippines and ADB), and possible cooperation with ADB, etc.

<p>Consistency with Japanese government and JICA policies</p>	<p>[Hydrogen/CCUS] Consistent with various Japanese external cooperation frameworks and policies. For example, in "(2) Support for Overseas Deployment of Japan's Superior Decarbonization Technologies, etc." of the Infrastructure Systems Overseas Deployment Strategy 2025, "Japan will provide support for carbon capture and storage (CCS) projects and geological formation exploration, etc. for such projects, and will leverage its experience in the unique energy and power generation situation in Japan to provide various options that meet the needs of partner countries. The program is fully in line with the "enhancement of package-type proposal capabilities through public-private partnerships that also take advantage of Japan's unique experience in energy and power generation and offer a variety of options according to the circumstances of the partner country.</p> <p>The program to be continued is in line with the "introduction and diffusion of low-carbon facilities and equipment for GHG emission reduction/sequestration enhancement [mitigation measures]".</p>
<p>Socially vulnerable groups, gender</p>	<p>Project content should be consistent with the GAD CHECKLIST FOR THE ENERGY SECTOR, which is applicable to DOE project selection.</p> <p>In particular, the project will take into account the limited influence of women in policy making and promote gender mainstreaming in planning and policy making.</p>

2) Evaluation of the cooperation program

Table 3-17 Evaluation of the possible cooperative program (Energy Sector)

Possible Cooperation Program	Climate Countermeasure Effect		Spillover effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
<p>E-1 Energy Data Management Capacity Improvement Program</p>				
<p>E-1-1 Development and implementation of Energy Balance Table Management System (EBTMS) and cooperation in regionalizing energy database</p>	<p>Partial contribution to the energy sector CO2 emissions of 120.01MtCO2e in 2020</p>	<p>N/A</p>	<p>The spillover effect is qualitative and does not directly contribute to the reduction of greenhouse gas (GHG) emissions. However, it leads to the promotion of policies at the regional level, such as local governments, and encourages private sector investments, reinforcing the implementation of measures across all sectors.</p>	<p>JICA conducted the "Philippine National Energy Plan Formulation Support Survey" in 2008, during which various analysis tools forming the basis for the initial Power Enhancement Project (PEP) were developed and proposed. Cooperation will be based on these initiatives.</p>
<p>E-1-2 JICA Knowledge Co-Creation Program for energy data management and utilization</p>		<p>N/A</p>		
<p>E-2 Energy Transition Capacity Enhancement Program</p>				
<p>E-2-1 Natural Gas Utilization Capacity Enhancement and Hydrogen Fuel Transition Project</p>	<p>Partial contribution to CO2 emissions of 70.01MtCO2e from power</p>	<p>N/A</p>	<p>The widespread adoption of natural gas significantly contributes to achieving the PEP's CES goals, and the promotion of</p>	<p>In the local context, Osaka Gas Co., Ltd. has introduced a liquefied natural gas (LNG) facility in the Philippines, and domestic heavy</p>

Possible Cooperation Program	Climate Countermeasure Effect		Spillover effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
	generation in 2020		hydrogen utilization in gas-fired power generation will contribute to the future decarbonization of gas-fired power generation. Additionally, encouraging investment through private risk reduction also influences corporate expansion.	industry manufacturers are engaged in the production of Gas Turbine Combined Cycle (GTCC) systems and the development of hydrogen gas turbines. As of 2022, Japan ranks seventh globally in natural gas consumption, and the technical expertise of domestic gas infrastructure operators is high. The utilization of this know-how holds promising prospects.
E-2-2 Funding Project for Natural Gas Infrastructure and Hydrogen Fuel Transition for Gas-Fired Power Plants		N/A		Given the above, there is a potential to develop an effective funding support scheme based on the realities of natural gas infrastructure construction and operation.
E-3 Renewable Energy Investment Promotion Program				
E-3-1 Project to develop hydropower (Large Impounding) and pumped storage M/P for climate change adaptation including the aspect of climate change adaptation in the Philippines	Partial contribution to CO2 emissions of 70.01MtCO2e from power generation in 2020	Deterring floods caused by climate disasters and preventing droughts caused by extreme weather events	Hydropower can address both flood control and water utilization, serving as a climate change mitigation measure. It contributes to the stabilization of the agricultural sector and ensures water supply reliability. Furthermore, private sector investment incentives for risk reduction also impact corporate expansion.	In 2012, JICA conducted the "Hydropower Resources Inventory Survey in the Republic of the Philippines," laying the foundation for technology transfer through the hydropower database established during this initiative. The Philippines has also benefited from the construction of the San Roque Dam, funded by official development assistance (ODA) from Japan, allowing the application of Japan's established

Possible Cooperation Program	Climate Countermeasure Effect		Spillover effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
				expertise in construction and operation.
E-3-2 Financial Cooperation Project for Renewable Energy Deployment		Deter flooding caused by climate disasters, prevent droughts caused by extreme weather, and reduce grid instability caused by the spread of variable renewable energy	The widespread adoption of renewable energy not only serves as a mitigation strategy for climate change but also contributes to job creation through increased private sector investment. Additionally, promoting locally sourced and consumed energy enhances energy security.	There is potential to establish an effective financial support scheme based on the realities of construction and operation in hydropower and geothermal projects.
E-3-3 Cooperative Project for implementation in line with proposed policy after ADB assistance in geothermal power	Partial contribution to CO2 emissions of 70.01MtCO2e from power generation in 2020	Reduce grid instability caused by the spread of variable renewable energy and stable supply of electricity unaffected by weather disasters	Geothermal energy can serve as a baseload power source, replacing fossil fuel generation. Moreover, private sector investment incentives through risk mitigation also impact corporate expansion.	JICA has previously implemented geothermal development projects such as the Northern Negros Geothermal Development Project and the MacBan Geothermal Power Plant Refurbishment Project through yen loans, leveraging established expertise in construction and operation in our country, which is a geothermal powerhouse similar to the Philippines.
E-3-4 JICA Knowledge Co-Creation Program on: · Promotion of Hydropower Development · Acceleration/Promotion of Geothermal Energy Investment		Reduce grid instability caused by the spread of variable renewable energy and stable supply of electricity unaffected by weather disasters, deter floods caused by climate disasters and preventing droughts caused by extreme weather events	Reducing risks through private sector initiatives promotes investment and also influences corporate expansion.	The utilization of the proven know-how, as highlighted in E3-1 and E3-3, is anticipated.

Possible Cooperation Program	Climate Countermeasure Effect		Spillover effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
E-4 Transmission and Distribution and Electrification Capacity Enhancement Program				
E-4-1 Energy Regulatory Commission (ERC) capacity enhancement Project	Partial contribution to CO2 emissions of 70.01MtCO2e from power generation in 2020		Resolving this issue will not only delay investment in renewable energy installations due to the limitation of a power grid, but will also affect the resolution of delays in licensing and approval of renewable energy installations, thus boosting and accelerating the introduction of renewable energy in a combined manner.	Effective capacity development is possible in the form of shared know-how based on established transmission and distribution technologies in Japan.
E-4-2 Capacity development Project to establish smart grid		N/A	Expanding the use of renewable electricity will not only promote the introduction of renewable energy, but also reduce the introduction of gas-fired power generation. It is also expected to create new employment opportunities through resource aggregation, etc., and economic benefits will be realized.	It is assumed that a guideline and institutional framework based on the Ministry of Economy, Trade and Industry's "Guidelines for Energy Resource Aggregation Business" can be applied.
E-4-3 Improvement of sustainability for remote island power infrastructure	Partial contribution to CO2 emissions of 70.01MtCO2e from power generation in 2020	Contributing to a stable supply of electric power in times of disaster	Although the GHG reduction effect is expected due to a decrease in the utilization rate of diesel power generation, the contribution is relatively small because it is a small grid on a remote island, but in terms of adaptation, the contribution is high because it improves disaster tolerance. The project will contribute to the	Under the Department of Economy, Trade and Industry's "Subsidy for Project Feasibility Study on Overseas Deployment of High-Quality Infrastructure (Study on Promotion of Overseas Deployment of Infrastructure by Japanese Companies)," "Republic of the Philippines and Malaysia/Virtual Synchronous Generator Control
E-4-4 Resilient x hybrid power supply demonstration project				

Possible Cooperation Program	Climate Countermeasure Effect		Spillover effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
			improvement of energy accessibility in remote islands, of which there are quite a few in the Philippines.	(VSG) Study Project "Kawasaki Heavy Industries, Ltd." has been selected for the year 2023. The introduction of technologies related to this generator and switching technologies into the remote island power supply system will enable the introduction of more than 30% renewable energy, which is expected to boost the amount of renewable energy that private companies bid for and also contribute to the phased out use of diesel power generation.
E-4-5 Feasibility study on interconnection of Off-Grid islands into the National Transmission Grid	Partial contribution to CO2 emissions of 70.01MtCO2e from power generation in 2020	Contributing to the improvement of electricity accessibility on remote islands		Currently, the introduction of technology is expected to be submarine transmission cables, etc., and there is no particular possibility of utilizing Japanese knowledge and technology.
E-4-6 Project for interconnection of Off-Grid islands into the National Transmission Grid		Contributing to a stable supply of electric power in times of disaster		
E-4-7 JICA Knowledge Co-Creation Program on <ul style="list-style-type: none"> • Renewable Energy and Diesel Power Operation in Small Islands • Stabilizing Power Systems to Introduce Various Kinds of Renewable Energy etc., 				
E-4-8 Financial support for total electrification		Contribute to eliminating the 5.5% un-electrified rate as of 2020	100% electrification in terms of adaptation measures 100% electrification rate will greatly contribute to the realization of sustainable energy as set forth in the NDC.	Simple financial support, none in particular.

Possible Cooperation Program	Climate Countermeasure Effect		Spillover effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
E-5 Energy Efficiency and Conservation Capacity Enhancement Program				
E-5-1 Feasibility Study on ZEB	Contribute to the National Energy Conservation Plan and Roadmap (2023-2050) total government, commercial, and residential GHG reduction targets of 451.09MtCO ₂ e	High energy efficiency optimizes building energy consumption and flexibly responds to changes in energy demand due to climate change	It will greatly contribute to the realization of the National Energy Efficiency & Conservation Plan and Roadmap (2023-2050). In addition, the promotion of energy conservation will contribute to a reduction in the construction of new power plants by reducing future energy demand, which in turn will reduce environmental impact.	The introduction of the Zero Energy Building (ZEB), a building energy efficiency and conservation measure that has been published as a global standard ISO TS23764 under the cooperation of the Japanese public and private sectors, is expected to be introduced.
E-5-2 Project to strengthen the capacity to promote ZEB measures				
E-5-3 Finance to promote EE&C and ZEB dissemination				
E-5-4 JICA Knowledge Co-Creation Program on: · Promotion of Energy Efficiency and Conservation etc.				Energy conservation has long been developed in Japan, and it is expected that the system will be shared not only to expand the energy conservation market, but also to promote the self-sustaining spread of ZEB.
E-6 Programs to promote the introduction and diffusion of alternative fuels and emerging technologies				
E-6-1 Policy and roadmap formulation on biofuels	Partial contribution to CO ₂ emissions of 27.44MtCO ₂ e in transportation in 2020	N/A	Resolving issues in automotive fuels is highly effective since the transportation sector represents 1/3 of GHG emissions. In addition, the promotion of private investment will lead to job creation.	Know-how on bioethanol and biodiesel can be utilized from the past three JICA private-sector partnership projects in the Philippines. SAF has been demonstrated in Thailand and other countries under the NEDO Bio-jet Fuel Production Technology Development Project. Making use of such accumulated knowledge and know-how can be expected.
E-6-2 Demonstration Project on biomass-derived SAF plants		N/A		

Possible Cooperation Program	Climate Countermeasure Effect		Spillover effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
			not only to climate change mitigation measures, but also to raising the Philippines' international competitiveness, and may also contribute to the expansion of Japanese companies. The promotion of private investment will also lead to job creation.	Thailand and other countries as part of the NEDO Biojet Fuel Production Technology Development Project. In addition to the utilization of such accumulated knowledge and know-how, Japanese SAF producers and SAF production equipment manufacturers are expected to enter the market and spread the use of their facilities.
E-6-3 PtL SAF Plant Demonstration Project		N/A		The know-how can be utilized depending on the degree of technological development in Japan in the future.
E-6-4 Financial Cooperation Project on Alternative Fuels Promotion		N/A		Know-how, etc. related to E-6-1, E-6-2, and E-6-3 could be utilized to form an effective financial support scheme.
E-6-5 Development of hydrogen vision/roadmap and capacity enhancement Project	Partial contribution to the energy sector CO2 emissions of 120.01MtCO2e in 2020	N/A	The impact of realization is very high, as it concerns the decarbonization of all industries. It may also contribute to solving the energy problem. It is also expected to have a positive effect on employment promotion through the diffusion of new technologies.	The Japanese government formulated the world's first Basic Strategy for Hydrogen in 2017, and can use this institutional design and the private sector's expertise in hydrogen-related projects and facilities.
E-6-6 Green Hydrogen Production Demonstration Project		N/A		
E-6-7 JICA Knowledge Co-Creation Program on: · Promotion of Hydrogen Energy Use -Energy Policy Towards Hydrogen-Based CO2 Free Society- etc.		N/A		
E-6-8 Feasibility study to introduce CCUS	Contributes to almost total reduction of 70.01MtCO2e of CO2 emissions from power generation in 2020	N/A	The impact of the realization of this project is very high as it relates to the decarbonization of fossil fuel power generation. It may also contribute to carbon neutrality efforts in the Philippines. It is also expected to have a	The Advanced CCS Support Project is being implemented at JOGMEC, and the development of CCS in Japan is relatively advanced. Therefore, there is a possibility to share know-how on institutional design to enhance the possibility of CCS introduction.
E-6-9 Master plan for introducing CCS, institutional design, and capacity enhancement Project		N/A		

Possible Cooperation Program	Climate Countermeasure Effect		Spillover effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
			positive effect on employment promotion through the diffusion of the new technology.	

(3) Industry

1) Possible program concept

In the industry sector, the identified issues were organized into cooperation programs in four categories: high GHG emitting industries such as the cement industry, the EV industry, waste recycling promotion, and MSMEs support.

Table 3-18 Possible cooperation programs and scenario (Industry Sector)

Cooperation Program	Cooperation Project	
	Short term	Mid-to-long term
I-1 Climate Change Mitigation Support Program for High GHG Emitting Industries	Feasibility Study on AFR Utilization and Waste Heat Recovery in Cement Industry I-1-1	Financial assistance for AFR utilization and introduction of waste heat recovery facilities in the Cement industry I-1-2
	Feasibility Study on Introduction of Energy Reduction Measures in Iron and Steel Industry I-1-3	Financial assistance for the introduction of waste heat recovery facilities in the iron and Steel industry I-1-4
	RAC Industry Study Project for Establishing a System to Promote the Use of Low Global Warming Potential (GWP) I-1-5	
	Technical training for private companies on appropriate CFC gas recovery and treatment I-1-6	Financial assistance for the introduction of a CFC gas destruction treatment facility I-1-7
	Project to Study the Establishment of a System to Promote the Use of Bio-Naphtha in the I-1-8	
I-2 EV Industry Promotion Program	E-jeepney Homologation Project I-2-1	Financial assistance for Installation of Testing Facility I-2-2
		Financial assistance for jeepney Cooperative to purchase E-jeepney I-2-3
		Capital investment financial assistance for EV Manufacturers I-2-4
	Study on the impact of EV tariffs policy on domestic industry I-2-5	
I-3 Recycling Industry promotion Program	Project for policy-making capacity building for the recycling industry I-3-1	Financial assistance for the Recycling industry I-3-2
I-4 MSMEs Support Program	Project for Building Climate Smart Industries I-4-1	Financial assistance for installation of Green equipment I-4-2

I-1	Climate Change Mitigation Support Program for High GHG Emitting Industries
Objective	Since the Cement, Iron and Steel, and Refrigeration and Air Conditioning (RAC) industries account for 99% of the sector's GHG emissions, the Philippines' industrial sector as a whole aims to reduce GHG emissions by implementing a support program to promote climate change action for these industries.
Spread effect	It can contribute to the reduction of 16.772 MtCO ₂ e (2020) of GHG emissions in the industrial sector and the achievement of the 2028 CO ₂ reduction target of 0.71 MtCO ₂ e for the IPPU sector under the Philippine Development Plan (2023-2028). In addition, by providing financial support and economic incentives to private companies through this program, it is expected to encourage companies to invest in climate change measures, thereby reducing long-term costs by lowering each company's procurement costs for raw materials, fuel, electricity, and other resources. This improvement in profitability through cost reductions for each company is expected to have a spillover effect throughout the industry as investment in new businesses.

	Candidates for cooperation projects	Assumed scheme	Issues to be addressed	Implementation period
I-1-1	Feasibility Study on AFR Utilization and Waste Heat Recovery in Cement Industry	Technical cooperation	Decreased willingness of companies to invest due to low profitability of AFR utilization and waste heat recovery measures. Negative impact on the blended cement market due to inconsistencies between DPWH Bluebook and Philippine National Standards (PNS) standards for blended cement.	short term
I-1-2	Financial assistance for AFR utilization and introduction of waste heat recovery facilities in the cement industry	JCM, TSL (Two Step Loan)	Decreased willingness of companies to invest due to low profitability of AFR utilization and waste heat recovery measures	mid-term
I-1-3	Feasibility Study on Introduction of Energy Reduction Measures in Iron and Steel Industry	Technical cooperation	Decreased willingness of companies to invest due to low profitability of measures to replace energy-efficient equipment	short term
I-1-4	Financial assistance for the introduction of waste heat recovery facilities in the iron and Steel industry	JCM, TSL	Decreased willingness of companies to invest due to low profitability of measures to replace energy-efficient equipment	mid-term
I-1-5	RAC Industry Study Project for Establishing a System to Promote the Use of Low Global Warming Potential (GWP) Refrigerants	Dispatch of Experts	Lower willingness of companies to invest due to low profitability of low GWP refrigerant use measures	short term
I-1-6	Technical training for private companies on appropriate Fluorocarbon gases recovery and treatment	Technical cooperation (Dispatch of Experts)	Need to further improve registered refrigerant gas recovery and treatment companies, Need to further improve experience and capability of Department of Environment and Natural Resources staff in selecting technologies for Fluorocarbon gases destruction treatment facilities and operating the facilities.	short term
I-1-7	Financial assistance for the introduction of a Fluorocarbon gases destruction treatment facility	TSL	Need to further improve capacity for future Fluorocarbon gases destruction treatment	mid-term
I-1-8	Project to Study the Establishment of a System to Promote the Use of Bio Naphtha in the Petrochemical Industry	Dispatch of Experts	Low profitability of bio naphtha utilization measures in the petrochemical industry discouraging companies from investing	short term

The following eight projects were considered as candidates for individual cooperation projects in the above program.

I-1-1 Feasibility Study on AFR (Alternative Fuels and Raw Materials) Utilization and Waste Heat Recovery in Cement Industry

Name of cooperative program (tentative name)	Climate Change Mitigation Support Program for High GHG Emitting Industries
Anticipated JICA Scheme	Technical cooperation
Background (Issues related to climate change measures addressed by this cooperation program)	The cement industry accounted for nearly 80% of the total GHG emissions of the industrial sector in 2010, and major companies are working on AFR utilization and waste heat recovery measures. However, the measures have a long payback period of more than 5 years and low economic profitability, and the short-term commercial benefits are small, causing medium-sized companies, which account for 30% of the industry and do not have a large financial strength, to hesitate to invest in measures. This is why medium-sized companies, which account for 30% of the industry, are reluctant to invest in these measures, partly because they need to further improve experience and knowledge in implementing these technologies.
Project Outline Overarching Goals	The Cement industry as a whole can reduce GHG emissions in the industrial sector through AFR utilization and waste heat recovery measures.
Objectives and Outcomes	In terms of AFR utilization and waste heat recovery measures, it will clarify the technologies and facilities that should be introduced in each company in the cement industry, and at the same time, educate the personnel of each company on the technologies to be introduced.
Output	<ul style="list-style-type: none"> a. AFR (alternative fuels and raw materials) utilization feasibility study (including AFR database creation) b. Feasibility study on introduction of waste heat recovery c. Assistance in collecting technical information on blended cement
Cooperation period	2-3 years
Anticipated C/P Institutions	DENR/CCS, Cement Association
Other related institutions	DTI
Status of discussions with counterparts	Discussed with DENR/CCS

I-1-2 Financial Cooperation for AFR Utilization and Introduction of Waste Heat Recovery Facilities in the Cement Industry

Name of cooperative program (tentative name)	Climate Change Mitigation Support Program for High GHG Emitting Industries
Anticipated JICA Scheme	JCM, TSL
Background (Issues related to climate change measures addressed by this cooperation program)	The cement industry accounted for nearly 80% of the total GHG emissions of the industrial sector in 2010, and major companies are working on AFR utilization and waste heat recovery measures. However, the measures have a long payback period of more than 5 years and low economic efficiency, and the short-term commercial benefits are small, causing medium-sized companies, which account for 30% of the industry and do not have a large financial strength, to hesitate to invest in measures. This is why medium-sized companies, which account for 30% of the industry, are reluctant to invest in these measures, partly because they need to further improve experience and knowledge in implementing these technologies.
Project Outline Overarching Goals	The cement industry as a whole can reduce GHG emissions in the industrial sector through AFR utilization and waste heat recovery measures.
Objectives and Outcomes	Based on the results of the survey of technologies and facilities to be introduced by each company in the cement industry as clarified in the "I-1-1 Feasibility Study on AFR Utilization and Waste Heat Recovery in the Cement Industry," a Japanese financing scheme such as JCM and two-step loan will be implemented.
Output	AFR utilization and introduction of waste heat recovery facilities to companies in the Cement industry
Cooperation period	3 years
Anticipated C/P Institutions	DENR/CCS, Cement Industry Association

Other related institutions	DTI
Status of discussions with counterparts	Already discussed with DENR/CCS

I-1-3 Steel Industry Energy Reduction Measures Feasibility Study

Name of cooperative program (tentative name)	Climate Change Mitigation Support Program for High GHG Emitting Industries
Anticipated JICA Scheme	Technical cooperation
Background (Issues related to climate change measures addressed by this cooperation program)	The Iron and Steel industry is engaged in the business of melting imported steel semi-finished products and steel scrap collected in industrial furnaces and processing them into finished products. The introduction of waste heat recovery technology in industrial furnaces requires a large initial capital investment, and the payback period is as long as five years or more, which is not economically viable, resulting in small short-term commercial benefits. Furthermore, companies need to further improve experience or knowledge in the introduction of such technologies, which is another reason for their reluctance to invest in such measures.
Project Outline Overarching Goals	The entire Iron and Steel industry can work on waste heat recovery measures to reduce GHG emissions in the industrial sector
Objectives and Outcomes	To clarify the technologies and facilities that should be introduced to each company in the Iron and Steel industry for waste heat recovery measures, and at the same time, to educate the personnel of each company on the technologies to be introduced.
Output	Feasibility Study on Introduction of Waste Heat Recovery
Cooperation period	2-3 years
Anticipated C/P Institutions	DENR/CCS, Steel Industry Association
Other related institutions	DTI
Status of discussions with counterparts	Already discussed with DENR/CCS

I-1-4 Financial Cooperation for the Introduction of Waste Heat Recovery Facilities in the Iron and Steel Industry

Name of cooperation program (tentative name)	Climate Change Mitigation Support Program for High GHG Emitting Industries
Anticipated JICA Scheme	JCM, TSL
Background (Issues related to climate change measures addressed by this cooperation program)	The Iron and Steel industry is engaged in the business of melting imported steel semi-finished products and steel scrap collected in Japan in industrial furnaces and processing them into finished products. The introduction of waste heat recovery technology in industrial furnaces requires a large initial capital investment, and the payback period is as long as five years or more, which is not economically viable, resulting in small short-term commercial benefits. Furthermore, companies need to further improve experience or knowledge in the introduction of such technologies, which is another reason for their reluctance to invest in such measures.
Project Outline Overarching Goals	The entire Iron and Steel industry can work on waste heat recovery measures to reduce GHG emissions in the industrial sector.
Objectives and Outcomes	Based on the results of the survey of technologies and facilities to be introduced by each company in the Iron and Steel industry as clarified in the "I-1-3 Feasibility Study on Introduction of Energy Reduction Measures in Iron and Steel Industry," Japanese financing schemes such as JCM and two-step loans will be implemented.
Output	Introduction of waste heat recovery facilities for companies in the Iron and Steel industry
Cooperation period	3 years
Anticipated C/P Institutions	DENR/CCS, Steel Industry Association
Other related institutions	DTI
Status of discussions with counterparts	Discussed with DENR/CCS

I-1-5 Project to Study the Establishment of a System to Promote the Use of Low Global Warming Potential (GWP) Refrigerants in the Refrigeration and Air Conditioning (RAC) Industry

Name of cooperation program (tentative name)	Climate Change Mitigation Support Program for High GHG Emitting Industries
Anticipated JICA Scheme	Short-term dispatch of experts
Background (Issues related to climate change measures addressed by this cooperation program)	In the air conditioner industry within the RAC industry, domestic companies have already switched from HCFC to HFC with the help of government subsidies, but the shift from HFC to R290 (propane, GWP: 2 or less), a natural refrigerant with low GWP, has not progressed. This is the reason why companies need to make new investments to change their production lines for current HFC refrigerants, and because natural refrigerants must be imported from overseas, the procurement cost of refrigerants rises and the profitability of air conditioner sales declines, causing companies to not make investment decisions.
Project Outline Overarching Goals	The RAC industry's air conditioning industry can move forward with the transition to natural refrigerants in domestic manufacturing.
Objectives and Outcomes	Short-term experts will be dispatched to design support programs for companies, such as tax incentives for importing R290 natural refrigerants from overseas and subsidy support for domestic companies to retrofit their production lines for R290.
Output	<ul style="list-style-type: none"> a. Consideration of preferential treatment for import duties on R290 natural refrigerants b. Consideration of a subsidy system for the renovation of production lines to comply with R290, a natural refrigerant
Cooperation period	1 year
Anticipated C/P Institutions	DENR/CCS, DENR/Ozone Office, RAC Industry Association
Other related institutions	DTI
Status of discussions with counterparts	Discussed with DENR/CCS

I-1-6 Technical Training for Private Companies on Proper HFC Gas Recovery and Treatment

Name of cooperation program (tentative name)	Climate Change Mitigation Support Program for High GHG Emitting Industries
Anticipated JICA Scheme	technical cooperation
Background (Issues related to climate change measures addressed by this cooperation program)	Although the HFC chemical control order prohibits the release of Fluorocarbon gases into the atmosphere, very little is done to recover and process the gases. The reason is the low profitability of Fluorocarbon gases recovery operations and the strict requirements for registration, such as owning Fluorocarbon gases recovery equipment and having personnel with recovery skills, etc. Currently there is only one company registered to recover Fluorocarbon gases, and the number of companies registered to recover Fluorocarbon gases is not increasing.
Project Outline Overarching Goals	More companies registered for Fluorocarbon gases recovery
Objectives and Outcomes	<p>In technical cooperation scheme, it is conducted in cooperation with DENR to implement research and analysis on issues such as the low profitability of companies due to the high cost of Fluorocarbon gases recovery equipment and services, as well as the significant reliance of consumers on informal sectors for refrigerator and air conditioner services, and to consider possible solutions. Furthermore, the awareness campaigns about regulations concerning the recovery and destruction of Fluorocarbon gases among companies and consumers will be conducted.</p> <p>In addition, a Fluorocarbon gases recovery procedure manual will be developed. Based on the manual, Fluorocarbon gases recovery training will be provided to service companies of refrigerators and air conditioners to develop human resources with Fluorocarbon gases recovery skills. In addition, economic incentives (e.g., subsidies for purchase of recovery equipment) for registered companies will be considered.</p>
Output	<ul style="list-style-type: none"> a. Examination of issues on the low profitability of Fluorocarbon gas recovery services, and the significant dependence of consumers on the informal sector b. Conducting awareness campaign on relevant regulations c. Reexamination of registration requirements for Fluorocarbon gases recovery companies d. Fluorocarbon gases recovery procedure manual preparation e. Fluorocarbon gases recovery training f. Consideration of economic incentives for registered companies g. Assistance in selecting technologies for Fluorocarbon gases destruction treatment facilities

Cooperation period	1 year
Anticipated C/P Institutions	DENR/CCS, DENR/ozone chamber
Other related institutions	DTI
Status of discussions with counterparts	Already discussed with DENR/CCS

I-1-7 Financial Cooperation for Introduction of Fluorocarbon gases Destruction Treatment Facility

Name of cooperation program (tentative name)	Climate Change Mitigation Support Program for High GHG Emitting Industries
Anticipated JICA Scheme	TSL
Background (Issues related to climate change measures addressed by this cooperation program)	Since there is almost no recovery of Fluorocarbon gases, destruction of Fluorocarbon gases is only processed in the cement kiln of one cement company. DENR thinks that since the system to recover Fluorocarbon gases has not been established at present, the current cement company's kiln can be used for this purpose. However, in the future, the amount of recovered Fluorocarbon gases may increase, and the cement kilns of cement companies may not be able to handle the increased amount of Fluorocarbon gases.
Project Outline Overarching Goals	A Fluorocarbon gases destruction treatment facility is introduced, and Fluorocarbon gases treatment is implemented.
Objectives and Outcomes	Based on the results of the "Assistance in selecting technologies for Fluorocarbon gases destruction treatment facilities" conducted under "I-1-6 Technical training for private companies on appropriate Fluorocarbon gases recovery and treatment," a scheme for Japanese financing, such as a two-step loan, will be implemented.
Output	Introduction of Fluorocarbon gases destruction treatment facilities
Cooperation period	3 years
Anticipated C/P Institutions	DENR/CCS, DENR/ozone chamber
Other related institutions	DTI
Status of discussions with counterparts	Discussed with DENR/CCS

I-1-8 Project to Study the Establishment of a System to Promote the Use of Bio-Naphtha in the Petrochemical Industry

Name of Cooperation Program (tentative)	Climate Change Mitigation Support Program for High GHG Emitting Industries
Anticipated JICA Scheme	Short-term dispatch of experts
Background (issues related to climate change measures to be addressed by this cooperation program)	Since the petrochemical industry uses naphtha of fossil fuel origin, which emits CO ₂ during the cracking process, the Philippine NDC has set a goal to reduce CO ₂ emissions by using naphtha of plant origin, but the use of bio naphtha has not progressed at all. The reason is that bio naphtha is produced by only a few companies in the world (e.g., Neste) and all of them import it from overseas. The price of bio naphtha is extremely high, 2-3 times that of fossil fuel-origin naphtha, which increases procurement costs and reduces the profitability of the companies, thus causing them not to make investment decisions. This is a reason for companies not to make investment decisions.
Project Outline Overarching Goals	The Petrochemical industry can make the transition to bio naphtha as an alternative to naphtha from fossil fuel sources.
Objectives and Outcomes	A short-term expert will be dispatched to design a support system for companies, including tax incentives for importing bio naphtha from overseas.
Output	Consideration of preferential treatment for bio naphtha import duties
Cooperation period	1 year
Anticipated C/P Institutions	DENR/CCS, Petrochemical Industry Association
Other related institutions	DTI
Status of discussions with counterparties	Discussed with DENR/CCS

<Reasons for selecting this program>

<p>Contribution to support achievement of the Paris Agreement and NDC</p>	<p>The GHG emissions of the Philippine industrial sector in 2020 were 16.772 MtCO₂e, or 8.2% of the country's total GHG emissions. The Cement industry accounted for 77%, followed by the Iron and Steel industry at 13%, and the refrigeration and air conditioning (RAC) industry at 9%, with these three industries emitting the majority of GHGs in the industrial sector. The Cement, Iron and Steel, RAC, and Petrochemical industries are also covered by NDC's implementation measures in the Industrial Processes and Product Use (IPPU) sector. Therefore, implementation of this program targeting these three industries with large GHG emissions will lead to direct GHG reductions and contribute to the achievement of the NDC.</p> <p>Furthermore, the resolution of this issue will contribute to the achievement of the IPPU sector's 2028 CO₂ reduction target of 0.71 mt for the IPPU sector in the Philippine Development Plan (2023-2028) (GHG reduction effects are being estimated).</p>
<p>Consistency with sector policies</p>	<p>Consistent with NDC's Industrial Processes and Product Use (IPPU) Sector Implementation Policies (NDC, PAMs) and the achievement of the 2028 CO₂ reduction targets for the IPPU sector of the Philippine Development Plan (2023-2028) The NDC, PAMs are consistent with the Philippine Development Plan (2023-2028).</p>
<p>Urgency</p>	<p>In planning and implementing actual GHG reduction measures to achieve the 2030 NDC target, the urgency of this program is very high because there are only about five years remaining.</p>
<p>Status of support from other donors</p>	<p>The ADB is currently implementing a technical cooperation project with DENR on a project related to the RAC industry with the aim of providing advanced technologies and innovative solution options for Fluorocarbon lifecycle management starting in 2021. According to DENR, there is no overlap with this program, as it focuses on the policy aspects of overall life cycle management, rather than the specific topic of Fluorocarbon gases recovery in the private sector.</p>
<p>Economic efficiency</p>	<p>The payback period for GHG reduction measures is expected to be 5 years or longer, and the private sector is less willing to implement measures due to low short-term profitability. However, by providing financial support and economic incentives through this program, the payback period for measures can be shortened, thereby increasing the profitability of the private sector, economic potential is anticipated.</p>
<p>Investment Effectiveness</p>	<p>By providing financing support and economic incentives through this program, private companies can be encouraged to invest in GHG reduction measures, and it is expected that they will purchase not only Philippine products but also equipment that incorporates Japanese technology, resulting in a high investment effect.</p>
<p>DAC 6 items</p>	<p>Relevance: High (contributes to achieving NDC goals for 2030) Consistency: High (consistent with "(1) Strengthening the Foundations for Sustainable Economic Growth" in the Priority Areas of the Development Cooperation Policy (Medium-term Objectives)) Effectiveness: High (contributes to energy reduction in the industry through the use of alternative fuels and waste heat recovery; contributes to the Philippine national policy on Fluorocarbon gases reduction) Impact: High (leads to cost reductions through energy savings in the industry and contributes to economic revitalization) Efficiency: High (expected to spread throughout the industry) Sustainability: High (long-term project effects are expected by encouraging companies to invest in measures through financing support and economic incentives)</p>
<p>Consistency with Japanese government and JICA policies</p>	<p>Joint Statement of the Japan-Philippines Environmental Policy Dialogue (March 2, 2022) The statement regarding the management of Fluorocarbons involves assessing the potential for the recovery and destruction of HFCs, developing the capacities of policymakers and technicians, and advancing cooperation on utilizing the JCM. This aligns with the Japanese government's policy of providing support towards resolving this issue.</p> <p>JCM and TSL are likely to be utilized in the implementation phase of waste heat recovery measures in the Cement and Iron and Steel industries and will likely serve as a foothold for the introduction of Japanese knowledge and technology.</p>

Socially vulnerable groups, gender	(2) It is consistent with the promotion of co-benefit (development benefits and climate benefits) type climate change measures and directly contributes to the "doubling of GHG emission reductions by 2030 (2 million CO2 equivalent tons/year)".
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I-2	EV Industry Promotion Program			
Objective.	Promote EV adaption and the EV manufacturing industry through the development of enabling environment			
spread effect	The PDP's annual GHG reduction target for the transportation sector in 2028 is 5.14 MtCO ₂ e, and the World Bank estimates that the conversion of vehicles to EVs is the most cost-effective measure to achieve the goal. This project will also contribute to the Philippine government's policy of developing EV-related industries into export industries by 2040 through the formulation of homologation systems, human resource development, and manufacturing support.			
	Candidates for cooperation projects	Assumed scheme	Issues to be addressed	Implementation period
I-2-1	E-jeepneys Homologation Project	technical cooperation	Reduction of GHG emissions from old jeepneys. Safety, economic, and other issues arising from the absence of standards and certification systems.	short term
I-2-2	Financial assistance for installation of testing facility	Yen Loan/Grant/Technical Cooperation/ Training	Absence of vehicle inspection facilities/equipment for jeepneys and other vehicles, limited inspection technicians	Short to medium to long term
I-2-3	Financial assistance for jeepney Cooperatives to purchase E-jeepney	Loan	Insufficient funds for jeepney cooperatives to make replacements	Short to medium to long term
I-2-4	Capital Investment Financial assistance for EV manufacturing companies	Loan	Immaturity of EV manufacturing	Short to medium to long term
I-2-5	Study on the impact of EV tariffs policy on domestic industry	technical cooperation	Impact on domestic manufacturing and FDI of the currently timed tax exemption for EVs and EV components	short term

The following five projects were considered as candidates for individual cooperation projects in the above program.

I-2-1 E-jeepney Homologation Project

Name of cooperation program (tentative name)	EV Industry promotion program
Anticipated JICA Scheme	Technical Cooperation
Background (Issues related to climate change measures addressed by this cooperation program)	In the manufacture of E-jeepneys, for which no Homologation system currently exist, there is a need for assistance in establishing standards for size, durability, and safety. In particular, there have already been cases of fires caused by the use of inexpensive fuel cells, which is one of the factors hindering the spread of electric jeepneys. By bringing safe electric jeepneys that meet the standards to the market, and bringing down the price by standardized mass production, it is expected that users will be more willing to purchase and use E-jeepneys, which in turn will increase the conversion from diesel to electric jeepneys and reduce GHG and air pollutant emissions from jeepneys.
Project Outline Overarching Goals	Develop and implement a vehicle certification system, including manufacturing standards, product safety standards, and conformity testing facilities, for domestically manufactured e-

	jeepneys to promote the widespread use of EVs and, in turn, help achieve the NDC goals for the Philippines.
Objectives and Outcomes	<ul style="list-style-type: none"> a) To ensure the long-term sustainability of the industry, through the development of a vehicle certification system, human resources will be trained to be competent in system development and implementation. b) To ensure product safety, a Philippine E-jeepney homologation system will be developed. c) Through the design of test facilities, personnel with facility design capabilities will be developed.
Output	<ul style="list-style-type: none"> a) Personnel with the ability to develop and implement a vehicle certification system for E-jeepneys b) Official vehicle certification system for E-jeepneys c) List of necessary testing facility equipment and cost estimates
Cooperation period	Approx. 3 years
Anticipated C/P Institutions	DTI-BOI
Other Related Institutions	DOTr, DOST, EVAP
Points to keep in mind when implementing the program	PUVMP, which aims to convert aging jeepneys to those that meet the latest regulations, has taken a great deal of time to coordinate agreements with jeepney unions, but the proposed program does not cover activities for actual conversion to electric jeepneys.
Status of discussions with counterparts	Already submitted by DTI-BOI to NEDA as a candidate project for the JICA2023 Needs Survey.

I-2-2 Financial Assistance for Installation of Testing Facility

Name of cooperation program (tentative name)	EV Industry promotion program
Anticipated JICA Schemes	Yen Loan/Grant/Technical Cooperation
Background (Issues related to climate change measures addressed by this cooperation program)	Support the Philippine government's EV policy of fostering the EV industry and transforming it into an export industry in the future through the construction of vehicle inspection facilities that currently do not exist in the Philippines, and the introduction of necessary testing equipment.
Project Outline Overarching Goals	Vehicle inspection facilities are opened to ensure the safety of E-jeepneys and other domestically produced vehicles, paving the way for future exports.
Objectives and Outcomes	Establish a certification system by installing vehicle inspection facilities and equipment, training inspection engineers, and supporting the manufacture of vehicles that meet export-compliant safety standards.
Output	<ul style="list-style-type: none"> 1. Establishment of an inspection facility 2. Introduction of inspection equipment 3. Training of Inspection Engineers
Cooperation period	2-4 years
Anticipated C/P Institutions	DOTr
Other Related Institutions	DTI-BOI, DOST, EVAP
Status of discussions with counterparts	Discussed with CAR Program Office and DOTr PUVMP office in DTI-BOI. They are willing to proceed to the establishment of the system first, and then to this cooperation.

I-2-3 Financial Assistance for Jeepney Cooperative to purchase E-jeepney

Name of cooperation program (tentative name)	EV Industry promotion program
Anticipated JICA Schemes	Loan
Background (Issues related to climate change measures addressed by this cooperation program)	Currently, through the PUV modernization project, conversion from old jeepneys to newer model/E-jeepney is undergoing, and DBP and Land Bank are providing loans for the replacement. But the limited funds and the time required for screening are issues.
Project Outline Overarching Goals	Low-interest loans specifically for replacement to E-jeepneys will encourage replacement to E-jeepneys
Objectives and Outcomes	Facilitate conversion to E-jeepneys by providing more concessional loans than the current loans, since the loans currently offered are not specific to E-jeepneys. Provide loans more broadly by increasing the number of participating financial institutions (PFIs).

Output	1. Low-interest loans (Two Step Loan) for e-jeepneys 2. Expand lending schemes not only to state-owned banks but also to commercial banks
Cooperation period	3-5 years
Anticipated C/P Institutions	DBP, Land Bank
Other Related Institutions	DOTr, city banks, EVAP
Status of discussions with counterparts	Discussed ideas with DOTr PUVMP office and DBP.

I-2-4 Capital Investment Financial Assistance for EV Manufacturers

Name of cooperation program (tentative name)	EV Industry promotion program
Anticipated JICA Schemes	Loan
Background (Issues related to climate change measures addressed by this cooperation program)	Contribute to GHG reduction through promoting conversion to EVs. Encourage the rise of EV manufacturing by providing low-interest loans for capital investment to companies that manufacture EVs and EV components.
Project Outline Overarching Goals	Contribute to economic development and job creation through the development of EV manufacturing in the Philippines
Objectives and Outcomes	Capital investment in EV component manufacturing, assembly, and development will be stimulated, and the flourishing EV manufacturing industry in the Philippines will eventually contribute to the promotion of EVs.
Output	1. Low-interest loans for capital investment for EV manufacturers 2. Providing technology for EV manufacturing industry and business matching services with Japanese companies through consulting services
Cooperation period	2-3 years
Anticipated C/P Institutions	DBP, Land Bank
Other Related Institutions	DTI-BOI, City Bank, EVAP
Status of discussions with counterparts	Discussed ideas with CAR Program Office and DBP within DTI-BOI.

I-2-5 Study on the impact of EV tariffs policy on domestic industry

Name of cooperation program (tentative name)	EV Industry promotion program
Anticipated JICA Schemes	Technical Cooperation
Background (Issues related to climate change measures addressed by this cooperation program)	Although EV imports have been exempted from duty for 5 years starting in 2023 as a provisional measure, some parts manufacturers are withdrawing their FDI plan. The government plans to conduct a review of the impact of this law on the domestic industry and formulate a direction for future EV tariff policies (both for finished vehicles and parts).
Project Outline Overarching Goals	The impact of the elimination of EV import tariffs on domestic industry and FDI and future policy direction will be discussed to optimize the balance of domestic industry and FDI in EV imports and production and promote sustainable domestic EV penetration, which in turn will contribute to achieving the Philippines' NDC goals.
Objectives and Outcomes	a) A study of the positive and negative impacts of the elimination of EV import tariffs (including contribution to climate change action by increased imports) will be conducted. b) Policies for future EV tariff policies will be recommended.
Output	a) Results of a study of the positive and negative impacts of the elimination of EV import tariffs (including contribution of increased imports to climate change action) b) Policy Recommendations for Future EV Tariff Policy
Cooperation period	Approx. 3 years
Anticipated C/P Institutions	DTI/BOI Policy Planning
Other Related Institutions	DTI, MOF, DOTr, EVAP and other industry associations
Status of discussions with counterparts	DTI/BOI had the intention of submitting the project to NEDA as a candidate for the Requested Survey, but it has not been submitted in time to meet the 2023 deadline for the Requested Survey.

<Reasons for selecting this program>

Contribution to support achievement of the Paris Agreement and NDC	In the GHG inventory, the transportation sector accounts for 21.243% (24.174 MtCO ₂ e) of total emissions. In addition, the PDP's annual GHG reduction target for the transportation sector in 2028 is 5.14 MtCO ₂ e. CREVI has set a clean energy scenario of converting 50% of all vehicles in the country to EVs, which will contribute to achieving this goal. This will also contribute to achieving this goal. It will also contribute to the Philippines' policy goal of developing the EV industry into an export industry by 2040 in terms of formulating standards and certification systems, manufacturing support, and human resource development.
Consistency with sector policies	It will contribute to the policy of converting 50% of all vehicles to EVs, which is the target in the CREVI clean energy scenario.
urgency	CREVI's clean energy scenario aims to increase the number of EV vehicles in Philippines to more than 2.45 million by 2028, but with less than 10,000 EVs currently registered, the urgency to achieve this goal is high
Status of support from other donors	UNDP, UNEP, UNIDO, ADB and others are providing support.
economy (saving money)	not applicable
investment effect	The World Bank's analysis shows that it is the most effective compared to measures such as railroad maintenance and encouraging telecommuting.
DAC 6 items	Relevance: High (contributes to the development of the Philippine EV industry) Consistency: High (in the priority areas of the Development Cooperation Policy (Medium Goal), "(2) Align with ensuring human security for inclusive growth") Effectiveness: High (contributes to E-jeepney diffusion and air pollution improvement) Impact: High (expected to improve air pollution in the metropolitan area) Efficiency: High (standardization will serve as a guideline for the entire e-jeepney industry. (It will also contribute to improving production efficiency and meeting demand) Sustainability: High (long-term business benefits are expected from the creation of the standard)
Consistency with Japanese government and JICA policies	The Department of Land, Infrastructure, Transport and Tourism (MLIT) has been supporting the establishment and improvement of type certification, registration, inspection, maintenance, and inspection systems, laws, and systems in Vietnam, Cambodia, and Myanmar, because there are many issues in the development and operation of automobile infrastructure systems such as automobile standards certification systems, inspection, registration, inspection, and maintenance in the ASEAN countries. In the international community, Japan has demonstrated leadership as the vice-chair of the UN World Forum for Harmonization of Vehicle Regulations, which formulates international rules for ensuring vehicle safety and environmental protection. Japan is leading the formulation of safety and environmental standards, focusing on advanced technologies in which Japan has a technological advantage.
Socially vulnerable groups and gender	(2) It is consistent with the promotion of co-benefit (development benefits and climate benefits) type climate change measures and directly contributes to the "doubling of GHG emission reductions by 2030 (2 million CO ₂ equivalent tons/year)".

I-3	Waste Recycling Promotion Program			
Objective	Contribute to GHG reductions in raw material processing and at disposal by promoting waste recycling			
Spread effect	Contribute to the creation of a recycling eco-system by supporting the establishment of enabling environment of the EPR Act, with a focus on plastics, which only 9% are currently recycled.			
	Candidates for cooperation projects	Assumed scheme	Issues to be addressed	Implementation period
I-3-1	Project for policy-making capacity building for the recycling industry	Technical cooperation	Absence of recycling eco-system	short term
I-3-2	Financial Assistance for the Recycling Industry	Loan	Absence of facilities for proper demolition and recycling	Short to medium to long term

The following two projects were considered as candidates for individual cooperation projects in the above program.

I-3-1 Project for policy-making capacity building for the recycling industry

Name of cooperation program (tentative name)	Waste Recycling Promotion Program
Anticipated JICA Schemes	Technical Cooperation Project
Background (Issues related to climate change measures addressed by this cooperation program)	It has been more than 15 years since the study on building a recycling industry (JICA, 2006), but the current situation is that plastic is still partially recycled. In order to build a society in which recyclable waste is widely recycled, there is a need for support to understand the factors hindering the development of the recycling industry and to examine ways to address them. By fostering the waste recycling industry, it is expected to reduce the use of virgin materials and emission of GHG from dumped wastes.
Project Outline Overarching Goals	Policies will be developed to form and develop a recycling industry and the increased utilization of recycled materials among businesses will contribute to reduce the usage of virgin materials and GHG from dumped wastes, thereby contributing to the achievement of the Philippines' NDC goals.
Objectives and Outcomes	a) A database of the types and quantities of waste generated by companies in the industrial sector, as well as the types and quantities of waste that can be reused by companies as raw materials, will be developed and updated. b) Factors hindering the development of the recycling industry will be identified and ways to address them will be discussed. c) Legislation necessary to foster the recycling industry will be discussed.
Output	a) Database of types and quantities of waste generated by companies, as well as types and quantities of waste that can be reused as raw materials by companies. b) Factors hindering the development of the recycling industry, and how to address them c) Concept of legal system necessary for fostering recycling industry
Cooperation period	Approx. 3 years
Anticipated C/P Institutions	DTI-BOI Policy Planning, DENR
Other Related Institutions	LGUs,
Status of discussions with counterparts	DTI/BOI had the intention of submitting the project to NEDA as a candidate for the Requested Survey, but it has not yet been submitted in time to meet the 2023 deadline for the Requested Survey.

I-3-2 Financial Assistance for the Recycling Industry

Name of cooperation program (tentative name)	Waste Recycling Promotion Program
Anticipated JICA Schemes	Loan
Background (Issues related to climate change measures addressed by this cooperation program)	Absence of facilities for collection and recycling/proper disposal Illegal dumping and landfill disposal of valuable resources that can be reused.
Project Outline Overarching Goals	Increase the recycling rate and the percentage of waste that is properly disposed of in the Philippines
Objectives and Outcomes	Support the revitalization of the recycling industry by providing low-interest loans for collectors and recyclers/processors to invest in equipment and purchase vehicles
Output	Low-interest loans for capital investment for collectors and recyclers/processors Training for collectors and processors and government officials, including LGUs, through consulting services
Cooperation period	3-5 years
Anticipated C/P Institutions	DBP
Other Related Institutions	LGUs, DENR
Status of discussions with counterparts	Not discussed

<Reasons for selecting this program>

Contribution to support achievement of the Paris Agreement and NDC	Solid waste accounted for 4.851% of the 2010 GHG inventory. The 2028 reduction target for PDP is 1.08MtCO ₂ e. Of the waste generated in the Philippines, 45% comes from households, 21% from commercial facilities, 12.1% from government and educational/healthcare institutions, and 4.1% from manufacturing and industry.
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	Already contributing to soil, water, and air pollution due to improper disposal and treatment, 35% of plastic waste leaks into the ground and ocean, according to WWF. Plastics are made from petroleum and require processing at high temperatures during production, resulting in high energy consumption. The establishment of a recycling system will have a significant impact on the achievement of NDC because it will enable the use of new resources, reduce energy consumption, and reduce the impact of ocean dumping on the ecosystem.
Consistency with sector policies	Assisting EPR Act of 2022, RA 11898 by creating enabling environment
urgency	While the EPR Law is already in force, many companies are struggling to comply with it, and an immediate environmental improvement is required.
Status of support from other donors	WWF, UNIDO and others are providing support.
DAC 6 items	Relevance: High (contributes to the development of the recycling industry in the Philippines) Consistency: High (in the priority areas of the Development Cooperation Policy (Medium Goal), "(2) Align with ensuring human security for inclusive growth") Effectiveness: High (contributes to the promotion of its use as an alternative fuel and raw material in industry) Impact: High (leads to cost reduction in the entire industry and contributes to economic revitalization) Efficiency: High (expected to spread throughout the industry) Sustainability: High (long-term business benefits are expected from the system's creation)
Consistency with Japanese government and JICA policies	Most of the Japanese manufacturers in the Philippines are not only focusing on the Philippine market, but also focusing on export to other countries. Especially for products destined for Europe and the U.S., it is necessary that their manufacturing process including the waste disposal are in line with their required standard. The improvement of waste treatment capacity will also be beneficial to Japanese companies entering the market. It is also likely to serve as a foothold for the introduction of Japanese knowledge and technology as an advanced recycling country.
Socially vulnerable groups and gender	(2) It is consistent with the promotion of co-benefit (development benefits and climate benefits) type climate change measures and directly contributes to "doubling GHG emission reductions by 2030 (2 million CO2 equivalent tons/year)".

I-4	Micro, Small and Medium Enterprise Support Program			
Objective.	Support micro, small, and medium enterprises (MSMEs) to invest in energy-efficient equipment and more environmentally friendly manufacturing equipment			
spread effect	While MSMEs account for 99.6% of the total number of companies in the Philippines, they have not been able to implement environmental measures due to limited funds, human resources, and information. Although the impact of each individual company is small, reaching more companies and broadening the base of environmental awareness is expected to have the effect of encouraging the entire country to take action and improve awareness. In addition, meeting the environmental requirements imposed on exports will also contribute to promoting the transition to an export-oriented economy, which is one of the target of the Philippine government.			
	Candidates for cooperation projects	Assumed scheme	Issues to be addressed	Implementation period
I-4-1	Project for building Climate Smart Industries	technical cooperation	Limited knowledge of green manufacturing and energy saving devices among MSMEs and Negosyo Center staff	short term
I-4-2	Financial assistance for the installation of Green equipment	Loan	Insufficient funds for SSMEs to install equipment and energy-saving facilities for green manufacturing	Short to medium to long term

The following two projects were considered as candidates for individual cooperation projects in the above program

I-4-1 Project for building Climate Smart Industries

Name of cooperation program (tentative name)	Micro, Small and Medium Enterprise Support Program
Anticipated JICA Schemes	Technical Cooperation Projects
Background (Issues related to climate change measures addressed by this cooperation program)	To broaden the knowledge of MSMEs and accelerate environmental initiatives in their respective companies by introducing options and technologies for various initiatives, given the limited access to and information on technologies such as energy conservation and smart factories in MSMEs and LGUs.
Project Outline Overarching Goals	Improve MSMEs' and LGUs' staff's knowledge of the latest technologies, such as energy conservation and smart factories, and create opportunities for the adoption of these technologies
Objectives and Outcomes	Adoption of more environmentally friendly technologies and products in MSMEs
Output	<ul style="list-style-type: none"> ● Training for MSMEs and LGUs staff ● Development of training materials that summarize examples of energy conservation and smart factory technology adoption.
Cooperation period	Approx. 3 years
Anticipated C/P Institutions	DTI-BSMED, DENR
Other Related Institutions	LGUs
Status of discussions with counterparts	Conducted discussions with DTI-BSMED

I-4-2 Financial assistance for the installation of Green equipment

Name of cooperation program (tentative name)	Micro, Small and Medium Enterprise Support Program
Anticipated JICA Schemes	Loan
Background (Issues related to climate change measures addressed by this cooperation program)	Limited financial incentives for MSMEs to adopt technologies such as energy conservation and smart factories, etc.
Project Outline Overarching Goals	Facilitate the adoption of environmentally friendly technologies and products in MSMEs
Objectives and Outcomes	Providing long-term financing at lower interest rates will motivate MSMEs to make capital investments in energy-efficient equipment, etc.
Output	<ul style="list-style-type: none"> ● Low-interest loans to MSMEs for capital investment in energy-saving equipment, etc. ● Training for MEMEs and staff of participating financial institutions (PFIs) on energy efficiency and conservation technologies through consulting services
Cooperation period	3-5 years
Anticipated C/P Institutions	DBP, Land Bank
Other Related Institutions	DTI-BSMED, LGUs, and city banks
Status of discussions with counterparts	Discussed concept with DTI-BSMED and DBP

<Reasons for selecting this program>

Contribution to support achievement of the Paris Agreement and NDC	Calculating emissions by MSMEs is difficult, but given that they represent 99.6% of Philippine businesses, generate 40% of GDP, and engage 63% of the workforce, climate change action in MSMEs has a significant impact, both in terms of mitigation and adaptation.
Consistency with sector policies	It is consistent with the Small and Medium Enterprises Act, the Law on Promoting Job Creation and Inclusive Growth through the Development of Micro, Small and Medium Enterprises, the Roadmap on Green Manufacturing, and the Roadmap on Green Public Procurement.
Urgency	Mememes account for 99.6% of the total number of companies and need to be addressed, but the level of urgency is low as many initiatives are needed.
Status of support from other donors	GIZ was providing support.
DAC 6 items	<p>Relevance: High (consistent with needs and policies)</p> <p>Consistency: High (consistent with (1) Strengthening the Foundations for Sustainable Economic Growth in the Medium-term Objectives of the Development Cooperation Policy)</p> <p>Effectiveness: MESMEs in the Philippines generate 40% of GDP and account for 99.6% of the number of firms, making them highly effective</p>

	Impact: Although the effect is limited for each company's measures, Efficiency: Persistence: High
Consistency with Japanese government and JICA policies	JICA has provided assistance in the past in areas such as industrial human resource development. Many Japanese companies have established operations in the Philippines, and the growing environmental awareness of Philippine companies is expected to be of great benefit to Japanese companies as well.
Socially vulnerable groups and gender	(2) It is consistent with the promotion of co-benefit (development benefits and climate benefits) type climate change measures and directly contributes to the "doubling of GHG emission reductions by 2030 (2 million CO2 equivalent tons/year)".

2) Evaluation of the cooperation programs

Table 3-19 Evaluation of the possible cooperation programs (Industry Sector)

Possible Cooperation program	Climate Countermeasure Effect		Spillover Effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
I-1Climate Change Assistance Program for High GHG Emitting Industries				
Feasibility Study on AFR Utilization and Waste Heat Recovery in Cement Industry	Contributed to a partial reduction of 6.5 MtCO ₂ e of GHG emissions in the cement industry in 2010	N/A	Long-term business benefits are expected from the financing support and economic incentives provided by this program, which will encourage companies throughout the cement industry to invest in the measures	JCM and TSL can be considered in the implementation phase of waste heat recovery measures in the Cement industry. Specifically, the preheating boiler and air-cooled boiler at the Cement plant introduced to Republic Cement under the 2023 JCM equipment subsidy have been used to recover waste heat energy and turn a steam turbine to generate electricity. This Japanese technology is likely to serve as a foothold for introducing this technology to other cement plants.
Financial assistance for AFR utilization and introduction of waste heat recovery facilities in the cement industry		N/A		
Feasibility Study on Introduction of Energy Reduction Measures in Iron and Steel Industry	Contributed to a partial reduction of 1.1 MtCO ₂ e of GHG emissions in the steel industry in 2010	N/A	Long-term business benefits are expected by providing financing support and economic incentives through this program to encourage companies throughout the steel industry to invest in the measures	JCM and TSL may be used in the implementation phase of waste heat recovery measures in the Iron and Steel industry. Specifically, Japanese steelmakers have adopted a technology to reduce energy use by generating steam from waste heat from electric furnaces used in the steelmaking process and using it in the field. This technology is likely to serve as a foothold for introducing this Japanese
Financial assistance for the introduction of waste heat recovery facilities in the Iron and Steel industry		N/A		

Possible Cooperation program	Climate Countermeasure Effect		Spillover Effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
				technology to the steel industry.
RAC Industry Study Project for Establishing a System to Promote the Use of Low Global Warming Potential (GWP) Refrigerants	Contributed to a partial reduction of 0.8 MtCO ₂ e of GHG emissions in 2010 for the RAC industry	N/A	Long-term business benefits are expected by providing financing support and economic incentives through this program to encourage companies throughout the RAC industry to invest in the measures.	Possibility of leveraging Japan's experience and expertise in supporting the diffusion of low-GWP refrigerants
Technical training for private companies on appropriate HFC gas recovery and treatment		N/A	Increased economics of the current Fluorocarbon gases recovery business will encourage more companies to enter the market.	Possibility of utilizing Japan's experience and knowledge of Fluorocarbon gases recovery and treatment
Financial assistance for the introduction of a HFC gas destruction treatment facility		N/A	Expected employment in the Philippine construction industry during the construction of the Fluorocarbon gases destruction and processing facility.	When introducing Fluorocarbon gases destruction treatment facilities, technologies other than incineration technology are required, and there is potential for the use of Japanese technology. Specifically, the 2019 JCM equipment subsidy has introduced a Fluorocarbon gases destruction facility (non-combustion method) at Thuan Thanh Company in Vietnam, which is likely to serve as a foothold for introducing these Japanese technologies.
Project to Study the Establishment of a System to Promote the Use of Bio-Naphtha in the Petrochemical Industry	Contributed to a partial reduction of 0.02 MtCO ₂ e of GHG emissions in the petrochemical industry in 2010	N/A	By providing economic incentives through this program, the entire Petrochemical industry is expected to see long-term business benefits by encouraging companies to invest in measures	Japan's experience and knowledge in promoting the use of bio naphtha can be utilized.

Possible Cooperation program	Climate Countermeasure Effect		Spillover Effect	Possible application Japan's knowledge and technology			
	Mitigation	Adaptation					
I-2 EV Industry Promotion Program							
E-jeepney Homologation Project	The transportation sector accounts for 14.4% (29.431 MtCO ₂ e) of total emissions in the 2020 GHG inventory and will contribute to the reduction of a portion of these emissions.	Contribute to the creation of standards for vehicles that are less likely to break down and safer in heavy rain and flooding	This program is expected to foster the development of EV-related industries through the establishment of manufacturing standards and certification systems, human resource development, and support for the manufacturing industry.	The experience and knowledge of Japan's standards and certification systems, especially in ASEAN countries, can be utilized.			
Financial Assistance for Installation of Testing Facility							
Financial Assistance for jeepney cooperative to purchase E-jeepney					N/A	Increased conversion of Jeepneys, public transportation vehicles, to EVs will contribute to GHG reduction	none in particular
Financial assistance for EV manufacturers					N/A	Increasing the number of EV component manufacturers and the domestic procurement rate of EVs will lower production costs and promote conversion to EVs.	Able to leverage the experience and knowledge of the Japanese manufacturing industry
Study on the impact of EV tariffs policy on domestic industry					N/A	A healthier growth of EV-related industries as a whole is expected, while maintaining a balance between domestic industry development, FDI promotion, and EV imports.	Capable of leveraging Japan's experience and expertise in EV promotion and support
I-3 Recycling Industry Promotion Program							
Project for policy-making capacity building for the recycling industry	Increased recycling rate contributes to reduction of GHGs during manufacturing and	N/A	It is expected to help solve waste disposal problems, including raising awareness among	Able to share experiences and knowledge of recycling efforts in Japan			

Possible Cooperation program	Climate Countermeasure Effect		Spillover Effect	Possible application Japan's knowledge and technology
	Mitigation	Adaptation		
	methane emissions during disposal		businesses and citizens through various policies related to recycling.	
Financial Assistance for the Recycling Industry		N/A	Expected to promote the establishment of a recycling system through the creation of opportunities and modernization of the recycling industry	Utilizing the experience of Japanese technologies and initiatives through consulting services
I-4 MSMEs Support Program				
Project for Building Climate Smart Industries	Contribute to GHG reductions by deepening knowledge of energy-efficient equipment and measures that can be taken by each industry to encourage compliance with MSMEs.	Contribution through support for environmental risks and BCP creation	Contribute to the transformation of environmental awareness and practices throughout the Philippine industry through increased environmental awareness among MSMEs, which currently have no emission controls or reporting requirements.	Possibility of sharing energy-saving and smart factory technologies possessed by Japanese companies
Financial assistance for installation of Green equipment	Contribute to GHG reductions through the introduction of energy-saving and other facilities	N/A		Utilizing the experience of Japanese technologies and initiatives through consulting services

(4) Agriculture

1) Possible program concept

In the agriculture sector, cooperation programs were examined in four subsectors, production (land management), irrigation development, fisheries development and livestock development.

Table 3-20 Possible cooperation programs (agriculture sector)

Cooperation Programs	Cooperation Projects	
	Short term	Mid-to-long term
A-1 Climate Resilient Agricultural (CRA) and Farmland Management Capacity Building Program	Expert Disptach for the Capacity Building of DA for Climate Resilience A-1-1	
	Capacity Building Project for the Capacity Building of DA for Climate Resilience A-1-2	
	JICA Knowledge Co-Creation Program for Agricultural Technology as Solutions to Climate Change A-1-3	
	Smart Agriculture Technology Development Project A-1-4	
	Soil Organic Carbon Sequestration Validation Project	
A-2 Climate Resilient Irrigation Planning, Operation and Maintenance Program	Agri-climatic Mesh Data Development Support Project A-2-1	
	Small Scale Flood Control and Water Storage System Piloting and Validation Project A-2-2	
	Integrated Watershed management Master Plan Development using NbS A-2-4	
	Updating of Irrigation Designing Manual in Consideration of Climate Change A-2-5	
A-3 Climate Resilient Fisheries Development Program	Basic Survey for Climate Smart Fisheries Development Project A-3-1	Climate Smart Fisheries Development Project A-3-2
	JICA Knowledge Co-Creation Program for Climate Resilient Fisheries A-3-3	
	Climate Smart Fisheries Technology Validation Project A-3-4	Loan Assistance for the Development and Modernization of Fisheries Related Facilities and Equipment A-3-5
A-4 Climate Resilient Smart Livestock Development Program	Expert Disptach for the Promotion of Smart Livestock A-4-1	
	Technical Assistance Project for the Promotion of Smart Livestock A-4-2	
	JICA Knowledge Co-Creation Program for Livestock Technology in Consideration of Climate Change A-4-3	
	Smart Livestock Technology Validation Project A-4-4	Loan Assistance for the Introduction of Smart Livestock Techonology A-4-5

A-1	Climate Resilient Agricultural Land Management Capacity Building Program
Objective	Develop climate change countermeasure technologies and tools to support policy deliberations and farm management based on the latest weather science, and aim to achieve both food security and sustainable agriculture through technology validation and human resource development for their dissemination (mitigation and adaptation).
Spread effect	One of the challenges in agriculture in the Philippines is low productivity caused by climatic disasters and agricultural land management (shortage of irrigation facilities, scarce material inputs, etc.). Improvement, new development and localization of support tools for planning to implement farmland management and CRA to increase agricultural productivity, and strengthening of human resource development to use these tools, are expected to reduce the risk of

	<p>damage to the agricultural sector caused by natural disasters and improve the livelihood of farmers, who account for 20% of the working population. For the mitigation sector, net emissions from the agricultural sector can also be assessed by evaluating agricultural carbon sequestration functions of coconut farms, for example, which are currently not considered in GHG inventories.</p>			
	Possible cooperation projects	Applicable JICA support scheme	Issues to be solved	Implementation period
A-1-1	Expert Dispatch for the Capacity Building of DA for Climate Resilience	Expert Dispatch	<p>Limitation of information dissemination and reliable farming tools to disseminate CRA and provide guidance in response to climate change</p> <p>Delays in research and dissemination of agricultural technologies that improve productivity and are sustainable</p>	Short term
A-1-2	Capacity Building Project of DA for Climate Resilience	Technical Cooperation	<p>Limited capacity of central office staff of DA for the development and implementation of agri-fisheries policies and practices in response to climate change</p> <p>Inadequate capacity of DA-RFO and LGUs to develop, obtain budgets for, and implement local development plans in response to climate change, and their inadequate capacity to provide CRA extension and agricultural guidance</p> <p>Limited consideration of additional measures for NDC PaMs</p>	Short, mid term
A-1-3	Training and Dialogue Program for Agricultural Technology as Solutions to Climate Change	Knowledge Co-Creation Program	<p>Delays in research and dissemination of agricultural technologies that improve productivity and are sustainable</p> <p>Delays in the introduction of renewable energy in the agriculture and fisheries sectors</p>	Short term
A-1-4	Smart Agriculture Technology Development Project	PPP		Short term
A-1-5	Soil Organic Carbon Sequestration Validation Project	Technical Cooperation	<p>Delay in verification of agricultural carbon sequestration potential</p> <p>Limited GHG inventory methodology and data collection</p> <p>Limited incentives for agriculture and fishery workers working on climate change countermeasures</p>	Short term

The following five projects were considered as candidates for individual cooperative projects in the above program.

A-1-1 Expert Dispatch for the Capacity Building of DA for Climate Resilience

Name of Cooperation Program (tentative)	Climate Resilient Agricultural Land Management Capacity Building Program
Anticipated JICA Scheme	Expert Dispatch
Background (issues related to climate change measures to be addressed by this cooperation program)	Climate Resilience Agriculture (CRA) policies and practices need to be mainstreamed to strengthen the capacity to respond to climate risks. The central government is required to take climate change risks into account in its roadmap for major commodities, but there are some commodities for which impact assessment and countermeasures have not been conducted. While there is a lack of human resources to conduct CRA dissemination and agricultural guidance to farmers in DA-FROs and LGUs, there is a need to provide efficient agricultural guidance by utilizing reliable agricultural tools based on scientific data. Even within DA, multiple information and tools co-exist and their application (targets and situations of use) are unclear, resulting in confusion at the local and farmer levels.
Project Outline Overarching Goals	Climate resilience of the agricultural sector will be improved.
Objectives and Outcomes	Measures against climate change, including digital agriculture technologies being developed in the agriculture sector, and databases related to land management will be organized to provide a clear direction for the development and dissemination of CRA technologies that will be needed.
Outputs	<ul style="list-style-type: none"> • Analysis and evaluation of existing databases and tools related to climate change • Selection of tools that need to be updated or newly developed • Selection of candidate technologies and verification of their feasibility
Cooperation period	1 – 2 years
Anticipated C/P Institutions	DA-CRAO, DA-BAR
Other related institutions	Philrice, PSA, DA-BSWM, DA-ICTS, UPLB
Matters to be considered in implementation	With support from ADB, a compilation of recommendations for strengthening the organizational capacity for CRA as a whole in the DA is planned.

A-1-2 Capacity Building Project of DA for Climate Resilience

Name of Cooperation Program (tentative)	Climate Resilient Agricultural Land Management Capacity Building Program
Anticipated JICA Scheme	Technical Cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	Although the DA-CRAO is in charge of implementing capacity building activities for DA and LGU staff, it has not been fully implemented and CRVA has not been fully reflected in the commodity roadmaps and LGU agricultural investment plans. While there is a limited human resources to conduct CRA dissemination and agricultural guidance to farmers in RFOs and LGUs, there is a need to provide efficient agricultural guidance by utilizing reliable agricultural tools based on scientific data.
Project Outline	Climate resilience of the agricultural sector will be improved.
Overarching Goals	Awareness climate change within DA, RFOs and LGUs will be increased and decision support tools for considering climate change measures will be used at all stages of planning, policy formulation, budgeting, etc. Plans in the central and local levels will be developed based on climate change risks. CRA dissemination will be done using farm management support tools considering local characteristics and crops grown.
Objectives and Outcomes	<ul style="list-style-type: none"> • Improve awareness of DA, RFOs, and LGU staff on the latest weather science, use of weather information, and NDC targets. • Review of commodity roadmaps and study of countermeasures (central government and RFOs) and formulation of regional development plans (LGUs) using climate change action support tools • Improvement or development of advisory tools according to local characteristics and crop type

Cooperation period	Approx. 3 years
Anticipated C/P Institutions	DA-CRAO
Other related institutions	DA bureaus, LGUs
Matters to be considered in implementation	ADB support is planned for 5 provinces in the BARMM region. CIS strengthening in 9 provinces is planned with FAO support.

Name of Cooperation Program (tentative)	Climate Resilient Agricultural Land Management Capacity Building Program
Anticipated JICA Scheme	Technical Cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	GHG emissions from the agricultural sector accounted for about 30% of the Philippines total GHG emissions in 2010 and is a target sector for NDC mitigation but GHG emissions are not expected to increase toward 2030, and no specific GHG reduction targets have been set in the PDP 2023-2028
Project Outline	Effective climate change measures in the agricultural sector will be identified to reduce GHG emissions and achieve improvement of productivity.
Overarching Goals	Implementation plan for additional NDC measures will be developed, climate finance will be accessed and the budget necessary to implement measures will be secured.
Outputs	<ul style="list-style-type: none"> • Concretization of additional measures for PaMs based on the results of phase 1 • Creation of PDD for access to climate finance
Cooperation period	Approx.. 2-3 years
Anticipated C/P Institutions	DA-CRAO
Other related institutions	DA bureaus, LGUs
Matters to be considered in implementation	ADB support MRV for NDC implementation.

A-1-3 Training and Dialogue Program for Agricultural Technologies as Solutions to Climate Change

Name of Cooperation Program (tentative)	Climate Resilient Agricultural Land Management Capacity Building Program
Anticipated JICA Scheme	Knowledge Co-Creation Program
Background (issues related to climate change measures to be addressed by this cooperation program)	While population growth is increasing and demand for food, agricultural productivity is low due to damage caused by climatic disasters. Farmers are also aging and decreasing in number. ICT should be utilized to improve productivity and ensure food security.
Project Outline	
Overarching Goal	Increased digitization and modernization of agricultural sector will improve climate resilience.
Objectives and Outcomes	An action plan will be developed to promote the implementation of adaptation and mitigation measures using agricultural technologies as solutions to climate change.
Outputs	<ul style="list-style-type: none"> • Acquire knowledge of specific adaptation and mitigation measures that can be implemented in the agricultural sector • develop an action plan to promote the implementation of adaptation and mitigation measures using agricultural technologies as solutions to climate change
Cooperation period	1 month
Anticipated C/P Institutions	DA-BAFE, DA-BAR
Other related institutions	RFO
Matters to be considered in implementation	Cooperation agreements based on the MAFF Green Food System Strategy have been exchanged bilaterally and in the ASEAN region.

A-1-4 Smart Agriculture Technology Development Project

Name of Cooperation Program (tentative)	Climate Resilient Agricultural Land Management Capacity Building Program
Anticipated JICA Scheme	PPP (Survey with the Private Sector)
Background (issues related to climate change measures to be addressed by this cooperation program)	While population growth is increasing and demand for food, agricultural productivity is low due to damage caused by climatic disasters. Farmers are also aging and decreasing in number. ICT should be utilized to improve productivity and ensure food security.

addressed by this cooperation program)	
Project Outline	
Overarching Goal	Increased digitization and modernization of agricultural sector will improve climate resilience.
Objectives and Outcomes	R&D and dissemination of agricultural technology that improves both productivity and sustainability
Output	<ul style="list-style-type: none"> • Development of monitoring and evaluation methods for crop growth and soil fertility using satellite data • Verification of technologies that can be utilized in renewable energy programs (REPAFS 2022-2030)
Cooperation period	Approx.. 1 – 2 years
Anticipated C/P Institutions	DA-BAFE
Other related institutions	Philrice, PCA, Philippine Space Authority
Matters to be considered in implementation	Cooperation agreements based on the MAFF Green Food System Strategy have been exchanged bilaterally and in the ASEAN region.
Discussions with C/Ps	PCA has requested technical cooperation support. Philrice is working on rice, and DA-BAFE is working with PSA on maize and onions, and has confirmed its intention to expand.

A-1-5 Validation of soil carbon content potential using the soil carbon dynamics model (RothC)

Name of Cooperation Program (tentative)	Climate Resilient Agricultural Land Management Capacity Building Program
Anticipated JICA Scheme	Technical cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	GHG inventories of the agricultural sector have been estimated for 2015 and 2020 based on the data of PSA but limited estimation of agricultural carbon sequestration have been made. Increasing soil carbon content is being considered as an NDC measure.
Overarching Goal	National carbon content will be verified to estimate the climate change mitigation potential of agricultural soils, which can be enhanced through sustainable agricultural land management.
Objectives and Outcomes	Assessment methods for soil carbon content as a climate change mitigation measure will be established and monitoring facilities will be developed.
Output	<ul style="list-style-type: none"> • Soil carbon content is verified by soil carbon dynamics model and its improved version. • Sustainable cropland management capacity will be enhanced through the dissemination of soil environmental improvement technologies such as biochar and compositional management. • Formulation of methodologies that can be used in carbon credit projects
Cooperation period	Approx. 3 years
Anticipated C/P Institutions	DA-BSWM, PCA
Other related institutions	RFO, PhilRice, IRRI
Matters to be considered in implementation	NARO, JIRCAS, IRRI, and PhilRice collaborated to develop a national-scale model of paddy field carbon content; FAO released a global soil organic carbon map in 2023 with the collaboration of DA-BSWM in the Philippines.

<Reasons for the project selection>

A-1 Climate Resilient Agricultural Land Management Capacity Building Program

Indicator	Contents
Contribution to achievement of the Paris Agreement and NDC targets	NDC's contribution to the adaptation area "Food Security" is high. The risk of damage to the agricultural sector from natural disasters is expected to be reduced through the improvement and new development of planning support tools for implementing farmland management and CRA to increase agricultural productivity, as well as strengthening human resource development for using these tools. In the area of mitigation, net emissions from the

	agricultural sector can be assessed by evaluating the carbon sequestration function of agricultural lands such as coconut farms, which has not been sufficiently in GHG inventories.
Consistency with sector policies	Consistent with the National Agriculture and Fisheries Modernization and Industrialization Plan (NAFMIP2020-2030)
Urgency	“Food Security” is at the top of the President’s Socioeconomic Agenda. The urgency is high because the amount of damage to agriculture caused by natural disasters exceeds the growth rate of the sector and is hindering the achievement of the agricultural promotion goals set forth in the Mid-term Development Plan and Sector Plans.
Status of support from other donors	Three GCF projects and one Adaptation Fund project are underway, and FAO, ADB, WB, GIZ, etc. are implementing cooperation programs.
DAC evaluation criteria	Relevance: High (consistent with needs and policies) Consistency: High (consistent with (2) Ensuring Human Security for Inclusive Growth in the Medium-term Objectives of the Development Cooperation Policy) Effectiveness: High Impact: High (because mainstreaming CRA in the Department of Agriculture will contribute to solving issues such as food security) Efficiency: High (because farming tools will be developed and improved to supplement the shortage of CRA extension workers in rural areas) Sustainability: High (however, the use of various tools may be affected by the telecommunication environment, and therefore, it is necessary to improve the telecommunication environment as well).
Consistency with Japanese government and JICA’s policies	Cooperation agreements based on the MAFF Green Food System Strategy are being negotiated bilaterally and in the ASEAN region. There is a possibility to introduce and deploy technologies and initiatives of Japanese companies that contribute to adaptation and mitigation activities to address issues in the agriculture and fisheries sectors, which is consistent with the Japanese government's climate change measures.
Inclusion of socially vulnerable population and gender perspective	The cooperation aims to improve the capacity of the Department of Agriculture to understand and respond to climate risks and to incorporate climate change countermeasures (adaptation and mitigation) into its existing projects, which will contribute to adaptation and mitigation and help achieve JICA's Global Agenda No. 16 on climate change countermeasures.

A-2	Climate Resilient Irrigation Planning, Operation and Management Program			
Objective	Climate change has indicated that the Philippines may experience water shortages by 2040. In recent years, droughts related to El Niño have also occurred, which have greatly affected agricultural production. The project aims to improve agricultural productivity and ensure food security through appropriate irrigation facility development and management in light of the impacts of climate change. (Adaptation/Adaptation)			
Spread effect	One of the challenges in the Philippine agriculture is low productivity caused by the shortage of irrigation facilities and facilities to prevent flood damage. By promoting the accumulation, management, and sharing of meteorological data on water resources, studying irrigation and water storage facilities according to their scale, from large-scale facilities to the community level, and developing manuals and strengthening human resource development, it is expected to improve agricultural productivity and reduce the risk of damage caused by climatic disasters, and to improve the livelihood of farmers, who account for 20% of the working population. This is expected to lead to improved livelihoods for farmers, who account for 20% of the working population.			
	Possible cooperation projects	Applicable JICA support scheme	Issues to be solved	Implementation period
A-2-1	Agri-climatic Mesh Data Development Support Project	Technical cooperation	Limited capacity to plan, operate, and manage irrigation facilities (limited weather observation)	Short term

			data as a basis for management)	
A-2-2	Small Scale Flood Control and Water Storage System Piloting and Validation Project	Technical cooperation or PPP	Shortage of small-scale irrigation, water storage and drainage facility development	Short term
A-2-3	Integrated Watershed management Master Plan Development using NbS	Technical cooperation	Limited capacity for planning, operation, and management of irrigation facilities	Short term
A-2-4	Updating of Irrigation Designing Manual in Consideration of Climate Change	Technical cooperation	Limited capacity for planning, operation, and management of irrigation facilities	Short term

A-2-1 Agri-climatic Mesh Data Development Support Project

Name of Cooperation Program (tentative)	Climate Resilient Irrigation Planning, Operation and Management Program
Anticipated JICA Scheme	Technical cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	As indicated in the National Irrigation Master Plan (NIMP 2020-2030), the irrigation development throughout the country needs to be increased to achieve food security. Accumulation of local weather data and future projections are necessary for appropriate irrigation facility development and operation management that takes climate change into account.
Overarching Goal	Rural communities become resilient to climate change impacts such as floods and droughts
Objectives and Outcomes	High-resolution meteorological data that will serve as basic data for appropriate facility maintenance against floods and droughts that are becoming more extreme due to climate change will be developed.
Output	<ul style="list-style-type: none"> • Organize procedures for creating mesh precision meteorological data • Upgrading and adding to existing AWS • Development of mesh precision weather data • Training of relevant organizations on data utilization (central government, RFOs, LGUs, water users' associations, etc.)
Cooperation period	Approx 3 years
Anticipated C/P Institutions	DA-BSWM, PAGASA
Other related institutions	PhilRice, DA-BAFE
Matters to be considered in implementation	None

A-2-2 Small Scale Flood Control and Water Storage System Piloting and Validation Project

Name of Cooperation Program (tentative)	Climate Resilient Irrigation Planning, Operation and Management Program
Anticipated JICA Scheme	Technical cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	As indicated in the NIMP 2020-2030, there is a need to increase the rate of irrigation development throughout the country in order to achieve food security.
Overarching Goal	Rural communities become resilient to climate change impacts such as floods and droughts
Objectives and Outcomes	Enable farmers to respond to floods and droughts that are becoming more extreme due to climate change by investing in facilities and strengthening technical capacity (increase agricultural productivity and reduce flood impacts)
Output	<ul style="list-style-type: none"> • Small-scale flood control and water storage systems will be designed and management options will be considered • Small-scale flood and water storage systems will be validated in rural communities

	<ul style="list-style-type: none"> • Sustainable management of farmland through soil and water management techniques such as contour agriculture and AWD • Policy and investment plans will be developed at the local level for land and stormwater management.
Cooperation period	Approx. 3 years
Anticipated C/P Institutions	DA-BSWM
Other related institutions	DA-BAR
Matters to be considered in implementation	Project concept submitted by DA-BAR to DA-CRAO but no final support needs identified.

A-2-3 Integrated Watershed management Master Plan Development using NbS

Name of Cooperation Program (tentative)	Climate Resilient Irrigation Planning, Operation and Management Program
Anticipated JICA Scheme	Technical Cooperation for Development Planning
Background (issues related to climate change measures to be addressed by this cooperation program)	It has been pointed out that the Philippines may experience water scarcity by 2040, which will result in competing demands for water for agricultural irrigation, drinking water, and power generation, requiring integrated management of water resources. Under the National Irrigation Master Plan (NIMP), development of multi-purpose facilities, including irrigation, is planned.
Project Overview Overarching Goal	Support the development of multi-organization, multi-use structures planned from a watershed-wide perspective, integrating the use of water resources for competing uses and disaster prevention using more ecological and nature-friendly designs and technologies to promote economic development while protecting nature and ecosystems
Objectives and Outcomes	Select one model watershed from major watersheds in the country and prepare a watershed master plan to reduce flood damage, increase irrigated areas, improve water quality and vegetation, and increase community income (candidates are Cagayan due to flood occurrence, Bicol due to typhoon damage, and one water system in Mindanao due to economic development)
Output	(Excerpts only related to irrigation development) a. Basin-wide surface water reliability estimates b. Determination of irrigable area c. Selection of alternative rice crops d. Validation of pressurized irrigation potential for water-saving technology
Cooperation period	Approx. 3 years
Anticipated C/P Institutions	NIA
Other related institutions	DPWH, LWUA, DENR, NEDA, LGUs
Matters to be considered in implementation	The Department of Water Resources is to be established, under which water resource management related agencies will be integrated. NIA is expected to be transferred from DA to the new organization.

A-2-4 Updating of Irrigation Designing Manual in Consideration of Climate Change

Name of Cooperation Program (tentative)	Climate Resilient Irrigation Planning, Operation and Management Program
Anticipated JICA Scheme	Technical cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	As indicated in the NIMP 2020-2030, there is a need to increase the irrigation development throughout the country in order to achieve food security. The current irrigation planning and design manual does not take into account the effects of climate change, and a review of its contents is required.
Project Overview Overarching Goal	Irrigation facilities are developed with climate change impacts in mind, making rural villages more resilient to climate change impacts such as floods and droughts.
Objectives and Outcomes	
Output	<ul style="list-style-type: none"> • Organize information for manual revision (verification of differences between climate change impacts assumed in the FS and actual operational conditions) • Manual Revision • Training on the revision manual

Cooperation period	Approx. 3 year
Anticipated C/P Institutions	NIA
Other related institutions	DA-BSWM
Matters to be considered in implementation	The Department of Water Resources is to be established, under which water resource management related agencies will be integrated. NIA is expected to be transferred from DA to the new organization.

<Reasons for the project selection>

A-2 Climate Resilient Irrigation Development Program

Indicator	Contents
Contribution to achievement of the Paris Agreement and NDC targets	NDC's contribution to the adaptation areas of "Food Security" and "Water sufficiency" is high. Through the planning and implementation of facility development to cope with floods and droughts, and the strengthening of human resource development for this purpose, it is expected to improve agricultural productivity and reduce the risk of damage to the agricultural sector caused by natural disasters.
Consistency with sector policies	Consistent with NIMP 2020-2030.
Urgency	The possibility of water shortages in the future due to climate change is being pointed out, and the need to promote the development of irrigation facilities through NIMP 2020-2030 is highly urgent in order to improve agricultural productivity.
Status of support from other donors	ADB and KEXIM Bank support National Irrigation System (NIS); WB and AfD support or will support communal irrigation systems (CIS) than NIS
DAC evaluation criteria	High return on investment as it improves agricultural productivity and prevents flood damage
Consistency with Japanese government and JICA's policies	Relevance: High (consistent with needs and policies) Consistency: High (consistent with "(2) Ensuring human security for inclusive growth" in the Medium-term Objectives of the Development Cooperation Policy) Effectiveness: High (because facilities are being developed with climate change in mind) Impact: High (because it improves agricultural productivity and prevents flood damage) Efficiency: High (Applicable to a wide range of irrigation facility development from community level to national scale. Agro-meteorological mesh data can be used not only for irrigation development but also for farmland management) Persistence: High
Inclusion of socially vulnerable population and gender perspective	Cooperation agreements based on the MAFF Green Food System Strategy are being negotiated bilaterally and in the ASEAN region. There is a possibility of introducing and deploying technologies and initiatives of Japanese companies that contribute to adaptation and mitigation activities to address issues in the agricultural and fisheries sectors, which is consistent with the Japanese government's climate change measures.

A-3	Climate Resilient Fisheries Development Program
Objective	The fisheries sector accounts for about 10% of the agricultural sector's total value added, and output has been declining in recent years in both aquaculture and capture fisheries. With further reductions in catches predicted due to climate change, the objective is to conserve fishery resources and ensure food security in response to changes in the marine environment. (Adaptation)
Spread effect	This program will contribute to improving the livelihoods of fisherfolk which has high poverty through climate change impact assessment in the fisheries sub-sector, study of countermeasures, technology selection and demonstration, human resource development, and support for fishery associations and companies, and will contribute to the growth targets of the sub-sector and food security, including nutrition, in the NDC and NAFMIP. The project will contribute to the growth objectives of the sub-sector in the NDC and NAFMIP and to food security including nutrition.

	Possible cooperation projects	Applicable JICA support scheme	Issues to be solved	Implementation period
A-3-1	Basic Survey for Climate Smart Fisheries Development Project	SATREPS	Limited budget and technology to implement climate change measures in the fisheries sector	Short, mid-term
A-3-2	Climate Smart Fisheries Development Project	Technical cooperation	Limited budget and technology to implement climate change measures in the fisheries sector	
A-3-3	Training and Dialogue Program for Climate Resilient Fisheries (Small-scale inland aquaculture / Sustainable small-scale fisheries for blue economy / Fisheries diversification and sustainable use of resources in archipelagic countries, etc.)	Knowledge Co-Creation Program	Limited initiatives for climate change adaptation measures in the fisheries sector and limited capacity of central government officials in DA to formulate and implement policies	Short term
A-3-4	Climate Smart Fisheries Technology Validation Project	PPP	Delays in R&D and dissemination of agricultural and fisheries technologies that combine productivity improvement and sustainability	Short term
A-3-5	Loan Assistance for the Development and Modernization of Fisheries Related Facilities and Equipment	Loan Assistance (Sector loan)	Limited budget and technology to implement climate change measures in the fisheries sector	Short, mid-term

A-3-1 Basic Survey for Climate Smart Fisheries Development Project

Name of Cooperation Program (tentative)	Climate Resilient Fisheries Development Program
Anticipated JICA Scheme	SATREPS
Background (issues related to climate change measures to be addressed by this cooperation program)	As indicated in the Comprehensive National Fisheries Industry Development Plan, there is a need to promote climate and disaster resilience in the fisheries industry and the optimization of the marine aquaculture industry.
Overarching Goal	Fishing communities become resilient to climate change
Objectives and Outcomes	The goal is to enable communities to implement capture fisheries and aquaculture fisheries in response to climate change which is one of the causes of the decline in marine resources due to rising water temperatures, which will affect stable food production.
Output	<ul style="list-style-type: none"> • Marine environmental assessment and forecasting • Creation of a map showing the results of the evaluation of suitable locations for marine products. • Prepare a Climate Risk and Vulnerability Map (CRVA) for the development of the investment plan and pilot districts (the CRVA map will show the assessment results, costs, expected income, etc. for each item) • Conduct consultations and climate change mainstreaming activities in local communities
Cooperation period	Approx. 3 years
Anticipated C/P Institutions	DA-BFAR, DA-NFRDI, UP
Other related institutions	RFO
Matters to be considered in implementation	FishCoRe projects in two FMAs by WB starting in 2023.

A-3-2 Climate Smart Fisheries Development Project

Name of Cooperation Program (tentative)	Climate Resilient Fisheries Development Program
Anticipated JICA Scheme	Technical cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	As indicated in the Comprehensive National Fisheries Industry Development Plan, there is a need to promote climate and disaster resilience in the fisheries industry and the optimization of the marine aquaculture industry.
Overarching Goal	Fishing communities become resilient to climate change
Objectives and Outcomes	The goal is to enable communities to implement capture fisheries and aquaculture fisheries in response to climate change which is one of the causes of the decline in marine resources due to rising water temperatures, which will affect stable food production.
Output	<ul style="list-style-type: none"> • Based on the results of SATREPS, select the necessary aquaculture technologies and study the feasibility for technology introduction • Implementation of pilot projects • Compilation of technical guidelines, etc.
Cooperation period	Approx. 3 years
Anticipated C/P Institutions	DA-BFAR, DA-NFRDI, UP
Other related institutions	RFO
Matters to be considered in implementation	FishCoRe projects in two FMAs by WB starting in 2023.

A-3-3 Training and Dialogue Program for Climate Resilient Fisheries

Name of Cooperation Program (tentative)	Climate Resilient Fisheries Development Program
Anticipated JICA Scheme	Knowledge Co-Creation Program
Background (issues related to climate change measures to be addressed by this cooperation program)	Limited budget and technology to implement climate change measures in the fisheries sector Limited initiatives for climate change adaptation in the fisheries sector Limited capacity of central government officials in DA to formulate and implement policies
Overarching Goal	Promote productive aquaculture techniques and sustainable use of marine resources, even under the effects of climate change
Objectives and Outcomes	An action plan will be developed to promote the implementation of adaptation and mitigation measures using promising aquaculture technologies as a solution to climate change.
Output	<ul style="list-style-type: none"> • Acquire knowledge of specific adaptation measures that can be implemented in the fisheries sector. • Develop an action plan to promote the implementation of adaptation and mitigation measures using aquaculture technology as a promising solution to climate change.
Cooperation period	1 month
Anticipated C/P Institutions	DA-BFAR, DA-NFRDI, DA-PFDA
Other related institutions	Local fisheries companies, DA-FRO, coastal LGUs

A-3-4 Climate Smart Fisheries Technology Validation Project

Name of Cooperation Program (tentative)	Climate Resilient Fisheries Development Program
Anticipated JICA Scheme	PPP (Survey with the Private Sector)
Background (issues related to climate change measures to be addressed by this cooperation program)	The Philippines depends heavily on fry imports due to shortage of fry in the fisheries sector, which are declining due to climate change and degradation of the marine environment, and research and extension of agricultural and fisheries technologies that can both improve productivity and sustainability is needed.
Project Overview	To improve the shortage of fish fry in the Philippine fisheries sector, which is declining due to climate change and degradation of the marine environment, and improve import dependency, and to promote more productive and sustainable aquaculture.

Overarching Goal	Examine aquaculture technologies in the Philippines in light of climate change impacts.
Objectives and Outcomes	Verification of technologies for complete aquaculture of important species in the Philippine fisheries sector.
Output	3-5 years
Cooperation period	DA-BFAR, DA-NFRDI
Anticipated C/P Institutions	DA-PFDA, DA-CRAO
Other related institutions	Cooperation agreements based on the MAFF Green Food System Strategy have been exchanged bilaterally and in the ASEAN region.

A-3-5 Loan Assistance for the Development and Modernization of Fisheries Related Facilities and Equipment

Name of Cooperation Program (tentative)	Climate Resilient Fisheries Development Program
Anticipated JICA Scheme	Loan Assistance (Sector Loan for LGUs)
Background (issues related to climate change measures to be addressed by this cooperation program)	The Philippine fisheries sector is dominated by small-scaled fisherfolks, making it difficult to introduce climate change-responsive technologies and improve facilities. In conjunction with the government's unionization activities, a financial cooperation mechanism for RFOs and LGUs will be prepared to promote the introduction of technology and facility development.
Project Overview	Strengthen the resilience of fisheries communities through the development of aquaculture farms, post-harvest and other fisheries-related facilities.
Overarching Goal	Support the revitalization of the fishing industry by providing low-interest loans for LGUs to make capital investments.
Objectives and Outcomes	Low-interest loans to RFOs and LGUs for investment in fishery-related facilities and equipment (e.g., fishery test stations, aquaculture farms, and post-harvest) Training for government officials, including fishermen's associations and LGUs
Cooperation period	3-5 years
Anticipated C/P Institutions	DA-BFAR, DA-PFDA
Other related institutions	DA-NFRDI, DA-CRAO, RFO, LGUs

<Reasons for the project selection>

A-3 Climate Resilient Fisheries Development Program

Indicator	Contents
Contribution to achievement of the Paris Agreement and NDC targets	The contribution of NDC to the adaptation areas "Food Security" and "ecological and environmental stability" is high.
Consistency with sector policies	Consistent with the NAFMIP and the Comprehensive National Fisheries Industry Development Plan.
Urgency	"Food Security" is at the top of the President's Socioeconomic Agenda. In recent years, both aquaculture and capture fisheries have been declining in terms of production, and further declines in catches are expected due to climate change.
Status of support from other donors	FishCoRe projects in two FMAs by WB starting in 2023.
DAC evaluation criteria	Reduced damage from natural disasters in the agricultural sector will have a significant impact on the Philippine economy. Aquaculture and other technologies in the Japanese fisheries sector are expected to be deployed as climate change adaptation measures.
Consistency with Japanese government and JICA's policies	Relevance: High (consistent with needs and policies) Consistency: High (consistent with "(2) Ensuring human security for inclusive growth" in the Medium-term Objectives of the Development Cooperation Policy) Effectiveness: High (because facilities are being built with climate change in mind) Impact: High (because it improves productivity and livelihoods) Efficiency: High (however, efforts need to be linked to the organization of fishermen) Sustainability: High (but needs to be linked to fishermen's organization)

	There is a possibility of introducing and deploying technologies and initiatives of Japanese companies that contribute to adaptation and mitigation activities to address issues in the agricultural and fisheries sectors, which is consistent with the Japanese government's climate change measures.
Inclusion of socially vulnerable population and gender perspective	Fisherfolk are among the most vulnerable in terms of both social and climate change related aspects, thus the programs designed to support the fisherfolk is highly relevant.

A-4		Climate Resilient Smart Livestock Development Program		
Objective	The livestock sector accounts for about 20% of the agricultural sector's total value added, and DA has been focusing on improving productivity. In addition, according to the 2010 inventory, livestock-derived GHG emissions, including livestock ruminants and livestock waste, account for about 30% of the agricultural sector's GHG emissions. The objective of this program is to promote climate change action in terms of both adaptation and mitigation through a climate change-responsive livestock development program. (Mitigation and Adaptation)			
Spread effect	This program will contribute to the growth targets and GHG emission reductions of the sub-sector in NDC and NAFMIP through climate change impact assessment in the livestock sub-sector, countermeasure studies, technology selection and demonstration, human resource development, and farmer and enterprise support.			
	Possible cooperation projects	Applicable JICA support scheme	Issues to be solved	Implementation period
A-4-1	Expert Dispatch for the Promotion of Smart Livestock	Expert Dispatch	Limited capacity of central and local government officials of DA in policy formulation and implementation, securing budgets for climate change mitigation measures in the livestock sector, in policy formulation, and in securing budgets Delays in considering, policy, planning, and securing budgets for climate change adaptation measures in the livestock sector Limited incentives for agriculture and fishery workers working on climate change countermeasures	Short term
A-4-2	Technical Assistance Project for Livestock Technology in Consideration of Climate Change	Technical Cooperation	Limited capacity of central and local government officials of DA in policy formulation and implementation, securing budgets for climate change mitigation measures in the livestock sector, in policy formulation, and in securing budgets	Short term
A-4-3	Livestock Technology in Consideration of Climate Change (Comprehensive livestock promotion initiatives that take into account the SDGs / livestock management technologies as solutions to climate change)	Knowledge Co-Creation Program	Limited capacity of researchers for R&D of climate change mitigation and adaptation measures in the livestock sector	Short term

A-4-4	Smart Livestock Technology Validation Project	PPP	Delays in R&D and dissemination of livestock management technologies that improve productivity improvement and sustainability	Short term
A-4-5	Loan Assistance for the Introduction of Smart Livestock Technology	Loan Assistance (TSL)	Delays in considering, policy, planning, and securing budgets for climate change adaptation measures in the livestock sector Delays in the introduction of renewable energy in the agriculture and fisheries sectors	Short, mid term

A-4-1 Expert Dispatch for the Promotion of Smart Livestock

Name of Cooperation Program (tentative)	Climate Resilient Smart Livestock Development Program
Anticipated JICA Scheme	Expert Dispatch
Background (issues related to climate change measures to be addressed by this cooperation program)	GHG emissions from livestock account for about 30% of the agricultural sector, and DA has been studying the introduction of livestock waste treatment technology. Although the national direction has been provided in NDC policy measures, there is a limited capacity for policy planning and implementation among DA livestock-related officials at both the central and local levels to promote the measures.
Overarching Goal	Livestock production methods that take into account climate change impacts that contribute to food security and improved livelihoods will be established.
Objectives and Outcomes	The direction of climate change measures in the livestock sector will be clarified based on the current status of climate change impacts in the livestock sector, the implementation of future projections, and the collection of basic information for the preparation of specific plans to achieve reduction targets for GHG emissions from the livestock sector.
Output	<ul style="list-style-type: none"> • Assessment of the situation of emerging climate change and existing climate change adaptation and mitigation measures • Research and verification of renewable energies that can be introduced • Survey on technical and financial bottlenecks at the farm level • Analyze existing livestock farmer support programs and consider the possibility of new programs such as carbon credit projects.
Cooperation period	Approx. 1-2 years
Anticipated C/P Institutions	DA-BAI, DA-CRAO
Other related institutions	PCC, NDA, DA-BAFE

A-4-2 Livestock Technology in Consideration of Climate Change

Name of Cooperation Program (tentative)	Climate Resilient Smart Livestock Development Program
Anticipated JICA Scheme	Knowledge Co-Creation Program
Background (issues related to climate change measures to be addressed by this cooperation program)	The importance of safety and stable supply of livestock products for food security is increasing due to outbreaks of diseases such as ASF in the Philippines. At the same time, there is a need to promote sustainable livestock production, including climate change mitigation measures, but DA-BAI officials at both the central and local levels have limited capacity to formulate and implement policies. There is also a limited capacity and facilities for research and development of climate change mitigation and adaptation measures in the livestock sector.
Overarching Goal	Livestock sector is dominated by small-scale producers, making it difficult to introduce countermeasure technologies and equipment.

Objectives and Outcomes	Introduction of livestock facilities that take into account the impact of climate change on food security and farmers' livelihoods will be promoted.
Output	<ul style="list-style-type: none"> • Study on measures based on Climate Change Impact Assessment on Livestock Sector (CRVA) • Verification of the feasibility of introducing infrastructure and technology to support livestock farmers' adaptation to climate change • Prepare a master plan, guidelines, etc. for smart livestock production in response to climate change.
Cooperation period	Several months
Anticipated C/P Institutions	DA-BAI, DA-CRAO
Other related institutions	Local livestock producers, RFOs, LGUs

A-4-3 Technical Assistance Project for Livestock Technology in Consideration of Climate Change

Name of Cooperation Program (tentative)	Climate Resilient Smart Livestock Development Program
Anticipated JICA Scheme	Technical cooperation
Background (issues related to climate change measures to be addressed by this cooperation program)	Although the national direction has been provided in NDC policy measures, there is a limited capacity for policy planning and implementation among DA livestock-related officials at both the central and local levels to promote the measures. Livestock sector is dominated by small-scale producers, making it difficult to introduce countermeasure technologies and equipment.
Overarching Goal	Introduction of livestock facilities that take into account the impact of climate change on food security and farmers' livelihoods will be promoted.
Objectives and Outcomes	Based on climate change impacts, countermeasures will be studied by region and livestock, and plans for necessary climate change measures technologies and facility development will be formulated.
Output	<ul style="list-style-type: none"> • Study on measures based on Climate Change Impact Assessment on Livestock Sector (CRVA) • Verification of the feasibility of introducing infrastructure and technology to support livestock farmers' adaptation to climate change • Prepare a master plan, guidelines, etc. for smart livestock production in response to climate change.
Cooperation period	1 – 2 years
Anticipated C/P Institutions	DA-BAI, DA-CRAO
Other related institutions	PCC, NDA, DA-BAFE

A-4-4 Smart Livestock Technology Validation Project

Name of Cooperation Program (tentative)	Climate Resilient Smart Livestock Development Program
Anticipated JICA Scheme	PPP (Survey with the Private Sector)
Background (issues related to climate change measures to be addressed by this cooperation program)	Mechanization and modernization of agriculture and promotion of renewable energy use and efforts to increase productivity in the livestock sector under the effects of climate change have begun to be initiated and need to be encouraged.
Overarching Goal	Increased digitalization and modernization of the agricultural sector will improve climate resilience
Objectives and Outcomes	Research and development of livestock production technologies that improve both productivity and sustainability
Output	<ul style="list-style-type: none"> • In conjunction with A-4-3, select technologies to be introduced. • Demonstration of selected technologies <ul style="list-style-type: none"> -Verification of biomass and biogas technologies that can be used in the Renewable Energy Program (REPAFS 2022-2030) -Development of monitoring and evaluation methods for fodder crop growth using satellite data, etc. • Development and review of technical guidelines

Cooperation period	Approx. 1-2 years
Anticipated C/P Institutions	DA-BAI, DA-BAFE
Other related institutions	PCC, NDA
Matters to be considered in implementation	Cooperation agreements based on the MAFF Green Food System Strategy have been exchanged bilaterally and in the ASEAN region.

A-4-5 Loan Assistance for the Introduction of Smart Livestock Technology

Name of Cooperation Program (tentative)	Climate Resilient Smart Livestock Development Program
Anticipated JICA Scheme	Loan Assistance (Sector loan for private producers and LGUs)
Background (issues related to climate change measures to be addressed by this cooperation program)	The livestock sector in the Philippines is dominated by small-scale producers, and it is difficult to introduce technologies and improve facilities to cope with climate change. In conjunction with the government's activities to organize farmers, a financial cooperation mechanism will be provided to promote the development of technology and facilities.
Overarching Goal	Reduced GHG emissions from the livestock sector and increased RE use due to proper disposal of livestock waste
Objectives and Outcomes	Support the revitalization of the recycling industry by providing low-interest loans to livestock-related associations, companies, and LGUs for capital investments
Output	Low-interest loans for investment in livestock waste treatment facilities (including power generation facilities) for livestock producers and LGUs Training for operators and government officials, including LGUs
Cooperation period	3-5 years
Anticipated C/P Institutions	DBP
Other related institutions	DA-BAI, LGUs, private livestock companies

<Reasons for the project selection>

A-4 Climate Resilient Smart Livestock Development Program

Indicator	Contents
Contribution to achievement of the Paris Agreement and NDC targets	Contributes to the reduction of GHG emissions from the agricultural sector for mitigation in the NDC. High contribution to the NDC's "Food Security" and "Sustainable Energy" in adaptation. More than half of the protein source for Filipinos comes from the livestock sector. In addition, methane gas emitted from livestock waste can be effectively utilized as energy.
Consistency with sector policies	Aligned with NAFMIP and RE programs in the agriculture and fisheries sector.
Urgency	"Food Security" is at the top of the President's Socioeconomic Agenda. The amount of damage to agriculture caused by natural disasters is also significant, making it a matter of great urgency.
Status of support from other donors	One R&D project is underway to contribute to climate change mitigation measures.
DAC evaluation criteria	Reducing damage caused by natural disasters in the agricultural sector will have a significant impact on the Philippine economy. Livestock housing temperature management methods and technologies in the livestock sector in Japan are expected to be deployed as climate change countermeasure technologies.
Consistency with Japanese government and JICA's policies	Relevance: High (consistent with needs and policies) Consistency: High (consistent with "(2) Ensuring human security for inclusive growth" in the Medium-term Objectives of the Development Cooperation Policy) Efficacy: High Impact: High (to help solve issues including food security) Efficiency: High (efforts linked to livestock farmer organization) Persistence: High

	Cooperation agreements based on the MAFF Green Food System Strategy have been exchanged bilaterally and in the ASEAN region. Livestock housing temperature management methods and technologies in the livestock industry in Japan are expected to be deployed as climate change countermeasure technologies.
Inclusion of socially vulnerable population and gender perspective	The cooperation will contribute to climate change adaptation and mitigation through a combination of hard and soft measures of small-scale infrastructure development and human resource development for operation and maintenance, and will contribute to achieving the ASEAN-Japan Climate Change Action Agenda 2.0 and JICA's Global Agenda No. 16 on climate change measures. The project will contribute to the achievement of the ASEAN-Japan Climate Change Action Agenda 2.0 and JICA's Global Agenda No. 16 on climate change.

2) Evaluation of the cooperation program

Table 3-21 Evaluation of the possible programs (Agriculture sector)

Cooperation program	Climate change impact		Impacts	Possibility of utilizing Japanese knowledge and technology
	Mitigation	Adaptation		
1. Climate Resilient Agricultural Land Management Capacity Building Program				
Expert Dispatch for the Capacity Building of DA for Climate Resilience	No direct GHG reduction effect, but contributes to policy making, implementation of measures, etc.	Contribute to policy and countermeasure implementation Development of farming tools that lead to increased productivity	Contributing to improving the livelihoods of agricultural workers, who account for about 20% of the total workforce Contributing to the growth rate of over 3.0% in 2030 in the agricultural production sector as indicated in NAFMIP	Agricultural meteorological mesh data development,
Capacity Building Project for the Capacity Building of DA for Climate Resilience				Crop growth models, pest diagnosis, and other technologies can be applied in the development of farming tools.
Training and Dialogue Program for Agricultural Technology as Solutions to Climate Change	In the GHG inventory, the agricultural sector accounts for 29.894% of total emissions (43.152 Mt CO ₂ e) and contributes to the reduction of a portion of these emissions.	Dissemination of agricultural technologies that lead to increased productivity		Satellite-based crop growth monitoring, soil diagnosis, and other private-sector technologies can be applied.
Smart Agriculture Technology Development Project				
Soil Organic Carbon Sequestration Validation Project	Reduced GHG emissions due to agricultural carbon sequestration potential of coconut plantations, etc.	Improved productivity due to appropriate fertilizer application		Modeling studies in agricultural soils, GHG inventory methodology, and J-credit methodology can be used.
2. Climate Resilient Irrigation Planning, Operation and Maintenance Program				
Agri-climatic Mesh Data Development Support Project	none	Basic data for appropriate irrigation facility studies.	It can also be used for crop growth models, pest and disease forecasting,	Use of Japanese agricultural weather mesh data

Cooperation program	Climate change impact		Impacts	Possibility of utilizing Japanese knowledge and technology
	Mitigation	Adaptation		
			etc., and contributes to productivity improvement by applying it to cultivated varieties and schedules.	development knowledge
Small Scale Flood Control, Water Storage and Drainage System Piloting and Validation Project	Reduce paddy methane emissions by 30% by promoting AWD in conjunction with facility development In the GHG inventory, GHG emissions from paddy fields account for 51.856% (22.3775 CO2e) of the agricultural sector and contribute to a partial reduction.	Contributing to achieving the goal of increasing irrigated area in the NIMP (Part of the development of irrigation facilities of 1,000 hectares or less, which accounts for 44% of the approximately 680,000 hectares to be covered)	Contribution to food security by diversifying cultivated varieties through the development of irrigation facilities for upland and field cultivation other than rice paddy cultivation, which had been slow to be developed	Utilization of small-scale irrigation and water storage systems in Asia developed by Japanese research institutes
Integrated Watershed management Master Plan Development using NbS	none	Integrated water demand adjustment and disaster prevention enhancement in model basins	Expanding into major watersheds in the country to help improve community livelihoods by reducing flood damage, increasing irrigated areas, and improving water quality and vegetation	Utilization of Japanese knowledge on flood control technology and irrigation facility management
Updating of Irrigation Designing Manual in Consideration of Climate Change	none	Indirect contribution to achieving the goal of increasing irrigated area in the NIMP	Contribute to increased productivity and reduced flood risk in the approximately 680,000 ha of farmland covered by the NIMP, leading to food security and water resources	
3. Climate Resilient Fisheries Development Program				
Basic Survey for Climate Smart Fisheries Development Project (SATREPS)	none	Contribute to reducing the decline in catches assumed to be caused by climate change	Contribute to the 3.0-4.0% growth rate of the fisheries sector in the next 2030 as indicated in the NAFMIP	Marine environmental monitoring and model development knowledge
Climate Smart Fisheries Development Project (technical cooperation)	none	Maintaining quality by introducing post-harvest facilities	Contributing to improving the livelihoods of fishery workers, who account for about 2% of the total workforce	Enables sharing of technology and knowledge in Japanese aquaculture and coastal fisheries
Training and Dialogue Program for Climate Resilient Fisheries (Small-scale inland aquaculture / Sustainable small-scale fisheries for blue economy / Fisheries diversification and sustainable	none			

Cooperation program	Climate change impact		Impacts	Possibility of utilizing Japanese knowledge and technology
	Mitigation	Adaptation		
use of resources in archipelagic countries, etc.)				
Climate Smart Fisheries Technology Validation Project	none			
Loan Assistance for the Development and Modernization of Fisheries Related Facilities and Equipment	Contribute to part of the RE introduction program in the agriculture and fisheries sector (REPAFS 2022-2030)		Long-term project effects can be expected by providing financing support and economic incentives in conjunction with the organization of fishing cooperatives through this program.	
4 . Climate Resilient Smart Livestock Development Program				
Expert Dispatch for the Promotion of Smart Livestock	No direct GHG reduction effect, but contributes to policy making and study of countermeasures, etc.	Indirectly contribute to productivity improvement through policy formulation, study of countermeasures, etc.	Contributing to the 2030 growth rate of over 4.0% in the livestock sector as indicated in AFMIP Long-term project effects are expected by providing financing support and economic incentives in conjunction with the organization of livestock farmers' associations through this program, thereby encouraging private sector investment in countermeasures.	Capable of sharing experiences and knowledge of initiatives in Japan
Technical Assistance Project for the Promotion of Smart Livestock				Adaptation: barn temperature control methods and technologies, etc.
Training and Dialogue Program for Livestock Technology in Consideration of Climate Change(Comprehensive livestock promotion initiatives that take into account the SDGs / livestock management technologies as solutions to climate change)				Mitigation: Treatment technology for livestock waste, development of feed to inhibit digestive tract fermentation in livestock, etc.
Smart Livestock Technology Validation Project	GHG emissions from livestock accounted for about 30% (12.271 CO2e emissions) of the agricultural sector in the GHG inventory, and the project will contribute to the reduction of a portion of these emissions. Contribute to part of the RE implementation program in the agricultural and fisheries sector (REPAFS 2022-2030).	Contributing to productivity improvement by introducing countermeasure technology		
Loan Assistance for the Introduction of Smart Livestock Technology				

(5) Forestry and Natural Environment

1) Possible program concept

In the forest and natural environment sector, cooperation programs were considered in two subsectors, forest, and coastal/marine and biodiversity, respectively.

Table 3-22 Possible cooperation programs (Forest and Biodiversity Sector)

Cooperation Program	Cooperation project	
	Short term	Mid-to-long term
F-1 Forest management capacity strengthening program with consideration of climate change	Establishment of National Forest Monitoring System and F-1-1	Capacity building
F-2 Forest water protection capacity management strengthening program with consideration of climate change	Support for policy making and capacity building of Integrated Watershed Management F-2-1	
F-3 Forest management strengthening program with consideration of climate change	Successor JICA Forestland Management Project F-3-1	
F-4 Coastal and Marine ecosystem conservation management strengthening program with consideration of climate change	Support for policy making of Strategy Conservation Planning F-4-1 Capacity Building for Climate change vulnerability assessment and Creation of Knowledge Sharing Platform F-4-2 Support for conservation of Blue Carbon F-4-3	

Source: JST

F-1	Forest management capacity strengthening program with consideration of climate change			
Objective.	Provide technical assistance and capacity building support to establish forest remote sensing technology and build a National Forest Monitoring System (NFMS), one of the components for the REDD+ implementation phase			
Spread Effect	The challenges facing Philippine forests include reduction of forest cover and deforestation. Efforts to improve forest cover and reduce deforestation include the National Afforestation Program. However, it is believed that improving techniques to manage forests through monitoring including database as a policy will contribute to the implementation of REDD+, GHG inventories, and FAO's forest resource assessment through human resource development and comprehensive data management.			
	Candidates for cooperative projects	Assumed scheme	Issues to be resolved	Implementation period
F-1-1	Support for establishment and capacity building of the National Forest Monitoring System (NFMS)	Technical Cooperation Knowledge Co-Creation Program	Forest remote sensing technology has not yet established and National Forest Monitoring System (NFMS), including database not yet established	Short term

One project listed below was considered as a candidate for an individual cooperative project in the above program.

F-1-1 Support for establishment and capacity building of National Forest Monitoring System (NFMS)

Name of cooperative program (tentative name)	Support for establishment and capacity building of the National Forest Monitoring System (NFMS)
Possible JICA Schemes	Technical Cooperation Projects
Background (Issues related to climate change measures addressed by this cooperation program)	For sustainable forest management and REDD+ implementation, the Philippine government needs to establish a National Forest Monitoring System (NFMS). Forest inventories for NFMS are already in place. However, forest remote sensing systems has not yet established.
Project Summary target of higher order	Reduce and removal GHG emissions by establishing an NFMS and strengthening the REDD+ implementation system Promoting REDD+ and sustainable forest management Increased transparency and consistency of the forest sector to GHG inventories
Objectives and Outcomes	Through the establishment of the NFMS, DENR's capacity for REDD+ realization and sustainable forest management will be improved.
Output	a. Forest monitoring techniques and methodologies utilizing remote sensing technology will be developed. b. An NFMS methodology combining ground surveys and forest remote sensing will be established. c. Establishment of forest management database d. Utilization of NFMS results by other organizations, etc., for which the NFMS platform will be established e. Establishment of reporting system to the GHG inventory f. Sharing information of non-carbon benefit (Biodiversity, Safeguard Information System, etc.)
Cooperation period	Approx. 3 years
Anticipated C/P Institutions	Forest Management Bureau, Department of Environment and Natural Resources (DENR-FMB)
Other Related Organizations	Climate Change Commission, LGU, NGO, Private Sector
Points to keep in mind when implementing the program	Currently, no other donors are supporting the establishment of forest remote sensing technology, but the National REDD+ System-Philippines project implemented by GIZ from 2012~2017, including a prototype of a sub-national MRV, the content and design of the NFMS, a draft concept has been prepared. Also, in 2015, the NFMS action plan was developed with support from FAO through UN-REDD. support from FAO also includes capacity building of data analysis (statistics), and the content of support should be considered based on these drafts and action plans, as well as past training content The content of support should be considered in light of these draft action plans and the content of past training programs.

<Reasons for selection of this program>

Contribution to support achievement of the Paris Agreement and NDC	NDC's contribution to forestry, an area of mitigation and adaptation, is high. The establishment of forest remote sensing technology and NFMS will lead to the implementation of REDD+, which will reduce deforestation and forest degradation, increase carbon sinks, and contribute to the prevention of landslides and floods. Thus, both adaptation and mitigation are expected to contribute significantly to the achievement of the Philippines' NDC target.
Consistency with sector policies	The National Climate Change Action Plan (NCCAP) (2011-2028) and the Philippine National REDD-Plus Strategy are highly consistent with the implementation of REDD+.
Urgency	REDD+ implementation is mentioned in the NCCAP and the Philippine National REDD-Plus Strategy mentioned above, and the FMB, the department in charge of REDD+, hopes to implement REDD+ as soon as possible. The establishment of forest remote sensing technology necessary for REDD+ implementation is highly urgent.
Status of support from other donors	Currently, no other donors are supporting the establishment of forest remote sensing technology, but the National REDD+ System-Philippines project implemented by GIZ from 2012~2017 has developed the content and design of the NFMS, including a prototype of a sub-national MRV. A draft concept has been prepared. In addition, in 2015, the NFMS action plan was developed with support from FAO via UN-REDD; among the support from FAO, capacity building of data analysis (statistics) was also received, and based on these drafts and action plans, as well as past trainings, the contents of the support It is requested that the content of the support be considered in light of these draft action plans and past training programs.
DAC 6 items	Relevance: High (Consistency with needs and policies) Consistency: High Effectiveness: High (Because of leading to REDD+ implementation)

	Impact: High (Because of leading to REDD+ implementation and contribute significantly to achieving NDC targets) Efficiency: High (Because of leading to REDD+ implementation) Sustainability: high (Once the NFMS established, REDD+ implementation is expected)
Consistency with Japanese government and JICA policies	In implementing REDD+, Japanese companies may participate, which is consistent with the Japanese government's climate change measures. The cooperation will contribute to climate change adaptation and mitigation by leading to the implementation of REDD+, thereby contributing to the achievement of JICA's Global Agenda No. 16 on climate change action and No.17 on natural environmental conservation.
Socially vulnerable groups and gender	It is necessary to promote the establishment of forest remote sensing technology and NFMS while taking into account socially vulnerable groups and gender.

F-2	Forest water protection capacity management strengthening program with consideration of climate change			
Objective.	Develop policies to promote the implementation of Integrated Watershed Management Plan that ensure climate proofing and strengthen the capacity to manage water protection capacity.			
Spread Effect	One of the challenges facing Philippine forests is the decline of water protection capacity due to deforestation. The development of related policies and the strengthening of the capacity to manage water protection capacity can contribute to the ongoing management of water protection capacity with better results if implemented in a comprehensive manner.			
	Candidates for cooperative projects	Assumed scheme	Issues to be resolved	Implementation period
F-2-1	Policy making support and management capacity development/enhancement for implementation of the Integrated Watershed Management Plan	Technical Cooperation Knowledge Co-Creation Program	Limited climate proofing policies for Integrated Watershed Management Plan, limited expertise in analyzing precipitation and soil data collected by Automatic Weather Stations (AWS) and remote sensing, and limited AWS equipment and remote sensing equipment for collecting the data	Short term

One project listed below was considered as a candidate for an individual cooperative project in the above program.

F-2-1 Policy Making Support and Management Capacity Development/ Enhancement for Implementation of the Integrated Watershed Management Plan

Name of cooperative program (tentative name)	Policy making support and management capacity development/enhancement for implementation of the Integrated Watershed Management Plan
Possible JICA Schemes	Technical cooperation
Background (Issues related to climate change measures addressed by this cooperation program)	Climate proofing policies are needed to make progress in Integrated Watershed Management Plan, and there is a lack of expertise in data analysis to measure watershed protection capacity as well as a lack of Automated Weather station equipment and remote sensing equipment for data collection.
Project Summary target of higher order	Adaptation measures in the forest sector as mentions in the NDC are aligned with those for ecological and environmental stability of forests. Climate change has a significant impact on the water protection capacity of mountain areas due to temperature increase, impact on precipitation, and typhoon intensification, etc. Policies to strengthen watershed management and to strengthen watershed management capacity will contribute to climate change action.
Objectives and Outcomes	Facilitate the implementation of the plan based on policies that ensure the climate resilience of the Integrated Watershed Management Plan.
Output	a. Assist in developing policies to ensure climate resilience with respect to Integrated Watershed Management Plans

	b. Improvement of watershed data analysis capacity for climate resilient water protection capacity management c. Installation of measurement equipment
Cooperation period	5 years
Anticipated C/P Institutions	Forest Management Bureau, Department of Environment and Natural Resources (DENR-FMB)
Other Related Organizations	LGU
Points to keep in mind when implementing the program	The Department of Science and Technology-Philippine Atmospheric, Geophysical and Astronomical Service (DOST-PAGASA) conducts similar monitoring. Data on rainfall and soil are also collected by the Department of Public Works and Highways (DPWH), the Department of Interior and Local Government (DILG), and the National Disaster Risk Reduction and Management Commission (NDRRMC). However, information sharing is difficult due to differences in data specifications, making it difficult to make progress in watershed management plan. Attention should be paid to the division of roles between departments and commissions.

<Reasons for selection of this program>

Contribution to support achievement of the Paris Agreement and NDC	The contribution to the objectives of the adaptation measures in the forestry sector described in the NDC listed in the NDC adaptation measures is high.
Consistency with sector policies	Highly consistent with watershed management and climate change vulnerability assessments related to PDP, Philippine Master Plan for Climate Resilient Forestry Development, Technical Bulletin 16-A, etc.
Urgency	Urgency is high.
Status of support from other donors	None.
DAC 6 items	Relevance: High Consistency: High Effectiveness: High (Leading to Integrated Watershed Management Plan and moving forward). Impact: High (Facilitates the implementation of the Integrated Watershed Management Plan and contributes to the NDC). Efficiency: High (Leading to Integrated Watershed Management plan and moving forward). Sustainability: High (Policies, technology and equipment installation leading to ongoing management.)
Consistency with Japanese government and JICA policies	Consistent with the Japanese government's policy of considering water protection capacity and climate change measures.
	The cooperation will lead to sustainable forest management, which will contribute to adaptation to climate change measures and help achieving JICA's Global Agenda No. 16 to combat climate change and No.17 on natural environmental conservation.
Socially vulnerable groups and gender	It is necessary to promote water source management while taking into account socially vulnerable groups and gender.

F-3	Forest management strengthening program with consideration of climate change			
Objective.	Promote improved forest management through continued afforestation while taking climate change into account and improving the livelihoods of the local population through the continuation of JICA forest management projects.			
Spread Effect	The challenges facing Philippine forests include the reduction of forest cover and deforestation. In order to improve forest cover and reduce deforestation, initiatives such as the National Afforestation Program can be implemented while improving livelihoods, which will contribute to better results.			
	Candidates for cooperative projects	Assumed scheme	Issues to be resolved	Implementation period
F-3-1	Subsequent JICA forest management project	Loan	Limited capacity for watershed management prevailing, limited marketing capacity for agricultural products through agroforestry	Mid-term

One project listed below was considered as a candidate for an individual cooperative project in the above program.

F-3-1 Subsequent JICA forest management projects

Name of cooperative program (tentative name)	Subsequent JICA forest management project
Possible JICA Schemes	Loan
Background (Issues related to climate change measures addressed by this cooperation program)	Declining and degraded forest cover has increased the need for watershed management. There is a further need to robust forest management with community participation in order to strengthen climate change resilience. There is a need to improve livelihoods of local residents through increasing income from agricultural and forestry products. Momentum is growing for regional forest carbon markets through private financing, including foreign investment.
Project Summary target of higher order	Reduce GHG emissions and increase removal from forest by realizing sustainable forest management with more climate change resilient, contribute to the carbon market and contribute to collaborative approach to watershed management
Objectives and Outcomes	Realize sustainable and participatory forest management in watersheds with more climate change resilience through forest degradation restoration and forest conservation Enhance the efforts of local people to improve their sustainable livelihoods
Output	a. Promote information, educational and communication on collaborative watershed management, and rehabilitation and plantation in forest area b. Improvement of financial mechanism for business development/sustainable business by local people, including as follows; b1. Agroforestry prevailing and practice, b2. Improvement the agricultural and forestry product in value chain, b3. Business development and financial mechanism by local people
Cooperation period	10 years
Anticipated C/P Institutions	Forest Management Bureau, Department of Environment and Natural Resources (DENR-FMB)
Other Related Organizations	LGU
Points to keep in mind when implementing the program	For implementing measures in area related to Protected Areas, it is desirable to note related policies to the BMB.

<Reasons for selection of this program>

Contribution to support achievement of the Paris Agreement and NDC	The contribution to forest protection and restoration and forest conservation and agriculture sector objectives set forth in the NDC's adaptation measures is high. Support for forest rehabilitation and conservation and the establishment of carbon markets will contribute to Article 5 and 6 of the Paris Agreement, respectively.
Consistency with sector policies	It is highly consistent with the PDP's description of building a local carbon market, managing watershed degradation, and improving agricultural livelihoods.
Urgency	Urgency is moderate.
Status of support from other donors	A similar afforestation project for livelihood enhancement is the AFoCO's Promotion of Vertical Integration in Wood Processing (VIP) through People's Organizations in Community-Based Forest (CBFM) Management areas in the Philippines (AFoCO-VIP).
DAC 6 items	Relevance: High (Consistent with needs and policies) Consistency: High Effectiveness: High (Because of leading to smooth forest management) Impact: High (Because of increasing forest cover and contribute significantly to achieving NDC targets) Efficiency: High (Because of leading to smooth forest management) Sustainability: High (Forest management can be implemented sustainably in conjunction with self-sustaining community agriculture)
Consistency with Japanese government and JICA policies	Japanese companies may participate in the implementation of the carbon market, which is consistent with the Japanese government's climate change measures. The cooperation will lead to sustainable forest management, which will contribute to adaptation to climate change measures and help achieving JICA's Global Agenda No. 16 to combat climate change and No. 17 on natural environmental conservation.
Socially vulnerable groups and gender	It is necessary to promote forest management while taking into account socially vulnerable groups and gender.

F-4	Coastal and Marine ecosystem conservation management strengthening program with consideration of climate change			
Objective	Promote improved climate resilient conservation management of coastal/marine ecosystems by measuring and accounting for biodiversity conservation and blue carbon sequestration in coastal/marine areas, taking into account the effects of climate change.			
Spread Effect	The challenges for Philippine coastal/marine ecosystems include lack of policy and planning, and lack of assessment methods for management and methods for measurement and calculation. Policy and technical aspects of coastal/marine ecosystem conservation can contribute to the assessment of GHG inventories from this subsector by contributing to the expansion of Protected Areas of biodiversity and by contributing to the storage of blue carbon, which is considered as a new sink.			
	Candidates for cooperative projects	Assumed scheme	Issues to be resolved	Implementation period
F-4-1	Support for the formulation of Strategic Conservation Planning for the management of Marine Protected Areas, etc.	Technical Cooperation (Dispatch of Experts)	Limited Strategic Conservation Plan for the management of Mbarine Protected Areas, etc.	Short term
F-4-2	Project to improve Protected Areas management capacity by developing a technology and knowledge sharing platform for monitoring and assessment of local ecosystems in Marine Protected Areas vulnerable to climate change	Technical cooperation Knowledge Co-Creation Program	Limited technology for monitoring and assessment of local ecosystems in Marine Protected Areas vulnerable to climate change, limited integrated data management on coastal and marine ecosystems and biodiversity	Short term
F-4-3	Blue Carbon Conservation Support	Technical Cooperation (Dispatch of Experts) Subject-specific training	Limited policies to encourage blue carbon conservation, limited know-how in measurement and calculation methods for blue carbon storage and sequestration	Short term

The following three projects were considered as candidates for individual cooperative projects in the above program.

F-4-1 Support for the Formulation of Strategic Conservation Planning for the Management of Marine Protected Areas, etc.

Name of cooperative program (tentative name)	Support for the formulation of Strategic Conservation Planning for the management of Marine Protected Areas, etc.
Possible JICA Schemes	Technical Cooperation (Dispatch of Experts)
Background (Issues related to climate change measures addressed by this cooperation program)	Currently, there is no comprehensive plan to manage coastal and marine space, including blue carbon. The limited proper management of coastal and marine space risks reducing carbon sinks, and the inability of mangrove forests to control tidal waves and erosion, which in turn reduces resilience to climate change.
Project Summary target of higher order	With the plan in place, coastal and marine resources, including blue carbon, will be sustainably managed, contributing to the achievement of the Philippines' NDC goals.
Objectives and Outcomes	The implementation steps required for planning will be clarified and the necessary consensus building among the parties involved will be facilitated.
Output	Provide assistance in the development of strategic conservation plans
Cooperation period	Approx. 2 years
Anticipated C/P Institutions	Department of Environment and Natural Resources, Biodiversity Management Bureau (DENR-BMB)
Other Related Organizations	LGU, DA, DoE, NEDA

Points to keep in mind when implementing the program	Support for the development of marine spatial plans has been provided by USAID in the past. In this process, a module for marine spatial plan development has been created. However, the actual development of the marine spatial plan cannot proceed according to the module, as it requires collaboration with a variety of stakeholders. Therefore, while referring to the modules, strategic conservation planning that is more in line with the current situation is needed in this project.
Status of discussions with counterparts	BMB needs assistance and the survey team prepared this proposal, which has already been proposed to the BMB.

F-4-2 Project to Improve Protected Areas Management Capacity by Developing a Technology and Knowledge Sharing Platform for Monitoring and Assessment of Local Ecosystems in Marine Protected Areas vulnerable to climate change

Name of cooperative program (tentative name)	Project to improve Protected Areas management capacity by developing a technology and knowledge sharing platform for monitoring and assessment of local ecosystems in Marine Protected Areas vulnerable to climate change
Anticipated JICA Scheme	Technical Cooperation, Knowledge Co-Creation Program
Background (Issues related to climate change measures addressed by this cooperation program)	In order to achieve NDC, sustainable management, conservation, and restoration of coastal and marine ecosystems and biodiversity, including blue carbon, are required. and ineffective data management and limited integrated management of collected data.
Project Summary target of higher order	To improve technologies for ecosystem monitoring and assessment in areas of high vulnerability to climate change related to coastal and marine ecosystems and biodiversity, and to establish a knowledge sharing platform for integrated data management, thereby contributing to efficient policy making and planning for the management, conservation, and restoration of coastal and marine ecosystems and biodiversity efficiently, and in turn, contribute to the achievement of NDC goals.
Objectives and Outcomes	1) Technical assistance will be provided for monitoring and assessment of ecosystems in areas of high vulnerability to climate change 2) A new knowledge sharing platform unique to BMB will be established.
Output	1) Improved technologies for monitoring and assessment of ecosystems in areas of high vulnerability to climate change 2) Knowledge sharing platform
Cooperation period	Approx. 1 year
Anticipated C/P Institutions	Department of Environment and Natural Resources, Biodiversity Management Bureau (DENR-BMB)
Other Related Organizations	-
Points to keep in mind when implementing the program	Since there are existing knowledge sharing platforms such as CCC and PSA, research is needed before starting the project in building a new platform.

F-4-3 Blue Carbon Conservation Support

Name of cooperative program (tentative name)	Blue Carbon Conservation Support
Possible JICA Schemes	Technical Cooperation (Dispatch of Experts) Subject-specific training
Background (Issues related to climate change measures addressed by this cooperation program)	Currently, there is no policy targeting blue carbon conservation. In addition, although mangrove mapping necessary for carbon sequestration calculations has already been conducted in the SATREPS "Project on Comprehensive Assessment and Conservation for Blue Carbon Ecosystems and their Services in the Coral Triangle", the Blue Carbon calculations require the findings from this study as well as future. There is a limited technical updating of the results of such studies and the creation of an implementation system for the measurement and calculation of carbon storage and sequestration of blue carbon at the national level.

Project Summary target of higher order	The development of the plan will result in the formulation of a blue carbon policy and measurement and accounting and will contribute to the realization of quantified GHG storage from blue carbon in the Philippines and the achievement of the NDC target.
Objectives and Outcomes	The implementation steps necessary for planning will be clarified, facilitating consensus building among the necessary stakeholders.
Outputs	<ul style="list-style-type: none"> a. Providing support for policy development to boost blue carbon conservation b. Establishment of measurement and calculation methods for blue carbon storage and sequestration
Cooperation period	Approx. 2 years
Anticipated C/P Institutions	Department of Environment and Natural Resources, Biodiversity Management Bureau (DENR-BMB)
Other Related Organizations	-
Points to keep in mind when implementing the program	Considering coastal/marine ecosystems and biodiversity, it is desirable to make simultaneous progress with the conservation of coastal/marine ecosystems, as some of the contents are interrelated with the development of Strategic Conservation Planning, techniques for monitoring and assessment of local ecosystems in marine Protected Areas vulnerable to climate change, and knowledge sharing platform development, etc.

<Reasons for selection of this program>

Contribution to support achievement of the Paris Agreement and NDC	NDC's adaptation measures contribute to the conservation of coastal/marine ecosystems and biodiversity. In line with the development of the Strategic Conservation Plan, the expansion of protected areas and biodiversity conservation in coastal/oceanic areas are progressing. The conservation of blue carbon in coastal/marine ecosystems for climate change mitigation will contribute to quantification of carbon sinks and increase the amount of carbon dioxide absorbed.
Consistency with sector policies	The description of biodiversity and blue carbon protection for the Kunming-Montreal Biodiversity Framework, PDP, and PBSAP, and the implementation of the assessment of ecosystem vulnerability for the National Climate Change Action Plan (NCCAP) (2011-2028) The descriptions of the two are highly consistent with each other.
Urgency	The BMB, the department in charge of coastal and marine ecosystems and biodiversity management, wishes to develop a strategic conservation plan as soon as possible, and also wishes to establish a knowledge sharing platform, so there is a high urgency for assistance.
Status of support from other donors	Support for the development of Marine Spatial Planning has been provided by USAID in the past. In this context, a module for Marine Spatial Planning has been developed. While referring to the module, it is necessary to develop a strategic conservation plan that is more in line with the current situation. Otherwise, there is no overlap with other donors.
DAC 6 items	<p>Relevance: High (Consistent with needs and policies)</p> <p>Consistency: High</p> <p>Effectiveness: High (Because of leading to the conservation of coastal/marine ecosystems)</p> <p>Impact: High (Because of leading to conservation of coastal/marine ecosystems and contribute significantly to achieving NDC goals)</p> <p>Efficiency: High (Because of leading to conservation of coastal/marine ecosystems)</p> <p>Sustainability: Moderate (as further study is needed for sustainable implementation)</p>
Consistency with Japanese government and JICA policies	Japan's findings, such as the development of guidelines for spatial formulation in the marine, and the findings on biodiversity in the Japanese government's Department of the Environment are prior and consistent with policy.
	The cooperation will lead to conserve coastal/marine ecosystems and blue carbon, thereby contributing to mitigation and adaptation to climate change measures and helping to achieve JICA's Global Agenda No. 16 on Climate Change.
Socially vulnerable groups and gender	It is necessary to promote support for the conservation of coastal/marine ecosystems while taking into account vulnerable groups and gender.

2) **Evaluation of the cooperation program**

Table 3-23 Evaluation of the proposed cooperative program (Forestry and Natural Environment Sector)

Possible Cooperation program	Climate Change Impact		Spillover effect	Japanese knowledge and technology applicability
	Mitigation	Adaptation		
1. Forest management capacity strengthening program with consideration of climate change				
Support for establishment and capacity building of the National Forest Monitoring System (NFMS)	Establishment NFMS and strengthening the REDD+ implementation system to reduce and absorb GHG emissions. Also Facilitating the implementation of REDD+ and sustainable forest management. In addition, requiring improvement of the transparency and consistency of the forest sector to GHG inventories.		Contribution to the advancement of policies such as DAO 2021-32 and the REDD+ Action Plan that contribute to the identification of NFMS functions, facilitation of reporting and deepening accountability, helping to achieve NDC targets, and providing transparency, consistency, and MRV-enabled data.	JICA's past support, knowledge, and experience in establishing NFMS through remote sensing technology using Japan's superior satellite technology and data analysis technology can be utilized.
1. Forest water protection capacity management strengthening program with consideration of climate change				
Policy making support and management capacity development/enhancement for implementation of the Integrated Watershed Management Plan		Align with adaptation measures in the forest sector described in the NDC for ecological and environmental stability of forests. Climate change associated with climate change has a significant impact on the watershed protection capacity of mountain areas. Adaptation measures in the forestry sector described in the NDC will be followed for the ecological and environmental stability of forests. Climate change has a significant impact on the watershed protection capacity of mountain areas due to temperature increase, impact on precipitation, and typhoons. Therefore, policies to strengthen watershed management and to strengthen the	Policies and practices that manage forests sustainably in terms of their watershed functions and appropriately address watershed degradation, such as PDPs and forest development planning master plans, will be promoted in terms of the following Assistance will be provided in developing watershed management plans to ensure climate proofing. Human resource development and capacity building in	Japan has a large amount of precipitation and has implemented policies in forest management that take into account the water source recharge function. In addition, Japan has already provided knowledge and technology for analyzing precipitation and soil data that can be used to assess the impact of mountain areas on watershed protection capacity, as part of JICA's "Capacity Building for Weather Observation, Forecasting, and Warning" project in the Philippines, and

Possible Cooperation program	Climate Change Impact		Spillover effect	Japanese knowledge and technology applicability
	Mitigation	Adaptation		
		capacity of watershed management will contribute to climate change action.	the FMB will be promoted. By facilitating the collection of data by watershed, the FMB will be able to make progress in this work over a wide area.	we believe that we can provide effective support.
2. Forest management strengthening program with consideration of climate change				
Subsequent JICA forest management project	Prepare a carbon market in the region to reduce GHG emissions and increase absorption.	Contribute to climate change adaptation measures by strengthening information, education on collaborative watershed management and rehabilitation of forest area and plantation, and sustainable projects by local people.	<p>Contributions to the PDP include the following</p> <p>Contribution to the management of watershed degradation Among the watershed management with the participation of local people, the project contributes to the reduction of soil degradation and siltation in rivers and other bodies of water.</p> <p>The project will also contribute to raising awareness of the importance of forest management and conservation in terms of climate change by supporting building the capacity of local communities to participate in watershed management in the future.</p> <p>Furthermore, through improving income by agricultural forestry product, the project will contribute to improving the livelihoods of local</p>	For the voluntary carbon market, it is desirable to collaborate with private-sector trading companies, etc. to create credits. However, it is necessary to pay attention to carbon credits related to private-sector profits as an ODA project. Next, forest and watershed management is a good example of utilizing the multifaceted functions of forests, where Japan's knowledge from the JICA "Uttarakhand Mountain Disaster Project" and other projects can be applied. Furthermore, agricultural management support for livelihood improvement is an area in which Japan can contribute, as it has a proven track record in development assistance to date.

Possible Cooperation program	Climate Change Impact		Spillover effect	Japanese knowledge and technology applicability
	Mitigation	Adaptation		
			people and help reduce deforestation by converting forests to agricultural land.	
3. Forest management strengthening program with consideration of climate change				
Subsequent JICA forest management project		Contribute to climate change adaptation measures by strengthening information, education on collaborative watershed management and rehabilitation of forest area and plantation, and sustainable projects by local people.	<p>Contributions to the PDP include the following</p> <p>Contribution to the management of watershed degradation Among the watershed management with the participation of local people, the project contributes to the reduction of soil degradation and siltation in rivers and other bodies of water.</p> <p>The project will also contribute to raising awareness of the importance of forest management and conservation in terms of climate change by supporting building the capacity of local communities to participate in watershed management in the future.</p> <p>Furthermore, through improving income by agricultural forestry products, the project will contribute to improving the livelihoods of local people and help</p>	Forest and watershed management is a good example of utilizing the multifaceted functions of forests, where Japan's knowledge from the JICA "Uttarakhand Mountain Disaster Project" and other projects can be applied. Furthermore, agricultural management support for livelihood improvement is an area in which Japan can contribute, as it has a prove track record in development assistance to date.

Possible Cooperation program	Climate Change Impact		Spillover effect	Japanese knowledge and technology applicability
	Mitigation	Adaptation		
			reducing deforestation by converting forests to agricultural land.	
4. Coastal and Marine ecosystem conservation management strengthening program with consideration of climate change				
Support for the formulation of Strategic Conservation Planning for the management of Marine Protected Areas, etc.	Adaptation's action of conservation of ecosystem and biodiversity generates co-benefits of mitigation, such as carbon sequestration.	The development of the plan will ensure that coastal and marine resources, including blue carbon, are managed sustainably and contribute to the achievement of the Philippines' NDC goals.	The development of the plan will provide the basis for policies for the management of Marine Protected Areas, etc., consistent with the Kunming-Montreal Biodiversity Framework and the PDP, and will advance the conservation of coastal/marine ecosystems and biodiversity. It will also have a high spillover effect on Blue Carbon's carbon storage efforts. This support is expected to have a spillover effect on a wide range of government, private sector, and research institutions that the policy will affect.	In Japan, guidelines for domestic local governments for the development of Marine Spatial Planning have already been established. While there is no current track record of overseas assistance, we believe that it is possible to provide assistance in formulating policies that take into account the conservation of Marine Protected Areas based on Japan's knowledge.
Project to improve Protected Areas management capacity by developing a technology and knowledge sharing platform for monitoring and assessment of local ecosystems in Marine Protected Areas vulnerable to climate change	Adaptation's action of conservation of ecosystem and biodiversity generates co-benefits of mitigation, such as carbon sequestration.	Improve technology for monitoring and assessment of ecosystems in areas of high vulnerability to climate change and establish a data management platform to efficiently develop policies and plans for the management, conservation, and restoration of coastal and marine ecosystems and biodiversity, thereby contributing to achieving the goals for NDC adaptation measures.	Data management of Marine Protected Areas, a goal of the Kunming-Montreal Biodiversity Framework, is progressing and progress will be made toward achieving the Framework. It will also promote information management at the national, state, and local levels, and publicize the importance of Marine Protected	We believe that the Philippines' experience in conducting ecosystem vulnerability and restoration assessments in the SATREPS "Integrated Coastal Ecosystem Conservation and Adaptive Management Project" will contribute to supporting monitoring and assessment of

Possible Cooperation program	Climate Change Impact		Spillover effect	Japanese knowledge and technology applicability
	Mitigation	Adaptation		
			<p>Areas in public administration over a wide area.</p> <p>Contribute to the progress of policies related to Protected Areas vulnerable to climate change in line with the NCCAP.</p> <p>The prevailing of monitoring and assessment techniques that contribute to ecological and environmental stability will also increase the management capacity of government officials, while increasing public appreciation and recognition of Protected Areas in highly vulnerable areas.</p>	<p>coastal ecosystems at the national level.</p> <p>In addition, Japanese ministries and agencies have a platform for sharing information on biodiversity, and in establishing the platform, it would be possible to provide Japan's leading knowledge on ecosystems and biodiversity and dispatch technical experts in IT and data management, etc.</p>
Blue Carbon Conservation Support	Blue Carbon policy formulation and measurement/accounting will contribute to the realization of quantified GHG sequestration from blue carbon in the Philippines and the achievement of NDC targets.	Mitigation's action of conservation of ecosystem and biodiversity generates co-benefits of adaptation.	<p>Advance policies that contribute to new blue carbon storage along the lines of PDP and PBSAP, etc.</p> <p>The renewal of the mangrove carbon sequestration methodology will also secure and increase the carbon sink for blue carbon throughout the Philippines, which will have a significant impact on the achievement of the NDC.</p> <p>Furthermore, in relation to NDC adaptation measures and 30by30, the project will contribute to</p>	<p>In Japan, the amount of GHG absorption and fixation by mangrove forests was added to the national GHG inventory, and Japan is taking the lead in accounting for blue carbon and has knowledge of the legal system, etc. In the future, it will be possible to assist in the formulation of blue carbon policies in the Philippines. We believe that this knowledge can be useful to support the Philippines in formulating its blue</p>

Possible Cooperation program	Climate Change Impact		Spillover effect	Japanese knowledge and technology applicability
	Mitigation	Adaptation		
			improving protected area management in government, conserving and restoring mangrove forests and other forests belonging to the blue carbon in protected areas, and promoting data management, and to publicize the importance of ecosystem services related to marine ecosystems at the national level.	carbon policy in the future. In addition, the measurement and calculation methods of GHG sequestration and fixation by blue carbon (mangroves and seaweeds) are well established, and Japan's leading knowledge could be utilized for technical assistance. The experience and knowledge gained from the implementation of SATREPS can be used for the evaluation and prediction of carbon storage and sequestration, and for the comprehensive evaluation of ecosystem services.

(6) Urban Environment

1) Possible program concept

In the urban environment sector, two subsectors, waste and wastewater, respectively, were considered for possible cooperation programs.

Table 3-24 Possible Cooperation Programs (Urban Environmental Sector)

Cooperation Program	Cooperation Project	
	Short term	Mid-to-long term
Waste		
U-1 Waste management improvement program	Project for building technical expertise and knowledge product flow U-1-1	Self supporting and management by DENR, MMDA and LGUs for capacity development for keeping technical knowledge and knowledge product flow, and the behavior of household and community towards waste management
	Community awareness and environmental education promotion project U-1-2	
	Collaborative solid waste management through citizen and administrative partnership U-1-3	
U-2 Intermediate waste treatment capacity improvement program	Waste Segregation/Composting, Recycling Promotion Project U-2-1	Sustainable Waste Management Dissemination Project U-2-3
	Integrated Waste Management, including Waste Segregation, Composting, Recycling Technology Cooperation Project U-2-2	
U-3 Final disposal site capacity improvement program	Final disposal site operation and management project U-3-1	Sustainable final disposal site operation and management promotion project U-3-3
	Final disposal site capacity improvement technical cooperation project, including regional management U-3-2	
Wastewater		
U-4 Wastewater treatment (facility) improvement program	Sustainable wastewater treatment system promotion and technology enhancement project improvement U-4-1	Sustainable wastewater treatment technology dissemination project U-4-3
	Sustainable environmental development project through model project deployment, including wastewater treatment technology improvement and regional management U-4-2	

Source: JICA survey team

U-1	Waste management improvement program
Objective	To DENR and LGU officials, the proposal aims to enhance and share technical knowledge in waste management, promote environmental education for local residents and children, and establish an effective solid waste management system through collaborative efforts between citizens and the municipalities. The goal is to establish a sustainable waste management system that contributes to the environment at the regional level, while avoiding the burial of organic waste and reducing overall waste volume, leading to the suppression of methane gas generation through aerobic landfill management to mitigate global warming.
Spread effect	By improving technical expertise, DENR and LGU can establish an effective waste management system, and the shared knowledge can permeate throughout the region. Environmental education and awareness campaigns for local residents and children will deepen their understanding of the environment, encouraging a transition to sustainable lifestyles. Through collaboration between citizens and the municipalities, the adoption of effective waste management practices will be encouraged at the regional level, with successful cases spreading to other areas. Overall, this initiative anticipates the implementation of proper waste management aligned with the healthy development of the regional economy.

	Candidates for cooperation projects	Assumed scheme	Issues to be resolved	Implementation period
U-1-1	Project for building technical expertise and knowledge product flow	Knowledge Co-Creation Program /Expert dispatch	Limited number of waste management officers in LGUs and disconnection or loss of technical knowledge and local information	Short term
U-1-2	Community awareness and environmental education promotion project	Expert dispatch/Overseas cooperation volunteers	Low level of interest of the Barangay/local population in waste management	Mid-long term
U-1-3	Collaborative solid waste management through citizen and administrative partnership	Knowledge Co-Creation Program	Nationwide shortage of materials recovery facilities	Short term

U-1-1 Project for building technical expertise and knowledge product flow

Name of cooperative program (Tentative name)	Project for building technical expertise and knowledge product flow
Possible JICA Schemes	Knowledge Co-Creation Program /Expert dispatch
Background (Issues related to climate change measures addressed by this cooperation program)	Due to the low policy priority in LGUs, over 70% of them have either not appointed or appointed waste management officers in a concurrent capacity. As a result, the 10-year Solid Waste Management Plan is not faithfully executed, leading to low waste diversion rates and a nationwide shortage of resource recovery facilities and sanitary landfills. Furthermore, during the turnover of waste management officers, there is a limited of transfer of technical and regional knowledge, causing disruptions in the knowledge product flow and the loss of intangible information.
Project Summary target of higher order	Aim to establish a knowledge product flow targeting waste management officers, focusing on the transfer of technical and regional insights. This initiative is designed to reinforce the implementation of the Ecological Solid Waste Management Act (RA 9003) and promote best practices in waste management.
Objectives and Outcomes	<ul style="list-style-type: none"> a) Full-time ratio of waste management officers in LGUs is increasing. b) 10-year solid waste management plans of each LGU are faithfully executed. c) Best practices in waste management are implemented in each LGU.
Output	<ul style="list-style-type: none"> a) DENR facilitates the sharing of technical insights between LGU waste management officers and builds a knowledge product flow. b) Experts provide DENR and LGU waste management officers with localization methods for knowledge products.
Cooperation period	3 years
Anticipated C/P Institutions	DENR-EMB
Other Related Organizations	DILG, MMDA, LGUs
Points to keep in mind when implementing the program	<p>DENR aims to involve not only central staff but also regional officials familiar with the local context. The JICA training program corresponding to this project is envisioned to cover the following:</p> <ul style="list-style-type: none"> - Basic solid waste management (A) (B) - Municipal solid waste management practice (A) (B) - Sustainable solid waste management in island areas <p>In selecting target LGUs, it is preferable to choose from priority areas listed in the "List of Investment Portfolio for Risk Resilience" (Metro Iloilo, Eastern Samar, Northern Samar, Surigao del Norte).</p>

U-1-2 Community awareness and environmental education promotion project

Name of cooperative program (Tentative name)	Community awareness and environmental education promotion project
Possible JICA Schemes	Expert dispatch / Overseas Cooperation Volunteers

Background (Issues related to climate change measures addressed by this cooperation program)	In many LGUs, waste segregation ordinances have been enacted; however, approximately 70% of barangays do not implement waste segregation. Consequently, while many residents are aware of the obligation to segregate waste, understanding of its necessity is limited.
Project Summary target of higher order	To address this, seminars on waste management and the 3Rs for local residents, as well as environmental education for community children, will be conducted. Through these initiatives, proper waste disposal practices and increased environmental awareness will contribute to the promotion of sustainable lifestyles throughout the community.
Objectives and Outcomes	<ul style="list-style-type: none"> a) Achieving behavioral changes in barangays/residents regarding waste management. b) Thorough implementation of waste segregation and 3R activities in many Barangays.
Output	<ul style="list-style-type: none"> a) Implementation of waste management policies emphasizing waste segregation and 3R by DENR/LGU. b) Conducting seminars for local residents by DENR/LGU, focusing on waste segregation and 3R. c) Implementing environmental education for community children by DENR/LGU.
Cooperation period	From 5 to 10 years
Anticipated C/P Institutions	DENR-EMB
Other Related Organizations	DILG, MMDA, LGUs
Points to keep in mind when implementing the program	<p>To effectively utilize waste and resource segregation activities by Barangays/residents, we will concurrently implement the "Waste Intermediate Processing Capacity Improvement Project" as the recipient. Additionally, JICA's training programs relevant to this project are expected to include the following:</p> <ul style="list-style-type: none"> - Solid Waste Management through Collaboration with the Private Sector and Civil Society (A) (B) <p>In selecting target LGUs, it is preferable to choose from priority areas listed in the "List of Investment Portfolio for Risk Resilience" (Metro Iloilo, Eastern Samar, Northern Samar, Surigao del Norte).</p>

U-1-3 Collaborative solid waste management through citizen and administrative partnership

Name of cooperative program (Tentative name)	Collaborative solid waste management through citizen and administrative partnership
Possible JICA Schemes	Knowledge Co-Creation Program
Background (Issues related to climate change measures addressed by this cooperation program)	In more than 60% of Barangays, materials recovery facilities have not been established, primarily due to difficulties in securing land for such facilities and the unavailability of funds from LGUs. Additionally, limited subsidies from DENR-EMB to LGUs and the prioritization of funding for LGUs that meet the requirements, such as securing operational funds post-installation, land use, and possessing technical know-how on installation and operation procedures, contribute to the low installation rate. Furthermore, no ordinance pertaining to waste segregation affects over 10% of LGUs, impeding the progress of waste segregation initiatives.
Project Summary target of higher order	To address these challenges, targeted training sessions on waste collection, segregation, and recycling will be conducted. This will include facility visits, technical assistance, and guidance on reducing waste management costs. The aim is to promote effective solid waste management through collaborative efforts between citizens and local government authorities.
Objectives and Outcomes	The achievement of proper solid waste management through collaboration between citizens and municipalities will become a reality.
Output	a) Training sessions on waste collection, segregation, recycling, and reuse, including inspections of collection and processing facilities, their operational management status, introduction of case studies on regional management (clustering), provision of technology, and discussion of cost reduction effects in waste management expenses, will be organized by local governments, NGOs, and civic groups across the country.

	b) Investigations are conducted regarding LGUs where ordinances regarding waste segregation have not been enacted, and considerations are made towards the enactment and adherence to such ordinances.
Cooperation period	3 years
Anticipated C/P Institutions	DENR-EMB
Other Related Organizations	DILG, MMDA, LGUs
Points to keep in mind when implementing the program	<p>Recognizing the limited financial assistance from DENR, the project contemplates the clustering of barangays. Moreover, the anticipated JICA training sessions for this project include:</p> <ul style="list-style-type: none"> - Technology for Solid Waste Management with Recycling Promotion for Sound Material-Cycle Society - Development of Recycling Policy <p>In selecting target LGUs, it is preferable to choose from priority areas listed in the "List of Investment Portfolio for Risk Resilience" (Metro Iloilo, Eastern Samar, Northern Samar, Surigao del Norte).</p>

<Reasons for selection of this program>

U-1 Waste management improvement program

Contribution to support achievement of the Paris Agreement and NDC	<ul style="list-style-type: none"> - Increasing the full-time appointment rate of waste management officials and enhancing technical expertise to achieve and improve the 10-year solid waste plan. - Contribution to the improvement of segregation and recycling rates through regional environmental education. - Anticipated benefits from the installation of materials recovery facilities, including the reduction of mixed waste and illegal dumping, leading to extended lifespan of disposal sites <p>By achieving these goals, there will be significant contributions to the Paris Agreement and NDC attainment.</p>
Consistency with sector policies	<p>PDP: includes Information, Education, and Communication (IEC) activities for effective waste management by LGUs, appropriate waste disposal by residents, installation of resource recovery facilities, and clustering of LGUs for improved operation of waste facilities.</p> <p>National framework on Climate Change: strengthening the implementation of the Ecological Solid Waste Management Act (RA9003) is a strategic priority.</p> <p>NCCAP: focuses on waste segregation, collection, composting, and recycling, along with regulating toxic packaging materials and disposable items.</p>
Urgency	<p>Over 70% of LGUs have waste management officials either unappointed or serving in a dual role, leading to non-compliance with the 10-year solid waste plan and low waste diversion rates. Many Barangays have enacted segregation ordinances, but over 70% do not implement them, resulting in a low of understanding among residents. The installation rate of materials recovery facilities under the national plan is also below target, posing an urgent challenge.</p>
Status of support from other donors	<p>The World Bank supported DENR in 2014 with a project covering policy, planning, environmental management, monitoring, and evaluation capacity development. However, waste management officials in LGUs were not included.</p> <p>UNDP conducted a waste-to-cash project in Quezon City in 2021, aiming for increased awareness and proper waste disposal among residents (results and effectiveness under evaluation).</p>
Economic efficiency	Not applicable
Investment effect	Not applicable
DAC 6 items	<p>Validity: High (Aligned with needs and policies).</p> <p>Consistency: High (Aligned with policies of MoFA, JICA, and MoE).</p> <p>Effectiveness: To be verified in the future.</p> <p>Impact: High (Impact on NDC and sector policies).</p> <p>Efficiency: Moderate (Time-consuming for human resource development and behavioral change in communities, but collaboration with U-2 and U-3 programs is possible).</p> <p>Sustainability: High (Continuous implementation of local government capacity-building programs is essential).</p>
Consistency with Japanese government and JICA policies	<p>MoFA emphasizes waste disposal as part of "Ensuring human security for inclusive growth" in its key focus areas for country-specific development cooperation policies.</p>

	<p>In JICA's Global Agenda (Sector project strategy), No.18 on Environmental Management, JICA outlines a project strategy called the "Clean City Initiative." This initiative focuses on nurturing human resources capable of addressing facility and legal system development, improving public health, and building a circular society through 3R.</p> <p>The MoE's international development projects aim to contribute to the "Asia zero emission community concept" under the priority of promoting a transition to a circular economy, particularly emphasizing cooperation in waste management legislation, technology, and human resource development.</p>
Socially vulnerable groups and gender	<p>Considerations for improving the appointment rate of female waste management officials, conducting seminars with gender considerations for socially vulnerable groups such as women and female-headed households, and exploring employment opportunities for socially vulnerable groups in waste-related roles such as cleaners or employees in materials recovery facilities.</p>

U-2	Intermediate waste treatment capacity improvement program			
Objective	Provide practical skills in waste segregation, composting, potential for their market development and recycling to officials from DENR and LGUs. Implement pilot projects in selected regions, and explore methods to disseminate and expand successful models to other areas. Through these efforts, achieve a reduction in greenhouse gas emissions through the intermediate treatment of waste (composting, 3R, etc.).			
Spread effect	The widespread adoption of waste segregation, composting, and recycling will promote solutions tailored to regional needs. Furthermore, by disseminating successful approaches to other regions, the expectation is to foster the widespread adoption and expansion of sustainable waste intermediate treatment methods.			
	Candidates for cooperative projects	Assumed scheme	Issues to be resolved	Implementation period
U-2-1	Waste Segregation/Composting, Recycling Promotion Project	Knowledge Co-Creation Program /Expert dispatch	Low waste diversion rate	short term
U-2-2	Integrated Waste Management, Including Waste Segregation, Composting, and Recycling Technology Cooperation Project	Technical Cooperation/ Private Sector Cooperation		Short/Medium Term
U-2-3	Sustainable Waste Management Dissemination Project	Sector loan		Mid-long term

U-2-1/U-2-2/U-2-3 Intermediate waste treatment capacity improvement program

Name of cooperative program (Tentative name)	Intermediate waste treatment capacity improvement program
Possible JICA Schemes	Knowledge Co-Creation Program /Expert dispatch or Technical cooperation/Feasibility study, Sector loan
Background (Issues related to climate change measures addressed by this cooperation program)	The country has fallen short of the targeted waste diversion rate set in the PDP (2017-2022), aiming for an 80% diversion rate by 2022, achieving only 46.6%. Challenges such as financial constraints, technological limitations within LGUs, and a general lack of policy prioritization for waste management contribute to this gap.
Project Summary target of higher order	Provide practical skills for waste segregation, composting, potential for their market development and recycling. Implement pilot projects in selected regions and explore methods to disseminate and expand successful models to other areas. Through these efforts, achieve a reduction in greenhouse gas emissions through the intermediate processing of waste (composting, 3R, etc.).
Objectives and Outcomes	<ul style="list-style-type: none"> a) Improvement of waste diversion rate and reduction of organic waste volume b) Extension of the lifespan of final disposal sites c) Formation of a circular market through composting, 3R, etc.
Output	<ul style="list-style-type: none"> a) Training sessions on waste segregation/composting, potential for their market development and recycling for LGU officials conducted by experts/local companies (including facility inspections, case studies on operational management, introduction of cluster management, and provision of technical support)

	<p>b) Pilot projects on waste sorting/composting, potential for their market development and recycling, including consideration of cluster management, will be implemented in the selected target region.</p> <p>c) Methods for dissemination and expansion to other regions will be explored.</p>
Cooperation period	U-2-1: 3 years, U-2-2: 3 years, U-2-3: from 5 to 10 years
Anticipated C/P Institutions	DENR-EMB
Other Related Organizations	DILG, MMDA, LGUs
Points to keep in mind when implementing the program	<p>To address financial difficulties, the clustering of LGUs is also under consideration. Additionally, the JICA training programs relevant to this project are expected to include the following:</p> <ul style="list-style-type: none"> - Technology for Solid Waste Management with Recycling Promotion for Sound Material-Cycle Society - Management of compost projects - Development of recycling policy <p>In selecting target LGUs, it is preferable to choose from priority areas listed in the "List of Investment Portfolio for Risk Resilience" (Catanduanes, Ifugao).</p>

<Reasons for selection of this program>

U-2 Intermediate waste disposal capacity improvement program

Contribution to support achievement of the Paris Agreement and NDC	The promotion of waste segregation/composting and recycling is expected to have a significant impact on mitigating the effects, as it leads to the reduction of methane gas emissions through avoiding the landfilling of organic waste and reducing the overall waste volume. This is considered crucial for achieving the targets outlined in the NDC and sector policies.
Consistency with sector policies	<p>PDP: Clustering of LGUs for the further appropriate operation of waste joint facilities, including the establishment of resource recovery facilities and sanitary landfill sites.</p> <p>National Framework Strategy on Climate Change: Strategic priorities include strengthening the implementation of the Ecological Solid Waste Management Act (RA9003) and promoting best practices in waste management.</p> <p>NCCAP: Enhancement of waste segregation, collection, composting, and recycling at waste generation sources.</p>
Urgency	Given the failure to achieve the 2022 target waste diversion rate (80%) set in PDP (46.6%), the urgency is high.
Status of support from other donors	JICA has implemented projects to enhance waste management capabilities through advanced technologies, and WB has conducted methane recovery projects. Additionally, ADB implemented a value-added waste project in 2019.
Economic efficiency	Not applicable
Investment effect	Not applicable
DAC 6 items	<p>Relevance: High (Aligns with needs and policies)</p> <p>Consistency: High (Aligns with policies of MoFA, JICA, and MoE)</p> <p>Effectiveness: High (To approach the waste diversion rate target set by PDP)</p> <p>Impact: High (Expectations for employment in intermediate processing facilities and the formation of a circular compost market)</p> <p>Efficiency: High (Possible collaboration with U-1 and U-3 programs)</p> <p>Sustainability: High (However, it is necessary to ensure the sustained implementation of the local government capacity-building program)</p>
Consistency with Japanese government and JICA policies	<p>In MoFA's priority areas for country-specific development cooperation policy, it emphasizes overcoming vulnerability and stabilizing/strengthening livelihoods, including waste disposal, for inclusive growth and human security.</p> <p>JICA's Global Agenda (Specific project strategy) No.18 in environmental management unfolds a project strategy titled "Clean City Initiative." Cooperation Policy 1 states "Improve waste management mechanisms towards a circular society," advocating for waste reduction through segregation and recycling to reduce environmental impact and prevent pollution.</p> <p>As part of MoE's international deployment project under the "Contribution to the Asian zero emission community concept" and the "Promotion of the internationalization of circular industries and infrastructure development for international resource circulation" project, support is provided to ASEAN developing countries. This support is based on Japan's excellent waste management, recycling systems, and experiences, packaged to assist in the</p>

	development of systems, technologies, and human resources. The goal is to contribute to proper waste management, circular infrastructure development, and promote the international expansion of Japan's circular industry.
Socially vulnerable groups and gender	There is a focus on employing socially vulnerable groups, such as women working at disposal sites and waste pickers, as employees in intermediate processing facilities.

U-3	Final disposal site capacity improvement program			
Objective	Experts, local governments, and private sectors provide technical expertise and information on the operation and management of landfill sites. Through site visits and lectures, training is conducted on operational management methods, successful examples of regional management, and waste collection and management techniques. Additionally, training on landfill management is conducted by DENR, and a pilot project, including considerations for regional management, is implemented in selected areas. Unique waste management methods specific to each region are examined based on successful examples, and methods for dissemination and expansion to other areas are considered to promote sustainable waste management nationwide. Through these efforts, a reduction in greenhouse gas emissions, particularly methane, is achieved.			
Spread effect	Technical information on the operation and management of landfill sites is provided by experts and local governments, and consistent training is conducted by DENR. Through pilot projects in regional management, region-specific waste management methods are verified, and successful examples are disseminated to other regions. Based on shared methods and best practices, sustainable waste management is promoted nationwide.			
	Candidates for cooperative projects	Assumed scheme	Issues to be resolved	Implementation period
U-3-1	Final disposal site operation and management project	Knowledge Co-Creation Program /Expert dispatch	National shortage of sanitary landfill sites	Short term
U-3-2	Final disposal site capacity improvement technical cooperation project, including regional management	Technical Cooperation		Short/Medium Term
U-3-3	Sustainable final disposal site operation and management promotion project	Project loan		Mid-long term

U-3-1/U-3-2/U-3-3 Final disposal site capacity improvement program

Name of cooperative program (Tentative name)	Final disposal site capacity improvement program
Possible JICA Schemes	Specialized training/Expert dispatch or Technical cooperation/Feasibility study, Project loan
Background (Issues related to climate change measures addressed by this cooperation program)	Due to land restrictions (e.g., island regions, steep terrain, protected areas) and geological limitations (such as limestone), many LGUs, accounting for over 60%, cannot meet the current sanitary landfill siting criteria, are unable to access Sanitary Landfills and have resorted to establishing Residual Contaminated Areas as a temporary measure. However, guidelines specifying the conditions for establishing Residual Contaminated Areas do not exist, leading some LGUs to essentially manage waste in the same manner as Open Dumping Sites. Consequently, some RCAs operate under anaerobic conditions conducive to methane gas generation, contributing to an increase in methane gas potential.
Project Summary target of higher order	Experts, local governments, and private sectors provide technical information on the operation and management of final disposal sites, conducting tours, lectures, and training on operational methods, successful examples of regional management, and waste collection and management techniques. Additionally, DENR conducts training on final disposal site management, implementing pilot projects in selected regions that include considerations for regional management, examining unique waste management methods. The success stories are then used to explore methods for dissemination and expansion to other regions, promoting sustainable waste management nationwide and realizing a reduction in greenhouse gas emissions through the reduction of methane gas potential.
Objectives and Outcomes	<ul style="list-style-type: none"> a) Smooth transition from Open Dumping Sites or Residual Contaminated Areas to Sanitary Landfills b) Increase in the number of LGUs with access to sanitary landfills c) Reduction in the potential for methane gas generation

Output	<p>a) Technical information and support from experts, local governments, and domestic companies (through tours and lectures on disposal site management methods, regional management (clustering) case studies, waste collection and management techniques, etc.) will be provided.</p> <p>b) DENR conducts training on final disposal site management for LGUs.</p> <p>c) Exploration of potential improvements to sanitary landfill siting criteria</p> <p>d) Technical support from domestic companies and local governments will be provided.</p> <p>e) Pilot projects, including considerations for regional management (clustering), will be implemented in selected target regions.</p> <p>f) Methods for dissemination and expansion to other regions will be explored.</p>
Cooperation period	U-3-1: 3 years, U-3-2: 3 years, U-3-3: From 5 to 10 years
Anticipated C/P Institutions	DENR-EMB
Other Related Organizations	DILG, MMDA, LGUs
Points to keep in mind when implementing the program	<p>To address financial challenges, consider clustering LGUs. JICA's training related to this project envisions the following:</p> <ul style="list-style-type: none"> - Design and maintenance of Semi-Aerobic Landfill Site (Fukuoka Method) - Technology for Solid Waste Management with Recycling Promotion for Sound Material-Cycle Society <p>In selecting target LGUs, it is preferable to choose from priority areas listed in the "List of Investment Portfolio for Risk Resilience" (Metro Iloilo, Eastern Samar, Northern Samar, Ifugao, Mountain Province).</p>

Reasons for selection of this program

U-3 Final disposal site capacity improvement program

Contribution to support achievement of the Paris Agreement and NDC	The installation of Sanitary Landfills will resolve the alternative use of Residual Contaminated Areas, contributing significantly to the reduction of methane gas potential and making a substantial contribution to achieving NDC. Furthermore, addressing these challenges will enable the implementation of LGUs' 10-year Solid Waste Management Plans, reinforcing compliance with RA9003, and promoting best practices in waste management. The impact on sector policies such as the National Framework Strategy on Climate Change and the NCCAP, which emphasizes the closure of Open Dumping Sites, is also substantial.
Consistency with sector policies	<p>PDP: Clustering of LGUs for the further appropriate operation of waste disposal facilities, including resource recovery facilities and the installation of sanitary landfills.</p> <p>National Framework Strategy on Climate Change: Strategic priorities include strengthening the implementation of the Ecological Solid Waste Management Act (RA9003) and promoting best practices in waste management.</p> <p>NCCAP: Closure of Open Dumping Sites.</p>
Urgency	Considering that only 35% of LGUs have access to Sanitary Landfills as of 2022, the urgency of addressing this issue is high.
Status of support from other donors	Throughout the 2010s, JICA, ADB, and WB have implemented waste management projects, although their numbers are not extensive. Additionally, since the beginning of the 2020s, there has been a trend of privately led waste disposal facility construction projects.
Economic efficiency	Not applicable
Investment effect	Not applicable
DAC 6 items	<p>Validity: High (Aligned with Needs and Policies)</p> <p>Consistency: High (Aligned with Policies of MoFA, JICA, and MoE)</p> <p>Effectiveness: High (To approach the goal of increased installation of sanitary landfills)</p> <p>Impact: High (To realize the top goals of increasing LGUs with access to sanitary landfills and reducing methane gas potential)</p> <p>Efficiency: High (Possible collaboration with U-1 and U-2 programs)</p> <p>Sustainability: High (However, it is necessary to ensure the sustained implementation of local government capacity-building programs)</p>
Consistency with Japanese government and JICA policies	In MoFA's country-specific development cooperation policy, a focus area is securing human security for inclusive growth, including overcoming vulnerability to environmental issues such as waste disposal and enhancing the stability and strengthening of livelihoods.

	In JICA's Global Agenda (Specified project strategy), under No.18 Environmental Management, the project strategy titled "JICA Clean City Initiative" is deployed. The first stage of improvement in waste management is identified as enhancing public health and promoting landfill improvements (from open dumping to sanitary landfill). Additionally, MoE is promoting the international expansion of our country's recycling industry. As part of the international methane and other emission reduction contribution fund project, they are advocating support for methane emission reduction in the field of urban sanitation environments (including waste) in developing countries through the introduction of methane emission reduction technologies.
Socially vulnerable groups and gender	Even after landfill improvements, the project activity remains conscious of providing continued employment for socially vulnerable groups such as women and waste pickers.

U-4	Domestic wastewater treatment (facility) improvement program			
Objective	Reduction of GHG Emissions through methane generation potential reduction associated with water quality improvement in sewage and septic tanks			
Spread effect	Through expert and domestic company-led training on wastewater treatment, technical assistance, training by LWUA, and a pilot project for regional management, best practices in wastewater treatment are disseminated. Considering the results of the pilot project, expansion to other regions is explored, and shared successful methods are adopted throughout the community, promoting sustainable wastewater treatment and contributing to the reduction of methane generation potential.			
	Candidates for cooperative projects	Assumed scheme	Issues to be resolved	Implementation period
U-4-1	Sustainable wastewater treatment system promotion and technology enhancement project	Knowledge Co-Creation Program /Expert dispatch	Low capacity and funding for implementation of sewerage and septage sludge management projects in LGUs and Local Water Districts (LWDs)	Short term
U-4-2	Sustainable environmental development project through model project deployment, including wastewater treatment technology improvement and regional management	Technical Cooperation/ Private Sector Cooperation		Short/Medium term
U-4-3	Sustainable wastewater treatment technology dissemination project	Sector loan		Mid-long term

U-4-1/U-4-2/U-4-3 Domestic wastewater treatment (facility) improvement program

Name of cooperative program (Tentative name)	Domestic wastewater treatment (facility) improvement program
Possible JICA Schemes	Specialized training/Expert dispatch or Technical cooperation/Feasibility study, Project loan
Background (Issues related to climate change measures addressed by this cooperation program)	In 1,163 LGUs classified as Class 2 or below, there is a tendency for low policy priority towards wastewater treatment. This trend contributes to the nationwide shortage of sewage and sludge treatment facilities. Consequently, a significant portion of domestic wastewater is either discharged untreated or accumulates in septic tanks for extended periods. The anaerobic conditions resulting from this accumulation lead to an increase in methane potential, contributing to the rise in greenhouse gas emissions.
Project Summary target of higher order	Reduction of GHG emissions through methane potential reduction associated with water quality improvement in sewage systems and septic tanks
Objectives and Outcomes	<ul style="list-style-type: none"> a) Development of master plans and design standards by LGUs/LWDs. b) Introduction of centralized sewage treatment systems or decentralized wastewater treatment facilities (Johkasou) by LGUs/LWDs. c) Improvement of water quality in regional rivers, waterways, and groundwater. d) Reduction in methane gas potential.
Output	<ul style="list-style-type: none"> a) Training sessions conducted by experts and domestic companies for officials from LWUA, LGU, and LWD on decentralized and centralized sewage treatment systems, Johkasou treatment (including facility inspections, case studies of regional management, and technical support for the development of master plans, design specifications, and standards). b) Training sessions by LWUA for officials from LGUs/LWDs on decentralized and centralized sewage treatment systems, Johkasou treatment (including facility operations

	<p>management, case studies of regional management, and technical support for the development of master plans, design specifications, and standards).</p> <p>c) Technical assistance provided by experts and domestic companies (including facility design, construction, and operational management) to enhance sewage treatment capabilities.</p> <p>d) Pilot projects, including consideration of regional management (clustering), implemented in selected target areas.</p> <p>e) Exploration of methods for disseminating and expanding the project to other regions.</p>
Cooperation period	U-4-1: 3 years, U-4-2: 3 years, U-4-3: From 5 to 10 years
Anticipated C/P Institutions	LWUA
Other Related Organizations	DPWH-ESSD, DENR-EMB, DILG, LGUs
Points to keep in mind when implementing the program	<p>To address financial challenges, the consideration of clustering LGUs is proposed when introducing a centralized wastewater treatment system. Additionally, the specific training modules offered by JICA for this project are envisioned to cover:</p> <ul style="list-style-type: none"> - Wastewater Treatment Techniques - Sewerage and urban drainage management - Decentralized Wastewater Treatment System <p>In selecting target LGUs, it is preferable to choose from priority areas listed in the "List of Investment Portfolio for Risk Resilience" (Siquijor (Cang-adieng, Siquijor), Northern Samar (Catubig, Pambujan, Catarman Watershed)). Furthermore, it is desirable to select areas based on the readiness status of regions where feasibility studies have been conducted by LWUA (as of the end of 2023, there are 15 locations).</p>

<Reasons for selection of this program>

U-4 Domestic wastewater treatment (facility) improvement program

Contribution to support achievement of the Paris Agreement and NDC	Methane gas is generated when septic tanks and anaerobic ponds (stabilization ponds) used for domestic and commercial wastewater treatment become anaerobic. Therefore, reducing methane gas potential through the improvement of septic tank water quality is expected to have a significant impact on issue resolution and contribute substantially to NDC.
Consistency with sector policies	<p>NCCAP: Research and adoption of centralized wastewater treatment systems for advanced urban water quality improvement</p> <p>Gap and needs assessment during the implementation of Clean Water Act and NSSMP.</p> <p>NSSMP: Targets for 2020 include the development of septic tank management systems by all LGUs, 17 advanced cities developing sewerage systems, enabling approximately 43.6 million people to use septic tank treatment facilities, and about 3.2 million people to use sewage treatment facilities by 2020.</p>
Urgency	Despite the NSSMP's goal for all LGUs to achieve the development of septic tank management systems by 2020, this objective remains unmet.
Status of support from other donors	Since 2010, donor support for sewage projects has mainly focused on the Manila metropolitan area, with no confirmed assistance to LGUs. Additionally, there is no experience of support from other donors, including JICA, for LWUA's sewage projects.
Economic efficiency	Not applicable
Investment effect	Not applicable
DAC 6 items	<p>Validity: High (Aligned with Needs and Policies)</p> <p>Consistency: High (Aligned with Policies of MoFA, JICA, and MoE)</p> <p>Effectiveness: High (Anticipated increase in LGUs applying for NSSMP and adopting sewage treatment systems)</p> <p>Impact: High (Although the initial costs are high, it contributes to long-term improvement in water quality)</p> <p>Efficiency: High (Each project is designed for mutual collaboration)</p> <p>Sustainability: High (However, it is necessary to ensure the sustained implementation of local government capacity-building programs)</p>
Consistency with Japanese government and JICA policies	<p>In the MoFA's country-specific development cooperation policy, there is a commitment to overcoming vulnerabilities and stabilizing/enhancing livelihoods related to environmental issues, including water and sanitation, under the focus area of "Ensuring human security for inclusive growth."</p> <p>Under JICA's Global Agenda (Specified project strategy) No.18 for Environmental Management, they are advancing a project strategy titled "Clean City Initiative." Cooperation Policy 2 emphasizes the importance of sustainable operational structures and long-term large-scale investments in sewage treatment facility development and operation as essential components.</p>

	MoE also advocates for reducing methane emissions in the field of urban sanitation and environmental improvement in developing countries through the introduction of emission reduction technologies.
Socially vulnerable groups and gender	Informal settlers are compelled to live in poor sanitary conditions, such as directly discharging sewage into rivers. The introduction of Johkaso and sewage systems is expected to bring about environmental improvements.

2) Evaluation of the cooperation program

Table 3-25 Evaluation of the cooperation programs (Urban Environment)

Possible Cooperative Program	Climate Change Impact		Spreading effect	Possibility of utilizing Japanese knowledge and technology
	Mitigation	Adaptation		
1. Waste management improvement program				
Project for building technical expertise and knowledge product flow	Establishing a sustainable waste management system in the region to promote contributions to the environment and climate change across the entire area through the extension of the lifespan of final disposal sites and the reduction of methane generation potential.	N/A	Through the improvement of technical knowledge, DENR/LGU will establish an effective waste management system, and shared knowledge will permeate throughout the entire area.	Specialists with expertise in waste management will be dispatched or provided with targeted training, and the training content will be compiled in booklets or web tools.
Community awareness and environmental education promotion project		N/A	Increased understanding of waste management through community awareness and environmental education will facilitate the transition to a sustainable lifestyle.	Support utilizing materials created in English or Tagalog, based on Japan's experiences, can be facilitated by overseas cooperation volunteers of waste management and environmental education. Additionally, as part of the cooperation program, it is feasible to share knowledge on waste treatment, management techniques, and segregation practices held by Japanese companies.
Collaborative solid waste management through citizen and administrative partnership		N/A	The adoption of effective waste management practices is encouraged across the entire area, and successful cases will have a spreading effect to other areas.	Visits and training sessions will be conducted to observe and learn about the ordinances related to sorting and recycling in Japanese local governments, as well as the implementation status of such ordinances and the waste segregation and collection practices carried out by residents.

Possible Cooperative Program	Climate Change Impact		Spreading effect	Possibility of utilizing Japanese knowledge and technology
	Mitigation	Adaptation		
2. Intermediate waste treatment capacity improvement program				
Waste Segregation/Composting, Recycling Promotion Project	Establish a sustainable intermediate waste management system in the region, promoting contributions to the environment and climate change across the entire area through the extension of the lifespan of final disposal sites and the reduction of methane generation potential.	N/A	The spread of waste segregation, composting, and recycling will lead to the dissemination of solutions that are suitable for regional needs. Moreover, the sharing of successful approaches with other regions is anticipated, contributing to the widespread adoption and expansion of sustainable intermediate waste processing.	In the field of waste segregation and composting, there are already local companies in Davao City and Legazpi City with a track record of using Japanese composting technology. Leveraging private-sector technology and experience (application of technology, market development, localization) makes it feasible to support other regions' local governments.
Integrated Waste Management, Including Waste Segregation, Composting, and Recycling Technology Cooperation Project	CH ₄ generated during the composting process is oxidized to CO ₂ in aerobic environments, providing a mitigation effect of approximately 1/30.	N/A		
Sustainable Waste Management Dissemination Project		N/A		
3. Final disposal site capacity improvement program				
Final disposal site operation and management project	Establish a sustainable landfill management system in the region, promoting contributions to the environment and climate change across the entire area through lifespan extension and reduction of methane generation potential.	N/A	Technical information on the operation and management of the final disposal site is provided by experts and local governments, and consistent training is conducted by DENR. Additionally, through pilot projects for regional management, region-specific waste management methods are verified. Successful cases are disseminated to other areas, and based on shared methods and best practices, sustainable waste management is promoted nationwide.	The adoption of the Fukuoka method, a semi-aerobic system, which has already demonstrated success in multiple developing countries, is feasible. However, as mentioned in the challenges, taking into account the financial constraints, technical limitations of LGUs, and the unmet criteria for installation standards, it is necessary to utilize localized specifications.
Final disposal site capacity improvement technical cooperation project, including regional management		N/A		
Sustainable final disposal site operation and management promotion project	The conversion from anaerobic to semi-aerobic landfill sites results in a reduction effect of 1.3 Mt-	N/A		

Possible Cooperative Program	Climate Change Impact		Spreading effect	Possibility of utilizing Japanese knowledge and technology
	Mitigation	Adaptation		
	CO ₂ e/year for a 5ha scale and 1.9 Mt-CO ₂ e/year for a 20ha scale ¹²³ .			
4. Domestic wastewater treatment (facility) improvement program				
Sustainable domestic wastewater treatment system promotion and technology enhancement project	Promote contributions to the environment and climate change across the entire area by reducing the potential methane generation through the introduction of wastewater treatment facilities and Johkaso.	N/A	Through wastewater treatment training and technical support provided by experts and domestic companies, training facilitated by LWUA, and the implementation of a pilot project for regional management, best practices in wastewater treatment are disseminated. Based on the outcomes of the pilot project, expansion to other areas is considered, and the shared successful methods are implemented throughout the region, contributing to the widespread adoption of sustainable wastewater treatment.	As part of JICA projects, there is experience in implementing a Master Plan formulation project for sewage system development (in Davao City). Support for other local governments (application of technology, localization) is feasible. Additionally, given the track record of domestic companies in wastewater treatment technology (Johkaso/distributed sewage treatment) in places like Baguio City, providing assistance to other local governments is also possible.
Sustainable environmental development project through model project deployment, including domestic wastewater treatment technology improvement and regional management	Introduction of a wastewater treatment facility with a capacity of 18,000m ³ /day results in a daily reduction effect of 13.3 tons of CO ₂ ¹²⁴ .	N/A		
Sustainable domestic wastewater treatment technology dissemination project		N/A		

¹²³ <https://gec.jp/jp-cdm/1999cdmfs01-8/>

¹²⁴ Project study on quantification of GHGs reduction effects (JICA)

3.2 Prioritization of Cooperation Programs

Consideration of cooperation programs that should be prioritized by the Philippine government was based on the urgency of the issues to be addressed, climate change adaptation and mitigation effects, sector-wide/subsector-wide policy spillover effect (impact), and the applicability of Japan’s knowledge and technology. This section illustrates the cooperation programs that should be prioritized by the Philippine government, listed in the priority order.

Three cooperation programs in the areas of cross-cutting and energy sectors that are expected to have the largest positive impacts are listed below as the highest impact cooperation programs.

Table 3-26 Highest Impact Cooperation Programs that should be Highly Prioritized by the Philippine Government

Cooperation Program (priority sector)	Mitigation/ Adaptation	Issues to be addressed and expected positive ripple effects
Program to establish a transparency framework and strengthen response capacity (cross-cutting sector)	Mitigation and Adaptation	Issues: Need for immediate provision of means of implementation (capacity building, finance, technology transfer and development) under the UNFCCC and Paris Agreement in order to ensure that the Philippines will be able to deliver the international climate reports, i.e., National Communications, Biennial Update Report, and Biennial Transparency Report; needs of support for the development of systems and institutions related to data collection and maintenance necessary to ensure transparency; needs to improve smooth coordination and collaboration between CCC and relevant departments and agencies; limited climate change-related knowledge and expertise of CCC staff Expected positive effects: Smooth preparation and submission of official documents such as GHG inventories and national communication to the United Nations will enable the Philippines to show its efforts and support needs for climate change countermeasures to the world. Monitoring and evaluation of the implementation of climate change countermeasures (mitigation and adaptation) on these documents will ensure transparency and progress toward compliance with the Paris Agreement. In addition, clarification of the areas and contents of external assistance needs and provision of basic information necessary to consider donor assistance will promote donor assistance.
Renewable Energy Investment Promotion Program (energy sector)	Mitigation	Issues: Limited private investment in renewable energy Expected positive effects: Introduction of renewable energy to meet the growing energy demand in the future is also the largest GHG emission reduction measure and has the greatest impact on achieving the NDC target; Hydropower can also be a climate change adaptation measure by addressing flood control and water utilization, and has ripple effects such as development of the agricultural sector and securing water supply for citizens; Geothermal can replace fossil fuel power generation as a base-load power source; Promotion of investment by the private sector through risk reduction is expected to influence the expansion of companies and create employment.
Transmission and Distribution and Electrification Capacity Enhancement Program (energy sector)	Mitigation and Adaptation	Issues: Delays in expansion and reinforcement of the power grid; Insufficient funds for full electrification by 2028; Limited sustainability of remote island power infrastructure. Expected positive effects: If the introduction of renewable energy is accelerated, the amount of fossil fuel power generation will decrease, which contribute to GHG reduction by a considerable amount; Employment and economic benefits will be promoted; Since the fuel source of power generation in off-grid is 91% petroleum (diesel), it will contribute significantly to GHG reduction; From the perspective of adaptation, a robust energy infrastructure can be built against the frequent and severe disasters caused by climate change, it can contribute to NDC in terms of ensuring stable energy access in the region; reducing the proportion of diesel power generation on remote islands will reduce diesel procurement and mitigate the impact of supply chain disruptions due to disasters, while reducing fuel costs, thereby enhancing the overall sustainability of remote island power sources.

Meanwhile, among the cooperation programs in consideration, those that should be highly prioritized by the Philippine government are the top two cooperation programs in each priority sector that have the highest positive impacts as shown from the next page.

3.2.1 Paris Agreement Implementation

Possible cooperation programs	Subsector	Main issues to be addressed	Urgency	Mitigation/Adaptation		Spillover effect(impact)	Applicability of Japanese knowledge and technology
				Mitigation	Adaptation		
(Highest impact) Program to establish a transparency and framework and strengthen response capacity	Common	Document not yet submitted to UN.	High	✓	✓	+++	Dispatching experts who understand Japan's technology and policies.
		Needs to strengthen climate change-related knowledge and expertise of CCC staff (new and existing)	High	✓	✓	++	Providing educational materials that incorporate knowledge and information on Japanese technologies and policies, including site visits, networking with Japanese stakeholders
		Needs to establish institutions and systems to ensure transparency related to climate change measures	High	✓	✓	++	Utilizing the results of technical cooperation that the Japanese government and JICA have conducted in other developing countries.
(High impact) Program to strengthen local government greenhouse gas emission reduction activities	Mitigation	capacity of local government to develop GHG inventories and select appropriate mitigation actions	High	✓		+	Utilizing the results of technical cooperation that the Japanese government and JICA have conducted in other developing countries. It is also possible to promote technologies and initiatives of Japanese companies that contribute to mitigation activities.
		Needs to strengthen local government capacity to update and implement LCCAP	Med	✓		+	
		Demonstration and dissemination of decarbonization technologies	Low	✓		++	
Program to Promote Climate Resilience	Adaptation	Needs to strengthen knowledge and experience in ensuring implementation and monitoring and evaluation of adaptation actions positioned in the NAP	High		✓	+++	Japan's past activities and measures in the field of disaster prevention and water resources are effective.
		Needs to improve quality of proposals and project itself submitted to PSF	Med		✓	++	
		Needs to enhance capacity to access climate funds	Low		✓	+	
Program to promote the establishment of Carbon Trading Schemes	Mitigation	Needs to develop national direction on carbon trading	Low	✓		++	Cooperation with Japan's Department of the Environment (knowledge on the J-Credit System and prevention of double counting under consideration in JCM)

3.2.2 Energy

Possible cooperation programs	Subsector	Main issues to be addressed	Urgency	Mitigation/Adaptation		Spillover effect (impact)	Applicability of Japanese knowledge and technology
				mitigation	adaptation		
(Highest impact) Energy Transition Capacity Enhancement Program	Renewable energy	Limited private investment in renewable energy (especially hydroelectric and geothermal) Delayed expansion and reinforcement of the power grid Limited funds for full electrification by 2028	High	✓✓✓	✓	+++	Re-energy M/P formulation, construction operation know-how (private sector)
(Highest impact) Transmission and Distribution and Electrification Capacity Enhancement Program	Power transmission and distribution, electrification	Limited sustainability of remote island power infrastructure Limitation of concrete policies and systems for smart grid realization Limitation of knowledge in technical, legal, and financial aspects of natural gas	High	✓✓✓	✓✓✓	+++	Power transmission technology
Energy Transition Capacity Enhancement Program	Conventional energy	Limited sustainability of remote island power infrastructure Limitation of concrete policies and systems for smart grid realization Limitation of knowledge in technical, legal, and financial aspects of natural gas	Med.	✓	✓	++	None in particular
Programs to promote the introduction and diffusion of alternative fuels and emerging technologies	Alternative Fuels and Emerging Technologies	Limited private investment in energy efficiency and conservation Limitation of capacity to collect, analyze, and make energy data available	Low	✓✓		++	Synchronous generator control and switching technology
		Limited private investment in energy efficiency and conservation Limitation of capacity to collect, analyze, and make energy data available	High	✓✓		++	Ministry of Economy, Trade and Industry "Guidelines for Energy Resource Aggregation Business". High technological capabilities of Japanese operators (hydrogen gas turbines, gas infrastructure) as the world's 7th largest consumer of natural gas in 2022
		Limited private investment in energy efficiency and conservation Limitation of capacity to collect, analyze, and make energy data available	High	✓✓		++	3 past private partnership projects in the Philippines, NEDO bio-jet fuel production technology development project
		Limited private investment in energy efficiency and conservation Limitation of capacity to collect, analyze, and make energy data available	Med.	✓✓✓		+++	Hydrogen strategy and private sector expertise in hydrogen-related projects and facilities
		Limited private investment in energy efficiency and conservation Limitation of capacity to collect, analyze, and make energy data available	Med.	✓✓✓		+++	JOGMEC's advanced CCS support project
Energy Efficiency and Conservation Capacity Enhancement Program	Energy Efficiency and Conservation	Limited private investment in energy efficiency and conservation Limitation of capacity to collect, analyze, and make energy data available	Med.	✓✓	✓	++	ZEB and ISO/TS23764
Energy Data Management Capacity Improvement Program	Energy Statistics & Planning	Limited private investment in energy efficiency and conservation Limitation of capacity to collect, analyze, and make energy data available	Low	✓	✓	+	Analytical tools developed and proposed in the "Philippines Energy Planning Support Study (JICA 2008)

3.2.3 Industry

Possible cooperation programs	Subsector	Main issues to be addressed	Urgency	Mitigation/Adaptation		Spillover effect (impact)	Applicability of Japanese knowledge and technology
				Mitigation	Adaptation		
(High impact) Climate Change Mitigation Support Program for High GHG Emitting Industries	Cement industry	Delayed introduction of alternative fuel and raw materials (AFR) utilization and waste heat recovery	High	✓✓		+++	Waste heat recovery technology has been installed in a cement plant in the Philippines under the 2023 JCM equipment subsidy and can be utilized.
	Steel industry	Delayed measures to replace energy-efficient equipment	High	✓		++	Waste heat utilization technology for electric arc furnaces has been adopted by Japanese steel companies and can be utilized.
	RAC Industry	Delayed measures to use low-GWP refrigerants in the RAC industry	High	✓		++	Ability to share experiences and knowledge of efforts to promote the use of low-GWP refrigerants in Japan
	RAC Industry	Need to further improve registered companies for HFC gas recovery and treatment	High	✓		++	Capable of sharing experience and knowledge of HFC gas recovery and treatment efforts in Japan
(High impact) EV Industry Promotion Program	EV-related industries	Absence of manufacturing standards/certification system for E-jeeps and Low Speed EVs	High	✓✓	✓	+++	Possible to utilize Japan's experience and knowledge of standards and certification systems, especially in ASEAN countries
Climate Change Mitigation Support Program for High GHG Emitting Industries	Product Waste Management	Absence of plastic collection and recycling system	High	✓		++	Able to share experiences and knowledge of recycling efforts in Japan

3.2.4 Agriculture

Possible cooperation programs	Subsector	Main issues to be addressed	Urgency	Mitigation/Adaptation		Spillover effect (impact)	Applicability of Japanese knowledge and technology
				Mitigation	Adaptation		
(High impact) Climate Resilient Irrigation Planning, Operation and Maintenance Development Program	Irrigation Development	Limited capacity to plan, operate, and manage irrigation facilities	High	✓✓	✓✓	+++	Utilizing Japan's Agricultural Meteorological Mesh Data Development Knowledge Utilization of Japanese knowledge on flood control technology and irrigation facility management
		Shortage of small-scale irrigation, water storage and drainage facility development	High	✓✓	✓✓	+++	Utilization of small-scale irrigation and water storage systems in Asia developed by Japanese research institutes
(High impact) Smart Livestock Development Programs with Climate Change in Mind	Livestock	Limited capacity of DA central and RFOs and LGU officials in policy formulation and implementation of climate change mitigation and adaptation measures in the livestock sector	High	✓✓	✓	++	Capable of sharing experiences and knowledge of initiatives in Japan
		Limited capacity for research and development of climate change mitigation and adaptation measures in the livestock sector	High	✓	✓	++	Adaptation: barn temperature control methods and technologies, etc. Mitigation: Treatment technology for livestock waste, development of feed to inhibit digestive tract fermentation in livestock, etc.
		Limited capacity of DA central and RFOs and LGU officials in policy formulation and implementation of climate change mitigation and adaptation measures	High	✓	✓	++	Possibility to share experience and knowledge of initiatives in Japan
Climate Resilient Agricultural Land Management Capacity Building Program	Agricultural production	Limited farming tools to improve productivity and sustainability Limited agricultural technology as a solution to climate change	High	✓	✓✓	+++	Japan's technologies such as agricultural meteorological mesh data development, satellite-based crop growth monitoring, soil diagnosis, RE technology can be applied to the development of farming tools
		Delay in verification of agricultural carbon sequestration potential (Improvement of GHG inventory accuracy, consideration of incentives for agriculture and fisheries industry workers)	Med	✓		++	Modeling of agricultural soils, GHG inventory methodology, and J-credit methodology can be shared.

Possible cooperation programs	Subsector	Main issues to be addressed	Urgency	Mitigation/Adaptation		Spillover effect (impact)	Applicability of Japanese knowledge and technology
				Mitigation	Adaptation		
Climate Resilient Fisheries Development Program	Fisheries	Limitation of initiatives and capacity of DA central offices for policy planning and implementation related to climate change adaptation measures in the fisheries sector	High		✓	++	Marine environmental monitoring and model development knowledge
		Delays in R&D, limited budget and technology to implement climate change countermeasures in the fisheries sector	High		✓	++	Knowledge on marine environment monitoring, model development, and technology and knowledge in Japan's aquaculture and coastal fisheries.

3.2.5 Forest and Natural Environment

Possible cooperation programs	Subsector	Main issues to be addressed	Urgency	Mitigation/Adaptation		Spillover effect (impact)	Applicability of Japanese knowledge and technology
				Mitigation	Adaptation		
(High impact) Forest management capacity strengthening program with consideration of climate change	Forest	Forest remote sensing technology has not yet been established.	High	✓		++	Remote sensing technology using Japan's satellite technology and data analysis technology
		National Forest Monitoring System (NFMS) including database not yet established	High	✓		++	JICA's support, knowledge, and experience
		Limited ability to market agricultural products through agroforestry	Med	✓	✓	++	Achievements in Supporting Agricultural Management in Japan
		Limited capacity for watershed management dissemination	Med	✓	✓	+	JICA's experience and knowledge in watershed management
(High impact) Forest water protection capacity management strengthening program with consideration of climate change	Forest	Limited climate proofing policies for integrated watershed management plans	Med		✓✓	++	Policy realization considering water source recharge function in Japan's forest management
		Limited expertise in analyzing rainfall and soil data collected by automatic weather stations (AWS) and remote sensing	High		✓	++	JICA's support, knowledge, and experience
		Lack of AWS equipment and remote sensing equipment for rainfall, soil, and other data collection	High		✓	++	
Coastal and Marine ecosystem conservation strengthening program with consideration of climate change	Coastal/Ocean Biodiversity	Limited a strategic conservation plan for management of marine protected areas, etc.	High	✓	✓✓	++	Support for policy development that takes into account the conservation of marine protected areas based on Japan's prior findings
		Limited policies to encourage blue carbon conservation	Low	✓✓	✓	++	Japanese ministries' prior knowledge and experience with blue carbon sequestration
		Limited know-how on measurement and calculation methods for blue carbon sequestration and storage	High	✓	✓	++	Prior knowledge and experience with blue carbon sequestration
		Limited technology for monitoring and assessment of ecosystems in highly vulnerable marine protected areas	Med	✓	✓	++	JICA's experience, knowledge and experience in coastal/marine ecology
		Limited integrated data management on coastal and marine ecosystems and biodiversity	Med	✓	✓	++	Prior knowledge and experience on biodiversity in Japanese ministries and agencies

3.2.6 Urban Environment

Possible cooperation programs	Subsector	Main issues to be addressed	Urgency	Mitigation/Adaptation		Spillover effect (impact)	Applicability of Japanese knowledge and technology
				Mitigation	Adaptation		
(High impact) Final disposal site capacity improvement program	Waste	Nationwide shortage of sanitary landfill sites nationwide	High	✓✓		+++	It is possible to introduce the Fukuoka method, a semi-aerobic system, which has already been proven in several developing countries. However, as described in the issues, it is necessary to use localized specifications, taking into account the financial and technological shortfalls of LGUs and unfulfilled conditions of installation standards.
(High impact) Wastewater treatment (facility) improvement program	Wastewater	Low capacity and funding for implementation of sewerage and septage sludge management projects in LGUs and Local Water Districts (LWDs)	High	✓		+++	As a JICA project, the company has experience in implementing a master plan development project for sewerage development (Davao City), and can provide effective support (application and localization of technology) to other municipalities. In addition, there is a Japanese company with experience in wastewater treatment technology (septic tanks/decentralized sewage treatment) in Baguio City, etc., so it is possible to provide support to other municipalities.
Waste management improvement program	Waste	Limited number of waste management officers in LGUs and disconnection or loss of technical knowledge and local information	High	✓		++	-Dispatch experts with expertise in waste management or conduct subject-specific training, and summarize the course content in booklets, web tools, etc.
		Low level of interest among residents in waste management	Med	✓		++	-Waste management and environmental education materials in English and Tagalog, developed by Japanese waste management and environmental education corps members, can be used to support the program. Japanese companies can also share their knowledge of waste disposal and management techniques, sorting, etc. as part of the cooperation program.
Intermediate waste treatment capacity improvement program	Waste	Nationwide shortage of resource recovery facilities	High	✓		++	-International visits and training on the enactment and implementation of ordinances on waste separation and recycling in local governments in Japan, as well as on the status of waste separation and collection by residents.
		Low waste diversion rate	High	✓		++	In the field of waste separation and composting, there are already local companies in Davao City and Legazpi City that have experience in composting technology from Japanese companies, and it is possible to support local governments in other areas by utilizing private sector technology and experience (application of technology, Market development and localization).

Chapter 4 Recommendations

With regard to the various cooperation programs delineated in the Survey, it is urged that the Philippine government expeditiously commence deliberations on these cooperation programs especially high-impact cooperation programs, and engage in substantive discussions with the Government of Japan and JICA. The issues identified in the Survey are wide-ranging and include many issues that need to be resolved immediately, and therefore, it is not realistic to resolve all issues through the cooperation of the Japanese government and JICA alone. Thus it is anticipated that domestic funding will be actively secured and deployed by the Philippine government especially for the priority sectors of the Survey. It is also expected that the Philippine government will widely disseminate the findings of this Survey with donors beyond JICA, and work together with these donors to advance concrete measures to resolve issues. There should be continuous mapping and discussion on climate change activities both supported by development partners and funded by the Philippine government to avoid duplication of efforts.

In addition, in order for the Philippines to achieve its climate goals including NDC, it is recommended that the following efforts will be particularly accelerated.

The Philippines, which is one of the countries at the highest risk of climate change impacts and risks in the world, proactively implementing climate change adaptation measures to cope with the negative effects of climate change, which are expected to worsen in the future. The Philippine government is currently finalizing the NAP in order to ensure the implementation of adaptation measures, and it is expected that based on this plan, adaptation measures will be promoted in all related sectors based on sectoral policies. Although a certain amount of national budget is allocated each year to the adaptation activities related to disaster risk reduction and water resource management, it is desirable to expand the PSF in order to accelerate adaptation measures especially in other sectors. It is also recommended to improve access to international climate finance, such as the GCF and a new loss and damage fund that is expected to be launched soon, which should be enabled through further human resource development and organizational strengthening of relevant stakeholders in the country.

The COP28 recognized that limiting global warming to 1.5 °C with no or limited overshoot requires deep, rapid and sustained reductions in global GHG emissions of 43% by 2030 and 60% by 2035 relative to the 2019 level and reaching net zero CO₂ emissions by 2050, and also encouraged Parties to come forward in their next NDCs with ambitious, economy-wide emission reduction targets, covering all GHGs, sectors and categories and aligned with limiting global warming to 1.5 °C, as informed by the latest science, in the light of different national circumstances. The Philippines is active in climate change mitigation measures, such as setting ambitious reduction targets in the NDC. The private sector is expected to contribute to on-the-ground mitigation projects including the introduction of renewable energy, and the government is also taking various measures such as tax breaks and incentives to support private sector engagement. However, awareness on climate change issue in the private sector is still limited, with

the exception of large companies, and therefore it is recommended to further raise awareness of the private sector regarding climate impacts, risks, as well as business opportunities.

In addition to setting ambitious mitigation targets in the NDC as mentioned above, the Philippine government has also declared the phase-out of coal-fired power plants and the curbing of methane emissions. On the other hand, the government has not officially set a national carbon neutrality (net zero emission) goal. Some LGUs and large companies are ahead of the national government in declaring the zero emissions. By clearly declaring that the government is committed to zero emissions and taking a long-term proactive stance on climate change countermeasures to the international community, the climate support from international donors, including the above-mentioned climate funds, will be promoted, through which lead to not only accelerated planning and implementation of mitigation measures but also adaptation measures.