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

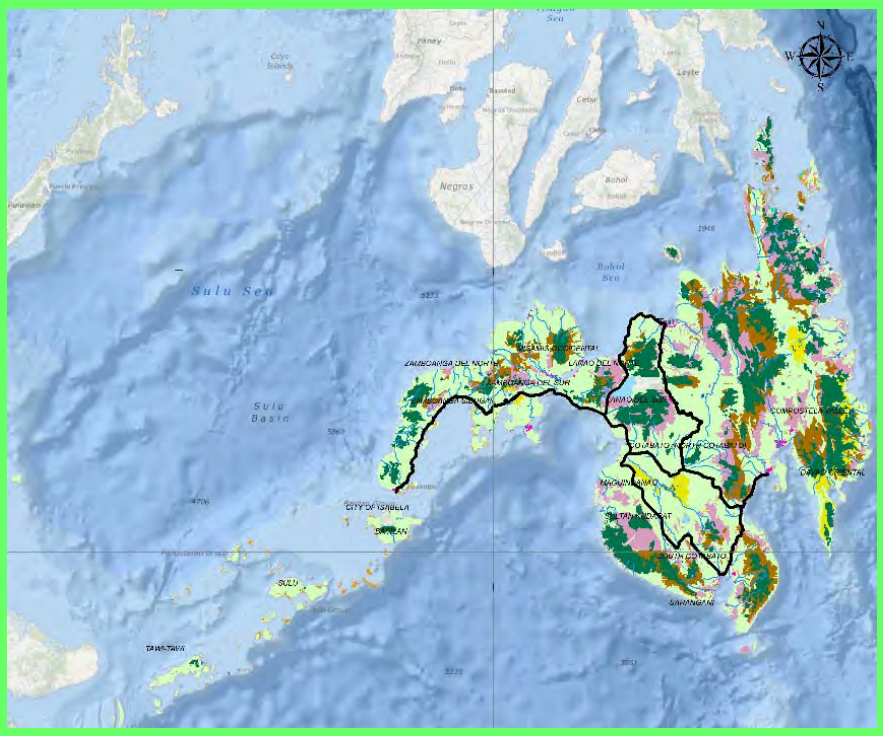
Japan International Cooperation Agency
(JICA)

Comprehensive Capacity Development Project for the Bangsamoro

Development Plan for the Bangsamoro

Final Report

Project Report



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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Abbreviations

AAD	annual average daily traffic
AAGR	average annual growth rate
AAIIBP	Al-Amanah Islamic Investment Bank of the Philippines
A&D	alienable and disposable
AC	advisory circular
ACC	Area Control Center
ACSR	aluminum conductor steel reinforced
ADB	Asian Development Bank
AFB	association of farmer beneficiaries
AFMA	Agriculture and Fisheries Modernization Act
AFP	Armed Forces of the Philippines
AHFF	agriculture, hunting, forestry, and fishery
AJD	Agrarian Justice Delivery
AMARDI	Al Mujahidun Agro Resources and Development Inc.
AO	Administrative Order
ARB	agrarian reform beneficiary
ARBO	ARB organization
ARC	agrarian reform community
ARCDSP	ARC Development Support Project
ARCCESS	ARC Connectivity and Economic Support Services
ARG or ARMM-RG	ARMM Regional Government
ARMM	Autonomous Region in Muslim Mindanao
ARMM HELPS	ARMM Health, Education, Livelihood, Peace and Governance and Synergy (Program)
ARMMIARC	ARMM Integrated Agricultural Research Center
ASEAN	Association of South East Asian Nations
ASPBI	Annual Survey of Philippine Business and Industry
AT	Agricultural technician
ATI	Agricultural Training Institute
ATM	air traffic movement
ATM	automated teller machines
AWG	American wire gauge
BASELCO	Basilan Electric Cooperative
BASULTA or BaSulTa	Basilan, Sulu, and Tawi-Tawi
BBAC	Bangsamoro Business Advisory Council
BBL	Bangsamoro Basic Law
BCT	Bangsamoro Core Territory
BDA	Bangsamoro Development Agency
BDH	berthing/deberthing hours
BDP	Bangsamoro Development Plan
BFAR	Bureau of Fisheries Aquatic Resources
BHC	Barangay Health Center
BIAF	Bangsamoro Islamic Armed Force
BIFF	Bangsamoro Islamic Freedom Fighters
BIMP-EAGA	Brunei-Indonesia-Malaysia-Philippines East ASEAN Growth Area
BIW	Bangsamoro Investment Window
BLGU	Barangay Local Government Unit
BLMI	Bangsamoro Leadership and Management Institute
BLMO	Bangsamoro Land Management Office
BOD	board of directors
BOI	Board of Investment
BPO	business process outsourcing
BS	Bachelor of Science
BSP	Central Bank of the Philippines [Bangko Sentral ng Pilipinas]
BSWM	Bureau of Soils and Water Management
BTA	Bangsamoro Transition Authority
BTB	boom truck with bucket
BTC	Bangsamoro Transition Commission
BTD	boom truck with digger
BuB or BUB	bottom-up budgeting
CA	College of Agriculture
CA	compulsory acquisition
CAAM	Conflict Affected Areas of Mindanao
CAAP	Civil Aviation Authority of the Philippines
CAB	Comprehensive Agreement on Bangsamoro
CADT	certificate(s) of ancestral domain title
CAGR	compound annual growth rate
CALABARZON	Cavite, Laguna, Batangas, Rizal, and Quezon
CALT	certificate(s) of ancestral land title
CARD	Center for Agricultural and Rural Development
CARL	Comprehensive Agrarian Reform Law
CARP	Comprehensive Agrarian Reform Program
CARPER	CARP-Extension with Reforms
CASELCO	Cagayan De Sulu Electric Cooperative
CBCRM	community-based costal resource management
CBFM	Community-Based Forest Management (Program)
CBFMA	community-based forest management agreement
CBO	Cotabato (Awang) Airport
CCA	climate change adaptation
CCCH	Coordinating Committee for Cessation of Hostilities
CCDP or CCDP-B	Comprehensive Capacity Development Project for the Bangsamoro
CCT	conditional cash transfer
CDA	Cooperative Development Authority
CD-CAAM	Community Development in CAAM
CDOCCI	Cagayan de Oro Chamber of Commerce and Industry
CDP	Comprehensive Development Program
CDP-ELA	Comprehensive Development Plan-Executive Legislative Agenda
CDRRMC	City Disaster Risk Reduction and Management Council
CDS	cooperative development staff

CEB	Cebu Pacific Air
CEC	cation-exchange capacity
CEPALCO	Cagayan Electric Power and Light Company
CIF	cost, insurance, and freight
CIS	communal irrigation system
CLOA	certificate(s) of landownership award
CLPC	Cotabato Light and Power Company
CLT	certificate(s) of land transfer
CLUP	comprehensive land use plan
CMO	central management office
COSUCECO	Cotabato Sugar Central Corporation
CP	core project
CPO	Cotabato Project Office
CSO	civil society organization
CSR	corporate social responsibility
DA	Department of Agriculture
DA-BAR	Department of Agriculture's Bureau of Agricultural Research
DA-RFO	DA-Regional Field Office
DAF	Department of Agriculture and Fisheries
DAO	Department Administrative Order
DAR	Department of Agricultural Reform
DBM	Department of Budget and Management
DBP	Development Bank of the Philippines
DCCCII	Davao City Chamber of Commerce and Industry, Inc.
DD	detailed design
DDP	Distribution Development Plan
DED	detailed engineering design
DENR	Department of Environment and Natural Resources
DILG	Department of Interior and Local Government
DLPC	Davao Light and Power Company
DME	Distance measuring equipment
DOF	Department of Finance
DOJ	Department of Justice
DOLE	Department of Labor and Employment
DOST	Department of Science and Technology
DOT	Department of Tourism
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
DRRMCEP	DRRM Capacity Enhancement Project
DSWD	Department of Social Works and Development
DTI	Department of Trade and Industry
DTI-EMB	DTI Export Marketing Bureau
DUs	distribution utilities
DVOR	Doppler VHF omnidirectional range
EA	environmental assessment
EC	electric cooperative
ECA	environmentally critical area
ECC	environmental clearance certificate
ECP	environmentally critical project
EEZ	exclusive economic zone
EIA	environmental impact assessment
EIAM	Environmental Impact Assessment and Management (Division)
EIRR	economic internal rate of return
EIS	environmental impact statement
EMB	Environmental Management Bureau
EO	Executive Order
EPIRA	Electric Power Industry Restructuring Act
ERC	Energy Regulatory Commission
ESWM(P)	Ecological Solid Waste Management (Plan)
EU	European Union
EWS	early warning system
FAA	Federal Aviation Administration
FAB	Framework Agreement on Bangsamoro
FAD	fish aggregating devices
FAO	Food and Agriculture Organization
FDI	foreign direct investment
FFWS	flood forecasting and warning system
FGD	focus group discussion
FIA	federation of irrigators' associations
FIDA	Fiber Industry Development Authority
FIES	Family Income and Expenditure Survey
FIT	farmers information technology
FIT	feed-in-tariff
FMB	Forest Management Bureau
FMR	farm-to-market road
FNRI	Food and Nutrition Research Institute
FS	feasibility study
FTZ	free trade zone
GAA	General Appropriations Act
GDE	grading and balling establishment
GDP	gross domestic product
GEM	Growth with Equity Mindanao (Program)
GIS	geographical information system
GIZ	German Society for International Cooperation [Deutsche Gesellschaft für Internationale Zusammenarbeit]
GM	genetically modified
GMP	good manufacturing practice
GPBP	Grassroots Participatory Budgeting Program
GPH	Government of the Philippines
GPPB	grassroots participatory planning and budgeting
GRDP	gross regional domestic product
GRP	gross regional product
GSR	Green Super Rice
HACCP	hazard analysis and critical control points
HDI	human development index
HEART	Humanitarian Emergency Action Response Team
HF	high frequency
HI	horizontal inequality
HIPC	halal industry promotion center
HVC	high-value crops

HVCDP	High Value Crops Development Program
IA	irrigators' association
IAC	inter-agency committee
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICT	information and communication technology
ICTSI	International Container Terminal Services, Inc.
IDP	internally displaced people
IEC	information and education campaign
IEE	initial environmental examination (or evaluation)
IFAD	International Fund for Agricultural Development
IFMA	Integrated Forest Management Agreement (Program)
IFSAR	interferometric synthetic aperture radar
ILO	International Labour Organization
ILPC	Iligan Light and Power Company
IMEM	Interim Mindanao Electric Market
IMT	international monitoring team
IP	indigenous people
IPA	Investment Promotion Agency
IPC	Investment Promotion Center
IPP	independent power producer
IPRA	Indigenous People Rights Act
IRA	internal revenue allotment
IRI	International Roughness Index
IRSG	International Rubber Supply Group
IT	information technology
IWRM	integrated water resources management
J-BIRD	Japan-Bangsamoro Initiatives for Reconstruction and Development
JAKIM	Department of Islamic Development Malaysia
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JNC	Joint Normalization Committee
JOL	Jolo Airport
JST	JICA Study Team
JV	joint venture
KBA	key biodiversity area
KOICA	Korea International Cooperation Agency
L	length
LAD	land acquisition and distribution
LAMP	Land Administration and Management Project
LAMPCO	Linabu Agrarian Multi-Purpose Cooperative
LASURECO	Lanao Del Sur Electric Cooperative
LBP	Land Bank of the Philippines
LCA	local conservation area
LCL	less than full container load or less container load
LDRRMC	Local DRRM Council
LDRRMF	Local DRRM Fund
LGU	local government unit
LGUOUs	LGU-owned utilities
LiDAR	light detection and ranging
LMB	Land Management Bureau
LMIP	Leyte-Mindanao Interconnection Project
LOA	length overall
LRA	Land Registration Authority
LTI	Land Tenure Improvement
Magelco or MAGELCO	Maguindanao Electric Cooperative
MAO	Municipal Agriculture Office
MASL	meter(s) above sea level
MC	moisture content
MDGs	Millennium Development Goals
MEDP	Missionary Electrification Development Plan
MEP	Mindanao Energy Plan
MF	microfinance
MFI	microfinance institution
MGB	Mining and Geo-science Bureau
MHPP	mini-hydro power plant
MICC	Matling Industrial and Commercial Corporation
MILF	Moro Islamic Liberation Front
MIS	Management Information Service
MIMAROPA	Mindoro, Marinduque, Romblon, and Palawan
MINDA or MinDA	Mindanao Development Authority
MLGU	municipal local government unit
MMAA	Muslim Mindanao Autonomy Act
MMDA	Metropolitan Manila Development Authority
MMHCBI	Mindanao Muslim Halal Certification Board Inc.
MNLF	Moro National Liberation Front
MOA	memorandum of agreement
MOOE	maintenance and other operating expenses
MPA	marine protected area
MPC	multi-purpose cooperative
MPDC	Municipal Planning and Development Coordinator
MRB	Mindanao River Basin
MRBIMDMP	MRB Integrated Management and Development Master Plan
MRCC	Mindanao Regional Control Center
MRDP	Mindanao Rural Development Program
MRF	material recovery facility
MSME	micro, small, and medium enterprises
MSU	Mindanao State University
MSU-IIT	MSU-Iligan Institute of Technology
MSU-LNCAT	MSU-Lanao National College of Arts and Trade
MSU-TCTO	MSU-Tawi-Tawi College of Technology and Oceanography
NADA	Needs Assessment Design Analysis
NAIA	Manila Ninoy Aquino International Airport
NAMRIA	National Mapping and Resource Information Agency
NAPC	National Anti-Poverty Commission
NASA	National Aeronautics and Space Administration
NCIP	National Commission on Indigenous Peoples
NCMF	National Commission on Muslim Filipinos

NCR	National Capital Region
NDCC	National Disaster Coordinating Council
NDRRMC	National Disaster Risk Reduction and Management Council
NEA	National Electrification Administration
NECP	non-environmentally critical project
NEDA	National Economic Development Authority
NFA	National Food Authority
NGA	National Grains Authority
NGCP	National Grid Corporation of the Philippines
NGO	non-governmental organization
NGP	National Greening Program
NIA	National Irrigation Administration
NICCEP	National Industrial Cluster Capacity Enhancement Project
NIPAS	National Integrated Protected Areas System
NIS	national irrigation system
NLUC	National Land Use Commission
NOAH	Nationwide Operational Assessment of Hazards
NPC	National Power Corporation
NPC-SPUG	NPC-Small Power Utility Group
NREL	National Renewable Energy Laboratory
NREP	National Renewable Energy Program
NSO	National Statistics Office
NWFP	non-wood forest product
NWRC	National Water Resources Council
OBOR	optimum berth occupancy rate
OCD	Office of Civil Defense
OCT	original certificate(s) of title
ODA	official development assistance
OECD	Organization for Economic Cooperation and Development
OFID	OPEC Fund for International Development
OIC	Organization of Islamic Cooperation
OPAg	Office of the Provincial Agriculturist
OPAPP	Office of the Presidential Advisor on the Peace Process
OPEC	Organization of Petroleum Exporting Countries
OPV	Office of the Provincial Veterinarian
OPV	open-pollinated variety
ORG	Office of the Regional Governor
OSCC	Office for Southern Cultural Communities
OTOP	one town one product
PA	protected area
PAG	private armed group
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAL	Philippine Airlines
PAMANA	Philippine Development Program and Framework for Peace and Development [Payapa at Masaganang Pamayanan]
PAMB	Protected Area Management Board
PAO	Provincial Agriculture Office
PAPI	precision approach path indicator
PB	Power Barge
PCA	Philippine Coconut Authority
PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
PCB	power circuit breaker
PCC	Philippine Carabao Center
PCC	Portland cement concrete
PCCI	Philippine Chamber of Commerce and Industry
PCDP	Provincial Comprehensive Development Plan
PCIC	Philippine Crop Insurance Corporation
PCN	pavement classification number
PD	Presidential Decree
PDP	Philippine Development Plan
PDPFP	Provincial Development and Physical Framework Plan
PEIS	Philippine Environmental Impact Statement
PENRO	Provincial Environment and Natural Resources Office
PERF	Production Economic Research Fund
PEZA	Philippine Economic Zone Authority
PFDA	Philippine Fisheries Development Authority
PhilFIDA	Philippine Fiber Development Authority
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PICRI	Philippine Industrial Crops Research Institute
PIOUs	private investor-owned utilities
PMO	project management office
PO	people's organization
PP	Presidential Proclamation
PPA	Philippine Ports Authority
PPP	public private partnership
PRA	Philippine Retirement Agency
PRDP	Philippine Rural Development Program
PRTC	Philippine Rubber Testing Center
PSA	Philippine Statistics Authority
PSALM	Power Sector Assets and Liabilities
PSC	project steering committee
PSE	Philippine Stock Exchange
PTA	Parent-Teacher Association
PTB	passenger terminal building
PTF-MRBRD	Presidential Task Force on MRB Rehabilitation and Development
RA	Republic Act
RBCO	River Basin Control Office (of DENR)
R&D	research and development
RAED	Regional Agricultural Engineering Division
RBOI	Regional Board of Investment
RC	reinforced concrete
RCC	regional control center
RCM	rice crop manager
RDC	regional development council
RDE	research, development, and extension

RDRRMO	Regional DRRM Office
REDPB	Regional Economic and Development Planning Board
RE	renewable energy
REZA	Regional Economic Zone Authority
RGDP	regional gross domestic product
RHU	Rural Health Unit
RIS	River Irrigation System
RNS	National Route Numbering System
RPMA	Regional Ports Management Authority
ROPAX or RoPax	roll-on/roll-off passenger
RORO or RoRo	roll-on/roll-off
ROW	right-of-way
RPDO	Regional Planning and Development Office
RWY	runway
SB	Small Business
SEA	strategic environmental assessment
SERD-CAAM	Socio-economic Restoration and Development of Conflict-affected Areas in Mindanao
SEP-CDP	Socio-Economic Profile-Comprehensive Development Program
SEZ	special economic zone
SGCP	State of the Grid in China
SIASELCO	Siai Electric Cooperative
SME	small and medium-sized enterprise
SMS	short message system
SOCSKSARGEN	South Cotabato-Sultan Kudarat-Saranggani-General Santos City
SPUG	small power utilities group
SRA	Sugar Regulatory Administration
S/S or SS	substation
SSIPs	small-scale irrigation projects
SUCs	State Universities and Colleges
SULECO	Sulu Electric Cooperative
SV	supervision
SWIMP	small water impoundments with multipurpose potential (or small water impounding project)
SWISA	small water irrigation system association
TAWELCO	Tawi-Tawi Electric Cooperative
TCP	Technical Cooperation Project
TCT	transfer of certificate of title
TDP	transmission development plan
TESDA	Technical Education and Skills Development Authority
TIKA	Turkish Cooperation and Coordination Agency
TISP	Transition Investment Support Plan
T/L	transmission line
TMS	Technical Management Services
TP	turboprop
TransCo	National Transmission Corporation
UAS	Upi Agricultural School
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USM	University of Southern Mindanao
USMARC	USM Agricultural Research Center
VAT	value added tax
VCA	value chain analysis
VHF	very high frequency
VLT	voluntary land transfer
VOS	voluntary offer to sell
VPA	vehicle parking area
VSU	Visayas State University
VTT	Value transformation training
WASH	Water, Sanitation and Hygiene (programs by UNICEF)
WB	World Bank
WDIL	wind direction indicator light
ZAM	Zamboanga International Airport
ZAMBASULTA	Zamboanga, Basilan, Sulu, and Tawi-Tawi

Unit of Measurement

Area		Weight	
m^2	square meter	µg	microgram
km^2	square kilometer	mg	milligram
ha	hectare (= 10,000 m^2)	kg	kilogram
		t	ton (=1,000 kg)
Energy		DWT	deadweight tonnage
W	watt	GRT	gross register tonnage
kW	kilowatt	GT	gross tonnage
kWh	kilowatt-hour	kTOE	kilo ton of oil equivalent
MW	megawatt	MT	metric ton
GWh	gigawatt-hour		
kV	kilovolt	Volume	
MVA	megavolt-ampere	L	liter
		m^3	cubic meter (= 1,000 liter)
Length			
mm	millimeter	Other	
cm	centimeter	°C	degree Celsius
ft	foot or feet	%	percent
m	meter	mil.	million
LM	linear meter	MPa	megapascal
km	kilometer	mps	meter per second

Time	
sec, s	second
min	minute
hr	hour
yr	year

Currency

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

I. BROAD-BASED INCLUSIVE DEVELOPMENT INITIATIVE

PROJECT 1-1 AGRARIAN REFORM COMMUNITIES (ARCS) STRENGTHENING PROJECT

PROJECT 1-2 AGRICULTURAL COOPERATIVES EMPOWERMENT PROJECT

PROJECT 1-3 EFFICIENT WASTE COLLECTION AND RECYCLING SUPPORT PROJECT

PROJECT 1-4 POWER SUPPLY SYSTEM MAINTENANCE IMPROVEMENT PROJECT, SUB-PROJECT A: BOOM TRUCK PROCUREMENT PLAN FOR DISTRIBUTION WORK

PROJECT 1-5 POWER SUPPLY SYSTEM MAINTENANCE IMPROVEMENT PROJECT, SUB-PROJECT B: REHABILITATION PLAN OF MAGELCO'S DISTRIBUTION FACILITIES

PROJECT 1-6 LABOR-BASED ROAD REHABILITATION AND MAINTENANCE TECHNOLOGY FOR FMRS

PROJECT PROFILE 1-1 AGRARIAN REFORM COMMUNITIES (ARCS) STRENGTHENING PROJECT

1. Project Title: Agrarian Reform Communities (ARCs) Strengthening Project

2. Location: Bangsamoro

3. Implementing Agencies: DAR, DAF, CDA, LGU, ARB organizations (ARBOs), and SUCs

4. Objective: To develop ARCs into successful agricultural production and agri-enterprise centers with ARBOs as prime movers of agribusiness

5. Expected Effects: Improved agricultural production and income that will lead to enhanced economic condition of ARBs

6. Project Cost:

7. Implementation Schedule: 2016–22

8. Project Description:

The Comprehensive Agrarian Reform Law (CARL) was passed building from the previous experiences of the Philippines from PD 27 and previous issuances. It caused the establishment of the Comprehensive Agrarian Reform Program (CARP), which sought to cover all types of agricultural lands with corresponding support services to support the beneficiaries who are tenant-turned landowners. Much to the desire of the government, funds were not enough to support all ARCs.

The lack of infrastructure, which made agriculture difficult even for the big landowners has made farming doubly difficult for the new land owners who do not possess capital. Some lands under temporary crops miss cropping while underinvestment has turned productivity drop drastically. Having been tenants of the land they till, the new landowners do not have the enterprising nature of a farmer. In fact, small farmers in the Philippines are not farmers but peasants. In particular, productivity of plantations given to ARBs under a CLOA suffered tremendously due to cutting up of plantations into small sizes that undermine economies of scale. Thus, one of the causes of decline in production and productivity in agriculture is the implementation of agrarian reform. Any gain that the farmers could have from owning the entire crop of his harvest is lost to decreased productivity.

Improving efficiency in agricultural production creates domino effect from producers/farmers' income to national concerns such as regional and national outputs and self-sufficiency food and even non-food requirements. Production efficiency becomes self-sustaining when it enables farmers to earn and re-invest in production. Thus, agricultural production should be an enterprise in itself. Based on this premise, the project is of multiple components to address the causes of declining production, productivity and poverty. The project will have a project management office (PMO) under the DAR Undersecretary for Support Services. It will manage the project funds and ensure the effectiveness of implementing all components of the project.

This project will have the following features and components:

1) Determination of ARCs for inclusion in the project. As there are completed and on-going projects for provision of support services to ARBs, this project will consider ARCs without support services received. It is to be implemented in various ARCs where more than 50% of the farmers are ARBs or more than 50% of the agricultural lands are under CLOAs.
2) Needs assessment of chosen ARCs and project design. Since the ARCs are of varying circumstances, they will have different needs. Needs assessment is necessary to respond to the needs. Based on these identified needs, intervention will be determined and designed for each ARC. Infrastructure, technical assistance on production and marketing, credit, etc. will be provided in accordance with the design.

3) Implementation. Implementation of component projects will start from social preparation of the ARBs to mentoring and guidance. The ARBs will need to embrace the culture of associations, cooperatives and business organization. As needed new farming systems may be introduced. More importantly, the ARBs/ARBOs will have to be taught and reared into successful agri-businesses that could compete with corporations in the same business.
4) Monitoring and evaluation. The PMO will have a system of monitoring and evaluating ARCs that will provide status information on a regular basis to correct procedures and processes along the way.
5) Impact assessment. Implementation of the project per ARC will have a time frame; i.e., assistance will have to end and hence, ARCs should be left to operate by themselves after the project.

9. SEA Considerations

Production systems that will be implemented under this project will be undertaken with due regard and compliance to the environmental laws and other regulations in the Philippines. In general, no environmental impact is seen to be caused by this project.

PROJECT PROFILE 1-2 AGRICULTURAL COOPERATIVES EMPOWERMENT PROJECT

1. Project Title: Agricultural Cooperatives Empowerment Project

2. Location: Bangsamoro

3. Implementing Agencies: CDA-ARMM, DAF, LBP, PCIC, LGUs, TESDA, DTI, DOST, and cooperatives

4. Objectives: (1) To enhance CDA's capacity to support development and sustainability of agricultural cooperatives and (2) to promote the development and sustain viable operations of agriculture cooperatives

5. Expected Effects: **(**1) Enhanced CDA's capacity to support and nurture agricultural cooperatives, (2) strengthened agricultural cooperatives, and (3) increased agricultural production and productivity and farmers' income

6. Project Cost: US$16.533 million

7. Implementation Schedule: 2017– 2022

8. Project Description

8.1 Rationale

The reputation of cooperative development in the entire Philippines has not been very encouraging. The number of cooperatives that become inactive after having successfully registered is staggering and is noteworthy of review. In fact, a lot of reviews of cooperatives have already been done and these yielded some basic understanding of causes of instability of cooperatives. Among them are wrong motives and lack of cooperative leadership.

After the cooperative registry was cleansed in 2009 following the enactment of the Cooperative Code in 2008, the number of registered cooperatives was trimmed down from 71,000 to 18,000. Under the new Code, regulations have become very stringent slowing down registration. In 2013, the total registered cooperatives numbered only 24,432. About 91% of these are micro and small cooperatives, of which only 36% are able to comply with the reportorial requirements of the law and can be classified as inactive. At present, a large portion of these micro and small cooperatives are primary agricultural cooperatives mostly weak and fragmented.[1] Similarly, a staggering majority of cooperatives in Bangsamoro are inactive. CDA-ARMM data shows that out of 1410 cooperatives[2] that were categorized into *active* and *inactive*, 1,118 cooperatives are inactive, which is about 79%.

Despite the current state of development, cooperative is the best option for small farmers to be able to rise from poverty and substantially contribute to the economy. Cooperatives have strengths that can improve agriculture as an economic activity under the hands of small holders. These have been properly cultivated in some cooperatives, which emerged as success stories in Bangsamoro. Through cooperatives, farmers can undertake entrepreneurial activities while providing services to the members. Under a cooperative, farmers can benefit from various schemes.

Cooperatives can operate small businesses like distribution of inputs to members or more advanced schemes such as consolidation of farms and operated as single unit thereby allowing efficiency through economies of scale. Similarly, cooperatives provide farmers a medium to reverse the situation from being just a price taker. With cooperatives combining all products of the members, farmers have stronger market position. Likewise, the combined volume of produce opens to alternative markets.

[1] CDA Vision 2020 A Radiant Agency Implementing Integrated and Comprehensive Plan for Cooperatives
[2] This data does not include Mag. 1, LDS 1 and 2, and some coops registered in 2014 particularly those that were organized under special programs such as the PAMANA-DSWD, PAMANA-MNLF and ARMM HELPS.

Cooperative development is appropriate for Bangsamoro. Duly said, Islam religion is a fertile ground for the growth of cooperatives as the basic principle of both is sharing. Under this principle, the spirit of group undertaking in livelihood, collective ownership of resources and operation of businesses from their economic activities can be easily embraced by Muslim farmers. The creation of the Islamic Cooperatives is an immediate need in ARMM since they will operate not only on a commercial but also on a social basis. It can manage commercial and social funds as well as religious taxes and donations such as Zakat, Infaq, and Sadaqah. Islamic Cooperatives will play an important role for micro-, small-, and medium-scale enterprises (MSME) in ARMM. They are important because they have been proven as the most robust and least-costly model of financial institutions like in Aceh, Indonesia and other developing Muslim Countries.[3]

The current status of cooperatives development in ARMM is symptomatic of the current state of affairs of the CDA-ARMM. The main reason for the poor cooperative development in Bangsamoro is basically the inability of the CDA to effectively function. For the year 2014, CDA-ARMM had a miniscule budget. If there is a total of 4,700 registered cooperatives[4], its capability to inspect is only around 11%, to provide trainings 7% and to provide technical assistance 10%.[5]

During the formulation of the Strategic Roadmap for Cooperative Development by the CDA-ARMM and commissioned expert, the following issues and concerns affecting the capability of the CDA were highlighted:

1) Unresponsive organizational structure to carry out the mandate and functions. Among others, the lack of division for cooperative development is noticeable. The Office of the Cooperative Development Staff (CDS) in each of the five provinces is a one- or two-person office. With this inadequacy, the CDS can only undertake registration. Despite the low targets, actual accomplishments of CDA-ARMM for 2014 in its program are 68% registration, 69% training, 8.9% collection of CAPRS[6], 48% inspection, and 40% technical assistance. The low accomplishment in collection of CAPR is an indication of lack of regulation or lack of capacity for cooperatives.
2) Lack of procedures and poor documentation. Citizens' Charter and manuals of procedures for registration, regulations and development of cooperatives are outdated.
3) Records management system is dysfunctional. Records keeping are hardly computerized. Existing databases are conflicting one another. The supervising CDS and the Records Section have database different from the field CDS. This results in unreliable statistics
4) Personnel needs training, yet there are no staff training programs.
5) CDA-ARMM suffers from a sore inadequate office space. The head office occupies three small rooms in the Japanese Friendship Building. There are no storage rooms, filing cabinets are insufficient, computer units are outdated and internet service is slow.

CDA-ARMM's dual function of regulating and developing cooperatives should be rationalized and its organization strengthened. Although development of cooperatives requires a concerted effort of various government instrumentalities and non-government organizations, the CDA should be on top of them all. Regulation of cooperatives under the domain of CDA-ARMM should be fortified to ensure that cooperative members are benefited and government resources are not wasted.

For the agency to focus more resources on strengthening the management of cooperatives, CDA should adjust its other development functions to coordination. As coordinator of infusing financial, technical and other assistance to cooperatives, services are not diminished rather made efficient by avoiding duplication of interventions by partner agencies. CDA-ARMM has already made inroads to capacity improvement. It developed its Strategic Framework for Cooperative Development illustrated in the figure below. Note that at the base of the framework is Institutional Strengthening of CDA-ARMM.

[3] Cooperative: The Islamic Perspective by former Regional Administrator Abdulrashi Ladayo, Sr. presented in 2nd Regional Ulama Summit at Marcian Garden Hotel and Conventional Center, Zamboanga City, February 16, 2014.
[4] Data before cleansing of registered cooperatives before the passage of the Cooperatives Code of 2008
[5] Based on data provided by CDA-ARMM
[6] Cooperatives annual performance report

It is an immediate need to fast track development and mainstreaming of small farm holders.

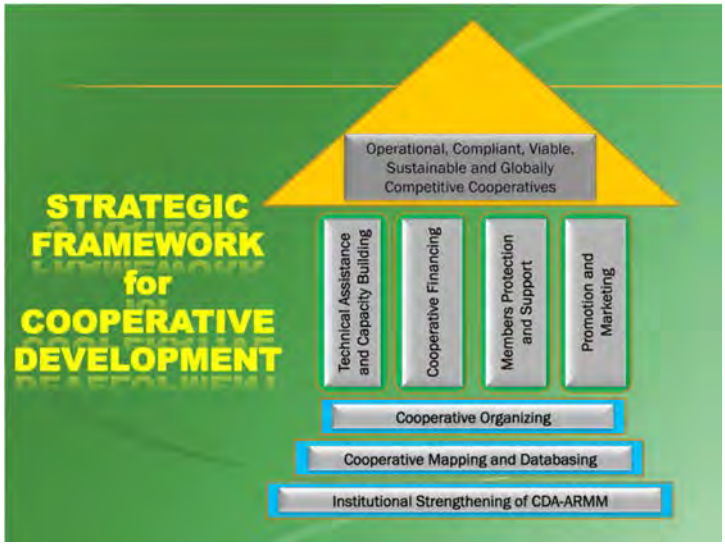


Figure 1-2.1 CDA-ARMM Strategic Framework for Cooperatives Development

8.2 Project Components

The essence of this project is to strengthen the capability of CDA-ARMM to reach out to rural areas where farmers are waiting for guidance to organize as cooperatives. With an agriculture-based economy, Bangsamoro is a wide field to work on for CDA-ARMM. The project components are discussed below.

(1) Institutional strengthening. This component of the project includes organizational review, human resource development, installation of a quality management system, and provision of functional infrastructure.

Organization review will be conducted by a team of organization experts outside of CDA. Inadequacies of the CDA organization is already apparent with major pitfalls identified, thus a total organizational review is necessary to be able to install a fully responsive structure where resources (human resources and funds) are utilized efficiently and effectively. Offhand, the agency would need a bigger budget to increase its staff particularly those that assist the cooperatives and support cooperatives development programs.

The need for human resource development is understandable in the current state of CDA. Under the Human Resources Development component, a program will be developed following the organizational review.

Quality management system should have clear system of procedures in the operations and conduct of business of the agency fundamentally founded on effectiveness and efficiency. This will also be developed following the recommendations of the organizational review. This component will include review of the training programs and methods and procedures for information and education campaign (IEC) and provision of support services to cooperatives.

The agency should be able to provide a continuous training program to sustain the response to need of cooperatives for able 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. This will necessitate establishment of training centers, which may be lodged at the provincial and municipal cooperative centers (see below).

Serviceable infrastructure is essential for the operation of CDA-ARMM. In this component, the following will be designed and constructed:

- One (1) regional office building,

- One (1) provincial cooperative center building (renovation and improvement of CDA building in Marawi City), and
- Six (6) municipal cooperative center buildings (2 in Maguindanao, 1 in Lanao del Sur, 1 in Basilan, 1 in Sulu and 1 in Tawi-Tawi).

The one provincial cooperative center and six municipal cooperative center buildings will be constructed for modeling purposes of the cooperative centers as another component of this project (see below). The selection criteria for location of the six municipal cooperative center buildings will necessarily include density of agricultural production activities. After the project completion, the government is expected to construct the four other provincial centers and all municipal level cooperative center buildings.

(2) Improvement of cooperatives registration and monitoring and evaluation. This component is aimed at improving the system of registration of cooperatives and providing for a system that facilitates monitoring of registered cooperatives. It includes development of cooperative management information system supported by a database, development of manual of systems and procedures and development of a web-based cooperative mapping and information system as follows:

   a. Development of cooperative management information system supported by a database would enhance monitoring of registered cooperatives. With this facility, cooperatives' compliance is easily tracked. It will also hasten periodic review of cooperatives.

   b. Development of manual of systems and procedure is an important tool for uniformity of practices in registration and monitoring and for proper guidance of cooperatives development workers.

   c. Development of an effective web-based cooperative mapping and information system. This will facilitate monitoring of cooperatives. It will also enhance delivery and monitoring of support services through a program, like geo-tagging developed by the Philippine Rural Development Project (PRDP) of the Department of Agriculture.

(3) Establishment of cooperative centers. Cooperative centers will be established at the provincial and municipal levels. This project component is aimed at improving effectiveness of assistance by increasing the interaction of cooperatives with support organizations.

The provincial cooperative centers' functions include the following:

a. Cooperatives registration and monitoring of cooperatives regulatory compliance and cooperative activities.
b. Finding and securing programs and projects to support cooperatives, acting as liaison with various government and non-government agencies, consolidating programs with development agencies like DA and DAR, and introducing them to municipal cooperative centers.
c. Monitoring of cooperatives support projects and programs of CDA and other agencies

The municipal cooperative centers directly interact with cooperatives and implement projects and programs. Each municipal cooperative center will consist of three units: organization and training, help desk, and entrepreneurship support. The expected functions of these units are as follows:

1) The organization and training unit will

   a. Undertake IEC for farmers to organize cooperatives;
   b. Provide cooperative organizational training; training program under this unit includes modules for value formation, organization, cooperative governance skills, administration, accounting, and bookkeeping;
   c. Provide assistance and facilitate organization and registration of new cooperatives; and
   d. Hosts a multi-purpose training facility.

2) The help desk unit will

   a. Host a concierge where anyone who enters the cooperative center can ask any information and be directed to appropriate units of CDA-ARMM or other entities;
   b. Provide support for regulatory compliance; and

c. Provide office administration services such as bookkeeping and report preparation related to regulatory compliance for small and micro cooperatives of small farmers, assisting them in building up their organizational capacity.

3) The entrepreneurship support unit will

a. Provide cooperatives linkage to production support projects and programs of various agencies (e.g., provision of technology, farm inputs, machinery, and crop insurance);
b. Provide small and micro cooperatives with assistance in accessing financing from banks, various programs of government, and other institutions, including preparation of documentary requirements such as feasibility studies, business plans, project proposals, etc.;
c. Provide guidance to small and micro cooperatives in contractual procedure, project implementation, network and linkage, marketing strategy, etc.; and
d. Maintain a facility that links cooperatives to markets.

Under the project, the establishment and operation of one provincial cooperative center and six municipal cooperative centers will be piloted. Since this component is newly proposed, CDA-ARMM has not programmed its implementation. Donor support is highly expected for the project with this novel component.

9. Project Timeline and Cost

9.1 Timeline

The project will be implemented over five years, and the implementation schedule for the first three years is indicated below.

Project Component	Year 1	Year 2	Year 3
Institutional Strengthening			
Organizational review	■		
Installation of quality management system		■	■
Construction of buildings			
Regional Office	■	■	
Provincial Cooperative Center		■	
Municipal Cooperative Center		■	
Improvement of Coop organization & monitoring		■	■
Establishment of Coop Centers			
Organization & staffing		■	
Pilot operation of cooperative centers		■	■

9.2 Project Cost

The project cost is estimated per component below.

Estimated Project Costs

Cost Component	(US$1,000)
Institutional Strengthening	
Organizational review	750
Installation of quality management system	1,000
Construction of Regional Office (1)	1,000
Construction of Provincial Cooperative Center (1)	223
Construction of Municipal Cooperative Center (6)	750
Improvement of Coop Organization & Monitoring	4,750
Establishment of Coop Centers & Pilot Operation	8,080
Total	16,553

10. Sea Considerations

There is no expected environmental impact for this project.

PROJECT PROFILE 1-3 EFFICIENT WASTE COLLECTION AND RECYCLING SUPPORT PROJECT

1. Project Title: Efficient Waste Collection and Recycling Support Project

2. Location: Marawi City

3. Implementing Agencies: General Services Office, Marawi City

4. Objective: To help promote solid waste recycling through providing material recovery facilities (MRFs), and to make waste collection efficient by providing compactor cars

5. Expected Effects: Environmentally-friendly and clean city; reduced work load of the staff

6. Project Cost: PHP 19 million

7. Implementation Schedule: 2016–2019

8. Project Description

To promote recycling, the following facilities will be provided:

- 25 material recovery facilities (MRFs) for 25 urban barangays,
- Compost facility, and
- Shredder for compost.

To make waste collection efficient a compactor car will be provided.

Total required costs are as follows:

- MRFs:	PHP 75,000 x 25 =	PHP 1,875,000
- Compost facility:	PHP 395,000 x 1 =	PHP 395,000
- Shredder for compost:	PHP 330,000 x 1 =	PHP 330,000
- Compactor car (6 m^3):	PHP 3,000,000 x 2 =	PHP 6,000,000
Total		PHP 8,600,000

9. Background

9.1.1 Present conditions

Marawi city has a population of 237,550 (2014), located just north of Lake Lanao. The Solid Waste Management Board (SWM Board) was established chaired by the Mayor in February 2002 based on the Executive Order (EO) 21. Generated waste in Marawi city is 113 tons/day (0.475kg/day/capita), 77% of biodegradable, 20% of non-biodegradable, and 3% of medical waste. The staff involved in waste management is 192 personnel including 78 street sweepers.

Dump trucks, three units of 3.0 m^3 and two units of 6.0 m^3, are used to collect garbage, but they are not designed for waste collection, and therefore, collection cannot be done efficiently. The dumpsite with 5.0 ha, 20-year old, is located at Barangay Papandayan, 5 to 6 km from the city. It is not fenced, and not covered with soil. There are scavengers in the dumpsite that collects recyclables (plastics, papers, metals etc.). There also junks group from Iligan City, which buys scraps (plastics @ 5.00/kg, metal @ 3.00/kg, etc.).

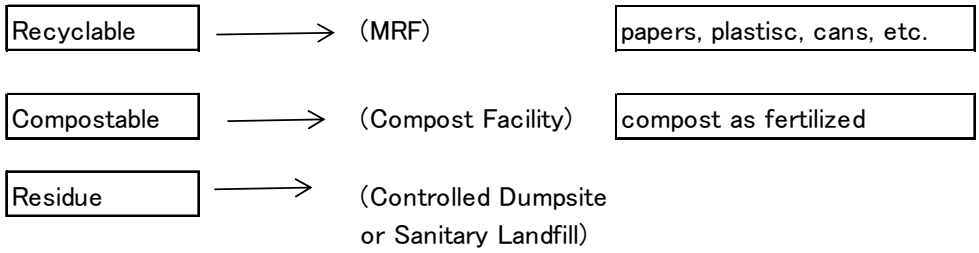
9.1.2 Ecological Solid Waste Management Plan (ESWMP)

The Ecological Solid Waste Management Plan (ESWMP) of Marawi City is formulated in consideration of the City's strategic directions as indicated in the Executive Agenda and the Capacity Development Plan, and in response to the timely enactment of R.A. 9003, known as the Ecological Solid Waste

Management Act of 2000 which mandates local government units to address and manage their solid waste management concerns.

The goal is of the ESWNP is to establish a sustainable ecological solid waste management program through the institutionalization of a permanent SWM structure, generation of sufficient revenue and fund allocation, and provision of adequate infrastructure and equipment support facilities for efficient delivery of SWM services complemented with the active cooperation and participation of the community as a result of effective education and enforcement campaign.

The image of general waste flow will be as shown below.



The main factors of the ESWNP are as follows:

Engineering component

- Practice of source reduction, reuse, and recycle ("3Rs")
- Segregation of solid waste
- Establishment of solid waste collection and transportation system.
- Operation of materials recovery facilities (MRFs) and composting facility and establishment of Barangay Redemption Centers
- Establishment of controlled dumpsite or sanitary landfill

Education component

- Organization of Speaker's Bureau on ESWM (pool of resource persons responsible the ESWM program)
- Conduct of seminars, orientation and trainings on ESWM
- Integration of ESWM in school curricula
- Promotion through radio and TV

Enforcement component

- Formulation and adoption of a comprehensive ESWM ordinance with supporting implementing rules and regulations

Equity component

- Revenue generation from regular solid waste collection fees, fines and penalties to violators, etc.
- Specific budget allocation for ESWM
- Establishment of ESWM trust fund

9.1.3 MRF

A MRF is one of the most important factors in the ESWMP. The Philippine Implementing Rules and Regulations of the Philippine Ecological Solid Waste Management Act of 2000 stipulate 'Barangays shall be responsible for the collection, segregation, recycling of biodegradable, recyclable, compostable and reusable wastes. MRFs will be established in every barangay or cluster of barangays'. MRF is a facility to receive, sort, process and store compostable and recyclable materials as shown in a sketch below. It usually has a temporary office and a rest place for workers. It costs 75,000 PHP per one unit. There is no MRF that is working at present.

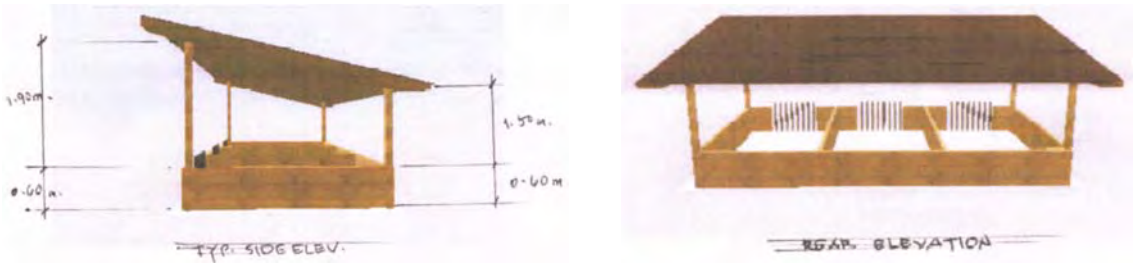


Figure 1-3.1 Sketch of General MRF

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 because of lack of fund. Marawi City is planning to build 25 MRFs in urban barangays, at first.

The following sites were selected for the pilot projects. They have high population density and therefore, it is easy to collect waste, excluding the Mindanao State University.

- Raya Madaya (outstanding effort to raise awareness on protecting the lake from dump, led by a young lady)
- Banggolo (with a public plaza.)
- Naga (with a market where much food waste is generated)
- Datsu sa Dansalan (the same as above)
- Mindanao State University (with existing taskforce)

The schedule is as follows:

2016:	- Information and education campaign
	- Building of the above five MRFs
2017:	- Operation of the five MRFs and evaluation
2018–2019	- Expansion to 25 barangays

9.1.4 Composting facility

Composting facility is important facility to promote recycle as well. The Department of Agriculture (DA) is going to promote establishment of vermi composting facilities (an example is shown below). If the same type of facility is adopted, the price is PHP 394,500 with floor area: (8mx5m), and vermi-bed: (1 m x 6 m x 2.5 ft.) x 3 units. A shredding machine is required to shred the compostable before using the facility. It costs around PHP 330,000 (shredding capacity of 500 kg to 6 tons of waste). One unit of compost facility with a shredder will be introduced as a model project.

The schedule is as follows:

2016–17:	- Information and education campaign
	- Installment of composting facility with a shredder
2018:	- Operation and evaluation

9.1.5 Compactor car

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 a compactor car is considered to help to make collection efficient. The price is considered to be about PHP 3,000,000 per vehicle.

The schedule is as follows:

2016:	- Information gathering, selection and required procedures
2017–18:	- Introduction, utilization and evaluation

Source: Website of Sta.Cruz, IlocosSur, Philippines (http://stacruz-is.gov.ph/main/sta-cruz-lgus-vermicomposting-facility/)

Figure 1-3.2 Example of Compost Facility

PROJECT PROFILE 1-4 POWER SUPPLY SYSTEM MAINTENANCE IMPROVEMENT PROJECT, SUB-PROJECT A: BOOM TRUCK PROCUREMENT PLAN FOR DISTRIBUTION WORK

1. Background and Issues

ECs in ARMM suffer distribution losses mainly from low tariff collection, and many need to get out of deficit. Due to financial difficulties, they do not have financing to procure new equipment such as boom trucks for distribution work. As a result, they have no choice but to continue to use second-hand vehicles for a long time. However, these vehicles frequently break down due to aged parts and need to be replaced due to the shortage of the spare parts. Furthermore, some of boom trucks owned by ECs have heavy weight since their chassis is of American-manufactured basis. Therefore, they are not desirable in terms of fuel consumption.

Japan-made boom trucks with less fuel consumption are medium-sized and suitable for the road condition in the Philippines and thus strongly requested by MAGELCO. According to the performance assessment by NEA, MAGELCO was ranked the bottom out of 120 ECs. Other six ECs in ARMM are similarly ranked low: 119th for LASURECO, 118th for SULECO, 117th for BASELCO, 116th for TAWELCO, 108th for CASELCO and 107th for SIASELCO. Almost all the ECs in ARMM are in the severe financial circumstances. The procurement of the Japanese-manufactured boom trucks for all the ECs represents very meaningful and effective assistance.

Boom truck owned by MAGELCO


Boom truck owned by LASURECO
(with missing bucket at boom top)

Figure 1-4.1 Boom Trucks Owned by MAGELCO and LASURECO

2. Scope of Proposal

Japanese automakers' boom trucks with a bucket/digger will be procured and distributed to all the ECs in ARMM. The number of vehicles to be allocated to each EC will be determined by the size of its franchise area and business scale in consultation with NEA. Table 1-4.1 is an example of the allocation of boom trucks.

Table 1-4.1 Example of Bucket/Digger Boom Trucks Allocation

ECs	Bucket boom truck (n)	Digger boom truck (n)
MAGELCO	2	2
LASURECO	2	2
SURECO	2	2
BASELCO	2	2
TAWELCO	2	2
SIASELCO	1	1
CASELCO	1	1
Total	12	12

3. Project Purpose

This project aims to improve capability for construction and maintenance work of ECs in ARMM.

4. Expected Effects

The following effects are expected:

1) High visibility of the assistance expected in the whole ARMM area including islands,
2) Contribution by small and medium-sized firms,
3) Minimization of the risk that the delivered equipment is exposed for a long time at site in the process of procurement,
4) Delivery to ECs in a short period of time, approximately two years, compared to infrastructure related projects, and
5) The experience of the Government of the Philippines to receive the boom trucks procured through grant aid scheme, through the Yolanda relief project.

Therefore, it would be possible to smoothly implement the boom truck procurement plan for ECs in ARMM.

5. Project Cost: JPY 500 million (in case of allocation presented in Table 1-4.1)

6. Security Consideration

There are many places where it is difficult to ensure security in Mindanao especially in ARMM. Safe shipping routes and warehouses for the delivery of the boom trucks should be carefully considered and secured.

PROJECT PROFILE 1-5 POWER SUPPLY SYSTEM MAINTENANCE IMPROVEMENT PROJECT, SUB-PROJECT B: REHABILITATION PLAN OF MAGELCO'S DISTRIBUTION FACILITIES

1. Background and Issues

MAGELCO was established on September 4, 1975 by NEC in accordance with Presidential Decree 269 as a non-stock, non-profit, non-political venture corporation owned by its members. As of today, it has three substations to supply power in the province of Maguindanao. However, MAGELCO is facing with serious issues in its power supply facilities which should be improved urgently to get out of the 'red'. The following are the problems of MAGELCO.

(1) Distribution system reliability

The distribution facilities of MAGELCO's franchise area belonging to ARMM were constructed from the 1970s to 1980s. Through the site survey conducted by the JICA Study Team, it is observed that, of all wooden poles and cross-arms of distribution facilities with an average span length of 100 m, approximately 60% of poles were inclined. Over the years of operation, many portions of the distribution lines have line conductors cut and had not been properly jointed or terminated. The power distribution lines are now dilapidated and unreliable.

(2) Substation capacity and facilities

According to the substation load forecast and loading analysis as shown in Table 1-4.2, the Salbu substation requires immediate capacity augmentation because it is scheduled to additionally supply the power through the DOS and Maganoy feeders newly connected to the system.

Also, existing substations are protected only by power fuses on the 69 kV line side. In order to improve the system reliability and shorten the duration of power outage, circuit breakers and instrument transformers should be installed on the primary side of substations.

(3) Primary line losses

The 13.2 kV distribution lines were constructed using #1/0 (54 mm^2), #2/0 (67 mm^2), and #4/0 (107 mm^2) AWG ACSR. The increase in customer demand and its present aging condition made the line capacities insufficient. Also it shall be noted that the existing backbone 13.2 kV lines are over-stretched using undersized conductors. This causes high primary line losses and voltage drops below 10% of nominal level in the distribution system. Table 1-4.3 presents the results of power flow simulation by MAGELCO showing primary line losses per feeder line for the Salbu and HQ substations.

The total line losses of 8% are too high, and the lowest voltage level less than 0.9 PU is a serious problem in properly supplying power to customers. In accordance with the NEA Engineering Bulletin, the recommended percent loss on primary lines is 3%. Serious efforts to reduce losses are required.

(4) Metering defects and losses

Illegal connections of service wire and breaking of kWh meters are being done on a day-to-day basis in the franchise area. According to the sampling calibration of 251 sets of kWh-meter, 75% (187 sets) of kWh-meter were found to be of low accuracy or defective, which resulted in low tariff collection rate. Therefore, replacement or installation of properly functioning kWh-meters is urgently needed to improve financial and managing status of MAGELCO.

Table 1-4.2 Substation Load Forecast and Loading Analysis

	SALBU SS		CAPITON SS (HQ)		SIMUAY SS	
Rated capacity (MVA)	5		5		10	
Power factor (%)	97.7		98.7		92.4	
Year	MW load	% loading	MW load	% loading	MW load	% loading
2008	3.33	68.25	2.13	43.26	3.5	37.87
2009	3.12	63.87	2.19	44.45	3.69	39.97
2010	3.02	61.72	2.37	48.03	3.86	41.80
2011	2.84	58.10	2.50	50.59	4.09	44.30
2012	3.38	69.19	2.58	52.29	4.37	47.30
2013	3.91	80.04	2.75	55.72	4.56	49.40
2014	3.93	80.53	2.88	58.45	4.80	51.92
2015	4.03	82.46	3.02	61.19	5.03	54.49
2016	4.15	84.93	3.15	63.92	5.28	57.11
2017	4.27	87.37	3.29	66.65	5.52	59.78

Source: MAGELCO.

Table 1-4.3 Power Flow Simulation Results

Substation	Feeder	SS-end MW Load	SS-end MW Load	Line losses kWh	% line losses	Lowest voltage level, PU
CAPITON (HQ)	DOS	1.63	646,549	72,761	11	0.82
	UPI	1.03	408,118	41,158	10	0.80
SALBU	MAGANOY	2.61	1,033,560	54,482	5	0.87
Total		5.27	2,088,227	168,401	8	

Source: MAGELCO.

2. Rehabilitation Program of MAGELCO

MAGELCO has prepared the rehabilitation program with the components listed below before the field survey of the JICA Study Team which was firstly conducted at the beginning of December, 2014.

(1) Sub-transmission projects

- Construction of 69 kV/13.2kV UB line
- Installation of switchyard Kauran SS
- Installation of switchyard at HQ SS

(2) Substation projects

- Installation of new 5 MVA Kauran SS
- Installation of new 10 MVA Landasan SS
- Upgrading of Salbu SS to 10 MVA capacity
- Installation of 5 MVA Nuro SS

(3) Rehabilitation of 13.2 kV lines: Total 115 km

(4) Metering project: 30,000 kWh meters

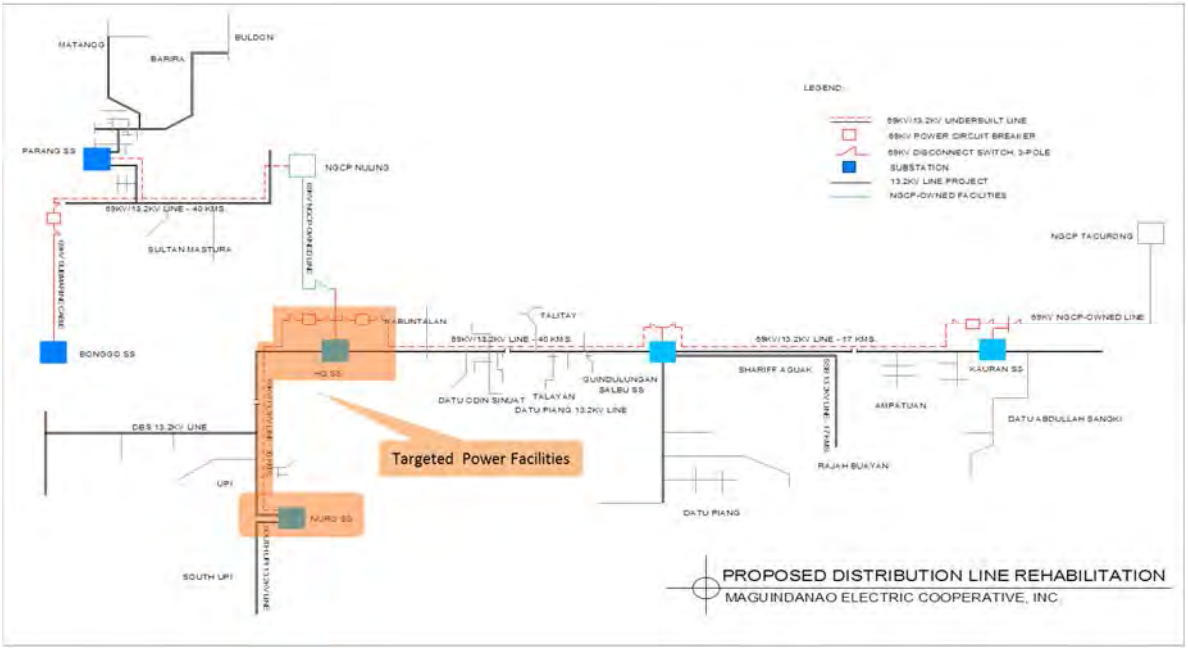
(5) Construction vehicles: Purchase of two boom trucks and five utility vehicles

3. Scope of Proposal

The following project components extracted from the Rehabilitation Program of MAGELCO are recommended, based on the criteria of security during construction work and budget for Japanese grant aid projects:

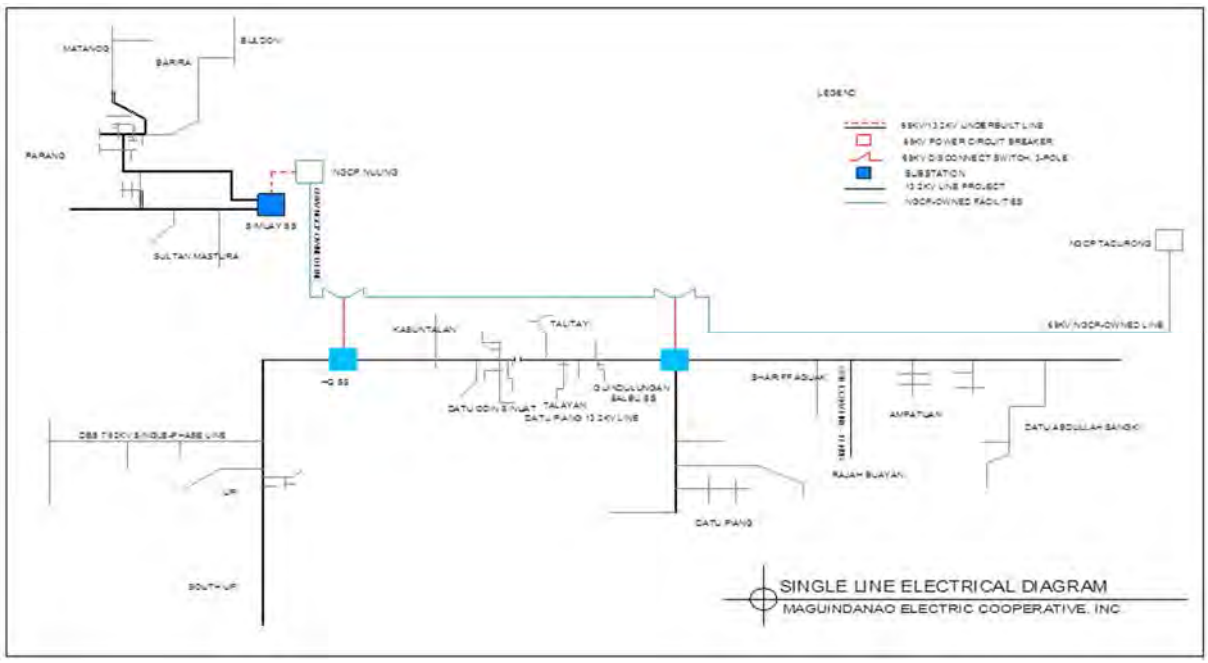
- Power transformer and substation equipment for new construction and improvement of substations: for HQ substation, one lot of substation equipment; for NURO substation, one unit of 5 MVA,
- 69 kV/13.2 kV transmission and distribution facilities (total 30 km, under-built, concrete poles),
- Digital kWh meters: 10,000sets, and
- Boom trucks with bucket and boom trucks with digger: two units each.

The proposed priority project for the rehabilitation of the power facilities of MAGELCO is shown in Figure 1-4.2. Figure 1-4.3 is a single-line diagram showing the current distribution system of MAGELCO.



Source: MAGELCO.

Figure 1-4.2 Targeted Power Facilities for Priority Project in Rehabilitation Plan of MAGLECO



Source: MAGELCO.

Figure 1-4.3 Single-line Diagram of Current Distribution System

4. Project Purpose

The project aims at

- Improving supply reliability of distribution network,
- Realizing quality power supply at the proper supply voltage,
- Reducing distribution loss and preventing and reducing illegal connection,
- Upgrading supply capacity to satisfy the future power demand, and
- Improving tariff collection rate.

5. Expected Effects

Since this type of project could be a role model of project implementation, the success of this project will lead to the continuous project formulation to supply equipment and materials to the ECs in the missionary areas and islands such as Lanao del Sur and Basilan. Consequently, this can contribute to the economic development of the Bangsamoro area as a whole. Also, improvement in the quality of life of local residents is expected.

6. Considerations for Project Implementation

This proposal is formulated based on the rehabilitation program prepared by MAGELCO, and the area, where the rehabilitation and construction work will be done, covers from Guindulungan of middle Maguindanao to Datu Abdullah Sangki in the southern area of Maguindanao; the project will only include procurement of equipment and materials, and installation and construction work should be done by MAGELCO.

Also, it is necessary to

- confirm the ability of project management of MAGELCO and ability of contractors because the requirement of project implementation is conditioned to be done by MAGELCO,
- review the scope of the project and technical justification because this scope of project has been formulated by MAGELCO, and
- ensure security during the construction.

PROJECT PROFILE 1-6 LABOR-BASED ROAD REHABILITATION AND MAINTENANCE TECHNOLOGY FOR FMRS

1. Project Title: Labor-based road rehabilitation and maintenance technology for FMRs

2. Locations: All five provinces of ARMM

3. Implementing Agencies: LGUs (city or municipality level) with cooperation from barangay LGUs, MILF and communities

4. Objectives: (1) To rehabilitate farm-to-market roads as part of effort to build the entire Bangsamoro road network and (2) to provide temporary jobs to the communities and combatants during the transition period

5. Expected Effects: Improved accessibility to agriculture, fisheries, and rural communities' access to social services

6. Project Cost: (PHP 13.68 billion)

7. Implementation Schedule: To be determined

8. Project Description:

The Bangsamoro development master plan has identified about 1,449 km of trunk roads (national roads, provincial roads, bypass roads) for Bangsamoro, of which 1,105 km is to be covered by new projects (new construction, road surface upgrading, and reconstruction) as indicated in Table 1-6.1. In the JICA-assisted master plan, the Study on Infrastructure (Road Network) Development Plan for the Autonomous Region in Muslim Mindanao ARMM in 2010, it was observed that for every 10 km of a trunk road, there is about 8 km of farm-to-market roads to be improved (excluding roads leading to unproductive areas). Thus it is estimated that about 884 km of FMRs are connected to the identified 1,105 km of trunk roads for improvement of Bangsamoro. A labor-based road construction and maintenance method should be applied where possible.

Table 1-6.1 Estimated Lengths and Cost of FMRs to Be Improved by Province

Province	Trunk roads (km)	Trunk roads to improve (km)	FMR (km)	Construction cost (PHP)	Engineering services (PHP)	Total (PHP)
Lanao del Sur	325	138.6	111	1,716,682,464	240,335,545	1,957,018,009
Maguindanao	515	375.3	300	4,647,479,904	650,647,186	5,298,127,090
Basilan	228	228.1	182	2,825,000,928	395,500,130	3,220,501,058
Sulu	202	201.9	161	2,499,883,776	349,983,729	2,849,867,505
Tawi-Tawi	178	161.1	129	1,994,690,880	279,256,723	2,273,947,603
Total	1,449	1,105.0	884	13,683,737,952	1,915,723,313	15,599,461,265

Note: Based on Philippine Rural Development Project by DA (October 2015), average direct cost (concreting) for FMR in ARMM is 11.5 M/km, which was used as basis; construction cost = direct cost, overhead cost, profit cost, contingency, and VAT; engineering services (ES) such as FS, DD, and SV are assumed to be undertaken during the improvement plan for the main trunk road where these FMRs are connected. If ES are undertake separately, estimated ES is PHP 1.91 billion.

9. Sea Considerations:

No land acquisition is expected since target FMRs exist.

II. CONCERTED PUMP PRIME INITIATIVE

PROJECT 2-1 BANGSAMORO ARTERY ROADS UPGRADING PROJECT: PHASE 1 (MAINLAND PROVINCES)

PROJECT 2-2 BANGSAMORO ARTERY ROADS UPGRADING PROJECT: PHASE 2 (ISLAND PROVINCES)

PROJECT 2-3 MISSING LINKS DEVELOPMENT PROJECT (MAINLAND PROVINCES)

PROJECT 2-4 MISSING LINKS DEVELOPMENT PROJECT (BASILAN)

PROJECT 2-5 CONSTRUCTION OF MARAWI CITY RING ROAD

PROJECT 2-6 CONSTRUCTION OF PARANG BYPASS ROAD OR EAST DIVERSION ROAD

PROJECT 2-7 FEASIBILITY STUDY ON CONSTRUCTION OF GREATER COTABATO RING ROAD

PROJECT 2-8 CONSTRUCTION OF ISABELA CITY BYPASS ROAD

PROJECT 2-9 BANGSAMORO NATIONAL IRRIGATION SYSTEMS (NIS) IMPROVEMENT PROJECT

PROJECT 2-10 COMMUNAL IRRIGATION SYSTEMS SUPPORT PROJECT

PROJECT 2-11 PREPARATORY SURVEY FOR STRENGTHENING OF NATIONAL HIGHWAY NO. 1 (NH1)/ASIAN HIGHWAY 26 (AH26) FOR BANGSAMORO ECONOMIC CORRIDOR

PROJECT 2-12 CORRIDOR LINK ROADS IMPROVEMENT PROJECTS (MAINLAND PROVINCES)

PROJECT 2-13 CORRIDOR LINK ROADS IMPROVEMENT PROJECTS (ISLAND PROVINCES)

PROJECT 2-14 POLLOC PORT UPGRADING PROJECT

PROJECT 2-15 COTABATO AIRPORT IMPROVEMENT PROJECT

PROJECT 2-16 SPECIAL EMPLOYMENT ZONE DEVELOPMENT PROJECT (AFTER 2022)

PROJECT 2-17 GREATER COTABATO CITY URBAN INFRASTRUCTURE DEVELOPMENT PROJECT

PROJECT 2-18 JOLO AND BONGAO URBAN FUNCTIONS UPGRADING PROJECT

PROJECT 2-19 POLLOC PORT AND ECOZONE DEVELOPMENT PROJECT

PROJECT 2-20 ABUBAKAR INTEGRATED AREA DEVELOPMENT PROJECT

PROJECT PROFILE 2-1 BANGSAMORO ARTERY ROADS UPGRADING PROJECT: PHASE 1 (MAINLAND PROVINCES)

1. Project Title: Bangsamoro Artery Roads Upgrading Project: Phase 1 (Mainland Provinces)

2. Locations: Maguindanao and Lanao del Sur

3. Implementing Agencies: DPWH-ARMM in collaboration with concerned LGUs

4. Objective: To complete and strengthen the regional artery roads of the region and contribute to facilitating rapid economic development

5. Expected Effect: Improved access

6. Project Cost: PHP 4.89 billion

Code	Road Name	(PHP mil.)
RA-L1	Molundo–Bumbaran–Wao Rd	790.0
RA-M1	Parang– Barira–Butig–Lumbayanague Rd.	1,210.5
RA-M2	Matanog–Barira–Alamada–Libungan Rd	1,167.1
RA-M3	Pagalungan–Mamasapano–Sharief Aguak Rd	1,719.0
	Total	4,886.7

7. Implementation Schedule:

8. Project Description:

The total length that needs to construct to complete the regional artery roads of Bangsamoro (mainland) is about 105.3 km (pavement upgrading and missing link). Aside from improvement of traffic circulation and strengthening of the network, these four roads when completed will unlock vast areas of productive agricultural land (RA-L1, RA-M1, RA-M2). The RA-M3 on the other hand will contribute in the realization of bring out with less transport cost the agricultural and fishery produces in Liguasan Marsh. Thus these roads have strategic importance in view of efforts to come up with projects that directly support the poorest of the poor.

9. SEA Considerations

Land acquisition might be needed for the road right-of-way (ROW) of the new road section (new construction).

PROJECT PROFILE 2-2 BANGSAMORO ARTERY ROADS UPGRADING PROJECT: PHASE 2 (ISLAND PROVINCES)

1. Project Title: Bangsamoro Artery Roads Upgrading Project: Phase 2 (Island Provinces)

2. Location: Tawi-Tawi Province

3. Implementing Agencies: DPWH-ARMM in collaboration with concerned LGUs

4. Objective: To complete and strengthen the regional artery roads of the region and contribute to facilitate rapid economic development

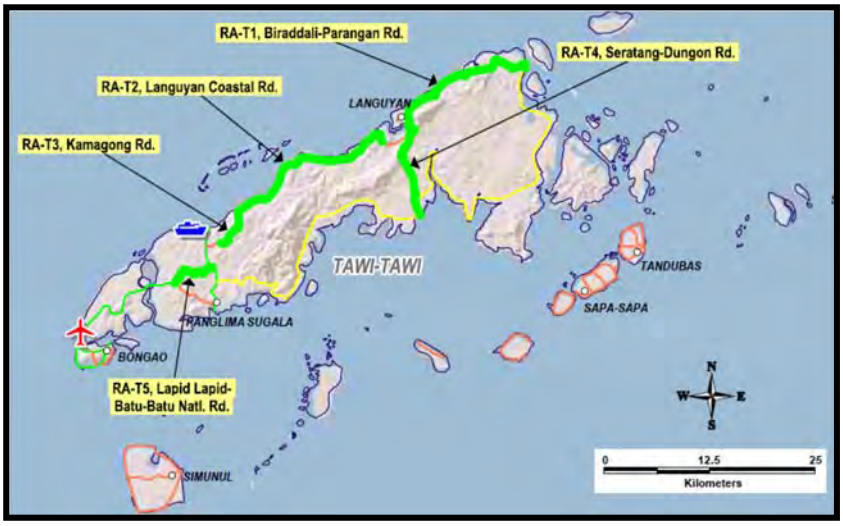
5. Expected Effects: Contribution to socio-economic integration of different municipalities and easy access to tourist areas

6. Project Cost: PHP 3.26 billion

Code	Road Name	(PHP mil.)
RA-T1	Biraddali–Parangan Road	1,374.9
RA-T2	Languyan Coastal Road	1,187.6
RA-T3	Kamagong Road	168.1
RA-T4	Seratang–Dungon Road	342.3
RA-T5	Lapid–Lapid–Batu–Batu Road	181.4
	Total	3,254.3

7. Implementation Schedule: 2016–2017 (FS); 2017 (DD); 2018 (CS)

8. Project Description:



In Tawi-Tawi, the total length of roads that needs to construct to complete the regional artery roads of Bangsamoro (mainland) is about 68.0 km (pavement upgrading and missing link). These roads would serve as the backbone of the island which would allow balance development of the island's area. Likewise, this backbone road will also support socio-economic integration of the different municipalities which are currently linked by water transport. Realization of the potential of the island will largely depend on the accessibility of its municipalities, which have huge potential in marine products and tourism.

9. SEA Considerations:

Land acquisition might be needed for the road ROW of the new road section (new construction).

PROJECT PROFILE 2-3 MISSING LINKS DEVELOPMENT PROJECT (MAINLAND PROVINCES)

1. Project Title: Missing Links Development Project (Mainland Provinces)

2. Locations: Municipalities of Balabagan, Kapatagan, and Parang in Maguindanao Province

3. Implementing Agencies: DPWH-ARMM in collaboration with concerned LGUs

4. Objective: To complete the Bangsamoro network and strengthen National Road No. 1 to facilitate rapid economic development

5. Expected Effects: Improved access to agri-potential areas and improved passenger and cargo movements

6. Project Cost: PHP 1.028 billion

7. Implementation Schedule: To be determined

8. Project Description:

This missing link is critical part of the network to provide access to coastal areas of the municipalities of Balabagan, Kapatagan, and Parang. Likewise, this missing link has potential to become the new alignment of the National Road No. 1 (or alternative route) since the existing parallel section of the said road has bad geometric alignment. Being a National Road No. 1, this road is envisioned by DPWH to be disaster-resilience to serve as trunk road during disaster operation. The scope of work includes improvement of existing 6 km and construction of new road with a length of 17.6 km (23.6 km in total).

9. SEA Considerations:

Land acquisition might be needed for the road ROW of the new road section which is about 17.6 km (new construction).

PROJECT PROFILE 2-4 MISSING LINKS DEVELOPMENT PROJECT (BASILAN)

1. Project Title: Missing Links Development Project (Basilan)

2. Location: Basilan Province

3. Implementing Agencies: DPWH-ARMM in collaboration with concerned LGUs

4. Objective: To complete the backbone network of Basilan for balance development

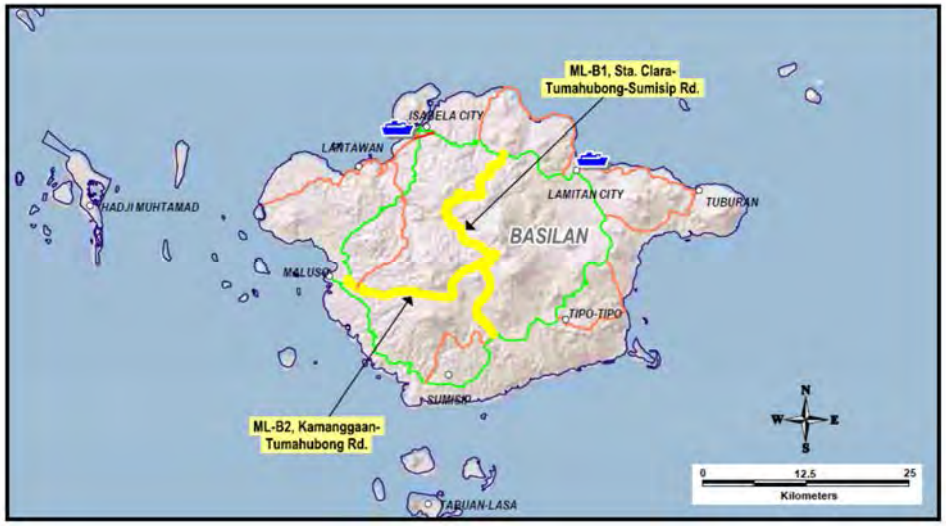
5. Expected Effects: Improved access to agriculture, fishery, and tourist spots

6. Project Cost: PHP 2.94 billion

Code	Road Name	Length (km)	(PHP mil.)
ML-B1	Sta. Clara–Tumahubong–Sumisip Road	38.5	1,482.6
ML-B2	Kamanggaan–Tumahubong–Sumisip Road	20.4	785.6
	Total	58.9	2,939.1

7. Implementation Schedule: To be determined

8. Project Description



The two missing links has hindered access to wide areas of the island and made it difficult to develop agriculture and other permanent crops in the island. Likewise, accessibility of the communities has become limited, and transportation cost for their agricultural produce is high. This condition has further aggravated the communities' poor economic condition, which is one of the development challenges. Currently DPWH-ARMM has allotted PHP 252.0 million from their 2015 budget to construct 21.0 km portion of the 38.5 km ML-B1. Assuming that DPWH-ARMM will complete the above section, the scope of work will be reduced to construction of new roads with a total length of just 37.9 km.

9. SEA Considerations:

Land acquisition may be needed for the road ROW of the new road section (new construction of about 37.6 km).

PROJECT PROFILE 2-5 CONSTRUCTION OF MARAWI CITY RING ROAD

1. Project Title: Construction of Marawi City Ring Road

2. Location: Marawi City, Lanao del Sur

3. Implementing Agencies: DPWH-ARMM in collaboration with LGU of Marawi City

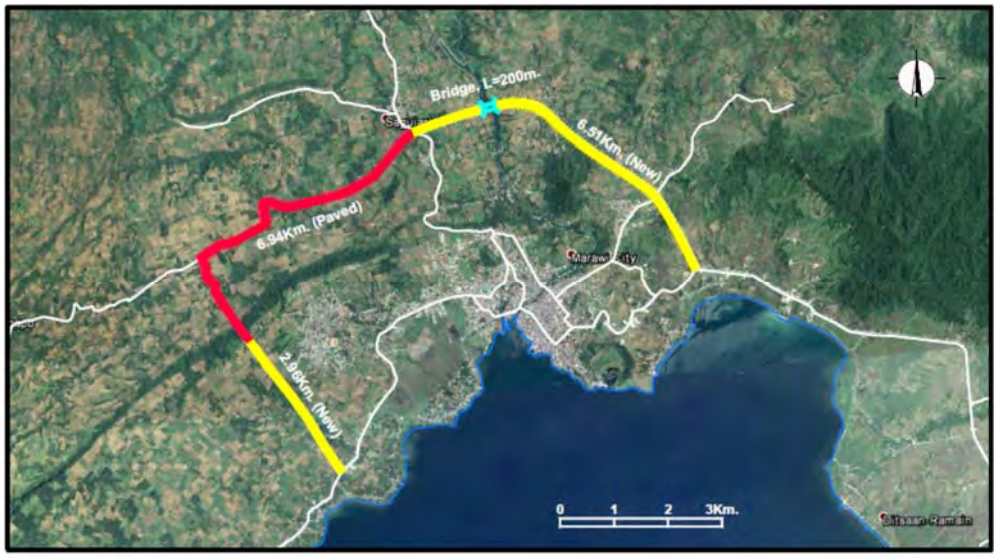
4. Objectives: (1) To improve traffic flow by separating through traffic from local traffic and (2) to support socioeconomic development of Marawi City by expanding the network capacity and by providing trunk road at the edge of built-up area for easy access

5. Expected Effects: Improved traffic circulation; improved travel speed; reduced transport cost, systematic urban expansion

6. Project Cost: US$18.73 million (PHP 836.3 million)

7. Implementation Schedule:

8. Project Description:



The Marawi City Ring Road has a length of 16.6 km of which 6.9 km is existing road and 9.7 km is new road. The road will serve two major functions: to divert through traffic (e.g., from southern cities and municipalities to Iligan or Cagayan) and to guide sound urbanization of Marawi City. Currently, the city road is experiencing serious traffic congestion due to narrow road, mixing of local and through traffic and illegal parking which further reduce the capacity of the road. Likewise the city is expanding outward and trunk is necessary to serve as backbone road of the new urbanized area.

9. SEA Considerations:

Land acquisition is needed for the road ROW of the new road section (9.7 km).

PROJECT PROFILE 2-6 CONSTRUCTION OF PARANG BYPASS ROAD OR EAST DIVERSION ROAD

1. Project Title: Construction of Parang Bypass Road or East Diversion Road

2. Location: Parang Municipality, Maguindanao

3. Implementing Agencies: DPWH-ARMM in collaboration with LGU of Parang Municipality

4. Objectives: (1) To strengthen National Highway No. 1 thereby supporting socio-economic integration of Bangsamoro and (2) to improve traffic circulation by solving traffic bottleneck

5. Expected Effects: Improvement in travel speed and reduction of transport cost

6. Project Cost: PHP 122 million for Option 1; PHP 563.4 million for Option 2

7. Implementation Schedule:

8. Project Description:

The National Highway No. 1 (N1) is the backbone highway of the entire country. In Mindanao, this highway starts from Surigao City (Lipata port) down to Davao City and connects to General Santos City, Cotabato City and ends at the International Port of Zamboanga City. The road passing the center of Parang Municipality is part of this important highway which is congested due to presence of schools, markets, municipal hall, church and other traffic generator/attractor structures.

There are two ways to address the bottleneck of N1 at the section passing the town proper: first is by constructing a bypass road with a length of about 2.4 km; second is by constructing a much longer diversion road in the eastern part of the town with a length of about 11.2 km. Any of the projects will address the serious congestion experience by motorist while passing the town. Likewise, this will strengthen the road, N1, which is envisioned by DPWH to be resilient to any type of disaster.

Option 1. Parang Bypass Road (L = 2.5 km); Estimated Cost = PHP 122.5 million

Option 2. Parang East Diversion Road (L=11.2 km); Estimated Cost = PHP 563.4 million)

9. SEA Considerations:

Land acquisition is needed for the road ROW of the new road section.

PROJECT PROFILE 2-7 FEASIBILITY STUDY ON CONSTRUCTION OF GREATER COTABATO RING ROAD

1. Project Title: Feasibility Study on Construction of Greater Cotabato Ring Road

2. Locations: Municipalities of Sultan Kudarat and Parang (Maguindanao), Pigcawayan (North Cotabato)

3. Implementing Agencies: DPWH-ARMM in collaboration with LGUs of Sultan Kudarat, Pigcawayan and Parang

4. Objectives: (1) To form flexible network by linking three primary inter-city roads and (2) to improve access to agri-fishery production areas

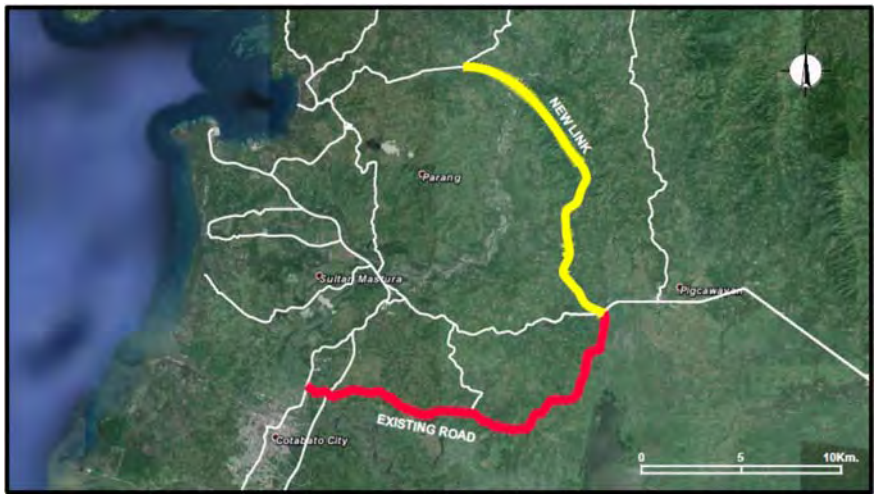
5. Expected Effects: Improved traffic circulation, provision of alternative route to Cotabato–Davao route, improved access to agri-production areas (and reduction of transport cost).

6. Project Cost: PHP 331.3 million for Phase 1 (existing road); PHP 821.26 million for Phase 2 (new link)

7. Implementation Schedule: Phase 1 (FS Review of Existing Road), 20.1 km; Phase 2 (FS on New Link), 17 km

8. Project Description:

The length of the ring road is about 37.0 km (existing section = 20.0 km; new link = 17 km). The road offers flexibility to the network since three national primary roads will be connected. The 2009 JICA ARMM Infrastructure Master Plan undertook an FS of the existing link (Pinaring–Simsiman). The scope of work involves upgrading of existing gravel-surfaced provincial roads to PCC-paved and construction of a new road. The road is passing through a productive agricultural land and could serve as trunk road of barangay roads with direct access to the agri-fishery resource rich Ligawasan Marsh. The 2009 JICA FS recommends improvement of farm-to-market roads as well.



9. SEA Considerations:

Land acquisition is needed for the road ROW of the new road section.

PROJECT PROFILE 2-8 **CONSTRUCTION OF ISABELA CITY BYPASS ROAD**

1. Project Title: Construction of Isabela City Bypass Road

2. Location: Isabela City, Basilan

3. Implementing Agencies: DPWH-ARMM in collaboration with LGU of Isabela City

4. Objectives: (1) To provide alternative route to insure that collapse of Aguada Bridge will not isolate the communities in the western side of the city and (2) to support socioeconomic development of Isabela City by improving traffic circulation

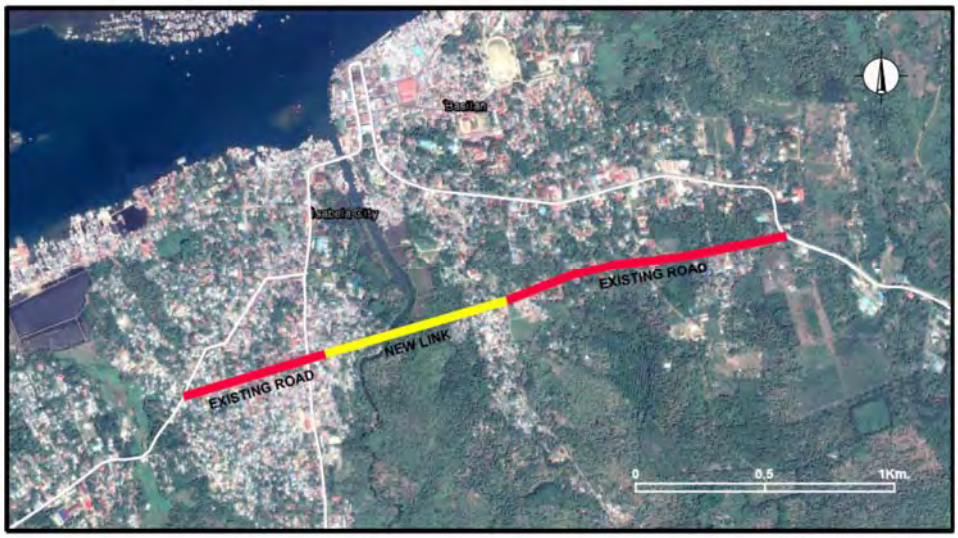
5. Expected Effects: Improved traffic circulation, reduction of transport cost, support for systematic city expansion

6. Project Cost: PHP 957.1 million

7. Implementation Schedule:

8. Project Description:

The length of the proposed bypass road is about 2.4 km (1.68 km existing + 0.73 km new) which will connect two regional primary roads and one regional secondary road. Isabela City, home to about 73,000 residents, is divided by a river and connected by a single bridge (Aguada bridge). The eastern side is hosting the city's port which is the main link of the island to Zamboanga city. A collapse of the bridge will isolate the population in the western side of the city thus the urgent need to have a second bridge. Likewise, construction of new bridge will decongest the existing bridge and will also guide sound urbanization in the southern part of city.



9. SEA Considerations

Land acquisition is needed for the road ROW of the new road section. Some houses may be affected during the road improvement of the existing sections.

PROJECT PROFILE 2-9 **BANGSAMORO NATIONAL IRRIGATION SYSTEMS (NIS) IMPROVEMENT PROJECT**

1. Project Title: Bangsamoro National Irrigation Systems (NIS) Improvement Project

2. Location: Bangsamoro

3. Implementing Agencies: NIA, Bangsamoro Agriculture Office, and federation of irrigators' associations (FIA)

4. Objective: To increase availability of irrigated lands for both wet and dry season

5. Expected Effect: Increased cropping intensity of paddy areas in the service areas of all NIS in Bangsamoro

6. Project Cost:

7. Implementation Schedule: 2018–2022

8. Project Description:

The largest support of government to paddy production comes thru irrigation development since the availability of irrigation services enables two cropping of paddy in one year. In some areas, three crops is possible. Thus, cropping intensity in irrigated areas is expectedly 200 percent. In Bangsamoro, paddy crop intensity in irrigated areas is about 127%. It is already worrisome that only 49 percent of the total service area under the eight NISs in Bangsamoro are operational. This is after the NIA has firmed up the irrigation service area of the eight NISs. The figures also indicate that of the operational areas, less than half get the privilege of two or more cropping.

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 unserviceable facilities, 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 integrity of the structure. Concrete lining of main canals, laterals and major farm ditches will be undertaken to minimize losses along the distribution system.

The project may be taken up by the NIA. About four of the eight NIS are already in the pipeline of NIA and may be continued even after the takeover of the new Bangsamoro Regional Government to be established under the BBL. Otherwise, the new government will have to implement the project by contracting the services of the NIA. The NIA has an existing procedure for rehabilitating the NIS in cooperation with the IAs and FIA.

9. SEA Considerations:

The project is expected to have no environmental impact during the operation stage. Minimal environmental disturbance may be expected during construction due to employment of earth moving equipment.

PROJECT PROFILE 2-10 COMMUNAL IRRIGATION SYSTEMS SUPPORT PROJECT

1. Project Title: Communal Irrigation Systems Support Project

2. Locations: Maguindanao, Lanao del Sur, Sulu, and Basilan

3. Implementing Agencies: Bangsamoro Agriculture Office, Irrigation Office

4. Objective: To increase irrigated paddy areas

5. Expected Effects: Increased paddy production per hectare per year and farmers' income in Bangsamoro

6. Project Cost:

7. Implementation Schedule: 2016–2022

8. Project Description:

Communal irrigation system (CIS) is defined by the National Irrigation Administration as an irrigation system with less than 1,000 ha-service area in contrast with the national irrigation systems (NIS) with more than 1,000 ha service area. Unlike the NISs, the operation and maintenance of the 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 CIS 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 the NIA as potential for irrigation development in 2013. During this year, rainfed paddy harvested area was 168,000 ha1, which had an average productivity of about one ton/ha less than irrigated areas. If these areas are irrigated, it would add tremendously to production by way of increased productivity and doubling the cropping intensity. These would redound 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 CIS. The activities of the project will include the following.

1) Reconnaissance/field survey to identify projects: An important strategy of this activity is to encourage farmers, IAs and LGUs to propose projects. Such proposals would be evaluated for technical and economic feasibility.
2) Prioritization of project proposals: Since this is a multi-year project to be undertaken from 2016-2022, project will be prioritized based on criteria established under the project.
3) Detailed designing and construction of the project
4) IA organizing and strengthening: IAs would be organized for their participation in the development and eventual turnover of completed communal irrigation projects (CIPs). The NIA scheme and policy for development of CIS is full turn over for ownership and O&M. The receiving IA pays back the NIA for the direct cost of construction (mainly labor and materials) and in order to keep the cost low, the IA members are allowed to participate in construction by providing labor. Thus, IA would have to be organized before the start of construction and made to sign a memorandum of agreement (MOA) that would cover construction and turnover of the complemented CIS. This

[1] Includes all rainfed paddy where some areas could have more than one crop during the year or some are not feasible for irrigation, such as upland paddy usually planted in sloping areas.

scheme would still be applicable for development of new CISs. Rehabilitation of existing CIS would require strengthening of IAs through training on management and O&M of CIS and signing of a new MOA covering the cost of rehabilitation.

9. SEA Considerations:

The project will cause temporary disturbance to the surrounding ecology of the project due to earth movements during construction of diversion dams and canals and transport of equipment and construction materials. However, these are none massive earthworks since CIS are small irrigation systems that divert water from small rivers. After construction, the ecology would eventually be restored and stabilized. The only change would be the periodic diversion of water from the water body source to the irrigation canals. Such activity does not create significant impact on the surrounding environment.

PROJECT PROFILE 2-11 PREPARATORY SURVEY FOR STRENGTHENING OF NATIONAL HIGHWAY NO. 1 (NH1)/ASIAN HIGHWAY 26 (AH26) FOR BANGSAMORO ECONOMIC CORRIDOR

1. Project Title: Preparatory Survey for Strengthening of National Highway No. 1 (NH1)/Asian Highway 26 (AH26) for Bangsamoro Economic Corridor

2. Locations: Maguindanao and Lanao del Sur

3. Implementing Agencies: DPWH-National and DPWH-ARMM

4. Objectives: (1) To strengthen the NH1/AH26 by improving geometric alignments thereby contributes in improving transport logistics and passenger movement and (2) to support the envisioned Economic Corridor by strengthening Bangsamoro's primary inter-city roads

5. Expected Effects: Improved traffic movement contributing to socio-economic development of the region

6. Project Cost: PHP 178.0 million for FS; PHP 372.8 million for repair of *Bad Section*

7. Implementation Schedule:

8. Project Description:

The policy of DPWH is to make National Highway No. 1, which is also AH26, disaster-resilient to serve as an important transport route during disasters. Currently, the Bangsamoro section of the highway has inferior geometric designs which prevent the highway to function correctly. Likewise, pavement condition of about 48 km of the highway is in bad condition based on the survey by the Study Team. To make the road an economic corridor, the first action is to correct the geometric alignment to accommodate container trucks. Strengthening of this road is critical as well to revitalize Polloc Port.

9. SEA Considerations:

Land acquisition might be needed for the road ROW of possible new alignment.

PROJECT PROFILE 2-12 CORRIDOR LINK ROADS IMPROVEMENT PROJECTS (MAINLAND PROVINCES)

1. Project Title: Corridor Link Roads Improvement Projects (Mainland Provinces)

2. Locations: Maguindanao and Lanao del Sur

3. Implementing Agencies: DPWH-ARMM in collaboration with concerned LGUs

4. Objective: To complete the Bangsamoro network and strengthen the corridor link roads to facilitate rapid economic development

5. Expected Effects: Improved accessibility to agri-potential areas

6. Project Cost: PHP 10.67 billion

Code	Road Name	(PHP mil.)
CL–L1	Marawi–Kapai Road	442.3
CL–L2	Madalum Road	188.6
CL–L3	Ganassi–Tubud Road	288.3
CL–L4	Malabang–Lumba–Caunayan Road	1,108.8
CL–L5	Piagapo–Marantao–Balindong Road	439.9
	Makir–Sibutu Road	356.8
CL–M1	Sibutu–Blensong–Nuro Road	356.8
	Nuro–Pinansaran Road	524.4
CL–M2	Ramongaob–Pandan–Pilar–Itao San Jose Road	396.3

Code	Road Name	(PHP mil.)
CL–M3	Maganoy–Lebak Road	478.1
CL–M4	Ganta—–Libungan Road	926.8
	Tabiran–Ganta Road	375.8
CL–M5	Ligawasan Road	412.6
	Alip–Lumoyon Road	1,390.3
CL–M6	Tamontaka–Tapian Road	158.7
CL–M7	Tapian–Lebak Coastal Road	331.3
	Total	10,670.9

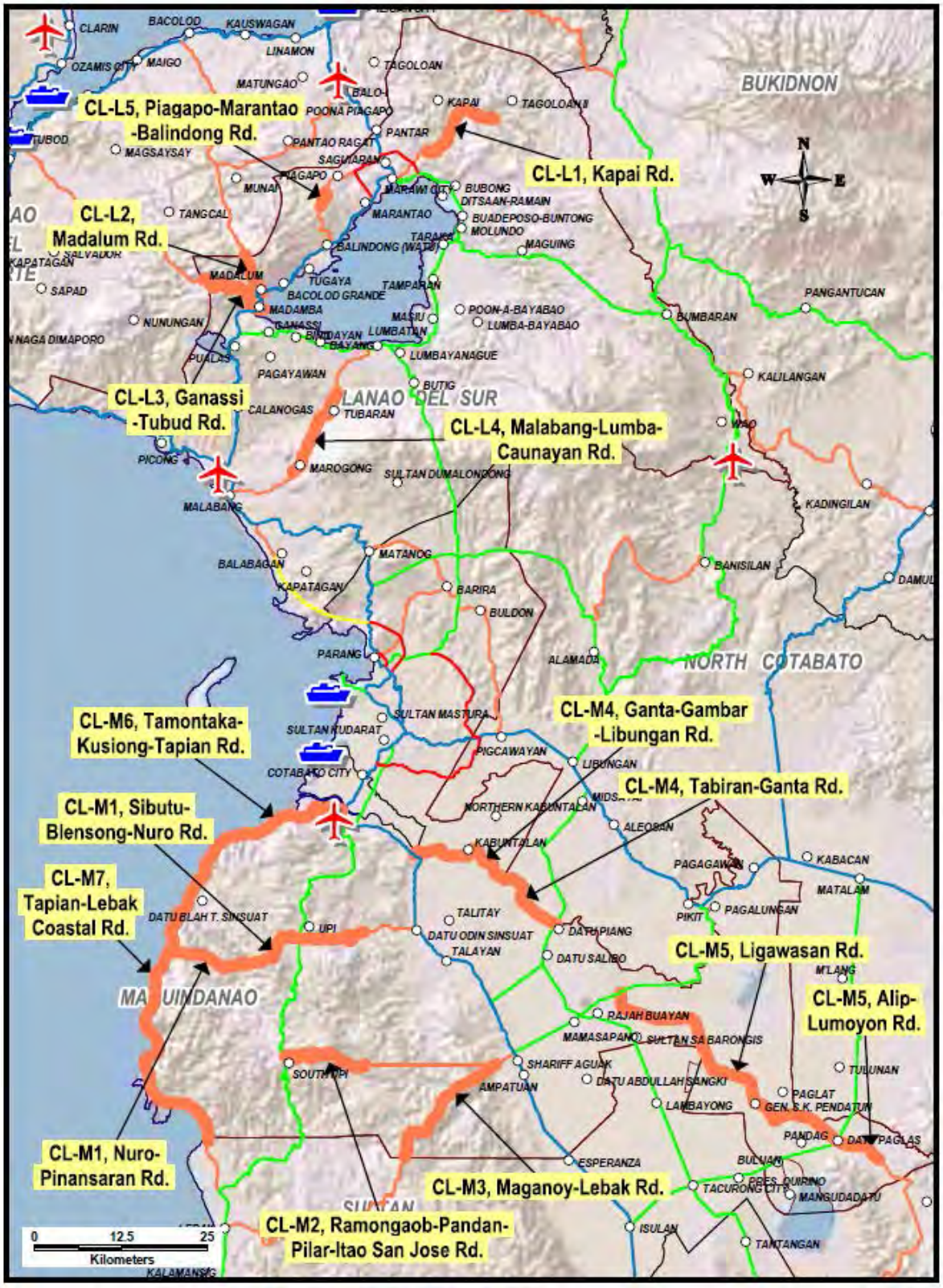
7. Implementation Schedule:

8. Project Description:

The corridor link roads upgrading projects intend to provide roads with high degree of access to communities and potential 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 road into paved surface. Road surface upgrading in the provinces of Lanao del Sur and Maguindanao involves 93.2 km of road and new road construction involves 162.1 km of road. The link roads to be improved in the projects are indicated in the figure next page.

9. SEA Considerations:

Land acquisition might be needed for the road ROW of the new road section (new construction).


CL-L5, Piagapo-Marantao -Balindong Rd.
CL-L1, Kapai Rd.
CL-L2, Madalum Rd.
CL-L3, Ganassi -Tubud Rd.
CL-L4, Malabang-Lumba-Caunayan Rd.
CL-M6, Tamontaka-Kusiong-Tapian Rd.
CL-M4, Ganta-Gambar -Libungan Rd.
CL-M1, Sibutu-Blensong-Nuro Rd.
CL-M4, Tabiran-Ganta Rd.
CL-M7, Tapian-Lebak Coastal Rd.
CL-M5, Ligawasan Rd.
CL-M5, Alip-Lumoyon Rd.
CL-M1, Nuro-Pinansaran Rd.
CL-M3, Maganoy-Lebak Rd.
CL-M2, Ramongaob-Pandan-Pilar-Itao San Jose Rd.
BUKIDNON
LANAO DEL SUR
NORTH COTABATO
MAGUINDANAO
0 12.5 25
Kilometers

PROJECT PROFILE 2-13 CORRIDOR LINK ROADS IMPROVEMENT PROJECTS (ISLAND PROVINCES)

1. Project Title: Corridor Link Roads Improvement Projects (Island Provinces)

2. Locations: Basilan, Sulu, and Tawi-Tawi

3. Implementing Agencies: DPWH-ARMM in collaboration with concerned LGUs

4. Objectives: (1) To complete the road network of island provinces and (2) strengthen the corridor link roads to facilitate rapid economic development

5. Expected Effects: Improved access to agri-fishery potential areas and tourism

6. Project Cost: PHP 9.10 billion

Code	Road Name	(PHP mil.)
CL-B1	Sumagdang–Kumalarang Road	199.9
	Kumalarang–Pangasaan Road	757.9
CL-B2	Kumalarang–Lumbang Road	120.4
	Lumbang–Mahayhay Road	682.4
CL-B3	Baluno–Balas Coastal Road	492.9
CL-B4	Kulay Bato–Tuburan Proper Road	460.4
	Lamitan–Tuburan Road	411.9
CL-B5	Parangbasak–Guinanta Road	304.7
	Tipo-Tipo–Al Barka Circumferential Road	255.3
CL-B6	Kanas–Baiwas Road	541.8
CL-S1	Jolo–Silangkan Road	277.9
CL-S2	Mampallam–Jolo Road	444.7
CL-S3	Silangkan Pob.–Indanan Road	190.7
CL-S4	Parang–Talipao Road	234.0
CL-S5	Patao–Kabungkol Road	562.9
CL-S6	Bilaan–Panglima Estino Road	421.1
CL-S7	Kabungkol–Kulay–Kulay Road	104.8
	Seit-Tayuagan–Camp Andres Road	252.6
CL-S8	Punay–Seit Road	59.8
CL-S9	Kulay Kulay–Karungdong Road	110.8
CL-S10	Karungdong–Pitogo Road	146.3
CL-S11	Pitogo–Niyog Niyog Road	129.2
CL-S12	Karungdong–Niyog Niyog Road	156.6
	Pitogo–Sucuban Road	225.4
CL-S13	Camp Andres–Sucuban Road	136.4
CL-S14	Sucuban–Lahing Lahing Road	156.0
CL-S15	Camp Andres–Lahing Lahing Road	402.2
CL-S16	Tandu Batu–Lahing Lahing Road	249.4
CL-S17	Seit-Kansipat–Tandu Batu Road	275.5
CL-S18	Taglibi–Pansol Road	263.3
CL-T1	Pahut–Swangkagang	41.1
	Subtotal	9,095.0

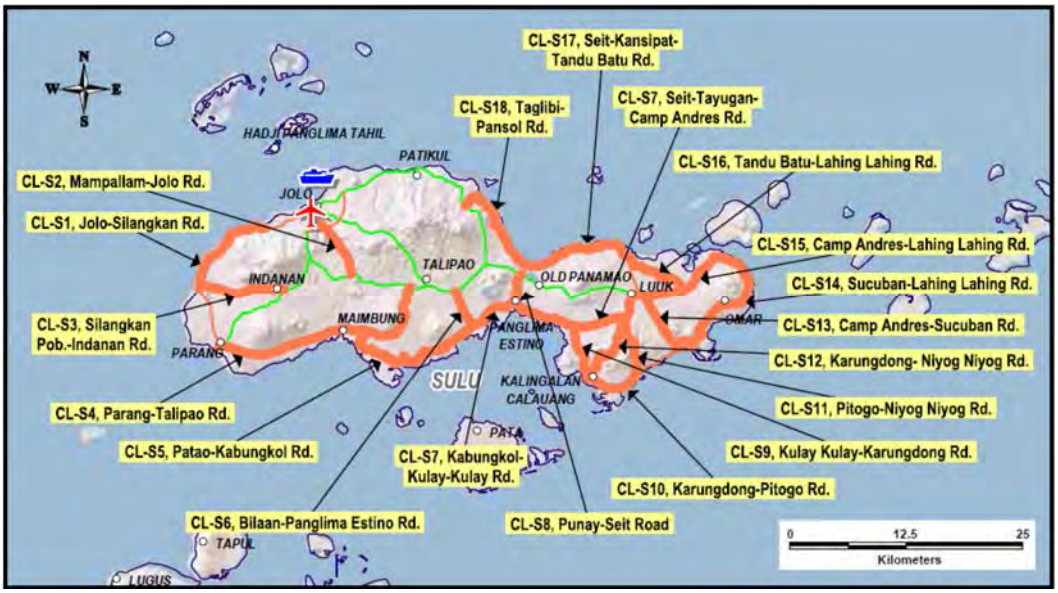
7. Implementation Schedule:

8. Project Description:

The corridor link roads upgrading projects intend to provide roads with high degree of access to communities and potential areas (agriculture, fisheries, and tourism). Likewise, these roads are necessary to give shape to the network which would lead to access to all areas of each province for balance development. Most of the works involved upgrading of existing gravel road into paved surface. Road surface upgrading in the provinces of Basilan, Sulu and Tawi-Tawi is about 316.2 km.

9. SEA Considerations:

All the projects involves upgrading of road surface, rehabilitation, and reconstruction. Since construction of new roads are not involved, obtaining road ROW may be minimal.


CL-S17, Seit-Kansipat-Tandu Batu Rd.
CL-S18, Taglibi-Pansol Rd.
CL-S7, Seit-Tayugan-Camp Andres Rd.
CL-S16, Tandu Batu-Lahing Lahing Rd.
CL-S15, Camp Andres-Lahing Lahing Rd.
CL-S14, Sucuban-Lahing Lahing Rd.
CL-S13, Camp Andres-Sucuban Rd.
CL-S12, Karungdong- Niyog Niyog Rd.
CL-S11, Pitogo-Niyog Niyog Rd.
CL-S9, Kulay Kulay-Karungdong Rd.
CL-S10, Karungdong-Pitogo Rd.
CL-S8, Punay-Seit Road
CL-S7, Kabungkol-Kulay-Kulay Rd.
CL-S6, Bilaan-Panglima Estino Rd.
CL-S5, Patao-Kabungkol Rd.
CL-S4, Parang-Talipao Rd.
CL-S3, Silangkan Pob.-Indanan Rd.
CL-S2, Mampallam-Jolo Rd.
CL-S1, Jolo-Silangkan Rd.
HADJI PANGLIMA TAHIL
PATIKUL
JOLO
INDANAN
TALIPAO
OLD PANAMAO
LUUK
OMAR
MAIMBUNG
PANGLIMA ESTINO
PARANG
SULU
KALINGALAN CALAUANG
PATA
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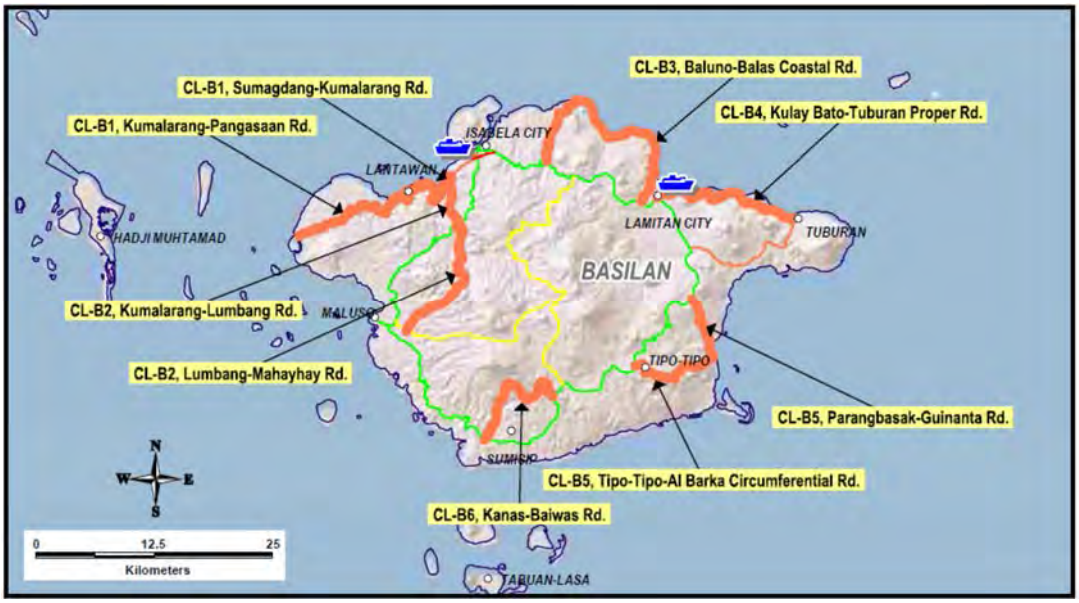
12.5
25
Kilometers


CL-B3, Baluno-Balas Coastal Rd.
CL-B1, Sumagdang-Kumalarang Rd.
CL-B4, Kulay Bato-Tuburan Proper Rd.
CL-B1, Kumalarang-Pangasaan Rd.
ISABELA CITY
LANTAWAN
LAMITAN CITY
TUBURAN
HADJI MUHTAMAD
BASILAN
CL-B2, Kumalarang-Lumbang Rd.
MALUSO
TIPO-TIPO
CL-B2, Lumbang-Mahayhay Rd.
CL-B5, Parangbasak-Guinanta Rd.
SUMISIP
CL-B5, Tipo-Tipo-Al Barka Circumferential Rd.
CL-B6, Kanas-Baiwas Rd.
TABUAN-LASA
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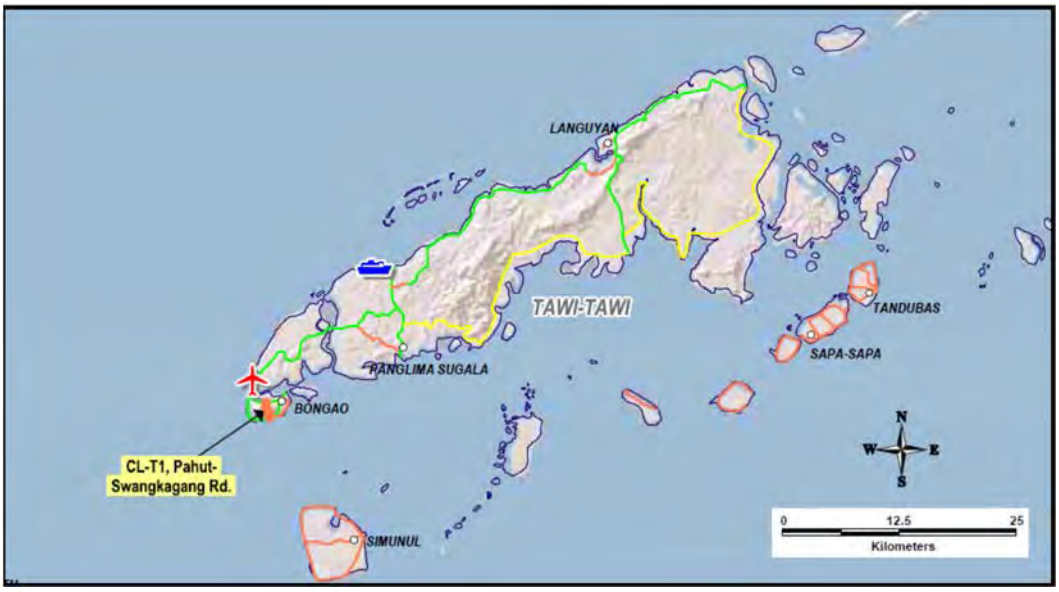
Kilometers


LANGUYAN
TAWI-TAWI
TANDUBAS
SAPA-SAPA
PANGLIMA SUGALA
BONGAO
CL-T1, Pahut-Swangkagang Rd.
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PROJECT PROFILE 2-14 POLLOC PORT UPGRADING PROJECT

1. Background

1.1 General

The port of Polloc was constructed by the Nam Kwang Construction Company, Ltd. in 1977 funded by ADB. Port operation was started by the Philippine Ports Authority (PPA) in March 1980 and transferred to DOTC-ARRM. Operation and management of the Polloc Freeport was started in 2010 by Regional Economic Zone Authority (REZA). The Polloc Port has high potential for construction, operation, and management. It is one of the best ports in the Philippines.

1.2 Existing System of Port Operation

The study on the Polloc Port operation is based on available actual statistical data obtained from REZA. There are no data available on the Polloc Port from 2006 to 2012 but data from 1995 to 2003 are available as attached in Appendix A. The latest record of cargo throughput at the port in 2013 was 296,354 tons.

1) Berth length: 400 m
2) Ship call: 181 ships
3) Ship size: 2,000 GT container ship
4) Vessel waiting time: once a month
5) Forklift: 2 units
6) Truck chassis: 6 units
7) Reach stacker: 2 units (new)

For port operation, productivity is the primary concern for the production and any service activities. This could be measured in many ways, as in the manufacturing and services sectors, but the bottom line always is to produce more at the least possible cost.

Indicators of productivity in post operation are used to measure the proficiency and ability to serve the port's constituents. These are as follows.

1) Indicators of output

The major indicators of output are the annual berth throughput, ship output and gang output. The annual berth throughput measures the total volume of cargo handled at the berth yearly. As indicated above, no data are available for the Polloc Port from 2006 to 2012. The ship output indicator measures the rate at which cargo is handled to and from a vessel at a berth. It is expressed in one of three ways depending on the time period used to measure the weight of cargo handled: working hour, ship-hour at berth, and lineal meter of berth. However, these records of this port are unavailable.

2) Indicators of service

There are many indicators that can be used to measure the quality of service a port provides for its users (shippers, importers, ship owners), but the most commonly used indicator is ship turnaround time, i.e., the total time spent by a particular vessel in the port.

3) Indicators of utilization

Indicators of utilization are measures of how intensively berth facilities and resources are used. There are two important indicators in this group: berth occupancy (the proportion of time a berth is occupied by vessels) and capacity utilization (the proportion of actual traffic to either the optimum capacity using optimum berth occupancy rate (OBOR) or maximum capacity using 100% OBOR. Berth occupancy effectively indicates the level of demand for port services. It can be measured over various time intervals, and is normally expressed as a percentage:

> Berth occupancy rate = {(ship calls)(Average LOA)(Spacing factor)(Average service time)(100)}/{(Total available berth length)(Day/Year)(Hours/Day)}

High berth occupancy causes quality of service to decline. It is signals congestion, and there is a danger

that ships have to queue for a berth. The other extreme, low berth occupancy (45% or less in the case of general cargo berth) indicates that resources are being underused.

Berth occupancy is an indicator to be used with caution- aiming for high values may be very dangerous (in terms of congestion delays), while low values may be uneconomic (in terms of return on investment). Research and experience have shown that, at a general cargo berth, berth occupancy values within the range of 40% to 70% are perhaps the optimum.

4) Indicators of efficiency

Indicators of efficiency, as measured by the cost per ton of cargo, are determined from a cost-based study. It is analogous to time utilization, but in this case, it involves prorating the cost among the contributory port facilities and related services.

There are no available data for the above four indicators, therefore, it is recommended to apply general indicators for port development. For reference, tonnage per lineal meter of berth specified in UNCTAD standard will be examined in the next paragraph.

Tons/Lineal meter of berth = (Total tonnage)/(Length of berth)

1.3 Cargo Handling Capacity of Representative Ports in Mindanao and Manila Ports

In order to determine the required scale of the plan for future cargo traffic, it is necessary to determine the present cargo handling capacity of the port. Port capacity is generally calculated in terms of the volume of cargo. Since port capacity varies according to the type of the cargo, size of lot, size of the berth, method of loading and unloading, etc., it is often represented simply as the volume of cargo handled at the port.

To assess the handling volume per lineal meter for busy and increasing handling volume of cargo, Davao, General Santos, Zamboanga and Manila North Harbor were selected and calculated the ton/lineal meter together with ratio of container cargo. Generally if container cargo is increased, the handling volume of cargo is increased as well due to the efficiency of the movement of cargo. The result of the calculation is indicated in Table 2-14.1.

Table 2-14.1 Tons/Lineal Meter of Berth in Mindanao and Manila

	Davao	Zamboanga	General Santos	Manila North Harbor
Ton/Linea Meter	3,925	1,503	3,154	2,581
Ratio of Container (%)	88	57	83	80

The present handling ton/lineal meter at the Polloc Port is 296,354 tons/400m = 740 ton/m which is under-utilization of the port and port facilities. According to the statistics of cargo throughput of the port in 2013, the percentage of container cargo was 47%, which is less than the Zamboanga port. Based on the above, the port capacity of the Polloc Port is estimated at 2,000 ton/m/year considering the increase in containerization at the port in the future.

1.4 Present Condition for New Development for Polloc Port

1.4.1 Fuel oil depot

Based on the REZA information, DS3 Management started the construction of an oil supply facility at the Polloc Port from May 2015. General information is as follows (see also Figure 2-14.1):

1) DS3 will invest in the Polloc Port with strong Philippines based fuel supply.
2) Initially floating storage will be used to provide immediate storage.
3) Once fuel volumes have grown, storage tanks will be built on the eco-zone of the Polloc Port; the proposed size of the tanks is two 8 million liters tanks for diesel oil and one 5 million liter tank for gasoline for a total of 21 million liters.
4) By providing local storage, the serious logistical problems of delivering fuel by road from Davao will be removed.

5) Local fuel prices will be reduced promoting economic growth and greater fuel usage.

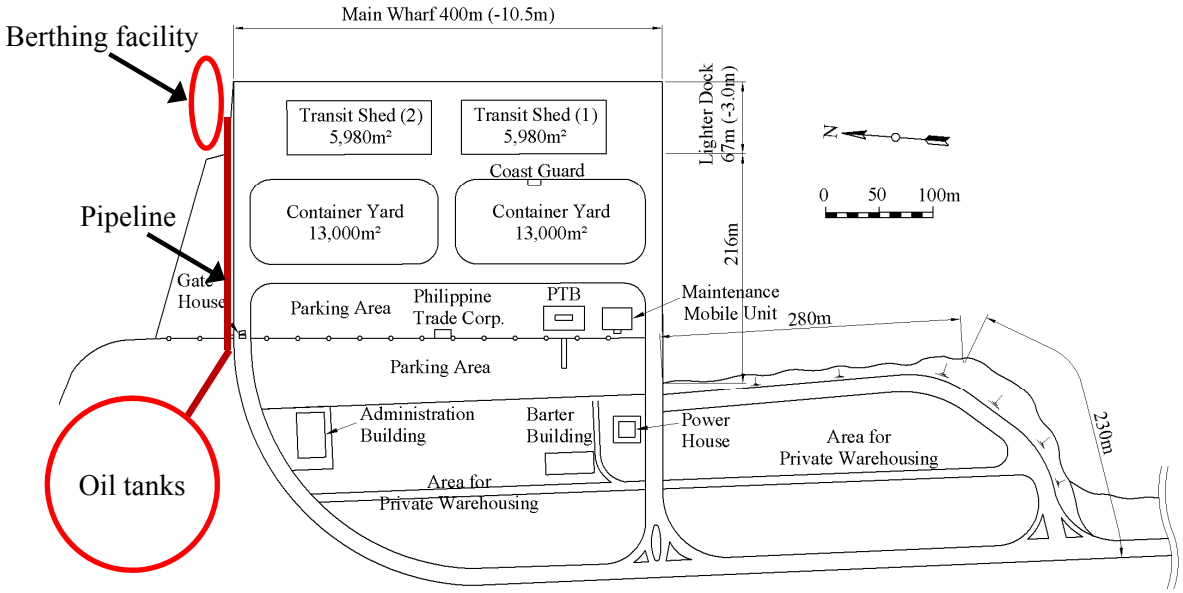


Figure 2-14.1 Schematic Drawing of Oil Handling and Deposit at Polloc Port

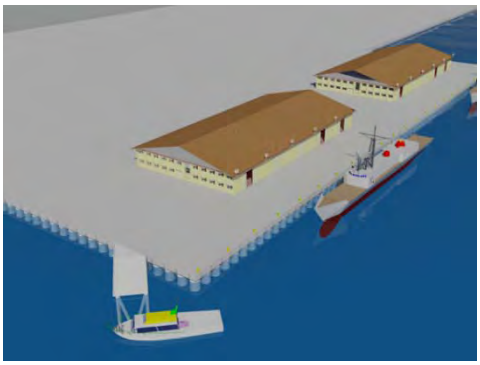
1.4.2 Corn importation from Indonesia

The importation of 40,000 tons of corn from Indonesia for the LAMSAM corn starch company started from June 2015. Lamsam Trading, the port operator, purchased a pneumatic unloader for corn unloading from ship to truck as per attached photo.

1.4.3 RORO ramp

According to the REZA's construction plan of the RORO, the objectives of the ramp (12 m x 20 m) are as follows:

1) RORO transportation will become part of the strong nautical highway of the Philippines and included in the Western Mindanao RORO link.
2) RORO will enhance mobility and improve linkages between islands, provide access to markets or activity centers and support different business sectors in ARMM.
3) The delivery of basic goods and farm produce is made easier, economical and efficient as travel time to and from destinations, as well as transportation costs are considerably reduced.



1.4.4 Latest cargo volume handled in Polloc Port

The latest statistic of cargo volume handled at the Polloc Port is indicated In Table 2-14.2. As the data indicate, the cargo volume has been increasing rapidly.

Table 2-14.2 Latest Statistic Cargo Volume

	2013	2014	2015*
Cargo throughput (ton)	296,351	358,111	433,380
Growth rate (%)	-	20.8	21.0

*estimated from January–June data.

2. Proposed Port Development

2.1 Required Number of Berths

The number of berths required to handle a given volume of cargo differs greatly depending on the nature of the port, kind of cargo, cargo handling facilities, etc. There are several methods in determining the berth length. For the rough estimation of the required total length of berth, unit productivity method is mainly used as below:

Unit productivity = (Converted cargo volume)/(Converted berth length)
= 700 - 1,100 ton/meter (1,000 ton/m for general cargo and 2,000 ton/m for container will be utilized for calculation.)

The adjusting rate of bulk and general cargo is 0.5 and container is 1.0, while adjusting the rate of berth is as shown in Table 2-14.3. The required berth lengths for the target year of 2019, 2022, and 2030 are shown in Tables 2-14.4 through 2-14.7.

Table 2-14.3 Relation of Water Depth and Berth Length

Water depth of berth	Converted berth length
2.10–3.90 m	1/3 x berth length
4.00–7.40 m	2/3 x berth length
7.50 m ≤	Berth length

Table 2-14.4 Total Cargo Volume Handled by Polloc Port for 2019, 2022, and 2030

Polloc Port	Year	2019	2022	2030
	Cargo (MT)	921,197	1,060,318	1,542,860

Table 2-14.5 Required Berth Length for General Cargo at Polloc Port in 2019, 2022, and 2030

Year	Cargo throughput (ton)	Required berth length* (m) [a]	Existing berth length (m) [b]	Required extension of berth [a]-[b]
2019	460,599	230	200	30
2022	530,159	265	200	65
2030	771,430	386	200	186

*Assuming that general cargo accounts for 50% of total throughput.

Table 2-14.6 Required Berth Length for Container Cargo in 2019, 2022, and 2030

Year	Cargo throughput (ton)	Required berth length (m) [a]	Existing berth length (m) [b]	Required extension of berth [a]-[b]
2019	460,599	230	200	30
2022	530,159	265	200	65
2030	771,430	386	200	186

*Assuming that container cargo accounts for 50% of total throughput.

Table 2-14.7 Required Berth Length for General Cargo and Container Cargo

Year	Cargo throughput (ton)	Required berth length (m) [a]	Existing berth length (m) [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

2.2 Required Transit Shed Area

The transit shed area required to handle the cargo volume is determined by the following:

Transit shed area = (VET x RF x 2.2)/SD
VET = (DT x ET x PF)/365

Where

VET: Volume within a dwell time
DT: Design traffic volume
ET: Dwell time
PF: Peak factor
RF: Re-stowing factor
SD: Stacking density (1.0–1.50 MT/m^2 for general cargo)

Transit shed area = (DT x ET x PF x RF x 2.2)/(SD x 365)
= (771,430 x 25% x 5 x 1.12 x 1.05 x 2.2)/(1.5 x 365)
= 4,556 m^2 (existing shed 11,960 m^2)

No additional transit shed is necessary.

2.3 Required Open Storage

The open storage area required is calculated as follows:

Open storage area = (VET x RF x 2.0)/SD
VET = (DT x ET x PF)/365

Where

VET: Vol. within a dwell time
DT: Design traffic volume
ET: Dwell time
PF: Peak factor
RF: Re-stowing factor
SH: Stacking density (1.0–1.50 MT/m^2 for general cargo)

Open storage area = (DT x ET x PF x RF x 2.0)/(SD x 365)
= (771,430 x 55% x 5 x 1.12 x 1.05 x 2.0)/(1.5 x 365)
= 9,113 m^2
= 9,200 m^2 (using existing open yard)

2.4 Required Container Yard

The container yard necessary to store and handle the expected volume of containers is determined as follows:

Ground slots = (VET x RF x 2.0)/SH

VET = (DT x ET x PF)/365

Where

VET: Volume within a dwell time
DT: Design traffic volume
ET: Dwell time
PF: Peak factor
RF: Re-stowing factor
SH: Stacking height

Ground slots = (DT x ET x PF x RF x 2.0)/(SH x 365)
= (771,430 x 5 x 1.12 x 1.05 x 2.0)/(1.0 x 365)
= 24,854 m^2
≈ 25,000 m^2

The construction of the wharf including the aforementioned expansion and construction of the berth and other facilities will be completed by 2030 as presented in Table 2-14.8. The medium- and long-term development plans for 2022 and 2030 are indicated by Figures 2-14.2 and 2-14.3 based on the required facilities described above.

Table 2-14.8 Completion of Port Facilities at Polloc Port by 2022 and 2030

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

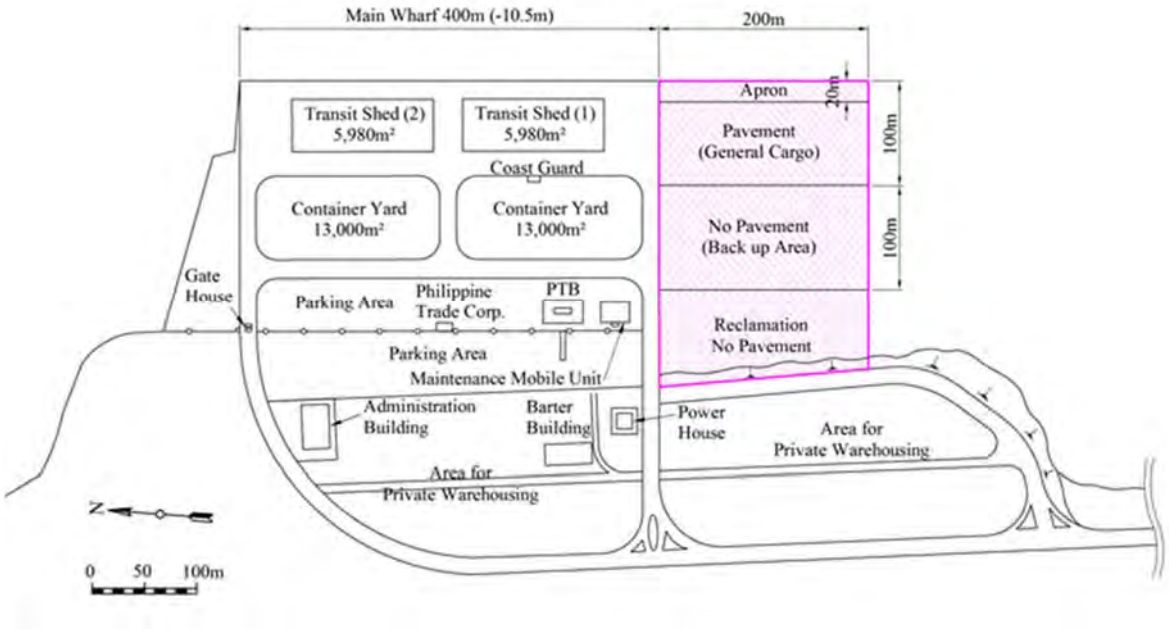


Figure 2-14.2 Polloc Port Development Plan by 2022

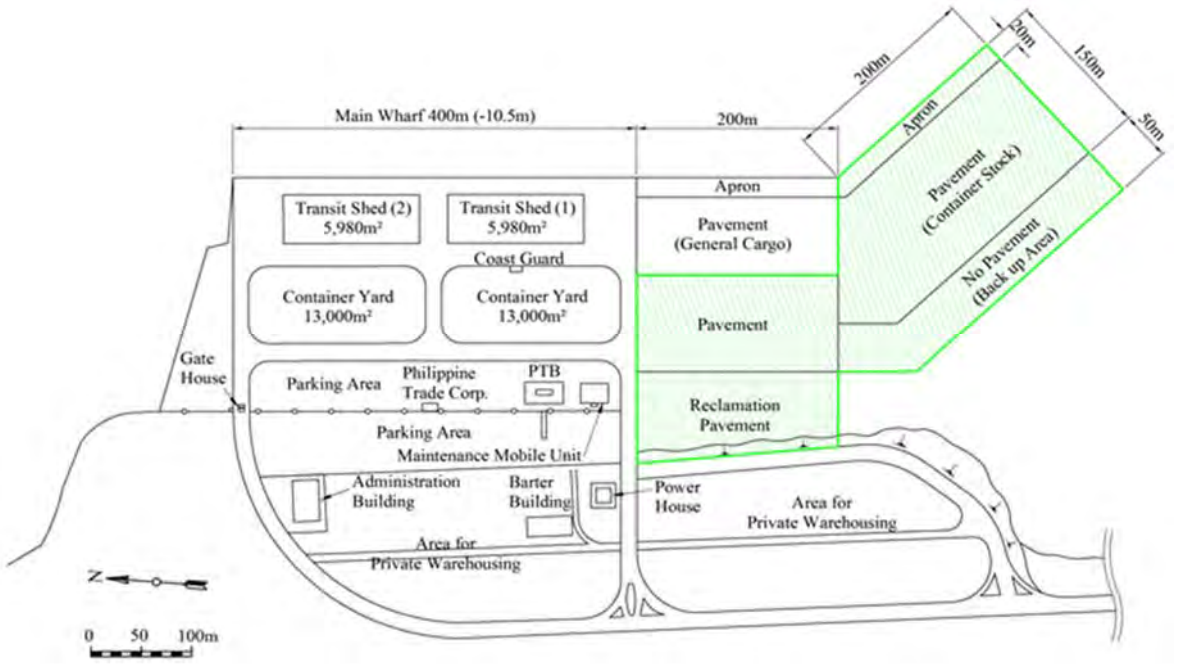


Figure 2-14.3 Polloc Port Development Plan by 2030

3. Project Cost

The costs of the medium- and long-term development plans for 2022 and 2030 are estimated and summarized in Tables 2-14.9.

Table 2-14.9 Polloc Port Construction Cost in 2022 and 2030

(Unit: US$)

	2022			2030		
Cost component	Local portion	Foreign portion	Total	Local portion	Foreign portion	Total
A. Construction	10,616,806	7,940,070	18,556,876	14,214,224	10,659,147	24,873,371
1. Preparation works	580,000	1,270,000	1,850,000	580,000	1,270,000	1,850,000
2. Dredging and reclamation	2,614,500	560,500	3,175,000	2,956,500	596,000	3,552,500
3. Berth construction	5,168,650	2,741,050	7,909,700	5,168,650	2,741,050	7,909,700
4. Yard construction	1,431,150	682,350	2,113,500	4,402,875	1,923,375	6,326,250
5. Other expenses	782,506	1,926,170	2,708,676	1,021,199	2,513,722	3,534,921
6. Equipment procurement	40,000	760,000	800,000	85,000	1,615,000	1,700,000
B. Contingency and taxes	3,129,704	952,808	4,082,513	4,619,471	1,598,872	6,218,343
1. Physical contingency	530,840	397,003	927,844	710,711	532,957	1,243,669
2. Price escalation	743,176	555,805	1,298,981	1,421,422	1,065,915	2,487,337
3. Taxes and duties	1,855,688	0	1,855,688	2,487,337	0	2,487,337
C. Consulting services	467,633	1,019,144	1,558,778	626,809	1,462,554	2,089,363
Total project cost (A+B+C)	14,214,144	9,984,022	24,198,166	19,460,504	13,720,573	33,181,077

4. Urgent Improvement Plan

Due to the minimal maintenance since 1977, after the completion of port facilities, it is found that the fender system and bollards shall be replaced, the water supply system should be rehabilitated and the deposit of soil in front of the wharf should be removed. A detailed investigation should be conducted before the implementation of the improvement of the above work. Photos of the damaged fender and bollards are shown below:

Photo: Damaged Fenders

Photo: Damaged Bollards

Rough estimate for the replacement cost of fenders and bollards is presented in Table 2-14.10.

Table 2-14.10 Cost of Fenders and Bollards

	Estimated cost (US$)
Fender	656,000
Bollard	115,500
Total	771,500

5. Institution of Polloc Port

The Polloc Port was constructed in 1977 funded by ADB and started its operation in March 1980 by the Regional Ports Management Authority (RPMA) until 2010. By virtue of MMA Act #154 and Proclamation No. 1 dated May 15, 2010, the port was transferred to REZA as the Polloc Freeport and Ecozone (see the sketch on the right). The organization of the Polloc Port is composed of the Port Manager and the divisions of Resource Management, Port Services, Planning, Business and Investment, Port Police, and Engineering Services as shown in Figure 2-14.4. The Polloc Port is operated by PTC, a private company. A new operator of Lamsan Trading will continue the port operation until 2022.

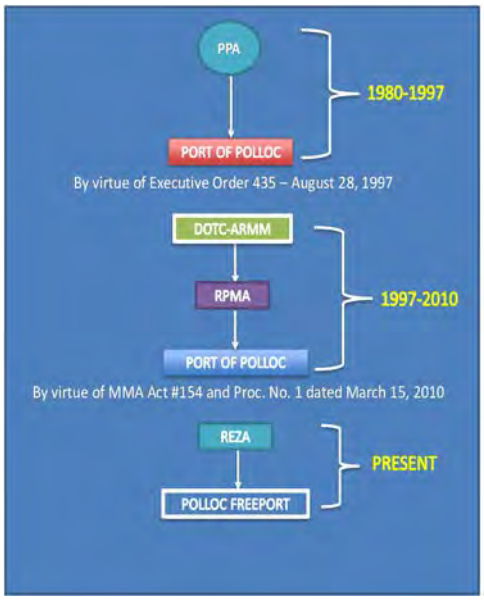


Figure 2-14.4 Existing Organization of Polloc Port (REZA)

6. Necessity of Cargo and Passenger Traffic between Polloc and BaSulTa

Around Cotabato, the city area is envisioned and considered to be the capital of the Bangsamoro, with ports and other means of transportation as a central location for the transfer of goods and people to and from the nearby main islands, namely, Basilan, Jolo, and Tawi-Tawi. In addition, the Polloc Port will

be a trunk line for marine transportation among the main three islands as this may spur the fundamental infrastructure development for economic and social aspects (Figure 2-14.5).

Small islands which are located near the three main islands shall be interconnected to the main islands to act as feeder lines. The inter connection between Isabela and Zamboanga is also very important for three main islands. The figure below shows the schematic flow of marine transportation among all ports in Bangsamoro considering the volume and origin and destination.

Conventional type ships or RORO ships are commonly used in the Philippines to transport cargo and passengers. The BaSulTa area is rich in agriculture and fishery resources and it also has the potential to establish an agri-industrial center for the processing of agriculture and fishery products. There is a plan to develop Bongao port into an international seaport in line with a gateway to trade with Indonesia of BIMP-EAGA.

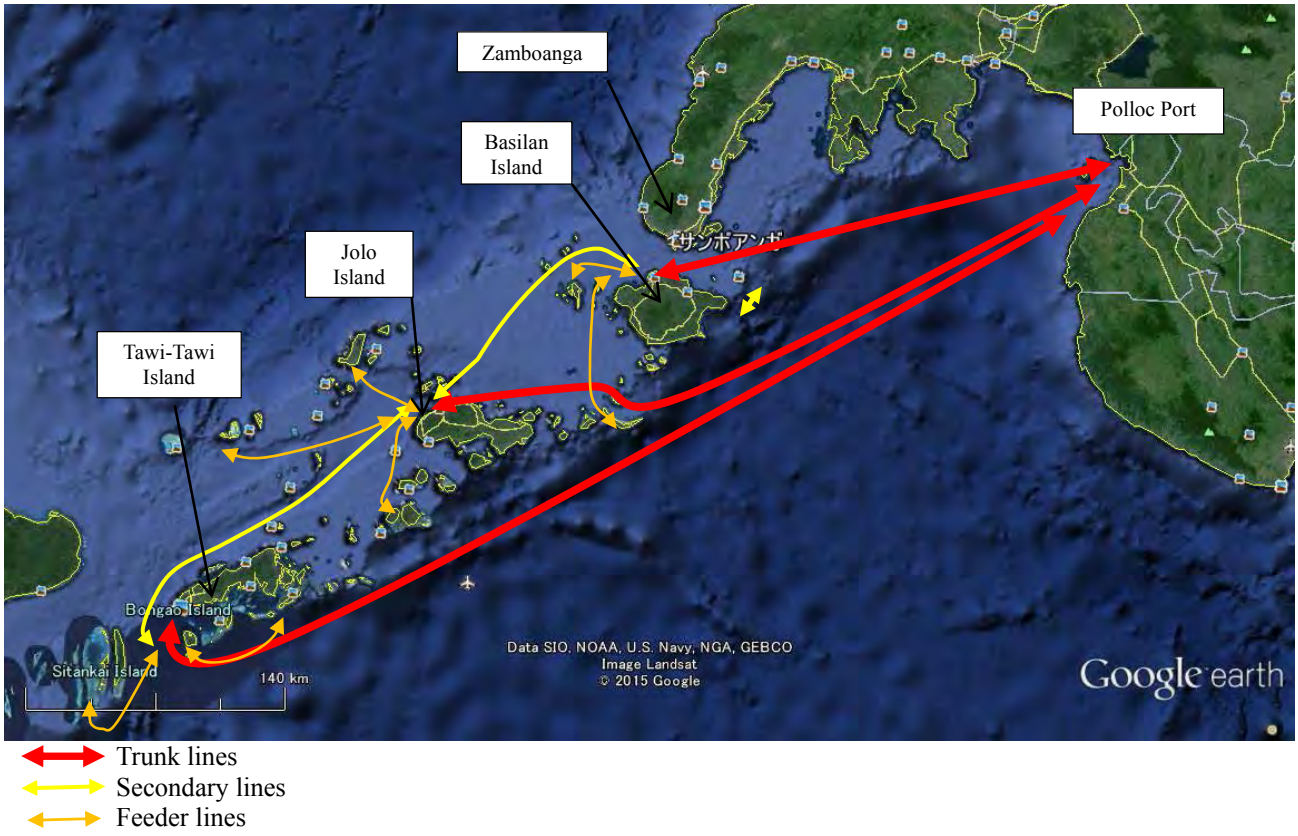


Figure 2-14.5 Cargo and Passenger Traffic between Polloc and BaSulTa

7. Development Plan of New Cotabato Port

The new Cotabato port (Timaco Port) was proposed by the defunct Metro Cotabato Regional Agro-Industrial Center. The Timaco Port development, however, was denied by Regional Planning and Development Office (ARMM NEDA) because of the existing and nearby the Polloc Port 25 km away.

The Incumbent Congresswoman of Cotabato still supported the implementation of development for the Timaco Port and made a request to MinDA for its development. MinDA endorsed the request provided that it is approved by the Board of the Philippine Ports Authority (PPA) and the other is to review and examine the results of assessment on the conflict between the Polloc Port and the Timaco Port financed by USAID.

PROJECT PROFILE 2-15 COTABATO AIRPORT IMPROVEMENT PROJECT

The Cotabato airport is expected to be upgraded to a local leading airport after 2020, from which more than 500,000 passengers are expected to be handled by the airport. The facility expansion is required in accordance with the expected air traffic demand.

The expected demand in 2025 will exceed 500,000, and the runway approach category shall be upgraded from non-instrument to non-precision in accordance with facility requirements. The airport needs to ensure that its facilities meet safety standards while installing and operating approach light system and radio navigational aid. In addition, the top priority in non-precision approach operation is to secure the runway strip. The current 130 meter-wide runway strip shall be expanded to 300 m.

Distance between runway and apron taxiway shall follow international standards for 4C, which is the airport classification category of A320 aircraft currently under operation. This calls for the expansion in the depth of the apron, which is impossible under the current situation as the apron is surrounded by Passenger Terminal Building (PTB), Vehicle Parking Area (VPA) and other buildings. Therefore, it is proposed that the apron shall be relocated to the opposite side of the existing landside area. Such relocation would be accompanied with the construction of passenger terminal, VPA and access roads, which needs to be reflected in the Short-Term Plan.

The Cotabato airport has limited expandability since there is a significant height difference or faulting between both ends of the runway and surrounding areas. Accordingly, the conditions are unfavorable not only for securing a 2,600 m runway required to service A321 planes in 2025 but also for meeting the facility requirement of a 2,200 m runway to service A320.

However, it is possible to service A320 planes flying domestic routes within Manila without separate load limit owing to the already secured stop-way and clear-way in both direction by 45 and 60 meters respectively. Therefore, it seems feasible to operate A320 planes until 2030 without additional expansion. Realistically, however, it is challenging to secure Runway End Safety Area (RESA). Furthermore, additional widening was found to be unnecessary since there is a runway widening project by DOTC underway covering runway parts that are 30 meters wide. Still, runway overlay has been included in the short-term plan in consideration of the asphalt pavement's service life of 20 years and of the growing air traffic demand (Table 2-15.1).

Table 2-15.1 Cotabato Airport Development Plan by Phase (up to 2030)

Phase	Contents	Scale
Short-term plan (2016–2020)	Securing runway strip width	
	New stub taxiway (110 m x 23 m x 2)	5,060 m^2
	New apron	8,000 m^2
	Improvement of aeronautical lighting facilities upgraded to Grade C	
	Expansion of rescue and firefighting station	170 m^2
	New passenger terminal building	5,500 m^2
	New vehicle parking area	8,960 m^2
	Installation of radio navigational aid (VOR/DME)	
	Installation of aeronautical information service (VHF)	
	Runway overlay (1,913 m x 45 m)	86,085 m^2
	Completion of fence connection	500 m
	New control tower	
Medium-term plan (2021–2025)	None	
Long-term plan (2026–2030)	Expansion of passenger terminal building	1,600 m^2

Source: KOICA master plan study report.

It is suggested to include key facilities for the non-precision approach in the short-term plan, such as runway strip securing, VOR/DME installation, and aeronautical lighting facility upgrade from B to C, since the relocation of landside facilities should be carried out in the Short-Term Plan. A new rescue and fire fighting vehicle has already been installed and but currently not utilized yet due to the lack of the personnel to operate the equipment. The station shall be expanded in accordance with the number of the vehicle.

Targets set for the Cotabato airport development by phase are presented in Table 2-15.2.

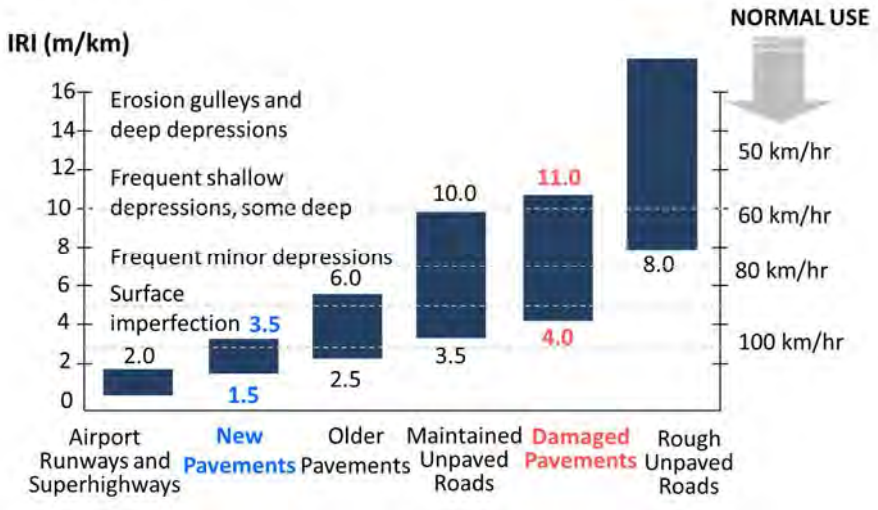
In the road condition survey using dynamic response intelligent monitoring system (DRIMS), the survey team carried out the calibration procedure at the Cotabato airport runway in advance from their real measurement procedure on the roads in the Bangsamoro area (Figure 2-15.1). According to the calibration result, it proved that the roughness of existing runway pavement exceeds the criteria of International Roughness Index (IRI) for airport runways (Figure 2-15.2).

Table 2-15.2 Summary of Practical Targets for Cotabato Airport Development up to 2030

Demand/Main facility	Unit	Current	Future Requirements			Note
		2015	2020	2025	2030	
Traffic Demand						
Annual passengers	Pax.	-	445,424	558,900	672,017	
Annual AC movements		-	4,064	5,103	6,139	
Peak-hour passengers	Pax.	-	436	436	545	
Peak-hour AC movements		2	4	4	5	
Design Aircraft		A320	SJ	SJ	SJ	
Approach Category		Non-instrument	Non-precision	Non-precision	Non-precision	
Airside Facility						
Runway length	m	1,913	1,913	1,913	1,913	
Runway width	m	45	45	45	45	
Runway strip width	m	130	300	300	300	
Taxiway system		Stub	Stub	Stub	Stub	New construction
Apron area	m^2	25,600	8,000	8,000	8,000	New construction
Airfield lighting		B	C	C	C	
RFF (category)		6	6	6	6	
RESA length	m	0/0	0/0	0/0	0/0	
Landslide Facility						
Passenger terminal area	m^2	1,152	6,600	6,600	8,200	New construction
Cargo terminal area	m^2	n/a				
Vehicle parking area	m^2	7,920	8,960	8,960	8,960	New construction
R/W-T/W separation	m	86.6	168	168	168	
CNS/ATM						
RNA		Non-instrument	Non-precision	Non-precision	Non-precision	
AIS	CH	2/3/4	6/3/4	6/3/4	6/3/4	VHF/TRSC/HF
MET	Set	1/0/0	1/0/0	1/0/0	1/0/0	WIND/RVR/CCLM
Other Improvement						
Runway overlay			Overlay			1,913 m x 45 m
Perimeter fences		Incomplete	Complete			500m (250 bays)

Abbreviations: AC = aircraft, RFF = rescue and firefighting, RESA = runway end safety area, R/W = runway, T/W = taxiway, CNS/ATM = communication navigation and surveillance/air traffic management, RNA = radio navigational aid, AIS = aeronautical information service, VHF = very high frequency, TRSC = multi-transceiver, HF = high frequency, MET = meteorological facilities, WIND = anemometer, RVR = runway visual range, CCLM = COSMO climate limited-area model

Source: KOICA master plan study report (revised by JICA Study Team).



Source: World Bank.

Figure 2-15.1 Rating of International Roughness Index (IRI)

Source: Road Condition Survey using Dynamic Response Intelligent Monitoring System (DRIMS).

Figure 2-15.2 Example of Calibration Result at Runway of Cotabato Airport

The project cost is estimated as summarized in Table 2-15.3. The following should be noted:

1) The cost is referred from the proposed CY 2016 Annual Investment Program of CAAP-CBO.
2) Expenses for land acquisition and compensation and incidental expenses have not been considered.

Table 2-15.3 Cost Estimation for Cotabato Airport Development Project (up to 2030)

(Unit: PHP '000)

Main Work	Future Requirements			Note
	2020	2025	2030	
Airside Facilities				
Runway extension				
Runway widening				
Taxiway system	25,300			
Apron expansion	40,000			
Strip expansion and site preparation	707,220			
Upgrading of AGL	144,000			
Upgrading of RFFS	6,560			
Subtotal	923,080	0	0	
Landslide Facilities				
PTB expansion	396,000		96,000	
CTB expansion				
VPA expansion	26,880			
Construction of control tower	120,000			1)
Site preparation	31,120		3,200	
Subtotal	574,000	0	99,200	
CNS/ATM				
RNA	128,082			
AIS	34,247			
MET				
Subtotal	162,329	0	0	
Other Improvements				
Runway overlay	139,788			
Completion of fences	4,000			
X-ray machine and metal detector				
Subtotal	143,788	0	0	
Contingency (10%)	180,320	0	9,920	
Total Construction Cost	1,983,517	0	109,120	

Abbreviations: AGL = aeronautical ground lighting, RFFS = rescue and firefighting station,
PTB = passenger terminal building, CTB = cargo terminal building, VPA = vehicle parking area,
CNS/ATM = communication navigation and surveillance/air traffic Management,
RNA = radio navigational aid, AIS = aeronautical information service, MET = meteorological facilities

Source: KOICA Master Plan Study report (revised by JICA Study Team).

PROJECT PROFILE 2-16 SPECIAL EMPLOYMENT ZONE DEVELOPMENT PROJECT

1. Project Title: Special Employment Zone Development Project

2. Locations: Basilan, Sulu, and Tawi-Tawi provinces

3. Implementing Agencies: New Bangsamoro government with a committee consisting of DOLE of the Bangsamoro government, Regional Department of Trade and Industry (R-DTI) including REZA and RBOI, and Chamber of Commerce of Cotabato City

4. Objectives: (1) To develop special economic zones in the island provinces with less strict labor and employment regulations and (2) to effectively make ecozones the centers of human development

5. Expected Effects: Revitalized island economies linked with the mainland and BIMP-EAGA, employment opportunities created, and quality labor force to support the Bangsamoro development

6. Project Cost: US$4 million

7. Implementation Schedule: 2016–2017 for master planning, followed by implementation

8. Project Description:

8.1 Background

Employee rules and office regulations of the Philippines are so complicated that many companies feel that it is impossible to comply with them. Bangsamoro should simplify the labor regulations of the Philippines and also use a more flexible wage setting mechanism.

The Philippine labor regulations, and consequently the business regulations, are complex. It is important for the Bangsamoro government to assess the relevance of national laws to the region. In labor protection and wage setting, the local culture and traditions should also be considered, and businesses should be aware of the possible differences from the rest of the Philippines. Some criticisms on the national Labor Code and its effects are described below[2].

- It is too complex: The Labor Code has conflicting or overlapping aspects, and this makes it hard for companies to properly comply with it. The complexity also encourages the informal sector.
- It is out of date: The Labor Code was formally signed in 1974 and patterned with those of developed countries. To date, there has been no comprehensive review or revision on the Labor Code to check its relevance to the current labor situation.
- It is lopsided to favor workers over businesses: The Labor Code centers on the welfare of those already employed in the formal sector rather than setting good labor benchmarks to bring more businesses and investors. However, it has power over those employed in the formal sector and not those working in the informal sector. This may raise issues particularly in Bangsamoro since the informal sector is considered as the norm.
- The focus of the implementing agency, the Department of Labor and Employment (DOLE), may not be appropriate. DOLE is clustered with the social branch of the executive arm of the government. With this, the DOLE's focus is more on providing social protection than setting labor regulations to enhance economic development.
- The perspective of the entire workforce is not well recorded or recognized by legislators. The informal sector is guided by social relations and kinship; formal employment contracts may not

[2] Institute for Development and Econometric Analysis, Inc. *Working Paper No. 5 Labor Regulations in the ARMM*.

be necessary. Geared towards the formal sector, the Labor Code may be indifferent to such cultural dynamics.

- It intervenes too much: Compared to the labor regulations of other Asian neighbors, the Labor Code is too restrictive, allowing the government to intervene in the labor market. The extent of the intervention by the government regulations may explain why some businesses prefer to be part of the informal sector.
- It is heavily influenced by politics. DOLE has adopted a tripartite mechanism (a dialogue among DOLE, labor groups, and private sector) to address labor issues. Though this may appear to promote democratic arrangements, the mechanism has been found to be overly political.

8.2 Rationale

Formal labor regulations may not have huge effects in Bangsamoro. For instance, some agricultural companies in the region have been able to negotiate lower minimum wages with their workers. In some cases, these lower minimum wages are supplemented with productivity bonuses or other benefits according to the Bangsamoro's culture. These companies have argued and explained the importance of their enterprise to the local economy.

It is recommended that the Bangsamoro government and the private sector divide responsibilities for labor and employment-related functions. The Bangsamoro government may establish a special district or area where employment insurance, social security, and other provisions of desirable employee protection are practiced. In that, the private sector will assume the role of the constructor to build the special employment zone, where many of the laws of the Philippine Economic Zone Authority (PEZA) on customs and other regulatory requirements are allowed to be modified.

For example, the private sector will be allowed to adopt its own rules in securing its labor force, including the import of foreign technical labor so that these special employment zones can achieve the highest level of quality labor supply. Given this, the area with a special employment zone (SEZ) will become a hub of high-level industrial human resources supply. Further, with the high-quality labor force attracted to and produced within the area, the special employment zone is expected to serve as a human resources training center.

The desirable scenario is that workers to be employed in the SEZ designated by the government in the future will develop skills and experiences while working in the special employment zone. If such special employment zones are established throughout Bangsamoro, and also if businesses locating in the zone are allowed to apply simplified employment regulations and their own wage-setting process instead of those applied elsewhere in the Philippines, investors will be more attracted to investing and starting their businesses in special employment zones in Bangsamoro than in other regular SEZs.

8.3 Project Scope

(1) Investors' autonomy in securing labor force

Investors can propose various employment conditions by themselves, which will be announced to the Bangsamoro's labor market. Local residents as well as foreign nationals who wish to work under such conditions will apply to the committee, which will then direct the applicants to be trained at the training center established by the private sector. The investors will start their businesses with the trained applicants applying the proposed (and approved) employment conditions.

(2) Location and time limit for establishment

The special employment development zone will be established as part of or near an SEZ within a certain time limit (up to five years).

(3) Operation

The private sector (investors) will propose business structure including employment conditions, which will be announced to the labor market through the committee as specified below. Those who are interested in the conditions can apply through the committee to the companies established by the

investors. These applicants will be trained at the training center in the respective SEZ before they are employed by their company.

(4) External support

Support of international donors such as JICA should be sought for the following:

- Technical knowhow of the scheme,
- Technical/financial support on establishing private-led training center,
- Seed fund to start business by local (Bangsamoro) investors, and
- Technical knowhow of monitoring the business by such investors.

The following additional inputs are also expected:

- Third-country experts in the field of Islamic finance and halal processing from Malaysia, and
- Middle-level managers dispatched to provide field training in Turkey.

8.4 Implementing Arrangements

Under the initiative of the Bangsamoro government, the implementing agencies will form a committee to determine the project's timeline and customs and labor regulatory requirements such as on minimal customs and import duties, employment of foreign experts, wages, working hours, and so on. The private sector (the Chamber of Commerce of Cotabato City) also will propose the training center for local people who will work in the SEZ with the special employment zone.

8.5 Project Cost

The project cost is roughly estimated at US$4 million including the following

(1) Technical assistance by experts (150 person-months)

- PM/institutional design
- Business promotion
- Financial support
- Human resource development/ training
- Monitoring

(2) Training center construction

- Premises (for the training center and the office for the committee and consultants)
- Furniture and equipment

(3) Promotion and dissemination

PROJECT PROFILE 2-17 GREATER COTABATO CITY URBAN INFRASTRUCTURE DEVELOPMENT PROJECT

1. Project Title: Greater Cotabato City Urban Infrastructure Development Project

2. Locations: Cotabato City and surrounding municipalities

3. Implementing Agencies: Inter-agency with MinDA coordinated by BDA

4. Objectives: (1) To develop Cotabato City as the regional capital of Bangsamoro, (2) to enhance provision of urban functions and services to Bangsamoro people, and (3) to make Greater Cotabato most effective links to the global economy

5. Expected Effects: Greater Cotabato City as internationally first-class city competitive in the global economy

6. Project Cost: US$4 million for master planning

7. Implementation Schedule: 2016–2017 for master planning, followed by implementation of priority infrastructure projects

8. Project Description:

8.1 Background

Cotabato City had a population of 163,849 in 2000 in its land area of 176.0 km^2, and thus its population density was only 9.3/km^2 in 2000. The city's population increased rapidly to 271,786 in 2010 at a rate of 5.19% per annum in the 10 years. The rapid population growth still continues as the prospect of peace has become more realistic in recent years.

Cotabato City is subject to flood damages. For this, the city government prepared a disaster risk reduction management (DRRM) plan in line with the Disaster Risk Reduction and Management (DRRM) Act of 2010 (RA 10121) and the ARMM Regional DRRM Plan 2012–2028 to guide local authorities to effectively comply with the DRRM Act. According to the City DRRM plan, the upstream portion of the city is prone to floods and the downstream portion to tsumami and floods. This leaves only a limited area for urbanization as shown in Figure 2-17.1.

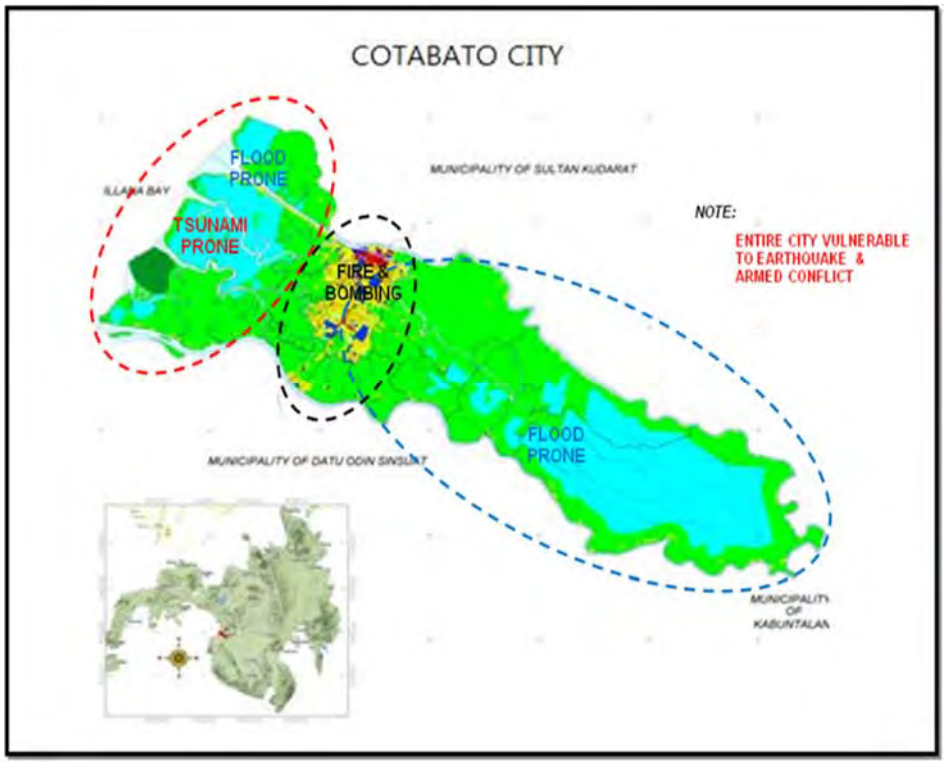
The Cotabato City government prepared a comprehensive land use plan for 2011–2030 to guide the future urbanization. According to the plan, the urbanized area is expected to expand in the central portion of the City largely free from floods and tsunami. The urbanized area is planned to be expanded from 9.9 km^2 in 2007 to 18.7 km^2 in 2030. The city population is projected to increase from 259,153 in 2007 to 634,507 in 2030. The city's urbanization rate was already high at 90.8% in 2007. Given the limited area suitable for urbanization, the population density in the urbanized area is already quite high and expected to increase further continuously.

The ratio of the working-age population to the total population, or the labor force coefficient, was very low in the city at 39.5% in 2000. Due to significant increase in employment-seeking in-migration with the increased prospect of peace, the labor force coefficient increased to 62.4% in 2007. The 0–14-year old population was about 35% during this period. Given these conditions, the future population growth will be likely to remain strong, and employment opportunities will need to be expanded continuously.

8.2 Rationale

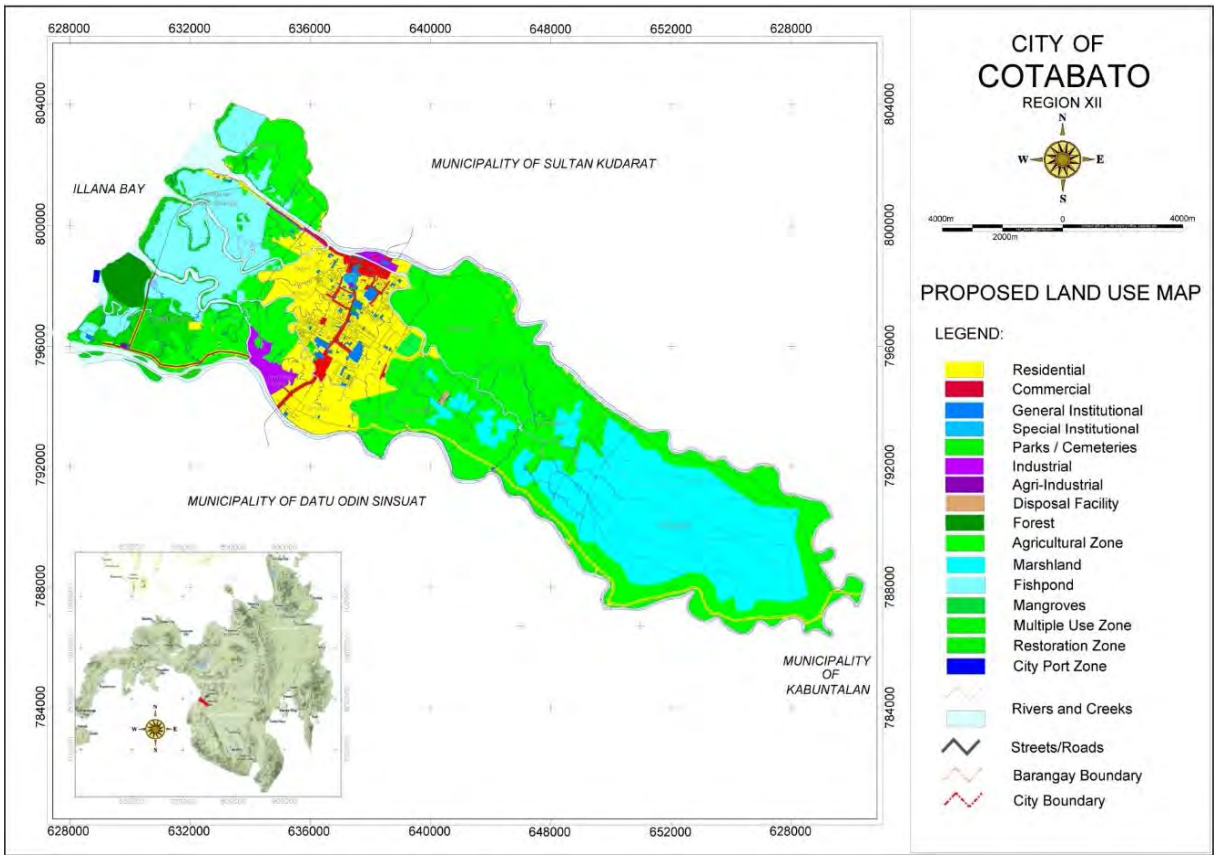
Cotabato City at present is characterized, among others, by the following:

1) Narrow territory with limited area suitable for urbanization,
2) Large city area vulnerable to floods and tsunami,



Source: Cotabato City, Disaster Risk Reduction Management Plan.

Figure 2-17.1 Disaster Vulnerability Profile of Cotabato City



Source: Cotabato City Comprehensive Land Use Plan 2011–2030.

Figure 2-17.2 Proposed Land Use Plan for Cotabato City

3) Rapid population growth that is expected to continue for some time,
4) Large youth population requiring significant increase in employment opportunities in coming decades,
5) Traffic congestion due to lack of proper spatial structure, and
6) Inadequate links with neighboring municipalities due to limited capacity of roads and bridges including the Quirino Bridge.

Cotabato City is assessed as one of the Tier I cities in Mindanao as examined by the urban hierarchical analysis in the sub-section 9.2.1 of the *Final Report*. Compared to other Tier I cities, Cotabato City has the smallest population (271,786 in 2010) despite the highest population growth of all the Tier I cities in Mindanao. It is classified as a *third-class* income city and also the only Tier I city not classified into *highly urbanized cities*.

Cotabato City is expected to serve as the regional capital of Bangsamoro due to its location, the largest population of all the urban centers in Bangsamoro, and the presence of a 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, the city should develop some higher-order urban functions such as a commercial and financial center of Bangsamoro, export base, advanced research and education, and some specialized healthcare.

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 with the 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 networks 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 freeport and ecozone development and a new Bangsamoro international airport should be examined and their stage-wise development plans should be formulated.

8.3 Implementing arrangements

To develop Cotabato City into the regional capital of Bangsamoro, concerted efforts are needed by all the related government agencies working with the private sector as well as residents in order to improve various infrastructures and utilities, provide comfortable urban environment with adequate facilities, and ensure proper urban services. Such collaborative arrangements should be established from the beginning of urban development master planning.

A steering committee should be organized with all the related government agencies of ARMM, neighboring municipalities, MinDA, and representatives of the private sector and some social organizations. BDA should function as a secretariat to the steering committee and coordinate the member agencies and organizations. Once the urban development master plan is prepared, priority projects should be implemented promptly by some of the member organizations of the committee. As the master plan will be prepared through collaborative efforts coordinated by BDA, there should be no further disputes concerning the prioritization of implementation.

8.4 Scope of Work for Urban Development Master Planning

(1) Planning area

At the beginning of the master planning, the area subject to the planning should be defined and agreed at a steering committee meeting. It should cover at least the two neighboring municipalities of Sultan

Kudarat in the north linked by the Quirino Bridge and Datu Odin Sinsuat in the north. In view of possible development of a new Bangsamoro international airport and expansion of the Polloc Freeport and Ecozone, the municipalities of Mastura and Parang may also be included probably at the macro zoning level.

(2) Planning framework

According to the comprehensive land use plan 2011–2030 of Cotabato City, the city's population is projected to increase to 634,507 in 2030 at an annual rate of 4.33% on average. This population growth rate may be too low in view of the rapid population increase in recent years. Also, as the Greater Cotabato City is defined first as a planning area, a much larger population is expected to be accommodated in the area. The master plan should anticipate a population of 1.0 million, more or less, in the greater Cotabato City by 2030.

To accommodate the population of 1.0 million comfortably, an urbanized area of about 100 km^2 will be required. This area is much larger than the present or even planned urbanized area of Cotabato City. To plan for the Greater Cotabato City with better physical structure, even a larger area should be taken as the planning area. The area in 15–20 km from the present city center, slightly further to the north, should be considered as the planning area.

(3) Characterization of Greater Cotabato City

To develop Cotabato City as the regional capital of Bangsamoro with upgraded urban facilities and more appropriate physical structure in an expanded territory for some higher-order urban functions such as

1) Commercial and financial center of Bangsamoro,
2) Export base,
3) Advanced research and education, and
4) Some specialized healthcare.

(4) Scope of master planning

An integrated urban development master plan for the Greater Cotabato City should be prepared encompassing the following:

1) Physical structure of the area including artery and sub-artery road networks,
2) Macro zoning of land use,
3) Socio-economic framework including population projection, and
4) Expected functions to be strengthened.

The location and development timing of the new Bangsamoro international airport should be determined as part of the macro zoning and in line with the socio-economic framework. The stage-wise Polloc Port upgrading with freeport and ecozone development is also planned in line with the socio-economic framework.

Within the structure and the framework, infrastructure and utilities should be planned including the following:

1) City roads in line with the artery and sub-artery road network,
2) Water supply, sewerage, and sanitation (cf. UNICEF WASH programmes),
3) Electricity,
4) Solid waste management,
5) Logistic infrastructure, and
6) Major public facilities to support the expected urban functions.

A development scenario should be prepared as part of the master plan to clarify staged implementation of projects constituting the master plan. The projects should be prioritized, and an indicative investment plan should be prepared. Implementation of priority projects should follow immediately by some member agencies of the steering committee, coordinated by BDA or a new autonomous authority.

PROJECT PROFILE 2-18 JOLO AND BONGAO URBAN FUNCTIONS UPGRADING PROJECT

1. Project Title: Jolo and Bongao Urban Functions Upgrading Project

2. Locations: Sulu and Tawi-Tawi

3. Implementing Agencies: Inter-agency coordinated by BDA

4. Objectives: (1) To upgrade Jolo and Bongao to Tier II urban centers, (2) to strengthen links between the main island and the island municipalities of Sulu and Tawi-Tawi, and (3) to promote livelihood and economic activities of these island provinces.

5. Expected Effects: Much strengthened socio-economy of Sulu and Tawi-Tawi provinces to facilitate linkages with BIMP-EAGA and the main land of Bangsamoro

6. Project Cost:

7. Implementation Schedule: 2016–2017 for implementation of urgent water supply, electricity and other projects, while support measures for livelihood and economic activities are formulated

8. Project Description:

8.1 Background and rationale

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 9.2.1 of the *Final Report*, the island provinces are poorly represented by higher-order urban centers. In Basilan, Isabela City is ranked as a Tier II city, 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.

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 through 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 area coverage.

In consideration of needs to improve the basic infrastructure and utilities and support livelihood and economic activities in an integrated way, an area development approach may be applied to the project implementation. Institutional support should also be introduced to support the implementation of the project and other related projects.

8.2 Candidate projects for urgent implementation

During a field validation survey conducted by BDA in late 2015, urgent projects were identified by the respective provinces, which are considered in line with the proposed projects. They are listed below by province.

Tawi-Tawi Province			
Municipality	Barangay	Priority project	Project description
Bongao	Tubig Tana Simandagit	Water supply	Improvement of old dug well with increased depth and protection Provision of larger reservoir and pump Extension of service lines
Bongao	Sapa-Sapa	Boat landing	Rehabilitation of stilt type boat landing
Simunul	Tubig Indagan	Municipal water system	Provision of pumps and extension of service lines

Sulu Province			
Panamao, Panglima Estimo	Siet Coastal, Upper & Lower Patibulan	FMRs	Improvement of FMRs with pavement to make them all season roads
Panglima Estimo	Siet	Water supply	Expansion of water supply by tapping water of Siet Lake
Panglima Estimo	Poblacion	Municipal port	Construction of stilt-type structure for larger boats
Panglima Tahil	Cabucan	Foot bridge	1.5 km foot bridges to connect three islands
Patikul	Umangay	Boat landing	Repair of existing structure

8.3 Related measures to support livelihood and economic activities

While the urgent projects are implemented, specific livelihood and economic activities to be supported in specific localities should be identified. Additional projects to develop infrastructure and utilities to support them should be formulated, including water supply, electricity, FMRs and port facilities. Some of these projects may be implemented under other proposed projects. The possibility to provide a package of support measures in the form of a special economic zone should be examined.

PROJECT PROFILE 2-19 POLLOC FREEPORT AND ECOZONE DEVELOPMENT PROJECT

1. Project Title:	Polloc Freeport and Ecozone Development Project
2. Locations:	Parang Municipality and surrounding area
3. Implementing Agencies:	REZA in cooperation with the private sector
4. Objectives:	(1) To upgrade the port facilities of the Polloc Freeport and (2) to expand the port area and the ecozone to accommodate various indigenous and export industries and logistic functions of Bangsamoro
5. Expected Effects:	Polloc Freeport and Ecozone as the main logistic hub in the region encompassing BIMP-EAGA and other regions of Mindanao
6. Project Cost:	US$5 million for master planning
7. Implementation Schedule:	2017–2019 for master planning in line with the Greater Cotabato City urban development master plan, followed by implementation by PPP

8. Project Description:

8.1 Background and rationale

The Polloc Port was constructed in 1977 funded by ADB, and its operation started in March 1980 by the Regional Ports Management Authority (RPMA) until 2010. By virtue of MMA Act No. 154 and Proclamation No. 1 dated May 15, 2010, the port was transferred to REZA as the Polloc Freeport and Ecozone. The organization of the Polloc Port is composed of the Port Manager and the divisions of Resource Management; Port Services; Planning, Business and Investment; Port Police; and Engineering Services. The Polloc Port was operated by a private entity (Peptalk Investment and Development Corporation, called PTC) and is now under the management of a new operator, Lamsan Trading, which will continue the port operation till 2022.

For Bangsamoro to realize its high development potential by utilizing its strategic position as well as rich indigenous resources, Cotabato City should be developed as the regional capital equipped with a major port and airport facilities nearby. In particular, as Bangsamoro is expected to pursue outward 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.

Terminal facilities and functions of the Polloc Port should be much strengthened by activating the Polloc Freeport 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 Freeport and Ecozone should be expanded to accommodate sufficient warehouse and container yard spaces as well as an ecozone for export and other industries. A stage-wise development plan should be prepared in the subsequent stage.

8.2 Development planning

The Polloc Freeport and Ecozone should be first planned as part of the Greater Cotabato City urban development master planning to establish the extent of development and the phased development plan in view of the socio-economic framework of the Bangsamoro development and the demand projection examined by the JICA Study for the BDP. Demand for the ecozone should include new industries and logistic services to be developed by industrial clusters, as the BDP adopts industrial clusters development as its key strategy. Some indigenous industries as well as export industries constituting industrial clusters may be located in the ecozone.

Master planning for the Polloc Freeport and Ecozone should be undertaken to determine dimensions of

the ecozone with prospective industries and logistic services to be located there, reflecting also the demand projection for the Polloc Port. Within the macro zoning prepared by the Greater Cotabato City plan, a land use plan for the ecozone will be prepared. Similarly in line with the infrastructure and utilities planning for Greater Cotabato City, external and internal infrastructure and utilities will be planned covering roads, water supply and sewerage, drainage, electricity, and solid waste management.

8.3 Implementing arrangements

Based on the development planning, an implementation plan will be prepared. Costs involved in the development of infrastructure and utilities will be estimated. Implementing arrangements of the ecozone development and operation will be clarified for the PPP, including funding for construction, management organization, and revenue sharing. A financial analysis will be carried out to confirm the project viability and specific conditions of project operation. A management entity will be established by the PPP arrangement.

Construction of the ecozone will be undertaken by a private contractor under the supervision of the PPP organization. For the ecozone to serve the Bangsamoro development to the fullest extent, generating sufficient employment opportunities, the concept of special employment zone as proposed by the BDP may apply to the ecozone.

PROJECT PROFILE 2-20 ABUBAKAR INTEGRATED AREA DEVELOPMENT PROJECT

1. Project Title: Abubakar Integrated Area Development Project

2. Locations: Municipalities of Kapatagan, Balabagan, and Maragong in Lanao der Sur; and Matanog, Buldon, and Barira in Maguindanao

3. Implementing Agencies: Interagency with Regional DAF and DPWH, LBD, SUCs, LGUs, and cooperatives coordinated by BDA

4. Objectives: (1) To convert the former camp area into viable rural communities and (2) to enhance the livelihood of people with higher income linked to mainstream economy

5. Expected Effects: Much activated rural communities with viable livelihood and economic activities as a model for the former MILF camp conversion

6. Project Cost: US$10 million for detailed planning and initial implementation

7. Implementation Schedule: 2016–18 for detailed planning and initial implementation

8. Project Description:

8.1 Background and rationale

A socio-economic survey was conducted as part of the JICA Study on the BDP for medium to long term to facilitate future development programming for communities in the former MILF Abubakar camps. The survey covered the municipalities of Kapatagan, Balabagan, and Maragong in Lanao der Sur and the municipalities of Matanog, Buldon, and Barira in Maguindanao. Profiles of the six municipalities are presented in Table 2-20.1.

Table 2-20.1 Profiles of Six Municipalities of Former MILF Abubakar Camp

	Kapatagon	Balabagon	Maragong	Matanog	Buldon	Barira
Land area (km^2)	288.1	230.3	363.9	246.8	447.2	248
Population (2010)	13,432	25,135	18,541	23,267	33,729	19,430
Sex ratio (%)	100.7	100.0	100.7	101.2	101.5	99.4
Urbanization rate (%)	13.3	13.7	19.5	14.0	0.0	23.0
Illiteracy rate (%)	21	24	30	36	21	29
Electricity use for lighting (%)	48.9	72.3	49.9	47.6	38.2	14.6
Access to faucet water system (%)	57.1	2.8	30.1	35.3	8.2	22.1
Use of water sealed septic tank (%)	17.1	17.8	8.3	29.7	20.8	6.3
Poverty incidence	60.4	53.9	76.2	59.3	65.1	43.7

Source: JICA Study Team.

A questionnaire survey was conducted on 720 respondents. Ethnic composition of the respondents was dominated by Iranun with 61% and Maranaw with 33%. Educational levels of the respondents are 35% elementary, 19% secondary, 14% primary, and 19% with no education. About how they perceived their communities, 56% were satisfied with living conditions, 89% socializing with people, and 56% satisfied with safety. As problems with livelihood, 31% reported access roads, 23% finance, 22% electricity, 21% water, and 12% training in disaster response and agriculture.

8.2 Possible project components

The integrated area development approach is to provide 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 healthcare; basic infrastructure such as access roads, water supply, electricity, and sanitation facilities;

and some community facilities. Specific components of the project are suggested below.

As the livelihood/economic activity to be supported by the project, corn farming may be selected as it is one of the most widely cultivated 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 the generally poor condition of rural roads in the area, a few farm-to-market roads should be included in the package of support measures 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 the major market.

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

8.3 Detailed planning and initial implementation

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, which include

1) Technical extension and training in pest control, fertilizer use, proper combination of crops for mixed farming, and other appropriate subjects;
2) Composting or vermicomposting of crop residues;
3) Improvement of farm-to-market roads;
4) Pavement of selected semi-artery roads; and
5) Multi-purpose waterfalls development for mini hydro power, water supply, and eco-tourism.

Of these components, the component 1) may be undertaken effectively under the Mixed Field Crops Farming Project, but it should be covered by the detailed planning to ensure consistency with other components. Improvement of farm-to-market roads should be implemented by applying labor-based technology to contribute to the generation of employment opportunities for former MILF combatants. Provision of basic tools and in-field training for the construction is part of this component. For waterfalls development, detailed planning and selection of priority schemes and design of the priority schemes should be carried out together for early implementation.

III. ALTERNATIVE SOCIO-ECONOMY PROMOTION INITIATIVE

PROJECT 3-1 ABACA AGRO-INDUSTRIAL CLUSTER DEVELOPMENT IN BANGSAMORO

PROJECT 3-2 RUBBER CLUSTER DEVELOPMENT PROJECT IN BANGSAMORO

PROJECT 3-3 GOAT-BASED INTEGRATED FARMING PROJECT

PROJECT 3-4 POULTRY-BASED INTEGRATED FARMING PROJECT

PROJECT 3-5 PLANTATION CROPS MIXED FARMING PROJECT

PROJECT 3-6 MIXED FIELD CROPS FARMING PROJECT

PROJECT 3-7 OPEN POLLINATED SEED PRODUCTION CENTER ESTABLISHMENT PROJECT

PROJECT 3-8 ORGANIC AGRICULTURE PROMOTION PROJECT

PROJECT 3-9 OPEN MARKETS DEVELOPMENT PROJECT

PROJECT 3-10 HALAL INDUSTRY PROMOTION PROJECT

PROJECT 3-11 COLD CHAIN FACILITIES INSTALLATION PROJECT

PROJECT 3-12 SOLAR POWERED FISH MARKET DEVELOPMENT PROJECT

PROJECT 3-13 FRESHWATER AQUACULTURE DEVELOPMENT PROJECT

PROJECT 3-14 MARINE AQUACULTURE DEVELOPMENT PROJECT

PROJECT 3-15 SEAWEED CULTURE DEVELOPMENT PROJECT

PROJECT 3-16 COCO PRODUCTS INDUSTRIAL CLUSTER DEVELOPMENT PROJECT

PROJECT PROFILE 3-1 **ABACA AGRO-INDUSTRIAL CLUSTER DEVELOPMENT IN BANGSAMORO**

1. Project Title: Abaca Agro-Industrial Cluster Development in Bangsamoro

2. Locations: Maguindanao (particularly municipalities of Matanog, Barira, Buldon), Lanao del Sur (particularly municipalities of Balabagan, Kapatagan, Malabang, Pagayawan, Pualas), and Sulu.

3. Implementing Agencies: BDA as the lead implementing agency, LGUs, DAF, MSU-Main Campus, MSU-Jolo, MSU-Dalican, PhilFIDA, LBP, and DTI

4. Objectives: (1) To revive and revitalize abaca production in Bangsamoro by providing support for cultivation, fiber extraction, and marketing; and (2) to attract investment in manufacturing of abaca-based products

5. Expected Effects: (1) Increased farmers income, (2) more employment opportunities, and (3) inclusive economic growth of Bangsamoro

6. Project Cost: US$3.0 million (PHP 131.0 million)

7. Implementation Schedule: 2016–2022

8. Project Description:

8.1 Background

Abaca (*Musa textilis Nee*), is indigenous to the Philippines and its fiber is known worldwide as Manila hemp. The fiber is obtained from the leaf sheaths of the abaca plant, which is similar to banana in appearance. At present, there are only two countries commercially producing abaca fiber, the Philippines and Ecuador. The abaca varieties in Ecuador originally came from the Philippines, in particular from Mindanao.

Abaca fiber is considered the strongest among natural fibers and is used as raw material for cordage, fiber crafts and pulp for the production of specialty paper products like security papers, tea bags, cigarette papers, meat and sausage casings, non-woven and other thin printing papers. Specialty paper products account for about 80% of global abaca consumption, 14% by cordage products and the rest, by fiber crafts and other usage.

8.1.1 Abaca industry in the Philippines

The Philippines supplies about 84% of the world abaca fiber requirements while Ecuador supplies about 16%. During the last five years, the Philippines produced an annual average of about 68,000 metric tons of abaca fiber. Of the total, 76% were processed locally into pulp, cordage and fiber crafts, mostly for export. The remaining 24% were exported in raw form. Demand for abaca, particularly in pulp form has been increasing due to the growing concern for environmental protection and forest conservation which provides more opportunities for natural fibers, like abaca. It is expected that demand for abaca fiber, particularly by local pulp processors will continue to expand as world demand for abaca pulp continued to grow. In spite of high demand for abaca and high abaca prices, local production has not kept pace with demand.

Abaca is grown practically all over the Philippines, except in the northernmost part of the Country. At present, some 121,400 ha are planted to abaca in the Country involving 76,100 farmers. The abaca areas are mostly located in Bicol, Eastern Visayas, Southern and Western Mindanao and Caraga. In Bangsamoro, the provinces of Sulu and Lanao del Sur are the largest producers.

Owing to low income derived from abaca farming and the tedious process of extracting the fiber, farmers especially the younger ones shy away from abaca farming and look for other jobs in the urban areas.

Also, because most of the abaca plantations are already old, typhoon-damaged and infected with diseases, productivity is very low. The national average yield is about 650 kg/ha per year. In Ecuador, the average yield is reportedly about 1,800 kg/ha per year and has only three abaca varieties, Tangongon, Bongolanon, and Maguindanao, which are Mindanao varieties. In the Philippines as a whole, there are about 200 varieties, and most of them are found in Luzon and Visayas.

8.1.2 Suitability of abaca culture in Bangsamoro.

Abaca has been found growing in virtually all types of soils and climate in the Philippines, but it is found most productive in areas where the soil is volcanic in origin, rich in organic matter, loose, friable, and well-drained clay loam type. It requires a water table of 80 cm with 60–80% saturation and a soil pH of 6.0 to 7.0. Undulating or rolling to hilly or mountainous areas less than 500 m above sea level with deep surface soil with slopes from 200 to 600 are ideal for abaca production. For normal growth of abaca plants, the soil must contain adequate amounts of organic matter, potassium, calcium, and magnesium.

Abaca requires warm and humid climate for optimum growth and productivity. Although the optimum temperature requirement for abaca has not been fully determined, it grows in areas with temperatures of 20°C during cool months and 25 °C during warm months. Thus, abaca is good for intercropping with coconut and trees that could dissipate high temperatures and sunlight directly from the sun. A relative humidity of 78 to 85% and a fairly distributed rainfall throughout the year are conducive to good growth. The area must be free from cyclonic winds and typhoons, if not the plants must be provided with cover trees or windbreaks to dissipate the force (PhilFIDA).

The western part of Lanao del Sur and the northern part of Maguindanao particularly the areas covered by Camp Abubakar and the hilly lands of the islands of Sulu meet the physical requirements for growing abaca. Municipalities in these areas have been producing abaca for a long time now although production has diminished overtime due to diseases, mainly bunchy top and mosaic. In the last 10 years, Maguindanao's production had been comparatively small although it used to be the main crop of the municipality of Matanog before Camp Abubakar was crushed by the military and MILF encounter in year 2000 under the *all-out war* policy of the government. Currently, abaca in the area is barely tended and commonly seen underneath coconut trees planted randomly.

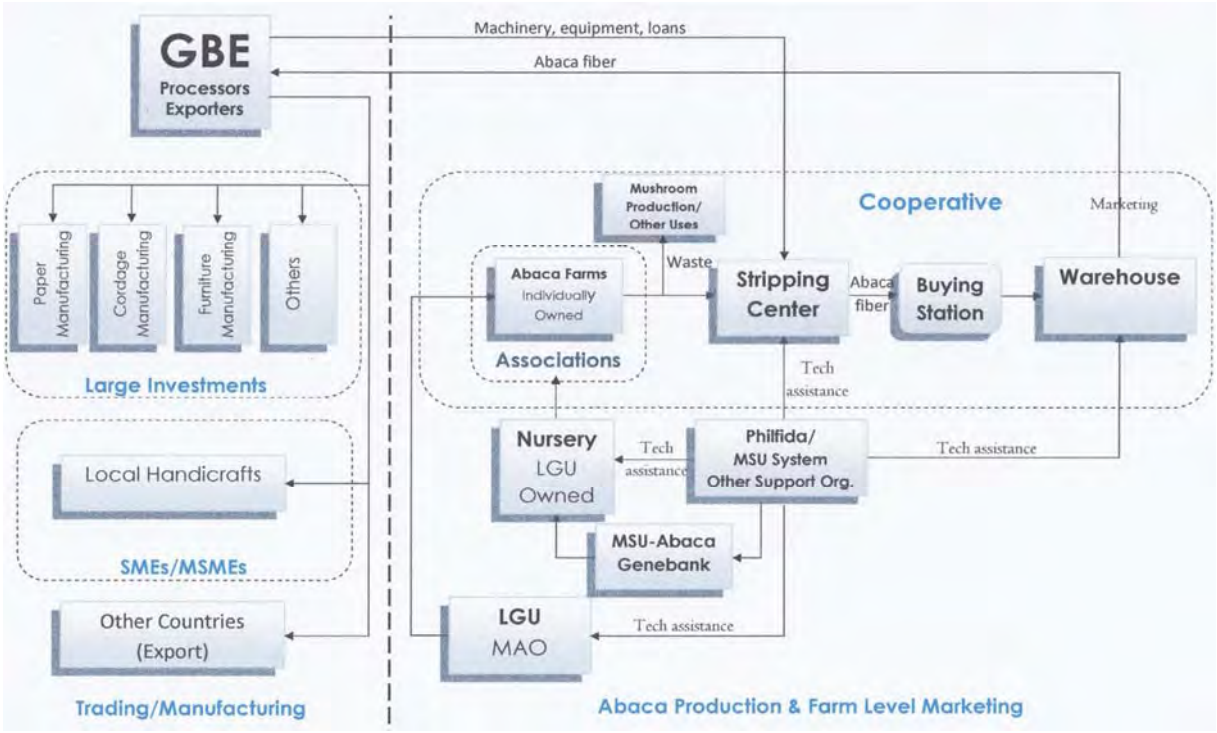
Abaca is best integrated with coconut trees as abaca thrives under shaded areas. According to the farmers they were not visited by technicians from government or other entities. Generally, technical assistance is unheard of. Despite these, productivity in Lanao del Sur and Sulu are among the highest in the Country. A few farmers own mechanical stripping machines powered by diesel engines and accept stripping for tolling. Tolling fee is equivalent to 20% of the output. Of the 80% output, 50% goes to the owner of the stripper as payment for labor in drying and bundling. Thus, the farmer practically gets 40% of the total fiber produced.

According to the local farmers in Lanao del Sur, the current prices of traders who buy abaca fiber in the farms are low compared to several years ago when prices were as high as PHP 100/kg. In the interviews at the farms in Balabagan and Kapatagan, farmers said that traders buy unclassified abaca fibers at PHP 43-45/kg. According to them, these prices have been kept within this range since 2010. This price is a little bit lower than GBEs' prices, which ranges from PHP 45 to PHP 50/kg depending on the grade.

It is apparent that invigorating abaca production in Bangsamoro will require three things: clean planting materials, technical assistance to the farmers and fair income from lower cost of stripping, and fair market pricing of farmers' produce. To address these requirements, a support system should be established for the production and marketing. Institutional users such as manufacturing industries should be established in addition to MSMEs producing handicrafts.

8.2 Scheme of Abaca Agro-Industrial Cluster Development

This project's scheme for the abaca agro-industrial cluster development is shown below.



Proposed Abaca Agro-Industrial Cluster Development Scheme

There are two aspects of the cluster development: agriculture and manufacturing. Agriculture aspect is basically agriculture production and extraction of abaca fiber. Manufacturing is processing of abaca fiber into final products such as specialty paper, cordage, twine, etc. Marketing is the distribution system and intermediary between fiber production and manufacturing. Under the scheme, the agriculture and fiber production and distribution system of abaca under the abaca agro-industry cluster development is described as follows.

(1) Farmers operating farms undertake planting-to-harvest. One of the major supports to the agriculture aspect is the provision of superior strengths and disease-free planting materials. The MSU gene bank makes a continuous R&D for development of disease resistant and high quality fiber parent stocks to supply the nurseries in project-covered municipalities. The R&D component also covers farm systems for integration of abaca with other crops and technologies and products (e.g., mushroom) for the utilization of abaca wastes. The municipalities establish and operate nurseries with stocks supplied from the MSU gene bank. The farmers associations source their planting materials from the nurseries and distribute to members. The operation of nurseries is under the municipal LGUs, although LGUs may opt to transfer operation to cooperatives. MSU in collaboration with the Philmech undertakes designing and commercialization of machines and equipment for extraction of abaca fibers.

(2) The individual farmers are organized into farmers associations, which constitute the cooperative as members. Abaca farmers have the option to invite farmers they choose and form an association. Associations undertake three main functions to:

a. Facilitate the delivery of support services from agriculture agencies (e.g., PhilFIDA, MSU, and LGUs) to the member farmers;
b. Manage the use of common service facilities (e.g., stripping machines), which may be acquired or leased from the cooperative by its members; and
c. Represent its members in its membership to the cooperative.

(3) The cooperative is organized at the municipal level and only one per municipality under the abaca cluster development scheme. Its members are abaca farmers' associations within the municipality. It operates a business that provides the requirements of the members. The cooperative operates on its internally generated funds and may also source funding from banks like Land Bank of the Philippines (LBP), which is mandated to lend to the agriculture sector. The business of the cooperative includes

a. Leasing of equipment and other facilities: Cooperatives source machines and equipment from the grading and baling establishment (GBE), on an arrangement under a memorandum of agreement (MOA) and other alternative sources and schemes.
b. Marketing (buying and selling of abaca fibers): Cooperative primarily buys from its members (directly from the farmers of the association or from the associations). For this purpose, a cooperative has its own pool of machinery and equipment under a stripping center, a buying station in strategic areas and warehouses.
c. Other activities: Cooperatives may also carry out lending to members. It can also operate nurseries, which the municipal LGUs may hand over to them.

(4) The GBE is a private entity. It is a major consolidator, supplier and exporter of abaca. Currently, there are only four GBEs registered with PhilFIDA all over the Philippines. With the high demand and low supply situation in abaca fiber, GBEs will rush to support production areas if only to increase volume.

(5) The major destinations of abaca fibers at present are export and handicraft mainly by small and medium-size enterprise (SMEs) and micro-SMEs (MSMEs). The presence of investments in large scale processing of abaca fibers is expected to increase production to feed the requirement of these industries.

The abaca agro-industrial cluster development is an inclusive economic development strategy. It builds on largely small farmers' economic activities and creates additional employment and income opportunities from the long value chain. Yet, it can only happen through concerted efforts duly integrated in an inter-agency implemented project.

8.3 Project Components

The project components are briefly described as follows:

(1) Abaca Production Support Component

a. Establishment of Abaca RDE center and gene bank at MSU-Main Campus in Marawi City, MSU-Jolo Campus, and MSU-Dalican Campus
b. Establishment of nurseries in selected municipalities of Lanao del Sur, Maguindanao and Sulu to provide farmers with disease-free planting materials
c. Establishment center for designing and commercialization of efficient abaca stripping machines, decorticator, and other equipment for extraction of high quality abaca fiber under Phil Center for Postharvest and Mechanization (Philmech) at MSU-Main Campus

(2) Organization and delivery of extension and other support services

a. Mapping of existing and potential abaca production areas
b. Soils mapping and analysis and formulation of intervention in production
c. Design of intervention for abaca farms such as soil analysis, best cultural practices in growing abaca for farmers

(3) Institutional and business development for farmers' cooperatives

a. Organization of farmers associations and producers and marketing cooperatives.
b. Preparation of feasibility study and business plan for cooperative enterprise
c. Provision of support for forging agreements and loan applications

(4) Investment promotion

The GBE and large manufacturing are areas of investment. It will be easy to invite a GBE to operate in Bangsamoro. Currently, local abaca traders are already financed by GBEs in order to secure large volumes. Investment in commercial scale plantations of abaca may also be pursued. Plantations spur rapid agricultural growth of its host locations. However, investment in manufacturing plants and plantations will take more effort from the LGUs (municipalities and provinces) due to competition among national and international destinations. Under the situation, the Bangsamoro area is not an investment haven. Yet, development in the progressive municipalities of Datu Paglas, Buluan, Wao,

and Bumbaran was anchored on investments of large trans-national corporations. There is a lot to learn from the development model of these municipalities, particularly attracting investment that goes beyond the typical strategy for granting fiscal and non-fiscal incentives, creation of promotion offices, etc.

(5) Project monitoring and evaluation.

The project includes monitoring the implementation for four years for purposes of reviewing and evaluating the effectiveness of the interventions provided under the project.

8.4 Organization of the Project

The development of abaca industrial cluster will necessarily be based on what is commonly called a value-chain analysis study. The project is an inter-agency implemented project led by the Bangsamoro Development Authority (BDA) as the focal agency under which the Project Management Office (PMO) will be established. The Project components and the members and agencies to be assigned to the components are summarized below.

Project Components and Respective Team Members and Agencies

Project component	Project Team members	Participating agencies
Project management 1. Management 2. Monitoring & evaluation of project activities under various components	Project team leader, economist, institutional development specialist, project financing specialist, coop development. specialist	BDA
Preparation of value chain analysis	Economist, VCA expert	DTI, DAF
Production support component		
Establishment of RDE, gene bank, nurseries, and RDE for abaca fiber extraction	Agronomist, plant pathologist, entomologist, soil expert, agricultural engineer, abaca farming system specialist	PhilFIDA, MSU-Colleges of Agriculture in Marawi City, Jolo, Dinaig, Municipal LGUs, Philmech, DAF-ARMM
Organization & delivery of extension & other support services	Training specialists, extension specialist	DAF-ARMM, CDA-ARMM, PhilFIDA
Institutional development component		
1. Organization of farmers associations and cooperatives 2. Preparation of business plan for cooperatives & feasibility studies	Institutional development specialist, cooperatives development specialist, economist, business development specialist, market development specialist	CDA-ARMM, LBP-Lending Centers (Cagayan de Oro, Kidapawan, Zambonaga)
Financing Component:		
1. Preparation of financing package for farmers, associations, cooperatives 2. Investment financing	Project finance expert	LBP-Lending Centers (Cagayan de Oro, Kidapawan, Zamboanga), LGUs
Investment Promotion:		
1. Preparation of investment policy, strategies and plans	Investment specialist, LGU fiscal policy specialist, investment promotion program specialist	DTI-ARMM, Municipal LGU

8.5 Project Team Deliverables

The project team are expected to deliver the following outputs.

1) Abaca value chain analysis (VCA) in Bangsamoro
2) Alternative schemes and farming systems
3) Cooperative business operation encompassing:
   - feasibility study for production and marketing,
   - business plan, and
   - financing
4) Report on financing package for small farmers, cooperatives

5) Report on large project financing
6) Maps of
   - existing and potential areas for development of abaca production, and
   - detailed soil maps of municipalities covered by the project
7) Investment promotion plan for LGUs

The project team will also submit project monitoring reports on the establishment of the nurseries and the abaca R&D centers as well as on the operation of the cooperatives.

8.6 Timelines

The project will be implemented for five years. In the first year, the following are undertaken; preparation of VCA, mapping of existing and potential expansion areas, establishment of support services for abaca production undertaken by small farmer, institutional development, preparation of financing programs, investment promotion programs and monitoring instruments. In the second year, the whole system should be in place and new farms would have been planted. During this year, the associations and cooperatives would have been installed and fully operational. Cooperatives are operating in municipalities with existing abaca production. The third year should see a fully developed abaca agro-industrial system in some municipalities covered by the project. Fourth and fifth years should see more expansion areas under abaca cultivation. The implementation schedule of these activities is indicated below.

Schedule of Activities

Project Activities	Implementation Years				
	1	2	3	4	5
1. Conduct of abaca value chain analysis	■				
2. Abaca production support					
a. Establishment of RDE centers & gene bank	■				
Monitoring of operation & intervention		■	■	■	■
b. Establishment of LGU nurseries	■				
Monitoring of Operation/Intervention		■	■	■	■
c. Establishment of R&D for fiber extraction	■				
Monitoring of operation & intervention		■	■	■	■
3. Organization and agricultural extension					
a. Mapping of existing & potential areas	■				
b. Soils mapping, analysis & intervention	■	■	■	■	■
c. Delivery of technical assistance	■	■	■	■	■
Monitoring of operation & intervention		■	■	■	■
4. Institutional & business development for coops					
a. Organization of associations & coops	■				
b. Preparation of fs & business plan		■			
c. Guidance for loans & agreements		■	■	■	■
Monitoring of operation & intervention		■	■	■	■
5. Investment promotion					
a. Investment promotion strategies & programs	■				
Monitoring of operation & intervention		■	■	■	■

8.7 Project Cost

The project cost is estimated as shown below.

Project Cost Estimates

Project Activities	Amount	
	PHP	US$
1. Project management		
1. Abaca value chain analysis	1,000,000	
2. Abaca production support		

Project Activities	Amount	
	PHP	US$
a. Establishment of RDE centers & gene bank	6,000,000	
b. Establishment of LGU nurseries (10)	20,000,000	
c. Establishment of R&D for fiber extraction	10,000,000	
3. Organization and agricultural extension		
a. Mapping of existing & potential areas	2,000,000	
b. Soils mapping, analysis, & intervention	5,000,000	
c. Delivery of technical assistance		
4. Institutional & business development for coops		
a. Organization of associations & coops		
b. Preparation of FSs & business plans	2,000,000	
c. Guidance for loans & agreements		
Monitoring of operation & intervention		
5. Investment promotion		
a. Investment promotion strategies & programs	2,000,000	

PROJECT PROFILE 3-2 RUBBER CLUSTER DEVELOPMENT PROJECT IN BANGSAMORO

1. Project Title: Rubber Cluster Development Project in Bangsamoro

2. Locations: Basilan, Maguindanao, and Lanao del Sur

3. Implementing Agencies: LGUs, DAF, MSU-Main Campus, LBP, and DTI

4. Objective: To improve quality of rubber produced in Basilan, Lanao del Sur, and Maguindanao

5. Expected Effects: (1) Increased farmers income, (2) additional employment, and (3) enhanced economy through increased agricultural and manufacturing output and through economic activities created upstream and downstream

6. Project Cost: (to be estimated)

7. Implementation Schedule: 2016–2022

8. PROJECT DESCRIPTION

Bangsamoro provinces such as Basilan, Maguindanao and Lanao del Sur are still competitive in production of rubber. However, after the transfer of rubber plantations to ARBs, production declined as ARBs are small farmers and former tenants who cannot afford to put up capital to sustain the operation of plantations. Also, a large number of old trees need to be replaced and hence, a replanting program should be undertaken. In order to support the new rubber producers who are mostly small farmers, the project will have the components described below.

(1) Establishment of nursery to disseminate planting materials

Provincial governments may start a nursery, which can be replicated in the municipalities. This will reduce the cost of transport for the farmers and the mortality of seedlings due to long transport.

(2) Innovative financing scheme

A responsive financing scheme should be designed for rubber producers. It should consider that rubber is a long gestating crop.

(3) Establishment of training center for rubber tappers

Trained rubber tappers have diminished over time and there is a need to augment the declining number. Training of tappers is important to preserve the trees and extend the number of years with good yields.

(4) Establishment of standards for quality of cup lumps and latex

The absence of quality standards led to unscrupulous practices by the farmers such as use of inappropriate acids leading to poor quality of rubber end products. As a result, local manufacturers do not patronize locally produced rubber. Due to poor quality, cup lumps are priced very low making a sweeping detriment to all producers thereby discouraging adherence to quality. The establishment of standards should be supported by a method of determination and detection of cup lumps formed with sulfuric acid and other unfavorable acids.

(5) Organization of rubber farmers into cooperatives

Farmers formed into cooperatives can engage in business as a group. The cooperative buys cup lumps from members and trade their produce to a manufacturer. It will be easy for manufacturers who buy cup lumps in bulk when they transact with a single entity or few entities. This system also reduces unscrupulous practices like adding sand and pebbles to increase the weight and get more cash because they know each other and it would be easy to trace deliveries. Through cooperatives, information campaign is better facilitated.

PROJECT PROFILE 3-3 GOAT-BASED INTEGRATED FARMING PROJECT

1. Project Title: Goat-Based Integrated Farming Project

2. Locations: Maguindanao, Lanao del Sur, Sulu, and Basilan

3. Implementing Agencies: Bangsamoro DAF, PCA, MSU/USM, cooperatives, and LBP

4. Objective: To enhance production capacity of agricultural land

5. Expected Effects: (1) Increased total value of land outputs per hectare from aggregated values of first, second, and third product from the same unit of land and (2) increased meat production in Bangsamoro

6. Project Cost:

7. Implementation Schedule: 2016–2022

8. Project Description:

The incentive for intercropping is essentially economic, since this system not only provides higher gross returns per hectare 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. As far as animal production is concerned the provision of shade and thus lower heat loads on animals is likely to have a positive effect on animal productivity. Although there are constraints particularly related to the level of shade under closely spaced coconuts, a number of grass and legume species have been identified which have varying degrees of shade tolerance. Where light transmission is greater than 50%, sustainable grazing of pastures is possible.[1] The study of Norton et al in 1991 confirmed that nutritive quality of forages grown in partially shaded environments such as old coconuts is comparable to those grown in full sun.[2] King grass can be cultivated under coconut trees, and its forage yield shows in a 60-day defoliation interval with 31,547.65 kg/ha per defoliation, comparable with 263 grass/day raised.

Goat integrated under the coconut tree does not affect the coconut farming system in the area.[3] 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.

According to the survey conducted by the 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. Native varieties of bananas are also in large area. Some coconut planted areas are already intercropped with native varieties of banana and fruit trees. There are also coconut farms intercropped with corn. Notwithstanding, these permanent crop

[1] Ohler, J.G., Modern Coconut Management; Palm Cultivation Products, FAO; www.ecoport.org
[2] Ibid.
[3] Introduction of Improve Forages Under Coconut Trees for Goat D. Polakitan, P. Paat, J. Wenas,O. Tandi, Z. Mantau Installation of Agricultural Technology Assessment and Research, Kalasey North Sulawesi

areas provide a vast opportunity for integration with goat production.

The target beneficiaries of the project are cooperatives with a total consolidated coconut and other tree crop plantations area of not less than 100 ha and large/commercial plantations of not less 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 in Bangsamoro. For these goals, the project will have the following components.

(1) Research and development

Although, there have been siting of goats raised under permanent crops such as coconuts, large scale production need 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 USM will develop site-specific farming system for integration of goat production to coconut, rubber and fruit tree plantations. The farming system would take in consideration the production of compatible forage crop within the plantation to provide for feeds. Maguindanao and Lanao del Sur have an advantage of more than 2,500 mm well-distributed rainfall annually to provide for a year round forage for the goats. Still, the system should incorporate measures to counter the disastrous effects of droughts. 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 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. Establishment of 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.

9. SEA Considerations:

Goats are generally sold live, hence the project is mainly production of goat and crops from the integrated farm system. Processing or establishment of a slaughterhouse is an option of the program participant. Thus, the environmental impact is minimal and could be well avoided under the established integrated farming system.

PROJECT PROFILE 3-4 **POULTRY-BASED INTEGRATED FARMING PROJECT**

1. Project Title: Poultry-Based Integrated Farming Project

2. Locations: Maguindanao, Lanao del Sur, Basilan, Sulu, and Tawi-Tawi

3. Implementing Agencies: Bangsamoro DAF, MSU, USM, cooperatives, and LBP

4. Objective: To enhance production capacity of agricultural land

5. Expected Effects: Increased farmers' income and meat production in Bangsamoro through introduction of poultry in the farming system

6. Project Cost:

7. Implementation Schedule: 2016–2022

8. Project Description:

Many benefits may be obtained in integrated farming systems, from increasing production and value of the land to reduction in production cost. These integrated farming systems have already been tried in multiple storey cropping of coconut, coffee and vegetables and livestock under some permanent crops. Livestock, forage and coconut can also be integrated. All these farm systems integrating production of several crops and livestock have been successful in increasing farmers' income and the value of agricultural outputs per unit area of land.

Poultry could also be raised in an integrated farming systems as in the case of rice-duck farming system. 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 they provide a natural pest control measure. Duck droppings can provide fertilizer to the 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 necessary 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 a mango farms in South Cotabato, regular spraying of chemical pesticides is practiced but no injury has ever been detected on the chickens in the farm. In other mango farms, chickens feast on the insects dropping immediately after spraying without any symptom of poisoning.[4] The orchard/native chicken integration is appropriate for Bangsamoro condition since the market prefer native chicken and farmers are more attuned to this culture.

To achieve these goals, the project will include the following components.

(1) Technical assistance

The project will consist of technical assistance for the farmers for the proper integration of specific types of poultry and crop integration, e.g., duck/rice, chicken/mango, etc. DAF will be capacitated to have a pool of trained technicians to assist farmers in setting up the integrated farming system and continually provide technical support. Technologies and technical experts will be sourced from SUCs, particularly USM, which has already developed various farm systems.

[4] Bareja, B.G and Sioquim E.M., More Efficient Mango Production thru Integrated Production System, 2010 www.cropsreview.com

(2) Financing

The project will include financial package to eligible project proponents. This financing package will be designed to answer the need for initial investment requirements and working capital.

(3) Promotion

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

9. SEA Considerations:

There is no known adverse environmental impact from the project.

PROJECT PROFILE 3-5 PLANTATION CROPS MIXED FARMING PROJECT

1. Project Title: Plantation Crops Mixed Farming Project

2. Location: Bangsamoro

3. Implementing Agencies: DAF and SUCs

4. Objective: To encourage farmers to adopt mixed farming of plantation crops

5. Expected Effects: Increased production value per hectare of land and farmers income

6. Project Costs:

7. Implementation Schedule: 2018–2022

8. Project Description:

Coconut trees occupy the largest areas of plantations and have been in the area for decades. Rubber plantations, which gained dominance in the early 1960s are a plenty in Basilan. Many of these plantations have already been awarded to agrarian reform beneficiaries (ARBs) under a certificate of land ownership award (CLOA). There are ARBs under one CLOA who formed a cooperative to continue the operation of the plantation as it was a profitable business of the previous owner. Some ARBs prefer to have the plantations subdivided and get individual titles. Some coconut farms are retention limits of CARP and farmed by long time owners (probably inherited from ancestors).

According to the survey conducted by the 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 and fruit trees. There are also coconut farms intercropped with corn. Some sightings are coconut intercropped with sugarcane.

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 system gives farmers security in income since plantation crops are traded commodities subject to fluctuation of prices. This is true in the case of rubber and copra.

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. The University of Southern Mindanao (USM) or other appropriate SUC. USM is executing farming systems under its regular agriculture instruction and R&D program. Mixed cropping system will have to be developed on a case-to-case basis considering soil suitability, complementarity of the crops to be integrated, and other factors.

3. The Land Bank of the Philippines (LBP). Financing for the project will be managed by LBP, which will either be a low-cost to no-cost loans for participating farms depending on criteria that will be established under the project.

4. Agriculture Marketing Assistance Division of the Department of Agriculture. The Division will help participating farms identify markets for new products.

9. SEA Considerations:

This project seeks to promote sustainable production in plantations and therefore espouses environmental protection.

PROJECT PROFILE 3-6 MIXED FIELD CROPS FARMING PROJECT

1. Project Title: Mixed Field Crops Farming Project

2. Location: Bangsamoro

3. Implementing Agencies: DAF, SUCs

4. Objective: To expand the adoption of mixed cropping farm systems throughout Bangsamoro

5. Expected Effects: Improved production value per hectare and increased farmers' income

6. Project Cost:

7. Implementation Schedule: 2016–2022

8. Project Description:

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. In general, the theory is that planting multiple crops at the same or almost the same time will allow the crops to work together. 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. In this sense it can be seen as performing different eco-services in the farm system.[5] All these lead to increase in overall productivity and to the use of scarce resources to the fullest degree.

There are several models of mixed crop farming systems that combine two or more crops in the same area of production. The choice of crop combinations are based on characteristics of each crop from which each can mutually benefit from. For example, crops should not have the same kind of pest or disease, and crops do not compete in soil nutrients. There are also 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.[6] Another farm system is called relay cropping best explained in the case of tomatoes and bitter gourd planted in the same plot. Tomatoes is 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.

There are various types of crop combinations and farming systems but they should also be adapted to the conditions of specific areas. Moreover, the choice of crops will have to consider the market. Thus, the project will entail a research and development and extension (RDE) component especially for coming up with various crop cultures and farm systems suitable for Bangsamoro. Different combinations of crops might work differently in different places.

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. But, overall it appears that measurably good effects result, when the right combination of crops is cropped together.

[5] The use of mixed species cropping to manage pests and diseases – theory and practice, Birgitta Rämert Department of Ecology and Crop Production Sciences, Swedish University of Agricultural Sciences, Box 7043, SE 750 07 Uppsala, Sweden.
[6] Mixed Cropping-History of Ancient Farming Technique, www.archaeoloy.about.com

PROJECT PROFILE 3-7 OPEN POLLINATED SEED PRODUCTION CENTER ESTABLISHMENT PROJECT

1. Project Title: Open Pollinated Seed Production Center Establishment Project

2. Location: Bangsamoro

3. Implementing Agencies: MSU College of Agriculture-Main Campus as R&D center; MSU-College of Agriculture on Maguindanao, Jolo, and Tawi-Tawi campuses; and DA-ARMM

4. Objectives: (1) To promote open-pollinated varieties (OPVs) in organic production of rice, corn and leguminous crops, (2) to collect and select OPVs and produce high quality seeds as planting materials from various OPVs of organic upland rice, organic corn, and organic leguminous seeds, (3) to introduce and ensure adoption of appropriate technology in processing of good quality OPV seeds at affordable cost to small farmers, and (4) to disseminate technologies that will enhance capability of technicians and farmers for production of OPV seeds.

5. Expected Effects: Established R&D and production system of OPVs on organic upland rice, corn, and leguminous crops.

6. Project Cost: US$1.80 million (PHP 82.0 million)

7. Implementation Schedule: 2018–2020

8. Project Description:

There had been substantial progress in the development of the seed industry primarily with the participation of private companies in R&D and production. However, their main domain still remains high cost/value and low volume catering only to the needs of few selected farmers. This project will establish a seed production and distribution system that will improve and strengthen the seed chain of upland organic rice, organic corn and organic leguminous crops (e.g., peanut, mungbean, soya bean, and mango). Through this system, the project will provide quality seeds of various OPVs at prices that most farmers can afford. This is basically a research project to establish good varieties through purification. For reproduction and distribution of open pollinated varieties, DA-ARMM should be included as one of the implementing agencies.

The project will have three components described below.

(1) R&D centers

R&D centers will be established at the College of Agriculture (CA) at the MSU main and offsite campuses within the Bangsamoro area. Each MSU Campus-CA will identify good quality OPV varieties in their respective provincial host, purify the seeds and establish production protocol. These seed varieties will be propagated as parent seeds and distributed to farm cooperators for production of certified seeds. Each MSU Campus-CA will be allocated at least one-hectare per crop for experimental plots and production of parent seeds.

(2) Farmers' cooperators

Farmers' cooperators will be enlisted to the project to produce certified seeds that farmers will sell to other farmers producing crops for marketing to consumers.

(3) Education and information dissemination

Seminars and an awareness-raising drive will be undertaken to spread the knowledge and practices on propagation and use of OPVs.

Activities to be undertaken under this project are as follows:

1. Establish the coordination mechanism in the implementation and monitoring and reporting.
2. Coordinate with LGUs and farmers organizations (associations, cooperatives, etc.) for identification and endorsement of farmers-cooperators and information dissemination.
3. Secure commitment of farmers-cooperators to ensure project success.
4. Exercise implementation proper including:
   4.1 Register qualified farmers-cooperators
   4.2 Organize training or seminars in cultivation and management of PVs of different organic upland rice, corn, and leguminous crops.
   4.3 Conduct field demonstration of OPVs for proper management of different varieties.
   4.4 Purchase and distribute tools and seed needed in planting.
   4.5 Supervise, monitor, report, and evaluate the project activities.

The project cost is estimated as follows:

For technical assistance,
Organic systems consultants (at PHP 1.2 million/year): PHP 2.5 million
Two (2) agri-business consultants (at PHP 1.2 million/year): PHP 2.5 million
Credit assistance (PHP 100 million loan fund): PHP 50.0 million
Training and organization: PHP 5.0 million
Demonstration farm: PHP 10.0 million
Project management: PHP 12.0 million
Total: PHP 82.0 million (US$1.8 million at US$1 = PHP 45)

9. Sea Considerations:

Production systems that will be implemented under this project will be undertaken with due regard and compliance to the environmental laws and other regulations in the Philippines. In general, no environmental impact is expected from this project.

PROJECT PROFILE 3-8 ORGANIC AGRICULTURE PROMOTION PROJECT

1. Project Title: Organic Agriculture Promotion Project

2. Location: Bangsamoro

3. Implementing Agencies: DAF, SUCs, ATI, and LBP

4. Objective: To promote organic farming by providing models and promote consumption of organic products

5. Expected Effects: Increased number of farmers adopting organic farming and consumption of organic products

6. Project Cost:

7. Implementation Schedule: 2016–2022

8. Project Description:

Organic farming is hoped to ensure and cumulatively condition and enrich the fertility of the soil, 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, going organic agriculture is an opportunity for the Country's organically grown commodities to enter the world market which would cost US$40 billion to US$70 billion in 2012.[7] 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.

Amid all the wonderful advantages, pundits say the local farming community is yet to totally embrace 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 be analyzed for rehabilitation to determine the exact nutrients needed and other recommendations for the soil. Second, land preparation should eliminate the use of herbicides and instead 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 vermicasts 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.[8]

All the trouble of going organic will still entice farmers if there is market for organic products. Thus, marketing need 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 the consumers the appropriate food information and proper guidance. Likewise, certification processes should be attuned to the interest of the small farmers to make it more economical to go into organic farming.[9]

Since the project objective is to increase the number of farmers adopting organic farming, the project will have three components: training program, model farms, marketing.

1) Establishing a training program for organic farming and marketing of organic products. The training program will accommodate farmers who are curious and want to know more and those who would like

[7] Organic Farming: The Future of Philippine Agriculture, www.fareasternagriculture.com
[8] Eco-Environment, Philippines
[9] La Liga Institute

to learn about organic farming, the benefits not only as an income earner but wider scope of consumers' health and environment. There will be courses on various organic farming systems, methods of pest control and management, and production of organic fertilizers. In order to learn the rope of marketing organic products, there will be courses on certification of farms and labeling of products.

2) Establishing model organic farms for production of vegetables, rice, corn, livestock, poultry, etc. The most effective way to showcase an organic farming is to put up demonstration farms operating as a business. This project will establish model farms for various farming systems to showcase production and marketing. Demonstration farms will be actual farms and will be implemented together with a farmer or cooperative operating the farm with all the technical guidance by technicians and consultants for free.

a. Identification of host farmers/cooperatives

Selection process will be based on some criteria to be established by the consortium. Initially, one of the requirements is ownership of land or holder of a lease agreement or any instrument that would ensure continuity of operation for the length of cooperation.

b. Technical assistance

Technicians and consultants are provided for production of specific products, design of the farms (crops to plant, crop combinations), practices on growing and harvesting, natural pest control, production of organic fertilizers, postharvest processing and compliance to the requirements of organic farm certification.

c. Provision of credit

Aside from owning a piece of land, the farmer/cooperative cooperator will provide for some production inputs, which will be determined under the project. The farmer/cooperator will be provided production credit line with LBP from which the cooperator may avail as he sees necessary.

3) Assistance on entering the distribution system for organic products. The consortium will assist an entity in the Bangsamoro to be accredited as organic farm certification body to lessen the cost of organic farm certification. It will also put up a website of Bangsamoro organic farms and producers that will provide information for prospective clients such as hotels, markets and restaurants.

The project will be implemented through a consortium consisting of DAF, ATI, SUCs, and LBP. DAF will be the head-implementing agency, ATI will undertake the training component, and SUCs will provide technical expertise in designing and providing technology and technical assistance to organic farms. LBP will undertake the credit component.

9. SEA Considerations:

Organic farming seeks to restore balance in the environment. Thus, the project will give more benefit to environment rather than harm it.

PROJECT PROFILE 3-9 OPEN MARKETS DEVELOPMENT PROJECT

1. Project Title: Open Markets Development Project

2. Location: Bangsamoro

3. Implementing Agencies: DAF and SUCs

4. Objective: To provide additional market model for small farmers' products

5. Expected Effect: Increased farmers' income by market-oriented farming

6. Project Cost:

7. Implementation Schedule: 2018–2022

8. Project Description:

The Bangsamoro region has already hosted a number of agri-business corporations, for example, La Frutera in Datu Paglas and Agumil in Buluan, both in Maguindanao; BJ Coconut 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 plantation 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.

In the meantime, product diversification is being encouraged in the region especially for the small farmers to have multiple sources of income. Currently, DAF under various programs of government are promoting planting of vegetables by distributing planting materials and other inputs supported by technical assistance. The same is being promoted by the SERD-CAAM, which has established demonstration farms for vegetable production in some municipalities such as Sultan Mastura. For the farmers to continue planting, a market infrastructure should be provided for them where they can bring their produce for the people/consumers to 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 agriculture production distribution (middlemen) is eliminated. Locally, these are also practiced in Makati as 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. Initially, the rules should establish that the market is only for products planted by local farmers or their families as sellers. Whenever applicable, the company may also participate in selling its product. It is one way for the local people to get to know the company's product especially when destinations are export markets.

9. SEA Considerations:

The operation of the project will create large amount of solid waste as agricultural products, particularly crops. However, these wastes are organic and can easily be managed through composting or can be brought back by the farmers for their vermi-culture. If waste is properly managed, the project has no expected environmental impact.

PROJECT PROFILE 3-10 HALAL INDUSTRY PROMOTION PROJECT

1. Project Components

To promote halal product 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).

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

The halal industry promotion center (HIPC) will be equipped with a halal certified laboratory for the analysis of ingredient and nutrition composition, hygiene control laboratory for quality control of local products, and a food processing experimental factory for development of new local agro-fish foods in the Bangsamoro region. The HIPC will work with both the public sector (LGUs or universities) and the private sector to promote halal certificates, control the quality of local foods, and develop new local processing foods. The food processing experimental factory should also serve as a training center in 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 works.

		
Halal testing laboratory at DOST-ARMM in Cotabato City. It was established by JICA assistance in 2010.	The laboratory has necessary equipment for halal testing analysis except gas chromatography. Basic analysis for halal certificates can be managed without alcohol content.	

Photo: Halal Testing Laboratory in ARMM

(2) Component 2: Technical cooperation on food quality analysis and local processing food 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, such as HACCP, as well as halal certificates.

		
HIPC has chemical and micro-biology laboratories to analyze food quality and hygiene condition (the photo in Food Development Center in Manila).	HIPC also has an experimental food processing factory to develop new local processing products (the photo in Food Development Center).	HIPC produces food samples in the experimental factory with local public or private sectors.

Photo: Food Development Center in Manila

2. Project Cost

Project cost is estimated as summarized below.

Main Program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Construction of Halal Industry Promotion Center	200,000,000	1	200,000,000
Technical Cooperation Project for Improvement of Food Quality Analysis and Management (3 years)	100,000,000	1	100,000,000
Total			300,000, 000

3. Implementing Agencies

Together with DAF-ARMM and DTI-ARMM, ARMM-RG has taken some steps to promote the halal industry in the region. The Food and Nutrition Research Institute of DOST-ARMM may also be involved. Recent development includes the creation of the Mindanao Halal Industry Task Force under the Mindanao Business Council and the creation of the Halal Certification and Accreditation Board in the private sector. In fact, the Framework Agreement on the Bangsamoro 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 this recent development by the task force for the halal industry and Islamic financing created by the technical working group for the present JICA Study.

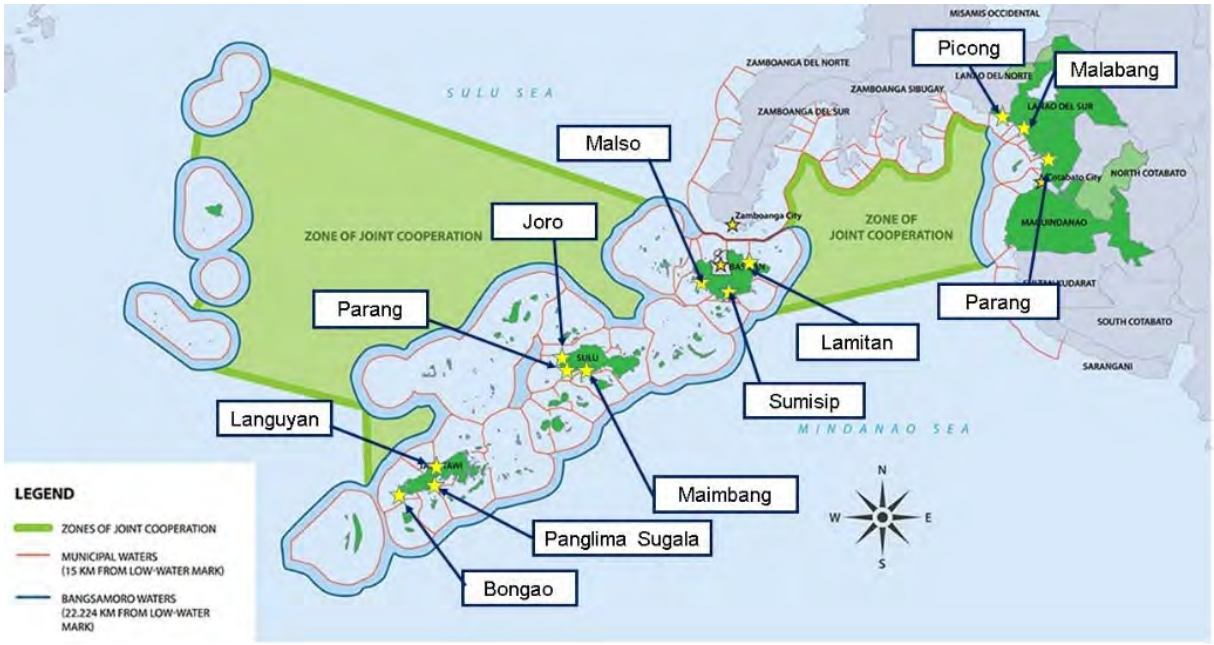
PROJECT PROFILE 3-11 COLD CHAIN FACILITIES INSTALLATION PROJECT

1. Background

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.

2. Project Components

The project will install cold storages and ice-making plants at major fishing ports to increase the distribution capacity of fresh and frozen fish. The candidates of fishing ports and fish landing facilities for the cold chain installation are Parang in Maguindanao; Malabang and Picong in Lanao del Sur; Lamitan, Malsu and Sumisip in Basilan; Joro, Parang, and Mainbang in Sulu; and Bongao, Languyan, and Pangila-Sugala in Tawi-Tawi. Because Malabang and Picong have no plan for fishing port construction at present, the project will establish new fish port facilities at both places. In other candidate municipalities, local fishing port facilities already exist or will be constructed by 2016 in the plan. The project will introduce additional cold storages and ice-making plants to expand the capacity of fresh fish distribution at target places.



Candidate Sites for Fishing Ports and Fish-landing Facilities for Cold Chain Installation in Bangsamoro

Target Sites of Construction and Renovation of Major Fishing Ports in Bangsamoro

Province	Target municipality	Present condition (2015)	Necessary measure for renovation/ installation of fish landing facilities
Magundanao	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

Province	Target municipality	Present condition (2015)	Necessary measure for renovation/ installation of fish landing facilities
	Malsu	Fish landing and market (by PFDA)	Renovation of fish landing and cold chain facilities
	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 PANAMA)	Installation of additional ice plant and cold storage

Ice making plant at Cotabato City (operated by Cotabato Light Co.)

Star-style piers adapting for local fishing boats/canoes at Karamasing, Sultan Kudarat Province

Fish landing and market facilities at General Santos Fishing Port

Photo: Image of construction and innovation of fishing port facilities

3. Project Cost

Project cost is estimated as summarized as follows

Project/Program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Feasibility study for construction and innovation of fishing port facilities	100,000,000	1	100,000,000
Construction of new fish landing center with ice plant or cold storage (Malabang, Picong)	80,000,000	2	160,000,000
Renovation of existing fish landing facilities with ice plant/cold storage (Parang-Maguindanao, Malsu, Sumsip)	60,000,000	3	180,000,000
Installation/upgrade of ice plant/cold storage (Lamitan, Mainbang, Parang-Sulu, Bongao, Pangima Sugala, Languyan)	40,000,000	6	240,000,000
Total			680,000,000

4. Implementing Agencies

The Philippine Fisheries Development Agency (PFDA) and the Bureau of Fisheries and Aquatic Resources (BFAR) are expected to work together to implement the project.

PROJECT PROFILE 3-12 SOLAR POWERED FISH MARKET DEVELOPMENT PROJECT

1. Project Components

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.

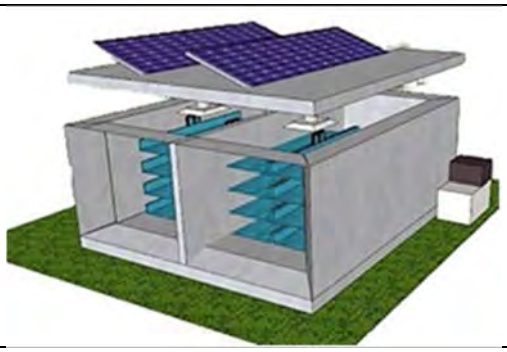
	
Reference: https://www.robotix.in/	Reference: http://www.ecozensolutions.com/

Photo: Image of installation of solar-powered cold storage

		
A fish market / processing facility at Matium, Sarangani Province, managed by local fisher women group: a good model of local fish market facility in Bangsamoro region.	A fish processing facility is equipped in the market building.	Local fisher's women sell their processing fish products to local people and visitors at the market.

Photo: Image of a small-scale fish market and processing facility (Matium Municipality, Sarangani Province)

2. Project Cost

The project cost is estimated as follows:

Main program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Feasibility study for construction of local fish market facilities	50,000,000	1	50,000,000
Construction of solar-powered fish market facilities at local landing sites (52 coastal municipalities)	5,000,000	52*	260,000,000
Total			310,000,000

*including 6 in Maguindanao, 4 in Lanao del Sur, 12 in Basilan, 19 in Sulu, and 12 in Tawi-Tawi

PROJECT PROFILE 3-13 FRESHWATER AQUACULTURE DEVELOPMENT PROJECT

1. Background

The main island provinces, Maguindanao and Lanao del Sur, have a lot of natural lakes (e.g., Lake Lanao and Lake Dapao) and wide marshlands (e.g., Ligawasan Marsh). However, these natural lakes and marshlands are only utilized for small-scale fishing activities, but not for aquaculture activities. Especially, two major lakes, Lake Lanao and Lake Dapao have a high potential for cage culture of freshwater fish and prawn, because their water qualities are suitable for aquaculture activities. The supply of compounded feeds for fish and prawn culture will be improved by the renovation of a national road between those lakes and Cotabato City. It will take only a half day to transport fish or prawn feeds from commercial feed plants located in General Santos by land.

2. Project Components

The project is composed of two components as described below.

(1) Component 1: Establishment and renovation of freshwater fish and prawn hatcheries

In order 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 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 freshwater prawn hatcheries. These freshwater prawn hatcheries can be utilized for seed production of brackish-water species such as milkfish or mud crab.

Construction and Renovation Plan of Existing/New Hatcheries for Freshwater Aquaculture

Existing/planned hatcheries	Place (municipality, province)	Program content	Target species
BFAR-ARMM Freshwater Fish Farm (existing)	Datu Odin Sinsuat Magundanao	Innovation/expansion of existing facilities	Tilapia
BFAR-ARMM Freshwater Fish Farm (existing)	Marantao Lanao del Sur	Innovation/expansion of existing facilities	Tilapia, common carp
Freshwater Fish Farm and Hatchery (newly planned)	Masiu Lanao del Sur	New construction of fish ponds and hatchery	Tilapia
MSU-Maguindanao Marine Multi-Species Hatchery (existing)	Datu Odin Sinsuat Maguindanao	Innovation / expansion of existing facilities	Freshwater prawn, other marine species (milkfish, mud crab)
Marine Multi-species Hatchery (newly planned)	Malabang Lanao del Sur	New construction of ponds and hatchery	Freshwater prawn, other marine species

		
BFAR-ARMM freshwater fish hatchery at Datu Odin Sinsuat in Maguindanao on MSU-Maguindanao campus producing only tilapia seeds.	BFAR-ARMM freshwater fish hatchery at Marantaro in Lanao del Sur with old and outmoded facilities producing tilapia and common carp seeds.	MSU-Maguindanao community-based multi-species hatchery at Datu Odin Sinsuat, which may be innovated to freshwater prawn hatchery in future.

Photo: Existing hatcheries possibly innovated for freshwater aquaculture development

Potential Species for Freshwater Aquaculture in Bangsamoro

Tilapia	Tilapia is the most popularly consumed freshwater fish in the Philippine. The basic technique of tilapia culture is simple for local farmers. The white meat of tilapia is highly valued in EU and U.S., because a shortage of a supply of local white fish meat. Tilapia filets will possibly be one of promising commodities exported from the Bangsamoro region.
Freshwater prawn	Freshwater prawn is one of high-valued species in domestic market. The basic technique of freshwater prawn culture is not so difficult for local farmers, comparing with marine shrimp. It is possible to transport them alive to local major markets, like Davao, Cebu, and Manila by land or air.

(2) 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 Mindanao State University at Maguindanao and Marawi, 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.

		
Lake Dapao at Pualas, Lanao de Sur. It is highly potential for cage culture development.	Experimental fish cage culture is carried out in Lake Lanao at Masiu, Lanao del Sur	Fish ponds for tilapia culture have been introduced recently at Sultan Mastura, Maguindanao.

Photo: Potential areas for freshwater aquaculture development in Bangsamoro region

	
Component 1: Establishment and renovation of freshwater fish/prawn hatcheries in Maguindanao and Lanao del Sur	Component 2: Technical cooperation and extension of freshwater fish and prawn culture (potential areas for freshwater aquaculture development in Bangsamoro region)

3. Project Cost

The project cost is estimated by component as follows:

(1) Component 1

Main program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Feasibility study for construction and innovation of freshwater species hatcheries	50,000,000	1	100,000,000
Construction of new freshwater fish or prawn hatcheries (Masiu, Malabang)	80,000,000	2	160,000,000
Innovation/expansion of existing freshwater fish hatchery facilities (Datu Odin Sinsuat, Marantao)	60,000,000	2	120,000,000
Innovation/expansion of existing marine hatchery facilities for freshwater prawn (Datu Odin Sinsuat)	60,000,000	1	60,000,000
Total			440,000, 000

(2) Component 2

Main program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Technical cooperation project for freshwater aquaculture extension (5 years)	150,000,000	1	150,000,000
Total			150,000, 000

PROJECT PROFILE 3-14 MARINE AQUACULTURE DEVELOPMENT PROJECT

1. Project Components

The production of marine culture in the Bangsamoro region heavily depends on seaweed culture. To utilize the coastal areas for marine culture efficiently, it is necessary to diversify local marine culture activities in the region. At present, however, the supply of marine species is not sufficient to promote marine culture regionally, because only one marine multi-species hatchery is operated at Tawi-Tawi in the whole region. First of all, the project will renovate the existing marine multi-species hatchery at Tawi-Tawi, and construct new marine hatcheries at Sulu and Basilan (Component 1). Utilizing these local marine hatcheries in island province, the project will develop local stable technique on artificial seed production for target marine culture species, such as groupers, abalone, and sea cucumber, at and supply locally produced seeds to local people with technical advises and monitoring (Component 2).

(1) Component 1: Establishment and renovation of multipurpose marine hatcheries

In order to produce and supply a sufficient amount of fish, abalone, and sea cucumber seeds, a multipurpose marine hatchery should be established in each island province. At present, BFAR-ARMM has only one multipurpose 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 multipurpose hatcheries should be also established in other island provinces, Sulu and Basilan. Joro 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.

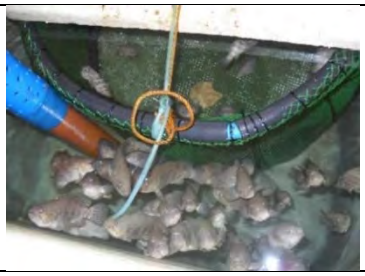
		
BFAR-ARMM Tawi-Tawi Multi-Species Hatchery at Bongao, Tawi-Tawi	The Tawi-Tawi hatchery can produce green grouper seeds.	The Tawi-Tawi hatchery also can produce abalone seeds regularly.

Photo: Activities of BFAR-ARMM Tawi-Tawi Marine Multi-Species Hatchery

		
Broodstock tanks	Water reserve tank	Seed rearing tanks

Photo: Image of marine multi-species hatchery facilities (newly constructed hatchery of Mega Fishing Corporation in Zamboanga, 2015)

Potential Species for Marine Aquaculture in Bangsamoro

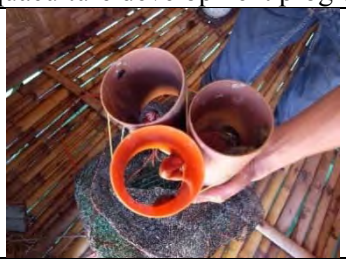
Grouper	Grouper is one of most high-valued fish at local and regional markets. Many local people have already started cage culture of groupers at coastal areas; however, they collect and grow their wild seeds. The collection of wild seeds affects the grouper natural stock seriously. At present, the BFAR-ARMM 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.

(2) Component 2: Technical cooperation and extension of marine aquaculture

The technical cooperation project for local extension of marine aquaculture 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.

Photo: Marine aquaculture development programs in Mindanao

		
Cage culture for groupers and lobsters at Parang in Maguindanao. Local farmers collect wild seeds, and grow them in cages.	Cage culture for abalone at Samal island, Davao. *Glacilaria* seaweeds are fed for abalone in cages.	Artificially produced sea cucumber seeds at MSU-Naawan, Misamis Oriental. The seeds are ranched at coastal areas, and naturally propagated.

2. Project Cost

The project cost is estimated by component as summarized below.

(1) Component 1

Main program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Feasibility study for construction/renovation of marine multi-species hatcheries	50,000,000	1	50,000,000
Construction/renovation of marine multi-species hatcheries (Bongao in Tawi-Tawi, Joro in Sulu, Lamitan in Basilan)	150,000,000	3	450,000,000
Total			500,000, 000

2) Component 2

Main program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Technical cooperation project for marine aquaculture extension (3 years), Phase I: Development of Seed Production Technologies	100,000,000	1	100,000,000
Technical cooperation project for marine aquaculture extension (5 years), Phase II: Extension of Marine Aquaculture	150,000,000	1	150,000,000
Total			250,000,000

3. Implementing Agencies

The Bureau of Fisheries and Aquatic Resources (BFAR) is the main implementing agency for the project. The technical assistance component of the project may be undertaken by the Mindanao State University at Tawi-Tawi, Sulu, Basilan and Naawan in cooperation with the Southeast Asian Fisheries Development Center (SEAFDEC) Aquaculture Department.

PROJECT PROFILE 3-15 SEAWEED CULTURE DEVELOPMENT PROJECT

1. Project Components

The ARMM makes the largest production of seaweed in the Philippines. Large potential areas for seaweed culture still remain in the island provinces. The project will promote to extend seaweed culture at new potential areas in the island provinces, Tawi-Tawi, Sulu, and Basilan.

(1) Component 1: Installation of sun-dryer platforms and dried seaweed storages

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.

		
Seaweed drying platforms constructed on the sea to prevent sand from mixing in seaweed (Sitangkai, Tawi-Tawi)	Seaweed drying platform and storage built on the beach (Parang, Sulu)	Drying harvested seaweed on a drying platform on the sea (Samal island, Davao)

Photo: Solar seaweed dryer platforms in Mindanao

(2) 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 the 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. By the project, small-scale model plants of seaweed dried chips will be operated on the pilot basis to verify the technical and economic sustainability of those plants' operation. Those pilot seaweed processing plants should be developed, after the necessary infrastructures for seaweed processing, electricity and fresh tap water are equipped at the island provinces.

		
Seaweed tissue culture laboratory at BFAR-ARMM (Cotabato City). It maintains high quality strains of seaweeds.	BFAR-ARMM processing plant for dried seaweed chips in Parang, Maguindanao. It did not work for a long time because of high processing cost.	Dried seaweed chip sample produced at BFAR-ARMM processing plant. Sufficient supply of electricity and fresh water is necessary to produce dried seaweed chips.

Photo: Seaweed tissue culture laboratory and processing plant of dried seaweed chips

2. Project Cost

Project cost is estimated by component and summarized below.

(1) Component 1

Main program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Feasibility study for construction of solar seaweed dryer platforms	50,000,000	1	50,000,000
Construction of solar seaweed dryer platform	1,500,000	200	300,000,000
Total			350,000,000

(2) Component 2

Main program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Technical Cooperation Project for Seaweed Culture Development (5 years)	150,000,000	1	150,000,000
Technical Cooperation Project for Value-added Seaweed Processing (5 years), including renovation of existing facilities	150,000,000	1	150,000,000
Total			300,000,000

PROJECT PROFILE 3-16 COCO PRODUCTS INDUSTRIAL CLUSTER DEVELOPMENT PROJECT

1. Project Title: Coco Products Industrial Cluster Development Project

2. Location: Bangsamoro

3. Implementing Agencies: Philippine Coconut Authority regional office (PCA-ARMM)

4. Objectives: (1) To establish comprehensive processing system for a variety of coco products and (2) to increase value-added and employment opportunities for majority of small coconut farmers in Bangsamoro

5. Expected Effects: Majority of small coconut farmers realizing much higher income and contribution to the main stream economic activities

6. Project Cost: US$3 million for initial implementation

7. Implementation Schedule: 2017–2018 for initial implementation by establishing model coconut farms and a comprehensive processing plant

8. Project Description:

8.1 Background and Rationale

Coconut is one of the most important crops in the Philippines. Over the last 10 years, coconut production in Bangsamoro averaged 1.2 million ton/year, based on volume of nuts with husk. This is about 8.2% of the Country's production and about 14% of production in Mindanao. Mindanao itself produces about 50% of the total production of the Philippines. The largest producer in Bangsamoro is Maguindanao (40% of the region for the last 10 years) followed by Basilan and Sulu (17 and 16%, respectively).

There are many buyers of fresh mature coconut at the farm level but the destination is only one, Franklin Baker Company located in Sta. Cruz, Davao del Sur. It processes fresh coconut into desiccated coconut. The quality of fresh coconut accepted by the processor is strictly observed by the traders since the company rejects products that are not up to quality standards. On the other hand, copra is bought by many oil mills in Davao City and Iligan City. There is no imposed quality standards. Traders buy any quality of copra at the same price except for copra with high moisture content. Fresh young coconut and fresh mature coconut occupies a small portion of the coconut market. The coconut market is still largely for copra.

Coconut farmers are mostly small and among the poorest in Bangsamoro. 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 coconut farmers' income per hectare of land, there are two ways. One is to combine this crop with other crops of higher value for integrated farming. The other is to utilize not only copra for immediate marketing but to produce various products by utilizing coco fruits as a whole and also coco trees. The latter will contribute to the establishment of a coco products industrial cluster for much higher value-added and larger employment opportunities.

8.2 Scope of Coco Products Industrial Cluster

There is a growing demand from mining and construction industries for hand-woven geo-nets made from coconut coir, an extracted fiber from coconut husks. The high production cost of geo-nets in the Country is apparently attributable to high labor cost as well as inefficient processing structure with each processing step (harvesting, decortication, twining, and looming) being conducted at a different location. Mindanao accounts for 60% of the current coconut husk supply of the Country while it accounts for only 35% of the Country's coir processing capacity. Bangsamoro, representing 9% of the national

coconut production (no data of utilization of husks), has a potential to fill the undersupply of coir from Mindanao with the utilization of unused husks.

The proposed project will support the establishment of an assembly unit for processing activities to integrate the current inefficient processing structure by utilizing Bangsamoro's abundant and relatively cheap labor. Specifically, the project will support the installation of a decorticator with solar-powered twining and looming kits. Coconut peat and dust, residual after extraction of fiber from husks, can be sold to organic farmers as a soil additive or an ingredient to produce organic fertilizer. This project is a fundamental step toward establishing coconut coir-based product lines in Bangsamoro with the export of high-value products being expected.

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.

A comprehensive processing system to be established should encompass at least the following:

1) Coco coir production with installation of decorticator with solar-powered twining and looming kits;
2) Coconut peat and dust, residual after extraction of fiber from husk, for organic farmers as soil additive or ingredient to produce organic fertilizer; and
3) High value coconut sugar for export by systematically controlled process that enables quick collection of saps, boiling with water and heat facilities, and treatment after drying and packaging.

8.3 Staged Development

The project may start to be implemented in the immediate future based on the existing coconut production. The first step may be to encourage small coconut farmers to undertake production of a range of coco products as described above. In order to invite a sufficient number of coconut farmers, BDA may invite proposals from municipalities for establishment of model coconut farms. Small coconut farmers are organized into a cooperative first for each municipality, and technical extension by PCA-ARMM should be provided to organized farmers for the use of decorticator with solar-powered twining and looming kits.

At the same time, BDA should invite prospective investors to establish a comprehensive processing system for various coco products. Such a system may be an extension of similar facilities outside Bangsamoro focusing first on production of coco coir as well as copra. The products should be diversified as more farmers join and more cooperatives are established. Products development based on coco coir and market development will be important part of the initial development to be supported by PCA-ARMM and BDA.

IV. ENHANCED RESOURCES MANAGEMENT INITIATIVE

PROJECT 4-1 NATIONAL GREENING PROGRAM (NGP) ENHANCEMENT PROJECT

PROJECT 4-2 BAMBOO PLANTING PROJECT

PROJECT 4-3 DIMAPATOY WATERSHED MANAGEMENT PROJECT

PROJECT 4-4 NON-WOOD FOREST PRODUCTS (NWFPS) RESEARCH

PROJECT 4-5 COMMUNITY-BASED FOREST MANAGEMENT (CBFM) PROJECT

PROJECT 4-6 SMALL-SCALE IRRIGATED CROP INTENSIFICATION PROJECT

PROJECT 4-7 MULTIPURPOSE SMALL-SCALE IRRIGATION DEVELOPMENT PROJECT

PROJECT 4-8 MINDANAO RIVER BASIN INTEGRATED FLOOD MANAGEMENT PROJECT (MRBIFMP)

PROJECT 4-9A SUB-PROJECT 1: COMPREHENSIVE STUDY ON FLOOD CONTROL FOR MINDANAO RIVER BASIN

PROJECT 4-9B SUB-PROJECT 2: RIO GRANDE DE MINDANAO AND TAMONTAKA RIVER FLOOD CONTROL SYSTEM

PROJECT 4-9C SUB-PROJECT 3: BULUAN RIVER FLOOD CONTROL SYSTEM

PROJECT 4-9D SUB-PROJECT 4: PULANGI RIVER FLOOD CONTROL SYSTEM INCLUDING REPAIR OF TUNGGOL BRIDGE

PROJECT 4-9E SUB-PROJECT 5: AMBAL-SIMUAY RIVER FLOOD CONTROL SYSTEM

PROJECT 4-9F SUB-PROJECT 6: ALA RIVER FLOOD CONTROL SYSTEM

PROJECT 4-9G SUB-PROJECT 7: MINDANAO RIVER BASIN FLOOD FORECASTING AND WARNING SYSTEM

PROJECT 4-9H SUB-PROJECT 8: MINDANAO RIVER BASIN URGENT FLOOD AND SEDIMENT CONTROL PROJECT

ANNEX: TERMS OF REFERENCE (DRAFT) FOR THE COMPREHENSIVE STUDY ON FLOOD CONTROL FOR MINDANAO RIVER BASIN (SP-1)

PROJECT 4-10 BANGSAMORO DISASTER RISK REDUCTION AND MANAGEMENT PROJECT (BANGSAMORO DRRMP)

PROJECT 4-11 COMMUNITY-BASED COASTAL RESOURCES MANAGEMENT PROJECT

PROJECT 4-12 MARINE SURVEILLANCE REINFORCEMENT PROJECT

PROJECT 4-13 LOW-HEAD HYDRO POWER PLANT DEVELOPMENT PROJECT (TAWI-TAWI)

PROJECT 4-14 MINI HYDRO POWER DEVELOPMENT PROJECT

PROJECT PROFILE 4-1 NATIONAL GREENING PROGRAM (NGP) ENHANCEMENT PROJECT

1. Project Title: National Greening Program (NGP) Enhancement Project

2. Locations: Appropriate NGP areas in Lanao del Sur, Maguindanao, Basilan, Sulu or Tawi-Tawi

3. Implementing Agencies: DENR -ARMM

4 Objectives: (1) To provide proper early-stage maintenance of NGP planted trees and (2) to monitor and evaluate the transplant nursery for NGP

5. Expected Effects: High survival rate of NGP planted trees and well-maintained forests to ensure growth of trees

6. Project Cost: PHP 71.4 million

7. Implementation Schedule: 2016–2018 for Phase 1; 2019–2020 for Phase 2

8. Project Description:

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 17,000 ha in the five provinces, namely; Lanao del Sur, Maguindanao, Basilan, Sulu and Tawi-Tawi. Tree planting has been finished in the area of 2,500 ha.

However, some planted trees do not grow very well because of lack of maintenance. Planted trees usually need maintenance work such as weeding, inspection, replacement, etc. to grow properly for the first 2–3 years. It is not done because of lack of personnel and budget.

The suggested way of maintenance is to make a contract with nearby barangay for maintenance work by the residents of the barangay. Usually one person can cover 4 ha of forest area, which costs PHP 6,000/month. If 1,000 ha will be covered during the whole period by the maintenance work for three years, the cost is PHP 54,000,000 (= PHP 6,000/month x 1,000/4 x 12 month x 3 years).

There is one more important point. Monitoring and evaluation of nurseries are important in planting programs but presently there is no proper management due to lack of experts. The required cost for proper monitoring and evaluation of nurseries is calculated as presented in Table 4-1.1.

Table 4-1.1 Cost of Nursery Monitoring and Evaluation

Item	Calculation	Amount (PHP)
Training of experts	PHP 200,000 x 10 trainees	2,000,000
Monthly fee for experts	PHP 10,000 x 12 months x 7 years x 10 trainees	8,400,000
Travel by experts	PHP 100,000 x 7 years x 10 trainees	7,000,000
Total		17,400,000

Thus, the total project cost will be PHP 71.4 million (= PHP 54.0 +17.4 million).

9. Background

The National Greening Program (NGP) is a massive forest rehabilitation program of the Philippine government established by virtue of Executive Order No. 26 issued on Feb. 24, 2011 by the President. It seeks to grow 1.5 billion trees in 1.5 million hectares nationwide within a period of six years, from 2011 to 2016.

Aside from being a reforestation initiative, the NGP is also seen as a climate change mitigation strategy as it seeks to enhance the country's forest stock to absorb carbon dioxide, which is largely blamed for global warming. It is also designed to reduce poverty, providing alternative livelihood activities for

marginalized upland and lowland households relating to seedling production and care and maintenance of newly-planted trees.

As a convergence initiative among the Departments of Agriculture, Agrarian Reform and DENR, a half of the targeted trees to be planted under the program would constitute forest tree species intended for timber production and protection as well. The other 50% would comprise of agroforestry species.

Areas eligible for rehabilitation under the program include all lands of the public domain. Specifically, these include forestlands, mangrove and protected areas, ancestral domains, civil and military reservation, urban greening areas, inactive and abandoned mine sites and other suitable lands. The tree species to be planted are Lauan, Mahogany, Apitong, etc.

In ARMM, DENR-ARMM is promoting the program in the five provinces. The province-wise budget allocation for the NGP in ARMM, and stage-wise allocation are presented in Table 4-1.2.

Table 4-1.2 Budget Allocation in National Greening Program (NGP) by Province and Stage

Bugget Allocation by Province (Unit:Php)

	Maguindanao	Lanao del Sur	Basilan	Sulu	Tawi-tawi	Total
1st District	9,644,900	7,992,200	1,540,000	2,832,000	920,000	22,929,100
2nd District	6,817,700	7,104,200	1,540,000	3,452,000	744,000	19,657,900
Regional Office						6,999,000
TOTAL	16,462,600	15,096,400	3,080,000	6,284,000	1,664,000	49,586,000

Note: 1st and 2nd district are political sub-divisions.

Source: DENR-ARMM website.

Bugget Allocation by Stage (Unit:Php)

	Survey, Mapping & Planning	Production of Seedlings	Site Preparation & Social Monilization	Plantation Maintemance	Total
Maguindanao	831,600	10,548,000	2,311,000	2,772,000	16,462,600
Lanao del Sur	770,400	9,618,000	2,140,000	2,568,000	15,096,400
Basilan	180,000	1,800,000	500,000	600,000	3,080,000
Sulu	369,000	3,660,000	1,025,000	1,230,000	6,284,000
Tawi-tawi	99,000	960,000	275,000	330,000	1,664,000
TOTAL	2,250,000	26,586,000	6,251,000	7,500,000	42,587,000
	5.3%	62.4%	14.7%	17.6%	100.0%

Source: ibid.

PROJECT PROFILE 4-2 BAMBOO PLANTING PROJECT

1. Project Title: Bamboo Planting Project

2. Locations: Along riversides in Maguindanao

3. Implementing Agencies: DENR-ARMM

4 Objective: To prevent erosion and scouring of river banks

5. Expected Effects: Prevention of soil erosion and contribution to livelihood support

6. Project Cost: PHP 16 million

7. Implementation Schedule: 2017–2020

8. Project Description:

Bamboo (*Bamboocea* sp.) trees are known to provide effective protection against winds, and their roots hold soil tight. Bamboo is also known as the tallest grass in the world. Bamboo is recommended to be planted along river banks to minimize soil erosion caused by floods and strong currents when river water overflows due to bulk of water. It can be used to make cages, baskets, and other products, which is expected to support livelihood of the nearby residents.

Bamboo is already planted on some banks of rivers and lakes, and more bamboo plantations are required. Maguindanao is an area that has many rivers and needs bamboo plantations. The proposed area named SPMS Box is a controversial area during the Mamasapano clash, known as the Mamasapano massacre, where the police operation, codenamed Oplan Exodus, took place on Sunday, January 25, 2015.

The required cost for a 6 km river section in Tukanalipao of Mamasapano is estimated as shown in Table 4-2.1.

Table 4-2.1 Estimated Cost of Bamboo Planting in Small Section

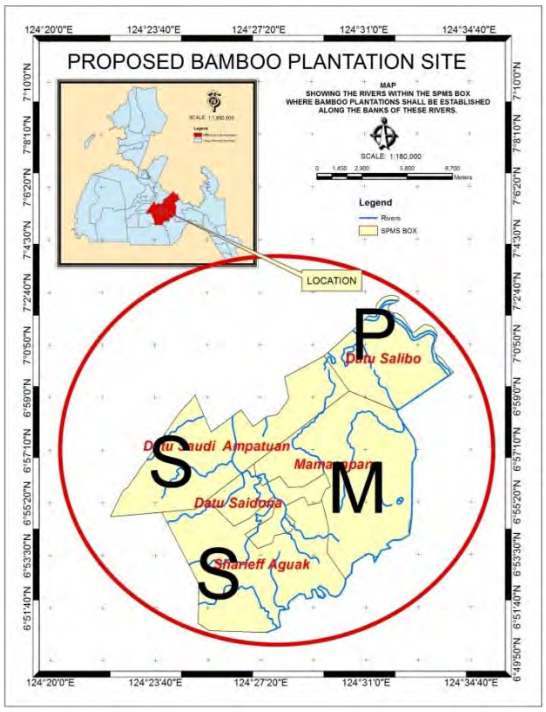
Item	Cost (PHP)
Bamboo seedling	590,600
Inputs	132,000
Material	95,700
Total	818,300

The amount of budget for each LGU involved is based on the length of the designated river in the LGU, and thus it varies depending on the river length. The cost estimation is presented in Table 4-2.2.

Table 4-2.2 Estimated Cost of Bamboo Planting by LGU

Name of LGU	Length of designated river (km)	Unit cost/km (PHP)	Total cost (PHP)
Datu Saudi Ampatuan	20.26	136,383.33	2,763,126.27
Datu Salibo	32.44		4,424,275.23
Shariff Saydona	12.55		1,711,610.79
Mamasapano	20.39		2,780,856.10
Shariff Aguak	32.03		4,368,358.06
Total			16,048,226.40

The proposed site is indicated in Figure 4-2.1.



Source: Project Profile of Expanded Bamboo Plantations along Rivers of SPMS Box Area after the Mamasapano Clash.

Figure 4-2.1 Proposed Site for Bamboo Planting Project

PROJECT PROFILE 4-3 DIMAPATOY WATERSHED MANAGEMENT PROJECT

1. Project Title: Dimapatoy Watershed Management Project

2. Location: Dimapatoy watershed

3. Implementing Agencies: DENR-ARMM

4 Objective: To solve problem of water shortage in Cotabato City, Datu Odin Sinsuat and the nearby municipalities

5. Expected Effects: Properly managed watershed, resulting in protection of watershed area

6. Project Cost: PHP 74 million

7. Implementation Schedule: 2017–2020

8. Project Description:

The Dimapatoy watershed, part of the Maguindanao watershed, serves as the source of potable water for Cotabato City, Datu Odin Sinsuat, and nearby municipalities. However, the water tends to suffer from shortages recently, and persistent abuse of the forest through logging and pollution has significantly degraded the water quality of the watershed. Therefore, proper watershed management is required to solve the problem. DENR-ARMM has a plan of the whole framework as summarized in Table 4-3.1. Part of the whole project can be supported.

Table 4-3.1 Dimapatoy Watershed Rehabilitation Framework

Activity	Expected output	Timeframe	Responsible party	Fund needed (PHP)
Dialogue/consultation meeting w/ stakeholders	Community made aware of the Project	January, 2016	Stakeholders and DENR	500,000.00
Delineation of watershed area	Watershed boundary delineated	February-March, 2016	Stakeholders and DENR	1,000,000.00
Inventory of forest occupants	Census of occupants	April, 2016	Stakeholders and DENR	200,000.00
Formulation of watershed management plan	Comprehensive management plan	May-June, 2016	Stakeholders and DENR	20,000,000.00
Pre identification of potential area for rehabilitation	Sites determined and identified for development and Maps	May-June, 2016	DENR	1,000,000.00
Assessment and geo-tagging of identified area	Area assessed and documented geographically	May- June, 2016	Stakeholders and DENR	1,000,000.00
Tree growing Nursery establishment Out-planting	Plantations established	June-December, 2016	Stakeholders and DENR	28,989,250.00 11,595,700.00
Plantation maintenance	Maintained and managed plantations	January-June, 2017	Stakeholders and DENR	9,276,560.00
Total				73,561,510.00

Source: PENRO-Maguindanao, DENR-ARMM.

PROJECT PROFILE 4-4 **NON-WOOD FOREST PRODUCTS (NWFPS) RESEARCH PROJECT**

1. Project Title: Non-wood Forest Products (NWFPs) Research Project

2. Locations: DENR-ARMM

3. Implementing Agencies: DENR-ARMM

4 Objective: To conduct research on NWFPs in ARMM as the first step for promotion of their use

5. Expected Effects: Plan prepared on how to encourage NWFPs in ARMM

6. Project Cost: PHP 2 million

7. Implementation Schedule: 2017–2020

8. Project Description:

Attention is drawn to use of non-wood forest products (NWFPs) recently, because it is expected to contribute to livelihood generation and poverty reduction, and help avoid increased forest loss and degradation. Resin, elemi gum, bamboos, rattan, and buri raffia, are the NWFPs mainly produced in the Philippines, and part of them is exported. Research on NWFPs is conducted in 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 ARMM, and therefore, it is required to conduct a research on NWFPs focusing on NWFPs' possibility in ARMM as the first step for promotion of their use. NWFPs can be incorporated into community-based forest management (CBFM).

The research will cover the following:

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

PROJECT PROFILE 4-5 COMMUNITY-BASED FOREST MANAGEMENT (CBFM) PROJECT

1. Project Title: Community-Based Forest Management (CBFM) Project

2. Locations: Community-Based Forest Management (CBFMA) forests

3. Implementing Agencies: DENR-ARMM

4 Objective: To conduct assessment and evaluation of existing CBFM

5. Expected Effects: Reactivated CBFM forests and the possibility of further JICA's support

6. Project Cost: PHP 2 million

7. Implementation Schedule: 2017–2022

8. Project Description:

A community-based forest management agreement (CBFMA) is an agreement between DENR and a registered people's organizations (PO) 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 11 CBFMAs, but only two are active, and no reports have been submitted for all the agreements. CBFMA holders have issued resource use permits and sometimes abused them, conducting harvesting activities without development. Therefore, first the CBFMA holders' performance will be monitored and evaluated by a joint team of the Forest Management Bureau (FMB), the Provincial Environment and Natural Resources Office (PENRO), and the Community Environment and Natural Resources Office (CENRO) to check the compliance with the terms and conditions.

One more challenge is that no more national fund was given to support the CBFM programs of ARMM after the creation of ARMM. Accordingly, fund is required to resume the CBFM in ARMM, and therefore, secondly, a new plan to resume CBFM should be prepared, based on the evaluation results. A new plan should clarify the way how to get fund and regular monitoring system.

The project includes the evaluation of 11 existing CBFMA holders' performance and the preparation of plans for resuming CBFM in ARMM, including funding and regular monitoring system.

9. Background

The existing 11 CBFMAs are shown in Table 4-5.1. The active ones are No.5. Tiruray Integrated Farmers Association, and No.10 Teduray Farumfungon Temikur Multi-purpose Cooperative (MPC).

Table 4-5.1 Community-based Forest Management Agreements by DENR-ARMM

As of December 2014

	Peoples Organization (PO)	No.	Location	Area (ha)	Date Issued	Expiration
1	Mindanao Alliance for Rural Advancement in Lanao Inc.	99-001	Barangay Lamalico, Bumbara, Lanao del Sur	5,757	6/25/1999	6/25/2024
2	Kualabaro Upland Farmers Association	99-002	Tubic Dacula & Parang Pantay, Languyan, Tawi-Tawi	312	11/25/1999	11/25/2024
3	Kabulnan Tree Planters and Tree Growers Multi-purpose Cooperative	99-003	Salman and Saniag, Amaputuan, Maguindanao	2,000	4/26/2000	4/26/2025
4	Kenebera Multi-purpose Cooperative	99-006	Kenebeke DOS, Maguindanao	1,000	1/9/2001	1/9/2026
5	Tiruray Integrated Famers Association Inc.	2001-007	Sta. Fe, Looy, South Upi, Maguindanao	794	7/16/2001	7/16/2026
6	Kabingaan Socio-economic MPC	2003-011	Barangay Aloh & Tangkapaan, Tapul, Sulu	4,527	4/20/2003	4/20/2028
7	Sitio Malnos Agro-industrial MPC	2007-012	Barangays Paitan, Maman, Mamali & Sambolawan, Buluan, Maguindanao	714	3/13/2007	3/13/2032
8	Tandubato Island Multi-purpose Coop.	2008-013	Barangay Tandubato, Tandubas, Tawi-Tawi	500	2/26/2008	2/26/2033
9	Ragayan Farmers Rattan MPC	2009-014	Malalis, Sultan Demalondong	514	2/10/2009	2/10/2034
10	Teduray Fagumfungon Temikur MPC	2009-016	Sito Betubekasan Barangay, Tomicor Amapatuan, Maguindanao	1,150	12/17/2009	12/17/2034
11	Maruhom Sidic Multi-purpose Coop.	2009-015	Barangay Rogero, Bubong,, LDS	1,841	10/23/2009	10/23/2034

Source: Forest Management Bureau, DENR-ARMM

PROJECT PROFILE 4-6 SMALL-SCALE IRRIGATED CROP INTENSIFICATION PROJECT

1. Project Title: Small-scale Irrigated Crop Intensification Project

2. Location: Bangsamoro

3. Implementing Agencies: DAF, NIA, and BSWM

4 Objective: To increase production of rice and high value cash crops

5. Expected Effects: Increased farmers' income

6. Project Cost:

7. Implementation Schedule: 2016–2022

8. Project Description:

Crop intensification means putting additional input to realize increased output per unit area of land. Irrigation is one means that crop intensification could be done by enhancing productivity per unit of land and allowing more than one crop per year (for temporary crops) increasing the annual production volume significantly. Coupled with improved agricultural water management practice, irrigation could provide opportunities to cope with impact of climatic variability. Specifically, small-scale irrigation is used to fight against droughts.

Large-scale irrigation development proliferated in the 1970s with the establishment of the National Irrigation Administration, which constructed the national irrigation systems (more than 1,000 ha irrigable areas) and communal irrigation systems (less than 1,000 ha irrigable areas) of mostly gravity type where water is diverted from the river and allowed to flow to the main canal and to the system of canals that distribute water to the farm lands. Those who are privileged to be in the in the service area and reached by water confirm the increase in production even if the land productivity may not have attained the optimum level. The difference in output of irrigated and rainfed paddies is about 1.0 MT. The problem with the CIS and the NIS in Bangsamoro and even all other regions of the Country is the large gap between irrigated and irrigable areas, which are about 50% in Bangsamoro and an average of 40% nationwide. About 65% of the service area in CISs and 44% in NISs are non-operational.

On the other hand, NIA and BSWM have been implementing projects on small-scale irrigation systems to take advantage of the potential of water resources in localities that could sustainably provide irrigation for small crop areas. NIA's small-scale irrigation projects (SSIPs) are generally larger than those of BSWM; about 50 ha area for the former while the minimum of 3 ha for the latter. Those SSIPs are generally of gravity type with a diversion canal for water directly from the source or pumped from the ground. BSWM's limited area development employs a wide range of technologies such as spring development, small farm dams, ram pump, solar pump, and wind pump.

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 who 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 appropriate to the capacity of the final users of irrigation infrastructure needs to be considered properly. Initial investments, including credit facilities and irrigation water management training was found to be critical in many small-scale irrigation projects that succeeded.

The project will take on from the experiences of SSIPs in other countries and those of NIA and BSWM.

The DAF-Agriculture Engineering Division, BSWM, and NIA, as technical advisers, will initially implement the project with DAF then transfer the project administration entirely to DAF. In the project, rice and non-rice crops (e.g., sugarcane, cassava, and other vegetables) will be covered.

The project will have the following components:

(1) Training for technology providers and farmers as recipients of the irrigation system, and

(2) Financing for the acquisition of equipment and materials and for production.

9. SEA Considerations:

Another important lesson relates to the technology choice. The choice of technology should consider the capacity of the beneficiaries to operate equipment on their own (e.g., mechanized pumps) and to maintain the pumps and obtain spare parts. There is a classic example of the Meki-Ziway Scheme in Oromia, which failed particularly because farmers could not get spares for the imported pumps, could not carry out maintenance, and could not afford the electricity fees to run the pumps.

Furthermore, it is important to assign well-trained manpower in the field of irrigation and agronomy. Access to markets (input and output markets) and institutional support services remain critical. Solving the problem of soil nutrient mining will be very challenging, but an integrated approach that combines improved crop varieties and management practices, availability of knowledge of fertilizer options, availability of appropriately packaged fertilizers, conservation tillage, and access to markets where crops can be sold profitably will all help

PROJECT PROFILE 4-7 MULTIPURPOSE SMALL-SCALE IRRIGATION DEVELOPMENT PROJECT

1. Project Title: Multipurpose Small-scale Irrigation Development Project

2. Location: Bangsamoro

3. Implementing Agencies: DAF, DPWH, NIA, and BSWM

4 Objective: To mitigate the impact of climate change, floods, and droughts

5. Expected Effects: Increased production of rice, HVCs, and cash crops

6. Project Cost:

7. Implementation Schedule: 2018–2022

8. Project Description:

Small multipurpose reservoirs are a widely used form of infrastructure for the provision of water. They supply water for domestic use, livestock watering, and small-scale irrigation. Other beneficial uses include flood control and mitigation of the impacts of drought and soil erosion. The reservoirs are hydrologically linked by the streams that have been dammed.[1]

The importance of small multipurpose reservoir 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 droughts 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, the 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 expected to benefit 13,000 ha. A portion of this plan was covered by the overseas development assistance (ODA) of Japan, which implemented 25 projects from 1989 to 1994 Assessment of Japan ODA points to the project yielding substantial positive results, such as reduction in incidence of flooding and increase in irrigated lands. In many 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.[2]

The project will take from the identified small water impoundments 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 organize into association of farmer beneficiaries (AFBs). Whenever possible, completed SWIMP will be turned-over wholly or in part to the AFB. The project will be implemented through a project management office (PMO) with a Steering Committee under the Bangsamoro Regional 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

[1] Small Multipurpose Reservoir Ensemble Planning, CGIAR Program for Challenge Water & Food, February 2009. www.cgspace.cgiar.org

[2] Project Report: Small Water Impounding Management Project, March 2001, www.jica.go.jp

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, which the project can take advantage of.

9. SEA Considerations:

The project is expected to have environmental impact during construction stage. Thus, an appropriate environmental compliance certificate (ECC) conditions will be required for the construction of each SWIMP.

PROJECT PROFILE 4-8 MINDANAO RIVER BASIN INTEGRATED FLOOD MANAGEMENT PROJECT (MRBIFMP)

1. Project Title: Mindanao River Basin Integrated Flood Management Project (MRBIFMP)

2. Location: Mindanao River Basin

3. Implementing Agencies: DPWH in collaboration with MinDA, RBCO, DOST-ASTY, PAGASA, DILG, LGUs, etc.

4 Objective: To reduce flood risks in Mindanao River Basin

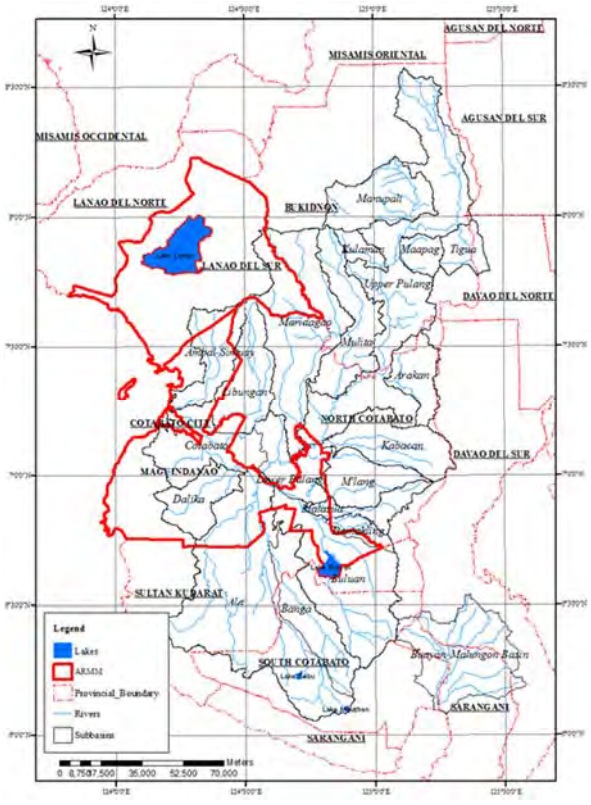
5. Expected Effects: Reduction and effective management of flood risks in the Mindanao River Basin

6. Project Cost: To be estimated under Sub-Project 1: Comprehensive Study on Flood Control in Mindanao River Basin

7. Implementation Schedule: 2018–2028

8. Project Description:

The Mindanao River Basin (MRB) is the second largest river basin in the Philippines with the catchment area of 21,503 km^2 which pours to the Illana Bay through Central and Southern Mindanao. Major rivers within the basin include the Ala River traversing the Ala 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 the Rio Grande de Mindanao and the Tamontaka River.



Mindanao River Basin

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 Flood Management Project aims to comprehensively deal with the flood problems in the Mindanao River Basin, composed of eight sub-projects listed in Table 4-8.1.

Table 4-8.1 Sub-projects of Mindanao River Basin Integrated Flood Management Project and Their Tentative Implementation Schedule

Sub-Project		Year						
		2016	2018	2020	2022	2024	2026	2028
SP-1	Comprehensive Study on Flood Control for Mindanao River Basin							
SP-2	Rio Grande de Mindanao and Tamontaka Rivers Flood Control System							
SP-3	Buluan River Flood Control System							
SP-4	Pulangi River Flood Control System including Repair of Tunggol Bridge							
SP-5	Ambal-Simuay River Flood Control System							
SP-6	Ala River Flood Control System							
SP-7	Mindanao River Basin Flood Forecasting and Warning System							
SP-8	Mindanao River Basin Urgent Flood and Sediment Control Project							

9. SEA Considerations:

EIA (Environmental Impact Assessment) of the ongoing projects (SP-2 to SP-6), which will serve as the basis of the acquisition of Environmental Clearance Certificate (ECC), will be conducted under their DEDs. In addition, SEA (Strategic Environmental Assessment) and/or IEE (Initial Environmental Evaluation) for newly proposed projects will be conducted under the Comprehensive Study (SP-1).

PROJECT PROFILE 4-9A **SUB-PROJECT 1: COMPREHENSIVE STUDY ON FLOOD CONTROL FOR MINDANAO RIVER BASIN**

1. Project Title: Sub-Project 1: Comprehensive Study on Flood Control for Mindanao River Basin

2. Location: Mindanao River Basin

3. Implementing Agencies: DPWH in collaboration with MinDA, RBCO, DOST, PAGASA, DILG, LGUs, etc.

4 Objectives: (1) to prepare an overall flood management plan, reviewing proposed urgent projects and (2) to conduct feasibility studies on high-priority projects

5. Expected Effects: Overall flood control plan (review of MRBIMDMP) prepared with review of Sub-Projects 2 to 6 and feasibility studies on high-priority projects

6. Project Cost: US$ 4 million

7. Implementation Schedule: 2017–2019 (2.5 years)

8. Project Description:

The Mindanao River Basin Integrated Management and Development Project Master Plan (MRBIMDMP) was prepared by a local consultant firm, Woodfields Consultants, Inc. in 2012. The plan aimed to identify specific causes of physical deterioration of the river basin, and to formulate a master plan that would provide a blue print for a balanced development approach for the basin area through sound water resources development and management practices.

As part of outputs of the master plan study, a variety of flood control and DRRM projects/programs were proposed. They cover structural measures as well as non-structural ones. Five flood control projects out of them, which correspond to Sub-projects 2 to 6 of the Mindanao River Basin Integrated Flood Management Project, are now about to be subjected to detailed engineering design (DED), as shown in Figure A1-2.

However, the master plan has to be regarded as a conceptual one, especially on the flood control aspect, from the following reasons:

- Hydrological and hydraulic analysis models was not validated with actual observation data;
- The master plan study was based on coarse geo- and topo-graphic information; and
- A basin-wide point of view including effects of the marsh areas and sediment supply from the upstream was lacking.

Therefore, the master plan still remains pre-matured, and need to be reviewed. The ongoing flood control projects proposed in MRBIMDMP, which are to be subjected to DED very soon, should be reviewed closely as well. The proposed Comprehensive Study will include following components:

1) Formulate an overall flood control plan (review of MRBIMDMP) including flood forecasting and warning system for Mindanao River Basin,
2) Review of the ongoing projects (Sub-projects 2 to 6), and
3) Feasibility studies on high-priority projects.

Draft terms of reference (TOR) for the comprehensive study is presented in Annex.

9. SEA Considerations:

SEA or IEE will be conducted under this Comprehensive Study (SP-1).

PROJECT PROFILE 4-9B **SUB-PROJECT 2: RIO GRANDE DE MINDANAO AND TAMONTAKA RIVER FLOOD CONTROL SYSTEM**

1. Project Title: Sub-Project 2: Rio Grande de Mindanao and Tamontaka River Flood Control System

2. Locations: Rio Grande de Mindanao and Tamontaka River (Figure-A1-2)

3. Implementing Agencies: DPWH in collaboration with LGUs and other organizations

4 Objective: To reduce flood risks in Cotabato City and its adjacent areas by improving the river channels of the Rio de Grande de Mindanao and the Tamontaka River with land reclamation

5. Expected Effects: Mitigation of flood damage in Cotabato City and its adjacent areas

6. Project Cost: PHP 5,186 million

7. Implementation Schedule: 2017–2021 (5 years)

8. Project Description:

Sub-Project 2, which was proposed by MRBIMDMP and is about to be subjected to detailed engineering design (DED), aims to mitigate flood damages in Cotabato City and its adjacent areas. The Sub-Project includes the three components listed in the table below.

Components of Sub-Project 2

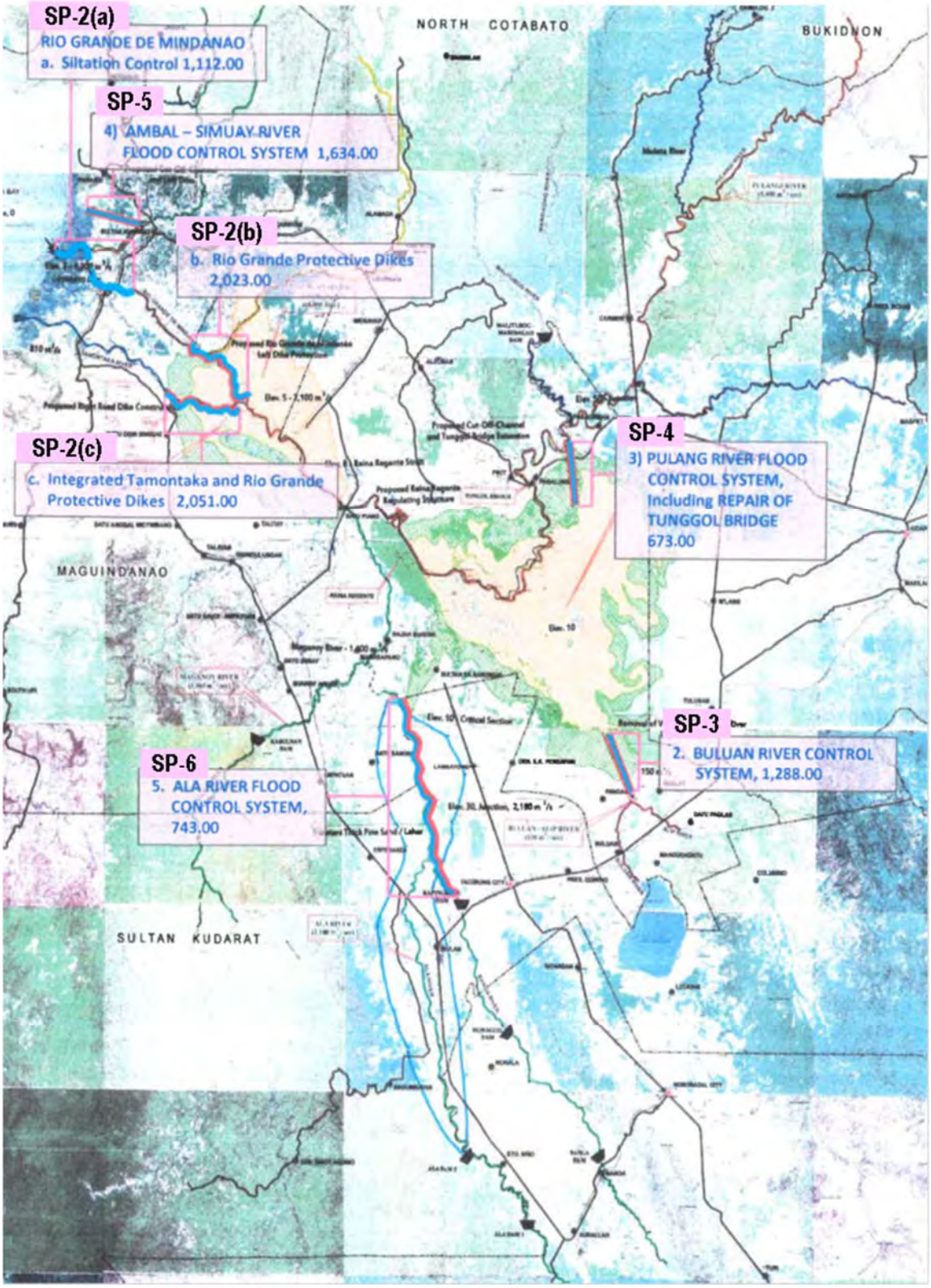
Component	Description	Cost (PHP 10^6)
Siltation Control	Immediate dredging with land reclamation/spoil bank at the lowest 7.5 km stretch	1,112
Rio Grande Protective Dikes	Construction of 10 km left dike of Rio Grande de Mindanao	2,023
Integrated Tamontaka and Rio Grande Protective Dike	Construction of 15 km right dike of Tamontaka	2,051
	Total	5,186

Source: DPWH.

This Sub-Project will be reviewed under the Sub-Project 1, the Comprehensive Study on Flood Control for Mindanao River Basin, to confirm its effectiveness and to propose modification and/or additional supplementary works of the Sub-Project if it is found insufficient or inappropriate.

9. SEA Considerations:

A total of 75 ha of spoil bank yards shall be secured in coordination with the LGUs. EIA (environmental impact assessment) of the sub-project, which will serve as the basis of the acquisition of Environmental Clearance Certificate (ECC), will be conducted under the DED.



Location Map of Sub-Projects 2 to 6

PROJECT PROFILE 4-9C **SUB-PROJECT 3: BULUAN RIVER FLOOD CONTROL SYSTEM**

1. Project Title: Sub-Project 3: Buluan River Flood Control System

2. Location: Buluan River (Figure A1-2)

3. Implementing Agencies: DPWH in collaboration with LGUs, etc.

4 Objective: To reduce flood risks along Buluan River and in part of Ligawasan Marsh by clearing water hyacinths and improving the river channel of the Buluan River

5. Expected Effect: Mitigation of flood damage along Buluan River

6. Project Cost: PHP 1,288 million

7. Implementation Schedule: 2017–2019 (3 years)

8. Project Description:

The Sub-Project 3, which was also proposed by MRBIMDMP and is about to be subjected to detailed engineering design (DED), aims to mitigate flood damages along the Buluan River by improving 20 km river stretch. The river improvement includes clearing of water hyacinths in the river, creating a 100 m bank to bank channel by excavation and embankment of 3 m high dike along the river stretch.

It is noted that a tripartite MOA has been agreed among DPWH, Maguindanao Province and Mapecon Green Charcoal Philippines, Inc. for extraction and utilization of water hyacinths. DPWH will remove/harvest the water hyacinths and shred, extrude and transport them to a designated area, and Mapecon will collect/process them to convert them to green charcoal and vermicast/fertilizer.

This Sub-Project will be reviewed under Sub-Project 1, the Comprehensive Study on Flood Control for Mindanao River Basin, to confirm its effectiveness and to propose modification or additional supplementary works of the Sub-Project if it is found insufficient or inappropriate.

9. SEA Considerations:

Special care on hazardous components of the hyacinths should be done to avoid health problems. EIA (environmental impact assessment) of the sub-project, which will serve as the basis of the acquisition of Environmental Clearance Certificate (ECC), will be conducted under the DED.

PROJECT PROFILE 4-9D **SUB-PROJECT 4: PULANGI RIVER FLOOD CONTROL SYSTEM INCLUDING REPAIR OF TUNGGOL BRIDGE**

1. Project Title: Sub-Project 4: Pulangi River Flood Control System Including Repair of Tunggol Bridge

2. Location: Downstream stretch of Pulangi River (Figure A1-2)

3. Implementing Agencies: DPWH in collaboration with LGUs, etc.

4 Objective: To reduce flood risks along the downstream stretch of Pulangi River by improving the downstream stretch of the Pulangi River.

5. Expected Effect: Mitigation of flood damage along the downstream stretch of Pulangi River

6. Project Cost: PHP 673 million

7. Implementation Schedule: 2016–2018 (3 years)

8. Project Description:

The Pulangi River System is located within the northeastern part of the Mindanao River Basin has its headwaters in the Northen part of Bukidnon Province and flows to the Ligawasan Marsh in Maguindanao and South Cotabato. Due to the geologic condition and topography, the Pulangi River meanders as a result of sedimentation and bank erosion, decreasing its flow capacity and constantly changing its alignment channel. In July 2011, continuous heavy rain triggered overtopping the Tunggol floodway, and 23 barangays were affected.

Sub-Project 4, which was also proposed by MRBIMDMP and is about to be subjected to detailed engineering design (DED), aims to mitigate flood damages along the downstream stretch of the Pulangi River and the Tunggol floodway by construction/repair of the Tunggol bridge abutment and construction of 1,500 m long cutoff channel with parallel dikes on both sides.

The Sub-Project will be reviewed under the Sub-Project 1, the Comprehensive Study on Flood Control for Mindanao River Basin, to confirm its effectiveness and to propose modification and/or additional supplementary works of the Sub-Project if it is found insufficient or inappropriate.

9. SEA Considerations:

EIA (environmental impact assessment) of the sub-project, which will serve as the basis of the acquisition of Environmental Clearance Certificate (ECC), will be conducted under the DED.

PROJECT PROFILE 4-9E **SUB-PROJECT 5: AMBAL-SIMUAY RIVER FLOOD CONTROL SYSTEM**

1. Project Title: Sub-Project 5: Ambal-Simuay River Flood Control System

2. Location: Downstream stretch of Ambal-Simuay River (Figure A1-2)

3. Implementing Agencies: DPWH in collaboration with LGUs, etc.

4 Objective: To reduce flood risks in Sultan Kudarat Municipality, Maguindanao and Cotabato City by improving the Simuay River

5. Expected Effects: Mitigation of flood damage in Sultan Kudarat Municipality, Maguindanao, and Cotabato City

6. Project Cost: PHP 1,634 million

7. Implementation Schedule: 2017–2019 (3 years)

8. Project Description:

The Ambal-Simuay River system is located in the westernmost part of the Mindanao River Basin with a catchment area of 759 km^2. The upstream of both the Ambal and Simuay watershed are generally occupied by volcanic flow and lava from a series of eruptions of Mts. Musuan and Kalatunan in Bukidnon and raging volcanic complex and Lanao volcanoes in the north and northwest.

The Ambal River with a catchment area of some 200 km^2 joined the Simuay River in the upstream in the 1950s, and the Simuay River joined the Mindanao River in the downstream in the 1970s, due to heavy sediment discharges and deposition in the lower sections.

The Ambal River swelled flood and sediment discharges to the Simuay River, and eventually the Simuay River brings a big flood and heavy sediment over many barangays of the municipalities of Sultan Kudarat, Sultan Mastura and Cotabato City through the left bank that was breached during Typhoon Frank in June 2008 (Figure below). Floods in 2009 also breached the other parts of the left bank of the Simuay River and expanded flood disaster areas. Many barangays located along the new flooding course are being exposed to flood damages on a daily basis. It has become an ordinary situation nowadays, and such floods usually inundate the areas for a week and more.

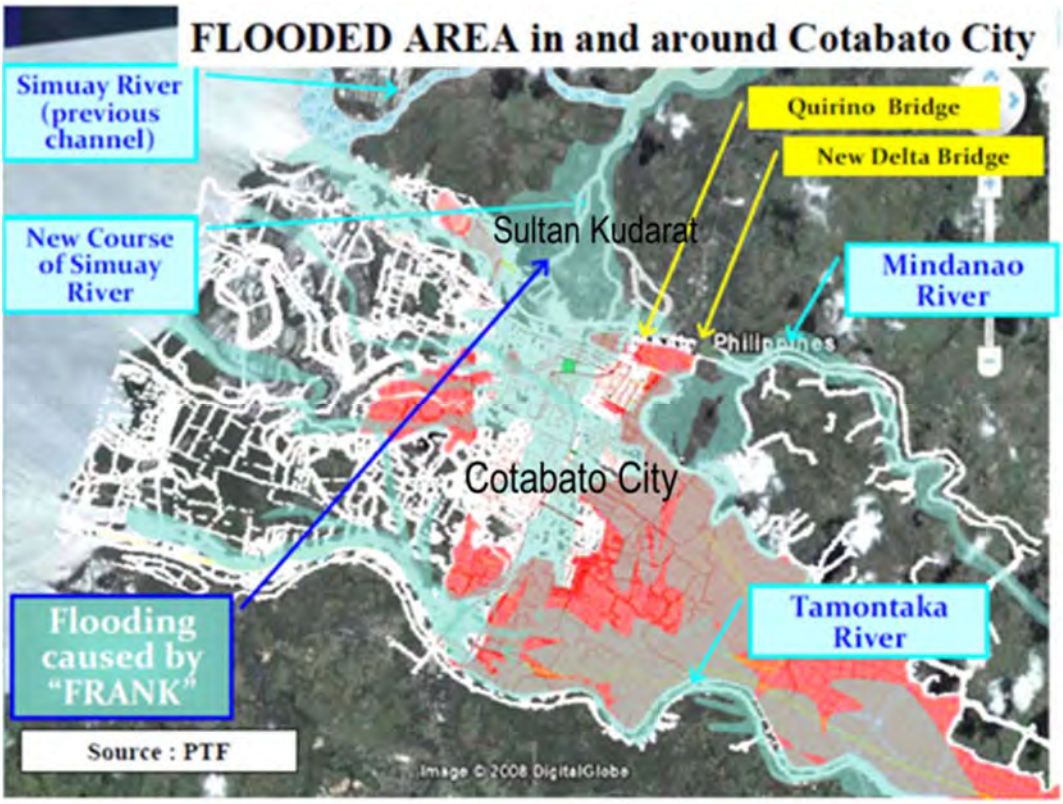
Sub-Project 5, which was also proposed by MRBIMDMP and is about to be subject to detailed engineering design (DED), aims to mitigate flood damages along the Simuay River and the Rio Grande de Mindanao by following works:

- Construction of a 7.7 km cutoff channel/widening of the existing cut-off channel,
- Construction of control irrigation gate/weir in the ongoing Simuay closure section,
- Construction of a multipurpose dam structure to diverting the inflow to the Ambal river to the Nituan River, and
- Construction of a 6.0 km dike along the Simuay cut-off channel.

It is also noted that this Sub-Project is proposed as a priority infrastructure project in the BDP Phase 1. The Sub-Project will be reviewed under Sub-Project 1, the Comprehensive Study on Flood Control for Mindanao River Basin, to confirm its effectiveness and to propose modification and/or additional supplementary works of the Sub-Project if it is found insufficient or inappropriate.

9. SEA Considerations:

EIA (environmental impact assessment) of the sub-project, which will serve as the basis of the acquisition of Environmental Clearance Certificate (ECC), will be conducted under the DED.



Flood Areas around Cotabato City Caused by Typhoon Frank in 2008

PROJECT PROFILE 4-9F **SUB-PROJECT 6: ALA RIVER FLOOD CONTROL SYSTEM**

1. Project Title: Sub-Project 6: Ala River Flood Control System

2. Location: Downstream stretch of Ala River (Figure A1-2)

3. Implementing Agencies: DPWH in collaboration with LGUs, etc.

4 Objective: To reduce flood risks in Lambayong Municipality, Sultan Kudarat by improving the downstream stretch of the Ala River

5. Expected Effects: Mitigation of flood damage in Lambayong Municipality, Maguindanao

6. Project Cost: PHP 743 million (provisional)

7. Implementation Schedule: 2017–2019 (3 years)

8. Project Description:

The Ala River originates in the southwestern mountain ranges in the Mindanao River Basin. It flows northwest to join the Ligawasan Marsh, although it originally used to flow into the Ebpanan Marsh. Due to the denuded upper mountains and hills in the Ala River basin, pyroclastic materials from previous eruptions of Mt. Parker and rich farmlands of Banga, Isulan, Tacurong and Koronadal contribute to siltation problems that have ever caused the perennial inundation of its flood plains.

Recently, heavy in-migration along the river banks and valleys has developed. A combination of heavy siltation and unguided irrigation/agriculture development results in drastic change in the area, especially in the downstream portion near the Ligawasan Marsh. Major storms in 2008 and 2009 have caused the river to change its course five times. In 2009, the diversion of the river course to the populated area in Lambayong Municipality, Sultan Kudarat imperiled the residents, and in May 2011 the entire river diverted towards Barangay Tinumiguez in Lambayong and destroyed over 2,000 ha of rice field and flowed through a 4 kilometer stretch of the Lambayong-Marbel road. This river course change has been affecting greatly the conditions of Ligawasan (expanding) and Ebpanan (shrinking) Marshes, too.

Sub-Project 6, which was also proposed by MRBIMDMP and is about to be subjected to detailed engineering design (DED), aims to mitigate flood damages in Lambayong Municipality, Sultan Kudarat by provision of dike of more than 10 km to redirect the Ala River to its original course (finally to the Ebpanan Marsh) and construction of evacuation centers.

The Sub-Project will be reviewed under Sub-Project 1, the Comprehensive Study on Flood Control for Mindanao River Basin, to confirm its effectiveness and to propose modification and/or additional supplementary works of the Sub-Project if it is found insufficient or inappropriate.

9. SEA Considerations:

Effects of the proposed works, especially on local people in the surrounding and downstream areas should be carefully examined. EIA (environmental impact assessment) of the sub-project, which will serve as the basis of the acquisition of Environmental Clearance Certificate (ECC), will be conducted under the DED.

PROJECT PROFILE 4-9G **SUB-PROJECT 7: MINDANAO RIVER BASIN FLOOD FORECASTING AND WARNING SYSTEM**

1. Project Title: Sub-Project 7: Mindanao River Basin Flood Forecasting and Warning System

2. Location: Mindanao River Basin

3. Implementing Agencies: PAGASA in collaboration with DOST-ASTY, MinDA, LGUs, RDRRMOs, etc.

4 Objective: To reduce flood risks in the Mindanao River Basin by establishing FFWS

5. Expected Effects: Early flood warning to flood-prone areas in the Mindanao River Basin

6. Project Cost: (To be estimated under SP-1)

7. Implementation Schedule: 2021–2023 (3 years)

8. Project Description:

The Government of the Philippines has been making efforts to develop flood forecasting and warning system (FFWS) as a non-structural flood risk reduction measures. Since 1972, flood forecasting and warning system has been established for five river basins (Pampanga, Agno, Cagayan, Bicol, and Pasig-Marikina) of the 18 major river basins in the Philippines under Japanese ODA schemes. Recently the importance of FFWS has been recognized especially as lessons learned of the recent large flood damages caused by Typhoons Ondoy/Pepeng in 2009, Pedring/Sendong in 2011 and Yolanda in 2013. PAGASA has a plan to extend FFWS to the other 13 major river basins including the Mindanao River Basin.

Sub-Project 7 aims to contribute the reduction of flood risks by implementing the FFWS proposed by Sub-Project 1. Although detailed configuration of the FFWS will be studied and designed under Sub-Project 1, inclusion of or integration with the Project NOAH, sure data/warning dissemination to LGUs and capacity development for operation and maintenance will be crucial issues for the system development.

9. SEA Considerations:

Since flood forecasting and warning system is a non-structural measure, its environmental impact seems negligibly small, although SEA and/or IEE will be conducted under the Comprehensive Study (SP-1).

PROJECT PROFILE 4-9H **SUB-PROJECT 8: MINDANAO RIVER BASIN URGENT FLOOD AND SEDIMENT CONTROL PROJECT**

1. Project Title: Sub-Project 8: Mindanao River Basin Urgent Flood and Sediment Control Project

2. Locations: Areas identified by Sub-Project 1 (SP-1)

3. Implementing Agencies: DPWH in collaboration with LGUs

4 Objective: To reduce flood and sediment disaster risks in the Mindanao River Basin by implementing high-priority projects

5. Expected Effects: Mitigation of damage by flood and sediment disasters in the protection areas of the Sub-Project

6. Project Cost: (To be estimated under SP-1)

7. Implementation Schedule: 2021–2028 (8 years)

8. Project Description:

Sub-Project 1 will propose, through the close hydrological and hydraulic analyses from a basin-wide point of view, several high-priority urgent flood and sediment control projects. In order to ensure the substantial flood and sediment control in the Mindanao River Basin, these projects should supplement the five ongoing projects (Sub-Projects 2 to 6) that are being prepared for their early implementation.

Sub-Project 8 aims to mitigate flood and sediment disaster damages in the Mindanao River Basin by implementing these high-priority projects that will be identified and justified in Sub-Project 1.

9. SEA Considerations:

SEA and/or IEE will be conducted under the Comprehensive Study (SP-1).

ANNEX: TERMS OF REFERENCE (DRAFT) FOR THE COMPREHENSIVE STUDY ON FLOOD CONTROL FOR MINDANAO RIVER BASIN (SP-1)

1. Background

The Mindanao River Basin (MRB) is the second largest river basin in the Philippines with the catchment area of 21,503 km^2 which pours to the Illana Bay through Central and Southern Mindanao. As seen in Figure-1, major rivers within the basin include the Ala River, traversing the Ala 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 the Rio Grande de Mindanao and the Tamontaka River.

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.

Under these circumstances, the Mindanao River Basin Integrated Management and Development Project Master Plan (MRBIMDMP) was prepared by a local consultant firm, Woodfields Consultants, Inc. in 2012. The plan aimed to identify specific causes of physical deterioration of the river basin, and to formulate a master plan that would provide a blue print for a balanced development approach for the basin area through sound water resources development and management practices.

As part of outputs of the master plan study, a variety of flood control and DRRM projects/programs were proposed. They cover structural measures as well as non-structural ones. Five flood control projects proposed in the master plan are now about to be subject to detailed engineering design (DED). However, the master plan has to be regarded as a conceptual one, especially on the flood control aspect, from the following reasons:

- Hydrological and hydraulic analysis models were not validated with actual observation.
- The study was based on coarse geographical and topographical information.
- A basin-wide point of view including the effects of the marsh areas and sediment supply from the upstream was lacking.

Therefore, the master plan still remains pre-mature, and need to be reviewed. The ongoing flood control projects proposed in MRBIMDMP, which are to be subjected to DED very soon, should be reviewed closely as well.

2. Objectives of Study

The objectives of the study are as follows:

1) To review the structural flood control projects proposed in MRBIMDMP;
2) To propose a comprehensive flood control plan including management of the marsh areas, basin-wide sediment control, drainage improvement of Cotabato City, flood forecasting and warning system;
3) To conduct feasibility studies on selected urgent projects proposed in the comprehensive plan; and
4) To enhance capacities of related agencies for planning of flood control and management through the comprehensive study.

3. Executing Agency

The main executing agency for the Study is the Department of Public Works and Highways (hereinafter

referred to as DPWH), Republic of the Philippines, in collaboration with MinDA, PAGASA, DOST-ASTY, DENR, RBCO, and related LGUs in the river basin.

4. Study Area

The study area covers the entire Mindanao River Basin. As target protection areas against floods, the most downstream areas including Cotabato City and its adjacent areas and the other urban centers are of higher priority.

5. Points to Which Special Attentions Should Be Paid

In executing the comprehensive study, special attentions should be paid to following points.

5.1 Hydrological and hydraulic analysis

A basin-wide distributed runoff model should be established in the comprehensive study to enable estimate of design discharges, production of flood maps, assessment of effects of the marsh areas and conceivable structural measures.

In preparing the runoff model, all available data including LiDAR data, river survey data, hydrological data by the Project NOAH, and detailed topographic maps by NAMRIA should be utilized with due care and attention to their accuracy. The hydraulic model that was prepared by the Project NOAH for flood mapping, also should be reviewed.

5.2 Integrated water resources management

Integrated water resources management (IWRM) is a process that requires the cross-sector, transboundary, coordinated development and management of water, land and related resources in order to maximize economic and social welfare without compromising the sustainability of ecosystems and the environment. The comprehensive study should follow this concept, paying attentions to the balance and coordination between urban and agricultural sectors. The most downstream areas consisting of Cotabato City and its adjacent areas where urban assets and functions are concentrated will be prioritized as target protection areas, but the comprehensive plan should be beneficial to agricultural areas in the mid and upstream areas, too. Win-win relationship should be sought in preparing the flood control plan.

5.3 Climate change impact

Sea level rise and increase of extreme rainstorm are projected as impact of climate change in the river basin, too. Although the Mindanao River Basin is generally less influenced by typhoons than those in Luzon and Visayas, future change of the typhoon course due to climate change is also worrying very much.

In the comprehensive study latest information on climate change impact should be collected from PAGASA and international institutions to reflect it in the examination of adaptation measures.

5.4 Review of ongoing flood control projects

There are five ongoing structural flood-control projects for the Mindanao River Basin as shown in Figure A1: (1) Rio Grande de Mindanao and Tamontaka River Flood Control System, (2) Buluan River Flood Control System, (3) Pulangi River Flood Control System, (4) Ambal-Symuay River Flood Control System, and (5) Ala River Flood Control System. Feasibility or pre-feasibility studies have already been conducted in MRBIMDMP, and detail engineering designs (DEDs) of these projects will be made soon by DPWH who intends to implement them as soon as possible. However, the feasibility and pre-feasibility studies seems immature and weak in scientific grounds. This is mainly because available data/information, especially hydrological, geo- and topographical data, were insufficient.

In the comprehensive study the distributed runoff model validated by using actually observed data should be applied to the above projects to assess their effects. If they are found insufficient or adverse, supplemental measures will be considered to offset the effects of the ongoing projects.

5.5 Conservation and management of marshes

There are three extensive marshes, Ebpanan Marsh, Libungan Marsh, and Ligawasan Marsh, in the three provinces of Maguindanao, Cotabato, and Sultan Kudarat. The three marshes, collectively known as Ligawasan Marsh, are separated from each other in the dry season; in the flood season, they merge and swell over 3,500 km^2. Thus the marshes function as natural retarding basins to attenuate flood discharges flowing to Cotabato City.

Ligawasan Marsh is also very important because of its rich biodiversity. The marsh is home to hundreds of endemic species of flora and fauna with a few of them considered threatened (the Ligawasan Marsh Development Master Plan, 2004). It is also a feeding ground for migratory birds and one of the last sanctuaries of the Philippine Crocodile. Because of these reasons, Ligawasan Marsh was once proposed by the Regional Development Council to be classified as a protected zone.

The comprehensive study more focuses on the flood retarding effect of the marshes. The retarding effect should be closely assessed through the hydrological and hydraulic analyses in consideration of the siltation and sedimentation process. As the output of the analyses, the boundaries of the minimum marsh areas that should be protected from encroachment should be delineated. In addition, recommendations should be made to effectively manage and conserve and maintain the minimum marsh area based on lessons learnt from previous studies and practices.

5.6 Sediment control plan

As experienced for the Simuay and Ala Rivers in the past, river course changes by sedimentation and river bank erosion are main causes of serious flood damages in the river basin. Cotabato City has been forced to dredge the Rio Grande de Mindanao every year to lower flood water level. In addition, it has been reported that the marsh areas are in the process of sedimentation by sediment transported from the deteriorated upper basins, although no concrete data are available. This might affect the rich biodiversity as well as the flood retarding effect of the marsh areas.

This comprehensive study should study basin-wide sediment balance of the entire Mindanao River Basin through analyses on sediment production and transportation based on satellite images, land cover maps, sediment sampling, sediment discharge measurement, dredging records, etc. to identify severely deteriorated sub-basins on which priority should be put for watershed management. In parallel with the sediment balance analysis, river morphological analyses are also to be conducted to identify locations of potential river course changes which should be treated by dikes, bank protection works, groins, check dams, etc.

5.7 Drainage improvement of Cotabato City

Cotabato City with a population of some 272,000 as of 2010 is located in the most downstream end of the Mindanao River Basin. The city is classified as a chartered city and belongs to Region XII, although it is surrounded by Maguindanao Province of ARMM. Since the ARMM government offices are usually situated in the city, the city also functions as the regional center of ARMM.

The city is sandwiched by two huge rivers, the Rio Grande de Mindanao and the Tamontaka River, which are further linked by tributaries such as Kakar and Manday-Bagua Rivers. Due to its low-lying geographical conditions, the city has been suffering from perennial flooding. Siltation of the rivers, clogging of the tributaries and creeks by garbage and high tide as well as overflow from the huge rivers are considered to be causes of the flood problem. The significant measures so far implemented by the City are limited to dredging and desiltation of the rivers and creeks due to financial constraints.

As experienced in June 2008 and May to June 2011, overflow from the two huge rivers are more destructive than that of tributaries and creeks and inland flood. Therefore, flood control of the two river should be give high priority. The two ongoing projects, the Rio Grande de Mindanao and Tamontaka River Flood Control System and the Ambal-Symuay River Flood Control System, are for this purpose. In order to fully generate the effect of these flood control works of the huge rivers and to seek a city that is resilient against floods, drainage problems in the city also should be addressed. Structural measures such as widening of tributaries and creeks, dikes, gates, sluices, pumps, interceptors, road heightening,

land heightening by earth filling, etc. as well as non-structural measures such as land use management, clearing of bushes on river banks and relocation of houses in low-lying areas should be examined.

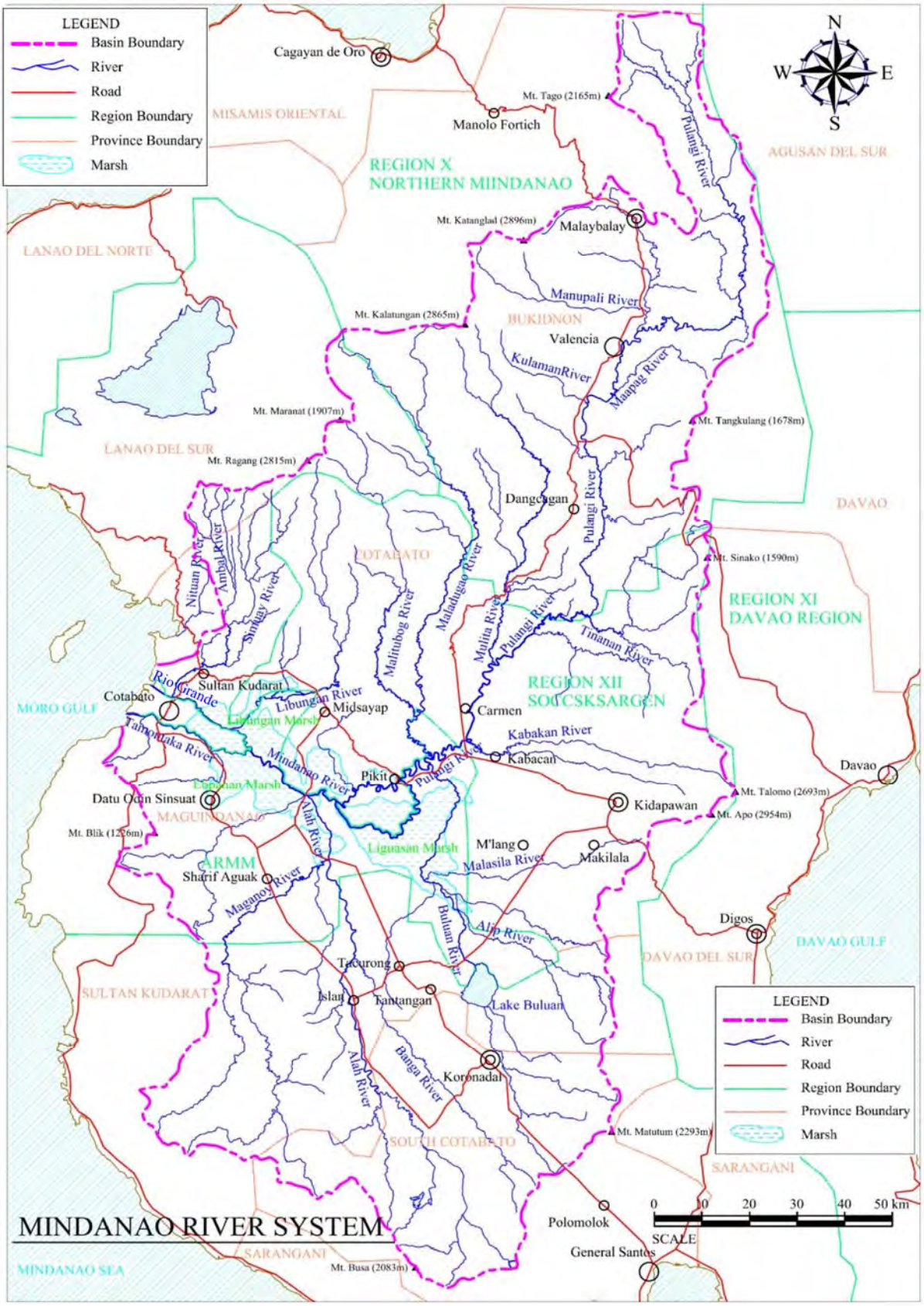


Figure A1 Ongoing Structural Flood-control Projects for Mindanao River Basin

5.8 Flood forecasting and warning system

In MRBIMDMP a pre-feasibility study on the development of early warning and flood forecasting project, which are to be undertaken by PAGASA, was conducted. The study proposed a flood forecasting and warning system consisting of three zones, namely 1) Data Collection Zone, 2) Command Zone and 3) Warning Recipient Zone. The project is planned to be implemented in two phases, taking into account constraints of finance and capacity of operators. In the first phase data collection and warning dissemination will be made manually through SMS (Short Message System) by cellular phone, and full automation by introducing telemeter system and warning dissemination through Internet will be in the second phase. The total cost was estimated at about PHP 2.0 million.

Project Components

Component	Contents
1) Data Collection Zone	A total of 13 stations are proposed in the Mindanao River Basin. Rainfall heights are measured and transmitted manually during Phase I while they will be converted into telemetered stations in Phase II.
2) Command Zone	One command center is proposed at CDRRMC of Cotabato City, and four sub-command centers are proposed at PDRRMCs of Maguindanao, Sultan Kudarat, South Cotabato, and Cotabato Provinces. The command center will receive the rainfall data tai are stored in the database of the flood simulation model. During high rainfall event, visualization module of the simulation model will be activated to forecast the probable areas to be flooded based on the rainfall data. If there are places found to be flooded, a warning bulletin will be sent to their respective sub- command centers. The sub-command centers then will transmit the text message to probable affected warning recipient zones.
3) Warning Recipient Zone.	As warning recipients, 17 municipalities in Maguindanao, 12 municipalities in North Cotabato, 1 city in South Cotabato and 5 municipalities in Sultan Kudarat are proposed.

Source: MRBIMDMP.

The Project NOAH that makes use of advanced scientific research and cutting edge technology to reduce risks in highly vulnerable communities launched in July 2012 and is still ongoing. The nation-wide project is consisting of 9 components including installation of automated rain gauges and water level monitoring stations, preparation of flood maps, formulation of flood early warning systems, enhancement weather forecasting. Outputs of the project are publicized in its web-site, http://beta.noah.dost.gov.ph. As of September 5, 2015, weather forecasting, real-time rainfall and water level data, etc. for the Mindanao River Basin can be viewed in the web-site. However, it is deemed that the Project NOAH have not been infiltrated into the LGUs in the Mindanao River Basin and that fruits of the program have not been incorporated in DRRM activities of them at all yet.

The comprehensive study should review the early warning and flood forecasting project proposed by MRBIMDMP in due consideration of possibility of inclusion of or integration with the fruits of the Project NOAH. The components of 1) Data Collection Zone and 2) Command Zone have been or are being materialized to some extent by the Project NOAH. These existing equipment and systems should be utilized at the maximum in order to avoid duplication of investment. In addition, maintenance of equipment is very important for this kind of telemetry systems to ensure sustainable operation of the system. Organizational set-up as well as financial framework for the operation and maintenance of the system should be closely examined.

6. Scope of Work

6.1 Data Collection

Available and updated data/information including satellite images, light detection and ranging (LiDAR) data, interferometric synthetic aperture radar (IFSAR) data, topo-maps, geological maps, boring data, hydrological data, land use maps, records of flood damages, socio-economic data, future development plans, reports of related studies, etc. will be collected.

6.2 Basic Study

In the project, the following will be conducted:

(1) Field surveys covering 1) field reconnaissance, 2) river survey consisting of longitudinal and cross-section survey for rivers and main drainage channels, 3) riverbed materials survey (sampling and gradation test), 4) flood damage and flood mark survey, and 5) environmental and social considerations survey;

(2) Meteorological and hydrological analysis on rainfall and discharge seasonal variation, probable rainfall intensity, impacts of climate change, etc.;

(3) Establishment of a basin-wide distributed runoff model and flood inundation analysis;

(4) Assessment of effects of the five ongoing projects through hydrological and hydraulic analysis;

(5) Sediment balance analysis including analysis of sediment production and transportation, riverbed/course fluctuation and river-mouth closure;

(6) Flood disaster risks and vulnerability analysis;

(7) Socioeconomic analysis for population projection, land use change and growth of income/expenditure; and

(8) Institutional study, especially on organization, legal framework on disaster risk reduction and management (DRRM), river, watershed and marsh management.

6.3 Formulation of Comprehensive Flood Control Plan

In consideration of the points raised in "5. Points to Which Special Attentions Should Be Paid", the comprehensive flood control plan including management of the marsh areas, basin-wide sediment control, drainage improvement of Cotabato City, flood forecasting and warning system should be proposed. The feasibility of each component of the comprehensive plan should be confirmed on technical, economic, institutional and environmental points of view.

In addition, high-priority projects that should be implemented urgently should be selected from the components proposed in the comprehensive plan. These selected urgent projects will be subjected to feasibility studies. The urgent projects should include supplemental works for the ongoing projects that will be proposed to offset the effects of the ongoing projects.

6.4 Feasibility Studies on High-Priority Urgent Projects

Feasibility studies will be conducted for the selected urgent projects. In order to make the feasibility studies more in-depth, additional surveys including topographic and geological surveys and public consultation should be carried out.

7. Implementation Schedule

The duration of the Study is tentatively estimated to be 30 months as shown below.

Work Item	Month									
	3	6	9	12	15	18	21	24	27	30
1. Data/Information Collection	━	━								
2. Basic Study		━	━	━						
3. Formulation of Comprehensive Flood Control Plan				━	━	━				
4. Feasibility Study on High-Priority Urgent Project							━	━	━	━

Tentative Work Schedule

8. Cost and Expected Financial Source

The cost of the study is roughly estimated at US$ 4.0 million. It is recommended that this Study be executed under a technical assistance by an international donor.

PROJECT PROFILE 4-10 BANGSAMORO DISASTER RISK REDUCTION AND MANAGEMENT PROJECT (BANGSAMORO DRRMP)

1. Project Title: Bangsamoro Disaster Risk Reduction and Management Project (Bangsamoro DRRMP)

2. Location: Bangsamoro Core Territory

3. Implementing Agencies: OCD, Bangsamoro Government, and LGUs

4 Objective: To strengthen capacity for DRRM in the Bangsamoro region

5. Expected Effects: Improved DRRM activities in the Bangsamoro region

6. Project Cost: US$3.0 million

7. Implementation Schedule: 2018–2021 (four years)

8. Project Description

8.1 Backgrounds

The proposed Bangsamoro Core Territory or the Bangsamoro region comprises the present Autonomous Region in Muslim Mindanao's five component provinces of Maguindanao, Lanao de Sur, Basilan, Sulu and Tawi-Tawi alongside two cities and the expansion areas of at least six municipalities in Lanao de Norte Province, 39 barangays in North Cotabato Province, together with the chartered city of Cotabato and Isabela City, located in Central and Western Mindanao. The total land area is approximately 15,000 km^2 with a population of about 4.0 million as of 2010.

Similar to other regions in the Philippines, the Bangsamoro region is exposed to many types of hazards. Floods and storm surges have been most frequently occurring. Due to its geography and geology, there is a high level of exposure to earthquake, tsunami and landslide. The periodic El Nino Southern Oscillation is likely to bring drought in the vast agricultural lands in Maguindanao Province. A number of active volcanoes that can be found in Sulu, Lanao de Sur, Bukidnon and South Cotabato Provinces likewise trigger constant threats to its communities.

Meanwhile, the Disaster Risk Reduction and Management (DRRM) Act of 2010 (RA 10121) has shifted its DRRM policies from reactive into proactive approach. As for the ARMM Regional DRRM Plan 2012-2028 (RDRRMP), it has been prepared to guide local authorities to effectively comply with the DRRM Act where one of the prioritized DRRM activities described in the NDRRMP and the RDRRMP, the capacity development of LGUs has been strongly emphasized. Further, to efficiently implement the DRRM activities under the new approach, the needs for preparing various plans as well as establishing and strengthening the capabilities of related agencies have been rapidly increasing.

The ongoing DRRM efforts in the ARMM may 'have not' been progressed well, and are still far behind the time frame proposed in the RDRRMP. As described in the Final Report of the Disaster Risk Reduction and Management Capacity Enhancement Project (DRRMCEP) of JICA dated March 2015, the percentage of LGUs that have submitted their Local DRRM Plans was only 50% for ARMM as of December 2014, the lowest among the 16 regions of which average was 90%. As for the establishment of the Regional DRRM Office (RDRRMO) and the Humanitarian Emergency Action response Team (HEART), there may be still some lacking in the capacity building efforts despite numerous training workshops and drills that are being implemented by OCD-ARMM.

DRRM efforts at the national level have been progressed gradually on the other hand. JICA implemented the DRRMCEP between 2012 and 2015 to further strengthen the capacity for DRRM of OCD. The JICA project developed a variety of training modules, regional and local DDRM plans of selected regions and LGUs, monitoring and evaluation tools, National Disaster Response Plans for hydro-meteorological, earthquake and tsunami which are definitely useful as references, guides or

prototypes for the DRRM activities at all levels.

The Bangsamoro Disaster Risk Reduction and Management Project (Bangsamoro DRRMP) aims to improve the DRRM activities at region to barangay levels in the new Bangsamoro region by utilizing fruits of the above-mentioned recent efforts at the maximum, so that substantial DRRM activities could be launched as soon as possible.

8.2 Overall Goal and Purposes

A project design matrix (PDM) is proposed as shown at the end of the profile. The overall goal and the project purpose are given below.

Overall Goal: DRRM activities in the Bangsamoro region are improved.

Project Purpose: Substantial DRRM activities are launched in the Bangsamoro region.

The success of the project greatly depends upon the positive participation of counterpart personnel, particularly those of OCD, the Bangsamoro government and LGUs. In order to attain the overall goal, the Bangsamoro government is required to continue to accept the national DRRM policy.

8.3 Outputs

As shown in the PDM, following four outputs are expected from the Project.

Output 1: DRRM activities at the Bangsamoro region level are improved.

Output 2: DRRM activities at the LGU level are improved.

Output 3: DRRM training system and program for all levels from region to barangay are developed.

Output 4: Model Early Warning Systems (EWSs) are developed in the pilot LGUs

a) Activities of Output 1

This output is regarding the capacity development for DRRM-related organizations at the regional level including RDRRM Council, the Regional DRRM Operation Center (RDRRMOP), OCD, and related regional government agencies. As a first step, the progress of the implementation of DRRM activities of the related agencies and all the provinces, cities and municipalities in the Bangsamoro region is monitored and evaluated, and an inventory survey on existing DRRM and CCA(Climate Change Adaptation) resources and services in the Bangsamoro region is made in parallel. The M&E tools developed by the JICA DRRMCEP might be useful for the monitoring and evaluation survey. Results of these surveys are regarded as the baseline for the subsequent project activities.

Based on the evaluation results and the developed inventory, the DRRM Plan, the Disaster Response Plans and the Contingency Plans for the Bangsamoro region are prepared (if not existing), or reviewed and revised, referring to similar products of the JICA DRRMCEP. These plans are validated through joint simulation drills with the related agencies and the pilot LGUs that are selected under the activities of the Output-2.

A web-site of the Bangsamoro DRRM Council is also set up for all stakeholders to share DRRM information including the evaluation results, the inventory, the plans and the training materials developed under the Project.

b) Activities of Output 2

This output aims at strengthening the capacity of LGUs. Since there are so many LGUs (some 130 municipalities and 3,200 barangays) in the Bangsamoro region, the output focuses on several LGUs selected as pilot LGUs. All the five provinces of ARMM and Cotabato City should be selected first, and one or two representative municipalities at least should be also selected from each province, based upon the evaluation results of the Output-1, preliminary risk assessment and mayors' awareness. In selecting the representative municipalities, type of hazard should be taken into consideration, so that

each of flood, landslide, storm surge, earthquake, tsunami, drought, and volcano eruption could be an important threat to any of them, in other words all these hazards could be covered by the representative municipalities. The selected pilot LGUs are also common for the outputs 3 and 4. Thus they could be enhanced, through the diversified activities, to the level of DRRM-advanced LGUs, which are successful models for the other LGUs.

For the pilot LGUs, LDRRM plans and Contingency plans are prepared or revised based on inventories of available resources and services developed under the Output-2 activities, referring to similar products of the JICA DRRMCEP. These plans are validated through the joint simulation drills with the Bangsamoro DRRMC.

c) Activities of Output 3

This output aims to develop DDRM training system and program that involve DRRM personnel of all levels from the region to barangays, namely those of LDRRMCs, LDRRMOs, Barangay Development Councils (BDCs) and Barangay DRRM Committees. To make the training system and program more efficient, the so-called ToT (training of trainers) mechanism where trainings are provided step by step from the region to the provinces, from the provinces to the municipalities, and then from the municipalities to the barangays might be adopted. In preparing training materials, those developed under the JICA DRRMCEP are useful. The training system, program and materials are validated through the implementation of the training for the pilot LGUs.

d) Activities of Output 4

The activities for the output aim to develop a model early warning system (EWS) for each of the high-potential hazards in the Bangsamoro region, flood, landslide, storm surge, earthquake, tsunami, drought, and volcano eruption. Products of the Project NOAH such as hazard maps, weather and flood forecasting, etc. and free alert service by mobile phone companies should be incorporated to the EWSs, which are validated through simulation drills.

8.4 Implementation Schedule

A tentative implementation schedule is presented in Table 4-10.1. The total project period is set as long as four years to ensure gradual and steady progress in the capacity development for DRRM by avoiding too intensive loads to the pilot LGUs.

9. SEA Considerations:

No significant environmental impact is foreseen.

Table 4-10.1 Tentative Implementation Schedule

No.	Activities	1st Year				2nd Year				3rd Year				4th Year			
		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
1−1	Monitor and evaluate the progress of the implementation of DRRM activities in the Bangsamoro region.																
1−2	Prepare an inventory of existing DRRM and CCA resources and services.																
1−3	Prepare (if not existing), or review and revise Bangsamoro DRRMP.																
1−4	Prepare Bangsamoro Disaster Response Plan (DRP) for natural disasters.																
1−5	Prepare Bangsamoro Contingency Plan (BCP) for natural disasters.																
1−6	Conduct simulation drill based on the prepared DRP and CP with the pilot LGUs, and improve the DRP and the CP																
1−7	Establish a web-site of Bangsamoro DRRMC including database of the inventory and the monitoring results.																
2−1	Select pilot LGUs (provinces and municipalities).																
2−2	Prepare inventories of existing DRRM and CCA resources and services for the pilot LGUs.																
2−3	Prepare (if not existing), or review and revise LDRRMPs.																
2−5	Prepare (if not existing), or review and revise Contingency Plans (CPs) for natural disasters for the pilot LGUs.																
2−6	Conduct simulation drills based on the prepared/ revised CPs with Bangsamoro DRRMC, and improve the CPs.																
3−1	Develop DRRM training system and program for LDRRMCs, LDRRMOs, Barangay Development Councils (BDCs) and Barangay DRRM Committees.																
3−2	Prepare DRRM training materials for each level.																
3−3	Implement Training to the pilot LGUs including a few barangays per municipality.																
3−4	Revise the DRRM training system and program.																
4−1	Assess disaster vulnerability of the pilot LGUs.																
4−2	Plan Early Warning Systems (EWSs) for natural disasters for the pilot LGUs.																
4−3	Materialize the EWSs.																
4−4	Conduct simulation drills on the EWS operation, and improve the EWSs.																

Project Design Matrix for Bangsamoro Disaster Risk Reduction and Management Project

Project Name: Bangsamoro Disaster Risk Reduction and Management Project
Target Area: Bangsamoro Core Territory (Bangsamoro region)
Implementing Agency: Office of Civil Defense, Bangsamoro Government, LGUs

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal: DRRM activities in the Bangsamoro region are improved.	Plans and systems prepared and/or revised through the Project are properly implemented.	Annual progress and monitoring reports by Bangsamoro DRRMC Disaster situation reports	The Bangsamoro government continues to follows RA10121.
Project Purpose: Substantial DRRM activities are launched in the Bangsamoro region.	Plan and systems for DRRM prepared through the Project are ready for operation	Project reports Annual progress and monitoring reports by Bangsamoro DRRMC.	Counterpart personnel and expenses for the project operation are secured.
Outputs: DRRM activities in the Bangsamoro region level are improved.	The plans prepared/revised through the Project are properly designed in consideration of existing situations and approved by Bangsamoro DRRMC. The web-site of Bangsamoro DRRMC are properly maintained, updated and accessed by stakeholders for data/information sharing.	Progress and monitoring reports and inventories Approved plans Evaluation reports on the drills on DRPs and CPs Interview to Bangsamoro DRRMOC staff on the website.	Cooperation of the selected pilot LGUs are obtained.
DRRM activities at the LGU level are improved.	The plans prepared/revised through the Project are properly designed in consideration of existing situations, and approved by each *sanggunian* (local legislative branch) of the LGUs.	Approved plans Prepared inventories Evaluation reports on the simulation drills on DRPs and CPs	Cooperation of the pilot LGUs are obtained.
DRRM training system and program for all levels from region to barangay are developed.	The training system and programs are properly designed and approved by BDRRMC. The training materials are accepted by trainees.	Training evaluation reports Developed training materials Approved training program	Cooperation of the pilot LGUs are obtained.
Model Early Warning Systems (EWSs) are developed in pilot LGUs.	Disaster vulnerability is appropriately assessed based on existing hazard maps. The EWSs are properly planned and materialized.	Vulnerability assessment reports Evaluation reports on the EWS simulation drills	Cooperation of the pilot LGUs are obtained.
Activities Monitor and evaluate the progress of the implementation of DRRM activities in the Bangsamoro region. Prepare an inventory of existing DRRM and CCA resources and services. Prepare (if not existing), or review and revise Bangsamoro DRRMP. Prepare Bangsamoro Disaster Response Plan (DRP) for natural disasters. Prepare Bangsamoro Contingency Plan (CP) for natural disasters. Conduct simulation drill based on the prepared DRP and CP with the pilot LGUs, and improve the DRP and the CP. Establish a web-site of Bangsamoro DRRMC including database of the inventory and the monitoring results.		Inputs <u>Donors' side</u> Dispatch of experts Equipment for EWSs Equipment and software for database Counterpart training in the Donor's country Expenses for printing of reports and training materials and holding workshops. <u>Philippine side</u> Counterpart personnel Office space and facilities for the project activities Necessary operational expenses for the project activities.	
2-1 Select pilot LGUs (provinces, cities, municipalities). 2-2 Prepare inventories of existing DRRM and CCA resources and services for the pilot LGUs. 2-3 Prepare (if not existing), or review and revise LDRRMPs. 2-4 Prepare (if not existing), or review and revise Contingency Plans (CPs) per natural hazard for the pilot LGUs. 2-5 Conduct simulation drills based on the prepared/ revised CPs with Bangsamoro DRRMC, and improve the CPs.			
3-1 Develop DRRM training system and program for LDRRMCs, LDRRMOs, Barangay Development Councils (BDCs) and Barangay DRRM Committees. 3-2 Prepare DRRM training materials for each level. 3-3 Implement Training to the pilot LGUs including a few barangays per municipality. 3-4 Revise the DRRM training system and program.			
4-1 Assess disaster risk of the pilot LGUs. 4-2 Plan Early Warning Systems (EWSs) for natural disasters for the pilot LGUs. 4-3 Materialize the EWSs. 4-4 Conduct simulation drills on the EWS operation, and improve the EWSs.			

PROJECT PROFILE 4-11 COMMUNITY-BASED COASTAL RESOURCES MANAGEMENT PROJECT

1. Project Components

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. 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 MPA areas, and organize eco-tour programs by local communities.

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

		
The area plan of mari-culture park at Panabo City in Davao del Norte. The areas of aquaculture activities are strictly controlled under the zoning plan.	Sea cucumber ranching and propagation is one of promising resource management activities with income generation for local communities (Laguindingan, Misamis Oriental Province)	In the sea cucumber project at Laguindingan, target community people regularly watch a protected area for sea cucumber propagation at a surveillance hut.

Photo: Coastal resource management programs in other areas of Mindanao

		
Local women group process bone-less milkfish filets as value-added product at a local workshop.	Local women group also produce bottled marinade milkfish by utilizing small-size fish.	Local community association manages direct sale activities, such as local fish food restaurant, or fish processed food store.

Photo: Income generation activities by local communities at Panabo Mariculture Park

2. Project Cost

The estimated project cost is presented in Table 4-11.1.

Table 4-11.1 Estimated Cost of Community-Based Coastal Resources Management Project

Main program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Technical cooperation project for coastal resources management (Phase 1, 5 year; Phase 2, 5 years)	150,000,000	2	300,000,000
Total			300,000, 000

PROJECT PROFILE 4-12 MARINE SURVEILLANCE REINFORCEMENT PROJECT

1. Project Component

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.

		
Local office of Bantay Dagat on the pier of fishing port at Parang, Maguindanao in need of renovation of the building	Fisheries Resource Management Unit Office at Banay-Banay, Davao Oriental. Community members engage in monitoring and surveillance activities in collaboration with municipal LGU.	Coastal community members at Banay-Banay regularly meet at Fisheries Resource Management Unit Office to discuss current and planned activities in fishing control and surveillance.

Photo: Cases of marine surveillance activities in Mindanao

2. Project Cost

The estimated project cost is presented in Table 4-12.1.

Table 4-12.1 Estimated Cost of Marine Surveillance Reinforcement Project

Main program	Unit cost (PHP)	Qty.	Subtotal (PHP)
Construction/renovation of Pantai-Dagat offices and introduction of seed boats for surveillance activities at all 52 coastal municipalities*	5,000,000	52	260,000,000
Total			260,000, 000

*6 in Maguindanao,4 in Lanao del Sur 4, 12 in Basilan, 19 in Sulu, and 12 om Tawi-Tawi

PROJECT PROFILE 4-13 LOW-HEAD HYDRO POWER PLANT DEVELOPMENT PROJECT (TAWI-TAWI)

1. Background and Issues

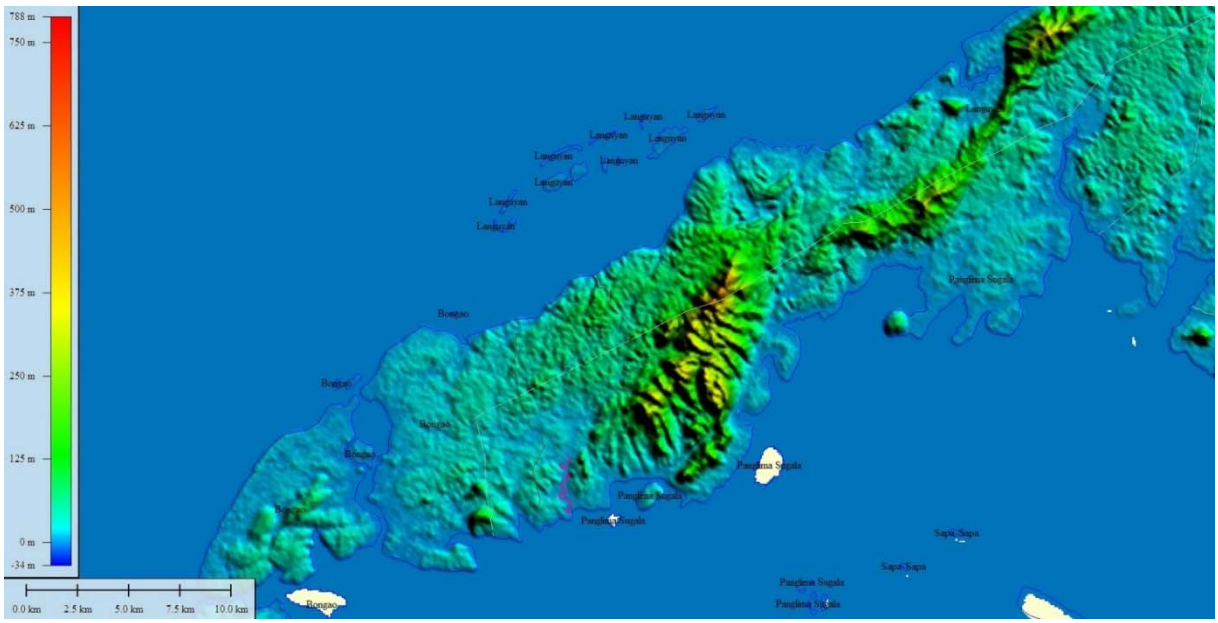
Various types of surveys for development of hydro resources are ongoing in the main island of Mindanao, while in surrounding island provinces of Bangsamoro, development studies have not been promoted sufficiently due to the security and potential risk. However, Tawi-Tawi seems to be a comparatively less 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 (MHPP) 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.

2. Project Scope

The Malum River, an S-shaped river, flows in the southern part of Tawi-Tawi Island as shown in Figure 4-13.1 below, and it is found that three candidate sites for development of hydro power plant are existing geographically as shown in Figure 4-13.2.

As shown in Figure 4-13.3, it is found that a road crossing the upper stream of Malum River exists. This road could be used for transportation of the materials required for the construction work at the site and even at the downstream point of Malum River. The temporary road could be branched from this road and would be advantageous in terms of work environment. The fact that the municipality of Panglima Sugala, is close to the construction sites would be one of important factors for work environment for workers and employees. This easy access to the construction site is a remarkable advantage.

At these targeted points, a hydro power plant should be developed based on the site survey. From the above diagram, the effective head can be expected to be about 5–10 m or more. Accordingly, a low-head type hydro power plant would be highly recommended.

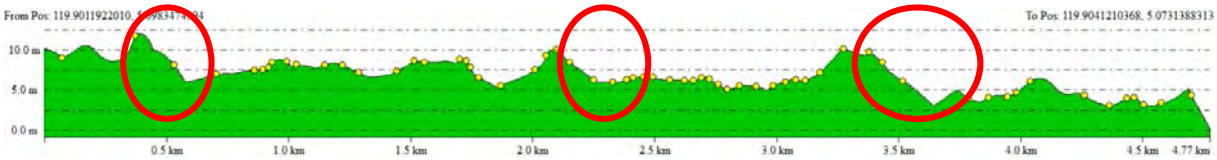


Source: JICA Study Team.

Figure 4-13.1 Location of Malum River in Tawi-Tawi

Source: JICA Study Team.

Figure 4-13.2 Zoomed-up Planimetric Map around Malum River (1/50,000)



Source: JICA Study Team.

Figure 4-13.3 Cross Section Diagram for Malum River in Tawi-Tawi

3. Project Purpose

The purpose of this project is to harness the hydroelectric potential of the Malum River and the Busay falls to produce electricity and contribute to CO_2 emission reduction by using renewable energy instead of fossil fuel.

4. Expected Effects

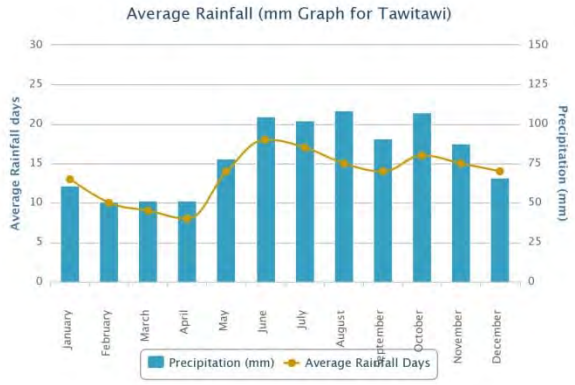
The following effects are expected:

1) Contribution to the reduction of fuel procurement cost required for power supply with diesel generators and the promotion of renewable energy in the Philippines; and
2) Demonstration of effectiveness of the renewable energy development in the island and provision of an incentive for further renewable energy development in other islands such as Sulu and Basilan.

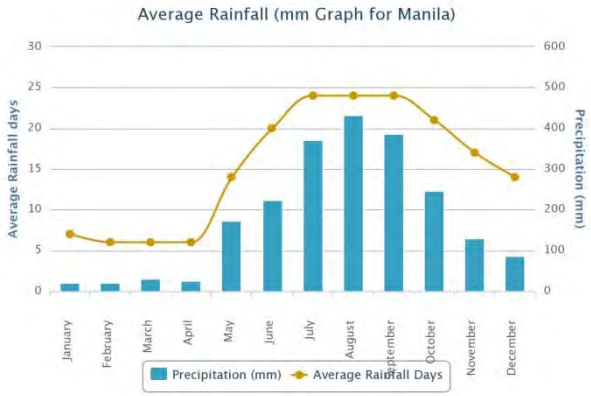
5. Consideration for Project Implementation

In order to roughly estimate the expected output of hydro power plant, it is required to measure the flow rate of river (m^3/s) on a monthly and yearly basis. According to DPWH-ARMM, such data are not available at the moment. Accordingly, prior to the implementation of this project, a pre-FS or FS is highly recommended with water flow and geographic survey, system impact study, environmental impact assessment (EIA), economic analysis, and surveys on fishery and water rights.

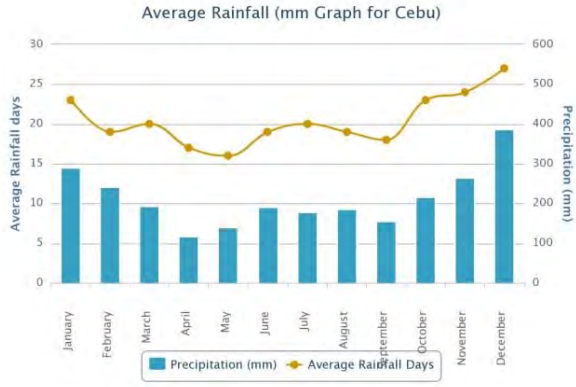
Rainfall is one of the most important factors in designing the development plan. Figure 4-13.4 shows average rainfall for typical city of each region in the Philippines. It is found that Mindanao area has less rainfall relatively compared with other regions. The less rainfall could possibly lead to the lack of power output caused by drought. Therefore, the development of hydro power plant should be evaluated in a comprehensive manner.



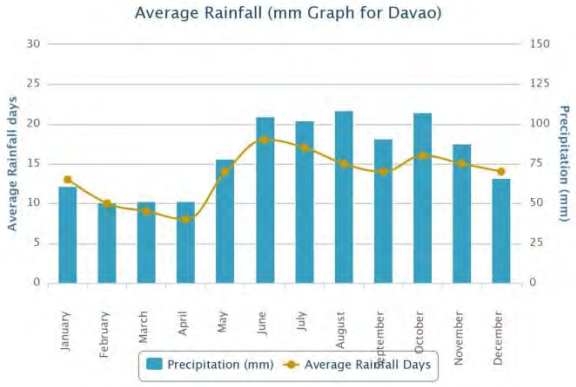
Tawi-Tawi (Mindanao [Small Island])



Manila (Luzon)



Cebu (Visaya)



Davao (Mindanao[Main Island])

Figure 4-13.4 Average Rainfall in Typical City in the Philippines by Region (2000–2012)

PROJECT PROFILE 4-14 MINI HYDRO POWER DEVELOPMENT PROJECT

1. Project Title: Mini Hydro Power Development Project

2. Location: Bangsamoro

3. Implementing Agencies: Electric cooperatives (ECs) in respective areas in cooperation with provincial governments under the guidance of National Energy Administration (NEA) and DOE

4. Objectives: (1) To expand the coverage of electricity supply to remote rural areas and (2) to utilize local water resources for multiple uses

5. Expected Effects: Reactivated rural communities with electricity supply supporting livelihood and other social activities

6. Project Cost:

7. Implementation Schedule: 2016–2017 for surveys and studies on schemes already identified, followed by implementation of priority schemes during 2017–2020

8. Project Description:

8.1 Background and rationale

The level of electrification in Bangsamoro has stayed quite low. The electrification rates in franchise areas of ECs in Bangsamoro are summarized in Table 4-14.1. As seen from the table, it appears that electrification of barangays is almost 100% achieved. However, connection rates at the sitio level vary and are generally low.

Table 4-14.1 Electrification Rates in Franchise Areas of ECs in Bangsamoro (December 31, 2014)

ECs	MUNICIPALTIES/CITIES		BARANGAYS				SITIOS				CONNECTIONS		
	Coverage/ Energized	%	Potential	Energized/ Completed To Date	%	Unenergized	Potential	Energized/ Completed To Date	%	Unenergized	POTENTIAL	SERVED TO DATE	%
TAWELCO	9	100	186	186	100	0	344	200	58	144	47,000	12,498	27
SIASELCO	2	100	66	66	100	0	75	31	41	44	13,000	4,067	31
SULECO	16	100	330	330	100	0	81	62	77	19	85,000	25,295	30
BASELCO	14	100	269	269	100	0	220	105	48	115	75,000	39,964	53
CASELCO	2	100	17	17	100	0	26	0	0	26	5,000	1,961	39
LASURELCO	41	100	1,175	1,175	100	0	68	68	100	0	138,000	56,357	41
MAGELCO	30	100	404	398	99	9	1,245	497	40	748	116,000	27,485	24
Total	114	100	2,447	2,441	99	9	2,059	963	47	1,096	479,000	167,627	35

Source: NEA.

In the Philippines, renewable energy (RE) has been gradually introduced since the Renewable Energy Law was promulgated in 2008. The law aims to protect the environment and ensure the national energy security. In the National Renewable Energy Program (NREP) that DOE formulated as a development plan, the target for introducing RE such as geothermal, hydro, biomass, wind, solar, and ocean energy is set for the entire Philippines and three regions, Luzon, Visayas, and Mindanao.

In Bangsamoro, hydro power represents relatively abundant sources of energy as compared to biomass, wind, and ocean energy. While the Agus hydro power plants continue to be important in future power supply in Bangsamoro, development of independent power sources is important to electrify remote rural areas away from the existing power transmission lines.

8.2 Identified mini hydro schemes

For the development of hydropower resources, various surveys are underway in the main island of Mindanao. However, this is not the case in the surrounding island provinces of Bangsamoro due to the security condition. However, according to hearings, potential risk seems to be less in Tawi-Tawi than

in other island provinces. In the BDP I for the transitional period, the development of a mini-hydro power plant (MHPP) at Busay falls in Bohol and Bongao in Tawi-Tawi is designated as one of the priority projects. To grow out of dependence on diesel power and facilitate the introduction of renewable energy resources on the island, the development of a low-head hydro power plant in Tawi-Tawi is recommended as shown in Project Profile 4-13.

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

During a field validation survey conducted by BDA in late 2015, additional projects were identified for the respective provinces as summarized in Table 4-14.2.

Table 4-14.2 Additional Projects under Mini Hydro Power Development Project

Municipality	Barangay	Project description
Basilan province		
Lantawan	Matikang	Further study needed as falls have limited head
Lanao del Sur province		
Coastal area cluster	Madaya (Marantao)	Falls about 40 m high Generating capacity about 8.5 MW to serve seven municipalities of Marugong, Calanogas, Puals, Picong, Malabang, Balagan, and Kapatagan
Maguindanao province		
Ampatuan, Shariff Aguak and Datu Sangki Abdullah	Sitio Ilantan, Kauran, Ampatuan	Springs discharge 200 L/s for water supply and mini hydro power Source located at 49 m elevation and 1.5 km from National Highway
Ampatuan	Sanyag, Taglong and Tubak	Muakat falls and two other sources
Buldon	Karim	Binaan falls 75 m high, located 8 km from National Highway

8.3 Implementing arrangements

Power supply is requisite for the economic growth and various existing industries in modern society. In Mindanao, and even in other regions of the Philippines, frequent power shortages annoy the public and businesses. According to the Electric Power Industry Restructuring Act (EPIRA) of 2001, the development of power sources is entrusted mainly to the private sector and investors/developers.

However, to facilitate and achieve rapid economic growth in Bangsamoro, it is necessary and effective not to rely too much on the private sector to avoid such risk as sudden termination of construction work due to unforeseen situations. To that end, it is essential for the Bangsamoro autonomous government itself to promote and develop power and/or for a new governmental organization to be established in the Bangsamoro autonomous government that takes charge of power development. Therefore, the Bangsamoro government needs to have the authority to develop power sources. Development of mini hydro power should be taken as an early test case for this institution.

At present, the power sector in Bangsamoro is under the effect of the EPIRA, it is recommended that it coordinate with ERC to discuss the future structure of the Bangsamoro power sector and coverage of the EPIRA. The development of power sources should be undertaken by the initiative of the Bangsamoro governmental organization.

For effective management, it is worth considering the possibility of integration of seven ECs in the ARMM as one distribution utility in Bangsamoro. It will make it possible to effectively manage the power distribution business and comprehensively plan for the development of distribution network, considering the entire development of Bangsamoro.

INSTITUTIONAL MEASURES

IM-1. ESTABLISHMENT OF QUALITY STANDARDS AND CRITERIA FOR EXPORT PRODUCTS

IM-2. AGRICULTURAL FINANCE EXPANSION

IM-3. DIET IMPROVEMENT CAMPAIGN IN RURAL AREA (2016–2022)

IM-4. IMPROVEMENT OF REGULATORY FRAMEWORK OF ISLAMIC FINANCE (2016–2022)

IM-5. COMPREHENSIVE SMES SUPPORT MEASURES (AFTER 2022)

IM-6. STRENGTHENING JUDICIAL SYSTEM FOR LAND ISSUES (2016–2022)

IM-7. BANGSAMORO INVESTMENT WINDOW (AFTER 2022)

IM-1. ESTABLISHMENT OF QUALITY STANDARDS AND CRITERIA FOR EXPORT PRODUCTS

Food business operators should be encouraged to implement a hazard analysis and critical control points (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 this is far behind from the number of Indonesia at 215 in 2009.

Promotion of HACCP will also be necessary for the development of the halal industry in Bangsamoro. Halal requires food safety elements, good manufacturing practices and good hygiene practices, which are already included in HACCP.[1] The ARMM Regional Government (ARMM-RG) has pursued the development of the 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 the halal industry in the region.[2] Some of these are[3] as follows.

- Formation of a certification body for Halal and creation of a certification standard
- Enactment into law of the Muslim Mindanao Autonomy Act No. 254, or the Halal Labeling Act of 2009
- Availability of support services that can be tapped and further strengthened at all levels of the government, such as agricultural extension and technology transfer
- Creation of halal compliant trainings
- For crops and livestock, the modules are still under development
- Implementation of pilot projects for halal feed and organic halal vegetables, among others, in some localities

The recent development includes 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 the Bangsamoro (FAB) provides for the Bangsamoro Basic Law enable the Bangsamoro government to accredit halal-certifying bodies in Bangsamoro.

However, HACCP implementation and certification, consequently the halal industry development, is hindered due to common issues/problems such as limited financial capability, lack of prerequisite programs (e.g., factory hygiene and sanitation), limited HACCP knowledge and technical competence, management problems (e.g., lack of commitment and motivation), and lack of government infrastructure and support. For example, quality control in sanitation has been a problem in the ARMM. Most of the food-related enterprises in the region are family-based and use traditional methods. These enterprises may not know modern product preparation practices which are needed for compliance to HACCP. As these business do not comply with such internationally accepted standards, their scope of operations would also be limited to the domestic market[4].

HACCP implementation in Bangsamoro and their adjustment to EU and US 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 (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

[1] Black, Rob. *Halal, Food Safety and HACCP (Presentation Material)*. Central Asia Regional Cooperation Program. Workshop on SPS Measures, 25-26 July 2012. Bangkok, Thailand.
[2] The initiative was funded and assisted by the Canadian International Development Agency's Local Government Support Program in ARMM (2005-2010), and later on by other funding agencies such as Japan International Cooperation Agency (JICA).
[3] Barandino, Rizalino. *Working Paper No. 11 Indicative Business and Investment Opportunities in the ARMM.*
[4] ibid.

international requirements for quality and safety.

It is recommended for this project to utilize the academic sphere. Realistically, new faculty teaching Shari'ah business and administration should be established in Mindanao State University (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 and Islamic rituals etc. BDA tying up with the Commission on Higher Education (CHED) will advance this concept having support from outer Muslim societies.

According to the interview to MSU on June 2015, there is only few combat happened inside campus and it is rather safe for the donors to implement the designated project inside the academic campus. This education faculty can be utilized for re-educating militants and army as well.

IM-2. AGRICULTURAL FINANCE EXPANSION

The Bangsamoro area is endowed with natural physical characteristics such as climate and land resources suitable for growing many types of crops. As people say, "You throw any seed, it will grow". It is very true in the Bangsamoro region. However, the land potential should be harnessed in order to optimize the seeds it could give back. The absence of suitable credit mechanism or the lack of access to it has proliferated very low productivity of crops in the region. Farmers suffer from a vicious cycle of low income and low production from low productivity due to the absence of financing. On the other hand, banks do not prioritize agriculture production loans due to the risk attached to agriculture. Risk-averse banks are more apprehensive to lend to farmers in Bangsamoro due to poor repayment rates of government lending through LBP. In view of these, the Bangsamoro agriculture financing need an alternative credit mechanism.

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-interest loans to the borrowers and limited to small farmers and cooperatives whose members have farms less than five hectare, which is the retention limit of landownership. The fund may be used for two types of loans as follows.

(1) Project financing

Loans may be granted to cooperatives for establishment or rehabilitation of commercial farms. Many ARBs under one 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 the LBP under a special lending program of 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 the farmer 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 PCIC 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.

The project will be implemented by cooperatives and LGUs under the support of DAF, LBP, PCIC, and CDA.

IM-3. DIET IMPROVEMENT CAMPAIGN IN RURAL AREA (2016–2022)

The dietary habits in Bangsamoro are still much traditionally Philippine. Although cereals, starchy roots, and tubers are eaten abundantly, consumption of fresh meat, eggs, and regulating food is still small. These habits may lead to diseases, especially those attributed to vitamin A and B shortage, such as beriberi and night blindness. For young children, it causes development disorders. The 2010 food intake survey (by Food and Nutrition Research Institute, FNRI) shows that Bangsamoro inhabitants take lowest level of regulating foods in the Philippines; for instance, the daily intake of green leafy vegetable and vitamin C rich food is 33 g and 15 g respectively in national average, while 31 g and 7 g are the intake by the Bangsamoro inhabitants.

Table 5.1 shows the summary of the results of the 2010 FNRI survey. The values represent the food intake per gram per day. As seen in the table, ARMM has lagged behind the Mindanao average and the Philippine average in terms of body building and regulating foods.

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 having a healthy balanced meal by providing recommendations on the proportions of the food content. 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 among the communities. Starting to address the food intake for regulating foods will be ideal since production of some vegetables can be done at home or in each community.

Green leafy vegetable such as *malunggay* and *pechay* can be produced very easily even at backyard and vitamin C rich food such as tomatoes and mangos as well. It is recommended that the importance of proper food intake is promulgated through information dissemination and also backyard production of such crops are extended through the barangay health worker of the Department of Health. Nutrition experts from international donor will train barangay health workers and disseminate proper and efficient dietary habit.

International donors may provide three to five nutrition experts and let them understand the present situation of food intake by barangay and extend practical training on backyard vegetable production. The promulgation of recipes for easy intake of these products is also the role of such nutrition experts.

Table 5.1 Summary of Results of 2010 FNRI Survey

Food Group	Philippines	Mindanao	ARMM
Energy Giving Foods			
Cereals and cereal products	367	384	396
Starchy roots and tubers	17	19	29
Sugar and syrups	40	14	16
Fats and oils	15	11	9
Body Building Foods			
Fish, meat, and poultry	175	165	151
Eggs	14	11	7
Milk and milk products	7	26	19
Dried beans, nuts, and seeds	9	7	5
Regulating Foods			
Green leafy and yellow vegetables	33	40	31
Vitamin C-rich foods	15	12	7
Other fruits and vegetables	114	113	87
Miscellaneous	29	27	15

Source: National Nutrition Survey.

IM-4. IMPROVEMENT OF REGULATORY FRAMEWORK OF ISLAMIC FINANCE (2016–2022)

Having a dual banking system, a conventional banking and an Islamic banking, may be necessary in Bangsamoro to support existing business and investors in the region. Capital and access to finance should be present to indicate the readiness of the region to welcome new investments. This proposed dual banking and finance recognizes the following tenets in Bangsamoro[5].

- The conventional banking and finance system is a support on the economic structure of the Country. Since the rest of the Country follows the conventional type, it will be plausible for Bangsamoro to have such as system as well.
- The Islamic banking and finance system is an alternative for market segments that would like to uphold Islamic principles in doing business.

In fact, the current situation proves that a conventional banking system and Islamic banking system share the same set of difficulties in Bangsamoro.

(1) Current situation

There is only one entity operating under the concept of Islamic finance in the Philippines: Al-Amanah Bank, a government-owned Islamic bank. However, 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.

- Weak financial literacy and fundamentals among the people: The people in Bangsamoro lacked a clear understanding of the concepts of Islamic banking system and products.
- Perception of high risk situation: The peace and order situation had made it challenging for people and companies to access the bank's offices and to transact for funding for their business activities.
- Current economic situation: There is a high degree of informality in the business sector, and there is low savings levels in the region.
- Lack of skills to handle Islamic banking: Within the Al-Amanah Islamic Investment Bank, its officials seem to lack appropriate skills and capacity to manage the operations.
- Politics: There is a prevailing perception that the Al-Amanah Islamic Investment Bank only served as the national government's instrument to appease the Muslims. The reason for this is that Muslim members of the board may not have sufficient, or no background on Islamic banking and finance[6].

To be able to attract market players to do Islamic finance, there must be robust regulations supporting Islamic finance following the Shari'ah 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.

(2) Potential, development concept and project component

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 Shari'ah 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.

(3) Institutional setup such as financial, implementation and coordination bodies

Recognizing possible entry points for Islamic banking and finance system will be important. Three aspects for Islamic banking and finance can be considered in the region[7].

[5] Workshop on Banking and Finance in the Bangsamoro: Notes on Outcome and Options for an Action Agenda. 2014
[6] ibid.
[7] The three aspects are summarized from the results of the *Workshop on Banking and Finance in the Bangsamoro: Notes on*

First aspect: Banking

There are two general categories of Islamic banking: (1) fully fledged Islamic banking, and (2) conventional banks operating Islamic windows.

One example of Islamic window is to have some of the fully fledged Islamic banks to set up as a subsidiary of conventional banks where the operation and management are clearly defined. While being a subsidiary of a conventional bank, these fully fledged Islamic banks should be able to comply with Shari'ah principles. This method could be a strong entry point due to the following arguments.

- Gradual implementation is more easily absorbed; customer base will be built, public will be educated, and management capabilities for Islamic banking will be developed.
- Cost efficiency will be ensured since the existing infrastructure of the banks can be used and the current manpower can be trained for Islamic banking.
- Conventional banks can use their technological know-how in the region.

It will be relatively easier to attract non-Muslim market to Islamic instrument.

Second aspect: Capital markets, including sukuk, stock market and mutual funds

*Sukuk*s are certificates of ownerships in a pool of underlying assets in which the certificates are of equal value. These financial instruments are suitable for mobilizing funds for new projects, expanding an existing project, and supporting a business venture. It is important to note that a return is obtained through a sharing or leasing of assets, and reflects the profitability of a project. Moreover, the assets are used for creating Shari'ah compliant returns; in essence, it works as asset-based financing, and not asset-backed.

At present, Islamic financial instruments such as sukuks could be expensive given the Philippine taxation regulations. These instruments would be subject to transfer taxes, value added taxes, and capital gains tax.

Third aspect: Non-banking financial institution, including takaful (Islamic insurance) and microfinance

One possible non-banking financial instrument in Bangsamoro would be Islamic pawn broking. Money from pawned items could be used for emergency purposes, such as educational needs and hospitalization of the people. On a broader perspective, it can also be used for additional capital among small businesses. Some of the advantages of Islamic pawn broking[8] are that

- The cost is cheaper and the procedure is simple;
- It is free from interest;
- Pawned assets are kept for safety and insured from loss; and
- The borrower is given advanced notice before the auction and bidding process, and if the pawned assets are sold, any excess amount is returned to the borrower.

Takaful, or Islamic insurance, is also needed for agricultural produce in the region. Since farmers may not have the enough financial resources to avail sizeable insurance products, introduction of micro-insurance products is a major consideration. Related regulations of the Insurance Commission are still not deemed to be appropriate for takaful, which works under Islamic principles. For instance, insurance companies are required to invest about 60% of their assets on interest bearing government securities, which may not be in accordance with Islamic principles. Thus, Islamic insurance companies may find it hard to enter the market.

The following institutional setup is recommended.

Outcome and Options for An Action Agenda.

[8] Latiph, Acram. *Banking and Finance in ARMM*. Presentation Material. 11-12 March 2014.

1) For Islamic banking: Bangko Sentral ng Pilipinas (BSP), as regulators for all kinds of banks in the Philippines; after the regulations are set up, the following options can be considered and decided upon:
   - To allow only fully fledged Islamic banks operate in the region to avoid moral hazard in possible contamination associated with Islamic banking windows (a prudent measure),
   - To create a full-fledged Islamic bank under the Bangsamoro government (an enhanced revival of Al-Amanah bank), and
   - To allow Islamic banking windows along with fully fledged Islamic banks, letting the market decides the most suitable form of delivery mechanism for Islamic banking products (a market-driven measure).
2) For non-bank Islamic finance activities (i.e., capital markets): Securities and Exchange Commission, as regulator for all capital markets products and participants.
   - It is important to continue the efforts creating an *equal playing field* for Islamic financial instruments. One example is the move of the Philippine Stock Exchange (PSE) in announcing that about 47 of its listed companies have Shari'ah compliant stocks. PSE's screening was based on the globally accepted Accounting and Auditing of Islamic Financial Institutions (AAOIFI) standards. This is one step to encourage Muslim Filipinos to invest.
   - Insurance products such as takaful will require an enabling law to be enforced. However, there is a lack of technical expertise and competent professionals to introduce and manage takaful insurance (not only in Bangsamoro, but also in the Philippines).
3) For implementation of necessary legislation: Congress and Senate of the Philippines (Bangsamoro Basic Law Committee, Banking and Intermediaries Committee).

IM-5. COMPREHENSIVE SMEs SUPPORT MEASURES (AFTER 2022)

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-size enterprises (MSMEs), serves as the governing policy for MSME development in ARMM. The region also follows the national definitions for MSME categories. Based on the capitalization requirements shown in Table 5.2, 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 the 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 focus on a specific product or service, in which it is competitive. The support of each local government unit is indispensable to make the OTOP initiative successful. OTOP becomes a support mechanism for MSMEs to manufacture and market their distinctive products[9].

Table 5.3 shows identified OTOP with Small Business (SB) Resolution Numbers.

Table 5.2 MSME Categories in the Philippines

MSME category	Capitalization	No. of employees
Micro	Less than PHP 1.5 million	1–9
Small	PHP 1.5 million to PHP 15 million	10–99
Medium	From PHP 15 million to PHP 60 million	100–199
Large	More than PHP 160 million	200 ≤

Source: Department of Trade and Industry.

Table 5.3 OTOP with Small Business (SB) Resolution Numbers

Name of LGU	Identified OTOP	Sustainability (SB Resolution No.)
Basilan Province		
1) Ungkaya Pukan	Rubber (first priority) Coconut (second priority) Seaweeds (third priority)	SB Resolution No. 08-11, s. 2008
2) Lamitan City	Rubber (first priority) Coconut (second priority) Marine/fishery (third priority)	SB Resolution No. 2008-16
3) Sumisip	Rubber (first priority) Cassava (second priority) Fish industry (third priority)	SB Resolution No. 02, s.2008
4) Lantawan	Coconut (first priority) Rubber (second priority) Seaweeds (third priority)	Resolution No. 47, s.2008
Sulu Province		
1) Kalingalan Caluang	Seaweeds production	SB Resolution No. 04, s. 2008
2) Talipao	Coffee	SB Resolution No. 05, s. 2008
3) Siasi	Red clay bricks	SB Resolution No. 06, s. 2008
4) Patikul	Abaca fiber	SB Resolution No. 26, s. 2008
5) Parang	Piz cloth	SB Resolution No. 08-082
Maguindanao Province		
1) Sultan Kudarat	*Inaul* (loom-woven fabric)	SB Resolution No. 08-01, s. 2008

[9] Barandino, Rizalino. *Working Paper No. 11 Indicative Business and Investment Opportunities in the ARMM.* 2014

Name of LGU	Identified OTOP	Sustainability (SB Resolution No.)
2) Ampatuan	Rice and corn	SB Resolution No. 2208-30
3) Rajah Buayan	Rice and corn	SB Resolution No. 022, s. 2008
4) Shariff Kabunsuan Prov.	Halal products	SB Resolution No. 20, s. 2008
5) Parang	Seaweeds	SB Resolution No. 07-15-08, s. 2008
6) Datu Odin Sinsuat	Livestock production	SB Resolution No. 332, s. 2008
7) Mother Kabuntalan	Freshwater fish production	SB Resolution No. 42, s. 2008
Tawi-Tawi Province		
1) Sitingkai	Seaweeds	Resolution No. 008-012
2) Languyan	Processed fish and marine products	SB resolution No. 009, s. 2008
3) Panglima Sugala	Cassava and fresh fruits	Draft already presented to SB
4) Simunul	Native delicacies	Draft already presented to SB
5) Bongao	Cassava and native delicacies	Draft already presented to SB
Lanao del Sur Province		
1) Balabagan	Abaca production	Resolution No. 001
2) Buadipuso-Buntong	Rice production	Resolution No. 10, s. 2008
3) Butig	Gravel and sand (for concrete products)	Resolution No. 45-07
4) Ditsaan-Ramain	Rice production	Resolution No. 032-008
5) Malabang	Fish processing (smoked tuna)	Resolution No. 08-005
6) Maranatao	Corn production (byproducts)	Resolution No. 19, s. 2008
7) Masiu	Gravel and sand (for concrete products)	Resolution No. 20, s. 2008
8) Pualas	Food processing (halal spice *palapa*)	Resolution No. 0055-08
9) Tugaya	Metal and woodcraft	Resolution No. 09-08

Source: Barandino, 2014; DTI-ARMM.

There are also other municipalities waiting for the SB Resolutions to implement OTOP (Table 5.4). To cope with policies and project surrounding SMEs in Bangsamoro, special temporary policy with specific life-span is needed to enhance the SME development. Such special temporary policy includes 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 to 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.

Table 5.4 OTOP Waiting for SB Resolutions

Lanao del Sur		Maguindanao	
Municipality	Identified OTOP	Municipality	Identified OTOP
1) Bacolod-Kalawi	Loom weaving	1) Northern Kabuntalan	Rice
2) Kapai	Ginger production	2) North Upi	Corn
3) Madalum	Bamboo rattan craft	3) Matanog	High value fruits
4) Madamba	Bamboo rattan craft	4) Paglat	Kawilan rice
5) Mulondo	Livestock and corn	5) Buluan	Banana chips
6) Wao	Feeds	6) South Upi	Abaca
		7) Datu Paglas	Rice
		8) SK Pendatun	Corn

Source: ibid.

IM-6. STRENGTHENING JUDICIAL SYSTEM FOR LAND ISSUES (2016–2022)

In the Philippines, a Torrens title system[10] is used for landownership. Various government agencies are involved in landownership system, such as[11] the following.

- The Land Registration Authority (LRA), under the Department of Justice (DOJ), keeps the official registry.
- The Land Management Bureau (LMB), under the Department of Environment and Natural Resources, administers the distribution of alienable and disposable public lands using patents of various forms. It also maintains technical information on land records based on cadastral surveys.
- The Forest Management Bureau (FMB), also under DENR, issues instruments of land rights for inalienable public forest lands.
- The Department of Agrarian Reform (DAR) implements the Comprehensive Agrarian Reform Program (CARP), and issues certificates of landownership award (CLOAs) as proof of land transfer. This is registered with LRA with encumbrances.
- The National Commission on Indigenous Peoples (NCIP) issues instruments over lands in the ancestral domain (i.e., certificate of ancestral domain title and certificate of ancestral domain claim).

Having various government offices handling land tenure and ownership in the Philippines eventually results to challenges in coordination and in organization of land information. Actual land practice shows that a special case of formal tenure is land held by agrarian reform communities (ARCs) and/or resettlement areas. This is premised on proper land documentation. These lands showcase the exercise of de facto and de jure property rights by smallholders in ARMM.

Doing business in Bangsamoro will entail partnerships with local strongmen or Datus. With their presence and influence in the region, several important features on land tenure system has to be noted.

- Datus and their clans enjoy the authority in the traditions and the state laws as they are often elected local officials in their respective domains.
- Any business prospects should entail the blessing of a Datu in the particular location, since Datus can be a gatekeeper for gaining access to land and can provide security and property rights within territory.
- It is imperative to find a progressive Datu who can address both the developmental concerns of the communities and the commercial interests of the clan and business partners.
- It is advantageous to find a clan with dynastic succession to ensure potential business continuity. Clan members will ensure the long term arrangements with the business partner.[12]

The banana plantation of La Frutera overcame the challenge of landownership issue by establishing a company that takes the responsibility of land leasing from small-scale farmers. This was the method that leveraged traditional culture and leadership of the Datu system. However, there is no guarantee that the same method works in other areas. There is no guarantee that a method successfully applied in one area is sustainable either. Agumil initially attempted the same approach in palm oil plantation. However, the problems emerged once the Datu who was the partner passed away and his successor did not continue the contract. Agumil's strategy today is to have individual farmers to join the cooperative that is a partner of Agumil.

Not all investments in the proposed Bangsamoro region met the same success with that of Agumil. In particular, there are significant challenges for foreign investors in seeking for potential partners (landowners) in the region. Disputes on land tenures and titles are barriers to investment promotion in

[10] A Torrens system is a land registration system in which the government is the keeper of all land and title records. The land title serves as a certificate of full, indefeasible, and valid ownership.
[11] *Workshop on Land and Property Rights in Bangsamoro. Notes on Outcome and Options for Action Agenda.* 04-05 June 2014.
[12] Workshop on Land and Property Rights in Bangsamoro. Notes on Outcome and Options for Action Agenda. 04-05 June 2014.

the region. Table 5.5 shows the typology of land conflicts in Mindanao.

Table 5.5 Land Conflicts in Mindanao

Province (Municipality)	Moro vs. Christian	IP vs. Moro vs. Christian	Intra-Moro (Rido)	Private vs. Government
Maguindanao (South Upi)		√		
North Cotabato (Aleosan, Arakan, Carmen, Kabakan, Midsayap, Pikit)	√	√		√
Lanao del Norte (Tubod, Linamon, Kauswagan)	√		√	
Lanao del Sur (Marami)			√	√
Zamboanga Peninsula (Zamboanga City, Ipil)		√	√	√
BaSulTa (Basilan, Sulu)			√	

Source: World Bank, "Towards a Viable Solution to Land Conflict in Mindanao," presentation at workshop, 2014.

On at the national and local levels, there have been a number of to address the issues relating to land tenure. These initiatives are supported by different NGOs and multilateral organizations. Some examples of ongoing projects are the following.

- A Joint Administrative Order was signed in 2012, which required DAR, DENR, LRA, and NCIP to coordinate and ensure no overlap in titles prior to issuing any new land tenure documents. While this will begin to help address the coordination problems, it is unlikely to resolve pressing issues in landownership in the Bangsamoro region due to the mandated functional overlaps of the agencies.
- LMB is currently updating the 1970s cadastral survey on a nationwide basis and aims to complete the process by 2015. Signing a memorandum of agreement with the ARMM Regional Government, LMB planned to start its efforts in the Bangsamoro region at the provinces of Maguindanao and Basilan.
- DENR has the Land Administration and Management Project (LAMP). The project was funded by the World Bank and Australian Aid. LAMP had a pilot test on the process of surveying, individual titling, proper record keeping, and storing of land titles. However this initiative's success was limited to particular areas; this did not cover conflict-affected areas in Mindanao, as gaining support from individual LGUs had been very difficult.

Other initiatives related to land tenure include the following.

- The National Land Use Commission (NLUC)[13], which was recently strengthened and reformed as a NEDA Board Committee.
- Catholic Relief Services, an international NGO, which implemented the Applying, Binding, Bonding, Bridging to Land Conflict in Mindanao (A3B) project; funded by USAID, the A3B project aimed to bring diverse identity group together to collaborate to resolve land-related conflict; in particular, this project puts weight on trust building as a key component of sustainable conflict resolution.[14]

Because of such background, the Bangsamoro Development Agency（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.

One immediate action is proper identification on areas where there are major land disputes and related conflict prevalence. The data would be used to map the particular areas which are perceived to have high landownership risks (the higher the disputes and conflicts, the higher the risk). The following are

[13] an interagency body on land use and physical planning
[14] Workshop on Land and Property Rights in Bangsamoro. Notes on Outcome and Options for Action Agenda. 04-05 June 2014.

some examples on the results of this recommended immediate action[15]:

- To acquire existing data on land rights and land classification from DENR, LRA, DAR, and NCIP,
- To create a map of ongoing and potential conflicts related to natural resources and plantations, with a focus on surrounding territory of indigenous peoples and ancestral domain, and
- To create a map of potential areas for agribusiness and mining investors.

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

Bangsamoro should look up to the models of Malaysia and Thailand for land management. In Malaysia, the government introduced a good land titling system, which was based on the Torrens system and had programs to enable the issuance of provisional titles based on limited surveys. Thailand's strength in land management system are defined by the following characteristics[16]:

- A strong and unified policy/legal framework, with systematic administrative processes for registration to formalize rights;
- A sound institutional framework, with a single land administration agency for land registration, cadastral survey and mapping, and collection of land and related fees;
- Streamlined procedure and reasonable transaction cost through a one stop shop;
- A strong public confidence in the land administration system; and
- High levels of participation.

For Bangsamoro, it will be paramount to explore alternatives and best-fit models especially on potential industries (such as agribusiness in the short term, and mining in the long term). These models should be structured according to the landownership aspirations and cultural characteristics of the people. For instance, matching progressive-minded Datus to be development entrepreneurs will be ideal for agribusiness industry in Bangsamoro.

[15] ibid.
[16] ibid.

IM-7. BANGSAMORO INVESTMENT WINDOW (AFTER 2022)

Land issue was original issue of conflict in Bangsamoro and without establishing land development strategy this issues will remain unsolved. BDA as the administrative body of Bangsamoro recognizes that deregulated permits on land development induce unorderly development, income differential and areal conflicts.

Most big landowners (including Datus) are expecting to start business with investors and they are waiting for this opportunity. While small landowners, ARBs and landless farmers are expecting to their participation in that project, which is initiated by Datus and investors.

On the other hand, the potential investors to large scale plantation 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 and landowners in line with the regulation set by the administrator. The ideal functions of BIW are to

1) Strategize the involvement of small landowners, ARBs, and landless farmers in the development,
2) Provide investment information to potential investors,
3) Serve as intermediary between large landowners and investors,
4) Monitor the development and accumulate the case studies, and
5) Disseminate successful cases.

The focus on the agricultural sector is due to the landscape of current activities in Bangsamoro. Agriculture and agri-business are clustered mainly in Maguindanao and Lanao del Sur. Information facilitation between progressive Datus and potential investors will be necessary since enlightened leadership is one condition for a successful investment project in Bangsamoro. Other key investment drivers,[17] which can be integrated in the proposed Bangsamoro Investment Window, are the following:

- Competitiveness of land (including components of price and fertility) and labor (prevailing rate of the workers),
- Adaptation to the local cultural environment,
- Emphasis on shared goals and values, and
- Appreciation of similarities and interfaith dialogues.

The BIW is collectively formed by different agencies, and each agency provides 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 listed in Table 5.6.

Table 5.6 Major Roles for Local Industry Promotion

Agency	Major Roles for Local Industry Promotion
DTI-ARMM	Promote, regulate, and coordinate trade and industry activities
DAF-ARMM	Develop agriculture, forestry and fisheries in the region
DOST-ARMM	Processing technologies
DILG-ARMM	Supervise LGUs in the region, support in preparing and evaluating development plans
RBOI-ARMM	Promote, assess, and develop local and foreign investment opportunities
CDA-ARMM	Register, supervise, train, and assist in the direction of cooperatives in ARMM

Source: JICA, Development Study on Local Industry Promotion in ARMM, 2011.

[17] Malik, Urooj. "The Bangsamoro: An Overview of Ecosystems, Endowments and Investments". Presentation material. Presented on November 26, 2013.

ADDITIONAL PROJECTS

PROJECT A-1 IP VILLAGE AGRICULTURE/AGRO-PROCESSING PROJECT

PROJECT A-2 LIVESTOCK BREEDING AND DISPERSAL PROGRAM

PROJECT A-3 JOLO AIRPORT DEVELOPMENT PROJECT

PROJECT A-4 SANGA-SANGA AIRPORT DEVELOPMENT PROJECT

PROJECT A-5 AIRPORT NETWORK DEVELOPMENT PROJECT

PROJECT A-6 BONGAO PORT IMPROVEMENT PROJECT

PROJECT A-7 JOLO PORT IMPROVEMENT PROJECT

PROJECT A-8 ISABELA PORT IMPROVEMENT PROJECT

PROJECT PROFILE A-1 IP VILLAGE AGRICULTURE/AGRO-PROCESSING PROJECT

1. Project Title: IP Village Agriculture/Agro-Processing Project

2. Location: Bangsamoro

3. Implementing Agencies: OSCC as Lead Implementing Agency, DAF, MSU System, USM, CDA

4. Objective: To assist IPs in developing sustainable livelihood from their agricultural production activities

5. Expected Effects: (1) Increased IP families' income and (2) increased agricultural production and productivity of IP lands

6. Project Cost: US$1.6 million (PHP 72.0 million)

7. Implementation Schedule: 2016–2017

8. Project Description:

The Bangsamoro region is home to several IP groups. Those in Sulu and Tawi-Tawi are engaged in fishery and related activities and agriculture while those in the mainland (Lanao del Sur and Maguindanao) are generally into agriculture. These IPs have traditional methods of farming to produce their own food. They also have their food preparations and delicacies that can be developed and promoted in the market of all consumers regardless of religious affinity.

Traditional IP agriculture production is organic farming since they are not likely to have used fertilizers and chemicals back in the old times. Production of native upland varieties of rice, vegetables, fruits including goats and native chickens and ducks. Their practices may form a variety of farming systems that may be enhanced to optimize production and suit market requirements and preferences.

The project will include the following components.

1) Organization of IP by village/community into a cooperative. The cooperative is an important vehicle for IPs to undertake a business activity.

2) Identification and documentation of IP practices in farming. Farming practices will be documented for each IP village. Methods of farming and indigenous weather forecasting will be noted and evaluated for purposes of identifying methods that may enhance farming in the village.

3) Formulation and establishment of appropriate farming systems. Out of the documented farming practices, the state universities will assist the IPs formulate a farming systems that will enhance their practices to increase productivity. These practices will form farming systems for particular villages. One IP village should have one or more farming systems as appropriate.

4) Indigenous food products and delicacies especially those made from their agricultural produce and their processing will also be documented and improved especially in the aspect of nutrition and food safety. This component would include identification of food products acceptable to taste of other villages, tribes, Christians and Muslims and even foreigners. This component should be able to identify a product that establishes the identity of a particular IP tribe.

5) Establishment of a special credit for the IPs to finance their farming activities and to establish food-processing facilities. The credit provision for this purpose should be designed based on the practices of the IPs.

6) Provision of training on enhanced farming methods and food processing for commercialization. This component would disseminate the technical knowledge to the IPs in the village to encourage large participation.

7) Assistance for establishment of market for IP products. This component would establish specialized

market of IP products in areas accessible to travelers such as airports, bus terminals. Supermarkets and malls may be required to provide a space for IP products.

9. SEA Considerations:

This project has no known environmental impact.

PROJECT PROFILE A-2 LIVESTOCK BREEDING AND DISPERSAL PROGRAM

1. Project Title: Livestock Breeding and Dispersal Program

2. Locations: Maguindanao, Lanao del Sur, Sulu, Basilan, and Tawi-Tawi

3. Implementing Agencies: Bangsamoro DAF, MSU System, Cooperatives, LBP

4. Objective: To increase inventory of large animals in Bangsamoro

5. Expected Effects: (1) Decline in the number of large animals stopped and (2) increased meat production in Bangsamoro

6. Project Cost: (To be estimated)

7. Implementation Schedule: 2016–2022

8. Project Description:

Inventory of both carabao and cattle has been declining in Bangsamoro probably because of the predominantly backyard raising by small farmers. Their need for immediate cash could easily bring young animals to slaughter. For carabao, such behavior defies the Philippine Carabao Center (PCC) Dispersal Program objectives. It also happens with dispersal entrepreneurship of some private individuals. The PCC-Dispersal Program especially for distribution of milk carabao should be continued as a means to improve rural families' nutrition. However, arresting the declining trend is better achieved by promoting investment in commercial-scale breeding of large animals, namely, carabao and cattle for meat and milk. To achieve these goals, the project have the following components.

(1) Research and development

Basically, the research agenda will be established by DAF and MSU in order to make the research outputs responsive to the objective of the program. This component will take advantage of the resources of the MSU system. The MSU-Main Campus has a long experience in raising dairy cattle supported by the New Zealand government. R&D will cover continuous breeding of imported and native breeds not only for milk but also for meat production. R&D will include formulation of the feed and feeding considering nutrition and cost. Along this line, a farming system would take into consideration the production of suitable forage crops. Maguindanao and Lanao del Sur have an advantage of more than 2,500 mm well-distributed rainfall annually to provide for a year round forage.

(2) Stock farm establishment

The MSU campuses undertaking breeding will operate a stock farm to supply commercial farms with breeder stocks.

(3) Extension

Mature researches will be compiled in manuals and made available to DAF and LGU-Agriculture Offices. Trainings may also be conducted for purposes of information and technology dissemination.

(4) Financing

The project will include financial package to eligible project proponents in cattle and carabao commercial farms. 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.

(5) Promotion

The agriculture agency of Bangsamoro will establish an information drive for the project. LGUs will include commercial livestock in their respective investment plan.

(6) Market development assistance

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

9. Strategic Environmental Assessment (SEA) Considerations:

Commercial livestock farms have minimal environmental impact. For large commercial farms, manure from holding sheds and feedlots may be managed by establishing an anaerobic digester for methane-capture to run engine to generate electricity. Small farms have no significant environmental impact.

PROJECT PROFILE A-3 JOLO AIRPORT DEVELOPMENT PROJECT

1. Project Components

As for geological features, there exist rocky hills as high as a two-story building at the threshold of the runway 27. This will make future expansion of the airport a challenge. However, there will be no runway length issue as long as the airport services only turboprop (TP) aircraft for the time being.

The runway is 45 m wide just over 310 m at the threshold of the runway 27; the remainder 1,535 m is only 30 m wide. Future design aircraft, however, would continue to be TP class in accordance with the air traffic demand. Accordingly, it seems unnecessary to implement separate runway widening for the 30 m section.

There is no runway-end safety area (RESA) for the runway 27. As the existing runway length can handle the service of TP aircraft, the removal of the stop-way at the threshold of the runway 27 and its replacement with the blast pad will create 60 m space, enabling the installation of the minimum RESA.

A new passenger terminal building funded by DOTC is under preparation for the bidding to select the contractor. Once completed, additional expansion will not be necessary until 2030. Furthermore, an area of 1,000 m^2 is being added to the parking lot, and 1,335 bays of airport perimeter fences and 80 bays of security fences are being connected. Because of this, no additional facility improvement plan has been developed.

Still, it is necessary to install PAPI and wind cones to secure safety during the daytime operation. Also, runway overlay may be considered in the medium-term plan taking into account air traffic demand although its pavement is still in good condition. An X-ray machine and a metal detector should be installed since passenger baggage is still manually checked at the airport. A new rescue and firefighting vehicle has already been allocated in the distribution plan but has yet to be installed. The station shall be expanded in accordance with the number of the vehicle. The development plan by phase is summarized in Table A-3.1, and the set targets are presented in Table A-3.2.

Table A-3.1 Jolo Airport Development Plan by Phase (up to 2030)

Phase	Contents	Scale
Short-term plan (2016–2020)	Installation of airfield lighting facilities (PAPI & wind cones) Expansion of rescue and firefighting station Securing RESA (runway 27) Installation of aeronautical information equipment (VHF/TRSC) X-ray machine and metal detector	150 m^2
Medium-term plan (2021-2025)	Runway overlay (1,845 m x 30 m)	55,350 m^2
Long-term plan (2026–2030)	None	

Source: KOICA master plan study report.

Table A-3.2 Summary of Practical Development Targets for Jolo Airport (up to 2030)

Demand/Main facility	Unit	Current	Future Requirements			Note
		2015	2020	2025	2030	
Traffic Demand						
Annual passengers	Pax.	-	20,009	21,605	23,077	
Annual AC movements		-	378	408	444	
Peak-hour passengers	Pax.	-	104	104	104	
Peak-hour AC movements		2	2	2	2	
Design Aircraft		Q400	TP	TP	TP	
Approach Category		Non-instrument	Non-instrument	Non-instrument	Non-instrument	
Airside Facility						
Runway length	m	1,845	1,845	1,845	1,845	
Runway width	m	30	30	30	30	
Runway strip width	m	150	150	150	150	
Taxiway system		Stub	Stub	Stub	Stub	
Apron area	m^2	9,000	9,000	9,000	9,000	
Airfield lighting		None	A	A	A	

Demand/Main facility	Unit	Current	Future Requirements			Note
		2015	2020	2025	2030	
RFF (category)		4	6	6	6	
RESA length	m	90/0	90/90	90/90	90/90	
Landslide Facilities						
Passenger terminal area	m^2	200	960	960	960	Ongoing
Cargo terminal area	m^2	N/A	-	-	-	
Vehicle parking area	m^2	3,290	4,290	4,290	4,290	Ongoing
R/W-T/W separation	m	71.5	71.5	71.5	71.5	
CNS/ATM						
RNA		Non-instrument	Non-instrument	Non-instrument	Non-instrument	
AIS	CH	1/0/2	6/2/2	6/2/2	6/2/2	VHF/TRSC/HF
MET	Set	1/0/0	1/0/0	1/0/0	1/0/0	WIND/RVR/CCLM
Other Improvement						
Runway overlay				Overlay		1,845 m x 30 m
Perimeter fences		Complete				Completed

Abbreviations: AC = aircraft; RFF = rescue and firefighting; RESA = runway end safety area; R/W = runway; T/W = taxiway; CNS/ATM = communication navigation and surveillance/air traffic management; RNA = radio navigational aids; AIS = aeronautical information service; VHF = very high frequency; TRSC = multi-transceiver; HF = high frequency, MET = meteorological facilities; WIND = anemometer; RVR = runway visual range; CCLM = COSMO climate limited-area model.

Source: ibid.

2. Project Cost

Project cost is estimated as summarized in Table A-3.3. It should be noted that expenses for land acquisition, compensation and incidental expenses have not been considered.

Table A-3.3 Cost Estimation for Jolo Airport Development Project (up to 2030)

(Unit: '000 PHP)

Main Work	Future Requirements			Note
	2020	2025	2030	
Airside Facilities				
Runway extension				
Runway widening				
Taxiway system				
Apron expansion				
Strip expansion and site preparation	10,000			1
Upgrading of AGL	4,000			
Upgrading of RFFS	6,000			
Subtotal	20,000	0	0	
Landslide Facilities				
PTB expansion	5,000			1
CTB expansion				
VPA expansion	1,650			1
Construction of control tower				
Site preparation				
Subtotal	6,650	0	0	
CNS/ATM				
RNA				
AIS	36,879			
MET				
Subtotal	36,879	0	0	
Other Improvements				
Runway overlay		99,000		
Completion of fences				
X-ray machine and metal detector	4,000			2
Subtotal	4,000	99,000	0	
Contingency (10%)	6,753	9,900	0	
Total Construction Cost	74,282	108,900	0	

Abbreviations: AGL = aeronautical ground lighting; RFFS = rescue and firefighting station; PTB = passenger terminal building; CTB = cargo terminal building; VPA = vehicle parking area; CNS/ATM = communication navigation and surveillance/air traffic management; RNA = radio navigational aids; AIS = aeronautical information service; MET = meteorological facilities.
[1]To be carried out by Airport Infrastructure Program of DOTC; [2]Cost estimated from similar projects in the Philippines

Source: ibid.

PROJECT PROFILE A-4 SANGA-SANGA AIRPORT DEVELOPMENT PROJECT

1. Project Components

Air traffic demand is small at the Sanga-Sanga airport, and the airport is already accommodating A319, small jet aircraft. Regardless of the demand, it has been planned to develop service facilities for small jet aircraft at the airport. Accordingly, the runway needs to be expanded since it somewhat falls short of the standard runway length to service small jet planes. Also, widening of the runway to 45 m has been suggested.

Further, there is a plan to relocate the apron along with the facilities of the passenger terminal building (PTB) and the vehicle parking area (VPA). This relocation plan is to be reflected in the short-term airport development plan. Moreover, it is recommended that at least a PAPI and a wind cone be installed for the daytime operation since there is no aeronautical lighting facility at present.

If the runway pavement is found to be with no significant flaw, runway overlay will be implemented as part of the long-term development plan. An X-ray machine and a metal detector should be installed to ensure security since passenger baggage is currently screened one by one manually.

A new rescue and fire fighting vehicle has already been allocated in the distribution plan but currently not installed yet. The station shall be expanded in accordance with the number of the vehicle. The development plan by phase is summarized in Table A-4.1, and targets are set as shown in Table A-4.2.

Table A-4.1 Sanga-Sanga Airport Development Plan by Phase (up to 2030)

Phase	Contents	Scale
Short-term plan (2016–2020)	Runway extension (250 m x 45 m) Runway widening (1,860 m x 15 m) New apron New stub taxiway Installation of airfield lighting facilities (PAPI & wind cone) Expansion of rescue and firefighting station Securing RESA (both sides) New passenger terminal building New vehicle parking area Installation of aeronautical information equipment (VHF) Runway overlay (1,860 m x 30 m) Completion of fence connection	11,250 m^2 11,250 m^2 8,000 m^2 230 m^2 1,110 m^2 5,100 m^2 55,800 m^2
	New control tower X-ray machine and metal detector	
Medium-term plan (2021–2025)	Expansion of passenger terminal building	1,500 m^2
Long-term plan (2026–2030)	None	

Source: ibid.

Table A-4.2 Summary of Practical Development Targets for Sanga-Sanga Airport (up to 2030)

Demand/Main facility	Unit	Current	Future Requirements			Note
		2015	2020	2025	2030	
Traffic Demand						
Annual passengers	Pax.	-	31,193	38,460	45,427	
Annual AC movements		-	287	353	417	
Peak-hour passengers	Pax.	-	218	218	218	
Peak-hour AC movements		2	2	2	2	
Design Aircraft		A319	SJ	SJ	SJ	
Approach Category		Non-instrument	Non-instrument	Non-instrument	Non-instrument	
Airside Facility						
Runway length	m	1,860	2,110	2,110	2,110	
Runway width	m	30	45	45	45	
Runway strip width	m	200	200	200	200	
Taxiway system		Stub	Stub	Stub	Stub	New construction
Apron area	m^2	5,500	8,000	8,000	8,000	New construction

Demand/Main facility	Unit	Current	Future Requirements			Note
		2015	2020	2025	2030	
Airfield lighting		N/A	A	A	A	
RFF (category)		4	6	6	6	
RESA length	m	0/0	90/90	90/90	90/90	
Landslide Facilities						
Passenger terminal area	m^2	240	1,110	2,600	2,600	New construction
Cargo terminal area	m^2	N/A	-	-	-	
Vehicle parking area	m^2	N/A	5,100	5,100	5,100	New construction
R/W-T/W separation	m	26.5	93	93	93	
CNS/ATM						
RNA		Non-instrument	Non-instrument	Non-instrument	Non-instrument	
AIS	CH	0/0/0	6/2/2	6/2/2	6/2/2	*VHF/TRSC/HF
MET	Set	1/0/0	1/0/0	1/0/0	1/0/0	*WIND/RVR/CCLM
Other Improvement						
Runway overlay			Overlay			1,860m x 30m
Perimeter fences		Incomplete	Complete			

Abbreviations: Same as Table A-2.2

Source: ibid.

2. Project Cost

The project cost estimate is summarized in Table A-4.3. It should be noted that the cost of land acquisition, compensation, and incidental expenses has not been considered.

Table A-4.3 Cost Estimation for Sanga-Sanga Airport Development Project (up to 2030)

(Unit: '000 PHP)

Main Work	Future Requirements			Note
	2020	2025	2030	
Airside Facilities				
Runway extension	56,250			
Runway widening	111,600			1
Taxiway system	10,000			1
Apron expansion	32,000			1
Strip expansion and site preparation	93,020			1
Upgrading of AGL	16,625			
Upgrading of RFFS	9,200			
Subtotal	328,695	0	0	
Landslide Facilities				
PTB expansion	91,250	59,600		1 (2020)
CTB expansion				
VPA expansion	30,000			1
Construction of control tower	25,000			2
Site preparation	12,420	2,900		
Subtotal	158,670	62,500	0	
CNS/ATM				
RNA				
AIS	48,784			
MET				
Subtotal	48,784	0	0	
Other Improvements				
Runway overlay	184,140			
Completion of fences	44,000			2
X-ray machine and metal detector	4,000			3
Subtotal	232,140	0	0	
Contingency (10%)	76,829	6,250	0	
Total Construction Cost	845,118	68,750	0	

Abbreviations: Same as Table 9.2.

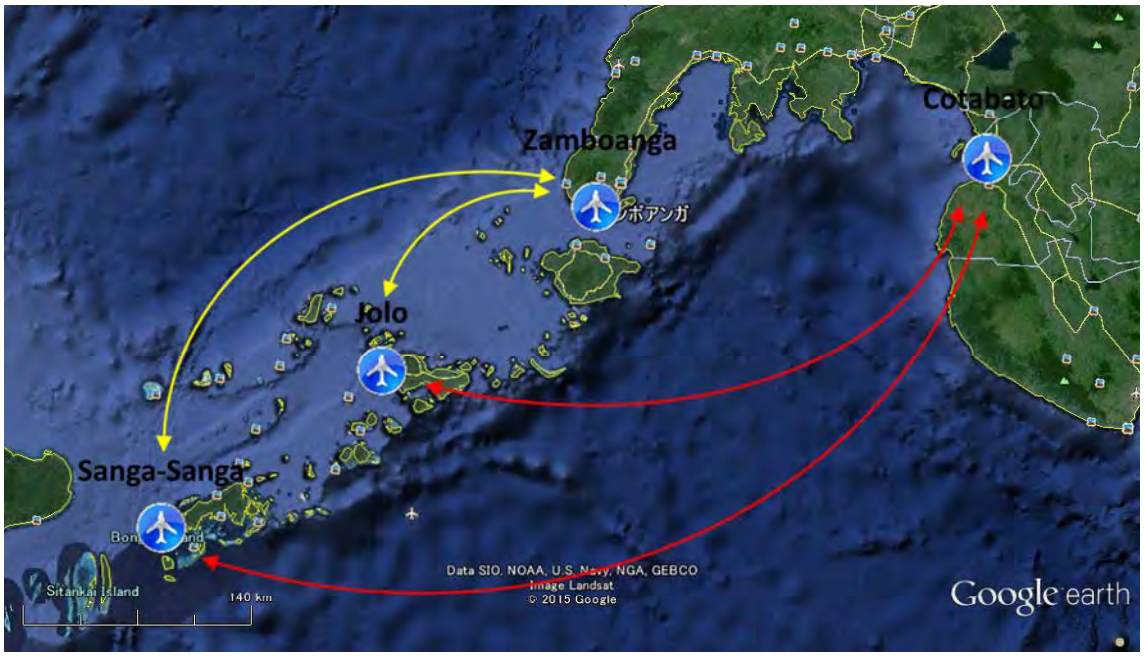
[1]To be carried out by Airport Infrastructure Program in 2015 of DOTC; [2]Based on the proposed Airport Infrastructure Program of DOTC; [3]Based on a similar project in the Philippines

Source: ibid.

PROJECT PROFILE A-5 AIRPORT NETWORK DEVELOPMENT PROJECT

The existing air network only links the Zamboanga airport and island airports in BaSulTa such as the Jolo airport and the Sanga-Sanga airport. There is no air connection between the Cotabato airport and island airports. The direct air transportation between Cotabato and BaSulTa should be established to promote comprehensive and integrative development of Bangsamoro although historically the regional economy in BaSulTa has a strong tie with Zamboanga City. There will be a demand for such direct air connection once Cotabato City's economy expands to the level comparable to Zamboanga City's.

Tawi-Tawi has enormous tourism potential with its beautiful scenery, majestic natural environment, and a variety of cultures. For Tawi-Tawi, increase in the number of tourists, not only from other areas in the Philippines but also from the neighboring countries such as Brunei, Indonesia, and Malaysia, is expected. Therefore, the Sanga-Sanga airport in Tawi-Tawi should be equipped with facilities for customs, immigration, and quarantine (CIQ) to accommodate international passengers in the future. Besides, Tawi-Tawi needs to establish the image that it is a safe area apart from the other islands in BaSulTa (Figure A-5.1).



Legend: Existing route (yellow line); desired future route (red line)

Source: JICA Study Team.

Figure A-5.1 Airport Network Development in Bangsamoro

PROJECT PROFILE A-6 BONGAO PORT IMPROVEMENT PROJECT

1. Background

Tawi-Tawi is one of the most remote island provinces in the Philippines. Its residents are highly dependent on the maritime travel because of the remoteness of the islands. The Bongao Port is an important sub-hub connecting numerous smaller nearby island ports to other ports in the Sulu Archipelago as well as the regional hub of Zamboanga. An improved Bongao Port will strengthen the economic linkage between Tawi-Tawi and Zamboanga City and to BIMP-EAGA.

(1) Present condition of Bongao Port

According to statistics of the Bongao Port, cargo throughput is 125,331 tons per year in 2013 and the total length of cargo berth is 163 m. The productivity of the Bongao Port is 770 ton/m/year. Considering the no backup area and very narrow apron of 9 m, it is assumed that the existing port facility is almost saturated in its capacity. The total ship calls to the Bongao Port was 392 in 2012 and the average ship size is 400 GT. The berthing time of the ships was 6 to 12 hours/call for loading and unloading. Calling ports to and from the Bongao Port are Zamboanga, Iligan, Sitangkai, Siasi. The main commodities handled at the port are seaweeds, copra, live fish/octopus, dried fish and sea shells.

(2) Urgent expansion of Bongao Port

To mitigate the congestion at the Chinese pier, 130 m berthing space should be created by reclaiming 3,800 m^2 and the cargo marshalling area. The berth so created will mainly serve motor launches (wooden hulled vessels with 60–125 ton GRT) and some conventional vessels (steel-hulled vessels with about 100 ton GRT). The expansion of the port will help to decongest the Chinese pier. The Chinese pier would then be better able to accommodate inter-island provincial traffic which uses smaller vessels.

Transit sheds will also be constructed to provide storage space for cargo. An additional small passenger terminal will be constructed to serve vessels at the reclaimed area. Perimeter fences and gates will be constructed to allow for better security. A lighting system will be built to allow for better operations at night. These improvements are expected to increase the capacity of the port while improving efficiency, security and safety. The improvement plan is indicated in Figure A-6.1.

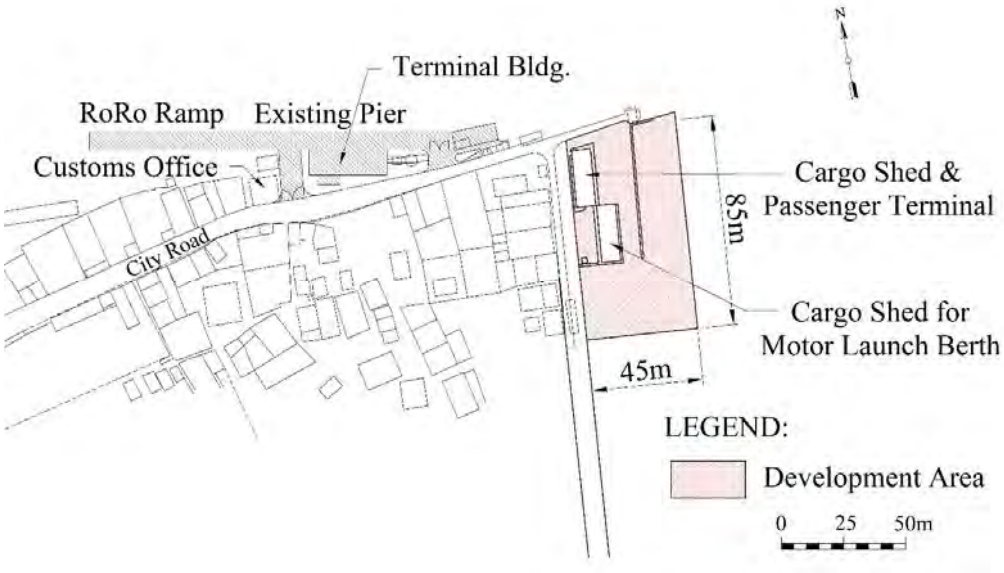


Figure A-6.1 General Plan for Urgent Expansion of Bongao Port

Rough cost estimate on the urgent expansion of the Bongao Port is presented in Table A-6.1.

Table A-6.1 Rough Cost Estimate for Urgent Expansion of Bongao Port

(Unit: US$)

Cost component	Local portion	Foreign portion	Total
A. Construction	1,656,202	1,095,067	2,751,269
1. Preparation works	136,000	284,000	420,000
2. Dredging and reclamation	76,680	8,520	85,200
3. Berth construction	661,260	421,260	1,082,520
4. Yard construction	268,383	132,643	401,025
5. Other expenses	286,379	151,145	437,524
6. Equipment procurement	227,500	97,500	325,000
B. Contingency and taxes	473,871	131,408	605,279
C. Consulting services	161,775	69,332	231,107
Total project cost (A+B+C)	2,291,847	1,295,807	3,587,655

2. Cargo and Passenger Forecast

Estimated cargo and passenger volume in 2019, 2022, and 2030 is indicated in Table A-6.2.

Table A-6.2 Cargo Volume and Passenger Traffic at Bongao Port in 2019, 2022, and 2030

	Year	2019	2022	2030
Bongao port	Cargo (MT)	253,363	348,384	538,728
	Passengers	233,434	265,623	316,135

3. Proposed Port Development

(1) Required number of berths

The number of berths required to handle a given volume of cargo differs greatly depending on the nature of the port, kind of cargo, cargo handling facilities, etc. There are several methods in determining the number of berth length. For the rough estimation of the required total length of berth, the unit productivity method is mainly used as below:

Unit productivity = (Converted cargo volume)/(Converted berth length)
= 700–1,100 t/m

The adjusting rate for bulk and general cargo is 0.5, and the berth lengths based on water depths are as shown in Table A-6.3.

Table A-6.3 Relationship between Water Depth and Berth Length

Water depth of berth	Converted berth length
2.10–3.90 m	1/3 x berth length
4.00–7.40 m	2/3 x berth length
7.50 m ≤	Berth length

The required berth lengths at the Bongao Port for the target year of 2019, 2022, and 2030 are presented in Table A-6.4.

Table A-6.4 Required Berth Lengths for Bongao Port

Year	Cargo throughput (ton)	Required berth length (m) [a]	Existing berth length (m) [b]	Required extension of berth [a]-[b]	Proposed extension of berth (m)
2019	253,363	189	163	26	0
2022	348,384	260	163	97	200
2030	538,728	402	163	239	100

(2) Required transit shed area

Transit shed area = (VET x RF x 2.2)/SD
VET = (DT x ET x PF)/365

Where

VET: Vol. within a dwell time
DT: Design traffic volume
ET: Dwell time
PF: Peak factor
RF: Re-stowing factor
SD: Stacking density (1.0–1.50 MT/m^2 for general cargo)

Transit shed area = (DT x ET x PF x RF x 2.2)/(SD x 365)
= (538,728 x 25% x 5 x 1.12 x 1.05 x 2.2)/(1.5 x 365)
= 3,182 m^2
≈ 3,200 m^2

(3) Required open storage

Open storage area = (VET x RF x 2.0)/SD
VET = (DT x ET x PF)/365

Where

VET: Vol. within a dwell time
DT: Design traffic volume
ET: Dwell time
PF: Peak factor
RF: Re-stowing factor
SD: Stacking density (1.0–1.50 MT/m^2 for general cargo)

Open storage area = (DT x ET x PF x RF x 2.0)/(SD x 365)
= (538,728 x 55% x 5 x 1.12 x 1.05 x 2.0)/(1.5 x 365)
= 6,364 m^2
≈ 6,400 m^2

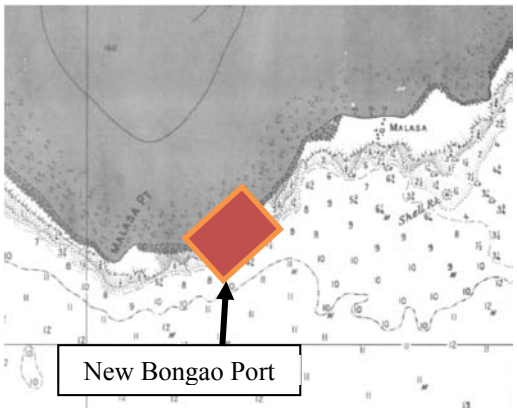
The construction of the wharf including the aforementioned expansion and construction of the berth and other facilities will be completed by 2030 as presented in Table A-6.5.

Table A-6.5 Completion of Port Facilities at Bongao Port by 2022 and 2030

	2022	2030
Completion of wharf construction	200 m	100 m
Completion of transit shed	1,600 m^2	1,600 m_2
Completion of open storage area	3,200 m^2	3,200 m^2

(4) Development plan of new Bongao Port

The provincial government has been planning the Tawi-Tawi Ecozone Agri-Industrial Project with approximately 83 ha in Barangay Marasa of Bongao Municipality. As there is no space for expansion at the existing Bongao Port with a narrow passage for vessels and shallow water depth, it is recommended to construct a new Bongao Port in the project area as indicated in Figure A-6.2.



Location Plan of New Bongao Port

Key Map of Barangay Marasa

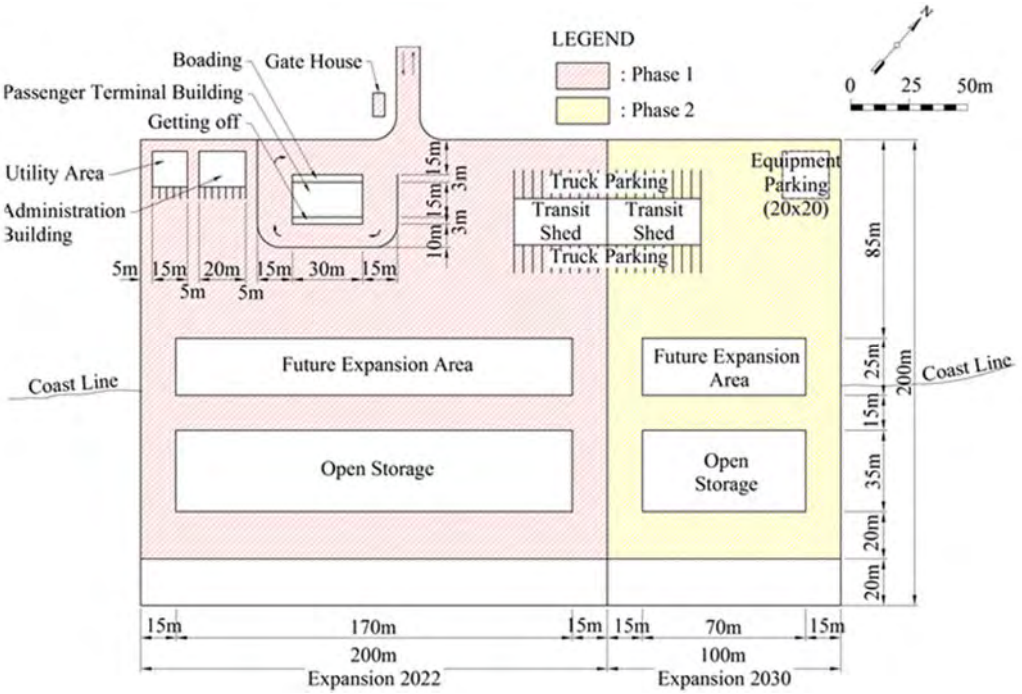


Figure A-6.2 General Layout Plan of New Bongao Port for 2022 and 2030

(5) Rough cost estimate of new Bongao Port

A summary of cost estimates for the Bongao port development is presented in Table A-6.6.

Table A-6.6 Estimated Bongo Port Construction Costs for 2022 and 2030

(Unit: US$)

	2022			2030		
Cost component	Local portion	Foreign portion	Total	Local portion	Foreign portion	Total
A. Construction	8,642,198	8,294,967	16,937,165	4,140,292	4,057,868	8,198,160
1. Preparation works	242,000	498,000	740,000	144,000	286,000	430,000
2. Dredging and reclamation	1,255,950	165,300	1,421,250	648,000	72,000	720,000
3. Berth construction	1,530,400	2,545,600	4,076,000	695,450	1,169,050	1,864,500
4. Yard construction	3,472,700	1,560,300	5,033,000	1,720,250	773,250	2,493,500
5. Building construction	1,255,100	537,900	1,793,000	504,000	216,000	720,000
6. Other expenses	836,048	2,037,867	2,873,915	398,592	971,568	1,370,160
7. Equipment procurement	50,000	950,000	1,000,000	30,000	570,000	600,000
B. Contingency and taxes	2,730,780	995,396	3,726,176	1,316,651	486,944	1,803,595
C. Consulting services	533,521	1,244,882	1,778,403	482,052	206,594	688,645
Total project cost (A+B+C)	11,906,499	10,535,245	22,441,744	5,938,995	4,751,406	10,690,401

PROJECT PROFILE A-7 JOLO PORT IMPROVEMENT PROJECT

1. Background

The port of Jolo is the main entry port via the sea to Sulu Province. It is protected on the northwest by the islands of Cabucan, Marongas, and Pangasinan, and on the east by the mountainous range on the island. The port has adequate water and land frontage for the development of port facilities and port-oriented industries. According to the Feasibility Studies and Formulation of Master Plan for Selected Ports in Southern Mindanao in April 2012 by PPA (referred to "Southern Mindanao FS" hereinafter), the superstructure of the pier has deteriorated and reinforcing bars have been exposed which are severely corroded (see the left photo below). Concrete piles above the water have cracks and the reinforcing bars are rusted severely (see the right photo below).

2. Present Condition of Jolo Port

According to the statistics of the Jolo Port, cargo throughput is 157,072 tons per year in 2013 and the total length of the cargo berth is 585 m. The productivity of the Jolo Port is only 268 ton/m/year. The one of reasons for under-utilization of the port is the considerable deterioration of the port facilities. Urgent rehabilitation of the berthing facility should be undertaken for the handling of increased cargo volume and safety of the port operation. The total of ship calls to the Jolo Port in 2013 was 1,746, the average ship size was 321 GT and the average berthing time of the ships was 16 hours/call for loading and unloading as recorded in 2009 and 2010. The calling ports to and from the Jolo Port are Zamboanga, Sandakan, Bongao, Sitangkai, Siasi and Luuk. The main commodities handled in the port are cement, food (coming in) and copra, seaweeds, abaca, charcoal, dried/fresh fish (going out).

Photo of superstructure

Photo of piles

3. Cargo and Passenger Forecast

Cargo throughput and passenger traffic at the Jolo Port reported in the Southern Mindanao FS are presented in Table A-7.1. The present study's cargo forecast for the port is indicated in A-7.2.

Table A-7.1 Jolo Port Cargo Traffic Forecast by Southern Mindanao FS

Year	Motor launch cargo (t)	RoRo cargo (t)	Conventional cargo (t)	Liner/RoPax (t)	WHV cargo (t)	Total cargo (t)	Passengers (n)
2011	26,886	72,592	169,381		8,856	277,715	621,690
2012	28,012	75,634	176,478		9,227	289,351	649,355
2013	29,186	78,803	159,969	23,903	9,614	301,475	678,251
2014	30,409	82,104	165,551	26,026	10,016	314,106	708,433
2015	31,683	85,545	171,268	28,336	10,436	327,268	739,959
2016	33,011	89,129	177,115	30,852	10,873	340,980	772,887
2017	34,394	92,863	183,090	33,592	11,329	355,268	807,281
2018	35,835	96,754	189,186	36,574	11,804	370,153	843,205
2019	37,336	100,808	195,398	39,821	12,298	385,661	880,727
2020	38,901	105,032	201,719	43,357	12,814	401,823	919,920
2025	50,151	128,243	233,263	65,970	15,733	493,360	1,143,648
2030	64,508	156,578	264,493	100,856	19,317	605,752	1,421,786

Table A-7.2 Jolo Port Cargo Traffic Forecast by Present JICA Study

	Year	2019	2022	2030
Jolo Port	Cargo (MT)	314,769	368,564	456,118
	Passenger	524,141	613,720	759,511

The difference between the two forecasts is accounted for by the decrease in cargo and passenger traffic between 2010 and 2013, specifically the cargo throughput, which decreased from 268,268 tons in 2010 to 153,769 tons, 98,835 tons, and 157,027 tons in 2013. It is considered that the Jolo Port still has potential cargo volume of 268,268 tons in 2015 after the normalization of Bangsamoro, therefore, the decreasing cargo volume from 2011 to 2013 is not taken into account.

The estimated cargo throughput at the Jolo Port by vessel type for the target years is summarized in Table A-7.3.

Table A-7.3 Estimated Cargo Volume by Vessel Type at Jolo Port in 2019, 2022, and 2030

Year	Motor launch cargo (t)	RoRo cargo (t)	Conventional cargo (t)	Liner/RoPax (t)	WHV cargo (t)	Total cargo (t)
2019	30,473	82,278	159,480	32,501	10,037	314,769
2022	35,681	96,339	186,736	38,056	11,753	368,564
2030	48,573	117,900	199,157	75,942	14,545	456,118

4. Proposed Port Development

The required berths for the Jolo Port are considered, based on the types of vessels calling at the port: RORO passenger/cargo, RoPax passenger/cargo vessels, fast craft, motor launches, motorized banca/wooden hulled passenger/cargo vessels, and conventional cargo vessels. The number and length of berths required for each vessel in 2030 are calculated as follows and summarized in Table A-7.4.

(1) RORO berth

Number of berths (NOB) = (Design Traffic)/(Gross Productivity [{8,760 x ABOR} - BDH])
Where:

NOB: Number of berth
DT: Design traffic
GP: Gross productivity considering the effects of berthing/de-berthing hours (BDH)

NOB = 117,900/(22.83 x (8760 x 0.51)
= 1.15 berths

(2) Conventional berth

NOB = 199,157/(10.09 x (8760 x 0.65)
= 3.47 berths
Berth length 4 x 1.1 x 55 = 242 m

(3) Liner/RoPax berth

NOB = 75,942/(68.21 x (8760 x 0.47)
= 0.27 berths
Berth length 1 x 1.1 x 95 = 104.5 m

(4) Motor launch

NOB = 48,573/(7.99 x (8760 x 0.55)
=1.26 berths
Berth length 1 x 1.1 x 35 = 39 m

(5) Motorized banca/WHV (wooden hulled vessel)

NOB = 14,545/(0.63 x (8760 x 0.67)
=3.93 berths
Berth length 4 x 1.1 x 15 = 66 m

(6) Transit shed

Transit shed area = (DT x ET x PF x RF x 2.2)/(SD x 365)
= (456,118 x 25% x 5 x 1.12 x 1.05 x 2.2)/(1.5 x 365)
= 2,694 m^2 (≈ 2,700 m^2)

(7) Open storage

Open storage area = (DT x ET x PF x RF x 2.0)/(SD x 365)
= (456,118 x 55% x 5 x 1.12 x 1.05 x 2.0)/(1.5 x 365)
= 5,388 m^2 (≈ 5,400 m^2)

(8) Container slots

Ground slots = (DT x ET x PF x RF x 2.0)/(SH x 365)
= (75,942 x 5 x 1.12 x 1.05 x 2.0)/(1.0 x 365)
= 2,446 m^2 (≈ 2,500 m^2)

Table A-7.4 Required Number of Berths at Jolo Port in 2019, 2022, and 2030

Year	RORO berth (n)	Conventional berth (n)	Liner/RoPax berth (n)	Motor launch (n)	Motorized banca/WHV (n)	Fast craft (n)
2019	1	3	1	1	3	1
2022	1	4	1	1	4	1
2030	1	4	1	1	4	1

Considering the berth arrangement, one finger pier will not be constructed until 2022 or 2030 as indicated in Figure A-7.1.

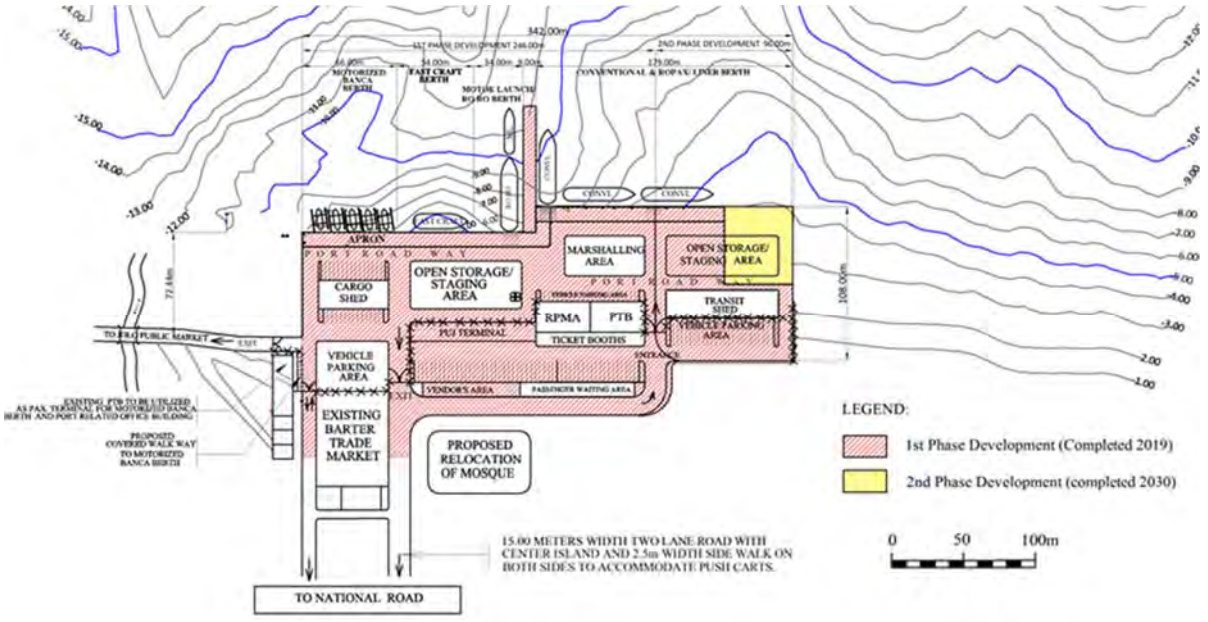


Figure A-7.1 General Layout Plan of Jolo Port for Year 2019, 2022, and 2030

(9) Rough cost estimate

A rough cost estimate of the Jolo Port development of for 2030 is summarized in Table A-7.5.

Table A-7.5 Rough Cost Estimate for Jolo Port Development by 2030

Cost component	Amount (US$)
A. General expenses	339,284
B. Marine works	9,573,925
- Reclamation	1,603,885
- Finger pier	1,108,919
- RC wharf (piles) L=152 m	1,843,714
- RC wharf (RC sheet piles) L=138 m	2,511,035
- Retaining wall	1,674,304
- RoRo ramp (1 & 2)	478,580
- Revetment	156,647
- Demolition works	196,842
C. Civil works	2,611,171
D. Building works	2,332,565
E. Utilities	723,530
Subtotal (construction cost)	15,580,476
F. Contingency and taxes	3,428,305
- Physical contingency	779,024
- Price escalation	1,090,633
- Taxes and duties	1,558,648
G. Consulting services	1,246,438
Total project cost (A+B+C+D+E+F+G)	20,255,218

PROJECT PROFILE A-8 ISABELA PORT IMPROVEMENT PROJECT

1. Past Cargo and Passenger Traffic

The port of Isabela handled only domestic cargo traffic up to the present. Cargo traffic volume handled at this port was much smaller than the port of Zamboanga, and most of the cargo was transported to and from the port of Zamboanga. The cargo and passenger traffic volume from 1980 to 1997 is indicated in Table A-8.1.

Table A-8.1 Cargo and Passenger Traffic at Isabela Port

Year	1980	1984	1985	1986	1987	1988	1989	1990
Cargo	115,723	107,005	102,807	109,681	110,069	116,336	138,972	153,198
Passenger	533,193	292,442	295,541	298,800	299,244	817,877	620,479	615,434

Year	1991	1992	1993	1994	1995	1996	1997
Cargo	116,781	119,312	137,114	160,223	187,210	175,072	198,793
Passenger	506,877	496,033	618,324	571,283	653,776	708,189	731,111

The cargo volume at the Isabela port fluctuated in the past years. The trend in volume change from 1980 to 1985 was downward, decreasing steadily to only 102,807 tons, equivalent to a negative growth rate of 2.34% per year. The cargo traffic started to increase in 1986, and from 1985 to 1997, increased at an average rate of 5.65% per year. However, the cargo volume went down in 1991. This decrease in volume might have been due to the oil price increase in December 1990 and the power crisis that started in 1991. This decrease notwithstanding, the trend for this period was a positive growth. The record volume in this period is 198,793 tons in 1997.

On the other hand, the Isabela port handled 533,193 passengers in 1980. The passenger volume increased to 731,111 in 1997. The average growth rate of passengers handled at the port was only 1.87% per year. The number of passengers went down to 292,442 in 1984 and decreased by 11.13% per year. However, it increased in the succeeding years at a rate of 15.80% per year from 1985 to 1990 and by 2.49% per year from 1990 to 1997. The record number of passengers in this period was 817,877 in 1988 and up to 2013 was 1,618,837 in 2004.

2. Present Condition of Isabela Port

According to statistics of the Isabela port, cargo throughput was 106,195 tons in 2013 and the total length of the cargo berth is 300 m. The productivity of Isabela Port is only 354 ton/m/year. One of the reasons for the under-utilization of this port is the considerable cargo throughput decrease from 150,000 tons in 2004 to 100,000 tons in 2013 and the lack of a backup area behind the wharf.

The total ship calls at the Isabela port was 3,745 in 2013, the average ship size was 283 GT, and the average berthing time of the ships was 15 hours/call for loading and unloading in the record of 1980 to 1997. The calling ports to and from Isabela Port are Zamboanga, Jolo, and Bongao. The main commodities handled at the port are bottled cargo, petroleum products, palay/rice, cement (inbound), and copra and general cargo (outbound). In addition, deterioration of the port facilities was found in the Feasibility Study with Master Plan Port Package V Port of Isabela, Basilan in 2000 by PPA (refer to FS PPA 2000). The berthing facility should be urgently rehabilitated for the handling of increased cargo volume and the safety of the port operation. Typical damages are indicated in the photos below.

Peeled concrete cover and exposed re-bars

Badly damaged concrete pile of deck

3. Cargo and Passenger Forecast

Estimated cargo volume and passenger traffic in 2019, 2022, and 2030 is indicated in Table A-8.2.

Table A-8.2 Cargo Volume and Passenger Traffic at Isabela Port in 2019, 2022, and 2030

Isabela Port	Year	2019	2022	2030
	Cargo (MT)	129,118	145,240	170,172
	Passenger	1,443,345	1,568,013	1,752,480

4. Proposed Port Development

Estimated cargo throughput in 2030 is 170,172 tons per year, which is smaller than the record cargo throughput of 198,793 tons in 1997. The total berth length in 2000 was only 209 m but the berth length has been extended to 300 m as of 2015. This means the present port capacity has been and will be increased by more than 198,793 tons to accommodate the estimated cargo throughput in 2030. Also, the passenger forecast in 2030 is 1,752,480, which is almost the same as the past record passenger traffic of 1,618,837 in 2004. Therefore, expansion of the port facilities will not be necessary for the Isabela port.

As mentioned above, rehabilitation of the wharf structure such as concrete slabs and piles should be undertaken immediately for the handling of increased cargo volume and the safety of the port operation. In addition, the apron width for cargo loading and unloading is too narrow at present, leading to low productivity. Thus, it is recommended to expand the backup area to stack the incoming cargo temporarily and load it at night time (Figure A-8.1).

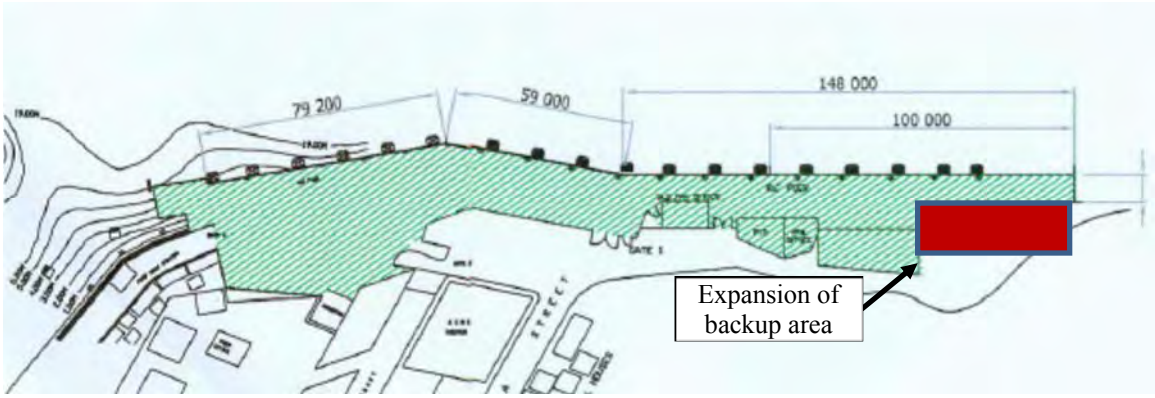


Figure A-8.1 General Layout Plan of Isabela Port

(1) PPA expansion plan and land acquisition by Provincial Government

The construction of the new Isabela Port is proposed in the northern area, based on the cargo throughput of 530,000 tons per year in the FS PPA 2000 as shown in Figures A-8.2 and A-8.3.

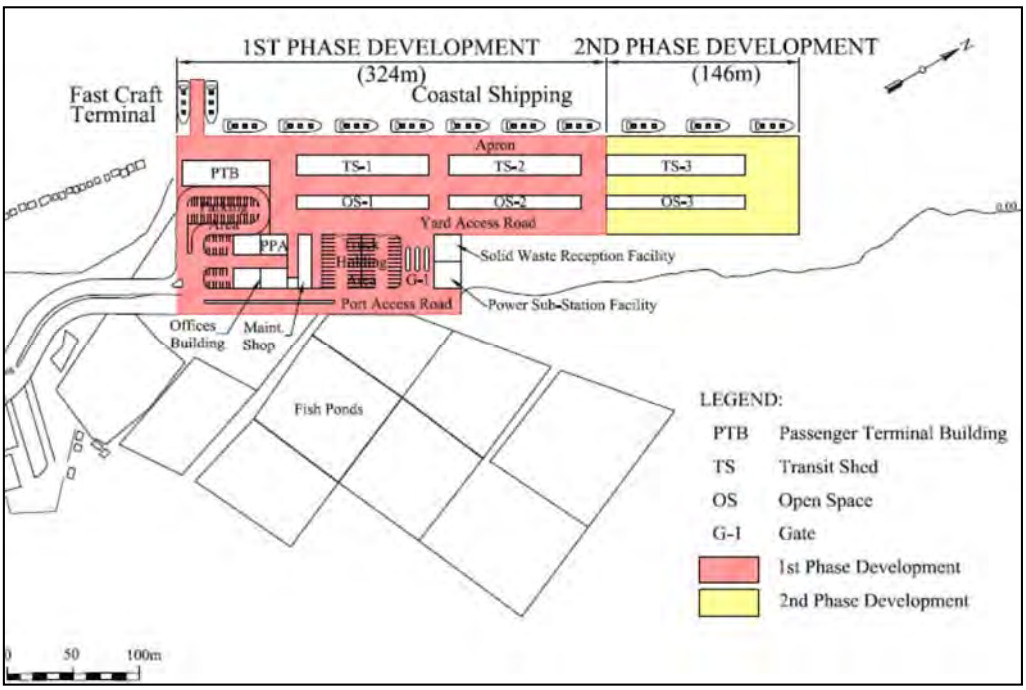


Figure A-8.2 General Layout Plan of New Isabela Port

Figure A-8.3 Location Map of Proposed New Isabela Port

On the other hand, the Provincial Government purchased the land for the new port construction area south of Isabela City. A photo of the site is shown below.

Photo of land purchased by Provincial Government