The Republic of the Philippines
Bangsamoro Transition Commission (BTC)
Bangsamoro Development Agency (BDA)

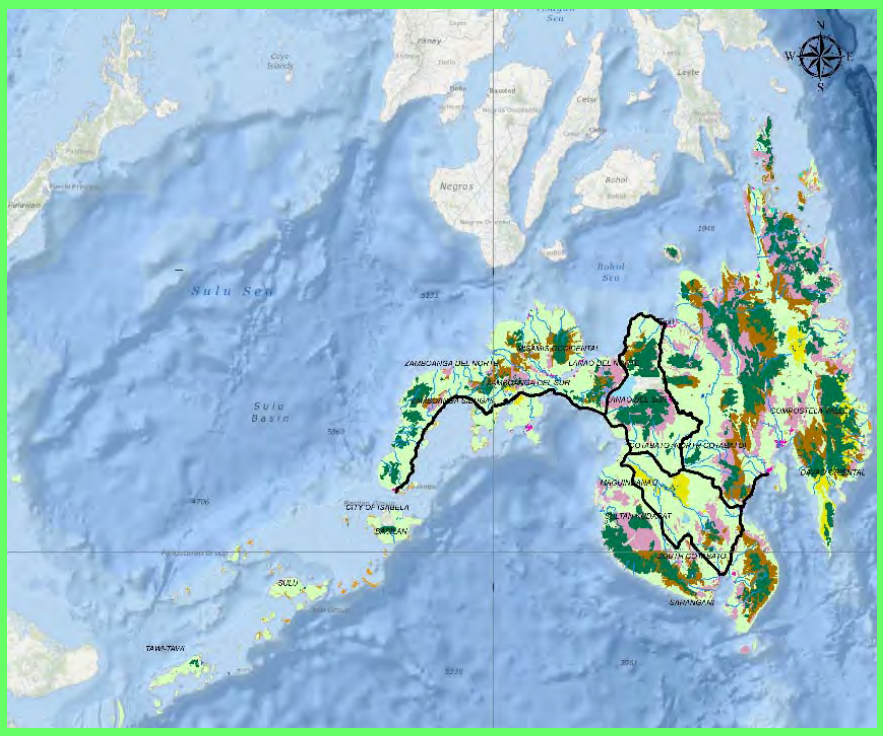
Japan International Cooperation Agency
(JICA)

Comprehensive Capacity Development Project for the Bangsamoro

Development Plan for the Bangsamoro

Final Report

Executive Summary



April 2016

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Source of GIS map on the cover: JICA Study Team (base map by U.S. National Park Service).

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Currency Equivalents (average Interbank rates for May–July 2015)
US$1.00=PHP 45.583
US$1.00=JPY 124.020
PHP 1=JPY 2.710
Source: OANDA.COM, http://www.oanda.com

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Abbreviations

A&D	alienable and disposable
ADB	Asian Development Bank
AFB	association of farmer beneficiaries
AJD	Agrarian Justice Delivery
ARB	agrarian reform beneficiary
ARG	Autonomous Regional Government
ARC	agrarian reform community
ARMM	Autonomous Region in Muslim Mindanao
ATI	Agricultural Training Institute
ATM	automated teller machines
BCT	Bangsamoro Core Territory
BDA	Bangsamoro Development Agency
BDC	Bangsamoro Development Councils
BDP	Bangsamoro Development Plan
BFAR	Bureau of Fisheries Aquatic Resources
BIMP-EAGA	Brunei-Indonesia-Malaysia-Philippines East ASEAN Growth Area
BIW	Bangsamoro Investment Window
BLMO	Bangsamoro Land Management Office
BSP	Central Bank of the Philippines [Bangko Sentral ng Pilipinas]
BSWM	Bureau of Soils and Water Management
BTC	Bangsamoro Transition Commission
BTB	boom truck with bucket
BTD	boom truck with digger
CARP	Comprehensive Agrarian Reform Program
CBCRM	community-based costal resource management
CBFM	community-based forest management
CBFMA	community-based forest management agreement
CDA	Cooperative Development Authority
CENRO	Community Environment and Natural Resources Office
CHED	Commission on Higher Education
CIS	communal irrigation system
CLOA	certificate(s) of landownership award
CSO	civil society organization
CSR	corporate social responsibility
CY	calendar year
DA	Department of Agriculture
DAF	Department of Agriculture and Fisheries
DAR	Department of Agricultural Reform
DBM	Department of Budget and Management
DENR	Department of Environment and Natural Resources
DILG	Department of the Interior and Local Government
DOJ	Department of Justice
DOST	Department of Science and Technology
DOTC	Department of Transportation and Communications
DPWH	Department of Public Works and Highways
DRIMS	Dynamic Response Intelligent Monitoring System
DRRM	Disaster Risk Reduction and Management
DTI	Department of Trade and Industry
EC	electric cooperative
ERDP	Ecosystems Research and Development Bureau
EU	European Union
FAB	Framework Agreement on Bangsamoro
FIDA	Fiber Industry Development Authority
FMB	Forest Management Bureau
FMR	farm-to-market road
FNRI	Food and Nutrition Research Institute
FRPDI	Forest Products Research and Development Institute
GBE	grading and baling establishment
GDP	gross domestic product
GIS	geographical information system
GMP	Good manufacturing practice
GRDP	gross regional domestic product
GRP	gross regional product
HACCP	hazard analysis and critical control points
HIPC	halal industry promotion center
IFMA	Integrated Forest Management Agreement (Program)
IP	indigenous people
IRA	internal revenue allotment
JICA	Japan International Cooperation Agency
LBP	Land Bank of the Philippines
LDRRM	Local Disaster Risk Reduction and Management
LED	light-emitting diode
LGU	local government unit

LMB	Land Management Bureau
LRA	Land Registration Authority
Magelco or MAGELCO	Maguindanao Electric Cooperative
MILF	Moro Islamic Liberation Front
MPA	marine protected area
MRF	material recovery facility
MSME	micro, small, and medium enterprises
MSU	Mindanao State University
MSU-LNCAT	MSU-Lanao National College of Arts and Trades
NAIA	Manila Ninoy Aquino International Airport
NCIP	National Commission on Indigenous Peoples
NEA	National Electrification Administration
NGO	non-governmental organization
NGP	National Greening Program
NIA	National Irrigation Administration
NIS	National irrigation system
NOAB	National Organic Agriculture Board
NWFP	non-wood forest product
OCD	Office of Civil Defense
OTOP	one town one product
p.a.	per annum
PAMANA	Philippine Development Program and Framework for Peace and Development [Payapa at Masaganang Pamayanan]
PC	personal computer
PCA	Philippine Coconut Authority
PENRO	Provincial Environment and Natural Resources Office
PEZA	Philippine Economic Zone Authority
PFDA	Philippine Fisheries Development Authority
PhilFIDA	Philippine Fiber Development Authority
PICRI	Philippine Industrial Crops Research Institute
PMO	project management office
POIG	Palm Oil Innovations Group
RA	Republic Act
R&D	research and development
RBOI	Regional Board of Investment
RDE	research, development, and extension
RG	Regional Government
ROD	Registry of Deeds
RSPO	Roundtable on Sustainable Palm Oil
SERD-CAAM	Socio-economic Restoration and Development of Conflict-affected Areas in Mindanao
SEZ	special economic zone
SME	small and medium-sized enterprise
SOCSKSARGEN	South Cotabato-Sultan Kudarat-Saranggani-General Santos City
SUCs	State Universities and Colleges
SWIM	small water impounding management
SWIMP	small water impounding with multipurpose potential
USAID	United States Agency for International Development
USM	University of Southern Mindanao
USMARC	USM Agricultural Research Center
USM-RDO	USM Research and Development Office
WFP	World Food Programme

Unit of Measurement

ha	hectare
kV	kilovolt
kWh	kilowatt-hour
km	kilometer
km^2	square kilometer
m	meter
m^2	square meter
MW	megawatt
MVA	megavolt ampere

Currency

JPY	Japanese yen
PHP	Philippine peso
US$ or USD	United States dollar

1. THE PROJECT

1.1 Comprehensive Capacity Development Project

The Comprehensive Capacity Development Project for the Bangsamoro ("the Project" hereafter) has being implemented since July 2013. The overall scope of the Project is summarized as outcomes expected as follows:

1) Promotion of human resources development for administrative services for the new autonomous government,
2) Enhancement of capacity to provide effective administrative services in the jurisdiction of the new autonomous government,
3) Promotion of organizational and institutional development of the new autonomous government, and
4) Preparation of technical materials useful for regional development planning for the jurisdiction of the new autonomous government.

1.2 Study Objectives, Area, and Scope

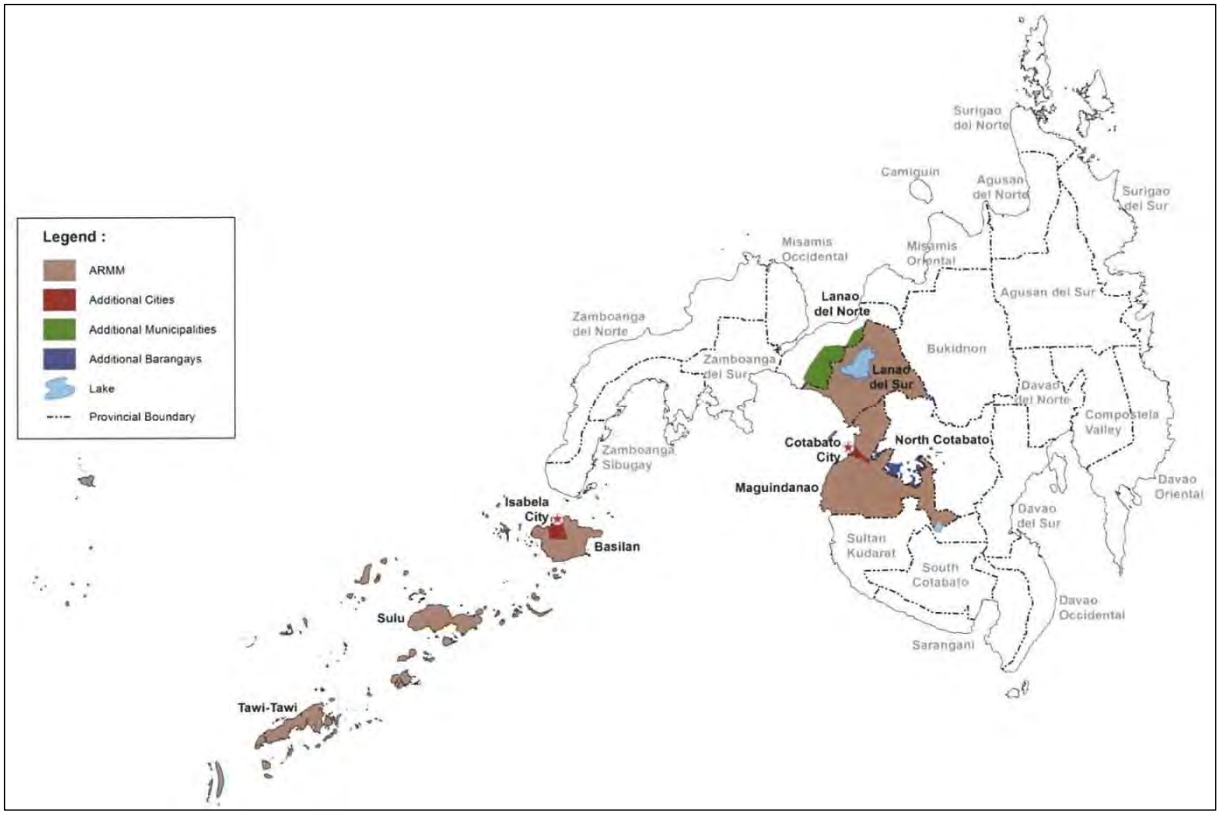
As part of the Project, the present study ("the Study" hereafter) has been undertaken to prepare technical materials useful for integrated development planning for the future jurisdiction of the new autonomous region of Bangsamoro. The Study relates directly to the outcome 4), but is expected to contribute also to the attainment of the other three outcomes.

Specifically, the objectives of the Study are as follows:

(1) To compile basic data to be used for development planning in jurisdiction of the new autonomous government,
(2) To prepare technical materials useful for preparing an integrated master plan for strategic development of the Bangsamoro, and
(3) To contribute to broad capacity development through the planning process encompassing individual administrators, the new autonomous government and its constituent local government units (LGUs), and related institutions and communities.

The Study Area is the Bangsamoro Core Territory (BCT), which covers the five ARMM provinces with two cities and the expansion areas consisting of six municipalities in Lanao del Norte Province and 39 barangays in six municipalities of North Cotabato Province, including Cotabato City (Maguindanao Province) and Isabela City (Basilan Province) as illustrated in Figure 1. The Study Area is called the Bangsamoro area or region, or simply Bangsamoro.

The Study has been undertaken based on the Bangsamoro Development Plan I (BDP I), prepared earlier for the transitional period before the establishment of the Bangsamoro autonomous government, as a point of departure. The Study focuses on economic development and related infrastructure development for the Bangsamoro. In particular, the Study covers agriculture, agro-industry, fishery and related industry; and logistic infrastructure including ports, airports, and roads for specific projects, programs and institutional measures; and power supply and river and flood control for policy and development directions. Environmental considerations are reflected in development planning, and GIS is used as a planning tool.



Source: Philkoei International, Inc., *Inception Report* (2013), consultancy services for the Bangsamoro Development Agency (BDA) Transitional Development Plan.

Figure 1 Location Map of Bangsamoro Study Area

2. EXISTING CONDITIONS OF BANGSAMORO

2.1 Overview

The Bangsamoro region as a whole is characterized among others by the following:

(1) Favorable natural conditions for agriculture with high temperature, plenty of rainfalls distributed throughout a year, and dominant soil characteristics having high nutrient holding capacity;
(2) Agriculture accounting for 65% of the GRDP and 68% of employment (2013);
(3) Multi-ethnic population with 13 major ethnic groups including over 200,000 indigenous peoples; and
(4) Poverty incidence 48.7% of families, which is much higher than other regions in Mindanao.

2.2 Economy

The Bangsamoro economy is characterized by the following:

Agriculture and livestock

1) Diversified crops cultivated but yields generally lower than national averages except sugarcane and few others,
2) Very limited livestock activities,
3) Irrigation area only 29% of irrigable area, lowest of all regions,

4) Smaller farms less than 5.0 ha accounting for 67% of the total farmland,
5) Close to 80% of farms owned or partly owned by farmers,
6) Relatively low cropping intensity (1.25 in Maguindanao as estimated),

Fishery

7) Aquaculture production dominant in fishery production,
8) Seaweed accounting for more than 90% of aquaculture production,
9) Both capture fishery and aquaculture having excess production due to limited marketing opportunities without adequate cold storage and related facilities,

Investment and banking

10) Cumulative investment during 2008–14 accounting for 0.05% of the total Philippine investment, and
11) Only 25 ATMs out of 12,000 ATMs in the Philippines, and 20 banks out of 9,442 banks in the Philippines (2013).

2.3 Infrastructure

The characteristics of infrastructure in Bangsamoro are represented by the following:

1) Lowest road density (0.10 in 2013), lower than the average in Mindanao (0.17) and less than half of the national average (0.25),
2) Pavement ratio of national roads increased to 81.9% in 2013 compared to 83% nationally,
3) Three airports with scheduled flights: Awang as principal class 1, Jolo and Sanga-Sanga as principal class 2, but no international class airport,
4) Port network with 13 major ports, and
5) Polloc port as a freeport with ecozone in the hinterland not effectively utilized despite favorable natural conditions and location as the regional port

3. VISION, OBJECTIVES, AND BASIC STRATEGY FOR BANGSAMORO DEVELOPMENT

3.1 Key Concepts Derived from BDP I

3.1.1 Transition from BDP I

The Integrative Report of BDP I published in early 2015 has been fully reviewed and reflected in the formulation of the BDP for medium to long term in all the designated thematic areas and related sectors. As part of the review, the results of consultative meetings including sessions with constituent local governments and focus group discussions were reviewed to extract issues and problems identified by stakeholders participated in different meetings. They are used to develop concepts and vision for Bangsamoro development and to establish development objectives and basic strategy.

3.1.2 Key concepts for BDP

Important common concepts for the Bangsamoro development are presented as shown in Figure 2 to facilitate sharing by all the stakeholders in the Region. These concepts have been derived from the BDP I as described above, but expressed in the way to reflect the characteristics of the Bangsamoro clarified by the analysis on existing conditions by sector as part of the Study. Each concept is explained.

Bangsamoro development is to be pursued through

Broad-based inclusive development,
Alternative socio-economy on tradition,
Natural resources management,
Good governance,
Self-reliant regional development,
Agro-based industrial clusters
Mixed ethnicity for diversity
Outward oriented development
Resilient and robust society
Organizational strength with unity

Figure 2 Key Concepts for Bangsamoro Development Derived from BDP I

Inclusive development is a main principle to guide the BDP. To alleviate wise spread poverty existing at present with the highest poverty incidence of all the regions in the Philippines, however, broad-based approach is necessary to link livelihood activities by the poor to main stream economic activities. **Broad-based inclusive development** represents these concerns. It is in fact the main theme of the BDP I.

Alternative socio-economy on tradition represents the concern by people in the Bangsamoro to pursue asymmetric relationships with other regions rather than just following the footsteps of more advanced regions. It should guide the Bangsamoro development to pursue such development model unique to the Region by utilizing its indigenous resources. Such alternative socio-economy, to be elaborated below, should effectively utilize traditional skills and wisdom to be enhanced by advanced technology.

To support the alternative socio-economy, rich natural resources in the Region should be effectively utilized, and a prerequisite is proper **natural resources management**. Proper resources management to support the alternative socio-economy would be made possible by **good governance**. All in all, **self-reliant regional development** should be realized, whereby indigenous resources would be utilized by, and for the benefit of local people and communities.

Development of **agro-based industrial clusters** provides a viable means to realize self-reliant regional development with broad-based inclusive development, alternative socio-economy, and proper natural resources management. Agro-based industrial clusters would link livelihood activities by the poor through indigenous industries to export industries, generating large number of employment opportunities and attaining high value-added without increasing environmental stress in line with the concept of alternative socio-economy.

The Bangsamoro region accommodates peoples of widely different ethnic, socio-cultural, religious, and other backgrounds, including indigenous peoples (IPs). Mixed ethnicity is taken to be a positive factor as it would contribute to diversity of human resources, economic activities, social systems and infrastructure facilities and enhance resilience and robustness of the Region. **Mixed ethnicity for diversity** implies these widely varied opportunities.

The Bangsamoro region is strategically located for trade within the Islam society extending from the Indian Ocean to the Pacific Ocean as its history shows. Such a position would become more important as the trade in the broad region of the BIMP-EAGA is recognized increasingly. To utilize this position effectively, the Region should pursue **outward oriented development** as elaborated subsequently. Service activities related to trade represent non-resource intensive and high value-added economic activities fit well with the concept of alternative socio-economy.

The BDP I aims to build foundations of functioning *peace economy* that will strengthen institutions, promote access to opportunities and jobs in the region and its adjacent regions. To pursue this under socio-politically uncertain and unstable conditions, the Bangsamoro region should build a robust society with respect to institutions, economic structure, justice system and other aspects. The region is disaster prone suffering from habitual floods, occasional earthquakes, erosion and landslides and others. The

regional society should anticipate these disasters and prepared to respond to them to minimize damages. **Resilient and robust society** represents these characteristics of the Bangsamoro region.

To realize its development potentials for the benefits of peoples in the Region, most important concept is **organizational strength with unity**. This concept is the key to realize just, peaceful and prosperous society of empowered people and communities supported by responsive, participatory and transparent governance systems, reflective of the Bangsamoro's distinct cultural identity, and rights to fiscal and political self-determination.

These key concepts and relationships between them are illustrated in Figure 3.

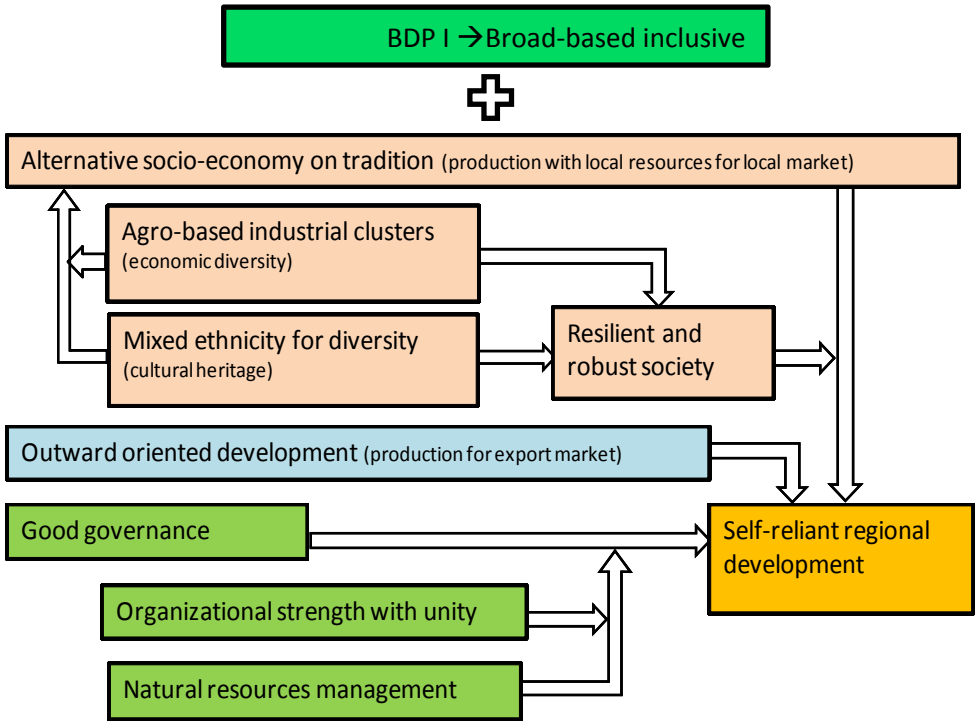


Figure 3 Key Concepts of Bangsamoro Development Plan and Their Relationships

3.2 Development Directions

Directions of Bangsamoro development have been sought by comparing alternative development models in two ways: 20th century development vs. alternative socio-economy; and globalization vs. localization.

3.2.1 20th century development vs. alternative socio-economy

(1) 20th century development

Economic development during the 20th century supported by technological innovation derived from the industrial revolution allowed developed countries to realize improved living conditions and higher income levels. These conditions were made possible basically by resources intensive and economic efficiency oriented development, which is represented by extraction and use of fossil fuel resources and mass production.

The resources intensive and economic efficiency oriented development in developed countries resulted in various environmental problems such as various pollution and social problems represented by degradation of rural societies and alienation of urban residents. Further, both developing and developed countries now face global environmental problems, threatening sustainability of human beings themselves.

It is recognized that trends of economic globalization and free trade are inevitable for both developing

and developed countries. Economic globalization means the pursuit of economic efficiency in a world wide scale, and thus considered a necessary condition for efficient use of limited resources. When the economic globalization is pursued without considerations on distribution of economic benefits and wealth, however, social problems such as income disparities will aggravate. Also, effective resources utilization exclusively for economic efficiency will degrade environmental quality by excessive resource use and increased waste generation.

(2) Alternative socio-economy

Against the 20th century development, the following conditions may characterize alternative socio-economy particularly in the developing countries' context:

1) Less resource intensive economic activities,
2) Economic activities with smaller environmental stress,
3) Economic activities ensuring large employment generation and maximizing value-added,
4) Local mechanism to allow resources management by local people and society, and
5) System of appropriate technology complementing traditional techniques with advanced technology.

These conditions are mutually related to one another. Condition 1) of less resources intensive economic activities contributes to Condition 2) of smaller environmental stress by effective utilization of resources with minimal wastes. Such economic activities that satisfy these conditions engage larger number of people to utilize wastes and byproducts and thus contribute to Condition 3). To promote these economic activities as a whole, it is desirable that a mechanism for managing resources by and for the benefit of local people and society exists as Condition 4) requires. To support such alternative socio-economy, a system of appropriate technology should be established by combining traditional techniques and advanced technology as Condition 5) requires.

(3) Comparative analysis

The two broad alternatives are compared in Table 1 from a few different points of view. Historically, the 20th century development model had been pursued by most developed countries since the industrial revolution and throughout the 20th century. The alternative socio-economy had been discussed recently, and some sporadic attempts have started to be made in recent years in both developed and developing countries.

The 20th century development model sees resources as income or something to realize immediate gains. This applies typically to extraction of fossil fuel and other underground resources. This view tends to encourage abusive use of resources. The alternative socio-economy sees resources as capital, on which development will be based. Capital needs to be conserved as much as possible to support continuous development activities. Economic efficiency is the prime criterion in pursuing the 20th century development model, while the alternative socio-economy takes social and environmental considerations more seriously into account.

The 20th century development model, as the history proves, is effective in realizing highest income levels possible. The alternative socio-economy pays more serious attention to generating the largest employment opportunities possible. This does not necessarily mean that this model sacrifices economic growth in favor of employment generation. Methods to attain high income levels are different between the two alternatives.

The 20th century development model had been supported generally by advanced technology developed in developed countries since the industrial revolution. Advanced technology has made it possible to pursue high economic growth by intensive resource use during the 20th century. Only recently, technological innovation has started to focus on effective use of limited resources for resource recycling and saving. For resource saving methods, a lot of lessons may be learned from collective wisdom of human beings constituting traditional skills, knowledge and wisdom. In fact, traditional skills, knowledge and wisdom should be strengthened by advanced technology to develop appropriate or intermediate technology, which should support the alternative socio-economy.

Table 1 Comparison of Two Broad Development Alternatives

	20th century development model	Alternative socio-economy
History	Pursued by most developed countries	Sporadic attempts started recently in developing & developed countries
Resources	Income → Abuse	Capital → Conservation
Criterion	Economic efficiency	Social & environmental considerations
Effects	Highest income possible	Largest employment opportunities
Technology	Advanced technology	Appropriate or intermediate technology

3.2.2 Globalization vs. localization

Generally, four broad alternatives are conceived for regional development by combining resources and markets as shown in Figure 4.

		Market	
		Local	Export
Resources	Local	A	B
	Import	C	D

Alternative: *A*:Import substitution
B: Export promotion
C: Import processing
D: Export processing

Figure 4 Broad Alternatives for Regional Development

Alternative A corresponds to the localization model. It implies the development based on local consumption of local products, but it may be applicable only to limited products as suggested below. Alternative C is applicable when local market is significantly large. Alternative D represents typical export processing, which does not automatically ensure promotion of indigenous industries. For self-reliant regional development, Alternative B is most valid. A key for success under this alternative is to create specialty products having export competitiveness.

The Bangsamoro development should pursue in principle outward oriented development. This, however, does not contradict with the localization model for local consumption of local products. The extent this idea is applicable, however, needs to be carefully examined. For water supply for instance, use of shallow groundwater as local resources as well as extraction of river water should be examined carefully to avoid costly development of water resources by large dams and transfer of water from remote areas. Renewable energy including biomass, mini hydro, wind and solar power should be emphasized as local energy sources. Further, indigenous resources related to local society, culture and heritage should be utilized to create niche markets for tourism and specialty products. These resources may be utilized for outward oriented development to vitalize the regional socio-economy supported by local governments and residents.

3.3 Vision for Bangsamoro Development

3.3.1 Proposed vision

The following vision to be shared by all the stakeholders has been proposed, reflecting the characteristics of the Region with rich natural and cultural resources and in line with the idea of alternative socio-economy discussed above.

Vision for Bangsamoro Development

Realization of robust and resilient Bangsamoro socio-economy, adapting to changing world and open to the global society on the one hand and ensuring sustained peace on the other, supported by abundant natural resources, diverse economic activities and rich cultural heritage of mixed ethnicity that are managed by responsive and transparent governance systems with people's participation.

3.3.2 Conditions for Bangsamoro vision

The vision for the Bangsamoro development will be supported by

(1) Network of transport and logistic infrastructure of high quality linking the Bangsamoro region to neighboring regions and countries;
(2) Agro-based industrial clusters linking livelihood activities by the poor, through indigenous industries to export industries producing a variety of products having comparative advantage in the global market;
(3) Environment friendly and less resource intensive socio-economic activities combining traditional wisdom of peoples with modern technology;
(4) Active communities of mixed ethnicity constituting the peaceful and prosperous Bangsamoro society with revitalized conventional cultural activities that residents are proud of and visitors can enjoy; and
(5) All of the above embraced in rich natural environment under proper management by local communities and local governments to ensure just, peaceful, and prosperous society.

3.4 Development Objectives and Basic Strategy

3.4.1 Problem structure of Bangsamoro

The Integrative Report of the BDP I has been reviewed by the JICA Study Team, and more important problems have been identified. These problems combined would work as constraints to the Bangsamoro development. Many of these problems are interrelated to cause undesirable phenomena as observed at present. A problem structure analysis is a method to clarify these interrelationships in a macroscopic way. The analysis, usually undertaken during the initial stage of the development planning, would allow a broad perspective without getting into details to identify more essential factors and major problems to be alleviated through planned development efforts.

With all the major problems identified, a problem structure has been constructed as shown in Figure 5. In the figure, more important problem factors and phenomena are shown, expressed in generic terms to imply many detailed or sector specific problems. The figure also shows causal relationships between the identified problems, focusing only on main interrelationships. From the figure, problem factors at the bottom of many inter-related problems and problem phenomena observed are identified.

3.4.2 Development objectives and basic strategy

(1) Objectives for Bangsamoro development

Three problem phenomena have been identified by the problem structure analysis. The economic problems are represented by low income levels, lack of capital accumulation and high unemployment rate. The social problems in the Bangsamoro region are outcomes of the economic problems and inadequate administrations due to unstable socio-political conditions. They are represented by high poverty incidents, social deprivation and marginalization, and low school participation and enrollment. The environmental problems have two broad aspects: forest resources and overall environmental quality.

Corresponding to these, three objectives are defined for the Bangsamoro development:

1) Economic objective: To pursue inclusive economic growth with diversified and viable agro-based employment and income opportunities to improve livelihood, increase local capital accumulation, and enhance competitiveness of regional economy in the globalizing economy.

2) Social objective: To revitalize local communities of empowered people to realize peaceful, equitable and just society, and responsive and transparent governance system with people's participation.

3) Environmental objective: To protect and enhance the environmental quality to ensure sustainable human and economic development, safeguard the traditional lifestyles and value, and ensure lasting peace.

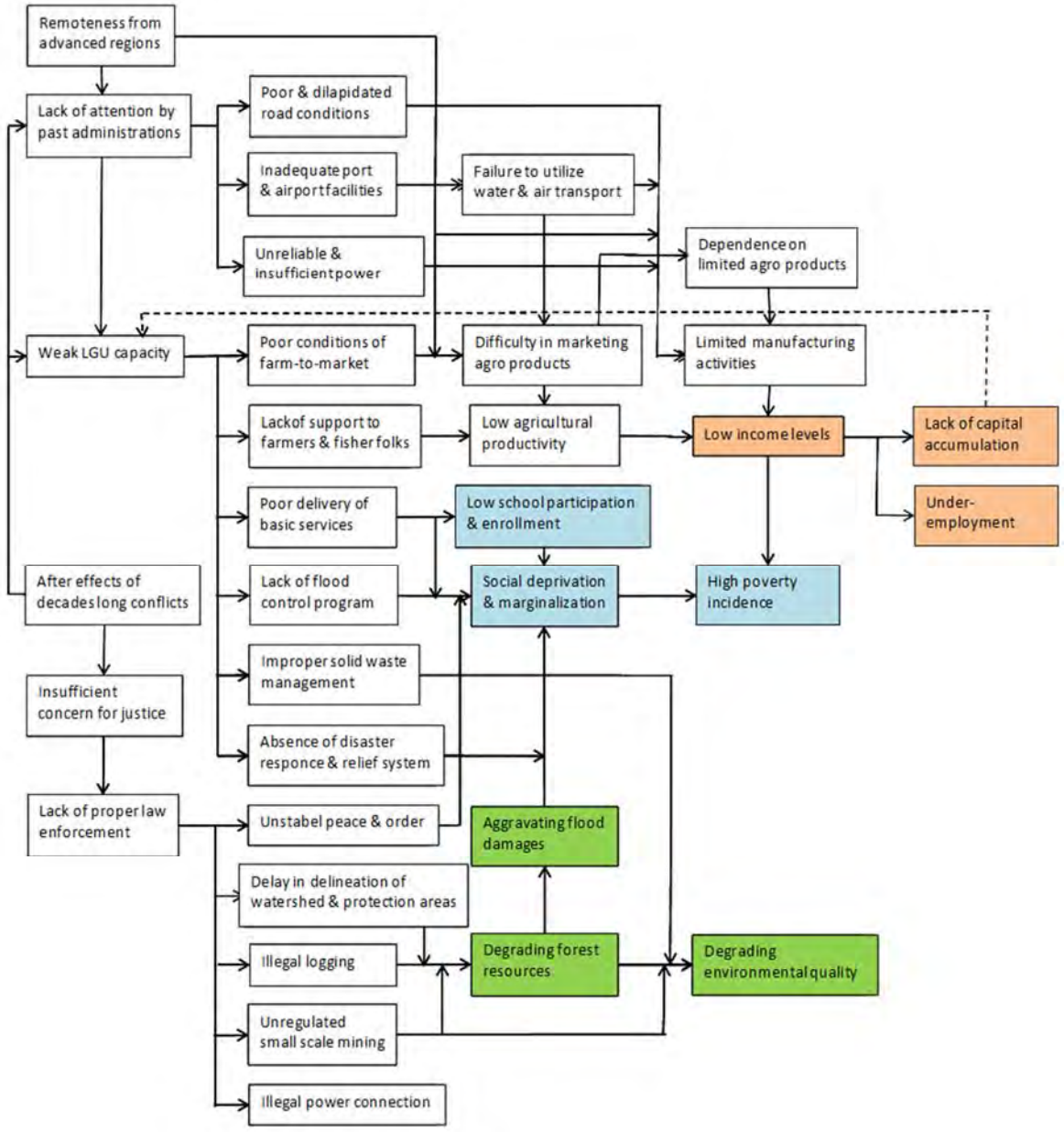


Figure 5 Problem Structure of Bangsamoro Development

(2) Basic strategy for Bangsamoro development

Basic strategy for the Bangsamoro development may be established in reference to the problem factors at the root of many interrelated problems analyzed by the problem structure analysis. They are as follows: (a) the Bangsamoro region has a disadvantage that it is located at the southwestern end of the National territory far from advanced regions; (b) the region suffers from the aftereffects of decades long conflict, which has undermined the concern on justice and equity resulting in weak law enforcement; and (c) capacity of LGUs is low to provide basic services and socio-economic infrastructure, and to ensure proper environmental and resources management.

Therefore, the following are proposed as four components of the basic strategy:

1) Pursuing outward oriented development by turning the disadvantage of remoteness into the advantage of proximity to neighboring regions in Mindanao and countries of the BIMP-EAGA;

2) Re-instating the traditional justice system combining the Shari'ah law and common criminal laws, observing also traditional rights of IPs;

3) Establishing mechanism for broad-based participation of all stakeholders in the process of development planning and implementation; and

4) Promoting alternative socio-economic activities, which are less resource intensive and environment friendly, combining traditional practices and modern technology.

The basic strategy with the four components together will help to attain not only the economic objective but also the social and the environmental objectives as defined above. In particular, it will suppress and prevent conflicts and ensure peace by providing safeguards in the forms of large number of lucrative employment opportunities, proper justice system observing traditional customs and value including rights of indigenous peoples, and participatory environmental and resources management.

(3) Bangsamoro land management strategy

Multiple agencies involved in land management with their roles and related issues in Bangsamoro are summarized in Table 2. Some conditions specific to Bangsamoro make the resolution of land issues difficult and complicated. The historical context of conflicts between the Moro people and the Central Government made them skeptical of land registration as a means to impose taxes. There was no room for registration of communal lands under the American (Torrens titling) system. LGUs are reluctant to cooperate with the land surveys as it may result in reduction of internal revenue allotment (IRA).

Table 2 Government Agencies Involved in Land Management and Related Issues in Bangsamoro

Agency	Roles	Issues in Bangsamoro
Department of Environment and Natural Resources (DENR)	To delineate public lands To issue free, homestead and sales patents to A&D land	Bangsamoro Government may re-delineate A&D land and protected areas.
Land Management Bureau (LMB) of DENR	To distribute public A&D lands using patents	Multiple agencies are involved in issuing patents. LMB in ARMM is grossly under-funded.
Forest Management Bureau (FMB), DENR	To issue titles in forestland by CBFMA and IFMA	Bangsamoro Government may re-delineate forest land.
Land Registration Authority	To deposit "mother title" with the Registry of Deeds (ROD)	Land registration in Bangsamoro is stipulated to follow the registration system of the Central Government, which may not fit to communal land ownership.
Department of Agrarian Reform (DAR)	To re-distribute private lands and some government lands under CARP To issue emancipation patents for rice & corn land To issue certificates of land ownership award (CLOA) for registration with ROD	Needs for land registration and cadastral surveys shall be understood widely. Sufficient fund shall be secured for cadastral surveys. Rights of people displaced by armed conflicts, communal land ownership and ancestral domains of IPs shall be respected and reflected in the CARP procedure. Lessons shall be learned from AJD program.
National Commission on Indigenous Peoples (NCIP), Presidential Office	To issue instruments over lands in ancestral domains	Rights of IPs for their land in ancestral domains shall be respected, and compensation and sharing arrangements shall be established.
Court (Barangay, Civil, Shari'ah courts)	To settle ownership claims for reflection in registered titles	Judicial system for resolution of land conflicts shall be strengthened encompassing barangay, civil and Shari'ah courts.
Local government units (LGUs)	To collect real property taxes To enforce land use laws and ordinances	LGUs shall cooperate for cadastral surveys, understanding the needs.

Establishment of proper legal and institutional arrangements to deal with land issues will involve some fundamental changes. First, multiple powers on land administration system should be streamlined and consolidated. This cannot be realized anymore in the main land, due to political complexity as many reports say, but only Bangsamoro remains the possibility. The *multiple* administration system committed by LRA, LMB, FMB, DAR, and NCIP is the first issue to be addressed.

Eventually, a new institution that may be called the Bangsamoro Land Management Office (BLMO) should be established. Consolidation of five land management agencies is quite a political issue, so that BDA should proceed this activity under the Chief Minister of Bangsamoro Parliament, and to secure neutrality, international and bi-lateral donors should act as observers.

A prerequisite to establishing the new institutions for land management is to cultivate wide understanding on importance of resolving land issues among the top management of MILF, LGUs, and residents. As there remains room for further negotiation with the Central Government related to land registration and management, it is essentially important for Bangsamoro to make concerted efforts based on the common understanding. For the purpose, the information function of the Bangsamoro Government would be critically important.

The new institutions for land management should be supported by strengthened judicial systems for land issues. As the first step, the ongoing Agrarian Justice Delivery program by DAR should be reviewed to extract lessons. Based on the review, a new judiciary system should be designed to make it fit to conditions in Bangsamoro. This system would be based on the traditional system combining the Shari'ah law and common criminal laws, observing also traditional rights of IPs and communal ownership of lands.

4. FRAMEWORKS FOR BANGSAMORO DEVELOPMENT

4.1 Socio-economic Framework

4.1.1 Rationale and assumptions

The socio-economy of Bangsamoro is projected to the target year of 2022 to set a socio-economic framework for the Bangsamoro development. The socio-economic projection should reflect ideas of the Bangsamoro development, and specifically the following ideas should be incorporated in the projection:

1) The share of agriculture in the GRDP should decrease significantly from 65% in 2012 to less than 50%.
2) The share of industry should increase significantly from 4.5% in 2012.
3) The service GRDP would increase induced by the development of agricultural and industrial activities.

4.1.2 Projections

Projection results are summarized in Table 3 (also graphed in Figure 6). The total employment of 1,778,000 in 2022 as shown in Table 4 is converted to the population of 4,023,000 in 2022. This represents the average annual population increase of 1.71%. The per capita GRDP of Bangsamoro will increase to PHP 47,685 in 2022, equivalent to 72% of the per capita GDP in 2012.

4.2 Spatial Framework

4.2.1 Urban hierarchy in Mindanao

The existing hierarchical structure of urban centers has been analyzed and the result is illustrated in

Figure 7. Detailed data on urban centers at higher tiers are summarized in Table 4 for Tier I cities and Table 5 for Tier II cities.

Table 3 Projections of GRDP and Employment by Sector in Bangsamoro

	GRDP (PHP 10^6)		Growth	Labor productivity (PHP 10^3)		Increase	Employment (10^3)	
Sector	2013	2022	(% p.a.)	2013	2022	(% p.a.)	2013	2022
Agriculture	66,162	86,326	3.0	78.8	94.2	2.0	840	917
Industry	4,582	24,939	20.7	152.7	190.7	2.5	30	131
Service	30,348	80,571	11.5	84.5	110.3	3.0	359	731
Total	101,092	191,836	7.4	82.3	107.9	3.1	1,229	1,778

Source: JICA Study Team.

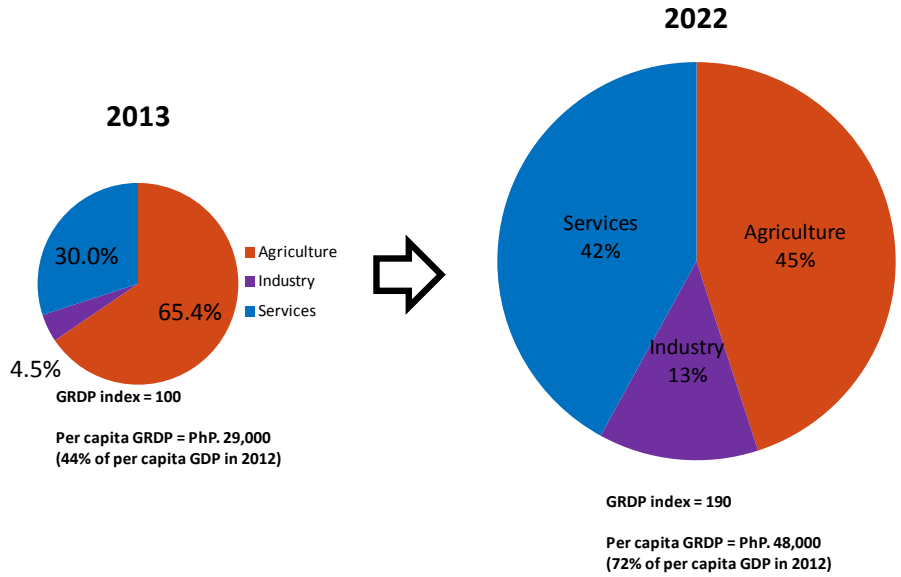


Figure 6 Socio-economic Framework for Bangsamoro Development to 2022

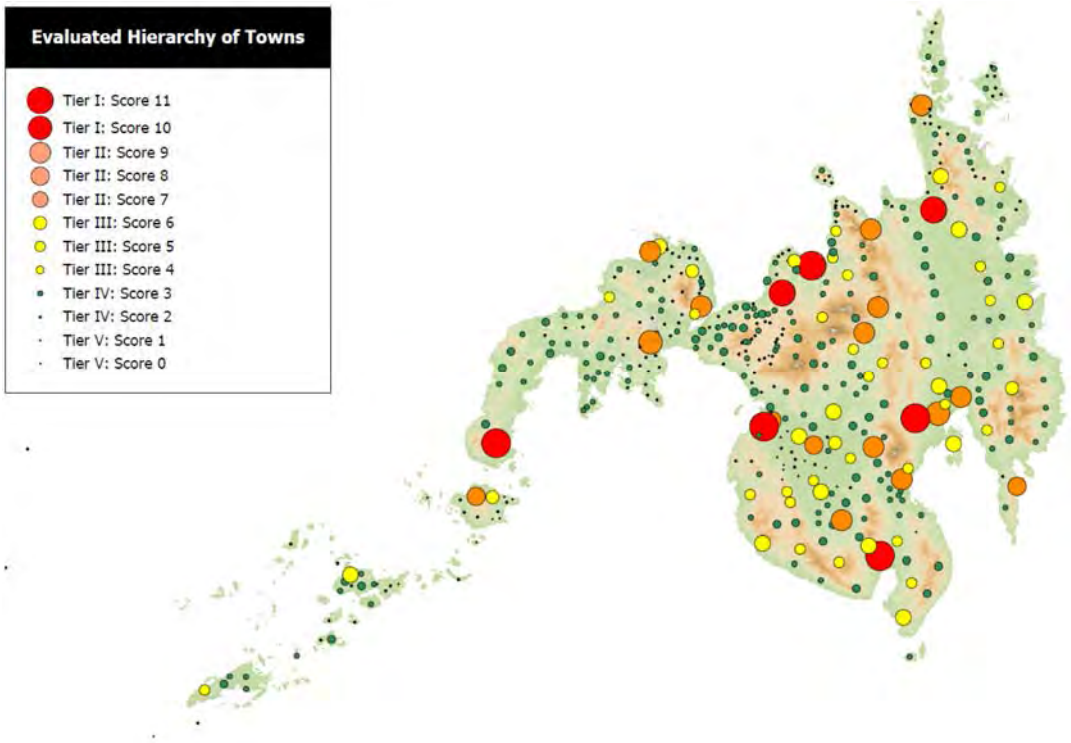


Figure 7 Existing Urban Hierarchy in Mindanao

Table 4 Profiles of Tier I Cities

City	Population 2010	Pop. change (2010/2000)	Income class	City category	Score
Butuan City (Capital)	309,709	1.18	1st	HUC	10
Cagayan de Oro City	602,088	1.31	1st	HUC	11
Cotabato City	271,786	1.66	3rd	ICC	11
Davao City	1,449,296	1.3	1st	HUC	11
General Santos City	538,086	1.31	1st	HUC	11
Iligan City	322,821	1.13	1st	HUC	10
Zamboanga City	807,129	1.35	1st	HUC	11

HUC = highly urbanized city; ICC = independent component city

Table 5 Profiles of Tier II Cities

City	Population 2010	Pop. change (2010/2000)	Income class	City category	Score
Surigao City (Capital)	140,540	1.23	3rd	CC	8
Sultan Kudarat (Nuling)	181,417	1.91	1st	M	7
Marawi City (Capital)	187,106	1.43	4th	CC	8
Koronadal City (Capital)	158,273	1.18	3rd	CC	8
Pikit	113,014	1.65	1st	M	7
Kidapawan City (Capital)	125,447	1.24	3rd	CC	8
Mati City (Capital)	126,143	1.19	5th	CC	7
Digos City (Capital)	149,891	1.20	2nd	CC	8
Tagum City (Capital)	242,801	1.35	1st	CC	9
Panabo City	174,364	1.30	3rd	CC	9
Gingoog City	117,908	1.15	2nd	CC	8
Ozamis City	131,527	1.19	3rd	CC	8
Valencia City	181,556	1.23	2nd	CC	8
Malybalay City (Capital)	153,085	1.24	1st	CC	8
Isabela City (Capital)	97,857	1.42	4th	CC	7
Pagadian City (Capital)	186,852	1.31	2nd	CC	9
Dipolog City (Capital)	120,460	1.21	3rd	CC	8

Notes: CC = Component City; M = Municipality

From the results of the urban hierarchical analysis, the following are observed:

1) Cotabato City has the highest score of all the urban centers at 11 points together with Cagayan de Oro, Davao, General Santos and Zamboanga.
2) Within Bangsamoro, Marawi City has the highest score at 8, followed by Sultan Kudarat and Isabela City at 7.
3) Other urban centers having high score near Bangsamoro are Kidapawan in North Cotabato, Valencia City and Malaybalay in Bukidnon, and Koronadal City in South Cotabato at 8, and Pikit on the border between Maguindanao and Bukidnon at 7.
4) These urban centers are ranked high due mainly to their income classes and the administrative status.
5) Other conditions contributing to the high ranks are the high population growth of Sultan Kudarat having the highest population growth, and Pikit.
6) Isabela City is ranked high due to its income class and administrative status despite relatively small population.
7) Island provinces of Bangsamoro are poorly represented by urban centers at higher tiers.

4.2.2 Urban axes and economic corridors in Mindanao

(1) Comparison of urban axes

As part of effort to evaluate the spatial distribution of development, alternative urban axes are compared

with respect to the concentration of urban population along the respective axes. For the analysis, eight alternative urban axes are defined as follows (Figure 8).

① Cotabato–Sharif Aguak–Surallan–Koronada–General Santos
② Cotabato–Sharif Aguak–Surallan–Koronada–General Santos–Davao
③ Cotabato–Sultan Kudarat–Kabacan–Kidapawan–Digos
④ Cotabato–Sultan Kudarat–Kabacan–Kidapawan–Digos–Davao
⑤ Cotabato–Sultan Kudarat–Kabacan–Carmen–Valencia–Cagayan de Oro
⑥ Cotabato–Parang–Malabang–Marawi–Iligan
⑦ Cotabato–Parang–Malabang–Marawi–Iligan–Cagayan de Oro
⑧ Cotabato–Parang–Malabang–Pagadian–Zamboanga

Figure 8 Alternative Urban Axes of Bangsamoro

For each urban axis, the total road length, urban population in all the cities along the axis, and the corresponding population concentration per km of road length are calculated as summarized in Table 6. The following are observed from the table.

(1) The total population along urban axes linking two port cities at both ends (urban axis 1, 3, 5, 6, and 8) is the largest for the Cotabato–Pagadian–Zamboanga axis, but the population concentration is the lowest for this axis.

(2) The population concentration is the highest for the Cotabato–Digos–Davao axis, followed by the Cotabato–General Santos–Davao axis due to the high population concentration between General Santos and Davao, particularly in Davao.

(3) If this section is excluded from these axes, the Cotabato–General Santos axis has larger population concentration than the Cotabato–Digos axis.

(4) The population concentration along the Cotabato–Malawi–Iligan axis is lower than its extension to Cagayan de Oro due to the high population concentration between Iligan and Cagayan de Oro, particularly in Cagayan de Oro.

(5) The inland axis to Cagayan de Oro passing through Kabacan, Carmen, and Valencia has the lowest population concentration, which is still higher than the concentration along the Cotabato–Pagadian–Zamboanga axis.

Table 6 Comparison of Alternative Urban Axes

Urban axis	Approx. road length (km)	End point	Population along axis (2010)	Population concentration (/km)	Municipalities (n)	Cities along axis (n)	Total urban score along axis
①	200.0	General Santos	1,502,773	7,514	19	3	51
②	329.1	Davao	3,465,004	10,529	28	5	88
③	173.6	Digos	1,569,740	9,042	18	3	74
④	222.8	Davao	3,100,129	13,914	20	4	89
⑤	282.1	Cagayan de Oro	1,959,574	6,946	20	2	80
⑥	157.1	Iligan	1,298,629	8,266	23	2	56
⑦	231.0	Cagayan de Oro	2,148,583	9,301	33	4	85
⑧	385.6	Zamboanga	2,269,264	5,885	29	3	80

(2) Promising economic corridors for Bangsamoro

The Bangsamoro region is and will continue to be an agricultural region, and the Bangsamoro development will depend on the development of broad agriculture including fishery and agro-related industries. As an effective strategy for broad-based development, economic corridors should be established along the urban axes. To identify more promising economic corridors, existing agricultural activities and land potentials for agriculture have been analyzed by using GIS. Assessment of alternative corridors with respect to existing agricultural value and agricultural potential is shown in Figure 9 and Figure 10, respectively.

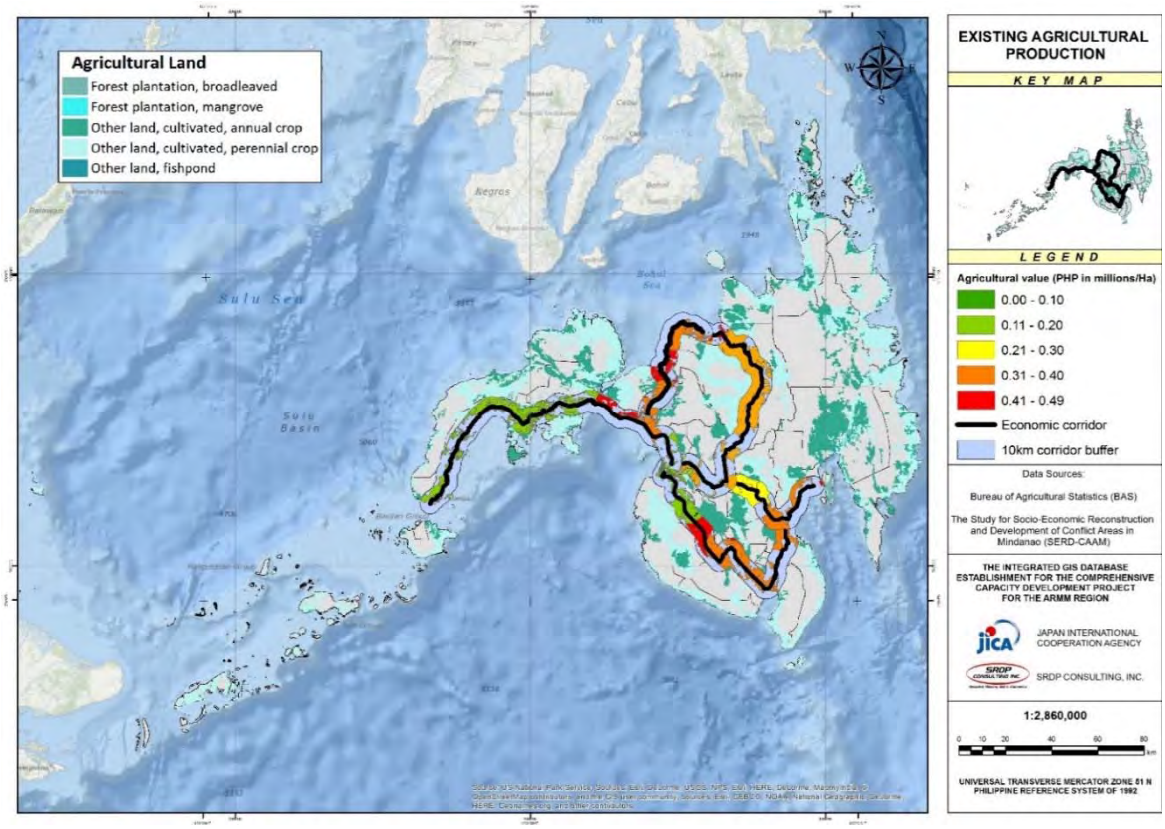


Figure 9 Agricultural Value Map of Bangsamoro along Urban Axes

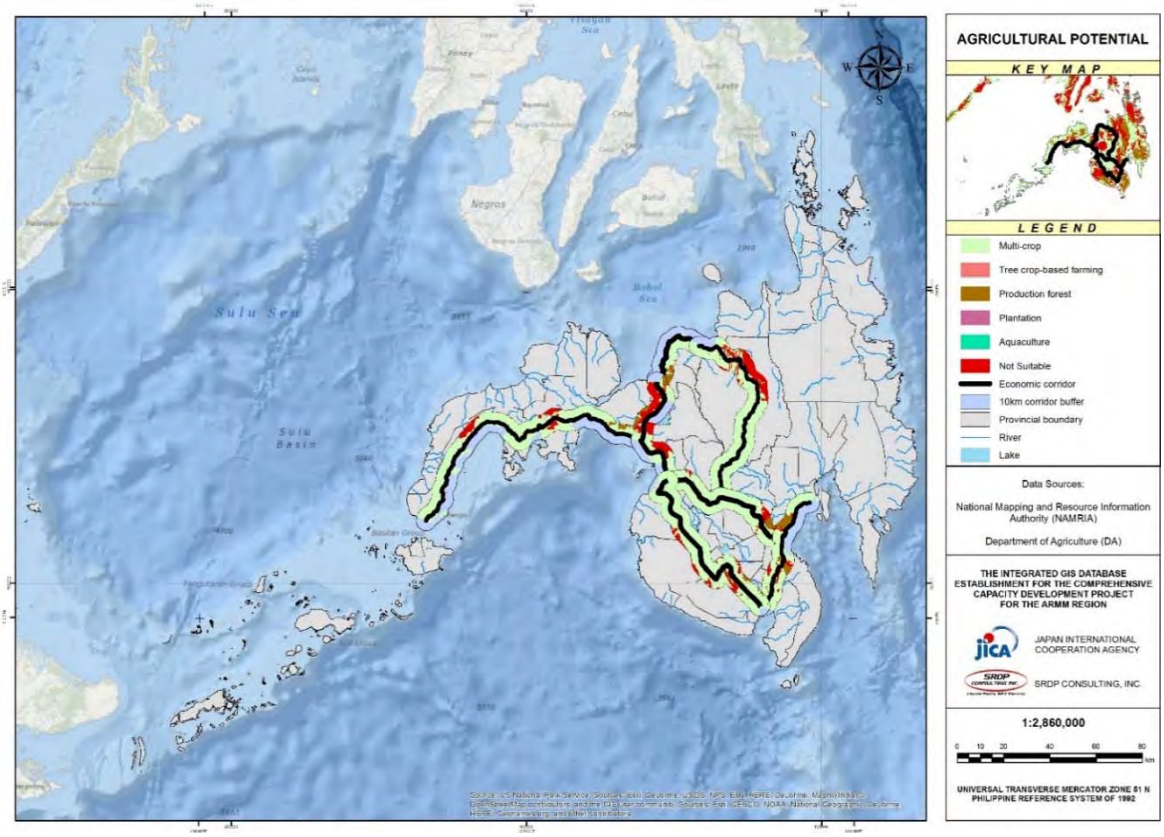


Figure 10 Agricultural Potential Map of Bangsamoro along Urban Axes

For each urban axis, the total road length, total existing agricultural value, total suitable agricultural area and the corresponding linear concentration per km of road length are calculated. The results are summarized in Table 7. Based on these results, three urban axes may be identified as more promising for economic corridor development. They are as follows in the order of potential:

1) Cotabato–Sharif Aguak–Surallan–Koronada–General Santos,
2) Cotabato–Sultan Kudarat–Kabacan–Kidapawan–Digos(–Davao), and
3) Cotabato–Parang–Malabang–Marawi–Iligan(–Cagayan de Oro).

Table 7 Evaluation of Urban Axes by Existing Agricultural Production and Agricultural Land Potential for Potential Economic Corridors

Urban axis	Length (km)	Existing agricultural production				Existing agricultural potential		
		Total agricultural area (ha)	Total agricultural value (PHP 10^6)	Density (PHP 10^6/km)	Rank	Total suitable agricultural area (ha)	Density (ha/km)	Rank
①	**209.77**	**258,990.70**	**82,189.44**	**391.81**	**1**	**386,316.00**	**1,841.62**	**2**
②	352.86	346,442.27	111,789.18	316.81	3	566,750.62	1,606.16	5
③	160.61	188,822.79	47,666.37	296.78	5	311,327.72	1,938.41	1
④	211.13	215,097.29	56,590.82	268.04	7	362,436.43	1,716.65	3
⑤	310.32	337,549.50	86,005.38	277.15	6	517,861.07	1,668.80	4
⑥	133.76	130,122.06	45,253.95	338.32	2	141,211.04	1,055.70	7
⑦	223.82	196,318.43	69,764.93	311.70	4	219,798.84	982.03	8
⑧	414.05	351,358.95	76,397.02	184.51	8	510,859.95	1,233.81	6

4.2.3 Land potential and land use

The existing land use map was constructed using forest cover data for Mindanao from SERD-CAAM (2008). More generalized divisions were assigned for these original land classes as given in Figure 11. The eleven crop suitability maps collected from the Department of Agriculture (DA) cover the entire Philippines. Based on these, a composite land suitability map is constructed as shown in Figure 12.

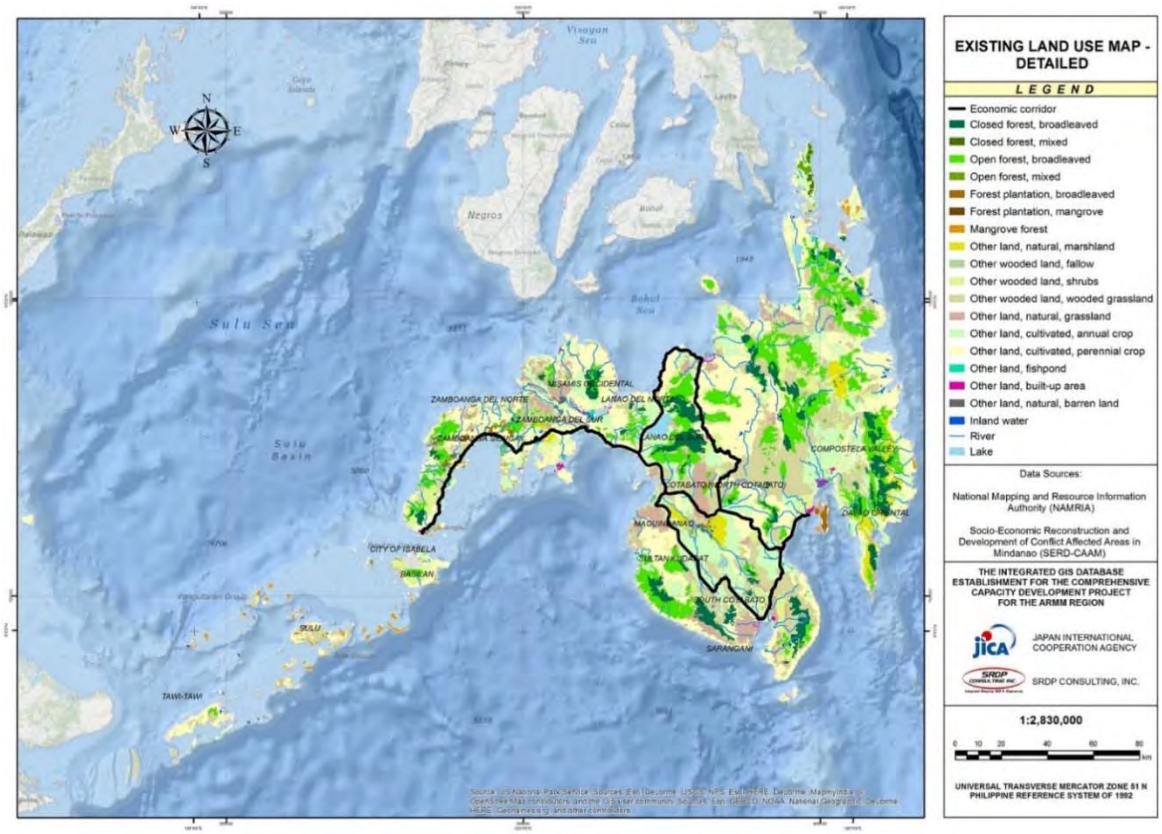


Figure 11 Detailed Existing Land Use Map

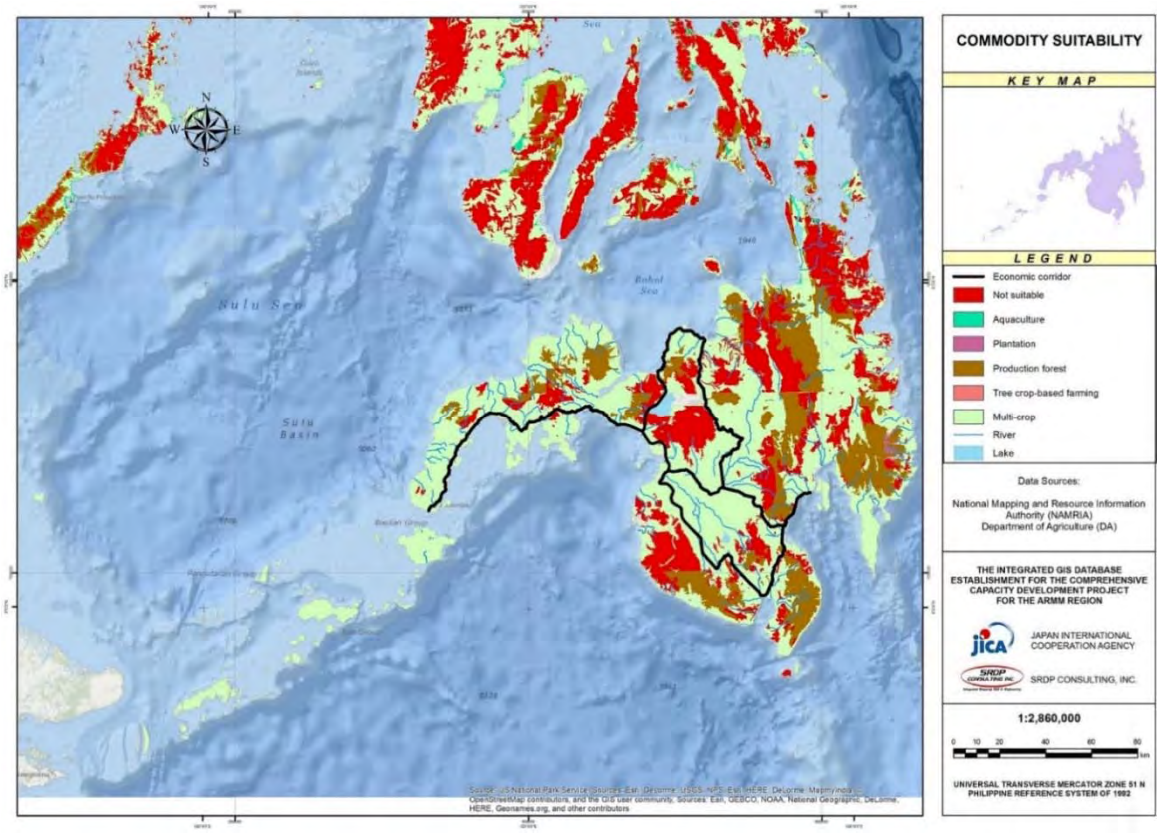


Figure 12 Integrated Crop/Commodity Suitability Map

4.2.4 Land use planning

To construct a future land use map, future land use is defined based on the existing land use and the land suitability. The following considerations are reflected in the definition:

1) Natural forests, marshland, and inland water areas should be preserved.
2) Available land for conversion should give priority to agricultural uses using the DA's recommended crop/commodity suitability maps.
3) Existing built-up areas should be maintained.
4) Existing barren land, cropland, wooded land, and grassland are considered to be land available for conversion.

Given these considerations, the future land use is planned in an indicative way as shown in Figure 13.

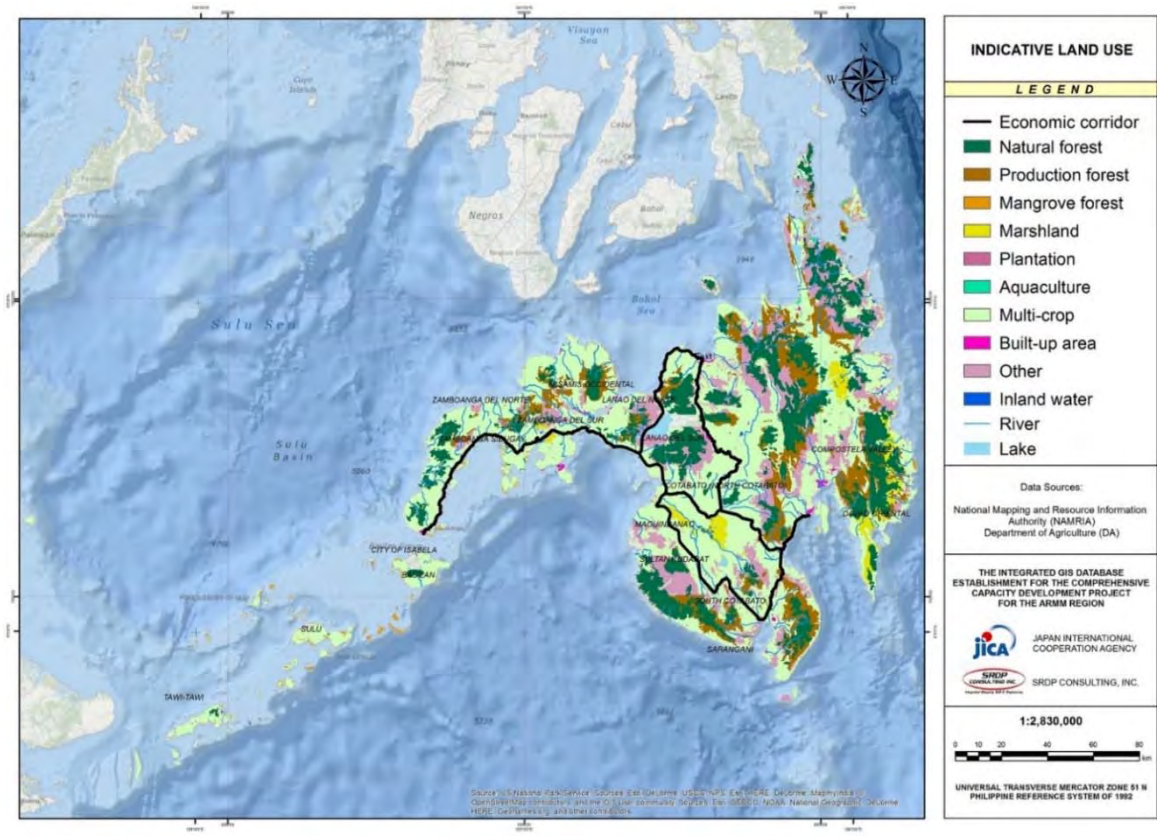


Figure 13 Indicative Land Use Planning Map

5. BANGSAMORO DEVELOPMENT PLAN

5.1 Structure of Bangsamoro Development Plan

5.1.1 Development with four initiatives

The Bangsamoro development plan presented in this chapter consists of development programs and projects structured into four initiatives and associated institutional measures.

I. Broad-based Inclusive Development Initiative

This initiative is basically the continuation and extension of the BDP I. It consists of projects responding to the imminent needs of the people for various social services and livelihood activities.

Immediate implementation of these projects will prepare the people to pursue more self-reliant socio-economic activities in the subsequent phase. Most projects under this initiative will continue to be implemented through 2022.

II. Concerted Pump Prime Initiative

Given the gaps existing in socio-economic conditions in Bangsamoro and the rest of the Country, rapid development of Bangsamoro to catch up with the national average at least is expected. This initiative responds to such demands. It will take more than just a jumpstart for Bangsamoro to catch up with the rest of the Country. This initiative will facilitate the rapid development to be sustained by concerted efforts of people supported by the governments and donors.

III. Alternative Socio-economy Promotion Initiative

This initiative pursues the main theme of the Bangsamoro development by encouraging effective use of indigenous resources for new economic activities. Projects under this initiative include those to improve and extend the existing economic activities such as integrated and mixed farming, and those to introduce innovative economic activities such as industrial clusters and halal industry. While it will take time to establish these activities fully, support measures should start to be implemented immediately.

IV. Enhanced Resources Management Initiative

This initiative will enhance the resource capacity of Bangsamoro and improve the resource management by community involvement to support sustainable development. Most projects under this initiative should also start to be implemented immediately. As it has long lasting effects, however, some of proposed projects should be further examined for their effects on social and natural environment as well as investment requirements, while some other projects are partly implemented.

5.1.2 Anchor projects

The Bangsamoro development plan is composed of 54 projects in 16 programs under four initiatives. Of the long list of the projects, 27 projects are earmarked as anchor projects. These are projects that characterize the Bangsamoro development throughout the medium to long term. They have been selected on the basis of the following criteria and considerations:

a) Projects have well defined characteristics consistent with the Bangsamoro development objectives, strategy and vision;

b) Projects will establish alternative systems for production, marketing or service delivery;

c) Projects have strategic importance in transforming the spatial and/or the socio-economic structure of the Bangsamoro; and

d) Projects have broad coverage of people in specific segments of the society to improve their livelihood.

A total of 27 anchor projects have been designated. The anchor projects are designated by asterisk (*) at the end of their titles.

5.2 Broad-based Inclusive Development Initiative

This initiative is the continuation and extension of the BDP I. In particular, the BDP priority programs for 2015 cover skill training, social services and community infrastructure. These aspects are not directly covered by the Study, which focuses on agriculture, agro-industry, fishery and related industries, logistic infrastructure including road network, ports and airports, power supply, and flood control. The elements of the BDP I related to these sectors are incorporated in projects under other initiatives. Additional projects are proposed below.

5.2.1 Agrarian reform communities strengthening project

This project is to promote business-oriented agriculture by providing related infrastructure, technical

training, marketing support, finance and other supports to selected agrarian reform communities (ARCs) under a project management office (PMO) to be established. It will be implemented in the following steps:

1) Determination of ARCs for inclusion in the project,
2) Needs assessment of chosen ARCs and project design,
3) Implementation starting from social preparation of agrarian reform beneficiaries (ARBs) to mentoring and guidance,
4) Monitoring and evaluation, and
5) Impact assessment.

5.2.2 Agricultural cooperatives empowerment project*

Many cooperatives have been used as conduits of government and non-government social programs, and cooperatives could actually serve well as such. However, many cooperatives have been established for this purpose without consideration of longevity; that is, sustaining operations even after the program. Thus, cooperatives that started as conduits readily become inactive after the completion of a particular program.

Despite the seeming failure, cooperatives have certain strengths that can improve agriculture under the hands of small holders as shown in some success stories of cooperatives development in Bangsamoro. Yet, facts and figures indicate that more is needed to make cooperatives effective in achieving their purposes in the farming sector. First, the farmers will have to embrace the spirit of group undertaking such as livelihood, collective ownership of resources and operation of businesses from their individual economic activities. Then, support tailor-made for the need of each cooperative should be provided at all stages. Nurturing of a cooperative after it has been established is an important support mechanism. This requirement would entail the following.

1) Strengthening the Cooperative Development Authority (CDA) to carry out its difficult dual function of regulation and development. The agency would need a bigger budget to increase its staff, particularly those that assist the cooperatives and support cooperatives development program. The possibility of having cooperative support workers immersed in the communities should be studied. This will enhance monitoring for purposes of assisting cooperatives through knowing the needs and providing problem-solving assistance.

2) Enhancing the training capability of CDA to go beyond organizational trainings. CDA should be able to provide a continuous training program to sustain the need of cooperatives for capable leaders and managers and skilled staff to handle administrative as well as technical jobs as required. Training modules should necessarily include: value formation designed for people desiring to become cooperative members, developing potential leaders, technical and administrative staff of cooperatives, etc.

3) Establishing cooperative centers in strategic places that could provide accessible assistance to cooperatives. Each center should be able to provide cooperatives assistance in accessing financing and support from various programs of government and other institutions. This assistance should include preparation of feasibility studies and business plans, preparation of project proposals, entering into contracts or agreements, implementation of projects, finding network and linkage, etc.

5.2.3 Small water purification plants distribution project

There exists a water purification unit which is self-standing and having a high performance to produce safe potable water at least cost by use of rapid flocculent made of volcanic ash. This unit can make 500 liters of dirty or contaminated water into drinking water in 10 minutes per batch with the least cost. It is possible to operate this unit even in rural areas where no electric power is available. A small diesel power generator of 4 kW is sufficient to operate this unit for 10 minutes per batch. The main raw material for producing rapid flocculent is rock or sand made of volcanic ash. It is believed that a suitable quarry site of such rock or sand materials for producing this rapid flocculent can be found in Bangsamoro or surrounding area of Mt. Apo.

5.2.4 Power supply system maintenance improvement project

(1) Boom trucks provision

Most electric cooperatives (ECs) in the ARMM area are running in the red financially. Accordingly, the ECs cannot afford to properly maintain boom tucks required for maintenance and construction work of power distribution facilities and have no choice but to continuously use them due to the lack of financial resource. Furthermore, the boom trucks owned by ECs are so aged that they frequently break down and it is difficult to find the spare parts that are no longer manufactured. In order to improve this situation, it is effective to provide boom trucks with bucket (BTB) and boom trucks with digger (BTD).

(2) Transmission substation and distribution materials procurement

Many distribution facilities of the Maguindanao Electric Cooperative (Magelco)'s franchise area belonging to the ARMM area were installed from the 1970s to the 1980s and approximately 60% of the poles are inclined and seriously deteriorated. Therefore, they should be replaced urgently. Also, illegal connections of service wires and breaking of kWh meters in the area are commonly observed in the franchise area, and Magelco is facing difficulties in tariff collection as well. Furthermore, Magelco has managerial problems due to a high rate of distribution losses. Magelco was ranked in the last place according to the performance assessment by the National Electrification Administration (NEA). Magelco has been formulated construction and rehabilitation plans of distribution facilities to satisfy the increasing power demand in the franchise area.

Based on the Magelco plans, the following scope of the project has been selected:

a) Power transformer and substation equipment for new construction and improvement of substations, consisting of one lot of substation equipment for a headquarters substation and one unit of 5 MVA equipment for a Nuro substation;

b) 69 kV/13.2 kV transmission and distribution facilities with a total length of 30 km, under-built lines, and concrete poles; and

c) Digital kWh meters and accessories (10,000 sets).

5.2.5 Island airports security improvement project

At the Jolo airport in Sulu and the Sanga-Sanga airport in Tawi-Tawi, passenger baggage is currently screened manually one by one. X-ray baggage screening equipment should be installed at these airports along with metal detector to ensure the security in accordance with the relevant regulations.

5.2.6 Efficient waste collection and recycling support project

Barangays are responsible for the collection, segregation, and recycling of biodegradable, recyclable, compostable and reusable wastes. Material recovery facilities (MRFs) should be established in every barangay or cluster of barangays. An MRF is a facility to receive, sort, process and store compostable and recyclable materials, usually with an open space with a roof, a temporary office, and a rest place for workers. Marawi City has 96 barangays, and a plan to have 60–65 MRFs in total, consisting of 45 MRFs for 45 urban barangays and 15–20 MRFs for 51 barangays. The plan has not been realized due to lack of fund, though some model MRFs have started. Inefficient waste collection is another problem. The City has only six ordinary trucks, which are not efficient to carry wastes as wastes are sometimes bulky. Therefore, introduction of compactor cars is considered to help to make collection efficient.

5.2.7 Labor-based road rehabilitation and maintenance project*

A new policy in road development should be to include farm-to-market road (FMR) improvement in any projects to improve trunk roads. Given 80 major road projects identifies for improvement, the estimated length of FMRs to be improved is about 884 km. Taking into account the importance of peace-building and job creation which would demand immediate attention after combatants return to civilian life, labor-based road construction and maintenance method should be applied to FMRs works.

JICA has recently completed two-pilot projects in the municipalities of Sultan Mastura (Maguindanao) and Matungao (Lanao del Norte) using this technology. The two projects were successful and useful reference for future projects involving labor-based technology. From this experience, a manual titled *Basic Manual for Road Rehabilitation and Maintenance by Labor-Based Technology* was compiled, and the technology was defined as the construction technology utilizing community participation as labor force supplemented with light equipment such as compactors to ensure the quality of construction works. This manual established correct procedure in terms of (i) road standards, (ii) construction methodology, (iii) work supervision and monitoring, and (iv) community organization for its involvement and other important aspect of works. It is envisioned that substantive workforce will comprise the community and combatants under the supervision of a municipal engineer.

5.3 Concerted Pump Prime Initiative

5.3.1 Pioneer-focused area development program

The area development approach is effective in providing a set of support measures in a comprehensive and mutually cohesive way to facilitate local people in a selected area to improve their livelihood. Support measures include provision of basic services such as primary education and preventive health care, basic infrastructure such as access roads, water supply, electricity and sanitation facilities, and some community facilities. This approach is applied to such areas that would not naturally be part of any economic corridor analyzed in the sub-section 4.2.2. They include island provinces in particular. Of the three island provinces, Sulu and Tawi-Tawi are effectively covered by the Jolo and Bongao urban functions upgrading project, and thus the Basilan project is proposed here.

A socio-economic survey was undertaken as part of the Study for the former Abubakar MILF camp as a pilot case to establish approaches and methods of the survey. The survey covered six municipalities of Kapatagan, Balabagan, and Maragong in Lanao der Sur; and Matanog, Buldon, and Barira in Maguindanao. Based on the survey, the Abubakar project has been formulated. To cover the central part of Maguindanao, another project has been formulated.

(1) Abubakar integrated area development project*

Specific components of the project are suggested as follows. For the livelihood and economic activities to be supported by the project, corn farming may be selected as corn is one of the most widely produced crops. To increase corn productivity, technical extension and training and mixed crop cultivation with vegetables may be promoted. Corncobs may be used together with other crop residues for composting or vermicomposting. In view of generally poor conditions of rural roads in the area, a few farm-to-market roads should be included in the package of support with priority to corn-producing barangays. Concrete pavement of the roads linked to the paved highway leading to Malabang may also be included to facilitate marketing of corn and vegetables in major markets.

While these support measures are taken for rather conventional crops cultivation, preparations for diversifying rural socio-economy should be made through new livelihood and economic activities. A prerequisite is improvement in water supply and electricity. The area has several waterfalls that may be tapped for mini hydro power and also water supply. They include Lingae, Mayaman, and Pabrica waterfalls in Marogong, Igabay falls in Balabagan, and waterfalls in Barira and Matanog. When the development of these waterfalls is planned, possibilities to develop eco-tourism should also be examined.

(2) Basilan integrated area development project

Specific components of the project are suggested as follows. For the livelihood and economic activities to be supported by the project, rubber farming may be selected as rubber is one of the most widely produced crops. As rubber production cannot be easily combined with other crops for mixed farming, integrated farming is the direction to pursue as supported by the ongoing AICCEP project. Basilan has a few falls in Lantawan Municipality that may be tapped for mini hydro power development and possibly also for water supply. For water supply, springs are also reported as possible water

sources for Lantawan and Tipo-Tipo. Small irrigation development is also proposed by the provincial government. A few farm-to-market roads should also be combined in the project.

A specific area development project should be formulated in the immediate future, followed by implementation. Detailed field surveys should be undertaken to validate the possible project components suggested above. Some component projects may be undertaken more effectively under other proposed projects such as the rubber industrial cluster development project and the mini hydro power development project. The areas development approach is justified as locations of possible project components extend from Lantawan in the northwest to Tipo-Tipo in the east of the main island.

(3) Central Mindanao integrated area development project

The project should cover the area between the proposed central and southern economic corridors. Development of this area is important to link the two corridors for balanced development of Maguindanao and also Bangsamoro as a whole. The municipalities of Ampatuan, Shariff Aguak and Datu Sangki Abdullah are included in the area together with parts of neighboring municipalities. An inter-municipal water supply system has been proposed by the provincial government of Maguindanao to cover these three municipalities, tapping springs in Ampatuan. The total discharge of springs is reported to be about 200 L/sec, sufficient to cover the three municipalities.

Ampatuan has a few waterfalls for mini hydropower at Muakat, Taglong, and Tubak. For the livelihood/economic activity to be supported by the project, coconut farming may be selected as coconut is one of the most widely produced crops. It may be promoted as part of integrated farming, combined with goat production or the coco products industrial cluster to be supported by the ongoing AICCEP project. A road connecting the two corridors constitutes one of missing links identified. This road links Pagalungan and Sharif Aguak. Dredging of the Rio Grande de Mindanao and the Pulangi River may also be included in the project. The project should be formulated further through a detailed survey to finalize components.

5.3.2 Spatial structure strengthening program

(1) Artery roads upgrading project*

The regional artery roads in Bangsamoro are the primary road network inside the Region (intra-network). The artery roads upgrading project will construct a new road with a total length of 79.4 km, road surfacing upgrading with a length of 93.3 km and reconstruction of 7.5 km to complete the region's artery roads. The locations of regional artery roads that need improvement in the mainland provinces and in the island provinces are presented in Figure 14 and Figure 15, respectively. The total cost to improve the identified nine regional artery roads is about PHP 8.14 billion.

The implication of these poor roads to the socio-economic development of the Region is huge. First, the movement of the communities in the influence area of these roads is restricted; second, produce of farmers and fishermen have to endure high transportation costs; third, access to services such as hospitals, markets, government centers, etc. becomes difficult; and fourth, presence of law enforcement becomes minimal which contributes to slow attainment of a peaceful society.

(2) Missing links development project

Missing links are critical part of the network necessary to address to achieve rational distribution of traffic and to strengthen the total network. In the Bangsamoro region, a number of missing links are observed which affect accessibility to large area of the Region and forced people to take a long detour. It is noted there are about 11 missing links in the mainland provinces, but others are included into (i) Bangsamoro artery roads upgrading project and (ii) Corridor link roads improvement project. Overall, there are many areas with accessibility problems in Bangsamoro.

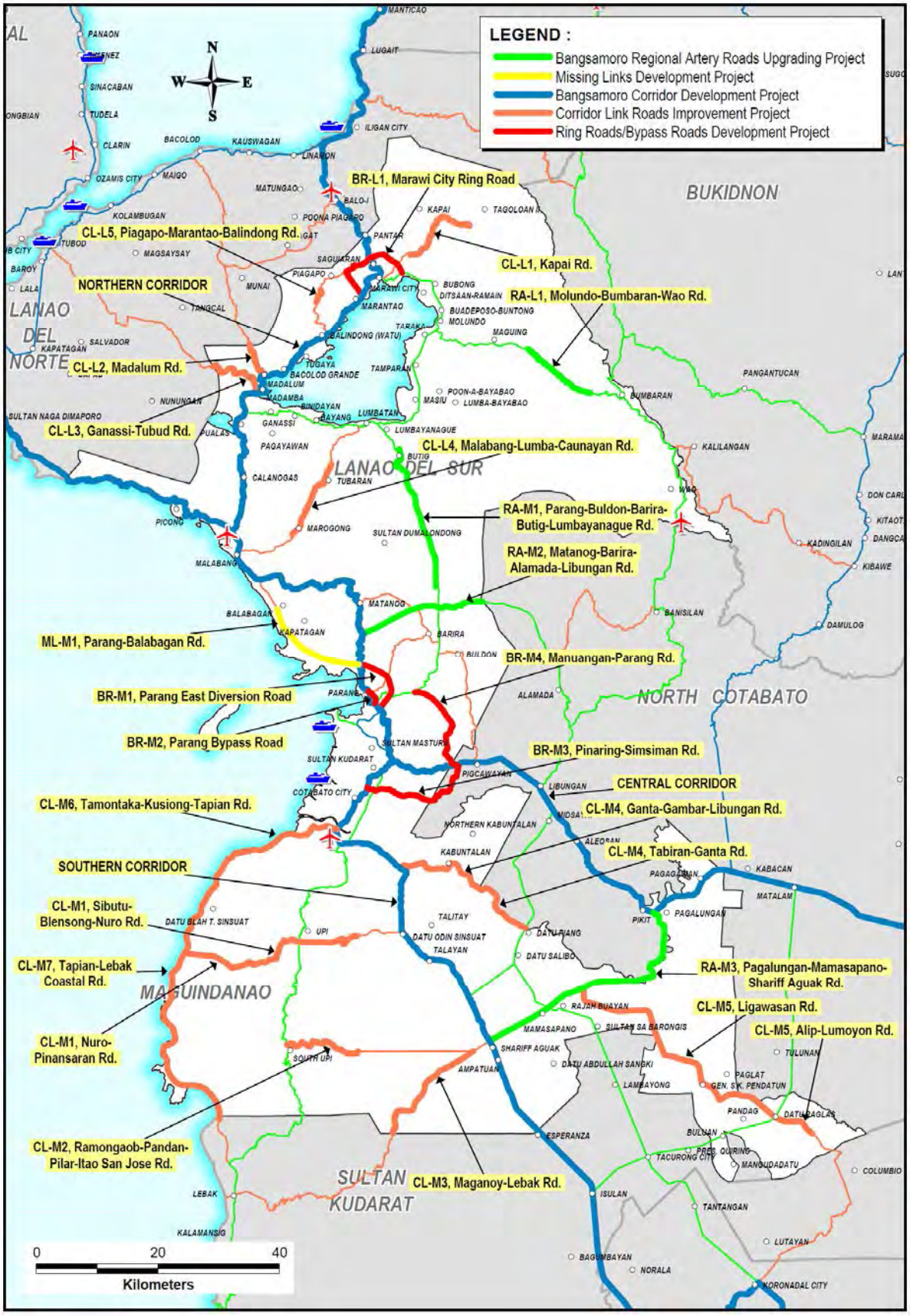


Figure 14 Locations of Bangsamoro Artery Roads for Improvement: Mainland Provinces

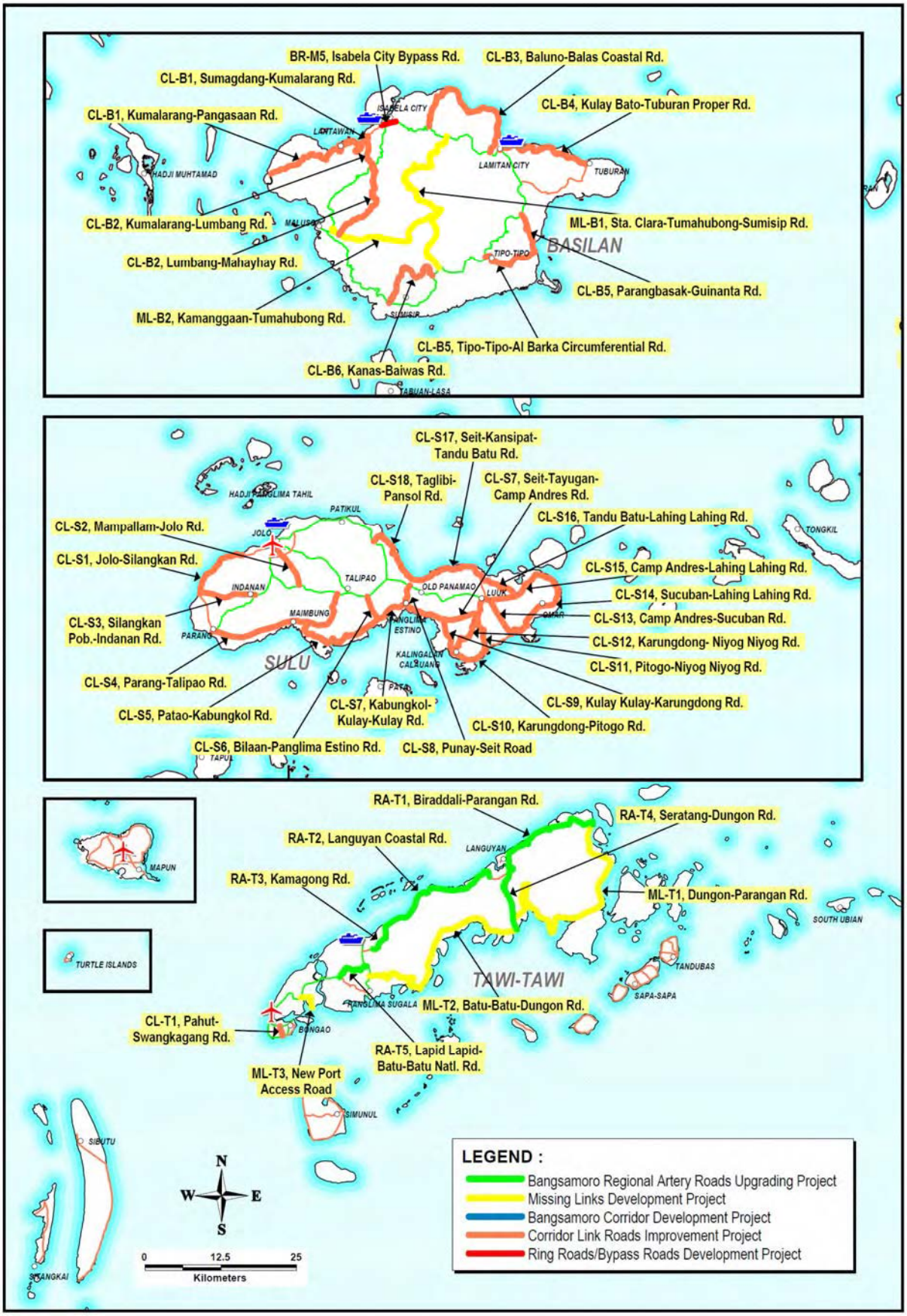


Figure 15 Locations of Bangsamoro Artery Roads for Improvement: Island Provinces

(3) Ring roads/bypass roads development project

In the Bangsamoro region, there are a couple of highly urbanized areas which experience serious traffic congestion and urban sprawl. This is not unique in the Region as the same phenomenon is observed in other cities of the Country. From the transportation point of view, provision of bypass roads would improve traffic flow since the build-up area where traffic congestion is serious is circumvented by passing vehicles. Likewise, removal of through-traffic from the center of the town decongests the city road, improves travel speed, and reduced road accidents.

A ring road on the other could both serve as bypass road and important facility to guide sound urbanization by providing a high capacity trunk road at the outer edge of the city or the existing urban core. This facility ensures good accessibility to commercial areas and residents moving in/out of the urban core.

(4) Polloc port upgrading project*

The required berth length for target year of 2019, 2022, and 2030 is as shown in Table 8. The existing transit shed area and open storage area are sufficient for the projected demand. A container yard and a wharf necessary to meet the projected demand are summarized in Table 9.

Table 8 Required Berth Length for General Cargo and Container Cargo at Polloc Port

	Cargo throughput (ton)	Required berth length (km) [a]	Existing berth length (km) [b]	Required extension of berth [a]-[b]	Proposed extension of berth (m)
2019	921,197	460	400	60	0
2022	1,060,318	530	400	130	200
2030	1,542,860	772	400	372	200

Table 9 Completion of Polloc Port Facilities at by 2022 and 2030

Required	2022	2030
Completion of wharf construction	200 m	200 m
Completion of container yard		25,000 m^2

The medium-term development plan for 2022 is indicated in Figure 16 based on the required facilities determined above. In the subsequent stage, cargo and passenger traffic for the Polloc port should be projected in detail based on the Bangsamoro development plan, including the potential demand to be diverted from other ports in Mindanao, demand to be generated newly by Bangsamoro development, and shipping lines to be attracted by upgraded port facilities.

(5) Cotabato airport improvement project*

As part of the improvement of the existing Cotabato (Awang) airport, some existing facilities will be improved and new facilities will be provided by the Department of Transportation and Communications (DOTC) according to the CY 2016 Awang Airport Consolidated Improvement Plan especially focusing on the short-term future development plan. It can be expected that the conditions of the existing passenger terminal building will be improved as the cargo building and airlines offices are newly established and the activities are undertaken in the new building instead of the existing passenger building.

Apart for the short term development, a further development plan for the Cotabato airport has been proposed with a new terminal area on the opposite side of the existing one, based on the previous JICA study and the feasibility study by ADB of 2006. The newly proposed layout of the Cotabato airport is illustrated in Figure 17.

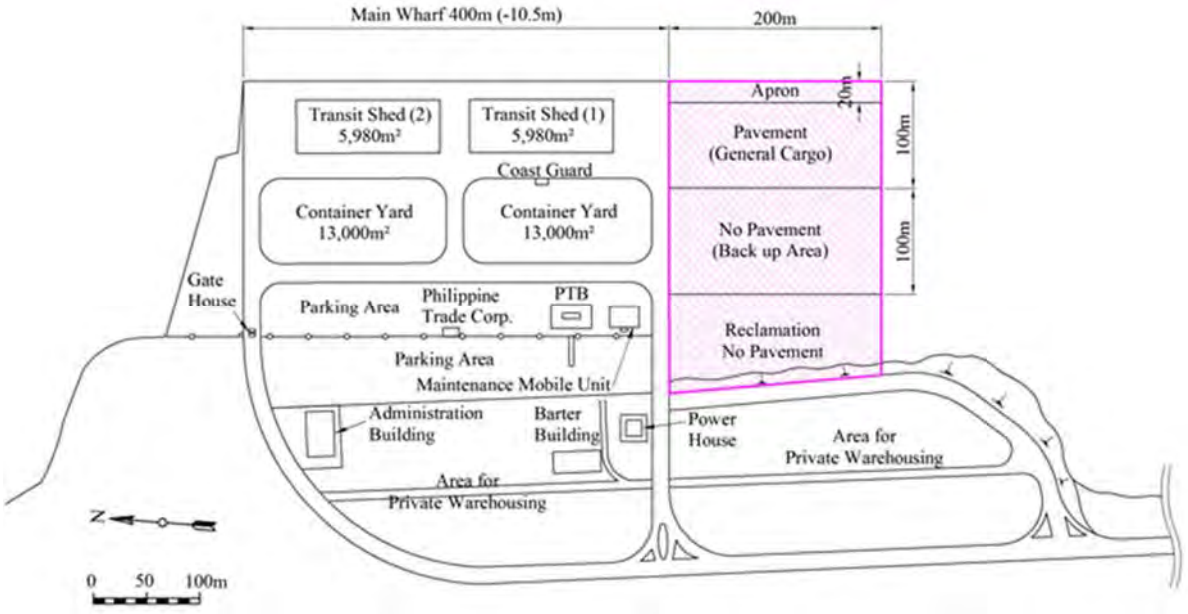
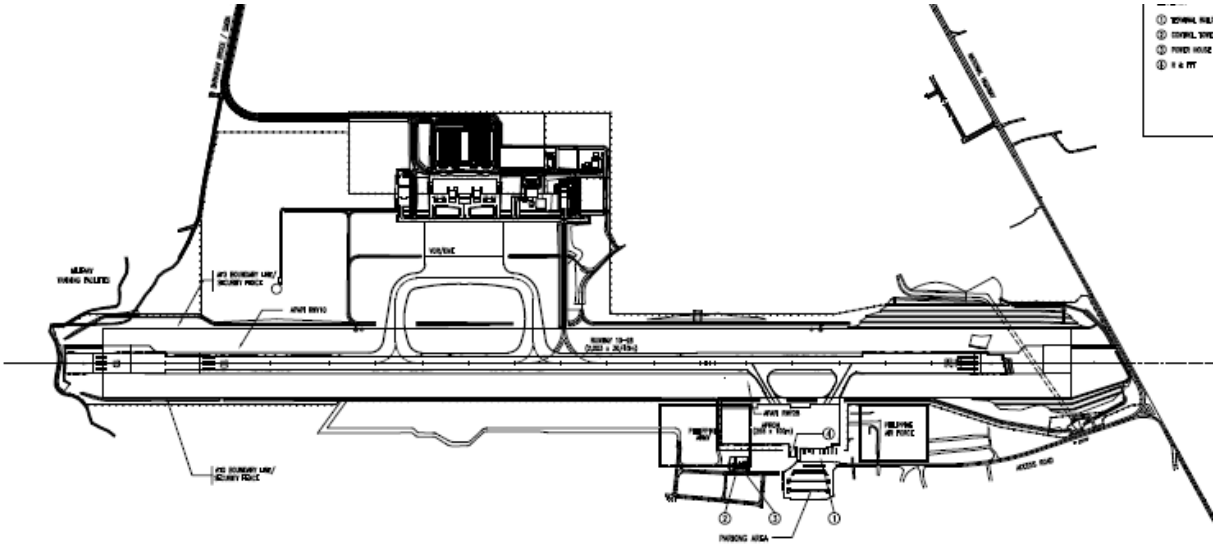


Figure 16 Polloc Port Development Plan by 2022



Source: ADB.

Figure 17 New Terminal Area Development Plan in Cotabato Airport

(6) New Bangsamoro airport establishment project

A new Bangsamoro international airport is expected to be established as the gateway to the Region as several constraints exist for further development of the existing airport. A rice field which is located in the flat land without any hills and mountains in the municipality of Sultan Mastura near the Polloc port is likely to be a potential candidate site for the new airport.

The existing Cotabato airport still remains to have sufficient capacity on runway to accommodate A320 aircraft as the maximum capacity aircraft. The airport also has essential capacity on terminal facilities to accommodate a single A320 aircraft at one time. On the other hand, it is considered that it is not easy to increase the frequency of the flights between Manila and Cotabato City due to the congested slot coordination at NAIA even if the traffic demand increases in the near future. In consideration of these situations, how to ensure the viability of the new airport development should be carefully examined in advance of discussing selection of candidate sites.

5.3.3 Comprehensive urban development program

(1) Greater Cotabato City urban infrastructure development project*

Cotabato City is assessed as one of Tier I cities in Mindanao as examined by the urban hierarchical analysis. As compared to other Tier I cities, Cotabato City has the smallest population, although the population growth was highest of all the Tier I cities in Mindanao. It is classified as the 3rd income city, and only city at Tier I not classified as highly urbanized cities.

Cotabato City is expected to serve as the regional capital of Bangsamoro due to its location, largest population of all the urban center in Bangsamoro, and the presence of major port and airport facilities nearby. Its urban functions should be much strengthened to serve the expected functions. As the high population growth is expected to continue, the capacity of urban infrastructure needs to be continually expanded. Moreover, Cotabato should be equipped with some higher order urban functions such as commercial and financial center of Bangsamoro, export base, advanced research and education and some specialized health care.

To satisfy these conditions, Cotabato City should develop more appropriate physical structure and its urbanized area should be much expanded to accommodate a variety of functions and facilities. For this purpose, the urban area of Cotabato City should be effectively expanded including surrounding areas. This does not necessarily mean that the jurisdiction of the City should be expanded, but proper administrative structure may be introduced for better urban management of this Cotabato metropolitan area in cooperation with the neighboring municipalities.

As the first step to upgrade urban functions and facilities of Cotabato City, an urban development master plan should be prepared for the Cotabato metropolitan area to be defined. The plan should clarify the physical structure of the area including artery and sub-artery road network and macro zoning of land use, and socio-economic framework including population projection and expected functions to be strengthened. Within the structure and the framework, infrastructure and utilities such as city roads, water supply, sewerage, electricity, solid waste management and logistic infrastructure should be planned. The Polloc port upgrading with a free port and economic development and a new Bangsamoro international airport should be examined and their stage wise development plans should be formulated.

(2) Jolo and Bongao urban functions upgrading project*

While the mainland portion of Bangsamoro is reasonably well covered by urban centers at higher tier as analyzed by the urban hierarchical analysis reported in the sub-section 4.2.1, the island provinces are poorly represented by higher order urban centers. In Basilan, Isabela City is ranked at Tier II, but Sulu and Tawi-Tawi have only Tier III urban centers. Urban functions of Jolo in Sulu Province and Bongao in Tawi-Tawi Province should be improved to upgrade these urban centers to Tier II, respectively.

To upgrade Jolo and Bongao, development of livelihood and economic activities in the respective provinces as a whole is necessary. This should be supported by integration of the respective territories by improvement of road network on the main islands and port facilities and links with island municipalities. Water supply and electricity should also be improved with expanded areal coverage. Specific projects to realize these are proposed under different projects, but institutional support should also be introduced by the project. Possibility to provide a package of support measures in the form of special economic zone should be examined in the subsequent stage.

(3) Urban hierarchy establishment project

Acceleration of urbanization is inevitable in Bangsamoro as economy develops under improved peace and order conditions throughout the Region. Provision of much improved urban services is indispensable to support the Bangsamoro development. To realize this with limited development resources particularly in the public sector, establishment of clear urban hierarchy is necessary. A desirable urban hierarchical system will be examined in the subsequent stage, but Isabela City, Marawi City and Lamitan City are among the urban centers to be strengthened.

5.3.4 Irrigated paddy development program

(1) Bangsamoro national irrigation systems (NISs) improvement project

Through irrigation development, cropping intensity is significantly increased by two cropping or even three cropping of paddy is possible in one year. In Bangsamoro, paddy crop intensity in irrigated areas is currently 127%. Only 49% of the total service area under eight national irrigation system (NISs) in Bangsamoro is operational. This is after the National Irrigation Administration (NIA) has firmed up the irrigation service area of the eight NISs. There is a dire need to put in place a project to rehabilitate the eight irrigation systems. The project will include restoration of areas that could not be served due to unserviceable facilities, and development of extension or new areas that could be supplied with irrigation water from the same diversion dam. Diversion dams may also be rehabilitated to restore the physical integrity of the structure. Concrete lining of main canals, laterals and major farm ditches will be undertaken to minimize losses along the distribution system.

(2) Communal irrigation systems (CISs) support project*

Communal irrigation system (CIS) is defined by the National Irrigation Administration as an irrigation system with smaller than 1,000 ha service area in contrast with NISs with more than 1,000 ha service area. Unlike the NISs, the operation and maintenance of CISs are under the irrigators' associations (IAs). Due to the inability of the IAs to finance repairs of canals and structures, CISs have deteriorated resulting to decrease in irrigated area. At present, areas served by CISs in Bangsamoro are only 34% out of the 12,215 ha total service area firmed up by NIA in 2013. Major repairs are needed to restore these portions of the service areas and be irrigated again.

Besides existing CISs, some 110,900 ha was identified and estimated by NIA as potential for irrigation development in 2013. During this year, rain-fed paddy harvested area was 168,000 ha, which had an average productivity of about 1.0ton/ha smaller than irrigated areas. If these areas are irrigated, it would add tremendously to production by way of increased productivity and doubling the cropping intensity, thus contributing to higher rice sufficiency and farmers' income. According to the NIA-Corporate Planning Office, most of the areas for irrigation development in the Bangsamoro area could fit as communal or small scale irrigation projects since there no contiguous areas of more than 1,000 ha identified anymore.

The project would include rehabilitation of existing CISs to restore previously irrigated areas and development of extension areas and construction of new CISs. The activities of the project will include the following:

1) Reconnaissance/field survey to identify projects,
2) Prioritization of project proposals,
3) Detailed designing and construction of the project facilities, and
4) IA organizing and strengthening

5.3.5 Economic corridor development program

(1) Bangsamoro economic corridor development project*

Three potential economic corridors have been identified in the sub-section 4.2.2. The Cotabato City–Valencia City–Cagayan de Oro City might serve as an alternative route for the Northern Corridor. The outlines of these identified logistics corridors are indicated Table 10 and Table 11.

Accumulation of economic activities along the corridor both attracts and generates freight and passenger traffic (Figure 18). Attracting investment, in turn, largely depends on ability to provide appropriate infrastructure and policies to facilitate movement of people and freight. Thus the following will be pursued.

1) Strengthening of the three identified corridors by upgrading of pavement and widening of lane. This strategy supports strengthening of linkages among major urban areas as well as linkages between indigenous industries and export industries to ports and airports.

2) Improvement of logistics corridors by strengthening links to agricultural areas and primary processing plants.

Of the three proposed corridors, the Northern Corridor has the poorest geometric alignment and pavement condition. A survey carried out by the JICA Study Team using Dynamic Response Intelligent Monitoring System (DRIMS) from February 2015 to October 2015 reveals that at least 13 km requires immediate repair. The immediate actions to be taken therefore are

i) Rehabilitation/reconstruction of 13.7 km road sections with pavement in bad condition, which will cost about PHP 372.8 million; and

ii) Carrying out a feasibility study/preparatory survey for strengthening of corridors with the objective of improving road alignment, repair/replacement of bridges in poor condition and identify sections to widen.

Table 10 Key Components of Three Logistics Corridors

Corridor	Trunk road			Port	Airport
	from	via	to		
a. Northern Corridor	Cotabato City	Marawi City	Cagayan de Oro City	Macabalan Port and Mindanao container terminal	Laguindingan International Airport
Northern Corridor (Alt)	Cotabato City	Valenci City	Cagayan de Oro City	Macabalan Port and Mindanao container terminal	Laguindingan International Airport
b. Central Corridor	Cotabato City	Kidapawan	Davao City	Sasa Port	Davao International Airport
c. Southern Corridor	Cotabato City	Koronadal	Gen. Santos City	Makar Wharf	Gen. Santos International Airport

Table 11 Characteristics of Existing Roads in Proposed Corridors

Corridor	Road	Road length (km)		Number of lanes (km)				Total (km)
		Bangsamoro	Outside Bangsamoro	Bangsamoro		Outside Bangsamoro		
				2	≥ 4	2	≥ 4	
Northern Corridor	Cotabato–Marawi–Iligan–Cagayan de Oro	157.30	115.38	157.30	-	100.00	15.38	272.68
Central Corridor	Cotabato–Kidapawan–Digos–Davao	31.43	194.74	31.43	-	148.20	46.54	226.17
Southern Corridor	Cotabato–Koronadal–Gen. Santos	73.96	126.06	73.96	-	43.49	82.57	200.02
	Total	262.69	436.18	262.69	-	291.69	144.49	698.87

(2) Corridor link roads improvement project

The corridor link roads improvement project intends to provide roads with high degree of access to communities and potential development areas. Likewise, these roads are necessary to give shape to the network which would lead to rational distribution of traffic. Most of the works involved upgrading of existing gravel roads into paved roads. Road surface upgrading involves 478.3 km of road length and new road construction involves 93.2 km of road length. A road length of 120.5 km also needs reconstruction as the pavement deteriorated to the level of the *bad* category.

(3) Polloc free port and ecozone development project*

For Bangsamoro to realize its high development potentials by utilizing strategic position as well as rich indigenous resources, Cotabato City should be developed as the regional capital equipped with major port and airport facilities nearby. In particular, as Bangsamoro is expected to pursue outward oriented development, strong economic corridors should be established encompassing main primary production areas linked to processing centers and export terminals. The existing Polloc port with upgrading should continue to serve as the export terminal for Bangsamoro.

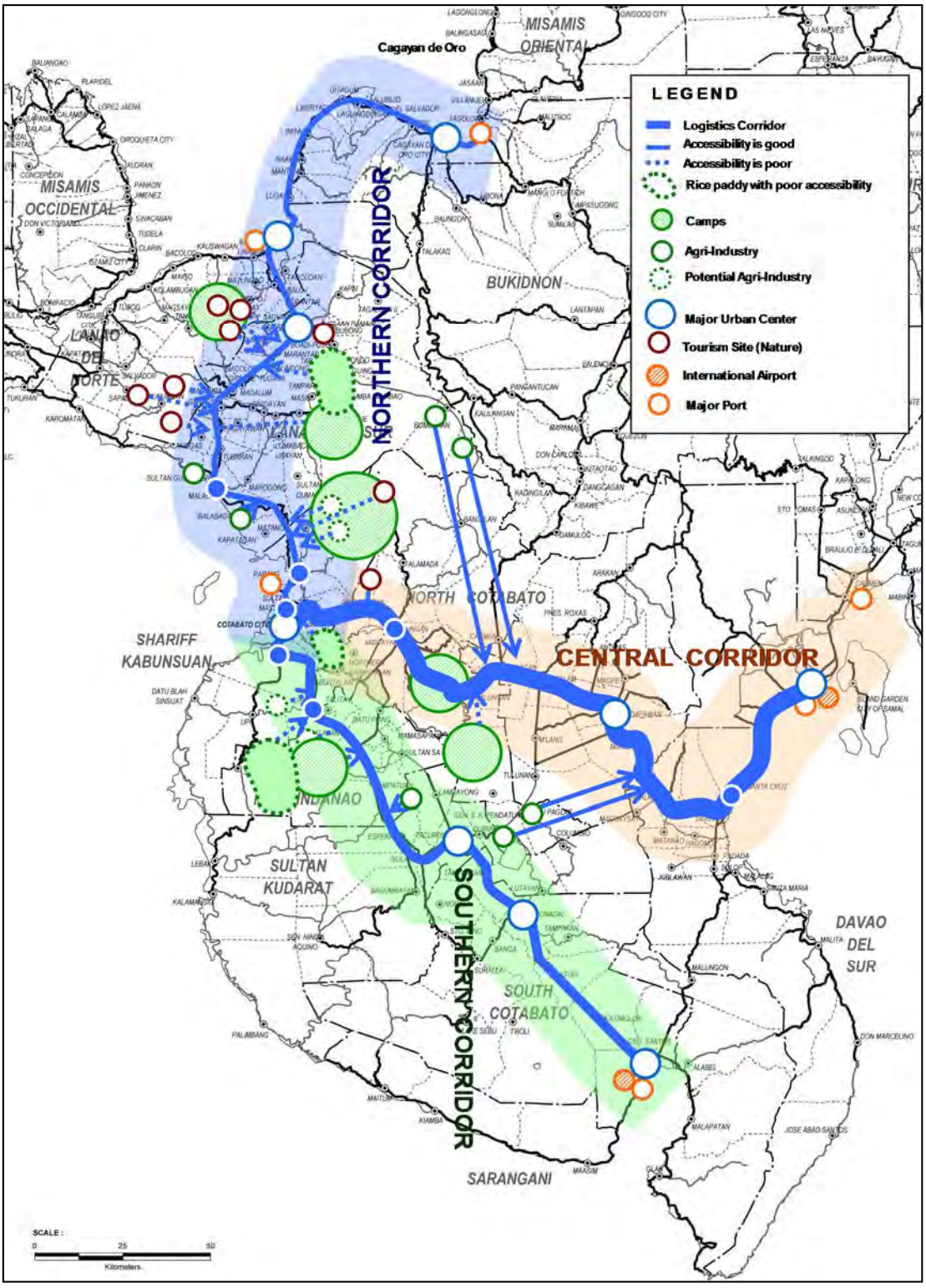


Figure 18 Locations of Logistics Corridors and Some of Region's Resources

Terminal facilities and functions of the Polloc port should be much strengthened by activating the Polloc free port and ecozone. This includes not only the improvement of existing port facilities as proposed but also the provision of logistic facilities in the immediate hinterland of the port. The area of the Polloc free port and ecozone should be expanded to accommodate sufficient warehouse and container yard spaces as well as an ecozone for export oriented and other industries. A stage wise development plan should be prepared in the subsequent stage.

(4) Special employment zone development project*

Employment rules and office regulations in the Philippines are complicated, and many companies feel that it is impossible to comply with them. In the Bangsamoro development, the labor regulations of the Philippines should be simplified and also a more flexible wage-setting mechanism should be formulated and applied. It is important for the Bangsamoro government to assess the relevance of national laws for the Region. Labor protection and wage setting should also consider the culture and the traditions of the people, and businesses should be aware of the possible differences from the rest of the Philippines.

The Bangsamoro government should prepare a humane employee administration district or area where employment insurance, social security, and other provisions for desirable employee protection are practiced. This may be called a special employment zone or a version of special economic zone. Under this administration, the private sector can undertake the construction of the industrial employment zone and introduce its own rules on workforce, including the import of foreign technical labor. As a result, these areas can achieve the highest level of labor supply.

By allowing this, the areas with an industrial employment zone could become a hub of high-level industrial human resource supply. In other words, the special employment zone to be established by the private sector serves as a certain training center. In the scenario envisioned by this Project, employees in the SEZ can develop knowledge and skills while working.

If a time-bound legislation is introduced for special employment zones is established, exempting locators from applying regular rules implemented elsewhere in the Philippines by using the simplified employee regulation/rules and wage setting processes, investing to special employment zones in Bangsamoro will become more attractive for investors than any other incentives and assurance systems offered in other regular SEZs.

The proposed project concepts may be applied widely to special economic zones, small and large, throughout Bangsamoro, but especially to those in island provinces of Basilan, Sulu, and Tawi-Tawi (BaSulTa). An ecozone in each island province should be developed with specific characteristics reflecting the resources and advantages of the respective provinces. Basilan may be specialized in selected agro-processing based on rubber, cacao, oil palm and abaca and aqua-processing based on lobster, crab, seaweed and abalone. Sulu may be specialized in processing of marine products. Service oriented ecozone may be suitable for Tawi-Tawi based on tourism and trade with the BIMP-EAGA countries.

5.4 Alternative Socio-economy Promotion Initiative

5.4.1 Agro-based industrial clusters development program

(1) Abaca industrial cluster development project*

Abaca fiber is processed into a variety of forms for industrial purposes such as pulps for paper-based fabrics (e.g., banknotes, teabags, napkins, etc.) and blended fibers for handicrafts (handbags, clothes, and ropes). The Industry Cluster Component (being implemented until 2016) of the JICA/DTI-ARMM's Comprehensive Capacity Development Project that is currently developing and promoting an abaca industry cluster in Lanao del Sur, provided a fund for the first abaca nursery in Mindanao.

The proposed project, which will succeed the above-mentioned JICA/DTI-ARMM's project, will be composed initially of two main components. The first component will be the dissemination of the proper fiber extraction technology (hand-stripping, spindle-stripping and decortication) to farmers located in over 3,000 ha in Lanao del Sur in collaboration with the above-mentioned investor. This will lead to an enhancement of the quality of fibers and thus contribute to an increase in growers' incomes. Provided that in Lanao del Sur, practices of adding impurities to abaca fiber (to earn weights) by traders have been widely observed, the supervision and regulation capacity of the Fiber Industry Development Authority (FIDA), a government agency responsible for the monitoring of abaca

collection and storage, will be strengthened as the second component of the project.

A full-scale abaca industrial cluster should be developed through collaborative efforts of farmers, LGUs, and the private sector. The main participants are abaca farmers' associations, grading and baling establishment (GBE) in the private sector, the Mindanao State University (MSU) for R&D with the gene bank, the local handicraft industry, LGUs, and PhilFIDA. A possible scheme is illustrated in Figure 19.

For full scale development of the abaca industrial cluster in steps, external support should be sought for technical and financial cooperation. The support may cover the following components:

1) Provision of equipment for improved abaca fiber stripping;
2) Training for improved abaca fiber stripping techniques;
3) Production of improved abaca seedlings;
4) Products development to diversify abaca products such as handicrafts, textiles, paper and related products;
5) Market development for new abaca products; and
6) Laboratory for tissue culture to improve abaca quality further.

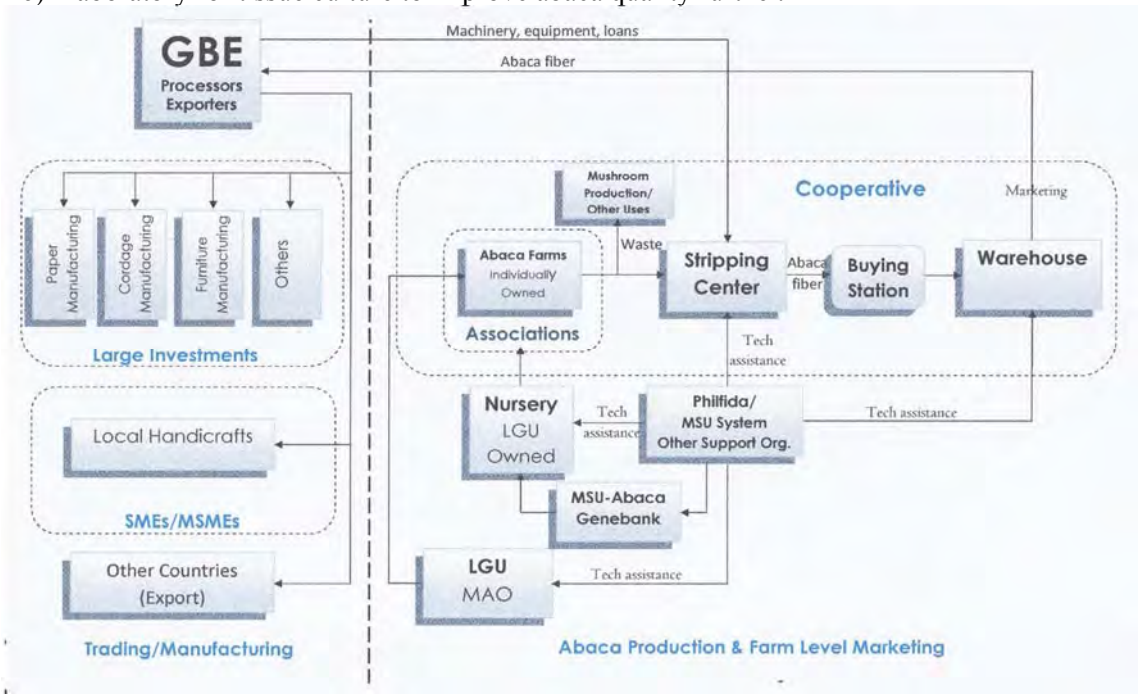


Figure 19 Possible Abaca Industrial Cluster Development Scheme

(2) Coco products industrial cluster development project*

The proposed project will support the establishment of an assembly unit for processing activities in order to integrate the current inefficient processing structure by utilizing Bangsamoro's abundant and relatively cheap labor. More specifically, the project will support the installation of a decorticator with solar-powered twining and looming kits. Coconut peat and dust, a residual after extraction of fiber from a husk, can be sold to organic farmers as a soil additive or an ingredient to produce organic fertilizer.

Coconut sugar, processed from boiled saps taken from blossoms, is increasingly drawing health-conscious consumers' attention in developed countries together with its high nutrition. The coconut sugar production of the Country's largest processor located in Cotabato Province cannot meet its growing orders from Europe. Although the high purchase price of coconut sugar has recently led to an emergence of small- to medium-scale coconut sugar processors in Bangsamoro, most of their products do not meet the export standards.

The proposed project aims to encourage the forming of a cluster that produces high value coconut sugar qualified for export. Inconsistencies in quality (texture and color) of coconut sugar have been observed

in products sold in domestic markets. In order for local processors to meet the quality standards for export, a systematically controlled process needs to be set up that enables a quick collection of saps, the boiling with water and heat facilities, and the treatment after drying and packaging. As saps are taken in short cycles, the coconut sugar requires more labors in the field than usual coconut cultivation, as well as female labors in processing activities. The project will encourage farmers to purchase a processing unit equipped with a boiler, drier, packager and storage through small scale credits (i.e., Bangsamoro financing facility). This project would contribute to an increase in wage and employment through the production of a high value product.

(3) Coffee industrial cluster development project

The Robusta variety of coffee, which is used for domestic instant coffee, accounts for most of the coffee produced in Bangsamoro. The value of Arabica variety produced in Bangsamoro is not properly reflected to its prices, with Arabica being even sold mixed with Robusta. Local traders in the Philippines buy high-quality Arabica from their contracted farmers (mainly located in Mindanao) and export to the international market which has stringent quality standards.

The proposed project aims to impart production techniques of highland Arabica to farmers in Bangsamoro and establish sales channels. The project provides partner farmers with techniques for nursery, cultivation with care, post-harvest treatment, and roasting. The location of project would be selected from Wao, Bumbaran, or Buldon in Lanao del Sur with favorable conditions of altitude between 1,000 and 2,000 m and rainfall between 1,500 and 2,000 mm. The project will also endeavor to link farmers and buyers possibly through contract farming, combined with support from investors in nursery and agricultural inputs. The project will also support the forming of intermediary farmers' groups which will sell a large volume of collected beans to investors/exporters. There is a high possibility that the certification of organic coffee would lead to an increase in farmers' incomes. As a step for the international organic certificate, the project would assist farmers' groups in applying for the National Organic Agriculture Board (NOAB) which provides support and funding under the DA.

(4) Rubber industrial cluster development project

Most rubber growers in Bangsamoro are smallholders who cultivate 1.0 to 2.5 ha of rubber intercropped with fruits, such as lanzones, durians, rambutans, bananas and coconuts. There is no primary processing plant in Maguindanao; farmers sell their cup lumps of latex to traders, who then transport them to one of the rubber processing plants in Makilala of Cotabato Province (easily accessible from the production areas in other parts of SOCCSKSARGEN).

The rubber industrial cluster is composed of several sub-systems encompassing production including input, marketing and processing, and possibly export. The input sub-system includes the supplier of fertilizers, agrichemicals, labor and planting materials. The production sub-system comprises farmers, small-holders and plantation. Marketing and processing sub-system include traders and manufacturers. These sub-systems should be supported by government, industry associations, R&D institutions, financial institutions, and the logistics industry.

Post-harvest handling of rubber is a key to the improvement of farmers' incomes by improving the quality of latex. It is difficult to judge the quality of latex from its appearance once rubber is formed into cup lumps. Mixing impurities (such as sands and metals) inside the cup lumps is reported to be sometimes practiced (and rather prevalent in Bangsamoro), which makes cup lumps appear to contain highly consolidated latex (better quality) with its increased weight. Since it is too costly to introduce impurity detectors, raising farmers' awareness through DA extension services would be indispensable to quality improvement. DA's extension services should also include the utilization of high-yield seeds, better care of trees during growing periods, and the improvement of post-harvest handling.

5.4.2 Integrated farming promotion program

(1) Goat-based integrated farming project*

The incentive for intercropping is essentially economic, since this system not only provides higher gross

returns per ha but also plays an important role as an insurance against total crop loss. With the marked fluctuations and long term decline in copra and coconut oil prices, the integration of livestock and coconuts is economically increasingly attractive. Traditionally used for weed control in plantations so that coconuts could be located, cattle, sheep and goats are increasingly seen as important parts of the system. There are both advantages and disadvantages in this integration but the latter can be tempered by good practices.

Goat integrated under the coconut tree does not affect the coconut farming system in the area. Thus, crop livestock system (coconut-forages-goat) is an answer to the scarce supply of good forages (grass and legume) to support the feed requirements of goats. In addition the system produces manure with the feed converted to organic fertilizer. Thus, this supports the optimal growth of pasture and coconut productivity.

The target beneficiaries of the project are cooperatives with a total consolidated coconut and other tree crop plantations area of not smaller than 100 ha and large/commercial plantations of not smaller than 100 ha. In addition to increasing the value of output per hectare of land, the project is intended to create impact by drastically increasing the availability of goat meat and dairy products in Bangsamoro. In order to achieve these goals, the project shall have the following components.

1) Research and development

   Although, there have been sighting of goats raised under permanent crops such as coconuts, large scale production needs a well-designed farm system that will ensure the success of the project. Constraints and disadvantages can be managed through technology intervention. R&D, which may be done by MSU and the University of Southern Mindanao (USM) will develop site-specific farming systems for integration of goat production to coconut, rubber and fruit tree plantations. The farming systems would take in consideration the production of compatible forage crops within the plantation to provide for feeds. It should also ensure that productivity of the permanent crops is not adversely affected. Farming systems will also be designed for halal goat production.

2) Financing

   The project will include a financial package to eligible project proponents. This financing package will be designed to answer the need for initial investment requirements and working capital. Financing will be implemented as a loan program administered by the Land Bank of the Philippines and the Development Bank of the Philippines.

3) Promotion

   The agriculture agency of Bangsamoro will establish an information drive for the project. Model farms or small-scale farms may be established for better appreciation of target project participants.

4) Market assistance

   Since the project is directed towards commercial production, there is a need to create markets not only in Bangsamoro but nationwide and even export. Hence, the project would include a market development assistance component that would respond to the need of the project participants.

(2) Poultry-based integrated farming project

Poultry could also be raised in an integrated farming systems as in the case of rice-duck farming system already practiced. Rice/duck integration makes a symbiotic relationship good for land efficiency. Raising ducks entail having ponds of water being part of their natural habitat. Ponds can be replaced by the rice fields, which are watery for most of the growing period of rice plant and a period during land preparation.

Rice paddies all over the Philippines are so infested with snails that destroy rice at the growth stage. Ducks eat snails, which provide protein and other nutrients so that they provide a natural pest control

measure. Duck droppings can be used as fertilizer for rice paddies. For commercial scale production, the farming system will have to be designed for entire requirements of ducks and rice from the knowledge that rice farming will necessarily have to be on dry land for a period while ducks will continually need water to swim.

Native chickens can also be raised in orchards like mango farms. Chickens naturally ward off insects in the mango farm as they graze on grasses and feed on insects that hide under the grasses. Mango farms are regularly sprayed with pesticides but there are experiences that showed chickens are not affected. In mango farms in South Cotabato, regular spraying of chemical pesticides is practiced but no injury has ever been detected on the chickens in the farms. In other mango farms, chickens feast on the insects dropping immediately after spraying without any symptom of poisoning. The orchard/native chicken integration is appropriate for Bangsamoro condition since the market prefer native chicken and farmers are more attuned to this culture.

In order to achieve these goals, the project shall have the following components: 1) technical assistance, 2) financing, and 3) promotion.

5.4.3 Mixed farming diversification program

(1) Plantation crops mixed farming project

According to the survey conducted by the Philippine Coconut Authority (PCA) in 2012, the total area planted to coconut in Bangsamoro is 348,417.8 ha. This total is well-distributed among the five provinces of Maguindanao and Lanao del Sur in mainland Mindanao and the island provinces of Basilan, Sulu and Tawi-Tawi. Rubber plantation areas are about 13,000 ha mostly in Basilan. Some coconut planted areas are already intercropped with native varieties of banana, fruit trees or corn. Some instances of coconut intercropping with sugarcane have been observed.

In terms of value of production, coconut, coffee and corn generate the lowest value per hectare out of the top 10 crops of Bangsamoro. In order to increase farmers' income per hectare of land, these crops should be integrated with other crops of higher value creating a mixed cropping system. Mixed cropping systems give farmers security in income since plantation crops are traded commodities subject to fluctuation of prices.

This project will consist of a package of assistance including technology and financing and product marketing for participating farms. It will be implemented by a consortium consisting of the following:

1) Bangsamoro's Department of Agriculture as lead agency,
2) USM or other appropriate schools of the State Universities and Colleges (SUCs) to develop site-specific mixed farming systems,
3) The Land Bank of the Philippines (LBP) for financing with a low-cost to no-cost loans for participating farms, and
4) Agriculture Marketing Assistance Division of the Department of Agriculture to identify markets for new products.

(2) Mixed field crops farming project*

Mixed cropping, also known as inter-cropping or co-cultivation, is a type of agriculture that involves planting two or more of plants simultaneously in the same field. It is often perceived as a viable tool to increase on-farm biodiversity in organic agriculture and is a potentially important component of any sustainable cropping system. Possible benefits of mixed cropping are improvement of soil fertility management, keeping down weeds and insect pests, resisting climate extremes (wet, dry, hot, cold), and suppressing plant diseases. All these are expected to lead to increase in overall productivity and to the use of scarce resources to the fullest degree.

There are such farm systems that take the most of benefits from combination of crops. The classic example of mixed cropping is the combination of corn, beans and squash. All three seeds are planted in the same hole. Corn provides a stalk for the beans to climb on, the beans are nutrient-rich to offset that taken out by the corn, and the squash grows low to the ground to keep weeds down and water from

evaporating from the soil in the heat.

Another farm system is called relay cropping best explained in the case of tomatoes and bitter gourd planted in the same plot. Tomatoes are planted ahead and bitter gourd planted as soon as tomatoes are in the flowering stage. This timing allows harvesting period for tomatoes before the vine of bitter gourd climbs up to the trellis and deprive tomatoes with sunlight when harvest is over. In a few weeks, harvesting of bitter gourd starts.

The choice of crops will have to consider the market as well. Thus, the project will entail a research, development, and extension (RDE) component especially for coming up with various crop cultures and farm systems suitable for Bangsamoro. Agronomists studying mixed crops have had mixed results determining if yield differences can be achieved with mixed versus monoculture crops. If a combination of say, wheat and chickpeas works in one part of the world, it might not work in another. However, overall it appears that measurably good effects result, when the right combination of crops is cropped together.

(3) Open pollinated seed production center establishment*

Mixed farming is a method to increase agricultural productivity without depending on expansion of agricultural land, but its effectiveness depends on productivity of selected crops to be combined. Bangsamoro has already well diversified crops that fit to local conditions, but the production increase of best crop varieties is constrained by availability of seed. Also, further research is required to develop varieties to produce quality products.

SUCs play key role in the provision of research, development, and extension (RDE) services for the growth of the agriculture sector in the Philippines. Along with instruction, they are tasked to undertake research and development. Fortunately, Bangsamoro has rich resources for agricultural research and development, which should be utilized to enhance the key sector of the Bangsamoro economy.

MSU is the only university in the Philippines with a special mandate of integrating the cultural communities, especially the Muslims into the mainstream of the nation's socio-cultural and political life. It has multi-regional service areas. Its 11 collegiate campuses are located in eight provinces and four out of the six regions in Mindanao. Of the 11 campuses, five are located in the Bangsamoro region; the main campus and MSU-Lanao National College of Arts and Trades (LNCAT) in Marawi City, MSU-Maguindanao in Dalican, MSU-Sulu in Jolo, and MSU Tawi-Tawi in Bongao. Each of the campuses including those in other regions offers courses in agriculture and fisheries.

USM has a research function geared towards discovery and expansion of science knowledge and development of appropriate technologies for its clientele through collaborative and interdisciplinary R&D activities. The USM Research and Development Office (USM-RDO) coordinates all research activities in the university, establish research priority areas consistent with the priority areas of the region and the national government, evaluate research proposals and endorse to funding by USM and other agencies. USM operates two national research centers: the USM Agricultural Research Center (USMARC) for corn and fruits, and the Philippine Industrial Crops Research Institute (PICRI) for rubber, cacao, coffee, spices and essential oil-bearing crops, fiber crops, oil crops, and other industrial crops.

These existing universities and research centers should be utilized to support the production of quality seed and development of crop varieties best suited to local conditions in Bangsamoro. Specifically, an open pollinated seed production center should be established with collaborative efforts of the existing agricultural institutes including MSU and USM. A seed bank may be attached to the center to fill in the seasonal and locational gaps in seed supply throughout Bangsamoro.

5.4.4 Innovative production and distribution program

(1) Halal industry promotion project*

To promote the halal products industry in the Bangsamoro region, it is necessary to create a promotion center for controlling halal certification and quality of local food products under the Bangsamoro government. The project will establish Halal Industry Promotion Center (Component 1) at a proper place

and train local officials to be able to certify local food products properly (Component 2).

Component 1: Establishment of halal industry promotion center (HIPC)

The HIPC will be equipped with a halal-certified laboratory, hygiene control laboratory, and a food-processing experimental factory. The halal-certified laboratory is where ingredients and nutritional composition of food products are analyzed. The hygiene control laboratory is for quality control of local food products. At the food-processing experimental factory, new local agro-fish foods in the region are developed. The factor will also serve as a training facility for food-processing.

The HIPC should be established as a financially and administratively autonomous entity to be operated by the private sector involving the local Chamber of Commerce and Industry, LGUs, and universities under the supervision of the Bangsamoro government. To make it financially autonomous, fees for halal certification, laboratory tests, entrusted processing, and other works should be properly determined and managed. The HIPC may operate a mobile halal food production techno-clinic as part of agricultural extension efforts.

Component 2: Technical cooperation on food quality analysis and local food-processing development

The project will train the research staff engaged in the HIPC to enable to analyze local food quality and hygiene condition and develop new processing foods by local materials. Finally, the HIPC will have the capacity to issue food security certificates as well as halal certificates.

(2) Organic agriculture promotion project

Organic farming is expected to ensure and cumulatively condition and enrich the soil fertility, increase farm productivity, reduce pollution and destruction of the environment, prevent depletion of natural resources and protect the health of the farmers and of the general public. Moreover, organic agriculture provides an opportunity for the Country's organically grown commodities enter the world market, which has the total value worth US$40 billion to US$70 billion in 2012. The Country is set to go all natural in agriculture through Republic Act 10068 that aims to strengthen the state's policy to promote, propagate, develop further and implement the practice of organic agriculture.

The tedious task plus its high production costs has discouraged farmers to shift into organic farming. *Going organic* involves a considerable amount of investment and time. First, the soil must first be analyzed for rehabilitation to determine the exact nutrients needed and other recommendations for soil improvement. Second, land preparation should eliminate the use of herbicides and instead adopt using the grass cutter or manual pruning to plow and pulverize the soil and prevent grass from growing. Third, soil should be reconditioned by using vermin-casts or composts using earthworms to let the garden rest for at least a month from the chemicals. Certifying bodies should check that seedlings/seeds are totally free of synthetic inputs and other inputs totally free from chemicals.

Marketing needs to raise consumer awareness. There is much to be gained in enhancing the labeling, standards and certification of organic products and byproducts to sustain ecological agriculture. With a concrete labeling system with clear government check mechanism for the validity of labels, the promotion of organic products and byproducts would boost trading system that would benefit more consumers and producers. This means developing labels and standards that range from organic, semi-organic, organically grown, naturally farmed, pesticide free or less chemicals. Appropriate labels will provide consumers appropriate food information and proper guidance. Likewise, certification processes should be attuned to the interest of small farmers to make it more economical to go into organic farming.

Since the project objective is to increase the number of farmers adopting organic farming, the project will have three components: training program, model farms, and marketing. The project will be implemented through a consortium consisting of the Department of Agriculture and Fisheries (DAF), the Agricultural Training Institute (ATI), SUCs, and LBP. DAF will be the lead implementing agency, ATI will undertake the training component. SUCs will provide technical expertise in designing and providing technology and technical assistance to organic farms. LBP will undertake the credit component.

(3) Open market establishment project*

The Bangsamoro area already hosts a number of agri-business corporations like La Frutera in Datu Paglas, and Agumil in Buluan, both in Maguindanao, BJ Coconut Oil Mill in Indanan Sulu and Mt. Kalatungan in Bumbaran and Matling in Malabang, both in Lanao del Sur. With further opening up of the Region to investments, more businesses will be established. Like the ones that are already established, the Region is likely to attract more agri-businesses like plantations and agro-processing companies, which will naturally be places where people would congregate. First, these companies will employ hundreds to thousands of workers because agro-industries are labor-intensive. Second, the up-stream and down-stream industries that will be created by the companies will add more people in the area.

For the farmers to continue planting, a market infrastructure should be provided for them where they can bring their produce for the people/consumers who can buy directly. These are farmers' markets and are already common in developed countries because small farmers are given space to sell their products at good prices directly to consumers who benefit from fresh produce and lower prices because one layer of agricultural production distribution (brokers) is eliminated. Locally, these are also practiced in Makati as the weekend market.

The project will entail cooperation of the large companies locating in Bangsamoro to be facilitated by the regional government and DAF. A company may provide the site and infrastructure as its corporate social responsibility (CSR) project, which would provide them tax credits or tax exemptions. Operation and maintenance of the market may be a shared responsibility of DAF and the company particularly on peace and order, upkeep of the facilities and policing the participants in the market. It will have established rules on qualification of farmer/sellers and basic rules of conduct, e.g., management of market wastes. The project will allow farmers to undertake more market oriented production.

5.4.5 Fishery products processing and distribution program

(1) Cold chain facilities installation project*

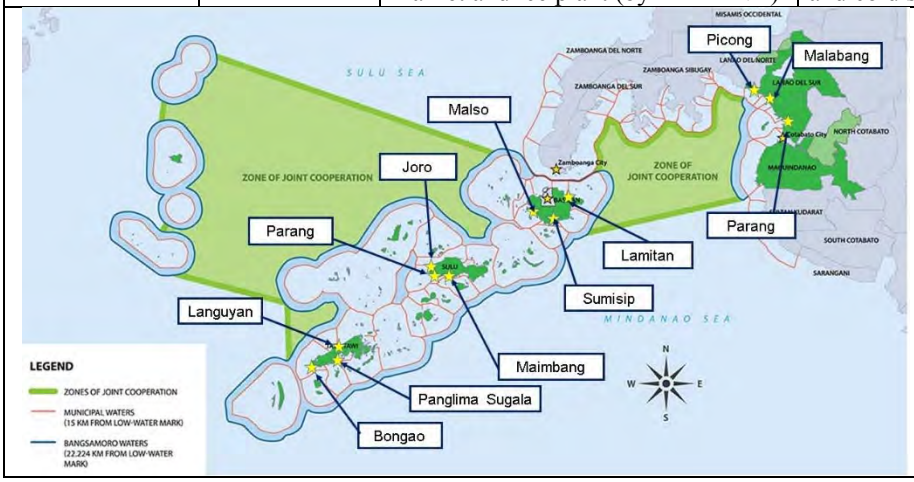
Due to lack of cold chain facilities and system, the majority of local fish caught in the Bangsamoro region cannot be distributed to outside markets as fresh and frozen products. At present, most of locally produced fish is processed to salted and dried fish. By establishing cold chain facilities, a large amount of locally produced fish can be distributed to outside markets and processing factories as fresh and frozen fish.

The project will install cold storages and ice making plants at major fish ports to increase the distribution capacity of fresh and frozen fish. Present conditions of major fishing ports and fish landing sites in Bangsamoro and measures necessary to renovate them are summarized in Table 12.

Table 12 Present Conditions of Major Fishing Ports and Fish Landing Places in Bangsamoro and Necessary Measures

Province	Municipality	Present Condition (2015)	Necessary Measure
Maguindanao	Parang	Landing pier and fish market (by USAID)	Renovation of fish landing facility and installation of ice plant and cold storage
Lanao del Sur	Malabang	Small fish landing hut (by ARMM social fund)	Construction of new fish landing complex with ice plant
	Picong	Small landing pier (by Municipal LGU)	Construction of new fish landing complex with ice plant
Basilan	Lamitan	Under-construction of fish landing, market and ice plant (by PFDA)	Introduction of additional ice plant and cold storage
	Malso	Fish landing and market (by PFDA)	Renovation of fish landing and cold chain facilities

Province	Municipality	Present Condition (2015)	Necessary Measure
	Sumsip	Under-construction of fish landing and market (by PFDA)	Renovation of fish landing facility and installation of ice plant and cold storage
Sulu	Joro	Old fish landing and market (by Provincial LGU), and ice plant (by BFAR)	Renovation of fish landing facility and installation of additional ice plant and cold storage
	Mainbang	Fish landing, market and ice plant (by Municipal LGU)	Installation of additional ice plant and cold storage
	Parang	Under-construction of fish landing, market and ice plant (by PFDA)	Installation of additional ice plant and cold storage
Tawi-Tawi	Bongao	Old fish landing and market (by Provincial LGU) and ice plant (by private)	Renovation of fish landing facility and installation of additional ice plant and cold storage
	Pangila Sugama	Under-construction of fish landing, market and ice plant (by PFDA)	Installation of additional ice plant and cold storage
	Languyan	Under-construction of fish landing, market and ice plant (by PAMANA)	Installation of additional ice plant and cold storage



Major fishing ports or fish landing places for renovation and expansion of cold chain facilities for local fish products in the Bangsamoro region.

(2) Solar-powered fish market development project

The project will install small-scale fish market facilities at local fish landing sites as local focal points of fish distribution to major fishing ports above-mentioned. In principal, a fish market facility will be established at each coastal municipality. Due to lack of public electricity supply in rural areas, a solar power unit should be installed to operate small cold storages for temporal preservation of fresh fish and ice making. Local fisher associations and cooperatives will also be organized to manage the fish market facilities and the solar-powered cold storages. The fish market facilities can be also utilized for fish processing activities at local communities.

5.4.6 Aquaculture development program

(1) Fresh water aquaculture development project

<u>Component 1: Establishment and renovation of freshwater fish and prawn hatcheries</u>

To produce and supply a sufficient amount of freshwater fish and prawn seeds, local freshwater aquaculture centers should be established in target areas. The two existing freshwater fish hatcheries operated by the Bureau of Fisheries Aquatic Resources (BFAR)-ARMM (Datu Odin Sinsuat in Maguindanao and Marantaro in Lanao del Sur) will be renovated to increase the capacity of fish seed production. Additionally, a new freshwater fish hatchery should be also established in the eastern side of Lake Lanao. Masui is a proper site of a new freshwater fish hatchery. The hatcheries of freshwater prawn should be established at coastal areas, because, sea water is necessary to produce the prawn seeds. The coastal areas of Datu Odin Sinsuat in Maguindanao and Malabang in Lanao del Sur are the proper places for the construction of prawn hatcheries. These freshwater prawn hatcheries can be utilized for

seed production of brackish-water species, such milkfish or mud crab.

Component 2: Technical cooperation and extension of freshwater fish and prawn culture

The technical cooperation project for the extension of freshwater aquaculture will be carried out in collaboration with local academic resources such as MSU at Maguindanao and Naawan, which has the Faculty of Fisheries. The project will train Bangsamoro government and LGUs' officials and local community leaders for extension personnel, and create the extension structure and system on freshwater aquaculture development in the Region. Additionally, the project will also introduce and advise the processing activities of tilapia and freshwater prawn to be marketed at outside market. Especially, tilapia filet is a lucrative commodity to be exported to overseas market.

(2) Marine culture development project*

Component 1: Establishment and renovation of multi-purpose marine hatcheries

In order to produce and supply a sufficient amount of fish, abalone, and sea cucumber seeds, a multi-purpose marine hatchery should be established in each island province. At present, BFAR-ARMM has only one multi-purpose marine hatchery at Lato-Lato, Bongao in Tawi-Tawi to produce grouper and abalone seeds. The facilities and equipment of the existing marine hatchery will be renovated to increase the capacity of seed production and handle other species for seed production. The similar marine multi-purpose hatcheries should be also established in other island provinces, Sulu and Basilan. Jolo in Sulu and Lamitan in Basilan may be the proper sites of new marine hatcheries in collaboration of Mindanao State University at Sulu and Basilan. Potential species for marine aquaculture are described in Table 13.

Table 13 Potential Species for Marine Aquaculture in Bangsamoro

Grouper	Grouper is one of most high-valued fish at local and regional markets. Many local people have already started cage culture of groupers at coastal areas; however, they collect and grow their wild seeds. The collection of wild seeds affects the grouper natural stock seriously. At present, the BFAR-ARMM Tawi-Tawi Hatchery is able to produce only green grouper (*Epinephelus coioides*) seeds artificially.
Abalone	Local abalone (*Haliotis asinine*) is a high-valued shellfish at local and regional markets. Even though the BFAR-ARMM Tawi-Tawi Hatchery is able to produce abalone seeds regularly, its culture skill has not been extended well in island provinces. Only small numbers of local people conduct abalone culture in cage. There is a difficulty in harvesting a sufficient amount of naturally grown seaweed for feeding abalone (*Gracilaria spp.*) in island provinces.
Sea Cucumber	Recently, a lot of trials and pilot projects of sea cucumber propagation have been conducted in the Philippines. In terms of a local species of sea cucumber (*Holuthuria scabra*), the artificial technique of seed production has been already established. In case of sea cucumber, the seeds are ranched at protected areas, and naturally propagated under a monitoring and surveillance by local communities.

Component 2: Technical cooperation and extension of marine culture

The technical cooperation project for local extension of marine culture will be carried out in collaboration with the Faculty of Fisheries at Mindanao State University at Tawi-Tawi, Sulu, and Basilan. The project will introduce and develop the seed production methods of high-value marine species such as grouper, abalone, and sea cucumber, and train Bangsamoro officials and local community leaders for extension personnel to create the extension structure and system on marine culture in the Region. Additionally, the project will also introduce and develop the processing activities of abalone and sea cucumber to be marketed at outside market. Especially, dried abalone and sea cucumber are lucrative commodities to be exported to overseas market.

(3) Seaweed culture development project

Component 1: Installation of sun-dryer's platforms and dried seaweed storages at potential areas

In order to increase the seaweed production and improve the quality of dried seaweed, the sun dryer's platforms and storages of dried seaweed will be installed at the coastal areas in potential areas of seaweed. It is ideal that each seaweed grower group will manage a sun-dryer's platform on the sea and a seaweed storage at a landing site. In addition, local farmers can also culture fish and abalone in net cages under sun-dryer's platforms. Approximately, 100–200 platforms and storages for seaweed culture will be

installed at proper culture sites in each island province.

Component 2: Technical cooperation and extension of seaweed culture

A technical cooperation project for the extension of seaweed culture will be conducted in collaboration with local universities, Mindanao State University at Tawi-Tawi, Sulu, and Basilan. The project will introduce and develop seed nursing skills to maintain healthy and strong strains of seaweed for culture purpose, and train Bangsamoro government officials and local community leaders for extension personnel to make an extension structure and system on seaweed culture in the island provinces. Additionally, the project will also introduce the processing activities of dried seaweed in higher quality to be marketed to local carrageenan factories or exported to overseas. In the project, small-scale model plants of seaweed dried chips are also tried to be operated.

5.5 Enhanced Resources Management Initiative

5.5.1 Forest and watershed management program

(1) National greening program enhancement project*

The Department of Environment and Natural Resources (DENR) is promoting tree planting in the whole country under the National Greening Program (NGP). The NGP in the ARMM is covered by an agreement between DENR and ARMM with an aim of reforesting 2,500 ha in the five provinces. Some planted trees, however, do not grow very well due to lack of maintenance. Planted trees usually need maintenance work such as weeding, inspection, replacement, etc. to grow properly for the first 2-3 years. This is not usually done because of lack of personnel and budget.

Therefore, the suggested way of maintenance is to make a contract with nearby barangay for maintenance work by residents of the barangay. Usually one person can cover 4.0 ha of forest area, which costs PHP 6000 per month. If 1,000 ha will be covered each year for the whole period by the maintenance work for three years respectively, the total cost is PHP 54 million. For the NGP and other ongoing forest management agreement and rehabilitation programs, monitoring and evaluation of nurseries are important. Therefore, assignment of experts after training is proposed.

(2) Bamboo planting project

Bamboo is useful for protection from flood, erosion and landslide because it has underground stems and is deeply rooted. This can protect the river banks, lake banks, etc. Bamboo can be used to make cages, baskets or other bamboo products, after cutting. Bamboo is already planted on some banks of rivers and lakes, but more bamboo planting is recommended. Maguindanao is an area that has many rivers, and needs more extensive bamboo planting.

(3) Dimapatoy watershed management project

The Dimapatoy watershed is serving as the source of potable water for Cotabato City, Datu Odin Sinsuat and the nearby municipalities, but the water tends to suffer from shortages recently, and proper watershed management is required to solve the problem. Dimapatoy is a barangay in the province of Lanao Del Sur, located just east of Lake Lanao, with 773 residents.

Watershed reserves are designated by DENR, and one of the reserves in ARMM is Lake Lanao watershed preservation with 1,894 ha. However, persistent abuse through logging and pollution has significantly degraded its water quality of the Lake. The Dimapatoy watershed is part of the Lake Lanao watershed preservation, therefore, proper management of the Dimapatoy watershed is expected to lead to protection of Lake Lanao.

The project consists of the following activities in two phases:

Phase 1: Delineation of watershed of Dimapatoy, preparation of occupants inventory, and formulation of watershed management plan; and

Phase 2: Conduct of tree growing, and other watershed management works.

(4) Non-wood forest products research project

Attention has been drawn to non-wood forest products (NWFPs) recently. They are expected to contribute to livelihood development and poverty reduction and help prevent further forest loss and degradation. Resin, elemi gum, bamboos, rattan, and buri raffia are among the NWFPs mainly produced in the Philippines, and part of them is exported. Research on NWFPs is conducted at the Forest Products Research and Development Institute (FRPDI under DOST), and the Ecosystems Research and Development Bureau (ERDP under DENR).

However, no special activities on NWFPs are done in the ARMM, and therefore, it is required to conduct a research on NWFPs focusing on NWFPs' possibility in the ARMM as the first step for promotion. NWFPs can be incorporated into community-based forest management (CBFM).

The research may cover the following:

- Acceptability of NWFPs in view of social and natural conditions,
- Degree of NWFPs' contribution to livelihood development and forest protection,
- Proper kinds of NWFPs, if NWFPs are judged to be recommendable,
- Support measures by DENR, and
- Possibility to combine with CBFM

(5) Community-based forest management project*

A community-based forest management agreement (CBFMA) is an agreement between DENR and a registered people's organization for a period of 25 years for renewal, and for another 25 years to provide tenurial security and incentives to develop, utilize, and manage specific portions of forest lands that is under Executive Order No. 263 and DENR Administrative Order No. 96-29. DENR-ARMM has 10 agreements, but only two are active, and no reports have been submitted for all the agreements. CBFMA holders sometimes abuse the harvesting activities without development. Therefore, the CBFMA holders performance shall be monitored and evaluated annually by the composite teams from the Provincial Environment and Natural Resources Office (PENRO), the Community Environment and Natural Resources Office (CENRO), etc. to determine the compliance with the terms and conditions.

One more challenge is that no more national funds had been given to support the CBFM programs of ARMM after the creation of ARMM. Accordingly, fund is required to resume the CBFM in Bangsamoro, and possible donor support may be sought based on the results of the assessment and evaluation. The project is to implement a modified CBFM adopted to Bangsamoro, and start with the following:

- Evaluation of the 10 existing CBFMA holders performance,
- Formation of regular monitoring system, and
- Preparation of plan for resuming CBFM in Bangsamoro.

5.5.2 Marine resources management program

(1) Community based coastal resources management project*

In order to control and preserve natural resources at coastal areas properly, marine protected areas (MPAs) will be registered by the Bangsamoro government and LGUs. Basically, local communities manage the MPA activities with provincial and municipal LGUs to ensure proper monitoring and evaluation, and transparency and accountability. The project will train local community leaders and LGU officers for community-based costal resource management (CBCRM) activities, and support local communities to make their CBCRM regulations in participative ways.

The project will also introduce and develop some alternative activities for income generation to mitigate a fishing pressure at coastal areas by regular fishing activities. The eco-tourism program in MPAs is one of possible activities for income generation other than fishing. Therefore, the project will support to establish visitor centers of MPAs, and organize eco-tour programs by local communities.

BFAR promotes the establishment of mariculture parks to develop marine culture activities as alternative income sources in collaboration with coastal resource management. Referring to the success cases of mariculture parks in Mindanao (Panabo in Davao del Norte, or Balingasag in Misamis Oritenal), the project will apply the approach of mariculture park program to promote coastal resource management activities in coastal communities in the Bangsamoro region. Declaration of mariculture parks and their management may be facilitated by GIS.

(2) Marine surveillance reinforcement project

BFAR-ARMM currently conducts the training programs of illegal fishing control to organize local marine surveillance groups *Bantay Dagat* at coastal municipalities in the Bangsamoro region. However, most of local Bantay Dagat groups have only small canoes with small power engines for regular monitoring at the municipal sea areas (from coastal line to 15 km). They cannot chase and catch illegal fishing boats in spite of their regular surveillance activities. In order to strengthen the monitoring activities by local communities, the project will equip local Bantay Dagat groups in coastal municipalities with speed boats to control illegal fishing activities in their municipal sea areas. In addition, the project will support to build Bantay Dagat offices with local fish market facilities in coastal municipalities.

5.5.3 Renewable energy development program

(1) Mini hydro power development project*

Various types of surveys for development of hydropower resources are ongoing in the main island of Mindanao, while in surrounding island provinces of Bangsamoro, development studies have not been promoted much due to the security and potential risk. However, Tawi-Tawi seems to be a comparatively less risky island than other islands from hearing surveys. In the Bangsamoro Development Agency (BDA) Transitional Development Plan, the development of a mini-hydro power plant in Busay falls, Bongao, Tawi-Tawi, are designated as one of prioritized projects. In order to grow out of dependency on the diesel generation and facilitate the introduction of renewable energy resource on the islands, the development of a low-head hydro power plant in Tawi-Tawi is recommended. Three candidate sites exist on the Malum River.

Additional hydropower resources are available in the mainland as well. For instance, waterfalls exist in the municipalities of Marugong and Kapatagon, Lanao del Sur and Matanog, Baria, and Buldon, Maguindanao that can be tapped for mini hydro power generation. These power sources can supply to Camp Abubakar and its neighboring areas.

(2) Aquamarine farming with solar power pilot project

Power-sol Plastic Solar Panels, which are rust-resistant, lightweight, and easy-to-handle, are products with advanced technology developed by a Japanese manufacturer. It is innovative to apply a floating aeration system with this device to the aqua-farming and an experimental project of this system is ongoing in Dagpan, Pangasunan, financed by JICA. Developed solar panel is salinity resistant with 10 years of guarantee period, light weight (2.2 kg/unit), and flexible forming, so that it can be used as standalone electricity generating equipment at community level.

Since the Bangsamoro area is surrounded by vast sea and composed of large and small islands, it has a huge potential of realizing this business model. Furthermore, the utilization of solar power can contribute to the reduction of CO_2 emission and it is an eco-friendly system. In terms of environmental protection and business creation leading to cluster development in Bangsamoro, this project is highly effective and promising.

(3) Biomass power generation project

Fairly large area of Bangsamoro especially in rural areas has not be electrified by extending power grid and power distribution lines. There exists a program for village electrification by operating diesel generators for producing power to recharge batteries of LED lantern and lead-acid batteries for lighting,

communication, operating PCs, etc. or driving the post-harvesting equipment by diesel engine. The fuel for such diesel engines is straight vegetable oil made from beans of Jatropha that can be grown at backyard of residents, and marginal land available and suitable for growing such plants or along the village or farm roads. Jatropha can be planted along perimeters of small farm lots owned and cultivated by farmers interested in growing such oil plants.

The cost of machine and building designed to produce Jatropha seed oil (JSO) for diesel engine, battery charging and administrating business or purchase of oil beans and providing battery charging service or driving post-harvesting machines is estimated to be at about US$50,000. The house accommodating such equipment and provide battery recharging service can be called a power kiosk of which floor area can be 12 m x 4.5 m.

It is recommended to form a Jatropha cultivation farmers' association, which can be responsible for construction, operation and maintenance of power kiosks. In such a case, Jatropha growers will become the consumer of power service provided by the power kiosks. The monthly income of farmers who would cultivate and supply oil beans can be at PHP 1,500, while the monthly charge to pay to the power kiosk for power service (battery recharging) is PHP 500. Therefore, if the power kiosk system is operated and maintained properly, the power service economy generated by it would be purchased by villagers and farmers who cultivate and supply oil beans circulate within a village or barangay sustainably. Thus, an introduction of the power kiosk system will provide not only jobs and income generation opportunities but also enhances the post-harvesting processes that would add value on farm products.

The power kiosk is planned and designed to be operated in sustainable manner by those interested farmers of each village or barangay. The preliminary computation of financial return of one power kiosk is 18% and its pay-back year is six years. If the LGU will provide a long-term loan to the farmer's organization who plans and intends to operate and maintain a power kiosk such institutional financing would enhance a propagation of the power kiosk project through Bangsamoro having a problem of a lack or non-existence of electric power.

5.5.4 Small-scale irrigation program

(1) Small scale irrigated crop intensification project*

Many countries around the world have also benefited farmers from successfully implemented small scale irrigation projects. Generally, these projects' successes are accounted to effective communication with the farmer-users of the irrigation system. Consultations and involvement of the users themselves in the planning, design and implementation with reference to local information and indigenous knowledge are important. Local people, especially those that have lived in the locality for a long time can provide good baseline information validated by historical data, if any. Choice of technology should consider the capacity of the beneficiaries to operate equipment on their own. The need to introduce irrigation technology that is commensurate with the capacity of the final users of irrigation infrastructure needs to be considered properly. Initial investments, including credit facilities and irrigation water management training were found to be critical in many small scale irrigation projects that succeeded.

The project will take on from the experiences of SSIP in other countries and those of NIA and the Bureau of Soils and Water Management (BSWM). Implementing arrangements consist of the DAF-Agricultural Engineering Division, BSWM, and NIA as technical adviser, and the project will be initially implement with DAF, then transfer to DAF. The project should cover rice and non-rice crops such as sugarcane, cassava, vegetables.

The project will have the following components:

1) Trainings for technology providers and farmers as recipient of the irrigation system,
2) Financing for the acquisition of equipment and materials and production, and
3) Construction of facilities.

(2) Multi-purpose small-scale irrigation development project

The importance of small multi-purpose reservoirs in the Philippines was given due recognition with the issuance of Presidential Administrative Order No. 408 on May 1976. This order established the Small Water Impounding Management Plan, which was intended to uplift the agricultural sector through reduction of damages brought about by frequent floods and draughts and the efficient direction of water resources to applications such as irrigation, fishery, etc. At its core, the plan was intended to relieve rural poverty and remedy the economic and social disparities between urban and rural areas.

Subsequently, small water impounding management (SWIM) projects were developed under the Department of Public Works and Highways (DPWH) with primary objective of flood control while taking the benefits of irrigation from the dammed water in reservoirs. The plan covered 187 locations and expected to benefit 13,000 ha. In many Small Water Impounding Projects (SWIPs), flooding is almost wiped out while corresponding cropping intensity averaging at 128% increased to 180%. Before the project, most of the areas were only planted during rainy seasons while submerged areas only planted in dry seasons.

The project will take from the identification of small water impounding with multipurpose potential (SWIMP), particularly those with potential irrigable area for any type of crop. The project will consist of several sub-projects of SWIMP with irrigation and other components feasible under the circumstances. Project implementation will include: (1) technical and economic feasibility study of prioritized sub-projects primarily based on potential to increase in agriculture output, (2) detailed design, and (3) construction.

Implementation of each sub-project will involve deep collaboration with the farmers as beneficiaries who will be organized into an association of farmer beneficiaries (AFB). Whenever possible, completed SWIMP will be turned-over wholly or in part to the AFB. The project will be implemented through a PMO under a steering committee guided by the Bangsamoro government chaired by the Secretary of DAF and vice-chaired by the Secretary of DPWH. The members of the committee will include one representative each from DENR and DBM. The national government will provide technical assistance through a team of national experts from national-DPWH, NIA, and BSWM. NIA and BSWM have been implementing models of participatory approach to irrigation development, of which the project can take advantage.

5.5.5 Disaster risk reduction and management program

(1) Bangsamoro disaster risk reduction and management project

The Disaster Risk Reduction and Management (DRRM) Act of 2010 (RA 10121) has changed its DRRM policies from reactive to proactive ones. Accordingly, the ARMM Regional DRRM Plan 2012-2028 has been prepared to guide local authorities to effectively comply with the DRRM Act.

As one of the prioritized DRRM activities described in the National DRRM Plan and the Regional DRRM Plan, capacity development of the LGUs has strongly been emphasized. In order to implement the DRRM activities under the new approach, the needs for preparing the various plans as well as strengthening the capabilities of related organizations are rapidly increasing. However, the DRRM activities in ARMM have not been progressed well and still far behind the time schedule proposed in the Regional DRRM Plan. According to the Final Report of the Disaster Risk Reduction and Management Capacity Enhancement Project, March 2015, JICA, the percentage of LGUs that have submitted their local DRRM (LDRRM) plans is only 50% for ARMM as of December 2014, the lowest among the 16 regions.

Under the situation described above, the project aims to develop the DDRM capacity of Bangsamoro area, especially focusing on the following:

1) To establish local DRRM councils and offices and their operation centers;
2) To prepare/revise LDRRM Plans;
3) To establish well-organized disaster response operation;
4) To mainstream DRRM in regional, sector and local policies, and plans;

5) To establish sustainable training; and
6) To prepare necessary guidelines.

The success of the project greatly depends upon the positive participation of the Office of Civil Defense (OCD) staff, the Bangsamoro government, and LGUs. In order to attain the overall goal of the Bangsamoro DRRM, the Bangsamoro government is required to continue to accept the national DRRM policy. At the same time, introduction of innovative approach and elements such as risk transfer insurance should be examined that may fit conditions in Bangsamoro.

(2) Mindanao River basin integrated river shed and flood management project*

The Mindanao river basin is the second largest river basin in the Philippines with the catchment area of 21,503 km^2 which drains into the Illana Bay through Central and Southern Mindanao. Major rivers within the basin include the Allah River, traversing the Allah Valley in the South, the Pulangi River with headwater from Bukidnon, the Ambal-Simuay River system originating from Lanao del Sur, and the Mindanao and Tamontaka Rivers in the Lower Cotabato River basin. There are three huge marshes (Ligawasan, Ebpanan and Libungan) in the central and lower parts of the basin, which act as natural storages to attenuate large flood flows. Before entering Cotabato City, the Mindanao River bifurcates into Rio Grande de Mindanao and Tamontaka Rivers.

Due to the physiographic and climatic conditions, the basin has been prone to flooding and suffered from deforestation, soil erosion and siltation. Towns and cities along the Mindanao River have been constantly flooded during typhoons and heavy rain. Severe and constant floods ever caused disruption in social and economic activities, and inflicted damage to lives, livelihood, and properties reaching billions of pesos, especially at Cotabato City and surrounding areas. They also caused considerable reduction in the productivity of the forests, agricultural lands, and fisheries; availability of potable water; and returns from major investment in infrastructures, irrigation systems, among others.

The Mindanao River basin integrated watershed and flood management project aims to comprehensively deal with the flood problems in the Mindanao River basin, and utilizing the river basin in a more comprehensive way. It is composed of following eight sub-projects:

1) Comprehensive study on Mindanao basin flood control,
2) Improvement of Rio Grande de Mindanao and Tamontaka rivers flood control system,
3) Improvement of Buluan River control system,
4) Improvement of Pulangi River flood control system including repair of Tunggol Bridge,
5) Improvement of Ambal-Simuay River flood control system,
6) Improvement of Ala river flood control system,
7) Enhancement of Mindanao river basin flood forecasting and warning system, and
8) Mindanao river basin urgent flood and sediment control.

In preparing the Mindanao river basin flood control plan covering these rivers, a basin-wide point of view should be reflected, including effects of the marsh areas and sediment supply from the upstream. Also, utilization of land protected better by the flood control measures should be incorporated in the plan.

5.6 Institutional Measures

5.6.1 Agricultural finance expansion

Most smallholders have difficulties in receiving bank loans due to high collateral standards, complicated procedures and high interest rates set by the banks. The limited access to finance has hindered them from buying high-yield seedlings, fertilizers, cultivation tools as well as post-harvest and processing facilities. In order to cater to this situation, initiatives of intermediary organizations are needed to lower the costs of transaction and monitoring for the banks and provide farmers with technical assistance such as technical extension services and logistical assistance such as a collective supply of agricultural inputs and collective farming, harvesting, and selling activities to achieve the economies of scale.

Although microfinance institutions operating in Bangsamoro have been reported to receive funds from government institutions to expand agricultural loans, its impact will be limited given the presence of very few on-going programs that lead to an improvement of the linkages between farmers and financial institutions.

The alternative credit mechanism would necessitate a fund from the Government to provide agriculture project financing and production loans to individual farmers and cooperative farms producing crops or livestock under an agriculture finance program of the Government for small farms and cooperatives. The main feature of this program is provision of low to zero cost loans for the borrowers and limited to small farmers and cooperatives whose members have smaller than 5.0 ha, which is the retention limit of land ownership. The fund may be used for two types of loans as described below.

The financing program may be a joint undertaking of DA, LBP, and LGUS. DA will provide the loan fund, LBP will administer the fund, and LGUs will participate in monitoring the repayment of loans by the borrowers.

(1) Project financing

Loans may be granted to cooperatives for establishment or rehabilitation of commercial farms. Many ARBs under a certificate of landownership award (CLOA) formed cooperatives and operated the awarded farms as a single unit. Many of these cooperatives need financing to rehabilitate the previous commercial farms. The loans may be administered by LBP under a special lending program of the Government, which provides the loan fund.

(2) Production financing

This type of loan is designed for small producers for financing every crop production cycle. For example, a rice farmer can make a production loan to defray expenses for the whole cycle of production. He pays back the loan from the harvest and borrows again for the next crop cycle. This method of financing agriculture production is similar to production financing in the manufacturing sector. If this type of loan is available, small farmers are weaned from usurers and able to invest adequately in farming.

Essentially, the cost of money for farmers should be lower than the market rates. Since the project is production support of the Government, cost of money for the borrowers may cover transaction cost only. Thus, the fund is not expected to grow. Instead, it will have to be replenished to cover losses from repayment defaults and growing financing requirements. The Philippine Crop Insurance Corporation will provide insurance cover for production loans. This financing program may also be administered by LBP with cooperatives or farmers associations as conduits. In order to lessen defaults in repayment, the conduits should establish an effective mechanism for loan collection system.

(3) Land Bank of the Philippines

In concomitance with the expansion of agricultural finance as proposed, operational efficiency of LBP should be enhanced in providing loans to farmers and farmers' cooperatives. The project consists of two components. The first component is the support for the diversification of financial services that will help LBP improve its product design and loan distribution to smallholder farmers, and the second component is the support of extension services that will lead to the strengthening of farmers' linkages with actors in the value chains (financers, traders, investors, and relevant government agencies).

5.6.2 Diet improvement campaign in rural areas

People in Bangsamoro still maintain traditional food habits in the Philippines. Although cereals, starchy roots, and tubers are eaten abundantly, intake of fresh meat, egg, and regulating foods is still small. Such diet induces deceases due to vitamin A and B deficiency, such as beriberi and night blindness. For young children, it may cause developmental disorders. The 2010 food intake survey (FNRI) indicates that Bangsamoro inhabitants have the least amount of regulating foods in the Philippines; for instance, the daily intake of green leafy vegetables and vitamin C-rich food is 33 g and 15 g, respectively, on national average but 31 g and 7 g in Bangsamoro.

In July 2015, the ARMM Department of Health urged the Regional Nutrition Committee to emulate awareness programs and campaigns for better education of proper eating habits such as the national programs *Pinggang Pinoy* and *10 Kumainments* to address the emerging issues in nutrition in the Region. The Pinggang Pinoy program aims to educate the consumers on healthy balanced diet by providing recommendations on the proportion of food groups. Meanwhile, the 10 Kumainments provides guidelines on positive nutrition practices and encourage the adoption of healthy lifestyle among households.

Aside from educating the locals, it is also important to promote production of vegetables in the communities. For a start, awareness-raising of regulating foods will be ideal since some vegetables can be grown at home or in each community. Green leafy vegetables (e.g., *malunggay* and *pechay*) and vitamin C rich-crops (e.g., tomatoes and mangos) can be produced easily even in the backyard. The importance of proper food intake should be disseminated through awareness-raising activities, and also backyard production of such crops is extended by barangay health workers of the Department of Health.

Nutrition experts from international donors will train barangay health workers and disseminate proper and efficient dietary habit. The international donors may provide 3–5 nutrition experts, equip them with understanding of the present situation of food intake in the barangays, and extend practical training in backyard vegetable production. The dissemination of recipes for easy intake of these vegetables and fruits is also the role of such nutrition experts.

5.6.3 Strengthening information functions of Bangsamoro government

Knowledge gap within the Bangsamoro, particularly among population in remote areas such as island provinces, is one of the obstacles for socio-political and even economic development. For example, a report by World Bank and WFP pointed out that a significant proportion of people were unaware or distrustful of news in their province and on Mindanao (about one third of the respondents of their survey reported being not at all or little informed about events in their province and the scores were worst in Maguindanao and Lanao del Sur, where 64% and 49% said they had no or little information).

Through the Bangsamoro TV and radio, the new Bangsamoro government will strengthen its capacity to disseminate information on important political process, as well as socio-economic knowledge and skills for wider population. Through interactive programs, it also can provide the Bangsamoro society an avenue for dialogue thereby contributing to social cohesion. This project aims to not only provide basic infrastructure for independent TV and radio broadcasting for Bangsamoro, but also build capacity to produce TV and radio programs to disseminate contents focusing on peace-building and socio-economic development through a series of trainings. Cooperative relationships between the Bangsamoro government and the people would be strengthened with LGUs as intermediaries.

5.6.4 Institutionalization of participatory planning and development

The Solidarity Program for the Bangsamoro is a joint initiative by the Bangsamoro government, LGUs, communities, and civil society organizations. The democratically elected and inclusive (in terms of gender, different socio-cultural groups, etc.) Bangsamoro Development Councils (BDC) will be established at barangay level under the supervision of municipal LGUs. The councils will identify the development projects such as community infrastructure and livelihood projects through consultative process, and receive bloc funds from the Bangsamoro government. The councils manage the projects through technical and managerial support from the LGUs and civil society organizations (CSOs), thereby empowering communities as well as strengthening trust among community, LGUs and the government. The BSP projects may include small scale infrastructure, livelihood, education, health and so on.

5.6.5 Comprehensive SMEs support measures

More or less 50 SMEs are being registered in the Bangsamoro area but their operation is still vulnerable due to the lack of hard and soft recourses needed for their business. Under the situation of Bangsamoro for now, it is not effective to introduce SME development policy/project as it is from the Philippines

because industrial structure as well as hard/soft resources surrounding SME is quite different from them. For example, the corporate tax applicable to the Philippine local company at 30% seems too high for the locators in Bangsamoro, or the public finance to SMEs is actually limited to LBP, but relaxing this rule may take effect.

The Republic Act 9501, known as Magna Carta for Micro, Small and Medium Enterprises (MSME), serves as the governing policy for MSME development in the ARMM. The Region also follows the national definitions for MSME categories. Based on the capitalization requirements, most of the Bangsamoro's enterprises will fit into micro to medium enterprises.

Under the law, DTI-ARMM is the lead agency responsible for the mobilization of necessary technological support and coordination mechanisms for promoting MSME and other entrepreneurial initiatives in the Region. One notable program of DTI-ARMM is its one-town-one-product (OTOP) initiative. Through this project, each city or municipality will have a focus on specific product or service on which they have significant competitiveness. The support of each LGU is paramount to make the OTOP successful. The OTOP becomes a support mechanism for MSMEs to manufacture and market their distinctive products.

To cope with vulnerable policies and project surrounding SMEs in Bangsamoro, a special time bound policy is needed to enhance the SME development. Such special policy includes, but not limited to the following:

1) Special authorization given to SME support organization,
2) Tax policy of SMEs,
3) Business incentives of financial institutions and money lenders,
4) Incentives of investors,
5) Labor code for local SME employees,
6) Policies identified by CARP, especially on ARBs and formed cooperatives, and
7) SME cultivation policy especially start-ups and business promotion.

The temporary legislation needs limited time-span so that the staged support by international donors will be necessary applying project-type technical assistance.

5.6.6 Halal industry promotion

Promotion of hazard analysis and critical control points (HACCP) will also be necessary for the development of halal industry in Bangsamoro. Halal requires food safety elements, good manufacturing practices and good hygiene practices, which are already included in HACCP. The Autonomous Regional Government (ARG) has pursued the development of halal industry, and this is supported by the National Government with the identification of halal as a priority development strategy for the ARMM in the Philippine Development Plan.

Together with DAF-ARMM and DTI-ARMM, ARMM-RG had taken some steps to promote halal industry in the Region. Some of these are

1) Formation of a certification body for halal and creation of a certification standard;
2) Enactment into law of the Muslim Mindanao Autonomy Act No. 254 or the Halal Labeling Act of 2009;
3) Support services that can be tapped and further strengthened at all levels of the government, such as agricultural extension and technology transfer;
4) Creation of halal compliant trainings for crops and livestock, for which the modules are still to be developed; and
5) Implementation of pilot projects for halal feed and organic halal vegetables, among others, in some localities.

Recent development include the creation of Mindanao Halal Industry Task Force under the Mindanao Business Council and the creation of Halal Certification and Accreditation Board in the private sector. In fact, the Framework Agreement on Bangsamoro (FAB) provides for the Bangsamoro Basic Law that enables the Bangsamoro government to accredit halal-certifying bodies in Bangsamoro. Specific

promotion measures should be developed in line with these recent development by the task force for halal industry and Islamic finance created by the technical working group for the Study.

5.6.7 Establishment of quality standards and criteria for export products

The food business operators should be encouraged to implement an HACCP-based system for food safety assurance in their operations (Republic Act No. 10611 in the Philippines). As of 2013, the companies coping with HACCP are 92 factories in the Philippines and none in Bangsamoro, but far behind the number in Indonesia at 215 in 2009. HACCP implementation with certification is hindered due to common issues/problems such as limited financial capability, lack of prerequisite program such as hygiene and sanitation in factories, limited HACCP knowledge and technical competence, management problems like lack of commitment, motivation and government infrastructure and support.

HACCP implementation in Bangsamoro and their adjustment to EU and U.S. legal regulations concerning food hygiene, safety and quality will give the producer/exporter stronger market orientation leading to product quality improvement. It will ensure consumer protection and increase in production profit.

The project aims to strengthen capacity of good manufacturing practice (GMP) and HACCP through provision of classroom and on-the-job training to SME beneficiaries. A technical cooperation between the government (i.e., DTI) and the food industry to meet international standards for GMP and HACCP through an accreditation program will be promoted. This project also aims to increase food exports by providing buyers and interested parties with information on local processed food products that meet international requirements for quality and safety.

It is recommended that the project utilizes resources available in academic sphere. Realistically, a new faculty teaching Shari'ah business and administration should be established at MSU to lead Bangsamoro students to more Islamic business. The faculty should cover the fields of basic Shari'ah law, halal food development, Islamic banking, Islamic rituals, etc. BDA tying up with the Commission on Higher Education (CHED) will advance this concept having support from outer Muslim societies.

5.6.8 Bangsamoro investment window

Most large landowners (including *datu*s) are expecting to start business with investors and they are waiting for this opportunity. While small land owners, ARBs and landless farmers are expecting their participation in that project, which is initiated by Datus and investors. On the other hand, the potential investors to large scale plantations from outside Bangsamoro want to tie-up with promising Datu as his investment partner. They are keen to collect information on suitable partner but they are not familiar with practical customs on land management and endemic issues on their prospecting land.

The Bangsamoro Investment Window (BIW) supports realization of stakeholders' needs described above and strives to match investors, large and small landowners, and landless farmers in line with the regulation set by the administrator. The ideal functions of the BIW are as follows:

1) Strategize the involvement of small landowners, ARBs, and landless farmers in the development;
2) Assess investment proposals to ensure suitability of investments to local conditions in Bangsamoro;
3) Provide investment information to potential investors both inside and outside Bangsamoro;
4) Serve as intermediator between large landowners to investors;
5) Monitor the progress of investment development and accumulate case studies; and
6) Disseminate successful cases.

Other than focusing on agriculture and agri-business, key investment drivers which can be integrated in the proposed BIW are: a) competitiveness of land (including components of price and fertility) and labor (prevailing rate of the workers), b) adaptation to the local cultural environment, c) emphasis on shared goals and values, and d) appreciation of similarities and interfaith dialogues.

The BIW is to be collectively formed by agencies concerned, each providing information regularly to

the BIW center. In fact, the BIW can work for both local and foreign investors who are interested in doing business in Bangsamoro. Aside from gaining the support of local strongmen to be part of the BIW, the participation of the Land Registration Authority and other land related agencies will be needed to account for the possible tracts of land open for investment. Other agencies that are recommended to be involved in the proposed BIW as part of industry and investment promotion are agencies of ARG such as DTI, DAF, the Department of Science and Technology (DOST), the Department of the Interior and Local Government (DILG), the Regional Board of Investment (RBOI), and CDA. LGUs are expected to serve as intermediaries between the private sector investors and the Bangsamoro government with the BIW.

5.6.9 Development of regulatory framework of Islamic finance

There is only one entity operating under the concept of Islamic finance in the Philippines: Al-Amanah Bank, a government-owned Islamic bank. There is no legal framework supporting Islamic finance in the Philippines. The Al-Amanah Islamic Investment Bank had failed to be successful for the following reasons: 1) weak financial literacy and fundamentals among the people, 2) perceived high risk situation, 3) current state of economy, 4) lack of skills to handle Islamic banking, and 5) prevailing perception that Al-Amanah Islamic Investment Bank only served as the national government's instrument to appease the Muslims.

To be able to attract market players to do Islamic finance, there must be robust regulations supporting Islamic finance following the Sharia Law. Since the concept of Islamic finance in the Philippines is fairly new, regulators may not have the technical and practical capacity in drafting all the necessary regulations.

Technical assistance is necessary to support drafting of necessary regulations to support Islamic finance, in terms of banking and capital markets. Necessary expertise includes deep knowledge of Sharia Law, and establishment of Islamic finance in Malaysia. Capacity building is necessary for regulators to be adept with Islamic finance. For practicality, case or site studies with Malaysian regulators (i.e., Bank Negara Malaysia, Securities Commission) are to be undertaken.

The following institutional setup is recommended:

1) For Islamic banking: the Bangko Sentral ng Pilipinas (Central Bank of the Philippines, BSP) as regulator for all kinds of banks in the Philippines;
2) For non-bank Islamic finance activities (i.e., capital markets), Securities and Exchange Commission, as regulator for all capital markets products and participants; and
3) For implementation of necessary legislation, Congress and Senate of the Philippines (Bangsamoro Basic Law Committee, Banking and Intermediaries Committee).

5.6.10 Strengthening of judicial system for land issues

In the Philippines, a Torrens title system is used for land ownership. Various government agencies are involved in land ownership system such as the Land Registration Authority (LRA) under the Department of Justice (DOJ), the Land Management Bureau (LMB), and the Forest Management Bureau (FMB) under DENR, the Department of Agricultural Reform (DAR), and the National Commission on Indigenous Peoples (NCIP). Having various government offices handling land tenure and ownership in the Philippines poses challenges in coordination and in organization of land information. In actual land practice, land held by ARCs and resettlement areas constitute a special case of formal tenure. This is premised on proper land documentation. These lands showcase the exercise of de facto and de jure property rights by smallholders in the ARMM.

BDA needs to handle each individual case of private investment plantation with flexibility. Each investment case needs to be handled separately/individually, considering and adjusting to the situation of business activity at the site of investment as well as demographics and cultural characteristics of the site.

The protection of property rights must extend beyond the attributes of land and resources. In order to ensure the security of investment contracts, it is necessary to legislate a conflict and dispute resolution

mechanism. Bangsamoro needs both official and unofficial judicial systems functioning. As official systems, judiciary at the barangay level, judiciary based on Shari'ah, and judiciary by civil court are needed. Methods of various conflict/dispute resolutions should be clearly articulated, stipulated and promulgated widely. Each judiciary system requires capabilities for proper enforcement

5.6.11 Plantation development overseeing institution

Recently, some plantations have caused negative impact on environment and society, and therefore, an institution to oversee the development and operation of plantations is required. First, secretariat division will be formed as a permanent division. Then a committee will be formed with the members of local government officers, private sector people, NGO staff, residents' group, etc.

The committee members will prepare guidelines for plantations in ARMM, and oversee plantations from preparation stage to operation stage based on the guidelines. Similar guidelines used internationally already exist as below, and those may help to prepare the guidelines specific to Bangsamoro.

- The Palm Oil Innovations Group (POIG) Charter: http://poig.org/the-poig-charter/
- Roundtable on Sustainable Palm Oil (RSPO) Principles and Criteria: http://www.rspo.org/
- Transparency, compliance with applicable laws, commitment to long-term economic and financial viability, use of best practice, environment responsibility and conservation of natural resources, responsible consideration of employees, etc. are raised as principles in the RSPO Principles and Criteria.

5.7 Peace-building Support Strategy and Measures

5.7.1 Peace-building support strategy

The Bangsamoro development plan should contribute to building peace and preventing further conflicts. Projects and institutional measures proposed in this chapter have been formulated under the development vision presented in the sub-section 3.3.1 and the development objectives established in the sub-section 3.4.2, reflecting peace-building concerns. Also in line with the basic strategy with four components presented in the sub-section 3.4.2, strategy for peace-building is presented in this sub-section.

Focusing particularly on the thematic areas assigned to JICA for the BDP, two-pronged strategy will be effective for peace-building through the Bangsamoro development with the following:

1) Improvement of access to remote rural areas and conflict affected areas and
2) Widening opportunities for various livelihood and economic activities for those affected by conflicts.

These strategy components should be pursued in an integrated way for cost-effectiveness by promoting the economic corridor development and the industrial cluster development. The economic corridor development will be supported by the upgrading of artery road network, which is a prerequisite condition in Bangsamoro for access improvement to rural areas not linked to national or even provincial roads. It will be realized by the development of viable agricultural and agro-industry activities along the major artery roads, and provide a large number of employment opportunities.

The industrial cluster development based on primary products will link livelihood activities by the poor through indigenous industries to export industries competitive in the global market. This way, livelihood activities can be sustainable and given a better chance to be developed into viable economic activities together with indigenous industries linked to export industries. An economic corridor links between primary production areas, locations of agro-processing plants and export base such as port and airport facilities involved in an industrial cluster. Thus, the industrial cluster is established along the economic corridor.

In pursuing the two-pronged strategy by economic corridor development and industrial cluster development, good governance holds a key. As expressed in the Bangsamoro vision in the sub-section

3.3.1 and the development objectives in the sub-section 3.4.2, good governance is realized by responsive and transparent governance system with people's participation. Specific measures to realize good governance are proposed in the section 5.6 as highlighted in the sub-section 5.7.2.

5.7.2 Institutional measures to support peace-building

In addition to these strategy and projects, institutional measures will support the peace-building. In particular, the following institutional measures proposed in Section 10.6 will contribute to peace-building through empowering local people in remote rural areas and conflict affected areas:

1) Agricultural finance expansion;
2) Diet improvement campaign in rural areas;
3) Facilitation of communications between the Bangsamoro government, LGUs, and local people; and
4) Participatory development planning and implementation.

The following institutional measures will support livelihood development and peace-building indirectly by strengthening indigenous industries:

5) Comprehensive SMEs support measures and
6) Halal industry promotion.

To ensure the successful industrial cluster development, the following institutional measure is essential to establish viable export industries with value-added products:

7) Establishment of quality standards and criteria for export products and
8) Bangsamoro investment window.

The following institutional measures support all the economic activities constituting industrial clusters along economic corridors:

9) Development of regulatory framework of Islamic finance and
10) Strengthening judicial system for land issues.

Finally, the following measures will ensure sound relationships between all the players in any industrial cluster:

11) Plantation development overseeing institution.

5.8 Bangsamoro Development Scenario

Actions to be taken in steps to implement the BDP and changes to take place over time toward the realization of the Bangsamoro vision are outlined as the Bangsamoro development scenario (Table 14). For the purpose, the planning period of the BDP is divided broadly in three phases. No time line will be shown at this time, given the uncertainties surrounding the political process to establish the Bangsamoro Transition Authority. An implementation schedule of all the proposed projects is shown in Figure 20 in an indicative way without specifying time lines.

Table 14 Bangsamoro Development Scenario for Short to Medium Term

Phase	Overview	Socio-economy	Spatial development
Phase 1	Preparatory phase for BDP implementation Wide dissemination of BDP to LGUs & other stakeholders FGDs with former combatants, IPs and conflict affected people Detailed project design and initial implementation Cultivation of wide understanding on importance of resolving land issues and clarification of land issues specific to Bangsamoro	Implementation of urgent projects and some artery roads to improve access to rural areas Support for existing livelihood & economic activities Initiation of limited new economic activities Products & market development for abaca & coco products industrial clusters Formulation of promotion measures for halal industry & Islamic finance Acceleration of population growth	Steady progress of physical integration of Bangsamoro Preparation for forthcoming rapid urbanization Planning for urban development of Cotabato City metropolitan area Improvement of port & airport facilities in island provinces Water supply & electricity expansion using local sources & mini hydro
Phase 2	Legal & institutional arrangements for Bangsamoro autonomy Institutionalization of participatory development planning & implementation Community based resources management introduced first as pilot projects Jump start of BDP implementation supported by development partners Establishment of Bangsamoro Land Management Office	Full scale development of abaca & coco products industrial clusters Initiation of other industrial clusters Diversification of integrated and mixed farming practices Strengthening of R&D activities to support new economic activities Aquaculture development including mariculture for high value products Active development of halal industry & Islamic finance to support goat based integrated farming & mixed farming by small holders	Significant improvement of access to remote rural areas and conflict affected areas Initiation of Polloc port & ecozone development Further improvement island prots to strengthen links with mainland Initial development of ecozones in island provinces planned to expand trade with BIMP-EAGA
Phse 3	BDP implementation in full steam by Bangsamoro Government Strengthening of information functions of Bangsamoro Government to support bottom up development planning & implementation Private sector activities as main driving force under guidance of the new Government & community based resources management	Employment with adequate incomes ensured by new livelihood & economic activities for small farmers, subsistent fisher folks, IPs and former combatants and IDPs throughout Bangsamoro Polloc port & ecozone & special employment zones fully established linked by trade with BIMP-EAGA Major agri-businesses generating large number of employment opportunities & exporting processed goods produced by advanced technology International fame for selected products by halal industry Stabilization of population growth	Strong economic and physical links with BIMP-EAGA & neighboring regions of Mindanao Regular air & maritime transport services established with BIMP-EAGA linked also with other Mindanao cities Links between island & mainland provinces by speed boats Urban hierarchy well established for effective urban & social services delivery City network established with complimentary higher order functions provided by Bangsamoro cities

Figure 20 Indicative Phased Implementation Schedule