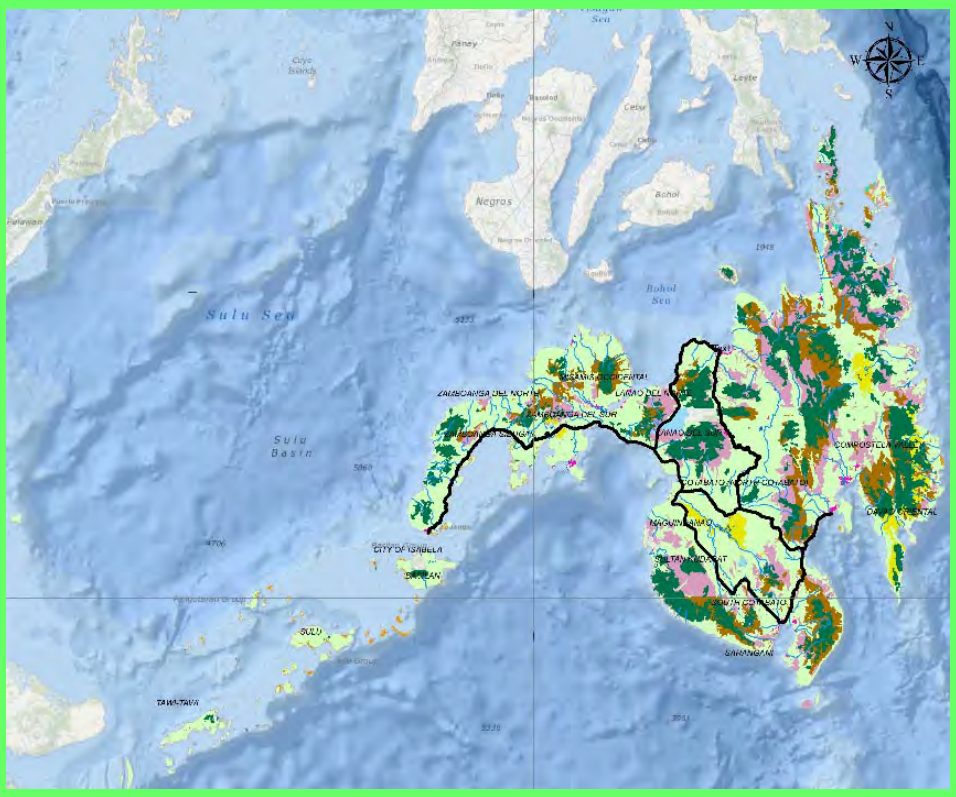
The Republic of the Philippines
Bangsamoro Transition Commission (BTC)
Bangsamoro Development Agency (BDA)

Japan International Cooperation Agency
(JICA)

Comprehensive Capacity Development Project for the Bangsamoro

Development Plan for the Bangsamoro

Final Report



April 2016

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

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

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Abbreviations

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	
m^2	square meter
km^2	square kilometer
ha	hectare (= 10,000 m^2)

Energy	
W	watt
kW	kilowatt
kWh	kilowatt-hour
MW	megawatt
GWh	gigawatt-hour
kV	kilovolt
MVA	megavolt-ampere

Length	
mm	millimeter
cm	centimeter
ft	foot or feet
m	meter
LM	linear meter
km	kilometer

Time	
sec, s	second
min	minute
hr	hour
yr	year

Weight	
µg	microgram
mg	milligram
kg	kilogram
t	ton (=1,000 kg)
DWT	deadweight tonnage
GRT	gross register tonnage
GT	gross tonnage
kTOE	kilo ton of oil equivalent
MT	metric ton

Volume	
L	liter
m^3	cubic meter (= 1,000 liter)

Other	
°C	degree Celsius
%	percent
mil.	million
MPa	megapascal
mps	meter per second

Currency

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

CHAPTER 1 INTRODUCTION

1.1 Background

1.1.1 A brief historical background

It is reported that conflicts between the Philippine Government and the Muslim opposition groups in Mindanao claimed the lives of more than 120,000 people and generated over 2 million refugees for the period of more than 40 years. The root of the conflicts, however, dates back to the period of Spanish colonial rule several hundred years ago. As Spain consolidated their hold of power in the country and moved from Luzon and Visayas Islands to Mindanao and the Sulu Archipelago, they encountered the strong Muslim society extending from North Africa through the Indian Ocean to Mindanao.

Struggles between the Muslim people and the Spanish colonial rulers, called the Spanish-Moro Wars (or the Moro Wars), continued for some 300 years, which cultivated deep hostility between the Muslim society in Mindanao and the Christian society in the Spanish dominated territories. In 1898, the United States won the Spanish-American war and took over dominance in the Philippines. The U.S. policy basically tried to neutralize the Muslims in Mindanao, and integrate them into the main stream society.

After the country's independence in 1946, successive administrations of the Philippine Government took a policy to neutralize armed opposition groups in Mindanao in cooperation with the U.S. military. Under the Christian-based administration centering on Manila in the north, the Muslim people in the south had been exposed to prejudice and discrimination. Many cases have been reported where the people in Mindanao were taken away their land by settlement of Christian people from the north, and development of farms and mines. This situation led to the formation of the Moro National Liberation Front (MNLF), consisting of the youth and Muslim leaders, which started armed combats aiming at independence of their territories in Mindanao as a separate country.

In 1976 under the Marcos administration, the Philippine Government and MNLF agreed on cease fire and the Tripoli agreement was concluded. This agreement envisioned the establishment of an autonomous administration for 13 provinces of Mindanao including the Sulu archipelago. The referendum for the establishment of the autonomous region triggered internal conflicts in MNLF, which resulted in the formation of Moro Islamic Liberation Front (MILF) in 1984.

In 1990 under the Aquino administration, the Autonomous Region in Muslim Mindanao (ARMM) was established, but only four provinces of Lanao del Sur, Maguindanao, Sulu and Tawi-Tawi joined ARMM. A peace agreement was reached between the Philippine Government and MNLF in 1996, but armed conflicts continued between the armed forces of the Philippines (AFP) and MILF.

A renewed negotiation for peace started in 2001 between the Philippine Government and MILF, and the Bangsamoro Development Agency (BDA) was established as the development arm of MILF. BDA is mandated to determine, lead and manage relief, rehabilitation and development programs in the conflict-affected areas in Mindanao. A breakthrough of the negotiation was reached through the signing of the Framework Agreement on Bangsamoro (FAB) in October 2012. In March 2014, the Comprehensive Agreement on Bangsamoro (CAB) was signed concluding 17 years of negotiations between the Government of the Philippines and MILF.

1.1.2 JICA support for Mindanao and ARMM

JICA has extended its cooperation in various sectors of Mindanao since the peace agreement between the Philippine Government and MNLF in 1996. For ARMM in particular, the Comprehensive Basic Survey of the Autonomous Region in Muslim Mindanao was carried out in 2003 covering agriculture, education, health, governance, power, water supply and sanitation, followed by the Study for Socio-economic Restoration and Development of Conflict-affected Areas in Mindanao (SERD-CAAM) during 2007–09, the Study on Infrastructure (Road Network) Development Plan in Mindanao during 2008-09, and the Local Industries Promotion Study in ARMM during 2010–12. Also, a project to prepare

topographic maps for peace and development of Mindanao was completed in February 2013 covering the entire Mindanao.

As the restoration and development efforts supported by donors proceeded, insufficient capacity of local government units (LGUs) has been recognized. After BDA was established, JICA has taken the initiative for the Capacity Enhancement Project during December 2004 through March 2007. Based on its outcomes, JICA has taken further initiative for the Capacity Enhancement Support Project for Community Development in Conflict Affected Areas of Mindanao (CD-CAAM) during 2012–15.

Following the FAB signed in October 2012 between the Philippine Government and MILF, both sides have agreed on the establishment of a new Bangsamoro Autonomous Government in 2016. Based on this agreement, the Bangsamoro Transition Commission (BTC) has been established for the transition period of three years from 2013. The BTC is instrumental in formulating the basic law and related laws and bylaws and regulations for the new autonomous government.

1.2 Study Scope and Objectives

1.2.1 Study scope

The Comprehensive Capacity Development Project for the Bangsamoro has been implemented since July 2013. As part of the Project, a present study (the Study hereafter) is undertaken to prepare technical materials useful for integrated regional development planning for the future jurisdiction of the new autonomous region of Bangsamoro. Overall scope of the Project is summarized as outcomes expected as follows:

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

The Study relates directly to the outcome 4), but is expected to contribute also to the attainment of the other three outcomes. Specifically, the Study will prepare technical materials useful for integrated regional development planning for the jurisdiction of the new autonomous government, and in the process try to effect broad capacity development encompassing individual capacity of administrators, organizational capacity of the future autonomous government, and institutional and social capacity for community development and related institutional development.

The Study focuses on economic development and related infrastructure development for the Bangsamoro. In particular, the Study covers agriculture; agro-industry; fishery and related industry; and logistic infrastructure including ports, airports, and roads for specific projects, programs, and institutional measures; and power supply and river and flood control for policy and development directions. Environmental considerations are reflected in development planning, and GIS is used as a planning tool.

1.2.2 Study objectives

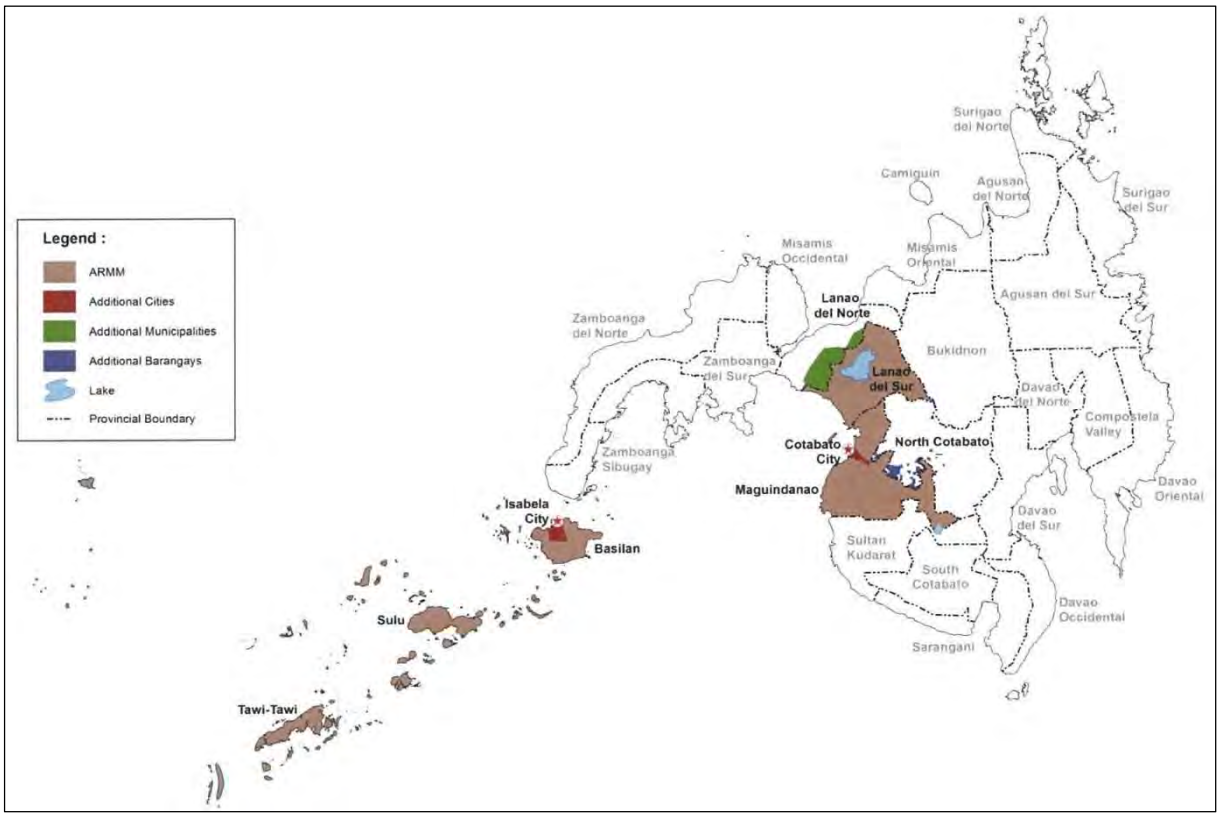
The objectives of the Study are defined as follows:

1) To compile basic data to be used for development planning in the jurisdiction of the new autonomous government,
2) To prepare technical materials useful for preparing an integrated master plan for strategic development of the Bangsamoro, and

3) To contribute to broad capacity development through the planning process encompassing individual administrators, the new autonomous government and its constituent LGUs, and related institutions and communities.

1.3 Study Area

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



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

Figure 1.1 Location Map of Bangsamoro Study Area

1.3.1 Position of Bangsamoro

The Bangsamoro region, tentatively defined here with five provinces of Lanao del Sur, Maguindanao, Basilan, Sulu and Tawi-Tawi, occupies 8.9% of the national land of the Philippines and 20.3% of the land of Mindanao. The population shares, however, are much smaller with 3.5% of the national population and 14.8% of the population in Mindanao (2010 census). The GRDP of Bangsamoro accounts only for 0.93% of the Philippine GDP and 6.3% of the GRDP in Mindanao (Table 1.1). Poverty incidence is much higher in Bangsamoro at 61.8% in 2006, compared to 32.9% in the Philippines and 45.5% in Mindanao. The ratio of poor households in Bangsamoro increased from 42.0% in 2009 to 46.9% in 2012, while the ratios decrease in the same period in both the Philippines and Mindanao.

Economically less developed status of Bangsamoro is reflected also in the economic structure. Agriculture constitutes 65.3% of the GRDP in Bangsamoro in 2012, much larger than the 11.8% share in the Philippine GDP and 29.9% in Mindanao. Industry accounts only for 4.7% of the GRDP in

Bangsamoro, compared to 31.1% of the Philippine GDP and 27.1% of the GRDP in Mindanao. Services account for 30.0% of the GRDP in Bangsamoro, while the shares are much larger at 57.0% of the Philippine GDP and 42.9% of the GRDP in Mindanao.

Labor force coefficient in the Philippines is 67.5% according to the 2010 census. This is reported to be 65% in Mindanao according to the Mindanao Strategic Development Framework 2010-20. In Bangsamoro, the value is reported to be 57.5% according to the Bangsamoro Development Plan Phase 1 Report. This low value reflects 1) large number of victims and displaced population by the civil war, 2) employment seeking outmigration, and 3) rapid increase in young population in recent years.

1.3.2 Characteristics of Bangsamoro

Basic data of the five provinces and Marawi City are presented in Table 1.2. From the table, large disparities are observed within the Bangsamoro. Population density is high in island provinces of Sulu and Basilan, and low in the main land of Maguindanao. Urbanization ratio is more or less 30% in all the provinces. Low average of household members in Maguindanao may reflect also low economic condition with large job seeking out-migration.

Road density is low in Tawi-Tawi and Maguindanao, but pavement ratio is high in the main land of Lanao del Sur and Maguindanao and low in island states. Barangay electrification ratio is high in island states of Basilan and Tawi-Tawi as well as Lanao del Sur, and low in Maguindanao and Sulu. Access to safe water is generally low in all the provinces, and the average access is 57.5% in Bangsamoro as a whole.

Human development index (HDI) varies between 0.266 in Sulu and 0.460 in Basilan in 2009. It improved in all the provinces except Basilan between 2006 and 2009. Ratio of poor households varies widely from 20.8% in Tawi-Tawi to 68.9% in Lanao del Sur in 2012.

Comparative position of the five provinces in Bangsamoro varies in terms of development potentials. If alienated and disposal land is taken as the land to be developed potentially, 49% of the land in this category exist in Maguindanao, accounting for more than 40% of the state land. In Bangsamoro as a whole, 22.8% of the land is classified as alienated and disposal land. The ratio of forest land varies from 15.5% in Tawi-Tawi to 49.9% in Sulu with the average of 24.2% in Bangsamoro.

Table 1.1 Comparison of Bangsamoro with Mindanao and the Philippines by Selected Socio-economic Indices

Item	Year	Philippine	Mindanao	Bangsamoro (ARMM)	Ref.*
Land area (km^2)	2010	309,771	135,402	27,517	1
Population (thousand)	2010	92,602	22,033	3,264	2
	2012	95,771	22,799	3,354	2
Population growth rate (%)	2010–2012	3.4	3.5	2.7	
Population density (pop/km^2)		309	168	123	
GDP/GRDP (PHP mil. at	2010	9,003,480	1,333,806	83,691	1
current prices)	2012	10,564,886	1,565,390	93,314	1
GDP/GRDP growth rate (%)	2010-2012	6.2	4.9	3.9	1
GDP Distribution (%)	2012	100.0	14.8	0.9	1
GDP/GRDP structure (%)					
Agriculture	2012	11.8	29.9	65.3	2
Industry	2012	31.1	27.1	4.7	2
Service	2012	57.1	42.9	30.0	2
Labor force participation	2007	64.0	65.0	58.2	5, 6
Poverty rate (%)	2003	30.0	44.2	52.8	3
	2006	32.9	45.5	61.8	3
Relative poverty rate (%)	2009	22.9	35.9	42.0	4
	2012	22.3	34.9	46.9	4

* 1. Final Transition Plan Report, Vol. II Consultancy Services for the Bangsamoro Development Agency (BDA) Transitional Development Plan, Philkoei International; 2. National Statistical Coordination Board; 3. Mindanao Strategic Development Framework; 4. Final Transition Plan Report, Vol. I Consultancy Services for the Bangsamoro Development Agency (BDA) Transitional Development Plan, Philkoei International; 5. Regional Development Plan, 2011–2016, Regional Economic and Development, Planning Board Technical Secretariat;

6. Mindanao Strategic Development Framework, 2010–2020

Table 1.2 Characteristics of Bangsamoro by State Compared by Selected Indices

Item	Year	Bangsamoro	Lanao del Sur	Maguindanao	Sulu	Tawi-Tawi	Basilan	Marawi	Ref.*
Land area (km^2)		27,517	12,052	7,547	2,251	3,427	2,218		1
Population (thousand)	2000	2,837.5	669.1	619.7	322.3	332.8	131.1		1
Population growth rate (%)	1990–1995	1.80	2.24	0.92	2.50	1.78	4.11	4.48	1
	1995–2000	3.86	3.42	4.16	3.15	5.53	2.58	2.96	1
Population density (pop/km^2)	2000	95	56	106	275	94	150	5,800	
Mean strength of ordinary households (pop)	2001	5.5	5.2	4.5	5.7	5.5	5.5	6.0	1
Urbanization rate	2003	30.4	33.8	18.0	32.4	28.3	32.0	100.0	1
Labor force participation	2007	57.2							4
Land use (%)	2001								1
Alienated and disposable land		22.8	11.0	40.6	21.2	16.2	38.6		1
Forest		24.2	21.1	26.3	49.9	15.6	21.3		1
Agriculture		13.3	6.3	29.2	13.7	7.6	4.9		1
Infrastructure									1
Road density (km/km^2)	2003	0.3	0.3	0.3	0.5	0.2	0.4	5.9	1
Paving rate of national highway	1998	0.5	0.5	0.6	0.4	0.2	0.2	1.0	1
Barangay electrification rate (%)	2003	50.4	60.0	38.1	32.2	62.6	67.8	92.9	1
Access to clean water (%)	2000	57.5	66.0	55.0	60.0	58.0	48.3		1
HDI	2000		0.42	0.41	0.29	0.37	0.41		2
	2006		0.45	0.43	0.33	0.33	0.43		3
	2009		0.42	0.30	0.27	0.31	0.46		4
Relative poverty rate (%)	2006	43.0	38.1	47.7	42.9	50.6	31.2		2
	2009	42.0	51.4	37.6	37.9	48.3	37.4		3
	2012	46.9	68.9	57.8	30.3	20.8	32.5		4

* 1. RPFP2000-2030_ARMM; 2. Mindanao Strategic Development Framework 2010–2020; 3. Philippine Statistics Authority-National Statistical Coordination Board; 4. Regional Development Plan, 2011–2016, Regional Economic and Development, Planning Board Technical Secretariat.

1.3.3 Existing plans and projects

There exist many development plans at different administrative levels related directly and indirectly to Bangsamoro. At the national level, the National Economic Development Authority (NEDA) has prepared the Philippine Development Plan 2011–2016, reflecting the Millennium Development Goals and the Sustainable Development Goals prepared by UN. It is reported that NEDA is now preparing a long-term vision "Filipino 2040." At the regional level, NEDA has prepared the Mindanao Strategic Development Framework 2010-20 covering Region IX through XIII and ARMM. The Mindanao Development Authority (MinDA) prepared in 2011 the Mindanao 2020 Peace and Development Framework Plan 2011-2030. For ARMM, the Regional Physical Framework Plan: 2000-2030 and the Regional Development Plan 2011-2016 are available.

(1) Mindanao Strategic Development Framework 2010–20

The Mindanao Strategic Development Framework 2010-20 has presented the vision that Mindanao shall have been fully integrated to the rest of the country and to the world by developing its gateways and its strategic growth areas. Specifically, the following statements effectively represent the strategy to establish economic corridors as the means to integrate Mindanao physically and economically.

> To ensure that the benefits are shared by all sectors of society in all the regions of Mindanao, economic and physical linkages will be strengthened. Economic linkages between and among markets and production areas and physical linkages through infrastructure, transport and communication facilities shall have been improved. These linkages shall have enhanced the delivery of basic services and dispersed economic opportunities and activities even to the island-provinces and rural areas.

As development potentials, the Framework mentions, among others, the Agus and the Mindanao Rivers, Mindanao's large Muslim community and its trading relationships with East Asia, and halal industry, which are directly related to Bangsamoro. As development themes, it lists up the following:

- Sustainable resource-based industrialization,
- Growth with social equity (including industrial clustering),

- Efficient logistic support,
- Peace building (including IPs and ancestral domain claims), and
- Good governance and strong partnership (including disaster-resilient communities).

(2) Plans and projects promoted by MinDA

Investment projects

In conjunction with the efforts of enhancing economic development in Mindanao by MinDA, the investment to Bangsamoro is seemingly increasing based on business confidence created in Bangsamoro. In 2015 new investment in Bangsamoro hits PHP 863 million. The investment opportunities in Mindanao and Bangsamoro that are promoted by MinDA are listed by sub-sector as shown in Table 1.3.

Table 1.3 Current Projects Promoted by MinDA as of 2015

Sector	Project	Location	Note
Agriculture	Oil palm plantation project	North Cotabato	PHP 1.5 billion palm seedling supply from Malaysia through BIMP-EAGA trade promotion
	Banana plantation project		
	Coffee plantation	Sultan Kudarat	
	Cacao industry project (with annual production of 80,000–100,000 MT, cacao is identified as priority crop in Mindanao)	Marihatag, Surigao del Sur (planting of 4 million cacao trees in 5,000 ha)	Headed by Cacao Industry Development Association of Mindanao (CIDAMi)/DA, TI, MinDA. With Kennermer Foods International (KFI), major supplier of cacao to U.S.-based Mars Chocolate
	Barangay StraTREEgic Forest Project (supporting National Greening Program) to product 6,000 MT of cacao		Inter-cropping of 34,000 ha farmland with cacao trees
Agro-industry	Corn processing project	South Cotabato	PHP 350 million
Mining	Nickel ore mining project	Tawi-Tawi Province	PHP 741.8 million to produce 1 million tons of nickel ore a year
	Petroleum deposit project		PHP 440 million to hold 7.6 million liter of petroleum products
Energy	Hydropower project (2,640 MW in total of 238 projects applied)	Throughout Mindanao	Renewable Energy (RE) targets 45% in energy mix by 2017
	Davao Hydraulic Power Project '140 MW)	Davao city	San Lorenzo Ruitz Builders and Developers Group, Inc. of Davao City
	Kabulnan 2 Hydropower project (110 MW)	Isulan, Sultan Kudarat	Philnewrive Power Corp. of Isulan, Kudarat
	Lake Davao Hydraulic Power Project (50 MW)	Lanao del Sur	AQA Global Power Inc. of Lanao del Sur
	Maltling River Hydropower Project (50 MW)	Lanao del Sur	AQA Global Power Inc. of Lanao del Sur
	Solar energy project (427 MW in total of 28 pending applications)	Throughout Mindanao	Pending and waiting for approval
	Lakewood Geothermal Project (120 MW)	Zamboanga del Sur, Zamboanga del Norte, Zamboanga Sibugay	Energy Development Corporation
	Ampiro Geothermal Energy Project (90 MW)	Misamis Occidental, Zamboanga del Norte, Zamboanga del Sur	Various energy investors

Sector	Project	Location	Note
	Biomass energy projects (145 MW in combination)	Agusan del Norte (23.5 MW by wood Sultan Kudarat, Maguindanao (15 MW by rice husk) Misamis Oriental (12 MW by multi source)	Various energy investors
Transport	Logistics center development project	Port of Polloc, Maguindanao	Multi-billion PHP, supported by ARMM RBOI
Trade	Trade promotion	Mindanao, especially for Bangsamoro	BIMP-EAGA
	Improved connectivity	Port of Polloc in Bangsamoro and Port of Labuan in Malaysia	BIMP-EAGA program
Environment	Payment for Ecological Services (PES)	Lubungan Watershed, Cotabato (53,177 ha.)	Municipalities of Pigcawayan, Aleosan, Libungan, Midsayap, Alamanda, Pikit, and Banisilan (PALMA+PB)

Source: JICA Study Team based on various information of MinDA.

When these projects are implemented, the conditions of infrastructure will dramatically change and that will create a sound basis for economic and industrial development of Bangsamoro. The trade of agricultural products with BIMP-EAGA member countries will also be enhanced because of improved connectivity and increased production volume of industrial crops.

Corridor development strategy

The Northern Mindanao's Regional Development Council (RDC-X) and various other development councils of Mindanao support the corridor development strategy that is innovative and responds to the development needs of the island-region Mindanao. MinDA adopted the Mindanao Development Corridors as a key spatial strategy in consistent with the guidelines set out in the Mindanao 2020 Peace and Development Framework Plan (long-term plan targeted toward 2030) that aims to improve infrastructure, establish connectivity, and spur the development of growth clusters within in the island-region so as to achieve balanced and inclusive growth among regions.

This corridor approach divides the island-economy of Mindanao into three identical development corridors namely the Northern Mindanao Development Corridor (NMDC), Southern Mindanao Development Corridor (SMDC) and Western Mindanao Development Corridor (WMDC). The initiative of this corridor development is held by MinDA in an integrated way aiming to position Mindanao as a single, integrated economy that is able to leverage and fully participate in economic groupings such as BIMP-EAGA, ASEAN and the rest of the global economic communities. However this corridor development plans have not been fully designed and prepared yet.

1.4 Work Progress

1.4.1 Preparatory works

Preparatory works for the Study started in Japan by the JICA Study Team (JST) led by RECS International Inc., nominated by JICA to undertake the Study. As part of the preparatory works, a meeting was held at the JICA head office on September 2, 2014 to discuss initial works and their schedule, communication protocol, and security situation as well as the scope of the Study.

The first group of the JST arrived in Manila on September 8 and 10 in Cotabato City for preparatory works in the field. A series of meetings were held with consultants involved in the BDP 1 and the Development Academy of the Philippines in Manila, and BDA, BTC, MILF, JNC, ARMM and other individuals in Cotabato City. Meetings with GPH-CCCH and MILF-CCCH were also held for security purposes. The JST conducted initial surveys on the mainland provinces of Maguindanao and Lanao

del Sur as well.

The JST carried out initial studies on agriculture and agro-industry during October. Based on the data and information collected by the preparatory works, the JST conducted a preliminary analysis on problem structure of Bangsamoro and also initial stakeholders' analysis. Incorporating results of these initial works, the JST compiled an Inception Report in early November.

1.4.2 Inception works

The Inception Report was discussed at the JICA head office on November 11, 2014. It was revised reflecting the discussion. The JST presented the draft Inception Report to the Philippine side, discussed with BDA, BTC, MILF Central Committee and RPDO-ARMM. The JST also made additional surveys to the two mainland provinces to exchange views on the Bangsamoro development.

To explain the Study based on the draft Inception Report to a wider audience and receive comments, a workshop was organized in Cotabato City on November 27. The workshop was attended by 85 participants representing civil societies, media, academe and donors as well as government organizations and BDA, BTC, MILF and JNC. Record of discussions of the workshop is attached to this chapter. Based on the discussions and results of the workshop, minutes of meetings were prepared and signed by representatives of BDA and the JST.

The JST continued initial fieldworks covering the sectors of agriculture, agroindustry, investment promotion, ports, airports, power supply, and river and flood control. The JST also prepared for an environmental baseline survey and a socio-economic survey on MILF camps during November through December.

1.4.3 Analyses on existing conditions

Analyses on existing conditions by sector continued during January through March 2015 by sector experts of the JST in cooperation with BDA and other relevant organizations. Surveys and consultation by province were continued by the JST. As the JST was not allowed to visit the island provinces due to security reasons, a team of national experts was formed for surveys and consultation in the island provinces during February.

The results of the fieldworks and analyses on existing conditions by sector were compiled during early March. Based on them, the JST started to prepare a medium term development plan for Bangsamoro in collaboration with BDA and other relevant organizations.

1.4.4 Preparation of first draft of medium-term Bangsamoro development plan

As part of preparation of the first draft of the medium term Bangsamoro development plan, the JST prepared three discussion papers as follows:

Discussion paper no. 1: Socio-economic framework for Bangsamoro Regional Development,
Discussion paper no. 2: Spatial Framework for Bangsamoro Regional Development, and
Discussion paper no. 3: Bangsamoro Development Directions and Vision.

These discussion papers were explained to and discussed with BDA. The JST presented an early draft of the Bangsamoro development plan in an outline to OPAPP, NEDA and DOF in cooperation with BDA. Results of surveys in the five provinces were compiled in the form of development diagnosis by province through the cooperative efforts of the JST experts and its national experts during March through April. Sector experts of the JST have formulated projects and related institutional measures in cooperation with relevant organizations, respectively during April through May.

Based on all these works, the first draft of the Bangsamoro development plan for the medium term was compiled into the Interim Report in June. The Report was discussed with JICA in a draft form, and finalized reflecting the discussions.

1.4.5 Elaboration on draft BDP and project profiles

Based on the draft BDP presented in the Interim Report, more extensive consultation was conducted with various stakeholders. In particular, two workshops and two seminars were organized to discuss on the draft BDP. The second workshop was convened in Davao City on June 24 and 25, 2015, participated by Bangsamoro stakeholders. On the first day, development objectives and basic strategy, development frameworks, directions and vision, and development diagnosis by province were presented and discussed. On the second day, development initiatives and projects were presented, and proposals for additional projects as well as comments on the proposed projects were obtained from the participants.

The first seminar was convened in Manila on June 26, 2015, inviting representatives of the Central Government and other stakeholders based in Manila. The draft BDP was presented, and the results of the Davao workshop were reported.

The third workshop was organized in Cotabato City on October 6, 2015 with Bangsamoro stakeholders. Selected anchor projects were presented, and additional projects were proposed by the participants. The second seminar in Manila was convened on October 9, participated by representatives of the Central Government including NEDA, OPAPP, DPWH, and DENR; development partners including ADB, WFP, ILO, UNOPS, UNPF, IOM, FAO, USAID, UNICEF, the Foundation for Economic Freedom, UNHCR, Asia Foundation, WB/Fastrack, and IFAD; a few embassies; and private sector representatives.

The technical working group has been organized at the regional level to guide and supervise the preparation of the BDP. Following a preparatory meeting on May 14, 2015, two formal meetings were held on July 28 and December 2. During the second meeting, the TWG members agreed to form a task force on halal industry and Islamic finance. The task force has met a few times to discuss how to incorporate these important issues into the BDP.

Cooperation between the JST and its counterpart team of BDA continued, and priority projects were examined in more detail to prepare project profiles. The JST's national experts made the second round of visits to the island provinces in September 2015 in collaboration with selected BDA staff to report on the work progress and elicit additional project ideas from stakeholders in the island provinces. The results were reflected in the presentation at the Davao workshop. Sector reports were prepared by the JST experts of the respective fields.

Based on all the works outlined above, the draft BDP were elaborated to prepare the Main Report of the Draft Final Report, incorporating the results of the workshops and the seminars. The Sector Reports were compiled separately and project profiles compiled into the Project Report, both as part of the Draft Final Report.

1.4.6 Preparation of the Final Report

Requests for submission of additional comments on the Draft Final Report presented during the last fieldwork were made by the JICA Philippine office to the participants in the third seminar in Manila, and by BDA to the participants in the fourth workshop in Davao. The deadline for the submission was set on February 26, 2016. Comments from the participants in the Manila seminar were transmitted to the JST on February 26, 2016. Another week was allowed for further comments but no additional comment was submitted. The comments from the participants in the Davao workshop were compiled by BDA and transmitted to the JST on February 25 and March 3, 2016. All the comments were reviewed by the JST to see if they are relevant to be reflected in the Final Report. Practically all the comments have been reflected in the Final Report, which was compiled during March through early April 2016.

CHAPTER 2 EXISTING ENVIRONMENTAL CONDITIONS OF BANGSAMORO

2.1 Legal and Institutional Framework for Environmental Management

2.1.1 National context

In the 1970s, three environmental laws were issued to establish the Philippine Environmental Impact Statement (PEIS) System in the Country. These laws are presented in Table 2.1.

Table 2.1 Basic Laws on the Philippine Environmental Impact Statement (PEIS)

Legal Instrument	Title and Date of Issuance
Presidential Decree (PD) No. 1511	Philippine Environmental Policy (1977)
PD 1152	Philippine Environment Code (1977)
PD 1586	Establishing An Environmental Impact Statement System, including Other Environmental Management Related Measures and for Other Purposes (1978)

Two additional environmental laws, namely Presidential Proclamation No. (PP) 2146 of 1981: Proclaiming Certain Areas and Types of Projects as Environmentally Critical and Within the Scope of the PEIS Established under PD 1586, and PP 803 of 1996: Declaring Golf Course Projects as environmentally critical projects (ECPs), define the environmentally critical areas (ECAs) and ECPs. These laws require projects or undertakings classified as ECPs occurring in ECAs to prepare and submit an EIS to be able to secure environmental clearance certificates (ECCs) prior to implementation. As shown in Table 2.2, the existing PEIS System covers four ECP types and 12 ECA categories. However, DENR may include non-environmentally critical project (NECP) types in the PEIS system, which if located in ECAs can have significant impact on the environment.

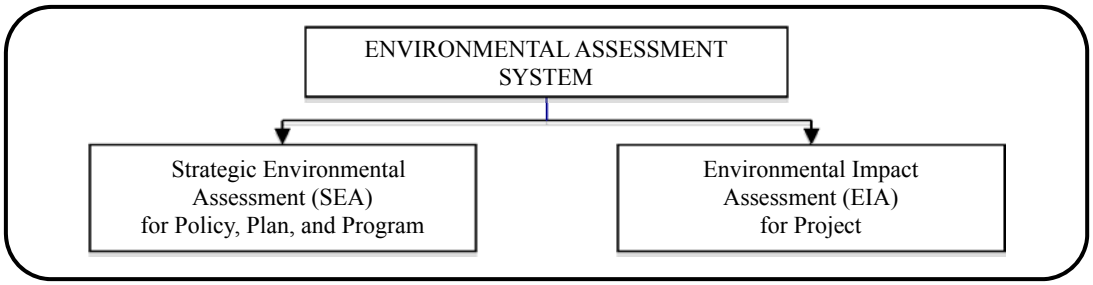
Table 2.2 List of ECP Types and ECA Categories

A. List of ECPs	
Declared by PP 2146 (1981)	
1.	Heavy industries - Non-ferrous metal industries, iron and steel mills, petroleum and petro-chemical industries including oil and gas, smelting plants
2.	Resource extractive industries - Major mining and quarrying projects, forestry projects (logging, major wood processing projects, introduction of fauna (exotic animals) in public and private forests, forest occupancy, extraction of mangrove products, grazing, fishery projects (dikes for / and fishpond development)
3.	Infrastructure projects - Major dams, major power plants (fossil-fueled, nuclear-fueled, hydroelectric or geothermal), major reclamation projects, major roads and bridges
Declared by PP 803 (1986)	
4.	All golf course projects
B. List of ECA Categories	
Declared by PP 2146 (1981)	
1.	All areas declared by law as national parks, watershed reserves, wildlife preserves, sanctuaries
2.	Areas set aside as aesthetic potential tourist spots
3.	Areas which serve as the habitat of any endangered/threatened species of Philippine wildlife (flora and fauna)
4.	Areas of unique historic, archeological or scientific interests
5.	Areas which are traditionally occupied by cultural communities or tribes
6.	Areas frequently visited and/or hard-hit by natural calamities (geologic hazards, floods, typhoons, volcanic activity, etc.
7.	Areas with critical slopes
8.	Areas classified as prime agricultural lands
9.	Recharged areas of aquifers
10.	Water bodies characterized by one or any combination of the following conditions: tapped for domestic purposes; within the controlled and/or protected areas declared by appropriate authorities; or which support wildlife and fishery activities

11.	Mangrove areas characterized by one or any combination of the following conditions: with primary pristine and dense young growth; adjoining mouth of major river systems; near or adjacent to traditional productive fry or fishing grounds; areas which act as natural buffers against shore erosion, strong winds and storm floods; areas on which people are dependent for their livelihood
12.	Coral reefs characterized by one or any combination of the following conditions: with 50% and above live coralline cover; spawning and nursery grounds for fish; act as natural breakwater of coastlines

Source: DENR-EMB, 2007; Revised Procedural Manual for DAO No. 30 Series of 2003 (DAO 03-30), p. 5.

Presently, the PEIS system applies mainly to projects that may have significant impacts on the quality of the environment and the welfare of the people depending on it. A draft bill entitled "An Act to Establish the Philippine Environmental Assessment (EA) System" has been filed and approved by the Committee on Ecology of the House of Representatives of the Philippine Congress on its 15th Congress in 2012, but this remains at the Committee level pending completion of the requirements for public hearing to secure majority endorsement by various stakeholders. The draft bill envisages the national application of a comprehensive EA system to encompass all development policies, plans, programs and projects with significant environmental impacts, as illustrated in Figure 2.1.



Source: Draft Bill, 2012.

Figure 2.1 Proposed Framework for Philippine Environmental Assessment System

2.1.2 Bangsamoro context

Under the RA 6734 of 1989: Providing for and Organic Act the Autonomous Region in Muslim Mindanao (ARMM), the ARMM Regional Government has been established to oversee the development and implementation of plans and programs for this region. One of its line agencies is DENR (Department of Environment and Natural Resources)-ARMM which handles matters related to the environment and natural resources of the region, while its EMB(Environmental Management Bureau)-ARMM provides staff support on environmental concerns including the review of applications for ECCs, issuance of ECC/CNC for compliant projects/undertakings, and conduct periodic compliance monitoring. Limited published documents from DENR-ARMM imply that the nationally promulgated environmental laws, regulations and guidelines are also applied for projects or undertakings in the Bangsamoro Core Territory (BCT) areas.

Organizationally, DENR/EMB-ARMM has adopted the structure of DENR-EMB with two main divisions: the Environmental Impact Assessment and Management (EIAM) Division and the Pollution Control (PC) Division. These divisions are responsible for the screening of projects for category determination and the evaluation, preparation, and recommendation of ECC; and the evaluation, preparation, and recommendation of pollution clearance and related documentary requirements for approval of higher authorities, respectively.

In some major programs (i.e., ARMM Social Fund for Peace and Development) implemented in the region, the environmental safeguards policies and guidelines have applied DENR Administrative Order (AO) 37 Series of 1996 and other related issuances in the granting of ECCs/CNCs for projects and sub-projects. Specific guidelines for ecological destination in Turtle Islands in the Province of Tawi-Tawi have also specified the application of DENR AO 37 Series of 1996 for all proponents of ecotourism development projects.

DENR-ARMM, in cooperation with other regional departments and environmentalists, is also taking a lead role for the passage of the proposed Regional Environment Code and Regional Sustainable Forest

Management Act (Regional Legislative Assembly Bill No. 91) to ensure sustainable development of the Bangsamoro region.

2.2 DENR-ARMM Activities in Bangsamoro

The budget of the Regional Office (headquarters) of DENR-ARMM comes from ARMM. It can cover personnel salaries and maintenance and operation expenses (MOE), but is not enough to implement projects, therefore, there are no projects by DENR-ARMM themselves at present. The following projects are on-going, but those are all the national projects, for which the budget is provided from the National Government and implemented under their instructions.

1) National Greening Program (NGP),
2) Cadastral survey project, and
3) Forest land boundaries and delineation.

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 February 24, 2011 by the President. It seeks to grow 1.5 billion trees in 1.5 million ha land 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, 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, and others.

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 shown in Tables 2.3 and 2.4.

Another important issue for DENR-ARMM is community-based forest management (CBFM). 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 are under Executive Order No. 263 and DENR Administrative Order No. 96-29.

DENR-ARMM has eleven CBFMAs, but only two organizations are active, and no reports have been submitted for all the agreements. Therefore, first, the CBFMA holders performance shall be monitored and evaluated by DENR to check the compliance with the terms and condition, but those activities have not been done partly because of lack of fund. A challenge is that no more national fund had been given to support the CBFM programs of ARMM after the creation of ARMM. Accordingly, fund is required to resume the CBFM in ARMM.

The existing eleven CBFMAs are shown in Table 2.5. The active ones are only No.5. Tiruray Integrated Farmers Association, and No.10 Teduray Farumfungon Temikur MPC.

Table 2.3 NGP Budget Allocation by Province

(Unit: PHP)

Province	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
Share (%)	33.2	30.4	6.2	12.7	3.4	100.0

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

Source: DENR-ARMM website.

Table 2.4 NGP Budget Allocation by Stage and Province

(Unit: PHP)

Province	Survey, mapping & planning	Production of seedlings	Site preparation & social mobilization	Plantation maintenance	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
Share (%)	5.3	62.4	14.7	17.6	100.0

Source: DENR-ARMM website.

Table 2.5 Community-based Forest Management Agreements of 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

2.3 Natural Environment

2.3.1 Meteorology

(1) Climate types

There are four climate types in the Philippines based on the rainfall distribution, and the Bangsamoro

region belongs to Types III or IV according to the Modified Corona classification of PAGASA as shown in Figure 2.2. The area of Type III has no very pronounced maximum rain period with a dry season lasting only from one to three months. The areas of Type III are partly shielded from the northeast monsoon, but are open to the southwest monsoon. The area of Type IV has more or less evenly distributed rainfall throughout the year.

(2) Rainfall and temperature

Monthly distributions of the average rainfall and temperature are compared in Figure 2.3 for selected locations in Mindanao including Cotabato City and Marawi City. There is little effect of tropical cyclones in Mindanao and particularly in the Bangsamoro region as seen from the trajectories of twenty tropical cyclones that hit the Philippines during 1948–2005 (Figure 2.4).

2.3.2 Topography

(1) Overview

The Bangsamoro region is located mainly in the Cotabato plain, the Lanao plateau and the Tiruray upland. Maps of the region's elevation are shown in Figure 2.5.

Most of Lanao del Sur is located in the Lanao Plateau with elevations ranging up to more than 450 m. The elevation around Lake Lanao is approximately 750 m. The elevation in southwest Lanao del Sur is comparatively high and Mount Ragang, an active volcano, is situated in one of the mountains which form the boundary between North Cotabato and Lanao del Sur.

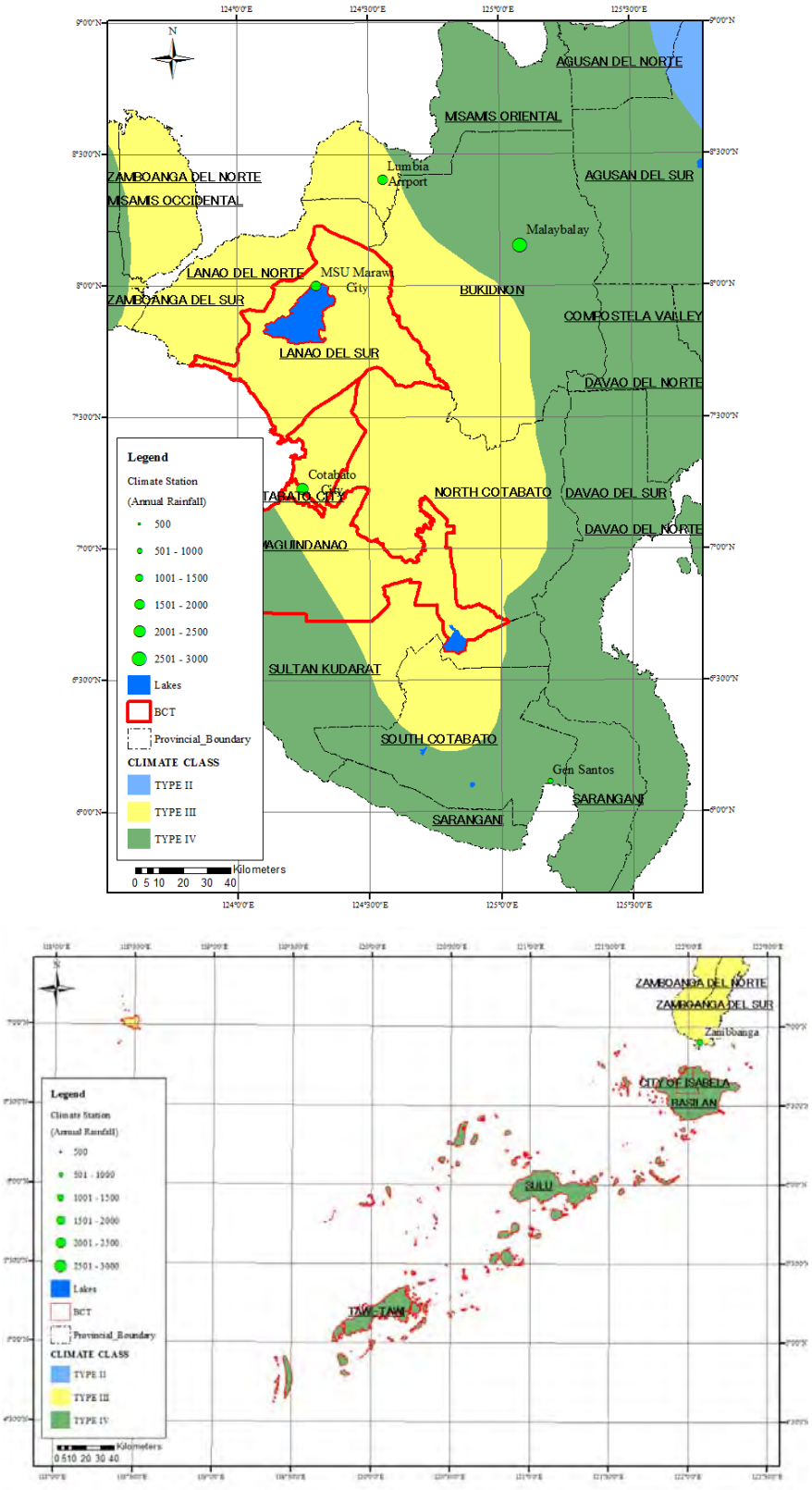
The southwestern part of Maguindanao is located in the Tiruray upland with elevations ranging from 450 to 750 m. There are two big mountain groups, Binaca and Blit. Mt. Binaca is an inactive volcano. The remaining area of Maguindanao is located in the Cotabato plain which is a lowland area with elevations ranging from 0 to 200 m. The lower Mindanao River basin has the largest area and the river is the longest in Mindanao.

The Basilan and Sulu provinces are hilly or mountainous and these are of volcanic origin. The topography of Basilan becomes steep towards the interior of the island. The big islands in Sulu such as Jolo and Siasi islands are mountainous and hilly of volcanic origin. The mountain chain in the Sulu archipelago includes Mt. Tumantang is (about 248 m), Mt. Pula (about 86 m), and Mt. Daju (about 30 m). The rest of the islands in Sulu are lowland and are coral and reef formations. The Tawi-Tawi Island has a continuous range of lowland and rolling hills. Its major peaks such as Mt. Datu Sali, Mt. Sitangkai and Mt. Baluk Sampan are approximately lower than 200 m.

(2) Topographic conditions by province

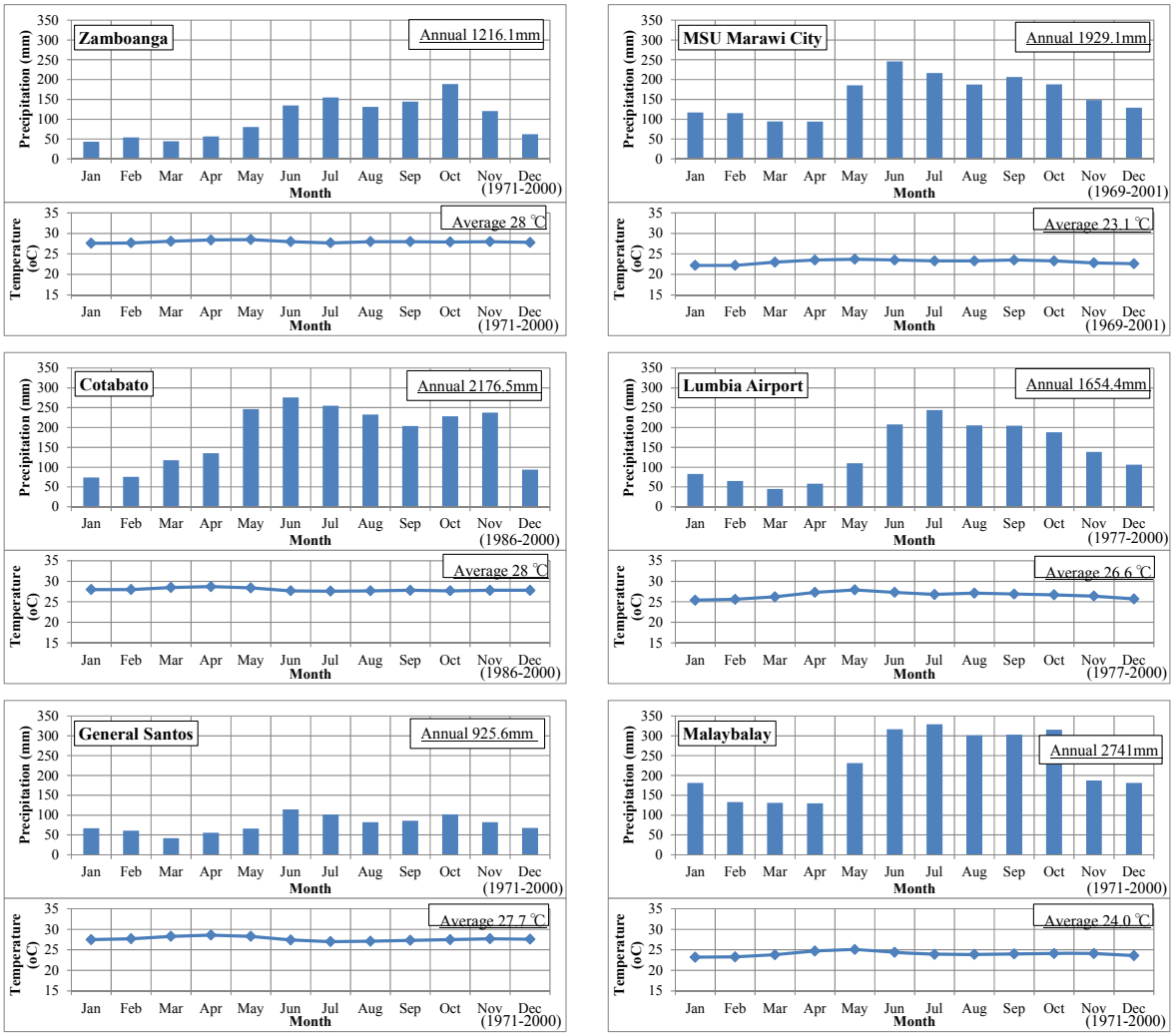
<u>Basilan</u>

Figure 2.6 shows the topographic map of Lanao del Sur, characterized by undulating to rolling terrain covering 46.85% of the province's total land area, and rolling to moderately steep terrain comprising 21.46% of the total land area. From the Illana bay on its southwestern coast to its neighboring Province of Bukidnon on the northwest, the elevation of the province ranges from 0 to 3,080 masl. The highest point in the province is found along the provincial boundary of North Cotabato on the south.



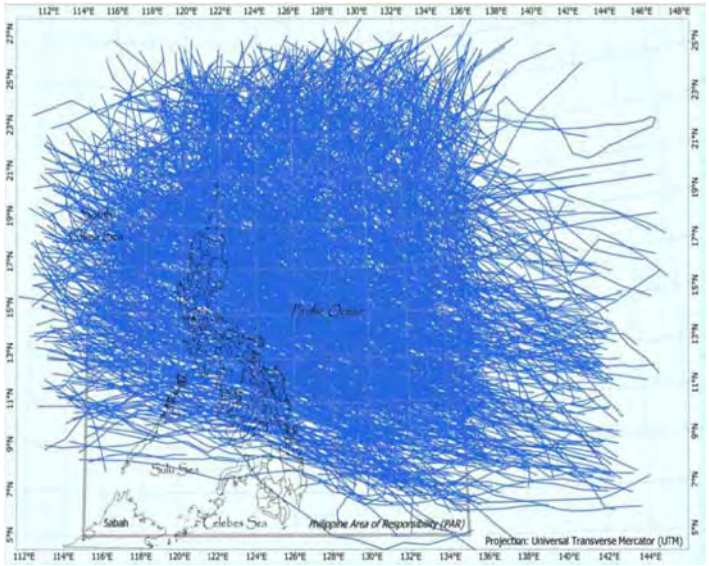
Source: PAGASA.

Figure 2.2 Climate Maps in Bangsamoro



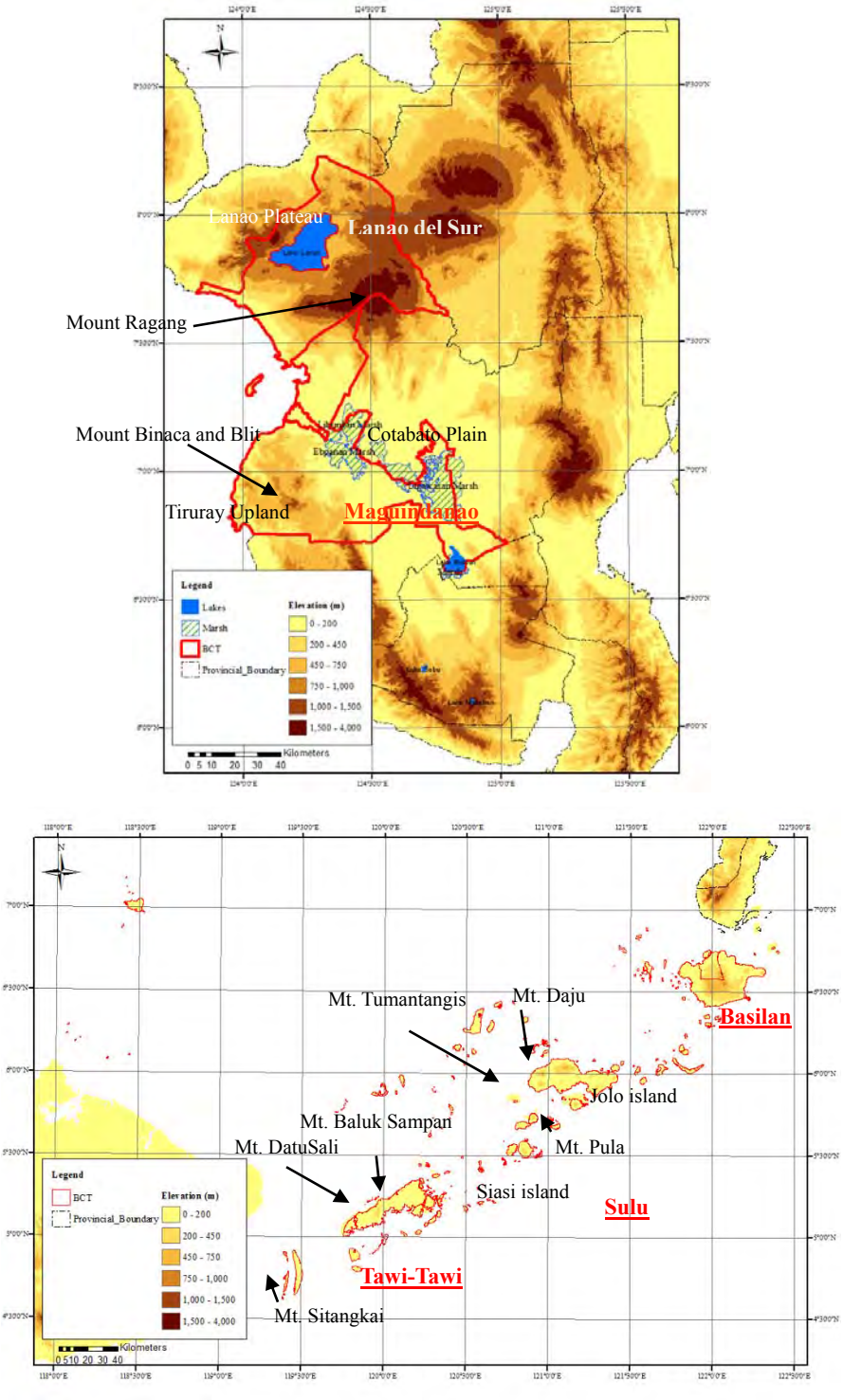
Source: ibid.

Figure 2.3 Average Annual Rainfall and Temperature in Mindanao



Source: ibid.

Figure 2.4 Actual Tropical Cyclone Tracks for 1948–2005



Source: SRTM.

Figure 2.5 Elevation Maps of Bangsamoro

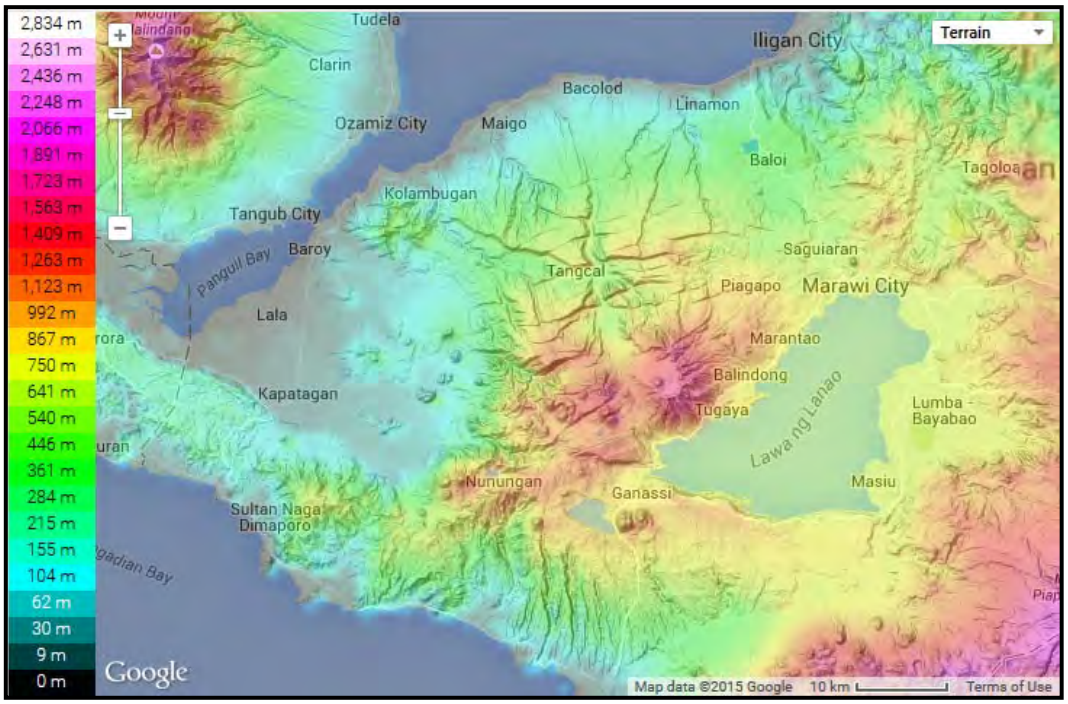


Figure 2.6 Topographic Map of Lanao del Sur

Sulu

Sulu Province is composed of small packets of mountains and valleys, and wide stretches of undulating to rolling lands, which formed as the agricultural base for farming activities. Jolo and Siasi Islands are mountainous and hilly areas, respectively; while the other islands such as Pangutaran are swampy, forested, flat, and low areas. The slope distribution of Sulu is shown in Table 2.6, while its topographic map is shown in Figure 2.7.

Tawi-Tawi

Figure 2.8 presents the topographic map of Tawi-Tawi, highlighting the generally low elevation of the large portion of the province's land area. The highest elevations are mainly located in the Municipalities of Panglima Sugala, with Thumbhill Mountatin, and Languyan.

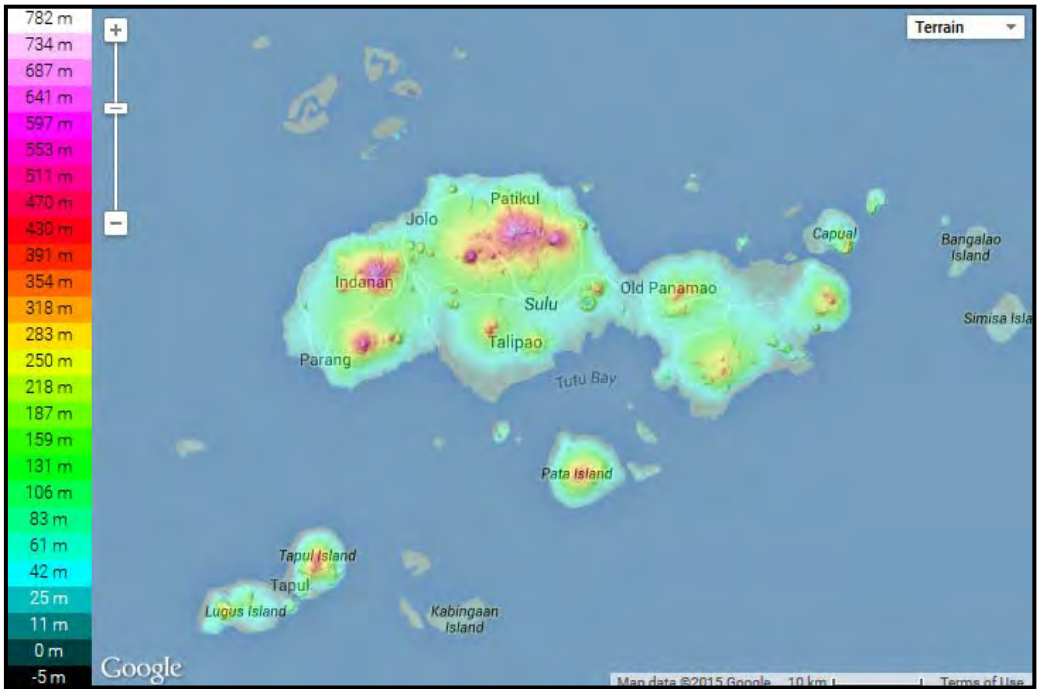
The topography of Tawi-Tawi ranges from level to moderately rolling and steep terrain (Table 2.7). The largest part of the province's land area (54.91%) is described as level to nearly level, covering an aggregate area of 66,370.4 ha, and mostly located in the island Municipalities of Sibutu, Sitangkai, Simunul, Sapa-sapa, South Ubian, part of Tandubas, Languyan, Panglima Sugala, and Bongao. This area serves as the agricultural base, particularly for cultivation of cassava, which is the staple food of the people.

Gently sloping to undulating areas, covering 2,138.9 ha (or 1.77%), are found in the municipalities of Bongao and Panglima Sugala, and are used for cash and perennial crop production. Undulating to rolling lands, covering 30,884.8 ha (or 25.55%), are found largely in the mainland of the province, particularly Languyan, Panglima Sugala, South Ubian and a portion of Bongao. These lands are also used for agriculture. Rolling to moderately steep lands cover 11,458.4 ha (or 9.48%), and support watersheds and irrigation projects of the province as well as the remaining dipterocarp forest trees. Steep lands, covering 1,868.4 ha (or 1.55%), are located only in the Municipality of Panglima Sugala. About 815.5 ha, or 6.75% of the province's land area, remain unclassified, and cover the island Municipality of Mapun, Bas-bas island, Mantabuan island, and portions of Languyan and Sapa-sapa.

Table 2.6 Slope Distribution of Sulu

Slope category	Description	Area (ha)
0–3%	Lowland	55,956.188
3–8%		34,375.448
8–18%	Highland	39,070.236
18–30%		15,717.321
30–50%	Upland	4,146.972
50% ≤		770.891
Subtotal		150,037.056
Unclassified		302.785
Lake		186,014
Total		150,525.855

Source: Sulu Provincial Development and Physical Framework 2008–2013.



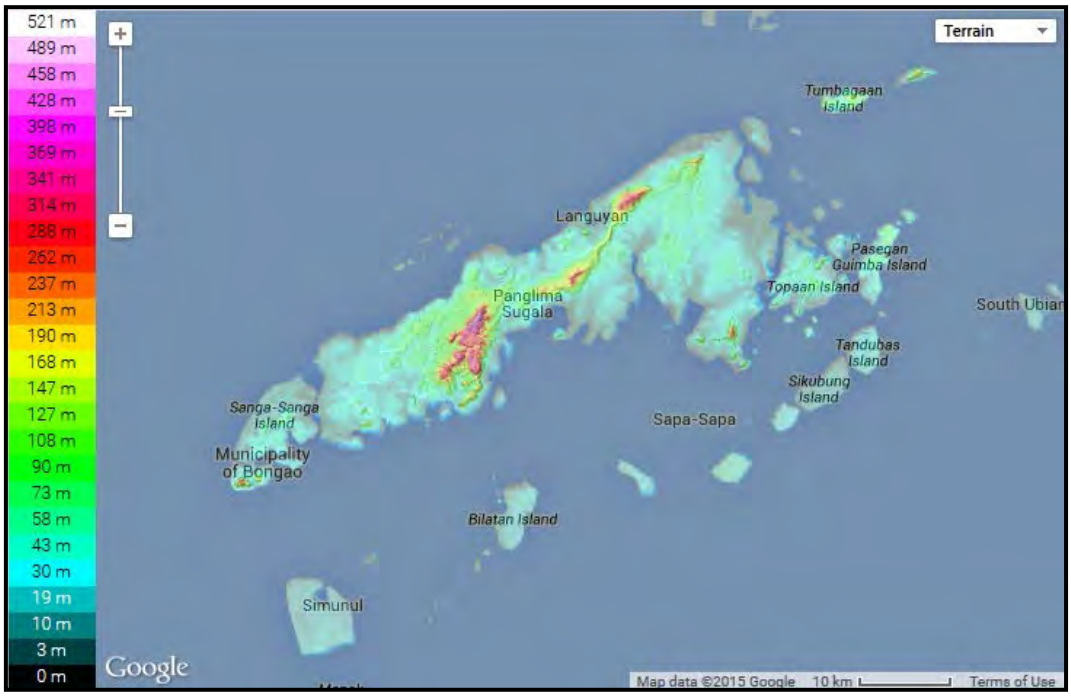
Source: http://en-ph.topographic-map.com/places/Mindanao-6695590/

Figure 2.7 Topographic Map of Sulu

Table 2.7 Slope Distribution of Tawi-Tawi

Slope category	Description	Area (ha)	Share (%)
0–3%	Level to nearly level	66,370.4	54.91
3–8%	Gently sloping to undulating	2,138.9	1.77
8–18%	Undulating to rolling	30,884.8	25.55
18–30%	Rolling to moderately steep	11,458.4	9.48
30–50%	Steep	1,868.4	1.55
Unclassified		815.5	6.75
Total		120,876.0	100.00

Source: DENR-ARMM, Tawi-Tawi as cited in Tawi-Tawi Provincial Development and Physical Framework Plan 2008–2013.

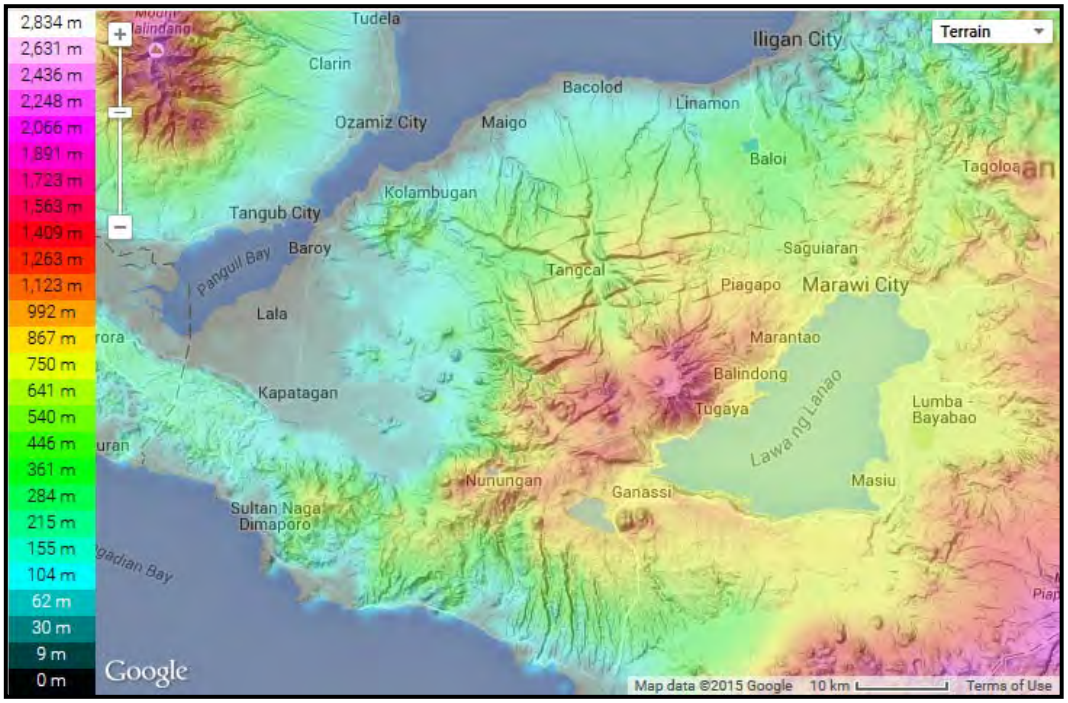


Source: en-ph.topographic-map.com/places/Tawi-Tawi-4039329/

Figure 2.8 Topographic Map of Tawi-Tawi

Lanao del Sur

Figure 2.9 shows the topographic map of Lanao del Sur, characterized by undulating to rolling terrain covering 46.85% of the province's total land area, and rolling to moderately steep terrain comprising 21.46% of the total land area. From the Illana Bay on its southwestern coast to its neighboring Province of Bukidnon on the northwest, the elevation of the province ranges from 0 to 3,080 masl. The highest point in the province is found along the provincial boundary of North Cotabato on the south.



Source: en-ph.topographic-map.com/places/Tawi-Tawi-4039329/

Figure 2.9 Topographic Map of Lanao del Sur

Maguindanao

The RFPF 2000-2030 of ARMM describes the topography of the Province of Maguindanao with a generally sloping terrain from front side of hills to relatively plain as it approaches the sea and Liguasan Marsh. The rolling part is reported to be covering 55% of the province's total land area, and the plain (i.e., nearly level and undulating to rolling) with 45%. Figure 2.10 shows the topographic map of Maguindanao.

Source: http://en-ph.topographic-map.com/places/Maguindanao-2706689/

Figure 2.10 Topographic Map of Maguindanao

2.3.3 Land

(1) Location and land area

The Bangsamoro Core Territory (BCT), comprising the five ARMM Provinces with two cities and the expansion areas consisting of six municipalities in the Province of Lanao del Norte and 39 barangays in six municipalities in the Province of North Cotabato including the cities of Cotabato (Province of Maguindanao) and Isabela (Province of Basilan), lies in Central and Western Mindanao. Geographically, the BCT is located at coordinate 07°13′ North and 124°15′ East.

The BCT has an estimated total land area of 1,386,735 ha based on the 2013 estimates published by the National Mapping and Resource Information Agency (NAMRIA), excluding the land areas for the barangays in the Municipalities of Pigkawayan and Pikit in the Province of North Cotabato, which are part of the BCT with no available data (Table 2.8). It comprises at least 4.7% of the Philippines' total land area (30 million ha) and 13.6% of Mindanao's land area (10.2 million ha). Presently, the BCT includes five provinces and a portion of two provinces, four cities, 122 municipalities and 2,669 barangays.

As shown in Table 2.5, the data from LGUs indicate a higher total land area in BCT estimated 1,716,958 ha, or a difference of 330,223 ha compared to the data derived from NAMRIA. Data discrepancy has occurred in the five BCT provinces, which can be attributed to the absence of cadastral survey in some of these areas.

Table 2.8 Total Land Area and Distribution in BCT by Province and Municipality

Province/Municipality	Total land area (ha)[1]		Number of barangays[2]	
	By NAMRIA, 2013	By LGUs		Reference year
BCT*	1,386,735	1,716,958	2,647	
Basilan	132,723	351,170	210	
Lanao del Sur	387,289	387,300	1,159	
Maguindanao	504,760	597,053	508	
Sulu	160,040	167,376	410	
Tawi-Tawi	108,740	120,876	203	
Lanao del Norte BCT†	70,738	70,738	118	
North Cotabato BCT‡	22,445	22,445	39	

* Total land area not including barangay land areas in the municipalities of Pigkawayan and Pikit in Province of North Cotabato due to none availability of data; †Covers land areas of six municipalities in Province of Lanao del Norte, which are included as part of BCT; ‡Covers land areas of barangays in the municipalities of Aleosan, Kabacan, Carmen, and Midsayap in Province of North Cotabato, which are included as part of BCT, and excludes barangays in the municipalities of Pigkawayan and Pikit with no available data.

Sources: [1]Land area by National Mapping and Resource Information Authority (NAMRIA) for the five BCT provinces as reported in the 2013 Philippine Forestry Statistics; and the respective LGUs' Provincial Comprehensive Development Plans (PCDPs), Provincial Development and Physical Framework Plans (PDPFPs), Comprehensive Land Use Plans (CLUPs), and Socio-Economic Profiles (SEPs) for the five BCT provinces and the expansion areas in the Provinces of Lanao del Norte and North Cotabato;
[2]Number of barangays: Respective LGUs' plans as above cited.

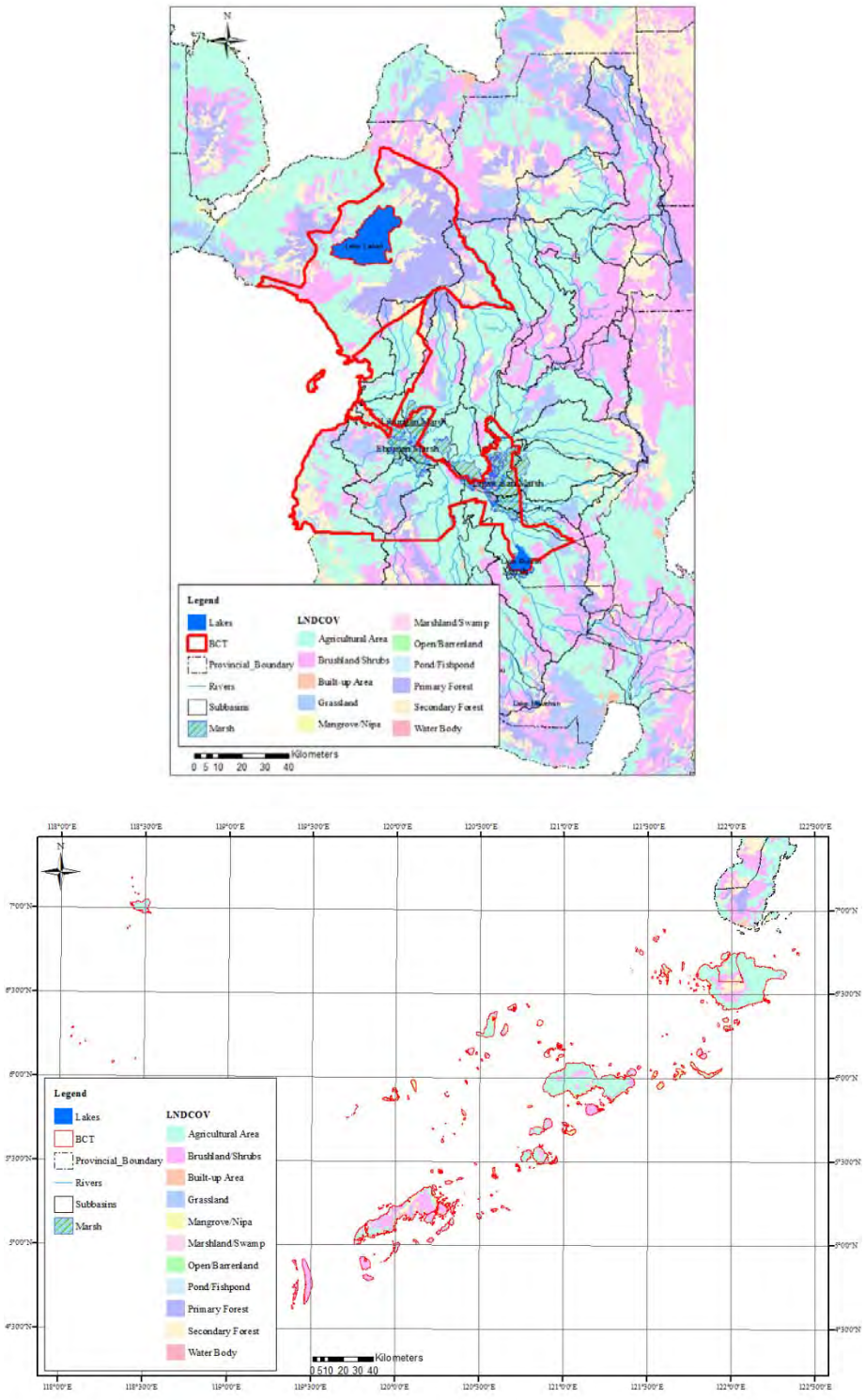
(2) Land cover

Figure 2.11 shows the land cover in the Bangsamoro region. The primary forest spreads to Eastern Lanao del Sur. The agricultural area spreads around Lake Lanao. The land cover of the Cotabato plain is also an agricultural area because there is the lowland area and some parts of the Cotabato plain are marshland/swamp area such as the Liguasan Marsh. Liguasan Marsh is a conglomeration of three marshes, namely; Liguasan, Ebpanan and Libungan, with a combined area of 288,000ha. Around the Tiruray upland located in southwestern Maguindanao, there are the grassland, brush-land/shrubs and the secondary forest, etc. The agricultural area is spread in Basilan and Sulu. The land cover of the mountain area in Basilan and Sulu is brush-land/shrubs or the secondary forest. Most of the land cover in Tawi-Tawi is brush-land/shrubs. There is the mangrove/nipa around the coastal areas of most of the islands.

In Lanao del Sur, there is Lake Lanao which is the largest freshwater lake in the Philippines. The area of Lake Lanao is 394.4 km^2 and the origin is volcanic. It is one of the ancient lakes in the world. The mean depth is 60.30 m and it becomes deeper towards the southwest as shown in Figure 2.12. The maximum depth is 112.00 m and the pondage volume is 21.53 m3.

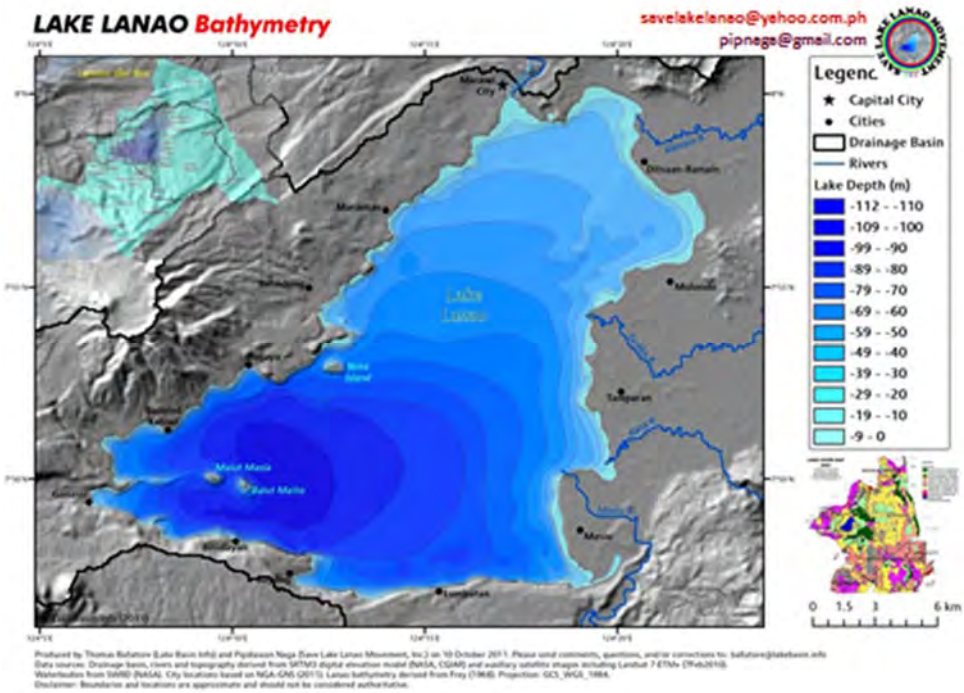
Lake Buluan is located in Maguindanao and Sultan Kudarat. It is the third largest lake in Mindanao with an area of 61.34 km^2.

The Forest Management Bureau has compiled the forest cover data of 2003 and 2010 as shown in Figure 2.13. The total forest cover of the Bangsamoro increases but that of Lanao del Sur decreases. The closed forest of the Bangsamoro and Lanao del Sur decreases.



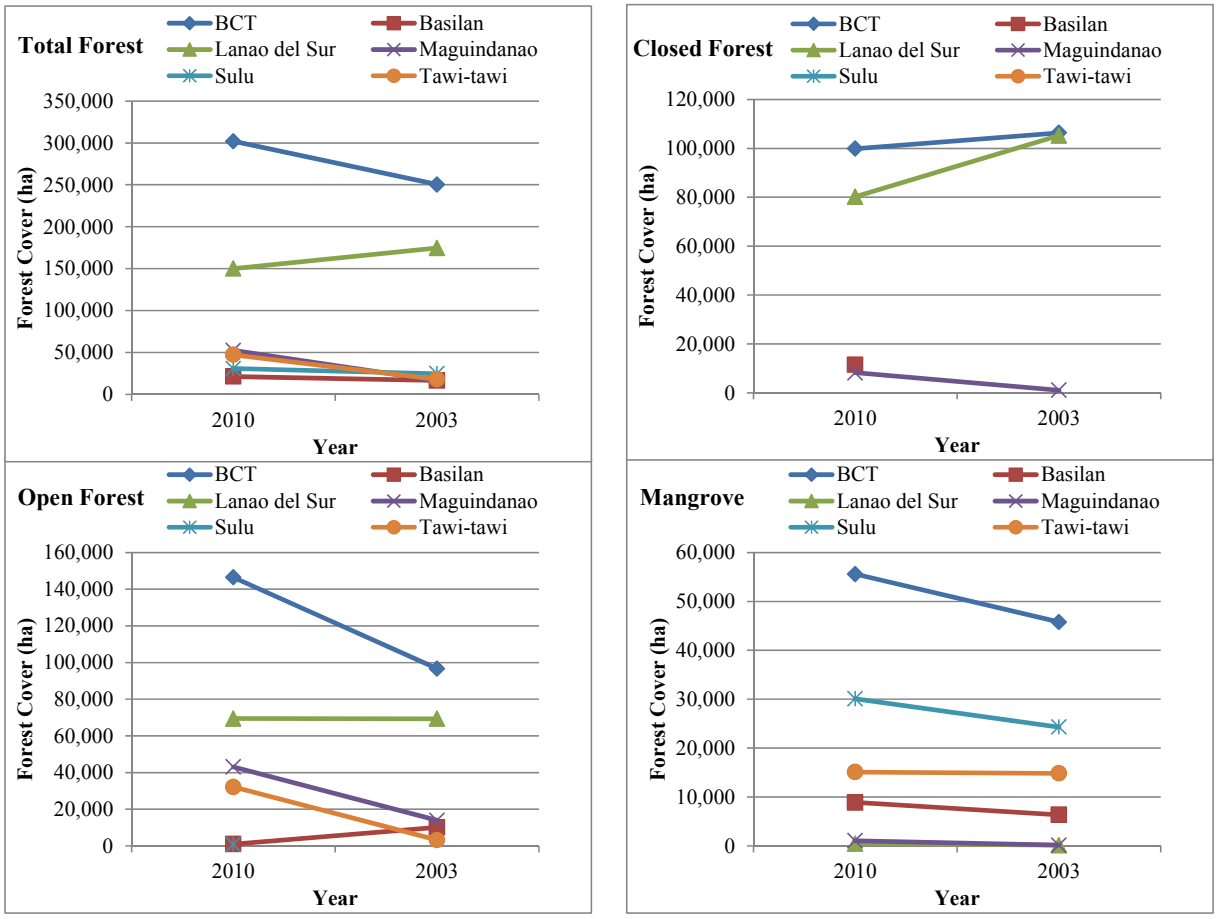
Source: NAMRIA.

Figure 2.11 Land Cover Maps of Bangsamoro, 2007



Source: Ranao River Basin Roadmap.

Figure 2.12 Bathymetry of Lake Lanao



Source: Forest Management Bureau.

Figure 2.13 Changes in Forest Area between 2003 and 2010

(3) Major land forms

Of major landforms listed in the Philippines, the following are found in the BCT:

1) Bud Dajo: One of the active volcanoes in the country, and located 8.05 aerial km southeast of the Municipality of Jolo in the Province of Sulu.
2) Makaturing: A stratovolcano located in the Municipality of Butig in the Province of Lanao del Sur.
3) Mount Ragang, or Mount Piapayungan (Blue Mountain by the local people): A stratovolcano, and considered the 7th highest mountain in the country. It is located in the Provinces of Lanao del Sur and North Cotabato.
4) Basilan National Park: Located in the eastern portion of the remaining public forest between City of Isabela and the municipalities if Lamitan, Tipo-Tipo and Sumisip; at an elevation of 971 m, where the highest peak, Puno Mahaji or the Basilan peak, is that dominates the landscape.

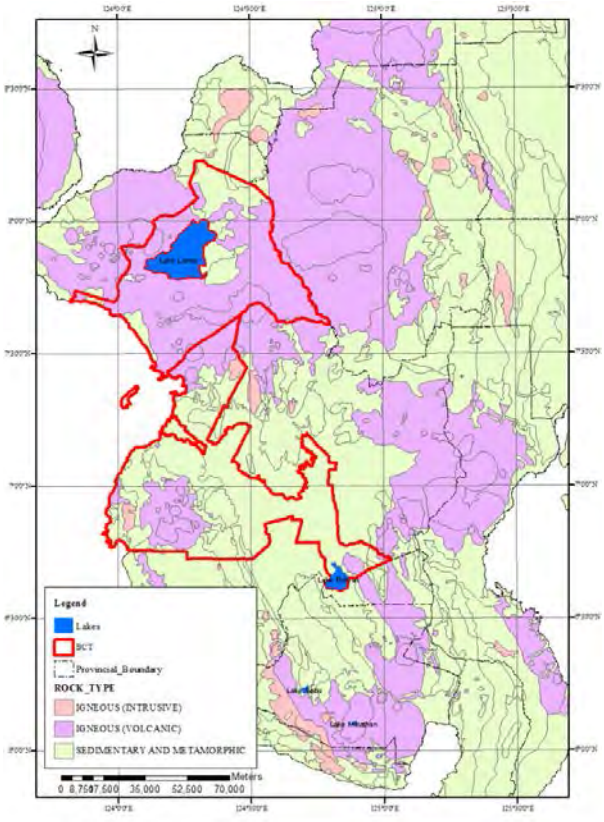
(4) Soil characteristics

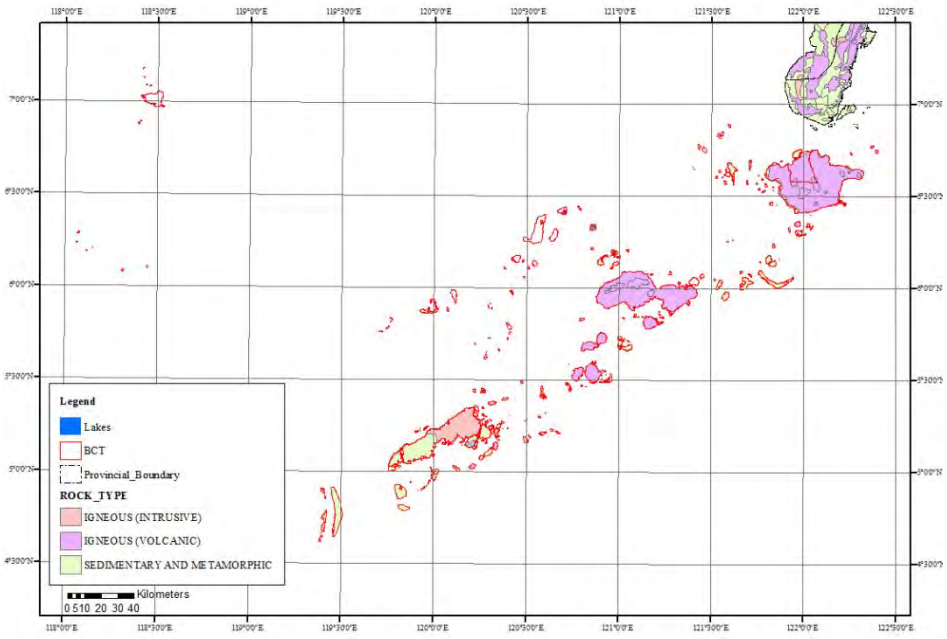
Generally, the dominant soil types in the BCT consist of clay loam, sandy loam, and silt loam, which are favorable for rice, corn and other cash crops on the lowland areas, and commercial crops on the upland areas. These soil types are characteristics of the entire region, particularly in Lanao del Sur, Maguindanao, and the extension areas in Lanao del Norte and North Cotabato. While these soil types are found in the three island provinces of Basilan, Sulu, and Tawi-Tawi, the data gathered reveal problems on soil erosion and nutrient deficiency (i.e., nitrogen, phosphorous, and potassium) associated with the current soil conditions.

2.3.4 Geology

(1) Geological formation

The main geology of Lanao del Sur is volcanic igneous and a part around Lanao del Sur is sedimentary and tamorphic. The main geology of Maguindanao is sedimentary and metamorphic. Geological maps of Bangsamoro are shown in Figure 2.14.



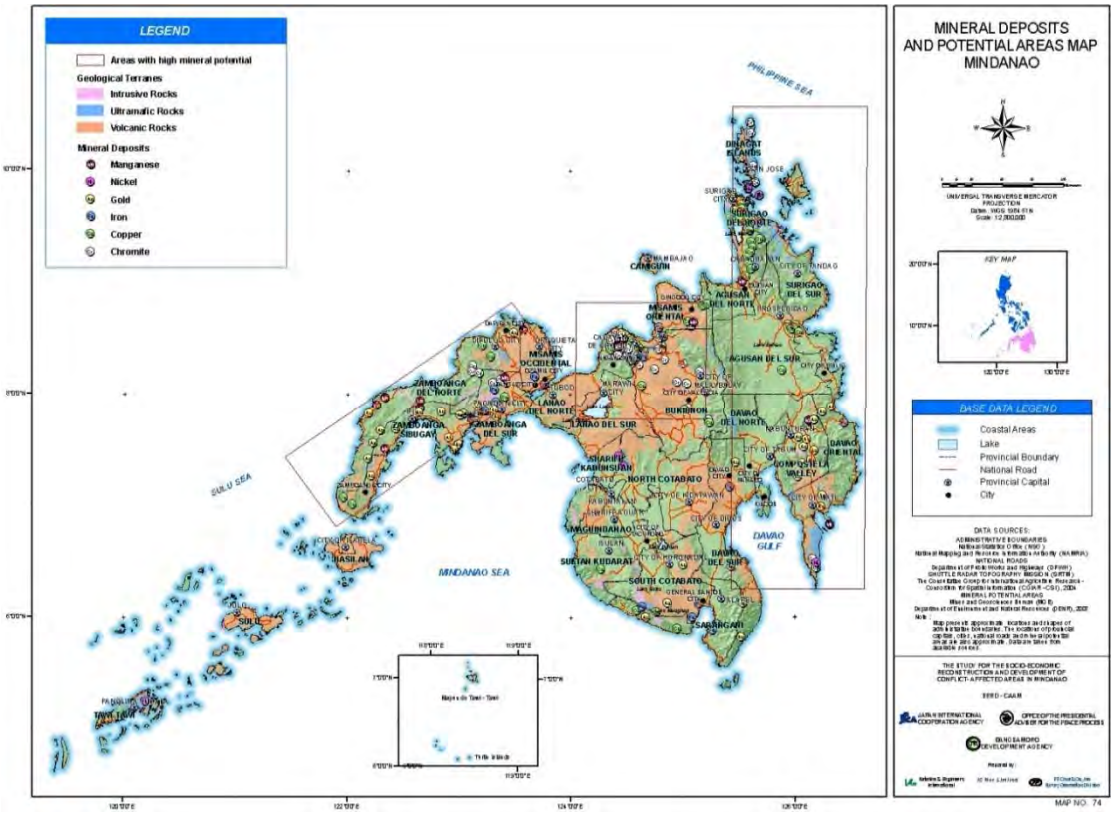


Source: Mines and Geosciences Bureau (1963).

Figure 2.14 Geological Maps of Bangsamoro

(2) Mineral deposits

Mindanao as a whole is largely underlain by intrusive rocks as shown in Figure 2.15. There exist a few areas of high mineral potentials, but they are outside the Bangsamoro. Table 2.9 presents available data on geological deposits in the BCT.



Source: SERD-CAAM.

Figure 2.15 Mineral Resources in Mindanao

Table 2.9 Mineral Deposits in BCT by Province, City, and Municipality

Province/City/ Municipality	Geological deposits	Major characteristics
BCT*		
Basilan	No data	
Lanao del Sur		
Maguindanao		
Sulu		
Tawi-Tawi	Copper, nickel, oil, sand, and gravel (quarried)	- Copper and nickel mining, and quarrying are found in the municipalities of Languyan, Panglima Sugala, Tandubas and Sapa-sapa. - Oil survey is underway in an area near the municipalities of Bongao and Mapun in the middle of Sulu Sea.
Marawi City		
Lamitan City		
Cotabato City		
Isabela City		
Lanao del Norte BCT†		
North Cotabato BCT‡	Sand and gravel (quarried in Aleosan, Carmen) Limestone (Carmen)	

* Not including barangays in the municipalities of Pigkawayan and Pikit in the Province of North Cotabato, which are included as part of the BCT due to no data; †Land areas of six municipalities in Province of Lanao del Norte, which are included as part of the BCT; ‡Land areas of barangays in the municipalities of Aleosan, Kabacan, Carmen and Midsayap in the Province of North Cotabato, excluding barangays in the municipalities of Pigkawayan and Pikit with no available data.

Sources: ARMM Regional Physical Framework Plan 2000-2030; respective LGUs' Provincial Comprehensive Development Plans (PCDPs), Provincial Development and Physical Framework Plans (PDPFPs), Comprehensive Land Use Plans (CLUPs), and Socio-Economic Profiles (SEPs) for the five BCT provinces and the expansion areas in Provinces of Lanao del Norte and North Cotabato.

2.3.5 Water resources

(1) River basins

In the Bangsamoro, there are two major river basins: the Mindanao River basin (MRB) and the Agus River basin. The Mindanao River basin is the second largest river basin in the Philippines with the catchment area of 21,503 km^2 which flows to the Illana bay through Central and Southern Mindanao. There are nine provinces and chartered cities including Lanao del Sur and Maguindanao in the Mindanao River basin, although two provinces, Agusan del Sur and Davao del Norte, are not recommended for inclusion by the Presidential Task Force on Mindanao River Basin Rehabilitation and Development (PTF-MRBRD) memberships because they occupy only a small area.

The MRB is divided into 20 sub-basins such as the Pulangui river sub-basin and the Ala river sub-basin as shown in Figure 2.16 in view of hydrological conditions, particular water management concerns and focused in-depth management planning and implementation. Table 2.7 shows the ratio of the Bangsamoro in the Mindanao River basin.

Flood (25-year flood peak) and water resources (mean annual discharge) in MRB are estimated in the Mindanao River basin Integrated Management and Development Master Plan (MRBIMDMP). The mean annual discharge is estimated by using specific flow calculated by using the records from various stations. The 25-year flood peak is estimated by rainfall-flood runoff analysis using HEC-HMS.

Since these are estimated from limited data, the 25-year flood in MRBIMDMP is compared with other estimation methods for rough verification as shown in Figure 2.17. The other estimation methods are from the NWRC (National Water Resources Council) report, the National Dredging and Flood Control Project (1981) and DPWH which is also rough. The result of MRBIMDMP estimation seems to be smaller than the other estimation methods, although there is linear relationship among them.

Figure 2.18 and Figure 2.19 show water resources (mean annual discharge) and 25-year flood peak by sub-basin in the MRB. The mean annual discharge of Upper Pulangi, Ala, and Maridagao sub-basins is more than 100 m^3/sec. From Figure 2.19, Liguasan Marsh seems to mitigate flood from the Pulungi River because the flood peak of lower Liguasan Marsh is less than the upper Liguasan Marsh.

The Agus River basin with Lake Lanao is located mainly in Lanao del Sur and Lanao del Norte as shown in Figure 2.20, and has four major rivers with only one outlet from Lake Lanao to the sea, Iligan Bay (Table 2.10). The area of the Agus River basin is 1,918 km^2.

Table 2.10 Ratio of the Bangsamoro in Mindanao River Basin

SUB_BASIN	Area (km²)	Ratio of Magundanao	Ratio of Lanao Del Sur	Total
Kulaman Sub-basin	205	0%	0%	0%
Libungan Sub-basin	935	11%	0%	12%
Maridagao Sub-basin	2,180	1%	20%	21%
Mulita Sub-basin	1,061	0%	0%	0%
Arakan Sub-basin	556	0%	0%	0%
Kabacan Sub-basin	933	0%	0%	0%
M'lang Sub-basin	688	3%	0%	3%
Malasila Sub-basin	381	16%	0%	16%
Dalika Sub-basin	629	100%	0%	100%
Manupali Sub-basin	949	0%	0%	0%
Ambal-Simuay Sub-basin	763	71%	17%	88%
Tigua Sub-basin	332	0%	0%	0%
Maapag Sub-basin	268	0%	0%	0%
Cotabato Sub-basin	1,054	74%	0%	74%
Damakling Sub-basin	228	19%	0%	19%
Banga Sub-basin	925	1%	0%	1%
Lower Pulangi Sub-basin	697	42%	0%	42%
Upper Pulangi Sub-basin	3,228	1%	0%	1%
Buluan Sub-basin	2,004	26%	0%	26%
Ala Sub-basin	3,488	19%	0%	19%

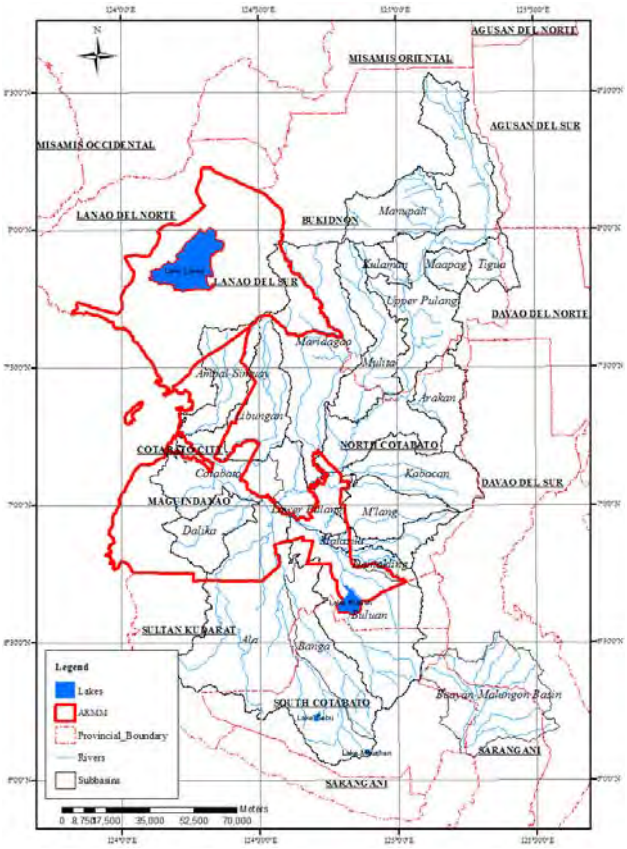
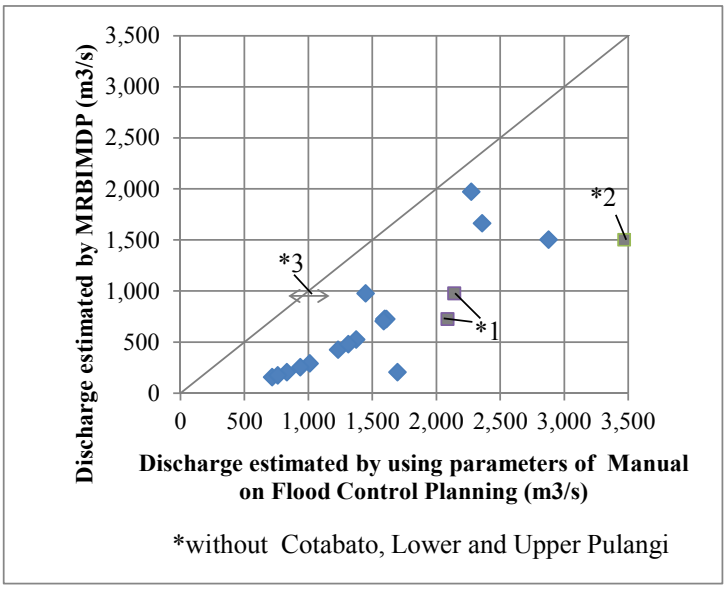


Figure 2.16 Sub-basins in MRB



*1 Estimated by discharge from Abaga basin located in Libungan, which is estimated by flow records (1949–79) in NWRC report
*2 National Dredging and Flood Control Project (1981)
*3 DPWH (Return period is unknown.)

Figure 2.17 Comparison of Flood Peaks by Sub-basins in MRB (25-year)

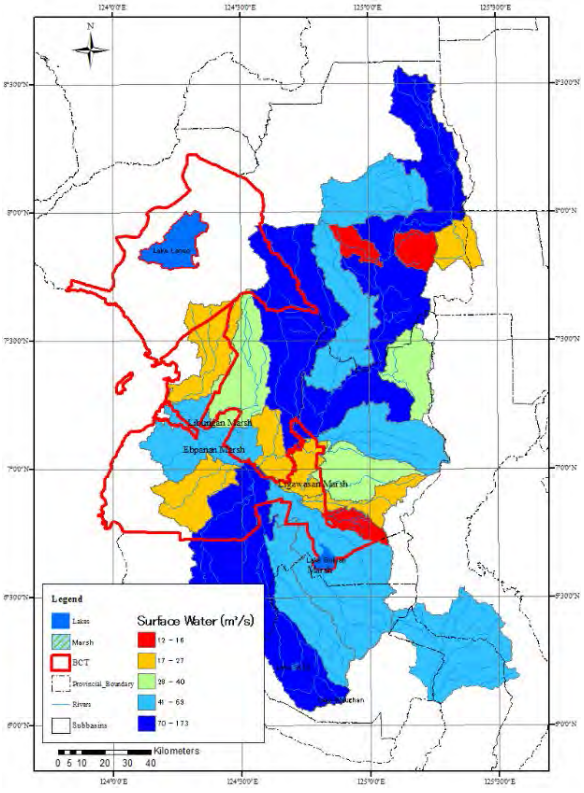


Figure 2.18 Water Resources by Sub-basin in MRB

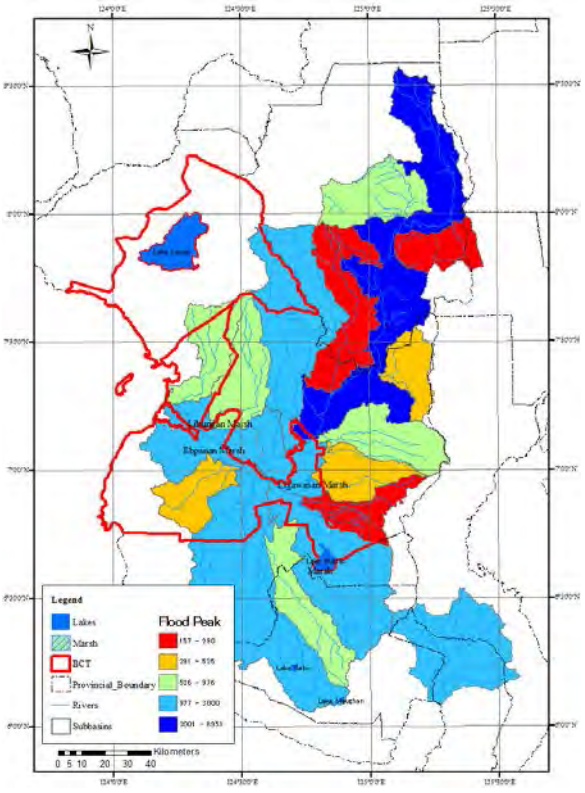
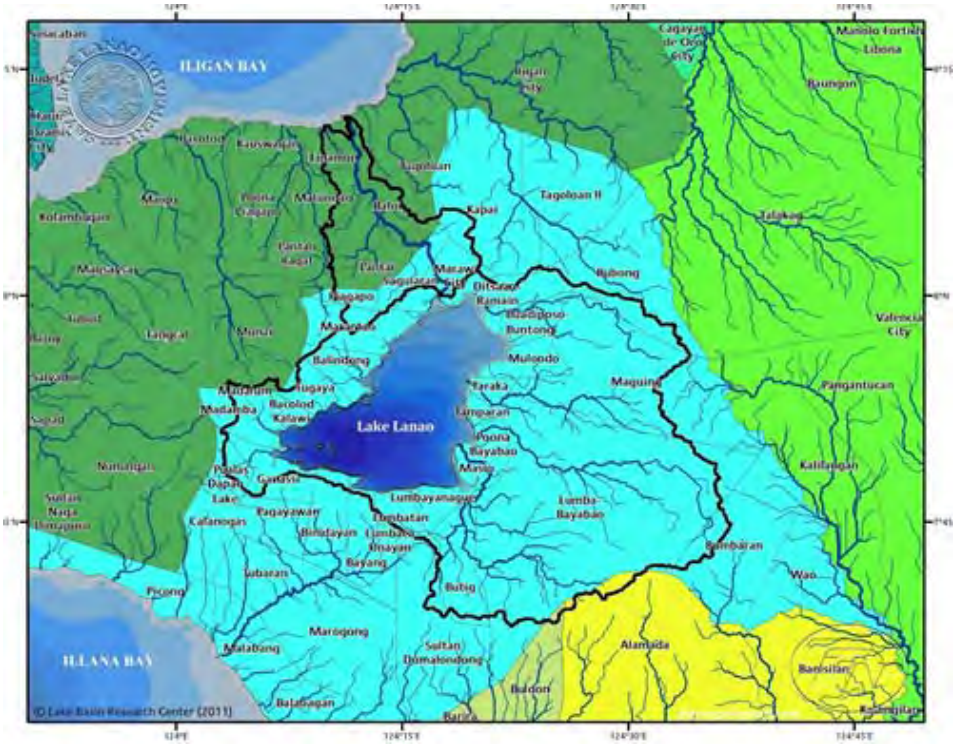


Figure 2.19 Flood Peaks by Sub-basin in MRB (25-year)



Source: Lanao River Basin ROADMAP.

Figure 2.20 Agus River Basin

(2) Groundwater

Figure 2.21 shows maps of groundwater in the Bangsamoro region. Largely volcanic igneous rock formation makes it difficult to reach groundwater in Lanao del Sur. In Maguindanao, the main geology is sedimentary and metamorphic, and there is groundwater about 20 m deep around its lowland area. Groundwater in southwestern Maguindanao is found deeper than 20 m and difficult to reach. In the islands, the geology of Basilan and Sulu is volcanic igneous. There is no information about groundwater in Basilan, and there is an area in Sulu where it is difficult to obtain groundwater. The geology of Tawi-Tawi is intrusive igneous or sedimentary and metamorphic. The classification of groundwater in Tawi-Tawi varies from difficult (to reach), deep, to shallow.

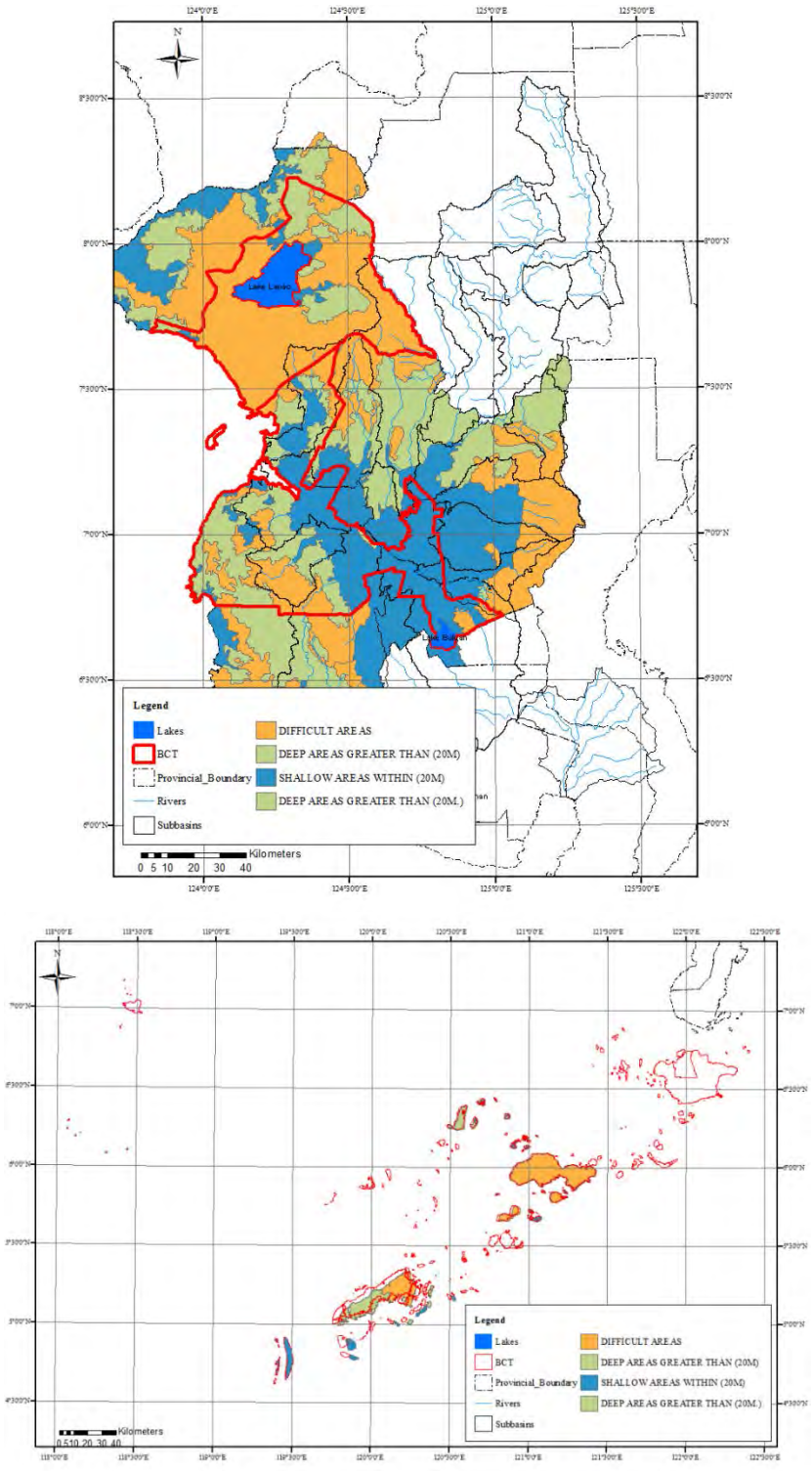
2.3.6 Forest resources

(1) Forest area

Using the NAMRIA data on land classification in the Philippines, the total land area of 1,386,735 ha in BCT in 2013 was distributed to forest land with an area of 665,151 ha, or 48% of the total, and alienable and disposable (A&D) land with an area of 628,401 ha, or 45% of the total, as shown in Table 2.11. The balance of 7% of the total land area pertains to BCT's expansion areas with no available data on existing land classification.

Among the existing five BCT provinces, Lanao del Sur has the largest forestland estimated at 254,154 ha, or 38.2% of the total forestland in the region. It was followed by Maguindanao with forestland of 198,138 ha, or 29.8% of the regional total, and Sulu with 112,353 ha, or 16.9% of the regional total.

Table 2.12 shows the area and geographical distribution of the forest cover in the Region by province in 2010, including the estimates for the Provinces of Lanao del Norte and North Cotabato, where the expansion areas of BCT are located. Among the BCT provinces, Lanao del Norte and Maguindanao have the largest forest cover in absolute terms. However, in relation to the respective forestland areas, Tawi-Tawi and Lanao del Sur have denser forest cover compared to the other three provinces.



Source: Bureau of Soils and Water Management (1950).

Figure 2.21 Groundwater Maps of Bangsamoro

Table 2.11 Land Classification in BCT by Province and Municipality, 2013

Province/Municipality	Total land area (by NAMRIA, 2013)	Forest land		Alienable/disposable land	
		Area (ha)	Share (%)	Area (ha)	Share (%)
BCT	1,386,735*	665,151	48.0	628,401	45.0
Basilan	132,723	47,149	35.5	85,574	64.5
Lanao del Sur	387,289	254,154	65.6	133,135	34.4
Maguindanao	504,760	198,138	39.3	306,622	60.7
Sulu	160,040	112,353	70.2	47,687	29.8
Tawi-Tawi	108,740	53,357	49.1	55,383	50.9
Lanao del Norte BCT†	70,738				
North Cotabato BCT‡	22,445				

* Not including barangay land areas in the municipalities of Pigkawayan and Pikit in Province of North Cotabato due to no data; †Land areas of the six municipalities in Province of Lanao del Norte, which are included as part of the BCT; ‡Land areas of barangays in the municipalities of Aleosan, Kabacan, Carmen and Midsayap in Province of North Cotabato, and excluding barangays in the municipalities of Pigkawayan and Pikit with no available data.

Source: NAMRIA as reported in 2013 Philippine Forestry Statistics.

Table 2.12 Area and Geographical Distribution of Forests, 2010

(Unit: ha)

Province	Forest land	Forest cover			
		Total	Closed	Open	Mangrove
Total	665,151	301,894	99,889	146,431	55,574
Basilan	47,149	21,320	11,442	1,003	8,875
Lanao del Sur	254,154	150,151	80,245	69,442	464
Maguindanao	198,138	52,351	8,202	43,087	1,061
Sulu	112,353	30,839		757	30,083
Tawi-Tawi	53,357	47,233		32,142	15,091
Lanao del Norte	150,731	66,384	11,934	52,122	2,328
North Cotabato	506,618	39,947	7,896	31,381	670

Source: Respective provincial socio-economic profiles.

(2) Forest reserves

Two of the most important watershed forest reserves in the BCT are Lake Lanao Watershed Reservation and South Upi Watershed Forest Reserve. The area and distribution of these forest reserves, as well as the legal basis for their conservation and protection, are presented in Table 2.13.

However, according to the 2013 Philippine Forestry Statistics, forest cover in the main BCT area increased from 250,346 ha, or 40.5% of the its total land area, in 2003 to 301,894 ha, or 45.4% of its total land area by 2010.

Table 2.13 Important Watershed Forest Reserves in BCT

Name of forest reserve	Location	Area (ha)	Proclamation No. and Date	
Lake Lanao Watershed Reservation	Lanao del Sur	180,460	871	February 26, 1992
South Upi Watershed Forest Reserve	South Upi, Maguindanao	1,894	65	June 20, 1987

2.3.7 Marine resources

Data on marine resources is limited. An earlier report indicates that 25% of the coral reef structures remaining in the Philippines lie within the island-Province of Tawi-Tawi. However, the report also identifies the environmental stressors of coral reefs in the province, particularly from population pressures and illegal fishing practices that caused degradation of its coastal ecosystems and threatened food security from the sea. This present state is compounded by the province's high population growth rate and incidence of poverty. However, the coral cover remains in good condition with an average of 59% living coral cover.

2.3.8 Key biodiversity areas and protected areas

(1) Definitions and distribution

Data on wildlife resources is not available from the documents gathered in the field. However, most of the key biodiversity areas (KBAs) identified in the Philippines host a range of globally significant species. KBAs, in the Philippines context, are identified using standard criteria based on two major conservation planning principles of vulnerability and irreplaceability. These principles are defined as follows:[1] "Vulnerability is measured by the confirmed presence of one or more globally threatened species, while irreplaceability is determined through the presence of geo- graphically concentrated species."

The criteria, as presented in the box below, indicate the types of wildlife resources, particular the trigger animal and plant species, used to identify the KBAs in the country, including those in the BCT.

Criteria for Identification of KBAs

Criterion based on vulnerability

Criterion 1: Globally threatened species. KBAs based on this criterion are identified by the regular occurrence of one or more globally threatened species—those assessed as Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) according to IUCN Red List.

Criteria based on irreplaceability

Criterion 2: Restricted-range species (RR). KBAs based on this criterion hold a significant proportion (provisionally set at 5%) of the global population of one or more species with a limited global range size (provisionally set at 50,000 square kilometers). Both the maximum range size and threshold appropriate for this criteria need further testing. In the Philippines, due to a lack of data on range and population size (both global and local), endemic species were used as a proxy for restricted-range species.

Criterion 3: Congregatory species (CC). KBAs based on this criterion hold a significant proportion (provisionally set at 1%) of the global population of a congregatory species, defined as a species that gathers in large numbers at specific sites during some stage in their life cycle (for example, breeding aggregations).

Source: Conservation International Philippines, DENR-PAWB and Haribon Foundation for the Conservation of Nature, undated. Undated. Priority Site for Conservation in the Philippines: Key Biodiversity Areas, Quezon City, Philippines.

Table 2.14 presents the types and distribution of the trigger (i.e., critically endangered, endangered, endemic, vulnerable, restricted-range and/or congregatory) species of the KBAs in the BCT, using the Sulu Archipelago and Turtle Islands Wildlife Sanctuary as examples.

Table 2.14 Examples of Trigger Species of KBAs in BCT

Key biodiversity area	Province	Municipalities covered	Trigger species	Estimated area (ha)
Sulu Achipel-ago	Tawi-Tawi, Sulu, Basilan	Languyan, Sapa-sapa, Tandubas, Balimbing (Panglima Sugala), Sitangkai, Sibutu, Sapa-sapa, South Ubian, Simunul; Indanan, Jolo, Kalingalan Caluang, Luuk, Maimbung, Old Panamao, Pandami, Panlima Estino, Pangutaran, Parang, Pata, Patikul, Siasi, Talipao, Tapul; Isabela City, Lamitan City, Lantawan, Sumisip, Tipo-tipo, Tuburan	Leatherback turtle *Dermochelys coriacea* (CR); Giant Clam *Tridacna gigas* (EN); Green turtle *Chelonia mydas* (EN); Humphead wrasse *Cheilinus undulatus* (EN); Barramundi cod *Cromileptes altivelis* (VU); Southern Giant Clam *Tridacna gigas* (EN)	4,940,529.88

[1] Conservation International Philippines, DENR-PAWB and Haribon Foundation for the Conservation of Nature, undated. Undated. Priority Sites for Conservation in the Philippines: Key Biodiversity Areas, Quezon City, Philippines.

Key biodiversity area	Province	Municipalities covered	Trigger species	Estimated area (ha)
Turtle Islands Wildlife Sanctuary	Tawi-Tawi	Turtle Islands	Hawksbill turtle *Eretmochelys imbricata* (CR); Green turtle *Chelonia mydas* (EN); Giant Clam *Tridacna gigas* (EN)	244,463.63

Source: Respective provincial socio-economic profiles.

(2) Characteristics

A total of 16 key biodiversity areas (KBAs) have been identified within the BCT, with a total area of 726,000 ha (Table 2.15). These KBAs are potential protected areas, once the biodiversity resources have been validated.

Fifteen protected areas (PAs) covering 489,000 ha have been established in the BCT (Table 2.15). Of these, Mt. Apo Natural Park has fully complied with the processes required under the National Integrated Protected Areas System (NIPAS) Act, which was established through a Republic Act. Four other PAs have been established through Presidential Proclamation based on the NIPAS Act. These are 1) Turtle Island Wildlife Sanctuary, 2) Mt. Dajo National Park, 3) Basilan Natural Biotic Area, and 4) Mt. Inayawan Range National Park.

The rest were established prior to the enactment of the NIPAS Act, which means they have to undergo protected area suitability assessment and other steps before they can be proclaimed and legislated. These PAs are considered initial components of NIPAS until the time they are established by Presidential Proclamation and, eventually, through Republic Act. One PA, the Bud Bongao Local Conservation Area (LCA), was established through a Local Ordinance.

It should be noted that there is no one-to-one correspondence between the identified KBAs and PAs. Ten KBAs have not yet been established as PAs, while nine PAs in were established in areas where there were no identified KBAs. According to the DENR-EMB Memorandum Circular No. 5 dated July 2014, PAs and KBAs are categorized as environmentally critical areas (ECCs) and therefore all development activities should comply with the EIS requirements[2].

Table 2.15 Profiles of Key Biodiversity Areas and Protected Areas in BCT

Province	KBAs	Municipalities	Area (ha)	PAs	Location	Area	Legal status
Sulu	Turtle Islands Protected Landscapes and Seascapes	Turtle Islands municipality	No data	Turtle Island Wildlife Sanctuary	Turtle Islands municipality	242,967	Presidential Proclamation No. 171, 1999
	Mt. Dajo National Park	Patikul, Talipao	3,304	Mt. Dajo National Park	Patikul and Talisay, Sulu	213	Proclamation 261, February 28, 1938
Tawi-Tawi	Tawi-Tawi Island	Languyan, Bongao	5,851	Bud Bongao Local Conservation Area	Bongao, Tawi-Tawi	103	Established thru LGU Ordinance
	Simunul and Manuk Manka Islands	Simunul	19,402	No PA			
	Sibutu and Tumindao Islands	Sitankai	116,763	No PA			
	Cagayan de Sulu (candidate KBA)	Cagayan de Sulu	7,550	No PA			
Basilan	Basilan Natural Biotic Area	Lamitan, Isabela, Sumisip, Tipo-tipo	4,497	Basilan Natural Biotic Area	Lamitan, Isabela, Sumisip, Tipo-tipo,	4,497	Presidential Proclamation No. 321, May 31, 2000
Lanao del Norte	No KBA			Mt. Inayawan Range Natural Park	Nunungan	3,120	Presidential Proclamation No. 1344, July 30, 2007

[2] EMB Memorandum Circular No. 5, dated July 2014. Revised Guidelines for Coverage Screening and Standardized Requirements under the Philippine EIS System.

Province	KBAs	Municipalities	Area (ha)	PAs	Location	Area	Legal status
Lanao del Norte and Lanao del Sur	Munai/Tambo	Karomatan, Kapatagan, Sapad, Nunungan, Salavador, Tangkal, Magsaysay, Maigo, Pantao Ragat, Munai, Maratao, Balindong, Tugaya, Bacolod-Kalawi, Madamba, Calanogas	69,836	No PA			
	Olangui River	Saguiaran, Pantao, Ragat, Pantar, Balo-I, Matungao, Iligan City	4,674	No PA			
Lanao del Sur	Lake Lanao	Marawi City, Ditsaan Ramain, Buadipuso Buntong, Molundo, Taraka, Tamparan, Poona Bayabao Masui, Lumbayanague, Lumbatan, Bayang, Binidayan, Pagayawan, Ganassi, Madamba, Madalum, Bacolod-Kalawi, Tugaya, Balindong, Marantao	36,351	Lake Lanao Watershed Reserve		180,460	Proclamation 871, February 23, 1992
	No KBA			Sacred Mountain National Park	Marawi City	94	Republic Act 4190, May 5, 1965
				Salikata National Park	Lumba Bayabao	undetermined	Republic Act 4190, May 5, 1965
				Rungkunan National Park	Ramain	undetermined	Republic Act 4190, May 5, 1965
				Pantuwaraya Lake	Saguiran	20	Republic Act 4190, May 5, 1965
				Lake Dapao National Park	Pualas	1,500	Republic Act 4190, May 5, 1965
				Lake Butig National Park	Butig	68	Republic Act 4190, May 5, 1965
Lanao del Sur, Cotabato and Maguindanao	Mt. Pinagayungan	Lumba Bayabao, Rumbaran, Wao, Maguing, Poona Bayabao, Masui, Butig, Marogong, Tubaran, Lumbayayanague, Matanog, Barira, Buldon, Alamada	154,340	No PA			
Maguindanao and North Cotabato	Pulangui River (candidate KBA)	Kabacan, Midsayap, Pikit, Pigcawayan, Matalam, Antipas, Carmen, Pagalungan, Datu Piang, Sultan Kudarat, Kabuntalan, Cotabato City, Maramag, Don Carlos, Kitaotao, Dancagan, Damulog, Kibawe, (also cover Impasug-ong, Cabanglasan, San Fernando, Quezon, Malaybalay, Valencia, Loreto in Bukidnon province	131,002				
Noth Cotabato	Mt. Sinaka	Arakan (also covers Davao City)	1,749	No PA			
	No KBA			Mado Hotspring	Awang	48	Republic Act 456, September 25, 1939

Province	KBAs	Municipalities	Area (ha)	PAs	Location	Area	Legal status
	Mt. Apo Natural Park	Arakan, Magpet, Kidapawan, Makilala (also covers Bansalan, Digos, Sta. Cruz, Davao City, in Davao del Sur)	99,091	Mt. Apo Natural Park	Kidapawan, Makilala, Magpet, Cotabato, Sta Cruz, Bansalan, Digos City and Davao City, Davao del Sur	54,974	Republic Act 9237, February 3, 2004
	Ligawasan Marsh	Pikit, M'lang, Tulunan, Pagalungan, Gen. S.K. Pendatun, Sultan sa Barongis, Don Mariano Marcos (also cover Maguindanao and Sultan Kudarat)	39,424	No PA (Candidate PA)			
Maguindanao	Mt. Daguma	Ampatuan, Esperanza (also include Isulan and Bagumbayan in Sultan Kudarat)	32,260	No PA			
	No KBA			South Upi, Watershed Forest Reserve	South Upi, Maguindanao	1,894	Proclamation 65, February 20, 1987
Total			726,094				489,958

Source: Respective provincial socio-economic profiles.

Only Turtle Island Wildlife Sanctuary has existing Protected Area Management Plan and Protected Area Management Board (PAMB). Basilan Natural Biotic Area and Mt. Inayawan Range National Park have initial Management Plans and existing PAMBs. The rest of the PAs do not have PAMBs and Management Plans.

2.3.9 Water and air quality

(1) Water quality

Data on water quality are not readily available in the BCT, even in its four key cities, indicating the little studies done on this environmental quality aspect. Water quality assessment has been undertaken only in Lake Lanao in the Province of Lanao del Sur, because of its major importance to power generation accounting for 70% of power supply in the entire Mindanao island, the socio-cultural and economic activities of the local communities in the Provinces of Lanao del Sur and Lanao del Norte, and the sustainable development of Lake Lanao and its surrounding communities.

In September 2011, an analysis of variance for parameters of water quality in three sample sites (Marawi City, Masiu, and Madamba) around Lake Lanao was done. The results show that the concentrations of water quality parameters excluding phosphate are within the normal limits, based on the DENR Administrative Order No. 34. Table 2.16 presents the results of analysis of water quality parameters in Lake Lanao.

Table 2.16 Analysis Results of Water Quality Parameters in Lake Lanao, Lanao del Sur

Sampling site	pH	Temp CC	Turbidity NTU	TDS mg/l	DO	Ca mg/l	PO_4 mg/l	Mg mg/l	Ch mg/l	NO_3 mg/l	Total coliform cfu/ml
Marawi City	7.7	25.2	2.32	51	5.53	0.88	0.0880	10.20	3.19	0.1281	102
Masiu	6.6	20.4	4.18	56	5.93	1.36	0.1186	10.88	3.33	0.0826	139
Madamba	6.5	25.4	1.28	52	5.43	1.20	0.0651	13.42	3.19	0.1293	97
DENR Standard Class A	6.5-8.5	3	No standard value	1,000	70	No standard value	0.1	No standard value	250	10	1,000

Note: Conducted by Iligan City Waterworks System, September 2011.

(2) Air quality

No available data has been found on air quality in Bangsamoro.

2.4 Social Environment

2.4.1 Demography

(1) Population and population density

As of 2010 census, the expanded administrative coverage of BCT has an estimated total population of 3,482,282 individuals. In 2000 census, the population had been counted at 2,888,461 individuals, indicating an increase of 593,821 individuals over the 10-year period. Table 2.13 presents the total population and population density in the BCT by province and municipality in 2000 and 2010. The two most populous provinces were Maguindanao and Lanao del Sur, accounting for about 54% of the BCT population in 2010. These provinces, including Sulu, showed sharp increase in the number of total population between 2000 and 2010.

Population density in the BCT has also increased from 208 persons per square kilometer (p/km^2) in 2000 to 251 p/km^2 in 2010. The Provinces of Sulu and Tawi-Tawi registered the largest increase, estimated at 449 p/km^2 and 337 p/km^2, respectively, which were higher than the regional average in 2010 (Table 2.17).

Table 2.17 Population and Population Density by Province/Municipality, 2000 and 2010

Province/Municipality	Population		Population density (/km^2)	
	2000	2010	2000	2010
BCT	2,888,461	3,482,282	208	251
Basilan	257,796	293,322	194	221
Lanao del Sur	800,162	933,260	207	241
Maguindanao	801,102	944,718	159	187
Sulu	619,668	718,290	387	449
Tawi-Tawi	322,317	366,550	296	337
Lanao del Norte BCT	87,416	136,993	124	194
North Cotabato BCT		89,149		397

Sources: Philippine Statistics Authority, 2014; QuickSTAT.

(2) Population growth

Disaggregated data on population growth by gender (male and female), and urban-rural dichotomy were not completely and readily available in the expansion areas of BCT for 2000 and 2010. Hence, the population growth data, as presented in this section, included mainly the five provinces with the four cities of BCT. Overall, the average annual population growth rate in the BCT from 2000 to 2010 was estimated at 2.41%, compared to the national average of 1.90% for the same period. The fastest growing provinces for the period were Basilan, Tawi-Tawi, and Lanao del Sur, with estimated annual population growth rates of 3.78%, 3.51%, and 2.92%, respectively, which were relatively higher than the regional average.

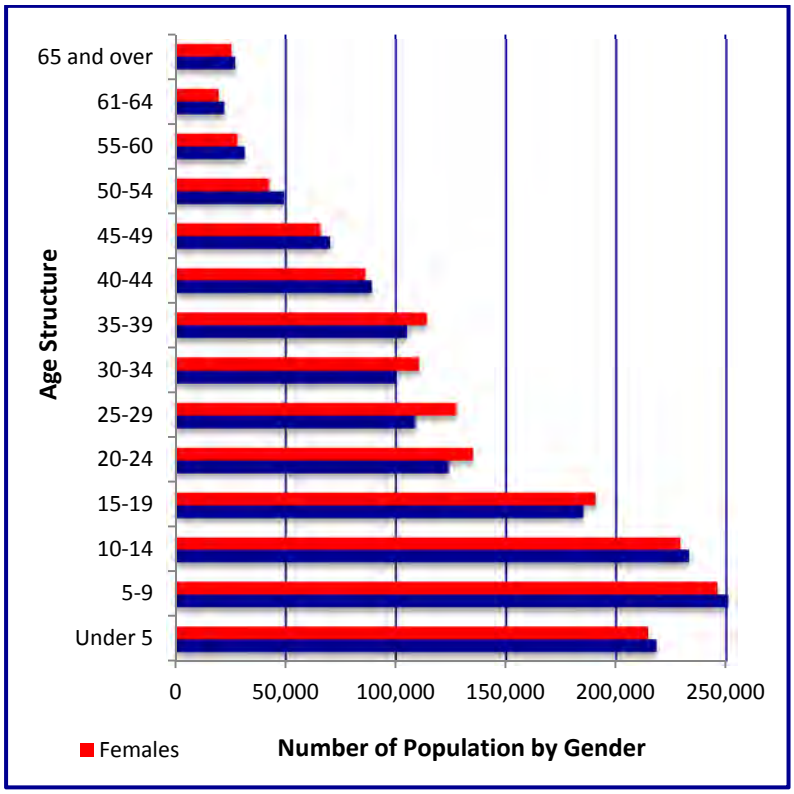
Population was generally concentrated in the rural areas than the urban areas at a ratio of 2:1. This reflects the generally dominant agricultural and rural character of the large part of the BCT, with the urban centers mainly located in the Cities of Marawi, Cotabato, Lamitan and Isabela. In the five provinces of BCT (i.e., excluding the expansion areas), 72% of the population was situated in the rural areas compared to only 28% residing in the urban areas in 2010.

(3) Age structure of population

Figure 2.22 presents the 2010 population of BCT by age structure and gender, which is generally reflects a young regional population. A total of 55.4% (1,767,890) of the population was from under 5 to 19

years of age.

Age groups	Gender	
	Males	Females
All ages	1,614,598	1,634,189
< 5	218,307	214,510
5–9	251,001	246,060
10–14	233,213	228,955
15–19	185,175	190,669
20–24	124,034	135,059
25–29	108,809	127,358
30–34	100,188	110,636
35–39	104,942	114,002
40–44	89,046	86,001
45–49	70,019	65,804
50–54	49,147	42,474
55–60	31,529	28,074
61–64	22,058	19,313
65 ≤	27,130	25,274



Source: 2010 Census.

Figure 2.22 Population by Age Structure and Gender, 2010

(4) Household size

The average household size in BCT was 6.0 compared to the national average of 4.6 in 2010. Household refers to "an aggregate of persons, generally but not necessarily bound by ties of kinship, who live together under the same roof and eat together or share in common the household food. Members comprise the head of the household, relatives living with him/her and other persons who share the community life for reasons of work or other consideration"[3]. A person who lives alone is considered a separate household. The Province of Lanao del Sur had a household size of 6.5, which was larger than the regional average in 2010.

(5) Ethnic composition

The BCT is composed of multi-ethnic population. In the ARMM Regional Physical Framework Plan 2000-2030, there were 12 major ethnic groups identified in the region in 1995. Of these groups, the most dominant are Maguindanaon, Maranao, Tausug, and Samal. Table 2.18 presents the ethnic composition in each province/area of BCT in recent years, including the dominant ethnic groups. In the mainland, Maguindanaos, Iranons and Tedurays are the dominant ethnic groups in the Province of Mindanao. The Tedurays are the indigenous peoples situated in the areas of North Upi and South Upi areas. In Lanao del Sur, the dominant ethnic group is the Maranaos. In the island provinces of Basilan, Sulu and Tawi-Tawi, the dominant ethnic groups are Yakans, Tausugs, Sama, Chavacano, Cebuano, Bisaya, and Badjaos. In the expansion areas of BCT, the dominant ethnics groups are composed of Maranao, Cebuano and Binisaya in the Province of Lanao del Norte; and Maguindanaon, Cebuano, and Hiligaynon/ Ilonggo in Province of North Cotabato.

[3] NSO, Integrated Survey of Households Bulletin, Series 99

Table 2.18 Ethnic Composition in BCT

Province/ Municipality	Ethnic composition	
	Existing ethnic groups	Dominant ethnic group
Basilan	Yakan, Tausug, Zamboangueno/Chavacano, Samal, Bajao, Cebuano, Ilonggo, Tagalogs, Ilocanos, Waray, Bicolanos, Maranaos, Iranons and Maguindanaos	Yakan, Tausug
Lanao del Sur	Maranao, Hiligaynon/Ilonggo, Cebuano, Ibanag, Iranon, Bisaya/Binisaya, Tagalog, Maguindanaon, others (not specified)	Maranao
Maguindanao	Maguindanaon, Iranon, Tiduray	Maguindanaon, Iranon, Tiduray
Sulu	Tausug, Sama (Samal)/Abaknon, Badjao (Sama Dilaut), Ibanag, Kiniray-a, others (not specified)	Tausug, Sama (Samal)/ Abaknon
Tawi-Tawi	Sama Daliya, Tausug, Sama (Sama Akanon), Jama Mapun, Badjao (Sama Dilaut), others (not specified)	Sama Daliya, Tausug
Lanao del Norte BCT	Maranao, Cebuano, Binisaya, Boholano, others (not specified)	Maranao, Cebuano, Binisaya
North Cotabato BCT	Maguindanaon, Cebuano, Hiligaynon/Ilonggo, Ilocano, Manobo/Manubo, Tausug, Maranao, Iranons, Kapampangan, Bicolano, Boholano, others (not specified)	Maguindanaon, Cebuano, Hiligaynon/Ilonggo

Sources: Basilan Comprehensive Development Plan 2011–2013; Lanao del Sur Provincial Socio-Economic Profile 2007; Sulu Provincial Development and Physical Framework Plan 2008–2013; Tawi-Tawi Provincial Development and Physical Framework Plan 2008–2013; Lanao del Norte Enhanced Provincial Development and Physical Framework Plan 2013–2018; Midsayap Municipal Socio-Economic Profile; Pigcawayan Municipal Comprehensive Land Use Plan 2011–2020; Pikit Municipal Socio-Economic Profile.

(6) Migration trend

Data on migration patterns/trends have not been generally available in most provinces and cities in the BCT, though existing regional and provincial plans have identified migration as one of the key variables of planning.

Of the total number of internally displaced persons (IDPs) by conflict in Mindanao, 123,779 in December 2014, the majority is in the ARMM area with a total of 64,648 people in the mainland, and 28,526 in the islands in 2014 (Displacement Dashboard). As the report of the Protection Cluster Mindanao points out, most of the recent conflict related displacements were caused by the armed clashes between the Armed Forces of Philippines (AFP) and the Bangsamoro Islamic Freedom Fighters (BIFF), and sporadic clashes between the Abu Sayaf Group (ASG) and the AFP displaced over 16,000 people in Basilan and Sulu.

2.4.2 Employment and income

(1) Employment

Philippine Statistics Authority (PSA) reported the 2013 total employment in BCT at 1,229,000 persons, of which the agriculture sector accounted for 68.3% (840,000 persons) as compared to 11.8% in the Philippines as a whole. In 2012, the agriculture sector comprised 70% of the total employment in the BCT. Table 2.19 shows the percentage share of the different sectors to the total employment in the BCT and other regions of Mindanao where the expansion areas of BCT are situated. Next to agriculture, wholesale and retail trade sector (including repair of motor vehicles and motorcycles) contributed 13% and 14% to the total employment in the BCT in 2012 and 2013, respectively.

Over the past four years, 2011–2014, the employment rate in the BCT has remained high, compared to other regions in the Philippines as shown in Table 2.20. Employment data in the Philippines do not distinguish underemployment. The high employment is a reflection of widespread underemployment particularly in rural areas. The employment rate tends to be higher as the share of agricultural employment is larger as is the case in Bangsamoro.

Table 2.19 Employment by Major Industry Group in BCT and Other Parts of Mindanao

Sector	BCT/ARMM		Northern Mindanao		Central Mindanao	
	2012	2013	2012	2013	2012	2013
Agriculture, Hunting and Forestry	53%	53%	41%	38%	47%	46%
Fishing and Aquaculture	17%	15%	2%	2%	3%	3%
Manufacturing	1%	1%	5%	6%	5%	5%
Construction	1%	1%	5%	6%	3%	3%
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	13%	14%	17%	18%	16%	17%
Transportation and Storage	6%	6%	6%	6%	6%	6%
Accommodation and Food Service Activities	1%	1%	3%	3%	3%	2%
Public Administration and Defense; Compulsory Social Security	4%	3%	5%	5%	5%	5%
Education	3%	3%	3%	3%	3%	3%
Activities of Households as Employers; Undifferentiated Goods	1%	1%	5%	5%	4%	4%
Activities of Households for Own Use	0%	0%	1%	1%	1%	1%

Source: PSA.

Table 2.20 Employment Rate in BCT, 2011–2014

Year	2011	2012	2013	2014
Employment rate (%)	96.3	97.1	95.3	96.5

Source: PSA.

(2) Income

Data on family incomes by income backet/class were available only at the regional (BCT/ARMM) level in 2012, as presented in Table 2.21. About 86.5% (456) of the families reporting converged on two income brackets: PHP 100,000.00–249,999.00 and PHP 60,000–99,999.00, which accounted for about 78.4% (PHP 51.991 million) of the total family income. Families belonging to these income brackets earned an average income of PHP 139,866.67 and PHP 81,218.90, respectively, in 2012. However, an annual family income of PHP 81,218.90 was below the poverty threshold of PHP 94,680.00 in the same year[4].

Table 2.21 Family Incomes by Income Bracket and Major Sector in BCT, 2012

Income bracket/class	BCT/ARMM		Agriculture		Industry		Services	
	Income reported (PHP 10^6)	Families (10^3)	Income reported (PHP 10^6)	Families (10^3)	Income reported (PHP 10^6)	Families (10^3)	Income reported (PHP 10^6)	Families (10^3)
< 40,000	140	4	106	3			34	1
40,000–59,999	1,843	35	1,575	30	45	1	223	4
60,000–99,999	16,325	201	13,114	163	792	10	2,417	28
100,000–249,999	35,666	255	22,468	165	1,566	11	11,632	79
250,000 ≤	12,316	32	3,242	10	231	1	8,843	22
Total	**66,290**	**527**	**40,504**	**372**	**2,634**	**22**	**23,149**	**134**

Sources: Philippine Statistical Authority, 2014; 2012 Family Income and Expenditure Survey (Additional Tables).

(3) Poverty situation

General conditions and nature of poverty

Poverty in the Philippines is usually measured in terms of poverty incidence, which is defined by PSA

[4] In 2012, the monthly poverty threshold for a family of five members was estimated at PHP 7,890.00, or PHP 94,680 for that whole year. National Statistical Coordination Board, 2013. 2012 Full Year Official Poverty Statistics. Makati City, Philippines.

as "the proportion of families/individuals with per capita income/expenditure less than the per capita poverty threshold to the total number of families/individuals."[5] Poverty threshold is defined as "the minimum income/expenditure required for a family/individual to meet the basic food and non-food requirements." Table 2.22 presents the general condition and nature of poverty in the BCT and selected regions in Mindanao, where the expansion areas of the BCT are located, for the period 2009 and 2012.

Annual per capita poverty threshold in the main BCT covered area in the current ARMM was PHP 20,517.00 in 2012 or 23% higher than the 2009 poverty threshold level of PHP 16,683.00. This translates to about 271,355 families in the whole region who lived below the poverty threshold, or an estimated 1.854 million of the regional population. In the neighboring Northern Mindanao and Central Mindanao Regions, annual per poverty thresholds were estimated at PHP 19,335.00 and PHP 18,737.00, respectively, in 2012. These figures were equivalent to poverty incidence among families and population estimated at 32.8% and 39.5%, respectively, in Northern Mindanao Region; and 37.1% and 44.7% in Central Mindanao Region.

Table 2.22 Poverty Threshold and Incidence in BCT and Other Regions in Mindanao

Poverty threshold/Poverty incidence	ARMM		Northern Mindanao		Central Mindanao	
	2009	2012	2009	2012	2009	2012
Per-capita poverty threshold (PHP/yr.)	16,683	20,517	16,878	19,335	16,405	18,737
Poverty incidence among families (%)	39.9	48.7	33.3	32.8	30.8	37.1
Poverty incidence in population (%)	47.4	55.8	40.1	39.5	38.3	44.7
No. of poor families	212,494	271,355	298,472	320,113	274,043	366,169
Poor population	1,507,868	1,854,188	1,661,208	1,759,570	1,511,050	1,895,820

Source: Philippine Statistics Authority.

Gini coefficient

No data on gini coefficients were readily available in the BCT. Even at the national level, the latest gini coefficient estimate was published in 2009. In a technical note on other measures of poverty, PSA presented a list of top 10 provinces with lowest and highest gini coefficient estimates, indicating the level of inequality of income distribution among the provinces in the Philippines in 2000. Of the top 10 provinces with the lowest gini coefficients, Sulu, Lanao del Sur, and Basilan were ranked the three leading, with estimates of 0.244, 0.271 and 0.283, respectively. On the other hand, the neighboring Province of Lanao del Norte was ranked fourth of the top 10 provinces with highest gini coefficients, estimated at 0.511.

In the Province of Sulu, with the lowest gini coefficient in 2009, indicating a low level of inequality of income distribution, and at the same time it was also ranked 1 of the 10 poorest provinces in the same year. Similarly, the Province of Lanao del Sur was ranked seventh of the 10 poorest provinces despite it was ranked number 2 in the list with lowest gini coefficients.

Government policy or remedial measures for poverty reduction

The common program consistently mentioned by key stakeholders in the BCT during the KII and FGD sessions to pursue poverty reduction is the Pantawid Pamilya Program or the Conditional Cash Transfer (CCT) Program. The national program is managed by the Department of Social Works and Development (DSWD) and implemented by the DSWD regional offices in partnership with LGUs. Each LGU has its own programs, projects and activities to address poverty. In some LGUs, the programs are linked with the CCT for better results. National government support is also a major contributor to LGUs' poverty projects particularly those implemented under the Grassroots Participatory Planning and Budgeting (GPPB) Program.

[5] PSA/ PSA/NSCB, 1997 Philippine Poverty Statistics.

2.4.3 Social services and infrastructure

(1) Education

Literacy rate

The simple literacy rate statistics from PSA/National Statistics Office (NSO) for the main BCT area and other regions in Mindanao for the period 1990 and 2000 is shown in Table 2.23. The lowest literacy rate was recorded in the Province of Sulu with 58.3% in the year 2000, followed by the Provinces of Maguindanao with 66.3%, Basilan with 72.2% and Tawi-Tawi with 73.5%. Only the Province of Lanao del Sur recorded a functional literacy rate of 80.1%. The two neighboring Provinces of North Cotabato and Lanao del Norte have the higher functional literacy rates estimated at 86.7% and 85.0% respectively.

Table 2.23 Literacy Rate for the Main BCT Areas and other Regions in Mindanao

Provinces	Literacy rate (%)	
	1990	2000
Basilan	66.00	72.23
Sulu	59.77	58.29
Tawi-Tawi	79.79	73.48
Lanao del Sur	82.53	80.12
Maguindanao	69.28	66.27
Lanao del Norte	90.88	85.04
North Cotabato	88.80	86.69

Source: Philippine Statistics Authority.

Enrollment

As presented in Table 2.24, the total primary school enrollment in the 2013–2014 school year represents 66% of the primary school-age children 5–14 years old in BCT. The primary school students were almost equally divided between boys and girls, 48% (333,992) and 53% (359,653), respectively. In the same school year, 162,266 students were enrolled at the secondary school level, of whom 94,011 were female accounting for 58% and 68,255 were male accounting for 42%. The total enrollment represents about 39% of the 15–19-year old population of 419,133 (as of 2010 census).

Table 2.24 Primary and Secondary School Enrollment in BCT, SY 2013–2014

Level	Enrollment			Enrollment rate (%)
	Boys	Girls	Total	
Primary school	333,992	359,653	695,979	66
Secondary school	68,255	94,011	162,236	39

Source: EBIS database.

(2) Schools and daycare centers

According to data obtained from the Department of Education (DepEd)-ARMM, there are 12,436 school buildings for primary schools and 2,687 for secondary schools in the region, which are distributed in the five provinces as shown in Table 2.25. However, the number of classrooms in these school buildings is unknown. In addition, there are about 1,629 daycare centers for preschool childrean in the region.

(3) Hospitals and clinics

The most common health facilities in the BCT are the Rural Health Units (RHUs) based in each municipality and the Barangay Health Centers (BHCs) in each barangay (Table 2.26). In the Province of Basilan (excluding Isabela City), there are 10 RHUs in the 12 municipal/city LGUs and 75 BHCs of the 210 barangays. Public and private hospitals and provincial hospitals are available in the province particularly in Lamitan City and Isabela City.

In the Province of Sulu, there are 19 RHUs in the 19 municipal LGUs and 43 BHCs out of the 410

barangays. In addition, the province has eight hospitals with a total capacity of 380 beds.

Table 2.25 Number of Primary and Secondary Schools and Daycare Centers in BCT

Province	Primary school buildings	Secondary school buildings	Daycare centers
Total	12,436	2,687	1,629
Basilan	1,169	211	136
Sulu	2,051	325	162
Tawi-Tawi	1,467	225	173
Lanao Sur	4,388	1,250	494
Maguindanao	3,361	676	620
Isabela City			44
Cotabato City	No data	No data	No data
Lanao de Norte	No data	No data	No data
North Cotabato	No data	No data	No data

Source: EBIS database.

Table 2.26 Health Facilities in BCT by Province/City

Province/City	RHUs	BHCs	Hospitals
Basilan	10	75	1. Provincial District Hospital* (25 beds) 2. Torres Hospital (private, 21 beds)
Sulu	19	43	1. Sulu Provincial Hospital* (100 beds) 2. Lutuk Hospital (65 beds) 3. Parang Hospital (53 beds) 4. Siasi Hospital (69 beds) 5. Pangutaran Hospital (41 beds) 6. Panamao Hospital (no data) 7. Tapul Hospital (52 beds) 8. Tongil Hospital (no data)
Tawi-tawi	11	39	Five (5) Government Hospitals (one Provincial District Hospital in Bongao* and other hospitals in Languyan, Mapun, Sapa-sapa, Sitangkai) Two (2) Private Hospitals located in Bongao with 130 beds in total
Lanao del Sur	26	63	Six (6) Government Hospitals: 1. Amai Pakpak General Hospital* (100 beds) 2. Tamparan District Hospital* (25 beds) 3. Balindong Municipal Hospital (10 beds) 4. Dr. Serapio B. Montaner Memorial Hospital (25 beds) 5. Unayan Municipal Hospital (10 beds) 6. Wao District Hospital (25 beds) Ten (10) Private Hospitals
Maguindanao†	23	194	1. Buluan District Hospital* 2. Dinaig Municipal Hospital 3. Maguindanao Provincial Hospital 4. Iranon District Hospital 5. Datu Blah Sinsuat District Hospital 6. South Upi Municipal Hospital 7. Regional Hospital*‡
Isabela City (Basilan)	NA	31	1. Basilan General Hospital* (100 beds) 2. JS Alano Hospital (private, 25 beds) 3. Basilan Community Hospital (private, 35 beds) 4. Infant Hospital (private, 25 beds)

*Top referral hospitals in the respective provinces; †inluldes Catabato City in this table though not included in BCT; ‡located at Catabato City

Sources: Basilan Comprehensive Development Plan-Executive Legislative Agenda 2011–2013; Lanao del Sur Provincial Development and Physical Framework Plan 2009–2014; Sulu Provincial Development and Physical Framework Plan 2008–2013; Tawi-Tawi Provincial Development and Physical Framework Plan 2008–2013; Isabel City Socio-Economic Profile 2013.

2.4.4 Heritage and tourism resources

(1) Heritage sites

Among the acknowledged heritage sites, the followings are in the BCT:

1) House on stilts: Typical fishers' village of Sama and Tausugs in Sapa-Sapa Municipality, Tawi-Tawi Province[6].
2) Sheikh Makdum Mosque: A poignant reminder of the beginnings of Islam in the Philippines; declared as a National Historical Landmark by virtue of House Bill No.99, which recognizes the contribution of Islam in the development of culture and civilization in the country[7].
3) Torogan: The ancestral house of the upper-class Maranao in the Lanao Region of Mindanao. It is the dwelling place of the Datu (Chieftain) along with his wives and children. There could not be any house larger than Torogan of the Datu within the sultanate, for this signifies rank, prestige and wealth[8].

(2) Tourist sites

Various tourism sites are found in the BCT. They include natural and man-made tourism sites. The sites are at varying degree of development and potentials particularly for community-based tourism. The list of the sites is shown in Annex to Chapter 2.

Table 2.27 shows the number of foreign and local tourists who visited the different provinces in BCT from 2010 to 2013. Overall, the number of tourists has increased, particularly among local tourists in the past three years and foreign tourists in 2013.

Table 2.27 Number of Tourists in BCT

Province	Number of tourists/visitors							
	Local tourists				Foreign tourists			
	2010	2011	2012	2013	2010	2011	2012	2013
ARMM	122,618	144,543	141,266	147,697	2,551	2,452	2,688	3,366
Basilan	20,130	19,019	19,799	20,117	21	16	17	25
Sulu	13,763	15,636	14,067	14,690	11	8	14	17
Tawi-Tawi	33,755	37,067	36,025	38,244	215	280	380	185
Lanao del Sur	38,240	45,693	44,700	47,619	14	27	32	35
Maguindanao	14,720	25,117	24,663	25,014	280	110	233	1,091

Source: ARMM Regional Planning and Development Office, Regional Development and Investment Program.

(3) Policy on tourism

The Department of Tourism has listed 78 "existing and emerging tourism development areas" that the Aquino administration will be protecting from mining activities. According to the list, the protected areas are islands with known fragile ecosystems, and Basilan, Tawi-Tawi, and Jolo in the ARMM are among them.

The Investment Priorities Plan (IPP) 2014–2016 by Department of Trade and Industry-Board of Investments (DTI-BOI) covers 11 categories including tourism. It says: This covers the establishment

[6] Rixhon, G. 2005. "A Journey into Sama Literature" in Literature of Voice Epics in the Philippines. Ateneo de Manila Univerity. p. 23–58. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.470.8785&rep=rep1&type=pdf.

[7] Unson, J. 2013. "Tawi-Tawi Mosque, the Country's Oldest, now a National Landmark", The Philippine Star (Updated June 1, 2013). http://www.philstar.com/nation/2013/06/01/948613/tawi-tawi-mosque-countrys-oldest-now-national-landmark; DOT-ARMM, undated. Heritage Sites: History and Culture, http://dot.armm.gov.ph/sheikh-karimul-makhdum-mosque-simunul-tawi-tawi/; and GMA News Online, 2008. Tawi-Tawi Mark Founding of First Mosque in RP.

[8] Valera-Turalba, M. C., 2005. Philippine Heritage Architecture: Before 1521 to the 1970s. Philippines: Anvil Publishing Inc.; and DOT-ARMM, undated.

of tourism estate subject to guidelines developed jointly by RBOI-ARMM and the Department of Tourism-ARMM, tourist accommodation facilities, tourist transport facilities and development of retirement villages which shall include health and medical facilities including amenities required by the Philippine Retirement Authority (PRA) and subject to the guidelines to be approved by RBOI-ARMM in consultation with the PRA, the Department of Health (DOH), the Regional Planning and Development Office (RPDO) and other concerned agencies.

2.5 Waste Management

2.5.1 Overview

LGUs are in charge of waste management in their respective jurisdictions, and the role of DENR-ARMM is to provide information to LGUs and to supervise them. Open dumping of waste was prohibited in 2005, and sanitary landfill was made mandatory in 2007 at the national level, but open dumping is still common in the BCT. Generally, waste is conveyed to the open dumping areas in the respective LGUs without any treatment. Recyclables such as cans, bottles, paper and plastics are collected at household level or at the dumping areas, and sent to recycle factories in Davao via traders. The main issues in the BCT are inadequate budget for waste management and lack of opportunities of raisig awareness. There are no factories to emit hazardous waste in the BCT.

A notable facility in the Philippines is a material recovery facility (MRF). The implementing Rules and Regulations of the Philippine Ecological Solid Waste Management Act of 2000 is one of the most important rules related to waste management, and it stipulates that MRFs is to be designed to receive, sort, process, and store compostable and recyclable materials efficiently and in an environmentally sound manner, and established in every barangay or cluster of barangays (RULE XI, Section 1 Operations of a Materials Recovery Facility). MRF's general features are shown in Figure 2.23.

Wao municipality, in Lanao del Sur, is the only LGU that has a sanitary landfill. They made efforts to obtain fund from an organization outside, and constructed a sanitary landfill site. In Wao, waste is collected at roadside in concrete receptacles, and conveyed to the MRF, which is located in the premises of the landfill. Recycables are picked up in the MRF, and the redidue is conveyed to the landfill to be filled in a regulated sanitary way.

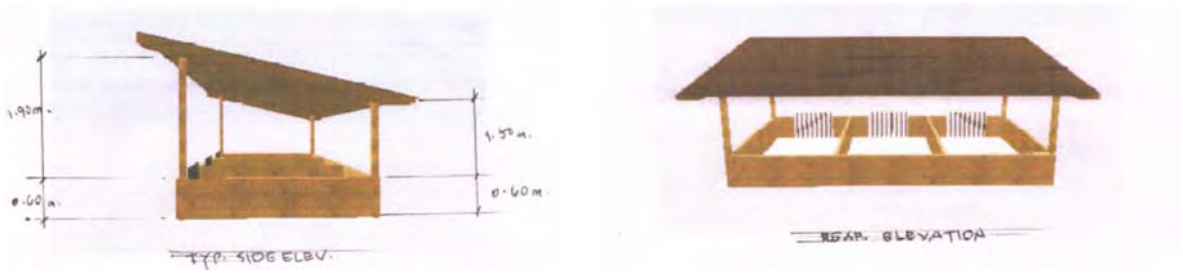


Figure 2.23 General Features of Material Recovery Facility

2.5.2 Waste management in Marawi City

One of the most critical cities in view of waste management is Marawi City, because it has a large population of 237,550 (as of 2014), and may contribute to pollute Lake Lanau as the city is located just north of the lake, if waste is not managed properly.

The Solid Waste Management (SWM)Board was established chaired by the City Mayor in February 2002 based on the Executive Order (EO) 21. The Board is responsible for all the matters related to waste in Marawi City. Waste generated in Marawi City amounts to 113 tons/day (0.475kg/day/capita). The staff involved in waste management is 192 personnel including 78 street sweepers. Dump trucks, three units of 3.0 m^3 and tow 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 5ha land, 20-year old, is located at Baranguy Papandayan, 5-6 km from the City. It is not fenced, and not covered with soil. There are scavengers in the dumpsite who collect recyclables (plastics, papers, metals etc.). There also junks group from Iligan City that buys the scraps (plastics at PHP 5.00/kg, metal at PHP 3.00/kg, etc.).

Table 2.28 shows the solid waste characteristics, indicating that compostable waste occupys 77.0%.

Table 2.28 Solid Waste Characteristics of Marawi City, 2007

(Unit: kg)

Type	Waste source					Total	(%)
	Household	Market	School	Office	Hospital		
Compostable	98.44	1,108.20	120.56	39.90	27.49	1,394.59	77.0
Non-biodegradable	39.30	191.75	49.39	41.40	41.95	363.79	20.1
Special waste	7.50	22.95	6.45	13.30	2.60	52.80	2.9
Total	145.24	1,322.90	176.40	94.60	72.04	1,811.18	

Note: Special waste includes batteries, fluorescent tubes, bulbs, chemical containers, spent chemical/drugs, appliances, etc.

Source: Islamic City of Marawi, Ecological Solid Waste Management Plan.

Marawi City has a 10-year plan for waste management, called the Ecological Solid Waste Management Plan (ESWMP) formulated in consideration of the City's strategic directions as indicated in the Executive Agenda and the Capacity Development Plan. This was formulated in response to the timely enactment of R.A. 9003, known as the Ecological Solid Waste Management Act of 2000, which mandates LGUs to address and manage their solid waste management concerns.

The goal 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, provision of adequate infrastructure and equipment support facilities for efficient delivery of SWM services. The program execution is complemented with active cooperation and participation of the community, which should be effected by effective education and enforcement campaign. The main factors of the ESWNP, out of which only the education component has started, are as shown below.

Engineering component

1) Practice of source reduction, reuse, and recycle or the 3Rs,
2) Segregation of solid waste,
3) Establishment of solid waste collection and transportation system,
4) Operation of the MRF and composting facility and establishment of barangay redemption centers, and
5) Establishment of controlled dumpsite or sanitary landfill

Education component

1) Organization of Speaker's Bureau on ESWM (pool of resource persons who are responsible the ESWM program),
2) Conduct of seminars, orientation and trainings on ESWM,
3) Integration of ESWM in school curricula,
4) Promotion through radio and TV.

Enforcement component

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

Equity component

1) Revenue generation such as collection of regular solid waste collection fees, to impose fines and penalties to violators, etc.,
2) Specific budget allocation for the ESWM, and
3) Establishment of ESWM trust fund.

Annex to Chapter 2: Features of Tourist Spots in BCT by Province

Name of Spot	Main Features	Location*
Basilan		
Kalun's Park/Shrine	This park/shrine was purposely built as a tribute to a known Yakan wily and fearless leader Datu Kalun (a.k.a. Pedro Cuevas a native of Cavite). It is a favored spot for meetings, resting and town walk.	Lamitan C.
Museum of Lamitan	It serves as an information center for the development of Lamitan Municipality. It also showcases the colorful and highlights of the traditional Yakan festival called *Lamilamihan*	Lamitan C.
Malamaui Island	The gateway to Basilan. Here, the parola of the lighthouse guides ships and vintas to the Channel. Here can also be found the traditional final resting place of the nomad sea-faring Badjaos, Samals, Luans and Banguigui. Traditional final resting place of the nomad sea-faring Badjaos, Samals, Luans and Banguigui can also be found in this island. It also boasts of the only lake in the province with wild ducks.	Malamaui M.
Kumalarang Waterfall	This has a 14 m drop waterfall and a proposed site for hydroelectric plant. Picturesque natures preserve soon to be altered by industrial modernization; a time limited scenic opportunity.	
White Beach	A fine white sandy beach suitable for recreation, swimming, snorkeling, and fishing.	Malamaui M.
Palm Beach	A beach where most local frequently visit, about 5 km away from the town hall of Lamitan, offers a site suitable for snorkeling, sand bathing.	Lamitan C.
Block 35 Falls	Located at Menzi Plantation. This offers a picturesque magnificent wonder of nature. The sight is also ideal for spiritual upliftment.	
Balagtasan Falls	The largest waterfall where the Basila Hydroelectric Plant is situated.	
Lanao del Sur		
Tomb of Jose Abad Santos	Tomb of a great Filipino whose love of the country offered himself to be sacrificed to the political power of the WW II. His courage and determination in facing the muzzles of deadly guns of the firing squad proved once more the Filipinos love for freedom from foreign domination.	Malabang M.
Japanese Fort	Now accommodates the Municipality's Philippine National Police Headquarters. The barracks is self-sustaining with potable crystal-clear spring water where local residents flock for their drinking water, have their bath and wash their clothes.	Malabang M.
Mabul Beach	It is a mile long glistering sandy beach being splashed upon by dashing dark blue seawater. The beach is perfect for fishing and sailing.	Malabang M.
Lake Lanao and its Twin Islets	The most breath-taking scene in the region noted for its lust countryside is the area fringing Lake Lanao.	Marawi C.
Lake Dapao	A picturesque body of clear water situated above a foggy range of rolling hills.	Pualas M.
The Sleeping Lady	Gazing toward the Southwest from the western side of Lake Lanao, one can behold a delicately formed sleeping lady out of the natural curvature of Lanao Sur's mountain ranges.	Lanao del Sur P.
Sumpitan Falls	It could be reached through a heavy rugged terrain about 3 km away from the National highway. The spot is composed of seven levels of falls ranging from 5 to 40 feet elevation with natural swimming pool.	Balindong M.
Century-Old Torogan	Old royal houses of hard wood with posts made up of whole tree-trunks. Torogans are usually dominated with artistically carved designs.	Marawi C.
Kanapnapan Falls	Located at the heartland of a 400 ha forest reservation dwarfs at its towering height of 400 ft. It rumbles river water at great gallop showering flora and fauna with vapors that also form cycles of eye captivating rainbows.	Marawi C.
Iga-Bai Waterfalls	Located about a mile west of the growth center of Barangay Iga-Bai. It brags of tiny streams of mineral water, which gushes out from the several breaks of hill-sized boulder shrouded by outgrowth of brushes and towering trees.	Balabagan M.
Barurao Springs	Located in Balabagan about 300 m west of National highway. It is about 1000 m of crystalline water briskly emerging from many outlets of various sizes from underneath the pool.	Balabagan M.

Name of Spot	Main Features	Location*
Maguindanao		
Camp Gen. Salipada K. Pendatun	The reputed camp, which was renamed after the great statesman, soldier, and gentleman, has been the barracks of many Filipino noble gentlemen-in-arms.	Parang M.
Tombs of Sultan Kudarat and Datu Mastura	The tomb of Sultan Kudarat, one of the most highly hailed Maguindanao heroes, the namesake of the municipality, and located in the heart of the municipality.	Sultan Kudarat M.
Blue Lagoon (Marguez Lagoon)	It is named after the heavily hued water that tries to fill the brim of the pond. It is a natural enclosure of body of warmth and polarity whispering on of the beauties and splendid ness too rare to be found anywhere else.	Dinaig M.
Limpongo Hotspring	The warm water that gushes forth from the spring provides wholesome pleasure and relaxation for Cotabato City dwellers and people from the hinterlands.	Sharrif Aguak M.
Punta Beach	The northern counterpart of Kusiong Beach with Cotabato City as point of reference. City people, and nearby dwellers flock to this beach especially during weekends they get the relaxing breath of sea breeze.	Parang M.
Our Lady of Lourdes Grotto	Owned and operated by the Oblates of Mary Immaculate, the holy place with its aura of peace and contentment is a venue where the Cotabatenos find their way if solace and spiritual revival.	Datu Odin Sinsuat M.
Lake Balut	Lake has 11 ha area about 2 km from the Cotabato Malabang National Highway with naturally grown tilapia, catfish, and other freshwater creatures.	Sultan Kudarat M.
Tumingay Lake	An 11 ha lake nested on the group of hills, which hereto preserve its virginity and natural sceneries. Surrounded by naturally growing trees and groups of islands of water lilies, the lake offers a very comforting breathtaking.	Sultan Kudarat M.
Kiga Falls, Sapala Falls and Tabuan Falls	This magnificent wonder of nature is a sight to behold where cool, clear water gushes down from top of the mountain. Aside from its nature preserved sceneries, the site is also ideal for spiritual upliftment.	Upi M.
Bogo Diving Spot	Noted for its splendid ness for swimming, recreation, fishing and scuba diving	
Sulu		
The Walled City	In the midst of the town is the smallest walled city in the world. What has become now of this once historically Majestic City is the deteriorating aftermath caused by age, and neglected and abused by modernity. The walled City justified the bravery of the people of Sulu in appraising foreign control over the archipelago.	Jolo M.
American Cavalry Monument	This bespeaks the Americans direct foreign intervention in the internal affairs of the Filipino in the first half of the 20th century.	Jolo M.
Fort Asturias	It is also a legacy foreign interference in a fort Asturias which now serves as abode to the local PNP Command of Jolo.	Jolo M.
Provincial Capitol	A capitol which construction is credited to Gov. Murphy Sankula (1968–72), and draws the eyes of visitors for its Moorish inspired architectural design. It is here where we can find the great glasswork Sarimanok of Abdulmari Imao, a renowned Tausug artist.	Jolo M.
Tomb of Rajah Baguinda	At Bud Datu or the mountain of Prince lays the tomb of Rajah Baguinda, a Muslim prince from Manangkaw, Sumatra, who in the year 1390 brought the wisdom of the Islam religion in Sulu. Numerous followers of the faith flock to the tomb for local pilgrimage.	Jolo M.
Sulu Provincial Museum	This Lone Museum in Sulu contains artifacts, relics and other works on historical and archeological value of great worth to the people inhabiting the island.	Jolo M.
White Sandy Beaches	Sulu is very proud of its short and long stretches of White Sandy Beaches that illuminate the shores of its islands and islets.	Sulu P.
Princess Tarhata Shrine	Located at Maubuh, Patikul in memory of the 1st Tausug Muslim Scholar to Harvard University, U.S.	Patikul M.
Mount Datu	Demand as satellite destination providing access to the legendary Rajah Baguinda Tomb where tourists/visitors will be excited to see the panoramic views of Jolo town and Marungas Islands (now Hadji Panglima Tahil Municipalities). Its cool and impressive climate can be a substitute for Tagaytay or Baguio in the North.	Indanan M.
Darul Jambangan (Palace)	Located at Darul Maimbung, Sulu. Noted for its legendary past and grandeurs where several succeeding Sultanate made the area as the Capitol.	Maimbung M.
Pala River	Longest river in Sulu. It originated from Municipalityof Talipao crosses the Municipality Indanan and ends at Maimbung Higad (Shoreline).	Talipao M.
Jikiri Cave	The cave was used by the famous Moro Freedom Fighter Jikiri and his men as safe haven during their insurrection against American injustices.	Patian I., Pata M.

Name of Spot	Main Features	Location*
Bangas Island	The Island has splendid crystalline white sand, clear and calm seawater splashing to the shoreline and with naturally preserved coral reefs suitable for scuba diving. This site is also famously known for Abalone cultivation.	Panglima Tahil M.
Tapaan Island	The Island's feature is comparably similar to Bangas Island. But only in this island can we find abundance of a rare type of a certain seashell locally called *bussu* (Proudly valued by local residents as their delicacy due to its unique taste).	Pandami M.
Tawi-Tawi		
Sheik Makhdum Mosque	The mosque is situated at Tubig Indangan in Simunul Island is considered to be the first mosque ever built in Phil. Sail. This great work is credited to Sheik Karimmul Makhdum, an Arab missionary who in 1380 AD reached the shores of Simunol and propagated the Islam religion.	Simunul M.
Tomb of Sheik Makhdum	In the southern part of the Island of Sibutu lies in the peaceful harmony with nature of the Tomb of Sheik Makhdum.	Simunul M.
Gusong Reef	Gusong Reef equals no other reefs with its most covered colorful and beauteous squads of aquarium and non-aquarium fish of numerous varieties. The place is also top producer of highly priced turtle eggs.	Cagayan de Tawi-Tawi M.
Turtle Island	Also known as Taganak Island to the people of Tawi-Tawi. Turtle Island vaunt of its sea turtle which lay hundreds of eggs on its seashore. This island was also declared as Natural Wildlife Sanctuary.	Taganak M.
Kaban-Kaban Natural Swimming Pool	Tawi-Tawi cannot help offering its natural richness of elegant and beautification characters like the Kaban-Kaban pool with its crystalline water. The place is an excellent resource for picnic goers.	Simunul M.
Sibutu Natural Wildlife Sactuary	Here, black, reddish brown, white, and spotted black wild boars roaming in frenzy. Exotic birds like Oriole, Canaries, Lovebirds, and Parrots of various colors abound the treetops of Sibutu.	Simunul M.
Bongao Peek	The pride of Tawi-Tawi, projecting luscious outgrowths of green forests where hundreds of varied sized monkeys of white and brown varieties find their sanctuary. People who traverse the peak by nightfall speak of its spell sorcery. Going deeper into the peak one can almost touch the pretty heads of wild but tame looking monkeys which roam and acrobat on the well of tree branches.	Simunul
Manuk-Mangkaw	This island lies in the southern side of Simunul, and derived its name from the branches of an ancient tree which forms the image of a hen.	Simunul
Tahing-Tahing Beach	It is in this place where a group of American soldiers were inspired to compose the song Tawi-Tawi beach. The place offers a good sight for picnickers with its clear cool water and aura of contentment.	Tabawan, South Ubian:
Sangay Slapo Island	About 30 minutes by pump-boat from Bongao Island noted for its splendidness for swimming, fishing, and scuba-diving.	Simunul
Pearl Farm	Actual processing of artificial pearl.	Languyan M.
La Island Beach	A natural site, surrounded by white sand beach; ideal for scuba diving, swimming, fishing, boating and picnicking.	La I.
Panampangan Island Beach	A natural site, an oval shape, surrounded by white sand beach; ideal for scuba diving, swimming, fishing, boating and panicking. Rich in aquatic resources.	Sapa-Sapa M.
Biraddali Water Falls	This magnificent wonder of nature is a site to behold where cool, clear water gushes down from top of the mountain.	Languyan M.
Saluag Island Beach	A natural site, surrounded by white sand beach; ideal for scuba diving, fishing and rich in marine resources.	Sitangkai M.
Sikulan Island Beach	Gateway to the Municipality of Sitangkai. Here the *parola* or lighthouse guides ships and motor land *Kumpit*.	Sitangkai M.
Tai-Tai Beach	One of the best beaches with crystalline water shoreline, sandy beaches in the west side of Simunul Island.	Simunul
Sukarno Beach	A nearby beach at Bongao Simunul, crystal clear seawater and sandy beach.	Simunul
Bolobok Cave	Previously used as a fortress against foreign invader now converted into a tourist destination about 8 km from Bongao.	Bongao M.
Marlboro Beach	The most popular sandy beach in Mapun.	Cagayan de Tawi-Tawi
Tangu Beach	Island beach also noted as Paradise Beach of Panglima Sugala.	Panglima Sugala

*M. = Municipality; C. = City; I. = Island(s)

CHAPTER 3 EXISTING CONDITIONS AND DEVELOPMENT ISSUES OF BANGSAMORO ECONOMY

3.1 Agriculture

3.1.1 Agriculture sector overview

(1) Agricultural GRDP and employment

The gross value added (GVA) in agriculture, hunting, forestry, and fishery accounts for more than 65% of the GRDP in Bangsamoro (Table 3.1). Its contribution to the total national output of the sector, however, was only 5% in 2013, which is still larger than the Bangsamoro population share of 3.5% in 2012. It consists of agriculture and forestry accounting for more than 50% and fishery slightly larger than 10%. The dominance of agriculture in Bangsamoro is more conspicuous in employment with a 68.3% share in the total employment in 2013.

Table 3.1 Bangsamoro Gross Value Added in Agriculture, Hunting, Forestry, and Fishery

Sector	2011	2012	2013
I. Agriculture, Hunting, Forestry, and Fishery	58,471,031	60,906,649	66,161,744
- Agriculture and forestry	46,916,581	50,332,336	55,011,018
- Fishery	11,824,450	10,574,313	11,150,726
II. Industry	4,042,181	4,458,698	4,582,109
- Mining and quarrying	108,303	121,941	126,127
- Manufacturing	852,765	884,559	942,322
- Construction	1,071,207	1,063,618	1,117,396
- Electricity, gas, and water supply	2,009,906	2,388,580	2,396,263
III. Service	25,295,777	27,927,781	30,347,540
- Transport, storage, and communications	3,501,308	3,811,049	3,931,310
- Trade and repair of automobiles, motorcycles, personal, and household goods	900,488	959,991	1,036,415
- Financial intermediation	2,190,632	2,464,177	3,022,712
- Real estate, rental, and business	6,230,292	6,706,338	7,056,295
- Public administration and defense; compulsory social security	8,201,360	9,259,984	10,141,058
- Other services	4,271,697	4,771,241	5,159,749
Gross Domestic Product	88,078,989	93,338,128	101,091,392

Source: GRDP 2011–2013, PSA (ISSN-0119-4518).

3.1.2 Natural conditions for agriculture

(1) Climate

The Bangsamoro area has only two types of climate, Type III and IV. Type III is characterized by the absence of pronounced maximum rain period with very dry season lasting only for one to three months. Type IV has a short dry season with rainfall more or less evenly distributed throughout the year. All three island provinces' climate is Type IV. The same is in small area of the western portion of Maguindanao, which is mostly Type III. The whole province of Lanao del Sur has Type III climate.

Basilan province is predominantly within the moist agro-climatic zone, which tolerates a moderate moisture deficit during dry season. As such it is capable to sustain a year round maximum production due to moisture availability.

The climate of Sulu is warm and moist and precipitation is fairly steady throughout the year. On average, Sulu has 152 rainy days a year and 2,050 mm annual rainfall. The dry months are from December to April while May through November constitute the wet months. The average annual

temperature of Sulu is 26.8 °C with the maximum and minimum of 30.9 and 22.7 °C, respectively. The coldest months are from December to February; the hottest months are from April to September.

The heavy wooded forest and mountains surrounding Lanao del Sur provide a natural shield against typhoons and floods. The province is at an elevation of about 70 m above sea level, and its climate changes from a warm to near temperate around the Lake Lanao vicinity. The months of January through April are generally considered as the dry season while May through December as the wet or rainy season. The wettest months of the year are June, July, and August.

(2) Soil

Soil types of ARMM region (Mainland) are moderately combined with clay loam (CL) and sandy loam (SL). Typically, Cotabato city and Northern Cotabato city are covered by clay and CL and Lanao del Sur are covered by sandy soil (S) and silt loam (SiL) and Mountain soil. Lanao del Norte is also covered by mountain soil.

Many studies indicate a content of clay on soil has a correlation with value of the cation-exchange capacity (CEC) which is the capacity of soil to hold positive charged nutrients for plant use. Therefore, the high value of CEC will appear higher clay content. In general, characteristics of clay soils are excellent for water retention capacity and nutrient storage as high value of CEC, while poor capacity of drainage of rain water. Sandy soil has some advantage of good drainage and breathability, however poor capacity of nutrient storage and water retention capacity.

Soil types found in Bangsamoro are mainly composed of *Gleyic* or *Eutric Cambisols* in south part, and *Orthic Acrisols* or *Luvisols*. According to FAO reports, Cambisols area accommodate genetically young soils, slight or moderate weathering of parent material, and being proceeding soil fusion to become next soil type. Cambisol is less common in the humid tropical region because of heavy rain and high temperature promote soil fusion however it is very common in areas with active geologic or soil erosion even tropical region. In general, Cambisols make good agricultural land as high nutrient for plant use and with groundwater influence in alluvial plains are highly productive paddy soils.

Acrisols have very acidic property with low base, a higher clay content in the subsoil than in the topsoil. Some acid-tolerant cash crops such as pineapple, cashew, tea, and rubber can be grown with some success. Recently, there are confirmed increasing areas of Acrisols planted with oil palm (e.g., in Malaysia). Acrisols are suitable for production of rainfed and irrigated crops only after liming and full fertilization.

(3) Water resources

The Bangsamoro territories in the mainland of Mindanao, Lanao del Sur and Maguindanao are endowed with abundant surface water resources. Lake Lanao is located 2,300 m above sea level and surrounded by communities and packets of flat lands cultivated for crop production. Lake Buluan in Maguindanao covers many municipalities.

The territory is also lined with rivers and streams. The Mindanao River, also called Río Grande de Mindanao, or Cotabato River is the main river of the Cotabato lowland or Central Mindanao. It rises in the central highlands of northeastern Mindanao as the Pulangi and then flows south to where it joins the Kabacan to form the Mindanao. It meanders northwest through the Libungan Marsh and Liguasan Swamp. At Datu Piang the river turns to enter Illana Bay of the Moro Gulf in two tributaries, the Cotabato and Tamentak after a 200-mile (320-kilometre) course. With its many tributaries (Pulangi and Maridagao (north), Allah (south), Malabul, Dalapuan, and Alip (east), the river system forms a wide fertile basin. There 18 municipalities in Maguindanao and six municipalities in Lanao del Sur covered by this river basin.

Maguindanao is well endowed with generous groundwater resources. It has a large portion of shallow well areas, which extends from the middle part of the province towards the east. Coastal areas along Mindanao Sea are deep well areas and only a small proportion of land in the western part of the province is considered difficult areas. Lanao del Sur is almost the opposite of Maguindanao. The province has extensive areas with inexistent groundwater resources (difficult areas). Portions north and southeast

of Lake Lanao are deep well areas.

Basilan has no groundwater data. The groundwater of mainland of Sulu is classified difficult. Tawi-Tawi has shallow well areas at the southern part but the rest are practically difficult areas.

3.1.3 Production performance

(1) Grains

Paddy/palay

Bangsamoro's palay production is dominantly under rain-fed conditions, accounting for 67% of the total production in 2013, the rest being under irrigation.[1] Maguindanao and Lanao del Sur are the major palay producers, accounting for approximately 70% and 30%, respectively, of the entire production in Bangsamoro.[2] According to the BDP I for the transitional period, none of the provinces in Bangsamoro except Maguindanao can meet the demand for rice[3]; out of the regional annual demand of 400,000 tons of milled-equivalent rice, 110,000–150,000 tons are purchased mainly from Bukidnon and Zamboanga.

The low yield poses a major challenge to Bangsamoro's palay production. The annual rice yield in Bangsamoro has been below the national average; 3.49 tons under irrigation (4.27 tons national average) and 2.43 tons under rain-fed conditions (3.06 tons national average) in 2013.[4]

The low level of production technology including low utilization of machinery is observed commonly in both the irrigated and rain-fed conditions in Bangsamoro. DA has been implementing the Upland Rice Development Program (2012–2017) aimed at establishing sustainable models for locally organized community-based seed banks (CSB) and a viable seed production system, including the capacity development of LGUs and Upland Farmer Organizations.

JICA, in collaboration with DA, is implementing Farmers Field School (FFS) and Farmer to Farmer (FTF) training programs under the "Rice-Based Farming Technology Extension Project ARMM" until 2017, which has thus far trained over 1,000 farmers from Maguindanao, Lanao del Sur and other areas in Bangsamoro.[5] Such technical assistance needs to be continued to overcome the constraints on Bangsamoro's palay production, namely limited irrigation on flat lands and the lack of machinery, extension services and post-harvest handling facilities.

Palay harvested area over the last 10 years hovers around 200,000 ha although area harvested reached a high of about 226,000 ha in 2013. Irrigated rice harvested area fluctuated over the period for various reasons like failed crop but also due to deteriorating condition of irrigation systems. From 2005 to 2013, production in irrigated areas continued to decline due to decreasing planted area. The increase in area harvested is mainly attributed to increased area in rainfed paddy. Over the last five years, the area increased by about 17,000 ha despite low productivity.

The productivity in rainfed palay is comparatively lower than the national average and that of the other regions in Mindanao. However, modest as it may be, productivity is on an upward trend in the last 10 years. On the other hand, overall productivity in the irrigated areas decreased mainly due to decrease in productivity of areas in Maguindanao.

Palay is mostly planted in Maguindanao where widest lowland plains are located. In 2013, it comprises about 67% to the total area of harvested area in the region. Lanao del Sur has about 31% and the very small portion in the island provinces mostly in the mainland of Basilan. Due to the terrain and soil of Sulu and Tawi-Tawi, rice production is nil.

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[1] Rice in the Philippines is usually harvested once a year under the rain-fed condition, and twice a year under irrigation.

[2] Philippine Statistics Authority CountrySTAT

[3] Calculated from the Bureau of Agricultural Statistics for production and the Medium-Term Regional Development Plan for population and per capita consumption. While the national average yield has been constantly increasing, the yield in Bangsamoro has been declining since 2010.

[4] Philippine Statistics Authority Crops Statistics of the Philippines (2009-2013)

[5] The number of target beneficiary farmers is 3,000.

Corn

Bangsamoro's share of yellow corn in the national production was 3% in 2013 while that of white corn was 24% in the same year (59% of which was produced in Maguindanao and 40% in Lanao del Sur). While white corn production has been constant in the last decade in Bangsamoro, yellow corn production has decreased by half, apparently due to the shrinkage of the product's market in the area resulting from the larger-scale production of yellow GM corns outside Bangsamoro, as well as the absence of commercial-based animal husbandry in the Region.

In contrast to the development of yellow corn production at the national level encouraged through government subsidies, indigenous varieties have continued to be used for white corn.[6] Since 2012, under the Agri-Pinoy Corn Program, DA has been implementing a sub-program for promoting white corn mainly in Mindanao and Visaya where corn is traditionally consumed as a staple food,[7] including the introduction of hybrid white corn seed to achieve food self-sufficiency through the diversification of staple foods and the reduction of imported rice. Other components include the installation of post-harvest equipment and trading centers, as well as the facilitation of corn-based agribusiness systems through the establishment of cooperative models supported by pilot irrigation.

Corn is next to rice in terms of strategic importance to the Bangsamoro region. Yield is comparable to the country's average and its Mindanao neighbors. However, it produces only about 10% of the country's total and about 20% of Mindanao's total. The low yield can be attributed to the huge portion of white corn production, which consists of native varieties.

Native corn varieties like many other crop native varieties are low yielding compared with their hybrid counterparts. Production of white corn in Bangsamoro ranges from about 70 to 85% of the total or about 77% on the average. The region produces more than 25% of the country's white corn production and about 35% of Mindanao's. (Two other big producers of corn in Mindanao are Northern Mindanao and SOCCCSKSARGEN). Comparing with other regions productivity, Bangsamoro has consistently topped all over Mindanao for the last 10 years. For the same period, its productivity is by far better than the national performance. Production of white corn will continue as it plays a big part in the Filipino diet as snack food. Yellow corn is generally used as feed for livestock. Due to its soft texture and thin pulp, it is best preferred as grain substitute for rice and as boiled young corn.

Yellow corn production in Bangsamoro is about 23% of the total production in the last 10 years. It is 4% of the total country's production and a little less than 10% of Mindanao's over the last 10 years. Productivity is a little less than the overall country's performance but comparable. Production of yellow corn is contributed by only two provinces in Bangsamoro, Maguindanao and Lanao del Sur, the former having more production and area harvested in the last 10 years. Production is low and it is interesting to note that yellow corn areas have been decreasing over the last 10 years (0.6%) and at a higher rate during the last five years (6%). Consequently, this trend is followed by the volume of production.

(2) Permanent crops

Coconut

The Country produced 15.4 million tons of coconut in 2013 of which Bangsamoro represented 8.6% (1.3 million tons). Within Bangsamoro, Maguindanao accounts for 44% of coconut production, followed by Sulu (16%), Basilan (15%), Lanao del Sur (13%), and Tawi-Tawi (12%).[8] The Country is a large exporter of coconut and its products; 826,721 tons (US$1.43 billion) of coconut oil, 108,867 tons (US$287 million) of dried coconut, and 7,605 tons (US$3.7 million) of raw coconut were exported in 2011.[9]

Over the last 10 years, coconut production in Bangsamoro averaged 1.2 million MT/year (based on

[6] Greenpeace (2013), *White Corn in the Philippines: Contaminated with Genetically Modified Corn Varieties*
[7] Adaptation and Dissemination of Newly Developed Improved White Corn Varieties as Alternative Source as Staple Food, 2012
[8] Philippine Statistics Authority CountrySTAT
[9] FAOSTAT

volume of nuts with husk). This is about 8.2% of the country's production and about 14% of production in Mindanao. The biggest producer is Maguindanao (40% of the region for the last 10 years) followed by Basilan and Sulu (17% and 16%, respectively).

Annual average harvested area in the last 10 years is about 309,000 ha. About 28% of this area is from Maguindanao and 21% each from Basilan and Sulu. Understandably, Lanao del Sur area is small due to the high elevation of most lands in the province. Overall, growth of harvested area in Bangsamoro is modest at 1.6% annually. Most of this increase is due to the increase area in Maguindanao (6%). Basilan area decreased while the rest remained all throughout the last 10 years.

In terms of productive number of trees, trend in the last ten years is almost stable with small increases and decreases. This is also true in the Bangsamoro region where only Maguindanao showed a steady growth of 3.6% per annum. Lanao del Sur and Basilan had an overall negative growth while the rest stayed. Yield per tree is low compared to the Philippines' average and all regions of Mindanao. Again, this is attributed to the low yields in the island provinces and Lanao del Sur. Maguindanao's coconut trees produce at a comparative performance with other areas in Mindanao.

Average annual yield is a little bit lower compared to the national average but much lower than most of the regions in Mindanao. Davao Region's productivity is almost twice that of Bangsamoro. Low productivity can be attributed mainly to the low productivity in the island provinces and Lanao del Sur. High productivity in Maguindanao has boosted the level for the whole region. Maguindanao's productivity at 5.8 MT/year is comparable to the high performances of many regions in Mindanao.

Rubber

Rubber production in the Philippines has increased from 273,979 tons in 2003 to 444,809 tons in 2013,[10] with Mindanao accounting for most of the national production. Among the production in the Philippines in 2013, Zamboanga contributed 43.9%, followed by Soccsksargen (38.9%), Bangsamoro (10.5%), Northern Mindanao (2.5%), Caraga (2.2%) and Davao (1.9%). Basilan represents 97% of the production within Bangsamoro.[11] In 2011, the Country exported 42,209 tons (US$80 million) of dry natural rubber.[12]

Production of rubber is unique to Mindanao where almost 100% of the total production of the Country is located. The biggest producers are Zamboanga Peninsula and SOCCSKSARGEN. Bangsamoro is far third. In Bangsamoro, more than 90% of production is in Basilan. The small share is from Maguindanao and Lanao del Sur.

Productivity in Bangsamoro is only about half of the nation's average and less than half of SOCCSKSARGEN, which is the highest performer. Among the provinces, Lanao del Sur is highest in productivity but the small production could not make a significance in the total performance of the region. The productivity is shown in the yield on a per tree basis.

Banana

The Philippines is a world supplier of banana. About 77% of the total production from 2004 to 2013 is from Mindanao. The production of all varieties of banana in Bangsamoro totaled 459,605 tons in 2013, representing 5.3% of the Country's total banana production (8.6 million tons) or 6.6% of Mindanao's total banana production. Mindanao dominates the Country's production of the Cavendish variety (over 99% of 4.2 million tons), while Bangsamoro's share is 3.5%, concentrated in Maguindanao.

Over the last 10 years, harvested area of banana in the Bangsamoro region was modestly increasing even in the provinces of Maguindanao and Lanao del Sur. Thus, the increases in production are due to the increase in productivity, particularly for Cavendish variety, which increased from 22.13 ton/ha in 2004 to 29.93 ton in 2013. Still, productivity of Cavendish banana is way below the productivity of other regions in Mindanao. Overall productivity of banana in Bangsamoro is only 14% since local varieties, which are non-plantation cultivation still constitute about 70% of the total production.

[10] Philippine Statistics Authority CountrySTAT
[11] Philippine Statistics Authority CountrySTAT
[12] Philippine Statistics Authority CountrySTAT

Abaca

While abaca is produced throughout the Country (138,000 ha by 90,000 smallholder farmers),[13] it is intensively cultivated in the Bicol Region and Eastern Visayas.[14] In 2013, the production in Bangsamoro was 4,974 tons, accounting for 7.7% of the country's abaca production or 23% of Mindanao's abaca production. Within Bangsamoro, Sulu leads the production with 3,196 tons followed by Lanao del Sur with 1,696 tons.[15]

Area planted or harvested with abaca in Bangsamoro over the last 10 years increased very modestly despite the significant increases in the provinces of Sulu, Lanao del Sur and Basilan. These increases were tempered by the decrease in area in Maguindanao.

Decrease in the Maguindanao planted area could be accounted to conversion to other uses especially that banana and abaca would have almost the same soil suitability. Moreover, productivity shows that abaca is not among the strengths of Maguindanao. In comparison, Lanao del Sur and Sulu's productivity are very commendable at the level higher the biggest and established region producers. Lanao del Sur prides in the high productivity and superior quality of abaca fiber produced in the province, thus the establishment of Newtech Corporation, that process abaca pulp.

Mangosteen

Bangsamoro produces 64% of the total mangosteen production in the Country. The remaining 36% is shared among Davao Region, SOCCSKSARGEN and Northern Mindanao. In fact, all over the Country, production of Mangosteen is also concentrated in the island province of Sulu. Volume of production is rather irregular due mainly to effects of weather conditions during flowering and fruiting period.

In the last 10 years, no observed change in area harvested as well as number of bearing trees. The slump in production is only affected by productivity, which dropped drastically in 2005 and nil in 2008.

Coffee

The Philippines' coffee production decreased from 112,271 tons in 2001 to 78,634 tons in 2013 apparently due to the relatively low purchase prices given by Nestle or traders, which made farmers shift to other crops. The reduction in domestic coffee production coupled with the increase in demand has significantly increased the Country's coffee import, especially from Vietnam and Indonesia; from 2001 to 2011, the value of imported unroasted coffee increased 7.7 times (US$55 million for 23,500 tons) and that of instant coffee increased 6.5 times (US$64 million for 27,600 tons).[16]

Coffee production in Bangsamoro (10,491 tons in 2013) is concentrated in Robusta (70%) as in the Philippines as a whole with Arabica accounting for a minor portion (16%), followed closely by Excelsa variety. Liberica coffee is still very small at 1.5%.

The central production area in Bangsamoro is Upi, Maguindanao and Patikul, Sulu. The JICA Study (2011) points out that the yield of Robusta in Bangsamoro is far below the yield in other parts of Mindanao due to poor maintenance practices, harvest technology, and post-harvest handling methods. The coffee's distribution channel is fairly well established in the Philippines. Nestle, accounting for 85% of coffee processing in the country, has a processing plant in Cagayan de Oro.

Production of coffee in Bangsamoro is only about 11% of the total production in the Philippines, the third largest of all the regions. It has hardly increased nor decreased in the last 10 years. In contrast, the total production in the Country decreased and so did the rest of Mindanao except SOCCSKSARGEN. Such decline is supported by the corresponding decline in harvested area due to conversion of some areas to senorita banana in Compostela Valley and Cavendish and lakatan bananas in Davao City (*Crop Statistics of the Philippines, 2009–2013*, p. 70). In Bangsamoro, this decrease is also true for the provinces of Basilan, also due to conversion to other crops and Tawi-Tawi.

[13] Abaca is harvested twice a year.
[14] FAO Future Fibers: http://www.fao.org/economic/futurefibres/fibres/abaca0/en/
[15] Philippine Statistics Authority CountrySTAT
[16] FAOSTAT

Cacao

The cacao production of the Philippines accounts for merely 0.1% of the world's total (5 million tons in 2012).[17] The Country exports most of its cacao in semi-processed form (260 tons or US$1 million of cacao mass and 920 tons or US$3.1 million of cacao butter) while importing a large amount of cacao products: 17,772 tons or US$72 million of cocoa cake (solid mass after the extraction of cocoa butter); and 11,052 tons or US$31 million of chocolate in 2011.[18]

The national cacao production has been reduced to half of what it was in 1991; attributable to the agrarian reform in the late 1980s, the sharp rise in input prices and replacement by banana trees. In 2013, the Davao Region alone contributed 79% of national production (4,876 tons) while Bangsamoro's contribution was merely 1.8%.[19] Cacao production in Bangsamoro is limited to Lanao del Sur and Sulu (56 tons and 22 tons in 2013, respectively). The production in Bangsamoro has been declining after its peak in 2003 (156 tons), replaced by rapid-growing crops with high return, such as banana and coconut.

Cacao production is being promoted as an industrial crop. Production all over the Philippines is barely 5,000 MT/year. The Bangsamoro contributes a measly 2% to this total. Like all over the country, Bangsamoro production in the last 10 years was on a downward trend at the rate of 6% annually decreasing from 150 ton in 2004 to 85 ton in 2013. Areas have decreased over the period along with productivity. Decrease in productivity was significant due probably to the lack of market. There are no large processing companies. Generally, processing of cacao is cottage-type level or small volume processing in households.

Durian

Bangsamoro is the far second producer of durian in the Country. In 2013, it is second to Davao Region, which produces about 75% of the Country's production. In the same year Bangsamoro's production is only 12% of the Country and 15% of Davao Region. Production of durian in Bangsamoro is synonymous to production in Sulu as more than 95% of Bangsamoro's production is in Sulu. Production in other provinces is not significant due to small volumes and low productivity.

During the year 2004, 2013, planted area in Bangsamoro grew at about 1.6% due to addition of planted area in Basilan. Sulu planted area, however, although consistently increasing over the last 10 years was very modest at 0.4 %.

Bangsamoro has been consistently highest in productivity over the last 10 years. It is even higher the Davao Region's productivity. Although the trend is decreasing from 2004 to 2009, it picked up from the lowest at 4.9 ton/ha and continued to increase until 2013 at 9.02 ton/ha.

Sugarcane

All sugarcane farmers in the Philippines are allocated to *Mill Districts* in which farmers are required to sell all of their produce to pre-assigned sugar mills. Sugarcane is grown throughout the Country with Western Visayas being the largest producer. Northern Mindanao, the largest producer in Mindanao, contributed 14% of the national production while Bangsamoro contributed merely 0.04% in 2013.

Lanao del Sur accounts for 94% of sugarcane production within Bangsamoro and Maguindanao accounts for the rest. In Mindanao, there are two sugar mills in Bukidnon,[20] one in North Cotabato and one in Davao. Bangsamoro ranks the second or third in the yield of sugarcane (60.2 tons/ha per annum in 2013) among all regions, after Western Visayas or CALABARZON, although its production volume is insignificant.[21] In general, sugar cultivation requires little labor during the 8-month growing period.

[17] FAOSTAT
[18] FAOSTAT
[19] Philippine Statistics Authority CountrySTAT
[20] One in Bukidnon (Bukidnon Sugar Milling Corporation: BUSCO) was founded by Marubeni in the 1970s. After the recent upgrade, BUSCO has the largest milling capacities (processing 18,000 tons of canes (output about 1,800 tons of raw sugar) and 900 tons of raw sugar (output about 850 tons of refined sugar) per day).
[21] Philippine Statistics Authority Crops Statistics of the Philippines (2009–2013)

The Bangsamoro's production of sugarcane follows the nationwide trend as production follows the price trends. When prices are up, production in the following year increases but when prices are down, production also decreases. Otherwise, production outputs could be caused by the weather conditions from planting to harvest.

The Bangsamoro's production is barely 2% of the Country's total production although production drastically increased in 2013 sharing 3% of the country. The biggest producer is Western Visayas, particularly Negros Island. Production is mostly in the province of Lanao del Sur, particularly the municipalities of Wao and Bumbaran. These towns are nearest the two sugar mills in Bukidnon where sugarcane is delivered and processed into sugar. The sugarcane areas in Maguindanao started to increase in 2007 but have significantly lost to other crop.

Sugarcane production in Bangsamoro is competitive to the extent that productivity is high. It is even higher than the established producing regions. Lanao del Sur's productivity is higher than the national average and Maguindanao's is higher than that of the Western Visayas.

Pineapple

Pineapple, although not a tree crop, is a multi-year crop. Current productivity is less than the major pineapple producing regions only because Bangsamoro's culture of pineapple is small areas and hardly applied with fertilizer.

Bangsamoro has a high potential for pineapple production with its advantages in climatic and soil conditions. Pineapple production in Bangsamoro decreased by 30% in the past decade to 1,000 tons due to the degraded security in the region; it could be expanded either by contract-farming or direct management of export-oriented investors (domestic and foreign). Land ownership, road infrastructure, and peace and order are critical in attracting investors. Encouraging farmers to form cooperatives to collectively sell or process pineapples is also an option.

Other fruits

The Bangsamoro region is also home to various fruit trees particularly in the island provinces. Although these are yet produced in much smaller quantities compared to other regions in the country, the competitiveness of producing these fruits are evident in their productivity. These products have high potential for increasing value added of the Bangsamoro region through processing and export. The products include the following.

1) Lanzones: Largely produced in Sulu with productivity higher than the rest of the country; Sulu produces about 70% of the total produced in the Country.
2) Papaya: Small production in Bangsamoro, one of the smallest producers with productivity comparable to national average but considerably lower than its neighbors in Mindanao.
3) Calamansi: Produced in small quantities and mainly in Sulu and Maguindanao with productivity higher than the national average; productivity in Bangsamoro has also been increasing over the last 10 years that in 2013, already close to MIMAROPA, the largest calamansi producer in the Country.

(3) Annual crops

Cassava

The total cassava production in the Philippines was about 2.36 million MT in 2013growing at the rate of 4% per year from 2004 of 1.64 million ton. This growth was influenced by the rapid growth in Northern Mindanao and SOCCSKSARGEN. Cassava is produced widely in Mindanao. Cassava in the Philippines is used for food (accounting for 75% of production), starch (20%), dried chips for feed (5%), and a small quantity of granules for brewery. Mindanao contributed 75% of the Country's production (2.4 million tons) in 2013. Bangsamoro contributed 44% and Northern Mindanao contributed 25%. Among the provinces, Lanao del Sur accounts for 50% of Bangsamoro's production,

followed by Basilan (25%), and Sulu (17%).[22]

On the average, Bangsamoro shares about 50% of the Country's total production. Production of cassava in Lanao del Sur started in 1954 with the expansion of Matling Industrial and Commercial Corporation's (MICC) operations to include processing of starch. Lanao del Sur, make up 50% of the total production in Bangsamoro. The next largest producer is Basilan, which shares about 25% of the region's total. Production in Tawi-Tawi is mainly for food as cassava is main source of carbohydrates.

Over the last 10 years increase in production was very high in Northern Mindanao and SOCCSKSARGEN at an annual rates of 10% and 14%, respectively. It was not the same trend in Bangsamoro. Over the period, harvested area modestly increased as there were no new users. MICC is the captive market of production in Lanao del Sur.

Productivity of cassava in Bangsamoro is comparatively low due to the poor productivity in Maguindanao, Sulu and Tawi-Tawi. Lanao del Sur and Basilan have higher cassava yield but still half of the averages of Northern Mindanao and SOCCSKSARGEN. Productivity in Lanao del Sur is caused by low yields from farms of independent farmers. The Matling Cooperative produces cassava at 20 MT/ha. Members are being assisted by the cooperatives in terms of technology and inputs such as planting materials and fertilizer.

Other annual crops

Bangsamoro also produce other annual crops in smaller quantities but with significant productivity showing potential for crop diversification. These crops include the following.

1) Mongo: Production in Bangsamoro is the fourth largest in the Country with productivity comparable to the national average; farmers plant this crop to rotate with rice crop as a method of restoring nitrogen to the soil.
2) Ginger: Production in Bangsamoro is only 3.5% of the national production on the average although it has been increasing in the last 10 years; in 2013, Bangsamoro is the ninth largest producer in the Country with productivity increase up to 2013 when it became the single highest with CALABARZON as poor second.
3) Gourd: Productivity is high in Bangsamoro but production is low, so is its harvested area.
4) Ube: Productivity is high in Bangsamoro but production is low.

(4) Livestock and poultry

Commercial-scale raising of livestock and poultry can be expected to increase inventory as this scale can manage multiplication of population. Consequently, the very small share of this scale in Bangsamoro accounts for the generally declining trend of inventory. Both livestock and poultry are pre-dominantly raised in backyard scale by small farmers. Commonly, large animals like cattle and carabao are used for draft but also to prepare for large expense occasions like school enrollment of children, weddings, birthdays, etc. This is also true for hog raising among non-Muslim families. Goat and poultry are largely raised to augment regular cash flows for family daily expenses. Farmers normally plan for multiplying their livestock and poultry, however, in times of unexpected events like hospitalization of family members, farmers are forced to sell to cover expenses. In the case of livestock, animals are sold even before the first offspring.

Large animals

Almost all carabao in Bangsamoro is raised on a backyard scale. It is the same trend all over the country. Carabaos are used as beast of burden rather than for meat or milk despite the establishment of the Philippine Carabao Center to promote carabao for meat and milk production. Carabaos are still widely used to pull the plow and other implements for field preparation for planting. The most number are found in Maguindanao where rice and corn farms are extensive and larger than the rest of the region. On the average, Maguindanao constitute 69% of the total carabaos in the region. Overall,

[22] Philippine Statistics Authority CountrySTAT

the carabao inventory in Bangsamoro is decreasing at the rate of 3% as it mirrors decrease in Maguindanao. The small counts of heads in Basilan, Sulu, Tawi-Tawi and Lanao del Sur are increasing.

Cattle inventory, which average in Bangsamoro is 3% of the Country's inventory and 10% of Mindanao's total. Like carabao, cattle is also largely raised backyard scale. Bangsamoro's commercial cattle raising steadily increased over the last 10 years but still much smaller than Northern Mindanao and SOCCSKSARGEN, the two Mindanao regions that host commercial cattle farms. The inventory of cattle is rather distributed among the provinces of Bangsamoro except for Tawi-Tawi. Among the four, provinces, a bit of concentration are in Maguindanao and Lanao del Sur. The latter has a commercial scale raising started in 2008.

Goat

Goat inventory in Bangsamoro is only 17% of Mindanao's total inventory and only 5% of the Country's total. Over the last 10 years, goat inventory in the region decreased an average annual rate of 3%. This is accounted to the continuous drop in number particularly from 2011 to 2012. The average decrease of the last ten years is 17% per annum. On the other hand, Sulu and Tawi-Tawi have consistently increasing inventory averaging at 6% per annum.

Goat raising in Bangsamoro like other livestock is generally of backyard scale. Commercial scale raising started in Maguindanao and Tawi-Tawi in 2013 with 809 and 2,270 heads, respectively. Goat is food usually seen in fiestas, wedding, birthdays and other celebrations of all people in any income bracket. For this purpose, goats are usually sold whole and live even among low-income families.

Hogs

It is not surprising that in Bangsamoro only 3.7% of the total hogs in Mindanao is raised and only 1% of the Country. In the last 10 years, all hogs are grown backyard. The larger inventories are found in the provinces of Basilan and Maguindanao where there is higher percentage of non-Muslim population. Despite the Bangsamoro's predominantly Muslim population, hog inventory actually grew during the last 10 years at an average growth rate of a modest 2%. This is due to the growth of hogs in Basilan at 11% per year average.

Poultry

Poultry production data in Bangsamoro consist of chicken and duck. For the last 10 years, the volume of meat production from these two poultry species is very small portion of the national volume, 0.5% for chicken and 3.6% for duck. Chicken and duck meat volume proportion to the whole Mindanao's production are 2.8% and 12.9%, respectively.

For the last 10 years, the average chicken inventory is 1.5% of the Country's inventory and 5% of the whole Mindanao's inventory. Almost 100% of the chickens grown in Bangsamoro are native varieties. Although the biggest inventory is in Lanao del Sur (34% to Bangsamoro), each province contribute a portion to the total inventory.

Chickens raised are mainly native breeds; easy and low-cost to raise since these are free-range and in large demand due to superior taste compared to broiler chicken. However, compared to broiler chicken, native chicken takes longer time to grow into marketable size and thus, has a slow cash flow potential. Without much expenses, farmers can sell any time after achieving the size. On the other hand, broiler chicken requires a budget for buying chicks, regular feeding, vitamins and antibiotics to grow fast. Marketable size is attained from 30 days and should be sold within a few days to optimize income. Thus, broiler chicken is treated a serious business enterprise as it requires more attention and management in both raising and marketing. While broiler chicken technology is well developed and has been in the Philippines much earlier, the farmers in Bangsamoro will need to embrace an entirely different culture to take the income advantage of the broiler chicken raising technology. Suppliers of technology and materials already abound in the neighboring Davao City and Cagayan de Oro City.

3.1.4 State of farm infrastructure

(1) Irrigation

The Bangsamoro region has the least area developed for irrigation, smaller than Zamboanga Peninsula, which has the smallest irrigable area, and the least developed with only 29% development status as compared to Northern Mindanao with 54% (Table 3.2).

Table 3.2 Irrigable and Irrigated Area, 2013

	Irrigable area (ha)	Irrigated area (ha)	Development (%)
Philippines	3,109,609	1,678,595	56
Mindanao	937,613	390,833	42
Zamboanga Peninsula	74,952	43,801	58
Northern Mindanao	113,631	60,869	54
Davao Region	147,313	63,119	43
SOCCSKSARGEN	286,263	112,112	39
Caraga	159,249	65,626	41
ARMM	156,205	45,306	29

Source: CountryStat (http://countrystat.psa.gov.ph/).

In the last 10 year, irrigation development performance in Bangsamoro was very slow. Growth of irrigated area is only about 7% mostly coming from development of communal irrigation systems (basically, small areas), with 11% growth. Table 3.3 shows that irrigation development almost stagnated from 2004 to 2010. During this period, growth of irrigated area was only 0.2% per year. Both national irrigation systems and communal systems have slow growths at 0.4% and 0.3%, respectively.

Table 3.3 Status of Irrigation Development in Bangsamoro

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Estimated total irrigable area (ha)	156,720	156,720	156,720	156,720	156,720	156,720	156,720	156,720	156,720	156,205
National irrigation System (ha)	16,065	15,987	15,987	15,987	16,105	16,520	16,520	23,234	23,234	25,643
Communal irrigation System (ha)	6,970	7,057	7,057	7,057	7,057	7,057	7,125	15,830	16,783	19,278
Private irrigation system (ha)	225	225	225	225	225	225	225	90	90	90
OGA-assisted IS (ha)								295	295	295
Total	23,560	23,269	23,269	23,269	23,387	23,840	23,870	39,449	40,402	45,306
Remaining potential area to be developed	133,460	133,451	133,451	134,008	133,890	133,440	133,410	116,756	115,803	110,900

Source: ibid.

(2) Farm roads

The Bangsamoro area has a total road length of 7,736.5 km (Table 3.4). Considering the total land area of the region, the road density is at 0.29, which is only half of the national average. Of the total road length in Bangsamoro, 13% are under national administrative road classification. Provincial and municipal roads account for 18% and 7%, respectively. Barangay roads are by far the most extensive with a total road length of 4,824.2 km or about 62% of the total road length.

Of the total road length, 14% are concrete paved and 85% are still gravel or earth surfaced. National roads account for 72% of the total concrete roads. Of provincial roads, 25% are concrete while municipal roads only 2% concrete. Barangay roads are only 0.20% concrete. Concrete barangay roads account for only 1%) of the total concrete roads.

Barangay roads are also called farm-to-market roads as these are the roads that extend to farms or agriculture production areas and link the producers to the distribution centers or brings out agricultural products and made available to consumers. The quality of farm-to-market roads is important to minimize losses during and lessen cost of transport of agricultural products.

Table 3.4 Bangsamoro Road Lengths by Administrative Class and Pavement Type

Administrative level	Type of Pavement							
	Concrete		Asphalt		Gravel/Earth		Total	
	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%
National	802.615	72	10.603	50	179.622	3	994.062	13
Provincial	277.520	25	10.353	49	1,096.618	17	1,385.229	18
Municipal	21.700	2	0.250	1	510.950	8	532.931	7
Barangay	9.510	1	-	0	4,814.722	73	4,824.241	62
Total	1,111.345	100	21.206	100	6,601.912	100	7,736.463	100
Pavement/Total		14		0.27		85		100

Source: ARMM-RPD Midterm Update, 2013–2016.

3.1.5 Agriculture support institutions and services

Republic Act No. (RA) 6734 or the Organic Act for the Autonomous Region in Muslim Mindanao as the law title expresses, provided for the establishment of the ARMM with a basic structure within the framework of the Constitution and sovereignty and territorial integrity of the Republic of the Philippines (Article 1 Section 2). Agriculture and fisheries regulatory and development are among the functions of the national government devolved to the ARMM under Section 2 (6) of Article V. This necessitated the establishment of the Department of Agriculture and Fisheries (DAF) under the direction and supervision of the Autonomous Government.

(1) DAF-ARMM

DAF-ARMM envisions a modernized smallholder agriculture and fisheries; a diversified rural economy that is dynamic, technologically advanced and internationally competitive As such, it mission is to help and empower the farming and fishing communities and the private sector to produce enough, accessible and affordable food for every Filipino and a decent income for all.

The sources of funds for the operation of the DAF-ARMM are the regular ARMM-General Appropriations Act (GAA), the national government, foreign assistance thru foreign assisted project and local funds. Like the national government, the ARMM Legislature also enacts the budge of the ARMM and this is where the budget for the operations of the DAF is taken from. The funds from the national government come to the ARMM as national programs implemented in the region. Foreign assisted projects contracted by the ARMM are also appropriated for the agriculture development projects in the region.

Table 3.5 shows the approved budget for agriculture and agrarian reform services under the DAF and DAR of the ARMM. About two thirds of the budget annual is allocated for paying the personnel of the two departments and only a third is left for the Maintenance and Other Operating Expenses (MOOE), which are used for the services given to the farmers. Note that for the annual budgets over six years, there was no allocation for capital outlay.

Table 3.5 Budget for Implementation of Agriculture and Agrarian Reform Services (RDAFAR)

Year	Personal services	Maintenance & operation expenses	Capital outlays	Total	% of total budget for programs & projects
2008	248,257,000	140,965,000		389,222,000	6.72
2009	289,918,000	123,800,000		413,718,000	5.99
2010	294,003,000	138,172,000		432,175,000	6.04
2011	320,988,000	111,665,000		432,653,000	5.22
2012	346,263,000	114,579,000		460,842,000	5.10
2013	395,985,000	117,301,000		513,286,000	4.96

Source: Department of Budget and Management (www.dbm.gov.ph).

The funds coming from the national government are program-based. The development program under

the current administration is called the AgriPinoy. It covers the national government's program on rice, corn, high value crops (HVC) and livestock and poultry. The AgriPinoy Program has covered all the Bangsamoro provinces under its rice, corn, HVCDP, and livestock and poultry programs. In 2012, the program served 211,311 farmers in total, consisting of 83,271 in the rice banner program, 132,826 in the corn program, 5,003 in HVCDP, and 12,295 in the livestock and poultry program.

Three other projects being implemented by DAF are

1) TISP: Rehabilitation and concreting of barangay/farm-to-market roads. The TISP is a one-year program funded from the Stimulus Fund- Disbursement Acceleration Program (DAP) of the Office of the President. The fund also covered roads and irrigation infrastructure.
2) GPBP/BUB: Rehabilitation and concreting of barangay/farm-to-market roads. The GPBP/BUB is multi-sectoral program, the projects under which are identified by the local people. The GPBP/BUB is an ARG Program that funds projects identified by the grassroots.
3) PAMANA (Payapa at Masaganang Pamayanan): A national government program that extends development intervention to areas that are isolated, hard to reach and conflict affected communities to ensure that these areas are not left behind in development. All the Bangsamoro provinces are covered by this program under its two cluster area: ZAMBASULTA for Basilan, Sulu and Tawi-Tawi and Central Mindanao for Lanao del Sur and Maguindanao. The project covers all types of location-specific assistance. In the Bangsamoro region, PAMANA has established trading posts thru the cooperatives.

(2) DAR-ARMM

The Comprehensive Agrarian Reform (CARP) and CARP-Extension with Reforms (CARPER) were implemented in the area of autonomy. DAR-ARMM to implement the program components such as Land Tenure Improvement (LTI), Program Beneficiaries Development, and Agrarian Justice Delivery (AJD), which are funded from the Agrarian Reform Fund (Fund-158). Other expenses of the agency are funded from the General Fund or Fund-101. DAR-ARMM implements the following major program services: Land Tenure Improvement (LTI), Agrarian Justice Delivery (AJD), and Program Beneficiaries Development.

By law, the CARP was to end on June 30, 2010. It was extended for another four years to end on June 30, 2014 due to the large area of land uncovered in the CARP and was named CARPER. Under CARPER, the voluntary offer to sell (VOS) was deleted and CA was prioritized for implementation. With the CARPER also ended, land acquisition has already stopped. However, lands that have already been acquired will have to be distributed. The status of LAD in the five provinces of ARMM is shown in Table 3.6.

Table 3.6 Cumulative LAD Accomplishment (November 30, 2014)

	Area (ha)					
	Bangsamoro	Basilan	Lanao del Sur	Maguindanao	Sulu	Tawi-Tawi
Scope	376,275	37,026	163,916	124,735	18,937	31,662
Accomplished	262,710	25,091	132,925	78,232	5,898	20,564
Balance	113,564	11,935	30,990	46,502	13,039	11,098
ARBs involved	108,079	10,036	53,170	31,280	5,368	8,225

Source: DAF-ARMM.

As of November 30, 2014, the total balance against ARMM scope is still a huge area of land of 113,564 ha. Unless, there is another extension, the remaining areas will remain with the land owners. Complying with the provisions of the CARPER, the DAR-ARMM continued with the land distribution program. From January to December 2015, Emancipation Patents (EP) and CLOAs generated corresponded to a total of 1,821 ARBs and 3,904.2 has. As of ending 2015, total ARBs is 109,900 corresponding to 266,614.2 ha.

Under the AJD program, the DAR provides the following services to the agrarian reform beneficiaries (ARBs); provision of agrarian legal assistance to ARBs (representation of ARBs before the regular

courts and/or before the DARAB), resolution of agrarian law implementation cases (done by the DAR Regional Secretary or his authorized representatives, and resolution of adjudication cases.

(3) Cooperative Development Authority (CDA-ARMM)

CDA-ARMM handles the devolved functions of national CDA in the Region for both development and regulation. The thrust of CDA is to provide training for cooperatives not only in establishing cooperatives but also on providing trainings for leadership, financial and business management. Due to its limited manpower, CDA can only conduct training for organization and registration. Other training needs of the cooperatives are given by private entities accredited by CDA. However, it has been the complaint of cooperatives that fees are beyond the capability of a starting cooperative.

CDA has registered a total of 1,869 cooperatives over the years of its operation in Bangsamoro. The most number are cooperatives in Maguindanao at 35% of the total. Basilan has the least number of registered cooperatives. Of the total, only 21% or 395 are active (Table 3.7). Active cooperatives are those that comply with the regular requirements such as submission of financial reports and other reportorial requirements. Sulu has the most number of active cooperatives, which are about 60% of its total registered cooperatives. Tawi-Tawi has the least number of active cooperative but it also has the least registered. On the other hand, Maguindanao has the biggest number of registered but the most number of failing cooperatives mostly cooperatives that have not been reporting for about a year.

Table 3.7 Status of Registered Cooperatives in Bangsamoro

Province	Registered	Active	Inactive			
			A	B	C	D
Basilan	52	17	3	0	30	2
Lanao del Sur	575	72	28	0	248	88
Maguindanao	655	43	41	27	416	128
Sulu	421	252	54	0	7	0
Tawi-Tawi	166	11	22	0	137	27
Total	1,869	395	148	27	838	245

Source: CDA-ARMM.

(4) National Government Agencies operating in ARMM

National Food Authority

National Food Authority (NFA) participates in the buying of palay in order to protect the farmers from the depressed prices, which normally occur during harvest season. However, according to the NFA Region 14, the agency's procurement of palay has diminished due to the acceptable market prices at the farm gate. The current price support for rice is PHP 17.00/kg and for corn, PHP 10.00/kg. According to the NFA the prices of palay are already reaching PHP 20.00/kg, which is way above the price support of the government.

National Irrigation Administration

Irrigation development program of National Irrigation Administration (NIA) covers development of potential irrigable areas into irrigation system either small scale of less than 1,000 ha under communal irrigation systems (CISs) development or large scale of more than 1,000 ha under the national systems development program. The NISs are operated by NIA and charges irrigation service fees to the users. On the other hand, NIA develops and constructs CIS and turns over to an irrigators' association on a cost-recovery agreement. Accomplishments of NIA in development of irrigation systems in the Bangsamoro region are 25,643 ha under the national irrigation systems (NISs) category and 19,278 ha under the communal irrigation systems category.

NIA is operating eight NISs with a total irrigated area of 28,380 ha and has turned over CISs with a total irrigated area of 12,215 ha (Table 3.8). The eight NISs are performing poorly at it only irrigates barely 55% of the total area during wet season and only 51% during dry season. Ideally, irrigation systems should at least double the cropping for rice. Table 3.9 shows the performance of CISs. Out of the

12,215 total service area in the five provinces, only 34% are operational.

Table 3.8 Existing NIS in Bangsamoro

System	Province	Service area (ha)	Firmed-up area (ha)	Irrigated area (ha)	
				Wet	Dry
Ditsaan Ramain	Lanao del Sur	475	475	0	0
Nalaig RIP	Lanao del Sur	2,750	2,750	478	456
Rugnan RIS	Lanao del Sur	3,050	3,050	932	902
Alip RIS	Maguindanao	3,311	3,311	1,648	2,157
Kabulnan RIS	Maguindanao	11,783	11,783	7,450	6,904
Maridagao RIS	Maguindanao	1,770	1,770	1,362	1,094
Pagalungan RIS	Maguindanao	1,200	703	630	368
Talayan RIS	Maguindanao	700	700	656	653
Total		24,339	23,842	12,501	11,880

Source: National Irrigation Administration, River Irrigation System (RIS).

Table 3.9 Existing Communal Irrigation Systems in Bangsamoro

Province	CISs (n)	Total service area (ha)	Total firmed-up area (ha)	Operational area (ha)	Non-operational area	
					(ha)	(%)
Basilan	3	145	145	84	61	42
Lanao del Sur	30	5,970	5,970	1,752	4,218	71
Maguindanao	36	5,454	5,454	2,001	3,453	63
Sulu	7	435	435	236	199	46
Tawi-Tawi	11	211	211	78	133	63
Total/overall	87	12,215	12,215	4,151	8,064	66

Source: National Irrigation Administration, River Irrigation System (RIS).

Philippine Coconut Authority

PCA is the sole government agency that is tasked to develop the coconut industry to its full potential in line with the new vision of a united, globally competitive and efficient coconut industry. As such, PCA is mandated to oversee the development of the coconut and other palm oil industry in all its aspects and ensure that the coconut farmers become direct participants in, and beneficiaries of, such development and growth.

In line with its objectives and functions, the PCA undertakes RDE focusing on varietal improvements, biotechnology, crop nutrition and integrated crop protection, maintains seed farms, distributes seedlings for replanting and salt for fertilization, building up of entrepreneur cooperatives of coconut farmers.

The PCA office in ARMM is still under the national PCA. With the budget allocation, it is able to provide extension particularly pests control, fertilization and making seedlings available. PCA is able to provide salt to coconut farmers in limited quantities. Hence, they encourage farmers to augment PCA's provision. Integration with other crops, such as corn is also encouraged as coconut also benefit from the fertilizer applied. PCA also established and support coconut nurseries at the barangays to make quality seedlings available for replanting.

Philippine Fiber Development Authority

PhilFIDA is mandated to promote the accelerated growth and development of the Philippine fiber industry in all its aspects including research and development, production support, processing, and trade regulation.

Despite the presence of abaca farms in Bangsamoro, PhilFIDA has no presence in the region. Its regional offices 9, 10, and 11 are located in Pagadian City, Cagayan de Oro City and Davao City, respectively. Region 11 operates a nursery in Bago Oshiro, Davao City. This facility produces planting materials from tissue culture and propagation of stocks through field multiplication. The proximity of this facility to Bangsamoro would benefit the abaca farmers by making planting materials and technology available.

Land Bank of the Philippines

LBP was created to finance the acquisition and distribution of agricultural estates for distribution to small landholders under the Philippine agrarian reform program. It is a government financial institution that strikes a balance in fulfilling its social mandate of promoting countryside development while remaining financially viable. This dual function makes LBP unique. The profits derived from its commercial banking operations are used to finance the Bank's developmental programs and initiatives. Like other commercial banks in Philippines, LBP is under the supervision of the Bangko Sentral ng Pilipinas (BSP).

Over the years, LBP has successfully managed this tough balancing act as evidenced by the continued expansion of its loan portfolio in favor of its priority sectors: the farmers and fisherman, small and medium enterprises and micro enterprises, livelihood loans and agribusiness, agri-infrastructure and other agri- and environment-related projects, socialized housing, schools and hospitals in the countryside.

Bangsamoro's financing needs are currently almost single-handedly responded to by LBP due to the high risk perception of commercial banks on the region. In 2004, its loan portfolio for Bangsamoro included only PHP 248 million (140 borrowers) in agricultural loans. The exposure and number of borrowers declined dramatically in 2011 to PHP 98 million (44 borrowers). The risks are high but the stakes are higher. Bangsamoro needs to be revived for the people to continue their endeavors for a better future.

Philippines Crop Insurance Corporation

The PCIC is a public corporation under the government's ownership and control attached to the Department of Agriculture. As stated in its website (http://pcic.gov.ph/about-us/), "[t]he PCIC's principal mandate is to provide insurance protection to farmers against losses arising from natural calamities, plant diseases and pest infestations of their palay and corn crops as well as other crops. The PCIC also provides protection against damage to [and] loss of non-crop agricultural assets including but not limited to machineries, equipment, transport facilities and other related infrastructures due to peril[s] insured against."

All the insurance packages are available for farmers and agricultural producers in the Bangsamoro region. However, due to unprofitable operations, PCIC decided to suspend all insurance coverage programs of PCIC in Maguindanao. The suspension was imposed 10 years ago.

Most insurance coverage in the region is that built in the credit components of government programs for agriculture. PCIC and LBP cooperate in the provision of credit services. Production loans that are given to farmers or commercial farms are coupled with insurance to ensure the loan. Although this scheme is a direct benefit to the LBP, the insurance helps the farmers secure loans to finance farming. More often, small farmers resort to loan sharks in order to buy inputs and to pay for needed labor.

3.1.6 Farm household income and expenditure

(1) Farm household income

Table 3.10 shows the average income of farming households by source. Based on the table, it can be said that farming households generally derive main income from farming (54%). Six regions in Mindanao are of this category. The next biggest source of income is off-farm, which basically activities related to farming. It is not the same for the Bangsamoro region as most farm families derive only about 46% of their income from agriculture and their next biggest source of income is non-farm related activities.

(2) Farm household expenditure

Food is basic necessity of man and it is at the base of the hierarchy of needs. Hence, it is the top priority for his household's expenses. In general, the higher the food expenses percentage of income, the poorer the household. Table 3.11 shows the average expenditure of farm households. From Table

3.10 and Table 3.11, farm families all over the country spend 37% of their income on food on average. In SOCCSKSARGEN[23], only 29% is spent on food by farm families. On the other hand farm families in Bangsamoro spend about 50% of their income on food.

Table 3.10 Average 2002–2003 Farm Household Income by Source

(Unit: PHP 10^3)

	Total	Farm	Off-farm	Non-farm	Others
Philippines	106,181	57,628	6,763	31,389	10,401
Western Mindanao					
Zamboanga Peninsula	99,327	54,135	5,946	33,431	5,815
Northern Mindanao	82,299	49,988	4,256	23,279	4,776
Southern Mindanao					
Davao Region	101,673	69,496	5,593	17,573	9,011
Central Mindanao					
SOCCSKSARGEN	134,406	84,331	9,347	33,658	7,070
Caraga	84,569	54,004	11,118	13,892	5,555
ARMM	73,356	34,026	5,737	24,936	8,657

Source: CountryStat (http://countrystat.psa.gov.ph/).

Table 3.11 Average Farm Household Expenditures (2011)

	Total income (PHP 10^3)	Expenditure (PHP 10^3)		
		Food	Recurring	Non-recurring
Philippines	106,181.00	40,186.77	9,726.12	12,629.45
Zamboanga Peninsula	99,327.00	35,593.31	9,290.50	9,305.59
Northern Mindanao	82,299.00	30,457.54	5,737.55	5,629.91
Davao Region	101,673.00	31,191.25	6,415.21	10,765.54
SOCCSKSARGEN	134,406.00	39,391.41	16,726.17	12,041.16
Caraga	84,569.00	31,384.62	4,940.71	8,385.67
ARMM	73,356.00	37,439.13	6,161.47	9,355.40

Source: ibid.

3.1.7 Development directions of Bangsamoro agriculture

(1) Characteristics of Bangsamoro agriculture

Bangsamoro has generally favorable natural conditions for agriculture with high temperature, plenty of rainfalls distributed throughout a year, and dominant soil characteristics having high nutrient holding capacity. The Region is relatively free from serious effects of typhoons, although the situations may be changing due to global climatic changes. Flatland suitable for intensive cultivation of paddy and other crops is rather limited, confined largely to the river basin of Rio Grande of Mindanao. A wide range of altitude in the mainland may be another favorable condition to cultivate a variety of crops including vegetables in high altitude.

Taking advantage of these favorable conditions, Bangsamoro produces a wide range of crops, including various commercial crops such as coconut, rubber, coffee, cacao, sugarcane, cassava and fruits as well as paddy and corn. Productivity, however, is not necessarily high for most crops except cassava and abaca. Livestock and poultry are least developed in Bangsamoro. They are mostly kept in backyards with very limited commercial operation.

Practically, all the agricultural support services provided in the Philippines are available also in Bangsamoro. Availability of commercial credit is naturally limited in Bangsamoro due to higher risks involved as perceived by private financing institutes. Financial needs of Bangsamoro agriculture, therefore, depend almost exclusively on LBD.

Agriculture support infrastructure is generally inadequate in Bangsamoro. Of the total irrigable area

[23] South Cotabato, Cotabato City, Sultan Kudarat, Saranggani, General Santos City

of 156,000 ha in the Region, only 45,000 ha or 29% is irrigated. This is the lowest of all the regions in Mindanao. Barangay roads or farm-to-market roads in Bangsamoro have a total length of 4,824km, accounting for 62% of the total road length in the Region, but only 9.5km are concrete paved. This constrains the marketing of agro products, especially perishable high value products including vegetables and fruits. In addition, the high cost of transportation reduces farmers' income.

(2) Development directions

1) Small holder farmers holding a key for agricultural development in Bangsamoro

RA 7607, better known as the Magna Carta of Small Farmers defines small farmers as natural persons dependent on small-scale subsistence farming as their primary source of income and whose sale, barter or exchange of agricultural products do not exceed a gross value of PHP 180,000 per annum based on 1992 constant prices.[24] At 2012 current prices, such income level would be about PHP 295,000 per annum. Table 3.12 shows the estimated net returns from farming various crops and the corresponding farm size needed to be able to earn PHP 295,000 per annum. Assuming that a farmer has no other source of income, a paddy farmer in an irrigated farm in Bangsamoro with 16 ha to 43 ha is still considered smallholder. Cassava, which showed the highest net return would need more than 5.0 ha.

Table 3.12 Net Returns from Various Crops

Crop	Net return (PHP/ha)	Farm size to earn PHP 295,000/year (ha)
Paddy-Irrigated Wet	17,897.00	16.48
Paddy Irrigated Dry	6,778.00	43.52
Paddy-Rainfed Wet	(513.00)	not applicable
Paddy-Rainfed Dry	(1,104.00)	not applicable
Corn	6,091.00	48.43
Coffee	19,225.00	15.34
Cassava	51,857.00	5.69
Mango	36,348.00	8.12
Mongo	16,037.00	18.39

Source: Net Return Data from CountryStat (http://countrystat.psa.gov.ph/).

By the scale of returns from farming in Bangsamoro, it can be said that farmers are smallholders operating small farms. The 2002 Census of Agriculture by the Philippine Statistics Authority (PSA)[25] reported 248,528 farms with a total corresponding area of 533,410 ha. Figure 3.1 shows the breakdown of this total area of farms into various size categories. Although there is no definition, small farm maybe identified comparatively. If a small farm is defined as less than 3.0 ha, then about 44% of all farms are small. The average size of farms under this category is 1.21 ha, which means that more farms within this range tend to be smaller than 1.5 ha and fewer are near 3.0 ha sizes. If small farm size category is defined as less than 5.0 ha, the small farms' share of the total area is 67%. This category has an average farm size of 1.55 ha.

That the percentage of owned farms is rather high makes sound assumption that in Bangsamoro the farmers or tillers of the land are owners. In the same Census of Agriculture, owned farms are 162,429, or 65% of the total (Table 3.13). Owned and partly owned[26] constitute almost 80% of the total. Only 12% are tenanted and leased farms comprise less than 3% of the total area reported.

Small farms, considered here as 3.0 or 5.0 ha and smaller, are substantial in number and more importantly as a percentage of the total area of farms in Bangsamoro. Reference data are about 12

[24] RA 7607 further provides that such An inter-agency committee composed of the Department of Agrarian Reform, the Department of Trade and Industry, the Department of Finance and the National Economic and Development Authority and headed by the Department of Agriculture may conduct periodic review and adjustments of the income level to take into account the effects of changes in inflation, devaluation and consumer price index

[25] Formerly, National Statistics Office (NSO)

[26] Definition of partly owned lands by PSA

years ago[27] and with the continuation of land acquisition and distribution under CARP and CARPER until June 30, 2014, the number and corresponding area of farms under owned tenurial status would have already increased greatly.

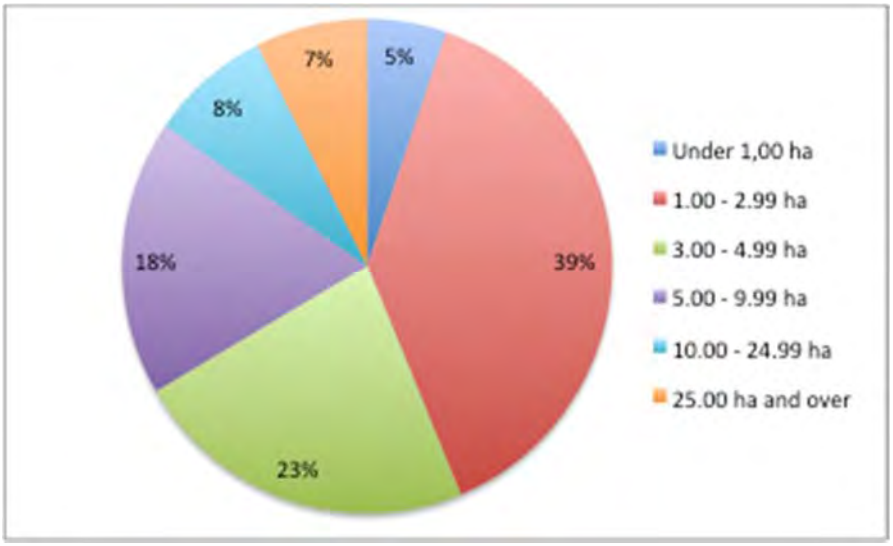

Figure 3.1 Area of Farms by Size

Table 3.13 Number of Farms and Area of Farms by Tenurial Status, 2002 Census

Province	Number of Farms						Area of Farms					
	Total	Owned d/	Partly Owned e/	Tenanted	Leased	Other Forms	Total	Owned d/	Partly Owned e/	Tenanted	Leased	Other Forms
Lanao del Sur	64,813	41,184	8,404	7,503	4,365	2,863	140,111	89,801	24,365	13,965	6,961	4,142
Maguindanao	95,089	5,432	19,127	11,719	4,388	4,711	221,174	131,951	51,180	23,412	7,845	5,289
Tawi-Tawi	13,890	10,827	418	1,802	57	738	30,144	22,281	2,080	4,602	57	1,106
Sulu	49,392	34,758	4,818	8,095	400	875	59,501	38,847	10,484	8,567	334	841
Basilan	25,344	21,268	1,774	1,292	252	724	82,480	69,948	7,029	4,327	573	632
Bangsamoro	248,528	162,429	34,541	30,411	9,462	9,911	533,410	352,827	95,118	54,782	15,770	12,010

Source: NSO, *2002 Census on Agriculture and Fisheries*.

A large portion of land area by small farm holders should be operated efficiently, in both production per hectare and cost per hectare, which is a two-pronged approach to the development of Bangsamoro. First, it adds to small farmer income, hence a rural poverty alleviation measure, which is primordial for development of Bangsamoro. Second, it adds to the regional output and eventually to the national output. However, small farmers are commonly faced with challenges and cannot overcome these constraints on their own. Thus, there is a need in the short term for greater public sector involvement. In fact, the Magna Carta for Small Farmers has already mandated all related government agencies to provide the support for farming entrepreneurship.

Unlike commercial farms operated by corporations, small farmers will need continuous assistance in acquiring updated technology, adequate financing and profitable markets. With these assistance, small farmers would be able to optimize land use and make farm operations financially viable for farmers.

2) Promotion of balanced diet to help increase domestic demand for agro products

The average per capita consumption of rice in Bangsamoro is 118 kg/person/year. It contributes to the elusive self-sufficiency in rice over decades and remains true for the last 10 years (Table 3.14). Corn is a rice substitute in many areas. Probably, the same is true in the region in particular as white corn is the main corn produce. Self-sufficiency level has always been high in the last 10 years although it has consistently declined over the years. In 2013, sufficiency level in corn is lower than rice due to decline in production. Other carbohydrate substitutes include cassava, ube, and camote, which have high

[27] Census on Agriculture is being conducted by Philippine Statistics Authority every 10 years. Processing of data for 2012 Census is still going on.

productivity especially in the provinces of Lanao del Sur and Maguindanao.

The capability of domestic production to support the protein requirements of the consumers. Notably, pork and chicken are consistently the main source of protein and other animal-based food nutrients while carabeef is the least source.

Promotion of balanced diet not only contributes to people's health especially in rural areas but may also expand opportunities to diversify agricultural production by small farmers. Rice and corn may be combined with root crops to attain carbohydrate self-sufficiency. Vegetable production is easy to respond to market demand, and thus should be encouraged as it contributes to farmers' income and economy as well. Meat production should also be diversified with livestock promotion including goats.

Table 3.14 Self-Sufficiency of Selected Commodities

(Unit: %)

Commodity	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Rice	90.45	83.98	85.38	85.47	81.90	85.83	81.27	93.91	92.13	96.81
Corn	99.58	98.67	95.21	97.79	99.70	95.88	98.64	99.06	98.20	95.57
Beef	79.31	84.86	83.25	79.91	78.32	82.02	79.55	80.14	79.79	79.70
Carabeef	54.94	54.58	58.27	63.95	61.56	68.33	68.24	72.67	73.38	78.21
Pork	97.56	97.83	97.78	96.87	95.08	94.21	91.54	92.08	93.30	91.72
Chicken (dressed)	97.18	96.50	95.20	95.55	95.25	93.56	90.38	90.00	90.67	91.78

Source: CountryStat (http://countrystat.psa.gov.ph/).

3) Integrated farming in commercial scale

Integrated farming is a means of increasing land productivity. The prevalence of backyard scale economic endeavors in Bangsamoro accounts for the small and sluggish growth of the livestock and poultry industry. Backyard scale may be low-investment production scheme but the inefficiency is deterrent to building opportunities to improve farmers' income, achieve food sufficiency and grow the region's economy as a whole. Current production levels render the whole region insufficient. On the other hand some mono-cropping systems' practices require large spaces in between like coconut and other perennials.

Bangsamoro has a wide and variety of opportunities for integrated farming combining crop cultivation and livestock/poultry. The practice of spacing in cultivation of trees and other crops in plantations are intended to provide as much sunlight needed by the trees/crops. For example, recommended coconut tree crop spacing are 10 m x 10 m, 10 m x 8.5 m, and 8.5 m x 8.5 m, for intercropping, double-stand tree and mono-cropping, respectively. With this spacing, all coconut plantations are suited for integration with small and large animals like goat and cattle. Goat keeping under coconut plantation is a promising case, and other combinations of plantation crops and livestock may also be introduced.

Integration of farming systems has already been introduced in the Philippines as well as many developing countries around the world for small farm holders as poverty alleviation measure and has proven workable and effective in increasing income of small farmers.[28] Integration of rice farming and fresh water fish like tilapia and catfish systems is an existing practice in other regions in the Philippines. Duck keeping in paddy fields is another form of integrated farming already practiced successfully in Maguindanao.

These practices are generally labor intensive, and generate higher value-added. Thus, they fit well to the alternative socio-economy model. To contribute to the Bangsamoro development in a significant way, business models for commercial operation of integrated farming should be pursued. Large commercial coconut farms and other plantations still intact under private commercial farms or distributed to ARBs but operated by cooperatives may be viable undertakings. As a model, cooperatives may be re-vitalized or strengthened for the purpose. Contract farming is already practiced for plantation crops, and introduction of livestock and/or poultry should be examined.

[28] FAO Corporate Document Repository, www.fao.or/docrep…/x686e07.htm

4) Mixed farming of various kinds to be further developed

Despite the favorable soil and climatic conditions allowing year round crop production, cropping intensity at present is relatively low. Mixed farming of various kinds should be promoted to increase cropping intensity and overall land productivity. Several farm systems increase land productivity by enhancing land utilization and productivity in terms of yield per unit land area. Right crop combinations grown in the same area can mutually benefit crops in terms protection from pests and diseases and provision of needed nutrients. This is also true for combinations of poultry and crops. Duck raising in rice fields is one example. Rice fields that are water logged for most of the growing period can provide ducks the needed water. Ducks reciprocate by providing rice growth with nutrients from the droppings.

Plantation crops may be combined with field crops such as corn, fodder and cassava, or industrial crops such as coffee, cacao, pineapple and exotic vegetables. These crops can be grown in multi-level combinations to take advantage of the spaces in tree crop plantations without necessarily depriving each other with the needed sunlight. Some plantations are good to raise native chickens as well. The free-range system of raising native chicken is fit to integrate with orchards of mangoes and other fruit trees. Chickens eat the insects that destroy fruits and their droppings fertilize the soil. Simultaneously, the trees provide the chickens with branches to perch on.

When productive reforestation is undertaken on slope land, tree crops may be combined with shade crops such as coffee and cacao. Other models may also be conceived to support the farmers under the community-based forest management agreement (CBFM).

5) Development of market infrastructure to help local farmers become demand sensitive

Access to markets is a key for expansion of agricultural production, while potential agricultural productivity is inherently high in Bangsamoro. Major agribusinesses tend to develop a self-complete system encompassing primary production, processing, packing and transport of their products. They should be guided to establish open markets to allow local farmers to sell their products as well as part of the agribusiness products. It is a good corporate social responsibility (CSR) undertaking that helps small farmers and small processors to sell and source raw materials. For instance, local farmers may sell fresh vegetables there. This will give major agribusinesses small but reliable local outlets for their products, and also opportunities to learn local demand.

Such open markets will give incentives for local farmers to produce for local sales. Moreover, it may help to make local farmers demand sensitive in making their decisions for agricultural production. Some of more active farmers may start producing new crops as well possibly in cooperation with the associated agribusiness.

The vicinity of an agribusiness company location is appropriate for establishing an open market since it tends to be the converging point of people in the community with buying capacity. Agribusinesses are labor intensive and employ big number of people. In addition, upstream and downstream businesses will be created and eventually add to employment. Reputation of the market is expected to increase the buyers and sellers and transactions.

As a CSR undertaking, an agribusiness company may establish the market and operate it for a period until a viable market organization (either a cooperative or an association) has been established and capable of continuing the operation. The importance of having the market initially operated by the agribusiness company is modeling an appropriate management with future managers having an on-the-job training. Such management model can be continued by the future market operator. The factor that separates CSR endeavors from each other is the depth of involvement. Ideally, CSRs should uphold sustainability. Sustainability in a sense that, should the company put a stop on the program for whatever reason the beneficiaries should be able to continue the undertaking. While CSR earns the company good image it is also able to reduce tax due as expenses on CSR undertakings can be converted into tax credit.

6) Establishment of standards and grading systems for export crops as first step for industrial cluster development

Although Bangsamoro is a significant producer of some industrial crops, yields are not necessarily high as compared to performance of other regions in Mindanao. More importantly, the quality of agricultural products after postharvest processing is not the ideal, resulting in low prices dictated by traders.

The current system does not give the farmers incentive to improve the quality of products since traders do not consider quality in pricing. For copra, the only classification is by moisture content. Copra with high moisture are paid lower price per kilogram while those with appropriate moisture (called *resicada*) are paid higher price. Although some copra are evidently composed of high percentages of burnt copra or having molds that impact the quality of oil produced, the same are not given due recognition in pricing.

In the case of rubber, some farmers selling cup lumps to traders go to the extent of adding sand or stones in sacks to increase weight since the weight is the only basis for payment. Other practices detrimental to rubber quality, like use of battery solutions instead of acids are common.[29] The processors, being privy to these machinations of rubber sellers tend to buy their raw materials collectively at very low prices.

The market itself should require quality of products. However, in the case of primary agricultural products used as raw materials in manufacturing, the processors cannot impose quality for many reasons. Among these is a situation where manufacturers are trying to catch up with volume requirement to reach a level of viable operating capacity. Having standards and grading systems for primary products that goes through a trading distribution system would tend to address the problem of quality particularly when these are related to pricing of commodities being traded. The system would encourage quality through fair pricing.

Standards and grading system should be established particularly for crops such as rubber, abaca, copra and cassava. This system may be used as a market tool to impose quality rather than imposed as regulation, although, there is a need for government to establish testing centers along with the standards and grading system.

This may be the first step to make these crops a basis for industrial clusters based on primary products. The quality of primary products is a determining factor to establish successful industrial clusters with final products that are competitive in the export markets. Some of the primary products and export goods may eventually establish fame internationally.

7) Addressing land conflict to put lands in productive use by establishing an appropriate institutional arrangement

Land conflict in Bangsamoro has been a major cause of armed struggle that spanned for more than half a century. It was a combination of several factors including the government sponsored settlement program during the Commonwealth era where Christian families from all over Luzon and Visayas were brought to Mindanao, which brought about legalized confiscation of lands of the Moros.[30] This was later aggravated by the fragmented nature of land governance, rigid formal land markets that gave rise to informal markets based on verbal agreements, absence of titles, etc. and absence of actual boundaries due to slow cadastral surveys. Abandonment of lands due to skirmishes among clans in *rido* and government and secessionist groups has added to the precarious land ownership state of affairs.

The Framework Agreement Bangsamoro (FAB) has adequately recognized that the resolution of land conflicts as a condition to a lasting peace. Under the Part IV, 2 & 3, the FAB provides for measures on addressing the land issues stating among others the recognition of grievances and the restoration of rights over properties unjustly taken away. This FAB provision is an important measure to take towards development of the Bangsamoro region by way of putting vast tracts of land under productive

[29] Based on interview with Philippine Rubber Techn0ology Center by JST Agriculture Expert

[30] "Legal frameworks and land issues in Muslim Mindanao" (Knack, P. D., 2013) in *Land and Post-Conflict Peacebuilding* (ed. J. Unruh and R.C. Williams)

use.

The Bangsamoro development should effectively utilize local resources as much as possible. This would inevitably require introduction of additional resources to fully realize the development potentials. Typically, technology necessary for new agribusinesses as well as capital would be introduced from outside. The introduction of technology and capital associated with foreign investors may involve risk of land conflicts and violation of rights of indigenous people.

Thus, putting an end and preventing future land conflicts is imperative. The present set up of government even under the ARMM does not adequately provide for the mechanism to address protracted land tenure problems that grew over decades of marginalizing policies taken advantage of by unscrupulous leaders and those who wield power. The policy on land should be established by the Bangsamoro legislature at the onset. The policy should address inconsistencies in land-related laws and regulations, the ineffectiveness of multiple land-related agencies and tailor-fit to the requirements of resolving the land tenure problems of Bangsamoro.

The Bangsamoro Land Commission is being recommended for creation to establish the framework for land governance that will address complex and fragmented nature of the existing institutional set up, informal land markets, tenure, support services for small farmers and conflict adjudication.[31] The framework should accommodate customary institutions in governing customary land arrangements, which still persist and may continue to persist particularly, among IPs. The framework should recognize to the extent of adopting customary laws, which continue to be used in settling land-related disputes.

To hasten the implementation of policies, the following are recommended:

1) Merger of the National Commission on Indigenous Peoples (NCIP) and the Office of Southern Mindanao Cultural Communities (OSCC) operating in the region under the Bangsamoro government; the merger of these two offices with same objectives but different powers and function will create a streamlined organization, unify programs and utilize resources of both offices efficiently;
2) Harmonization of policies, delineation of area coverage and improve coordination between DENR and NCIP. The DENR continues to issue CBFM and IFMA in forestlands and homestead and free patents in the alienable and disposal lands while NCIP issues CADT/CALT to IPs. Without coordination in the procedures of both agencies, their issuances result to multiple claimants on the same area; and
3) Completion of land distribution under the Land Acquisition and Distribution (LAD) Program of CARP/CARPER.

Current procedure of original titling lands emanate from DENR and NCIP, both process applications by undertaking investigations and survey of the areas being applied for, basically to establish the appropriateness of the applicant to receive the patents or CADT/CALT and the availability and legitimacy of areas being applied for. These are submitted to the Registry of Deeds of municipalities that have the jurisdiction over the areas for issuance of Original Certificate Title (OCT).

On the other hand, DAR issues CLOA and CLT to the identified agrarian reform beneficiary. The duplicate copies are being held by the Registry of Deeds. This looks like a simple procedure but actually, the processes within DENR and NCIP are tedious, long, prone to corruption and therefore expensive at times.[32] Procedures would sometimes need the expertise of a lawyer to be able to get through. The system of settling conflicts in Bangsamoro can be carried out in this current system with innovations suited to the circumstances of Bangsamoro. This system can be innovated by taking

[31] Gulane, Judy T., Land Governance in Bangsamoro-Policy Brief, International Alert. April 20, 2014 www.international-alert.or/sites/default/files/Philippines_PolicyBreifLandGovernance_EN_2014.pdf

[32] In the forum with IPs conducted for the ESA-BFF in Cotabato City dated January 12, 2015, one IP participant told her story of long how it took her to get the DENR to survey her land to get a homestead patent and had to pay PHP 30,000.00.

advantage of institutions nearest to the claimants, the LGUs.

Settling of local conflicts associated with land such as land confiscation and conflicting land boundaries may be resolved at the local level by the municipal and barangay LGUs working with local landowners and residents. For conflicts that arise, LGUs can institute adjudication process. A high level institution like a Bangsamoro Land Commission may also be established for ultimate resolution of all the disputes.

Beyond an effective institutional arrangement, the Bangsamoro government will have to work on these immediate priorities; completing cadastral surveys in the shortest possible period prioritizing areas with multiple claimants, developing a just compensation formula and looking out for parcels of land that can be immediately distributed to surrendered armed groups for purposes of integration and the landless.[33]

8) Irrigated paddy production to improve profitability

Self-sufficiency in rice has been elusive in the Country. From 2004 to 2013, rice sufficiency still fluctuated from a low of 81% to 97%. The year 2013 is an improvement from all the years in terms rice self-sufficiency as production was highest during the last 10-year period. Production of rice is still concentrated in Central Luzon and other large producing regions that are vulnerable to typhoons and droughts. Thus, the development of areas for production of palay crop less frequented by typhoons and drought would help improve if not attain 100% rice food self-sufficiency level.

Irrigation development in Bangsamoro has been delayed and slow as seen earlier. Profitability of selected crops is compared in Table 3.15. As shown in the table, farming of most crops is a profitable business undertaking, ensuring some 20% profit considered adequate for micro and small business operation. Exceptions are rainfed paddy production, showing negative profit ratios for both wet and dry season crops. Irrigation provides dramatic effects in profitability.

Irrigation carries a social development function with a large portion of paddy farmers being operators of small land holdings and subsistence farmers. Providing irrigation to rainfed paddies would better the socio-economic condition of a big number of farmers in Bangsamoro.

Table 3.15 Net Profit-Cost Ratio of Various Crops

(Unit: PHP/ha)

Crop	2009	2010	2011	2012
Palay irrigated-dry	0.30	0.65	0.31	0.17
Palay irrigated-wet	0.43	0.67	0.38	0.44
Palay rainfed-dry	0.41	0.18	-0.05	-0.03
Palay rainfed-wet	0.27	0.11	-0.08	-0.01
Corn	0.54	0.52	0.30	0.44
Coffee	0.66	0.67	0.72	0.65
Cassava	2.05	1.99	2.32	2.51
Mongo	1.00	1.38	1.51	1.08

Source: CountryStat (http://countrystat.psa.gov.ph/).

9) Cooperatives strengthening for attaining social and economic justice for small farmers

Associations and cooperatives of agricultural producers, especially small farmers, would benefit the members for many reasons. Delivery of support services by government, non-government organizations and donor organizations and individuals could be facilitated to benefit a group of farmers. In the Philippine setting where farms are generally of small sizes, cost of production tend to be higher since agricultural production and marketing is generally adapted to economies of scale. The larger the farm operations the more cost-effective.

Farmers associations have shown various success around the Country. Organizing Irrigators' Associations (IA) has been considered by NIA to be its most significant initiative in the development and operation and maintenance of irrigation systems. Farmers' associations have also shown successes in sharing of common service facilities like operating a pool of farm equipment as common service facilities of the member-farmers. Farmers' organizations can also beat the economies of scale in

[33] Partly coming from Judy Gulane

marketing of agricultural products. If farmers are organized, they can displace traders who rake in profits twice from them: (1) buy products not only at low prices but also putting large discounts on quality, and (2) high cost of transport of products[34].

Although associations are legal institutions being required to be registered with the Securities and Exchange Commission (SEC), associations cannot grow into businesses since they are not allowed by law to have earnings that can be distributed to members. Thus, associations can only function as self-help organizations good channels of assistance from or collaborations efforts with government programs and other institutions.

On the other hand, cooperatives have certain privileges that are not given to other organizations. These privileges enshrined in the Cooperative Development Code include engaging in business for profit with transactions exempted from various taxes imposed by government on business transactions. In return, cooperatives are expected to religiously follow regulations and are subject to regular audit by CDA.

Cooperatives should be very suited to farmers or agricultural producers in the Philippine setting since most Filipino farmers are small producers without entrepreneurial skills. Many farmers have the same economic undertakings that when collectively pursued will provide more benefits under a cooperative system. By way of land physical characteristics, paddy farmers can be in a number that would justify a reasonable cooperative that could integrate activities from production to marketing of paddy.

Under a cooperative, small adjacent farms can be operated as a single unit (e.g., a block farm). Under this scheme, economies of scale may lower cost of production. There are a number of cooperatives operating such as cooperatives of agrarian reform beneficiaries (ARBs) generally receiving assistance from various programs. The question of sustainability still persists.

While farmers are producers, they also engage in marketing their products, making the whole production and product distribution a business enterprise. Marketing of paddy undertaken by the cooperative creates direct link between the farmers and consumers, hence eliminating middlemen, which takes most of the profit from agricultural products (farm gate price low-consumers' price high).

Cooperatives can also go into processing of the members' products into higher value products. The cooperative structure enables members to share information about production plans, sales volumes, prices, and other market intelligence and/or to formulate price strategies. This collaboration increases the growers' market power. For cooperatives to grow, enterprise model should be market-driven, owned and governed by members and is designed to create value for members. Although, cooperatives operate for the benefit of their members, they still must recognize the competitiveness and risks of the business. The success of cooperatives relies on their ability to compete and survive within a given market as well as being driven by serving member interests.

The reputation of cooperative development in the entire Philippines has not been very encouraging. The number of cooperatives that turn inactive after having successfully registered is staggering and is noteworthy of review. In fact, many cooperatives in the Philippines have been reviewed and the results indicated some basic causes for the instability of cooperatives. Among them are wrong motives and lack of institutional leadership.

Many cooperatives have been used as conduits of government and non-government social programs and cooperatives could actually serve well as such. However, many cooperatives have been established for this purpose without consideration of sustaining operations even after the program. Thus, cooperatives that started as conduits readily become inactive after the completion of a particular program. This runs counter to the objectives of cooperative development where cooperatives are meant to be media for people with little or no capital to undertake business collectively. Despite the seeming failure, cooperatives have certain strengths that can improve agriculture under the hands of small holders. These have been shown in some success stories of cooperatives development in Bangsamoro.

Cooperative is well suited for the inclusive development of Bangsamoro. The Muslim culture includes

[34]Buying prices of products are on-farm and farmers pay for the transport. Such payment is deducted from the proceeds of the farmers' sales. Farmers in Parang and Balabagan pay at least P1.00/kg for transport. It is about 20% of the price of copra.

qualities that could make cooperatives work for the members. Important to note are

- Respect for people in authority; Muslims have high level of respect and trust to church and community leaders.
- Muslims are cohesive with their clans hence they look out for each other's welfare.
- MILF combatants have strong brotherhood ties with very high level of trust that brothers protect each other's interests.

Although they tend farms, they live in communities together and they can easily congregate for meetings.

Yet, facts and figures say that more is needed to make cooperatives effective in achieving their purposes in the farming sector. First, the farmers will have to embrace the spirit of group undertaking such as livelihood, collective ownership of resources and operation of businesses from their economic activities. Given the ownership thus established, support tailor-made for the need of each cooperative should be provided at all stages according to the priority determined by each cooperative and the budget allocation. Nurturing of cooperatives after its establishment is an important support mechanism. This requirement would entail the following.

1) Strengthening CDA to carry out its difficult dual function of regulation and development

   The agency would need a bigger budget to increase its staff particularly those that assist the cooperatives and support cooperatives development program. The possibility of having cooperative support workers immersed in the communities should be studied. This will enhance monitoring (knowing the needs and providing problem-solving assistance) for purposes of assisting cooperatives.

2) Enhancing the training capability of CDA to go beyond organizational trainings

   CDA should be able to provide a continuous training program to sustain the need of cooperatives for 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 center for cooperative development.

3) Establishing cooperative centers in strategic places that could provide accessible assistance to cooperatives

   This center should be able to provide cooperatives assistance in accessing financing and support from various programs of government and other institutions. This assistance should include preparation of feasibility studies and business plans, preparation of project proposals, entering into contracts or agreements, implementation of projects, finding network and linkage, etc.

10) Responsive financing system to increase farm yields and agricultural production

The Bangsamoro region is endowed with natural physical characteristics such as climate and land resources suitable for growing many types of crops. The popular saying that "you throw any seed, it will grow" certainly applies to the region. However, the land potential should be harnessed to optimize the seeds it could give back. For this, the right level of inputs such as planting materials, fertilizers, pest control, and labor should be acquired.

All these need capital. Development and operation of commercial farms can be financed from regular loan programs of LBP, DBP and commercial banks. Agri-business companies have capability to source financing from banks and other financing institutions in the Philippines and abroad. It is the opposite for small farm holders who cannot access financing from regular sources like banks. Although LBP is tasked to support agriculture by providing credit, it has to operate as a regular bank regulated by the Central Bank and earning a decent income. Thus, it has to protect its loan fund by requiring collaterals from all borrowers including agriculture producers. Presenting collaterals is a major problem among small farmers.

Among the ARBs, lands distributed are mostly under CLOA, which cannot be used by individual farmer

to borrow from banks. Knowing the vulnerability of agriculture production themselves, farmers whose farms are acceptable collaterals would not risk it. On the other hand, commercial banks do not prioritize agriculture production loans due to the risk attached to agriculture. Risk-averse banks are even more apprehensive to lend to farmers in Bangsamoro observing poor repayment rates in LBP. Thus, lending from commercial banks to the agriculture producers in Bangsamoro is nil.

Farmers resort to borrowing from informal sources, such as relatives working abroad, traders who finance production, local lenders, etc. Even from informal sources, credit is very inadequate and because of the high risk, lending often carry very high interest rates. The inadequacy and inaccessibility of credit result to low investment in agriculture production.

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 - low production from low productivity due to the absence of financing. In view of these, the Bangsamoro agriculture financing needs 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 Government may stop programs on direct distribution of inputs and farm machineries to farmers and divert the allocations to this fund. These programs had been subject of corruption cases filed against government officials of the Department of Agriculture (DA) and may have substantially robbed the farmers of needed production support.

The main features of this program are (1) provision of low-cost loans for the borrowers; (2) limited to small farmers and cooperatives, of which the members' farmlands are smaller than 5.0 ha (i.e., the retention limit of land ownership); and (3) accessible (may take from the models of informal lending).

The fund may be used for project financing such as those of the cooperatives awarded CLOA that covers commercial farms. According to some ARBs interviewed, the commercial farms particularly those planted to rubber and coconut, are already deteriorated with a number of old trees. Some areas have been burned or cut down. Cooperatives can access the fund for rehabilitation project financing.

The fund can also be used to provide production loan for every cycle of temporary crops like rice. Experiences reveal that this type of loan programs have seen large defaults in the past. Under this credit program a mechanism will be devised to address it. Aside from credit or crop insurance from the PCIC, alternative guarantees may be looked into. LGUs may participate in providing guarantees for cooperatives and, in turn, monitoring payments to prove their accountability to be shown to DA.

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

11) Coordinated agricultural support services

For coordinated programming, delivery, and monitoring of support services to the Bangsamoro farmers, all agencies of the Bangsamoro government should be placed under the umbrella of the main agriculture office like DAF. This will ensure holistic planning thereby avoiding duplication. Such an organizational structure will facilitate cost-effective delivery of support services.

Cross-cutting programs of other agencies linked to DPWH, DENR, DAR, CDA and other agencies with DAF are better planned through convergence initiatives. Development of infrastructure such as roads, ports and airports is a function of DPWH, which should support the development directions of agriculture. The same should be taken into consideration for programs of environment protection and natural resources, agrarian reform and economic development programs. Inter-agency development programs/projects will continue to be a strategy for holistic delivery of support services. Implementation will necessarily have a separate office managed by a consortium headed by DAF as the lead implementing agency.

R&D plays a pivotal role in economies in transition like the Bangsamoro region. Unleashing the strength of state universities will give a big boost to the agricultural potential of the region. The MSU

system has at least four campuses within the region with strong agriculture and fisheries program. To strengthen the agricultural programs of these campuses, adequate funding and a well-managed research agenda that respond to the requirements of the region should be established.

The main campus should be able to support technology appropriate for upland agriculture. Root crops and salad vegetables, which are high value cash crops are very promising in the province of Lanao del Sur. To support R&D, DAF should provide funds to R&D activities of state universities through an award system similar to what is being done by the Bureau of Agricultural Research (BAR) of the national DA. Alternatively, the MSU system may work out research agenda with DAF to ensure that all the research in the agenda supports the agricultural development program in the Bangsamoro region. Through a system of extension service delivery, researches should end up in the fields where technologies should make impact.

A very important aspect of the institutional arrangement is the provision of project/program monitoring during implementation and evaluation after implementation. Monitoring and evaluation save resources from ineffective projects or badly implemented projects.

3.2 Agro-industry

3.2.1 Current situations and prospects of agro-industries

Existing production performance of major agricultural products was examined in the agricultural sector. In this section, existing situations of agro-industries are examined, covering processing and marketing by major agricultural product.

(1) Banana-based agri-business

The supply chains for the Cavendish banana variety have already been developed. Commercial farms in Bangsamoro are equipped with packinghouses where the produce is packed in plastic bags and cartons, and then shipped to ports in refrigerated transportation. Unifrutti, operating banana plantations in Bumbaran, Lanao del Sur (over 500 ha) and Datu Paglas and Buluan, Maguindanao (over 1,000 ha), is planning to invest in new plantations in Talayan, Maguindanao. As banana plantations are labor intensive, requiring two workers per ha, expansion of Cavendish banana plantations would contribute to creating employment in Bangsamoro.[35]

There is also potential for expansion of markets for banana products and by-products. Processing of banana chips and fried bananas by small-scale processors for domestic consumption could be promoted. There could also be a focus on bananas other than the Cavendish variety, such as Lacatan or Saba bananas. Lacatan bananas are used in various types of food and there is a potential for growth of this market as the Bangsamoro currently accounts for 11% (102,443 tons) of the national production,[36] with 60% being produced in Maguindanao and 40% in Lanao del Sur.

According to the Development Study on Local Industry Promotion in ARMM (JICA 2011), most processing activities in Bangsamoro are conducted at the household level while packaging and trading are conducted by small-scale entrepreneurs. Indigenous Saba variety bananas are also processed into a variety of products including chips, ketchup, puree, jam, jelly, flour and cakes, and so there is demand for this variety of banana as well.[37]

[35] For example, in 2009, the cultivation of Cavendish bananas (harvested in 3.7% of the total agricultural land) accounted for 38% of the total employment in the sector of agriculture, forestry and fisheries. (Source: Philippine Statistics Authority)

[36] Philippine Statistics Authority CountrySTAT

[37] Banana products in Buluan, Maguindanao are promoted in the framework of the Department of Trade and Industry-ARMM (DTI-ARMM)'s One Town One Product (OTOP) program. In Buluan, La Frutera Inc. has a 1,000 ha plantation (to be expanded by 300 ha) solely for Chiquita bananas (Cavendish variety), of which the rejections (270 to 400 tons of oversized or undersized bunches per annum, acconting for 2 to 3% of its producion) are also given to local traders to be processed.

One by-product of bananas that has market value is a fiber from unused trees, which has a silky texture and is used for formal dress clothing, similar to the Barong Tagalog made from pineapple fibers. La Frutera, a subsidiary of Unifrutti, exported 30 tons of banana fiber from unused trees to Japan in 2008. Although export of banana fiber to Japan has since been suspended due to a disease among the banana trees, a market does exist for this material. Edwin, a Japanese jeans brand, sells eco-friendly bottoms developed by Toyobo Textile that are made from such banana fiber.

(2) Pineapple-based agri-business

Of the 60,750 ha planted with pineapples in the Philippines,[38] four major companies commercially operate plantations on 43,000 ha.[39] Corporate plantations are preferred for the production of fresh pineapples, which requires stringent timely harvesting under unpredictable weather conditions, while pineapples under contract farming are used for canned products.[40] Some cooperatives are engaged in pineapple processing (e.g., for dehydrated pineapple, pineapple tarts or pies, jelly, juice, and jam[41]) for the local market. The Fiber Industry Development Authority (FIDA) of the Philippines has been promoting the use of pineapple leaf fiber as a material for the premium class Barong Tagalog; however, due to its high cost and unstable production, international trading of pineapple leaf fiber has not yet been realized.[42]

(3) Coconut-based agri-business

The use of processing technologies in Bangsamoro is relatively low with virgin coconut oil (oil extracted without heat treatment) being produced by small- to medium-scale operators, including Matling Industrial and Commercial Corporation located in Malabang, Lanao del Sur. There is no coconut oil refinery in Bangsamoro;[43] local copra traders collect dried copra to sell to large refineries outside the region.

Coconut sugar, processed from boiled saps taken from blossoms, is increasingly drawing health-conscious consumers' attention in developed countries due to its high content of vitamins, amino acids and minerals.[44] Small- to medium-scale processors of coconut sugar have recently emerged in Bangsamoro. Some medium-scale producers, such as the Linabu Agrarian Multi-Purpose Cooperative (LAMPCO), have started exporting their products, although Development Study on Local Industry Promotion in ARMM (JICA, 2011) observed inconsistencies in their quality and color.[45] Treelife Coco Sugar, which is the largest coconut sugar producer exporting all its products (15 tons/month),[46] has been requested to increase its monthly production to 100 tons by its customers in Europe.[47]

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[38] Philippine Statistics Authority CountrySTAT

[39] Del Monte has 23,000 ha, Dole Philippines with its subsidiary Dolefil Agrarian Reform Beneficiaries Cooperative (DARBC) has 15,000 ha, and Tiboli Agricultural Development, Inc. (TADI) has 5,000 ha (Source: companies' websites).

[40] Interview with Unifrutti

[41] For example, a few cooperatives in Camarines Norte Province, Bicol started producing a wide variety of products under a DA and DTI support program, including testing of pineapple fiber production from its leaves. (Source: Bureau of Agricultural Research, Official Quarterly Publication Digest vol 14 (2012))

[42] There are small-scale processors in Visayas. Kanebo patented the manufacturing of pineapple fiber.

[43] There seem to be oil refineries in Iligan, Cagayan de Oro and Davao (Source: JICA (2011) "Development Study on Local Industry Promotion in ARMM").

[44] Maimbung in Sulu chose coconut sugar in the OTOP program in response to the growing domestic demand (Source: (Status Report of Transition Investment Support Plan for ARMM (July 2014) , press releases from PCA Coconuts R&D and BAR)

[45] LAMPCO's export started with Japan, and then the U.K. (5 tons/month were exported to the U.K. in 2014). Targeting other small scale producers in the nearby area, in early 2014, a "Project Formulation Survey under the Governmental Commission on the Projects for ODA Overseas Economic Cooperation" was conducted to eliminate inconsistencies in color by utilizing a unique technology of a Japanese firm. The product with this technology is slightly more costly than the current production.

[46] The company has certificates for organic products from the U.S., Germany and EU, and a certificate of Hazard Analysis and Critical Control Points (HACCP)

[47] Interview with Treelife

Another by-product of coconut is coir fibers processed from husks (comprising one-third of the weight of the coconut) after extraction of the copra. The fiber can be turned into geotextiles, which are, once combined with natural rubber, used for mattresses, automobile seats and sofas. However, most coir fibers in the Philippines are simply processed into geo-nets used to prevent soil erosion; the products are highly demanded by the Philippines' public construction sector. Promotion of coir fiber would have a large economic impact in the Philippines since coconut is grown by small-scale farmers and locally available mills are used for decortication. Lamitan and Sumisip in Basilan selected coir processing in the OTOP program. A set of processing equipment was provided to a cooperative in Lamitan through DTI-ARMM's Shared Service Facility (SSF).

Bangsamoro's geographic and climatic advantages, including being typhoon-free with fertile soil, make it suitable for coconut cultivation.[48] Coconut is suitable for intercropping and being grown by smallholders; household-level or small-scale processing, such as the extraction of virgin oil, the sorting of husks for coir, and the production of coconut sugar, could be promoted.

(4) Palm oil industry

In Bangsamoro, large-scale production techniques such as importing seeds,[49] nursing and crushing, have been practiced in the oil palm plantation of Agumil[50], a leading company in the subsector jointly formed by Philippine and Malaysian investors. After crude oil is extracted at crushing plants attached to plantations, it is shipped to Manila and India for refining.[51] According to the Mindanao Development Authority, there is a plan to establish an oil refinery in the Polloc Ecozone, the only economic zone in Bangsamoro. A thorough analysis will be needed to determine whether the volume of crude oil produced in Bangsamoro can justify the investment as the establishment of a large refinery unit is required in order to be competitive.

Further expansion of palm oil production could be expected in Bangsamoro.[52] For example, Agricola, a Singaporean firm, plans to invest in a 5,000 ha plantation in Datu Odin Sinsuat, near Cotabato City. Univanich Carmen Palm Oil Corporation, a joint venture between Thai and Philippine companies, has a newly built mill in Carmen in Cotabato Province to crush oil palms purchased from its surrounding farms (over 8,000 ha), and it plans to double the processing capacity while increasing the number of contracted farmers (an additional 3,000 ha of farmlands are targeted).[53]

It should be noted, however, that the development of oil palm plantations requires consideration of its environmental impacts, including possibilities of conflicts in connection with land acquisition and degradation of the environment caused by the clearing of vast amounts of land.[54] Moreover, oil palm farming is not labor-intensive[55] but it is capital-intensive[56]. Although a corporate plantation is more suitable for high-yield production[57], a model of contract farming with a nucleus corporate plantation[58] could be promoted. Support programs for smallholders' initial costs, such as financing for planting materials and fertilizers that could be paid back within two- or three-year harvests, either by investors

[48] JICA (2011) "Development Study on Local Industry Promotion in ARMM"
[49] As certified seeds are not available and there is no government body to conduct research and development for domestic seed production in the Philippines, seeds are imported from Malaysia and Papua New Guinea.
[50] Agumil's crushing plant at Buluan in Maguindanao (covering up to 8,000 ha) purchases oil palm (FFB) from its outgrowers.
[51] While there is a palm oil refinery in Caraga, there is no information about its operational status.
[52] Interviews with RBOI-ARMM and media report.
[53] Univanich is seeking financing (PHP 90 million) for high-yield seedlings to be distributed to farmers.
[54] Burning of forests to clear land for oil palm plantations has been internationally debated. In the Philippines, the Clean Air Act (1999) bans burning.
[55] The employment per ha in oil palm farming is 0.3 on average (e.g., 7,000 growers and 15,000 workers over 70,000 ha of land). (Source: The Philippine Palm Oil Development Council, Inc. (PPDCI) (2013), "A Road to Poverty Reduction")
[56] The average cost of high-yield seedlings (20-30 years' tree life), which are unable to be produced domestically, is PHP 30,000/ha and that of fertilizers is PHP 6,000/ha per annum. (Source: interview with Univanich and farmers)
[57] According to Univanich, the yield under a corporate plantation is twice as much as through contract farming.
[58] According to PPDCI (2013), Indonesia could create jobs for 1.5 million farmers under this model.

or PCA,[59] would be important.

(5) Mango-based agri-business

Philippine mango is internationally known for its Carabao variety with its sweetness and high nutritional value. Of the total production, 95% is consumed locally while the rest is exported (30,565 tons in 2011, valued at US$97 million[60]). The largest foreign buyer is Japan, accounting for 40% of the mango exported from the Philippines.[61] The demand for mango is growing also in the domestic market.

About a quarter of all mangoes produced in the Philippines are processed into various forms of products: puree, juice, dried mangoes, concentrates, frozen mangoes, etc., but there is no processor within Bangsamoro. The market for mango juice is rapidly growing, with its production being dominated by two large food manufacturing companies: San Miguel Corporation and RFM Inc. Mango puree is mostly produced in Luzon and Cebu.

While pre- and post-harvest technologies of mango production in the Philippines are widely disseminated, the actual production volume in Maguindanao is very small due to the insufficient use of chemicals for flowering, according to the JICA Study (2011). Enhanced production methodologies, such as spraying in groups, should be encouraged.

(6) Cassava-based agri-business

Cassava is collected mostly by traders through two channels: one for starch and granules; and one for local consumption and feed. In Lanao del Sur, two cassava processors, Matling Industrial and Commercial Corporation in Malabang and Itil Plantation Inc. in Balabagan, process the majority of cassava harvested in the province.[62] Demand for cassava starch is growing; the Country imported 54,000 tons of starch (US$29 million) in 2011.[63] Demand for cassava as animal feed is also growing in the Country.

The largest challenge in the cassava value chain is found in its post-harvest treatment. The JICA Study (2011) underscores the lack of post-harvest machinery and tools such as graters, cassava pressers, chippers, dryers and storage for processed cassava. Household-level processing of cassava flour and chips could also be encouraged.

(7) Rubber industry

Most rubber growers in Bangsamoro are smallholders who cultivate 1 to 2.5 ha of rubber intercropped with fruits such as lanzones, durians, rambutans, bananas and coconuts. There is no primary processing plant in Maguindanao; farmers sell their cup lumps of latex to traders, who then transport them to one of the rubber processing plants in Makilala of Cotabato Province (easily accessible from the production areas in other parts of SOCCSKSARGEN). Although rubber processing is a labor-intensive industry, dry natural rubber processing requires a certain level of investment; even a small-scale processing factory at the community level needs PHP 180,000 of initial investment.[64] Processing from natural latex to rubber goes through several stages with machines, such as coagulation, crushing, maceration, creping, drying and pressing, which makes processing within Bangsamoro technically and financially difficult.

The quick solidification of rubber sap after harvest requires an immediate conversion from sap to latex in cup lumps. Most major primary rubber processors that transform latex into dry natural rubber (in

[59] PCA, as the authority in charge of the promotion of oil palm and its industry, formulated the Philippine Palm Oil Industry Roadmap (2014-2023), which aims to develop new 300,000 ha oil palm fields with an employment of 30,000 farmers and establish a total of 500 tons/hour crushing mills by 2023.
[60] FAOSTAT
[61] JICA (2011) "Development Study on Local Industry Promotion in ARMM"
[62] JICA (2011) "Development Study on Local Industry Promotion in ARMM"
[63] FAOSTAT
[64] JICA (2011) "Development Study on Local Industry Promotion in ARMM"

the form of rubber sheet and bale) are located in Zamboanga and Makilala,[65] which is located in between production areas (in SOCCSKSARGEN and Maguindanao) and the Port of Davao. Most of the dry natural rubber processed in Mindanao is shipped from either Davao or Zamboanga with 90% of its destinations being in East Asia and 10% in Cebu or Metro Manila where industrial and household goods, such as tires, belts and bushing, are produced.

Post-harvest handling of rubber is a key to the improvement of farmers' incomes. According to a rubber processor,[66] the quality of dry natural rubber depends heavily on the quality of latex; however, judging the quality of latex from its appearance is difficult once rubber is formed into cup lumps. Mixing impurities (such as sands and metals) inside the cup lumps is reported to be sometimes practiced (and rather prevalent in Bangsamoro), which makes cup lumps appear to contain highly consolidated latex (better quality) with its increased weight. Since it is too costly to introduce impurity detectors, raising farmers' awareness through Department of Agriculture (DA) extension services would be indispensable to quality improvement. DA extension services should also include the utilization of high-yield seeds, better care of trees during growing periods, and the improvement of post-harvest handling.

(8) Abaca industry

Abaca is a species of banana native to the Philippines and the bio-fiber from its leaves is considered to be the strongest among natural fibers[67] For export purposes, abaca is either: (a) processed into pulp and fabric to be further processed in developed countries into filter papers, banknotes, napkins, tea bags, and hospital textiles (aprons and caps); or (b) processed into final products such as handbags, hammocks and mats. For domestic consumption, abaca is processed into clothes, jeans, fishing rope and other items. The Philippines is the leading exporter of abaca to the world market. In 2011, the Country produced 68,612 tons of abaca fiber,[68] of which 10,524 tons (US$13.4 million) were exported.[69]

According to the analysis of the JICA Study (2011), the major constraint on the development of abaca's value chain in Bangsamoro is farmers' limited access to technical assistance from FIDA in the areas of post-harvest handling, handicraft processing and marketing. While most handicrafts produced in Bangsamoro are not sufficiently sophisticated for export, some abaca handicrafts in and around Lanao del Sur are sold outside Bangsamoro[70] with the local community's well-known skillset being utilized.

(9) Cacao-based agri-business

According to the JICA Study (2011), there were 13 cacao processing factories in the Philippines as of 2011 with all of them being located in or around Manila. Cacao harvested in Bangsamoro is processed into dried fermented beans to be transported to factories around Manila. As cacao processing is highly capital intensive and economies of scale are difficult to be achieved with the small volume of cacao production in the Philippines, the establishment of a large-scale cacao processing plant is not feasible. However, the Country may still be able to seek an opportunity to export semi-processed beans or to promote small-scale production of chocolate for local consumption.[71]

(10) Coffee industry

There is a possibility that the certification of organic coffee would lead to an increase in farmers' incomes. Coffee farmers' cooperatives could be formed to apply to the National Organic Agriculture Board (NOAB) established under DA in 2010, which provides support and funding. Intercropping with other products such as coconuts and cassava is also a way to increase farmers' revenues. As the

[65] Philippine Statistics Authority (Profile of Makilala) and Department of Agriculture (High Value Crops Development Program)
[66] Interview with Farma Rubber Industries Inc.
[67] Fiber Industry Development Authority of the Philippines (FIDA)
[68] Philippine Statistics Authority CountrySTAT
[69] FAOSTAT
[70] Puyo Handicrafts (Cagayan de Oro) weaves abaca fibers from Bukidnon (a province adjacent to Lanao del Sur) into various abaca products (textiles, bags, and decorations) to export to the U.S.
[71] A commercial-based production of chocolate ("Coco Dolce") using organic coconut sugar commenced in 2013 in Davao with a capital investment of PHP 10 million.

international Arabica market is highly stringent in terms of the quality it accepts, export cannot be achieved through the existing market channels that have mostly been formed for instant coffee (Robusta). Therefore, establishing different distribution channels would be indispensable for export. Rocky Mountain Arabica Coffee Company (RMACC), an investment from Canada, has been purchasing Arabica coffee directly from contracted farmers and plantations at controlled elevations above 900m in Mindanao[72] and exporting to Canada.[73]

(11) Mangosteen-based agri-business

Mangosteen is in high demand in the domestic and international markets. Bangsamoro represents most of national production, ranging from 2,000 to 5,000 tons annually.[74] Sulu dominates the production in the range of 2,000 to 4,000 tons per annum while other major producers in Mindanao are Cotabato Province (100–800 tons), Compostela Valley Province (100–400 tons), and Davao del Norte Province (100 tons). According to a DA report, a small quantity of frozen mangosteen was exported to Japan previously, and processed jam has recently been exported mainly to the U.S.[75] The DA's report and the JICA Study (2011) further explain that there is a mangosteen farm in Kidapawan in Cotabato Province which processes the raw material into jam, soap and medically approved nutritious products (capsules from fruit pulps and tea from leaves) to be exported to the U.S., the U.K. and Israel.[76] The farm in Kidapawan is known for its well-developed production practices.[77]

Under extensive farming with wild seeds (mostly observed in Sulu), mangosteen bears fruits in a biennial cycle: 500 to 800 fruits during an on-year and 100 fruits or less during an off-year. The requirement for agricultural machinery and equipment is minimal; plowing and harrowing are needed for land preparation while harvesting is conducted manually. Philippines' mangosteen has an advantage; harvest seasons in Thailand and Malaysia, two main producers, are from May to August and June to August respectively, while production in the Philippines is from August to November. Furthermore, when a sufficient amount of fertilizer is provided and adequate pruning and irrigation applied, a tree can bear fruits twice a year with annual yield increased to 2,000–3,000 fruits per tree.[78]

In order to promote the expansion of mangosteen production, production practices used in Kadapawan can be disseminated in high production areas such as Sulu, followed by the installation of simple processing units through DA's extension services and awareness-raising. A mechanism to increase farmers' share in the value chain could also be introduced (e.g., forming farmers' groups or cooperatives for selling a larger quantity of mangosteen, gathering market information, and finding direct buyers).

Mangosteen is becoming an important crop due to its medicinal properties. Various parts of the fruit and even the leaves and bark can be processed into medicine and food supplements due to the high concentration of potent antioxidant, Xanthones.

(12) Corn-based agri-business

Lamsan Inc., a corn starch factory in Maguindanao, which processes 500 tons daily of corn produced in Bangsamoro, has a plan to increase its milling capacity to 1,000 tons.[79] According to Lamsan, the company's direct purchase in large volume from grouped farmers would be beneficial to farmers since

[72] Mainly in Bukidnon Province, Northern Mindanao, and in Sarangani Province, SOCCSKSARGEN (80 tons/year from 250 ha).
[73] Coffee for Peace, a Canada-based NGO for women-led fair trade, also promotes community development through producing Arabica coffee.
[74] JICA Study (2011)
[75] Department of Agriculture (2009) "Commodity Situation Report: Mangosteen"
[76] The DA's report mentions that the final packaging of jam is conducted in Manila.
[77] The farm has two stable harvests a year with minimal production techniques. Factors that are important for both the volume and quality of production include: fertilizers used at appropriate times, clearing of weeds for land preparation, using of high-yield seedlings, and the dry-spell (stress) period before flowering. (Interview with the farm)
[78] Department of Agriculture (2009) "Commodity Situation Report: Mangosteen"
[79] According to Lamsan, the company's added capacity (500 tons) will be used to process imported corn due to the insufficiency in the supply of yellow corn within the country.

middlemen, who provide farmers with fertilizers and seeds on credit, currently control farm-gate prices. Another problem the company faces in the supply of corns produced by farmers is their low quality caused by the lack of post-harvest handling facilities, such as harvesters and driers. Farmers' incomes would be increased should there be a means to financially support the purchase of such equipment.

(14) Sugarcane industry

Sugar mills in North Cotabato and Davao are under-utilized due to lack of raw materials.[80] The low purchase prices of sugarcane have caused small-scale farms to convert from sugarcane to other crops, which in turn has resulted in the unstable supply of raw materials to some of the mills.[81] Having their own plantations or dedicated out-growers would be necessary for mills to maintain a constant production volume.[82] For example, the Governor of Bukidnon facilitated the signing of the agreement between farmers, farmer associations, plantations and mills towards stable production to fill the milling capacity under the national sugar inventory allocation.

Another example is the SRA's initiative promoting *block farms* of smallholders through which necessary machinery and extension services are supported. In Talayan, Maguindanao, 500 ha of lands were experimentally cultivated in this scheme from 2013 with a long-term plan to expand to 3,500 ha.[83] Sugarcane Development Act 2014 is expected to be enacted shortly, which includes grant schemes for block farms and mechanization for smallholders under the collaboration between SRA, DA and the Department of Agricultural Reform (DAR).

Apart from the problems of low raw material prices and the low utilization rates of sugar mills, the Philippines' sugarcane industry will, in the near future, have to face competition with imported sugar once the tariff is reduced under the ASEAN Free Trade Agreement. Another challenge is how to increase bioethanol processing from sugarcane (described in the box below). Pedro Roxas, an investor in bio-sugar and bio-energy, is reported to have a plan to invest in a sugar mill and an ethanol plant that processes sugarcane to be produced on 5,000 ha of farmlands in Maguindanao. As the average employment for sugarcane farming is 1.5 persons/ha,[84] the investment in this industry would contribute to job creation in Bangsamoro.

3.2.2 Conditions for agroindustry promotion in Bangsamoro

(1) Overview of agroindustry investments in Bangsamoro

Foreign investment in Bangsamoro has been traditionally directed toward high-value cash crops such as palm oil (Buluan in Maguindanao), banana, and pineapple (Wao and Bumbaran in Lanao del Sur). Since the peace negotiation between the Philippine Government and MILF commenced in 2011, domestic investments have been on the rise. These investments focus on other crops that require smaller capital, such as coconut, crops for starches (cassava and corn), and coffee. There are 22 investment projects in agroindustry (including one fishery-based) listed by the Regional Board of Investment (RBOI)-ARMM. Major ongoing agroindustry investment projects in and around Bangsamoro are presented in Table 3.16.

The scale of investments in agroindustry in Bangsamoro, however, is still much limited compared to the

[80] The statistics from The Philippine Sugar Millers Association shows that mills in Davao and North Cotabato have been utilized for less than 100 days per year in the past decade while two in Bukidnon have been utilized for more than 200 days (due to the limited harvest seasons, mills can operate usually up to 200 days a year).
[81] Interview with Cotabato Sugar Central Company (North Cotabato). It was also found that Cotabato Sugar Central adopts a 62% to 38% (farmer to miller) profit sharing ratio, which would have demotivated farmers to continue sugarcane production.
[82] The low profit of sugar mills (due to low capacity utilization from low sugarcane supply) is directly reflected in the purchase price of sugarcane.
[83] Interview with Cotabato Sugar Central Company. However, the cultivation in Talayan is not going well, due to the difficulty in negotiations with the mayor regarding profit distribution, although the land acquisition was smooth.
[84] SRA (2012), *The Philippine Sugarcane Industry: Challenges and Opportunities*

Region's potentiality. In this section, specific matters that need to be taken into consideration when promoting agroindustry in the region, that is, land, environment, access to finance and agro-based infrastructure, and the mechanisms that are have been utilized by existing investors to realize investment, will be first presented. Afterwards, preferable faming systems by category of products and a mechanism that would enable agricultural financing in Bangsamoro will be presented.

Table 3.16 List of Ongoing Investments in and around Bangsamoro

Category	Corporate Name	Origin of FDI/Partner for domestic investor	Products	Farm size (ha)
Foreign	Dole	Japan	Banana, pineapple	32,000
	Sumifru	Japan	Banana, pineapple	13,000
	Del Monte	U.S.	Banana, pineapple	3,000
	Agumill	Malaysia	Palm oil	30,000
	Univanich	Thailand	Palm oil	8,000
	Newtech	U.S.	Abaca (pulp)	n/a
Domestic	Unifrutti	-	Banana, pineapple	2,000
	La Frutera	Subsidiary of Unifrutti	Banana	1,000
	Wao Development Corporation	Subsidiary of Unifrutti	Pineapple	n/a
	Lapanday Foods	(Supplying for Del Monte)	Banana, pineapple	6,000
	Delinanas	Subsidiary of Del Monte	Banana	550
	Lamsan	-	Corn starch	n/a
	Matling	-	Cassava starch	3,000
	Philippine Trade Center	-	Corn starch, cassava starch and biomass energy (rice husk)	n/a
	Granexport	-	Coconut oil	n/a
	Treelife	-	Coconut sugar	250
	Rocky Mountain	-	Coffee	250

Source: RBOI-ARMM and JICA Study Team.

(2) Specific conditions for agroindustry promotion in Bangsamoro

Land

The delay in the implementation of the Comprehensive Agrarian Reform Program (CARP) in Bangsamoro has been a serious obstacle to agricultural investment. CARP is an ongoing program since 1988 in which the Government acquired land from large landowners and distributed land parcels to landless farmers. A judiciary system was made available to settle any disputes between beneficiaries and land owners arising from the process. Among the Philippines' agricultural land totaling 18 million ha, 7.8 million ha was designated as the subject of CARP.

Although the distribution of 6.9 million ha of land was completed as of the end of 2013, the process has significantly been delayed in the areas where the establishment of land tenures is difficult, such as in Bangsamoro. CARP came with many loopholes, where powerful landlords came up with shrewd ways to escape the law.

Many cases of fraudulent land titles have been reported in the Region, which took advantage of ordinary people's difficulty in establishing their land ownerships due to the complexity and costliness of the procedures. Evidences have been seen where warlords, corporations or syndicates have been acquiring land titles with a fake certificate of land ownership award.[85] The ambiguity of land tenure in Bangsamoro has been aggravated by the presence of informal land markets where lands were transferred, mortgaged, traded or sold without being monitored or regulated by the government's land agencies.[86] As a result, a number of land ownership duplications have been observed in Bangsamoro. The ambiguity in land tenure has also hindered farmers from registering collateral when applying for agricultural loans.

[85] UNEP explains that in addition to Bangsamoro's weak institutions and governance, there was no systematic attempt to rectify land records during the conflict, as government officials often belong to warring clans.
[86] International Alert (2014), *Land Governance in the Bangsamoro*

Environment

Due to its rich and abundant natural resources, Bangsamoro is faced with the obligation to manage its forests and biodiversity wisely and efficiently. Whereas the Philippines' forest cover was 80% a century ago, it decreased to 18% by 2010 due to the massive deforestation from 2003 to 2010 at a rate of 47,000 ha per annum.[87] In order to prevent further deforestation, the government adopted environmental regulations on agricultural development, namely Executive Order (EO) 23 (sustainable forestry) and EO 26 (rehabilitation of green forest by planting 1.5 billion seedlings on 1.5 million ha public land by 2016), both of which took effect in 2011.

EO 23 declared a moratorium on the cutting and harvesting of timber in the natural and residual forests of the entire Country. It underscored the Country's obligation to protect the remaining forest cover, stipulating necessary actions not only to prevent destructions by natural disasters but also to preserve biodiversity, protect threatened habitats and sanctuaries of endangered species, and promote natural regeneration of residual forests and development of plantation forests.

Assisting EO 23, EO 26 stipulates a government initiative to reduce poverty, promote food security, environmental stability and biodiversity conservation, and enhance climate change mitigation and adaptation. The initiative was materialized as the National Greening Program (NGP), which was launched in the same year as EO 26 and has been jointly implemented by the Department of Environment and Natural Resources (DENR), DA, DAR and other government bodies. The NGP aims to plant 1.5 billion trees on 1.5 million ha of lands nationwide in six years, from 2011 to 2016; the targeted area for planting is more than twice the Government's accomplishment in the past 25 years.

Trees envisaged to be planted are coffee (90 million trees), rubber (117 million), cacao (62 million), bamboo (54 million), fruits (179 million)[88] and others (timber, fuelwood, rattan, mangrove, and indigenous species). As of the end of 2014, the actual planted areas reached 1 million ha, while the actual number of trees planted was 593 million.

The planting of fruit and other high-value trees has been promoted to increase the Country's forest cover as mentioned above, but the same does not apply to oil palm plantation, an industry that has been increasingly popular in Bangsamoro in recent years. Although oil palm is often promoted to landowners with an expectation that incomes from their farmlands will significantly increase, oil palm development cannot go without environmental concerns such as soil erosions, soil nutrient depletions, water pollutions and biodiversity destructions.

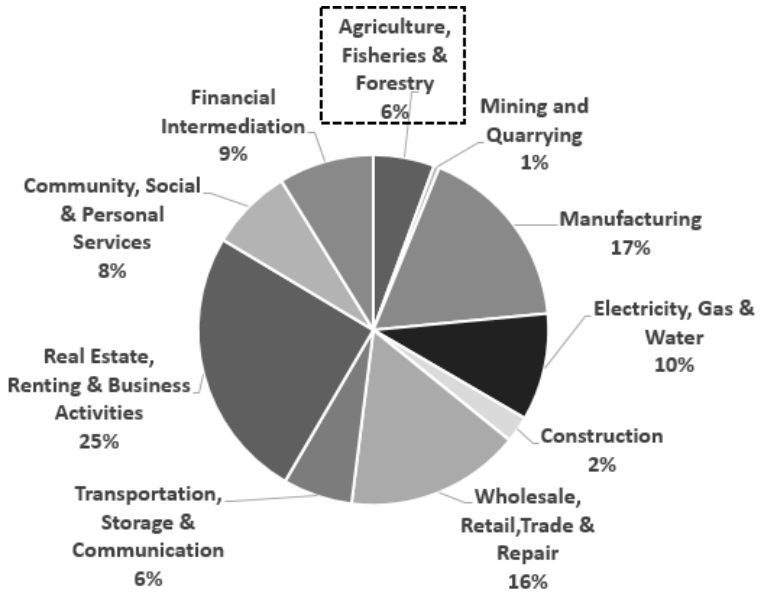
Oil palm plantation accompanies a large-scale conversion of land,[89] causing a loss of forest resources (some with illegal logging). Moreover, since oil palm plantation heavily depends on temporary workforce (i.e., in land preparation and initial planting), local communities, apart from landowners, are not much benefitted from the agribusiness arrangements. Nevertheless, given that the Philippines increasingly relies on import for the supply of edible oil,[90] and due to the profitability of oil palm with the versatility of its byproducts as well as its potential as a source of biomass energy, oil palm cultivation remains an attractive business for both foreign (e.g., Malaysian) and domestic investors. Bangsamoro must grapple with this dilemma on natural conservation and profitability taking place in its territories.

Access to finance

Agriculture is a critical component for Bangsamoro's development as a large population in the Region is engaged in agriculture-related jobs. Yet, banks in the Philippines have generally shied away from

[87] Department of Environment and Natural Resources (DENR)
[88] Fruit bearing trees include mango and mangosteen.
[89] Economies of scale demand at least 4,000 ha of land for oil palm plantation in order to feasibly operate a crude oil mill; most plantation companies in Southeast Asia manage a 10,000–25,000 ha plantation each. (Source: Friends of Earth, 2005, *The social and ecological impacts of large-scale oil palm plantation development in Southeast Asia*)
[90] Over a decade between 2001 and 2011, the country's import of palm oil products increased as follows: palm oil from 33,000 tons (US$10 million) to 41,000 tons (US 51 million), palm kernel oil from 1,000 tons (US$350,000) to 26,000 tons (US$31 million), and palm kernel oil (utilized for feed) from zero to 39,000 tons (US$8.6 million). (FAOSTAT)

agricultural loans; the same applies to Bangsamoro. Loans to the agriculture, fisheries, and forestry (AFF) sector represented only 6% of the Country's total loan outstanding in 2014, while a large portion of loans went to the burgeoning industries related to real estate and business services (25%), manufacturing (17%), and wholesale and retail trade (16%) sectors (Figure 3.2).



Source: BSP 2015.

Figure 3.2 Share of Bank Loans by Economic Activity in the Philippines

Besides the fact that decades of civil war and poverty suppressed the local economy, certain other barriers have prevented formal banks from readily expanding into the region to provide agricultural loans. One is that Bangsamoro farmers, having been excluded from the value chains of commercial agriculture for many years, lack the skills and knowledge to maintain and/or increase the quality and quantity of their products.

Another is that people in Bangsamoro often lack the basic knowledge on finance, confusing loans with dole-outs.[91] The LBP's lending centers covering the Bangsamoro area keenly understand the difficulty involved in agricultural lending with most of their agricultural loans in Maguindanao being overdue and the agricultural loan portfolio in Lanao del Sur having significantly shrunk over the last years as a result of accumulated overdue debts.

The majority of existing agricultural loans are held by a limited number of well-established large agribusinesses and commercial farms capable of producing a large amount of high-value agricultural products and selling them through established market channels.

Because of the high risks involved in agricultural lending, banks set strict requirements against clients, especially individual farmers. Smallholders are faced with issues of fulfilling high collateral standards and following complex and cumbersome loan procedures. The ambiguity in land tenure and the overlaps of property claims hinder the registration of property as collateral; characteristics endogenous to Bangsamoro that have been historically formed make loan procedures more complex. Farmers' inability to prepare a financial statement, business plans and records of assets also reduce their opportunities to borrow from banks. Because of these risks, the LBP does not lend to individual farmers, but only to cooperatives.

Some donors have established funds and projects that are aimed at overcoming the low depth and breadth of agricultural financial services (Table 3.17). However, a closer assessment on these initiatives reveals the difficulty of carrying out such programs in Bangsamoro. Growth with Equity in Mindanao Program (GEM) admits that nine out of 14 business support projects failed as peace and order was not

[91] Interview with Land Bank Lending Centers based in Mindanao.

yet in place at the time of the implementation.[92] The Rural Microenterprise Finance Project was not able to extend its operations in some parts of the Bangsamoro such as Sulu, Basilan, and Tawi-Tawi due to the absence of potent MFI branches.[93] Although undersupply of credit in the agricultural sector is a grave reality, initiatives to link financial services and agriculture are hardly seen in the region to date.

Table 3.17 Projects Including a Component of Agricultural Financing

Program	Key component related to financial access	Major donors	Project size (USD 10^6)
Growth with Equity in Mindanao Program (GEM)	Assist the mobilization of loans and joint venture funds for farmers and fishermen in Mindanao	USAID	GEM-1 (1995–2002): 22.3 GEM-2 (2002–2007): 82 GEM-3 (2008–2012): 98
Microenterprise Access to Banking Services (MABS) Program	Assist rural banking industry to expand microfinance services nationwide, including the Bangsamoro	USAID	1988–present Approximately PHP 25 million in total in 15 years
Rural Microenterprise Finance Project	Strengthen nationwide rural financial institutions through application of Grameen Bank Approach (GBA) including the Bangsamoro	ADB, IFAD	1996–2002 PHP 163.7 million[94]
Agribusiness Development Assistance for Smallholders in Mindanao	Provide Islamic credit facilities to 2,000 households through AAIIBP	Japan Fund, ADB	2012–2016 (plan) PHP 2.0 million as part of Japan Fund for Poverty Reduction (JFPR)[95]

Local MFIs established as early as in the 80s and 90s operate in the provinces of Bangsamoro (Table 3.18). These institutions vary in size and type, which include rural banks, cooperative banks, cooperatives, and NGOs. The majority of micro-loans currently offered by these institutions are for entrepreneurial and commercial business purposes and not for agricultural activities.

In the Philippines, it is only recently that MFIs have started to add agricultural microfinance in their service line.[96] These MFIs are still struggling to develop a farmer-friendly microfinance which will at the same time reduce the underlying risk factors associated with agricultural lending. Agricultural microfinance is still at the phase of being tested and examined by MFIs in several areas of Mindanao including South Cotabato and General Santos, yet it has barely reached the areas of Bangsamoro for the same reasons mentioned earlier: farmers' lack of knowledge on commercial-oriented farming and on the basic concept of loans.

Table 3.18 MFIs operating in the Provinces of Bangsamoro

MFI Type	Name of Institution	Mindanao Office
Rural Bank	Rural Bank of Cotabato	Cotabato City
	Rural Bank of Malabang	Lanao del Sur
	Rural Bank of Isulan	Isulan
	Rural Bank of Datu Paglas	Datu Pagla s
	Maranao Rural Bank	Marawi City
	Bagong Bangko Rural ng Malabang	Lanao del Sur
	Koronadal Rural Bank	Koronadal City
Cooperative Bank	Cooperative Bank of Cotabato	North Cotabato
NGO	Aakay ang MILAMDEC Microfinance Foundation	Cagayan de Oro
	Center for Agriculture and Rural Development, Inc.	Davao City, Cotabato City, Sulu
	Center for Community Transformation	Maguindanao
	Kabalikat para sa Maunlad na Buhay, Inc.	Davao City, Cagayan de Oro

[92] GEM, 2003. Assessment of the Business and Investment Climate in the ARM and Strategies to Address the Problems

[93] Foundation for Economic Freedom 2014. Strategic Road Maps for the Development of the Agribusiness Industry, Halal Food Industry, and Islamic Banking and Finance in the Bangsamoro

[94] ADB, *Philippines: Rural Microenterprise Finance Project in the Philippines*, 2006

[95] ADB, *Proposed Grant Assistance Republic of the Philippines: Agribusiness Development Assistance for Smallholders in Mindanao*, 2012

[96] Three Mindanao-based MFIs, Aakay Ang Milamdec Microfiannce Foundation, Inc. (NGO), Bansalan Cooperative Society (cooperative), and Cooperative Bank of Cotabato (cooperative bank)) were trained through a JICA project (2011–2014) for the designing and introducing of agricultural microfinance.

MFI Type	Name of Institution	Mindanao Office
	Kalimudan Foundation Inc.	Marawi City
	Kasanyangan Center for Community Development, Inc.	Zamboanga City
	Lumad Development Center, Inc.	Datu Odin Sinsuat
	Pagasa Pilipinas Lending	Cotabato, Davao, Sultan Kudarat, Lanao del Norte, Zamboanga, etc.
	South Cotabato Foundation	Koronadal City
	Taytay sa Kauswagan, Inc.	Iloilo City
	Tulay sa Pag-unlad, Inc.	Valencia City
	Zambowanga-Basilan Integrated Alliance	Basilan
Cooperative	Extension Farmers Multi-Purpose Cooperative	Wao, Lanao del Sur
	Federation of United Mindanawan Bangsamoro Women-MPC	Cotabato City
	King Cooperative	Davao City
	MSU Sulu MPC	Jolo, Sulu
	Sulu Provincial Cooperative Union	Jolo, Sulu
	Sulu Provincial Cooperative Union	Jolo, Sulu

Source: Mindanao Microfinance Council and JICA Study Team.

Support infrastructure

Insufficient agro-based infrastructure in Bangsamoro, including farm-to-market roads, post-harvest facilities, collection points and storage, considerably affects the transport costs of agricultural produce. There is a growing need of agro-based infrastructure programs in Bangsamoro that facilitate the trading of agricultural produce including perishable products.

In the vicinity of Bangsamoro, DA and USAID under GEM supported in 2006 the Northern Mindanao Vegetable Producers' Association (Normin Veggies) to establish a bulk consolidation center that handles storage within the central market in Cagayan de Oro. By connecting the transactions between the central market and other markets at the daily volume of 150 tons in partnerships with input suppliers, traders, buyers and processors, Normin Veggies enhanced farmers' ability to access vegetable processors, fast-food restaurants and supermarkets, through which Normin's viability and competitiveness has been consolidated. In Bangsamoro, as a pilot agro-based infrastructure project under the Philippine Rural Development Program (PRDP) financed by the World Bank (US$508 million for 2014–2020)[97] in Talayan, Maguindanao, where agricultural investments (including Unifrutti) are planned or ongoing, was selected for the construction of a 12 km farm-to-market road (PHP 150 million).

3.2.3 Models and issues of agroindustry businesses

(1) Gaining trust of local communities

Support of local communities is indispensable for attaining the sustainability of agricultural investments, especially in such post-conflicts areas as Bangsamoro. A profit sharing mechanism between investors and local communities that enables the distribution of peace dividend needs to be established, as shown in Unifrutti's and other on-going investment projects.

In response to consumers' growing demand for safe and environment-friendly products, companies in developing countries have become increasingly keen to acquire certificates for environment, hygiene, product quality, etc. Unifrutti encourages its outgrowers to obtain certificates of Rainforest Alliance,[98] a comprehensive certificate for sustainable development with its main criteria comprising community development (poverty reduction, land use, and adopting farming and business practice) and environment (forestation, biodiversity, and resilience to climate changes). These certificates add values to the produce.

[97] About 70% of the total budget will be utilized for funding LGUs' infrastructure projects, including farm-to-market roads, bridges, tire tracks, communal irrigation, potable water systems, post-harvest facilities, production facilities, etc. while about 20% will be utilized for agro-fishery enterprises (World Bank and DA).

[98] For certifying, the Rainforest Alliance has 10 principles and 94 sub-principles (with ad-hoc sub-principles to palm oil, sugarcane, sunflower, soybean, etc.). The certification has been increasingly adopted to agricultural produce: 5% of coffee, 15% of cacao, 15% of tea and 4% of banana (or 20% of exported banana) in the current world market. (Source: Rainforest Alliance and the Ministry of Environment of Japan)

Unifrutti also created opportunities for smallholders to make larger incomes through producing high value bananas demanded by the premium market in Japan. Since the undergoing land reform has made investors inevitably increasingly reliant on smallholders as suppliers of produce for export, both investors and farmers are required to make efforts to comply with stringent quality requirements, including food safety and traceability, in order to access premium markets such as the Japanese market.

The introduction of a mechanism to realize transfer of wealth from landowners to farmers/workers can contribute to the increase of incomes of community people. Unifrutti could lease over 1,000 ha of land from Paglas Corp at US$70/ha (the usual price at the time was US$160/ha), which was made through a mutual trust between Unifrutti and Toto. The saved capital was used for realizing more employment and higher wages as well as building infrastructures.[99] Providing a fair share to various stakeholders built a trust to the investor.

Some of the large investments in agroindustry are accompanied by Corporate Social Responsibility (CSR) programs that provide various services, such as education and welfare, to the local communities in or adjacent to the investment sites. For example, Dole provided educational services (building a library and scholarship) as well as skill training for livelihood activities, while IBM facilitated distant learning programs at secondary schools in partnership with the Growth with Equity in Mindanao (GEM) under USAID. Unifrutti also supports the income generation and livelihood of communities surrounding its plantations through its non-profit arm, Hineleban Foundation.

(2) Datu system and security

Securing access to land and maintaining order and security are prerequisites for any agricultural activities. Since politically powerful chieftains (i.e., sultans and *datu*s) have played important roles in consolidating individual lands for large-scale investment and maintaining order and security, having good relationships with such leaders and winning their support are important factors that determine the success of businesses, as represented by the successful agricultural investments at Datu Paglas and Bumbaran Municipalities.

Unifrutti, at the outset of the investment in its plantation in Datu Paglas, had a partnership with Datu Ibrahim "Toto" Paglas III, the Mayor of the town of Datu Paglas, who formed a consortium (the Paglas Corp) with leaders in neighboring areas to support and facilitate the investment. Toto obtained the consent of the MILF Chairman on the investment of US$27 million in this area, with some high-ranking or retired officials (including the General of the Military and the Chief of Staff of the Armed Forces) involved in the signing of the memorandum, and also obtained the support and endorsement of the President. Through Toto, Unifrutti successfully signed a 25-year lease contracts on over 1,000 ha of land at prices between PHP 12,000 and 15,000/ha. Paglas Corp, assisted by the MILF Chairman, mobilized soldiers to build the plantation and provided other services including logistics (trucking and gasoline stations) and security since 1997.

Likewise, to cope with the threats from kidnap gangs that intensified after Agumil set up oil palm seedling nurseries in Bangsamoro, Agumil had a series of negotiations on security issues with MILF leaders when establishing Bangsamoro's first palm oil crushing plant in Buluan. Agumil's community development approach including construction of hospitals, mosques and other public amenities around the plant and farms, backed by the security support from the governing clan and MILF, has contributed to the uplifting of the livelihood of the local community.[100]

In order to prevent the disturbance of security at investment sites, some of which is attributed to clan conflicts, it is essential to devise at each of the investment areas a local structure led by trusted chieftains and leaders that ensures fair distribution of incomes among community constituents. The successful cases in Bangsamoro mentioned above have been built on such structures. Given Bangsamoro's social and cultural specificity, these structures are likely to be functional in achieving a fast and large-scale

[99] A maximum 30% premium is added to the wages based on the productivity, while Unifrutti's on-farm employment was over 2 persons per ha (25% above that of other banana farms in the country), aside from packing houses workers who are mostly women. Infrastructures include roads and irrigation systems. (Source: Australian AID (2013) and interview with Unifrutti)

[100] Australian AID (2012), *Braving it and making it*

economic development, attracting both foreign and domestic investment.

Large-scale agricultural investment would be difficult at the locations where the presence of a well-trusted datu is absent, due to the larger risks of disturbance to be produced by local clans. In order to bring about agricultural development in such areas, local MFIs need to function as a conduit that channels funds to small-scale farmers. Those MFIs operating in the region for many years are often constituted of people who were born and raised in the area and are well versed in the local culture and value. Through the strengthening of the financial and technical capacity of these MFIs, the community will become able to access loans and other financial and technical services that will lead to an expansion of their farming activities.

(3) Farming systems

Large-scale commercial production of agricultural crops is commonly practiced in the world in the forms of a corporate plantation, an *outgrower* scheme and a nucleus estate model (a mixture of the two). Corporate plantations, which are in most cases mono-cropping, require a large capital investment. In an outgrower scheme, farmers agree in a written or verbal contract to supply produce to the buyer usually at either a pre-determined price or the market price upon delivery. A nucleus estate model is a combination of a nucleus corporate plantation and an outgrower scheme involving smallholders surrounding the plantation.

Corporate plantation is preferable for the production of distinct varieties, such as high-value or improved varieties, since it usually requires close supervision (e.g., upon transplanting and harvesting) to control and achieve consistency in their quality. For example, rigorous timing and direct control are required in harvesting pineapples, as their sweetness is highly affected by short-term changes in weather, while the difference in quality cannot be detected from their appearance.[101]

On the other hand, an outgrower scheme can be applied to canned pineapple since sugar can be added to the product. An outgrower scheme or a mixed model is preferable when the consolidation of farmlands is difficult for the plantation operator. It should be noted that although an outgrower scheme may provide farmers with an opportunity to realize larger incomes than a corporate plantation, it exposes farmers to larger risks to lose their incomes in case of natural disasters.

Although large-scale farms and corporate plantations outperform outgrower schemes with efficiency and profitability, certain markets prefer or appreciate smallholder solutions that comply with international (or increasingly regional or national) sustainability standards in terms of social and environmental considerations.[102] Depending on the type of crops, local needs and other regional success factors, different tactics are applied to each agricultural model. Table 3.19 presents the basic indicative figures for the farming of each agricultural product in accordance with categories defined by GIZ: Category I for raw material for industrial processing, Category II for high value and labor intensive suitable for export, and Category III for staple food for local markets.

Category III mostly fits in with small-scale farming. Local MFIs have designed agricultural microfinance models to meet the demand of smallholders producing rice, corn, and vegetables. Cooperative Bank of Cotabato and Aakay ang Milamdec Microfinance Foundation offers agri-microfinance that obligates farmers to attend regular meetings and make regular deposits and interest payment (the loans are repaid at the time of maturity that coincides with the harvest time of each crop). MFIs are aware of the necessity to address the problems of entire agricultural value chains in order to improve rural livelihood, and thus endeavor to increase farmers' bargaining power by uniting them and connecting them to the market.

[101] Interview with Unifrutti.
[102] GIZ (2013), *Contact Farming Handbook*. The report also states that in addition to the increasing demand for sustainability certifications (social and environmental standards) of crops (such as palm oil, rubber, coffee, tea, cocoa), the demand for certifications of specialty products (organic certification, origin labelling, etc.) is also growing despite a risk of creating unnecessary premiums for certifications.

Table 3.19 Basic Information on Agricultural Products

Product	Category	Use/Marketing of produce	Existing model of farming	Lead time (yrs.) to full production
Sugarcane	I	Industrial (domestic)	Plantation	1
Rubber	I	Industrial (export)	Smallholder	5
Palm oil	I	Industrial (domestic)	Plantation/mixed	3
Abaca	I	Industrial (export)	Smallholder	2
Coconut	I	Industrial (export of oil from copra)	Plantation/contract/mixed	5
		Industrial (coir for domestic)	Smallholder	*(Byproduct of copra)*
	II	Processing (coco sugar)	Smallholder (domestic)/plantation (export)	3
Banana	II	Export: fresh	Plantation/contract/mixed	2
		Domestic: fresh/ processed	Contract/smallholder	2
Pineapple	II	Export: fresh	Plantation	3
		Export/domestic: fresh/ processed	Contract/smallholder	3
Mango	II	Export: fresh/frozen/ processed	Plantation/contract	5
		Domestic: fresh/ processed	Contract/smallholder	10
Coffee	II	Domestic	Smallholder	5
		Export (high value)	Contract	4
Cacao	II	Domestic	Smallholder/contract	2
Mangosteen	II	Domestic (export exceptionally)	Smallholder	5–10
Rice	III	Domestic (staple)	Smallholder	0.5
Corn	III	Domestic (processing)	Smallholder/contract	0.5
Cassava	III	Domestic (processing)	Smallholder/contract	1

Product	Initial cost (/ha for seed/seedling)	Running cost (/ha/yr. for inputs & labor)	On-farm employment (/ha)	Revenue from land (PHP/ha/yr.)	Harvest (times/yr.)
Sugarcane	n/a	PHP 50,000	2 (seasonal)	120,000	1
Rubber	PHP 5,000	PHP 30,000	0.3	95,000	Year round
Palm oil	PHP 35,000	PHP 30,000	0.3 (year round)	90,000	20–25
Abaca	PHP 3,000	n/a	1.5 (at harvest)	35,000	2
Coconut	PHP 3,000	PHP 18,000	3 (at harvest)	35,000	10 (grown all seasons)
			Machinery	6,000	10 (grown all seasons)
	PHP 3,000	PHP 55,000	3 (at harvest)	150,000	15 (grown all seasons)
Banana	PHP 1,200,000 [1]	PHP 200,000 (FDI)	2 (year round)	800,000 (FDI) [2]	1
	PHP 55,000	n/a	Higher than Cavendish	50,000	1
Pineapple	PHP 48,000	PHP 64,000	0.3	200,000	1
	n/a	n/a	n/a	n/a	1
Mango	n/a	PHP 60,000	n/a	105,000	2
	n/a (wild seeds)	n/a	n/a	n/a	1 or 2
Coffee	n/a [3]	n/a	< 1	50,000	1 or 2
	PHP 400,000 [4]	n/a	n/a	150,000	1 or 2
Cacao	PHP 400,000/ha [5]	n/a	n/a	75,000–120,000	2
Mangosteen	n/a [6]	n/a	n/a	80,000 (high-yield)	1 or 2
Rice	n/a	PHP 30,000	n/a	12,000 or 50,000 (hybrid)	1 or 2
Corn	n/a	n/a	n/a	12,000	2
Cassava	PHP 20,000/ha [7]	n/a	n/a	≤ 30,000	1 (grown all seasons)

Notes: [1] Cavendish variety; [2] PHP 120,000 for farmers; [3] Seedlings cost PHP 15,000/ha; [4] Highland abaca; [5] Seedlings cost PHP 20,000/ha; [6] High-yield seedlings cost PHP 15,000/ha; [7] Land preparation

Source: GIZ (2013) and JICA Study Team.

(4) Agricultural finance models

As demonstrated by the examples in the sections above, appropriate local partners such as respected and influential leaders and experienced local companies bring about a number of benefits upon implementing an agricultural project. Such actors are capable of guaranteeing the efficiency and the security of the inputted resources during the life of the investment. They can also play the role of bridging farmers and financial institutions. Identifying and using such appropriate intermediaries is a key to success for dynamic and efficient agroindustry projects.

There are several possible agents that may come in between banks and farmers to enable the financing process (Figure 3.3). The nucleus estate model discussed in the previous section that are widely accepted by the communities and are well versed in local conditions may fit the Bangsamoro's context in achieving the dual objectives: increasing the volume of transactions and bridging farmers and financial institutions.

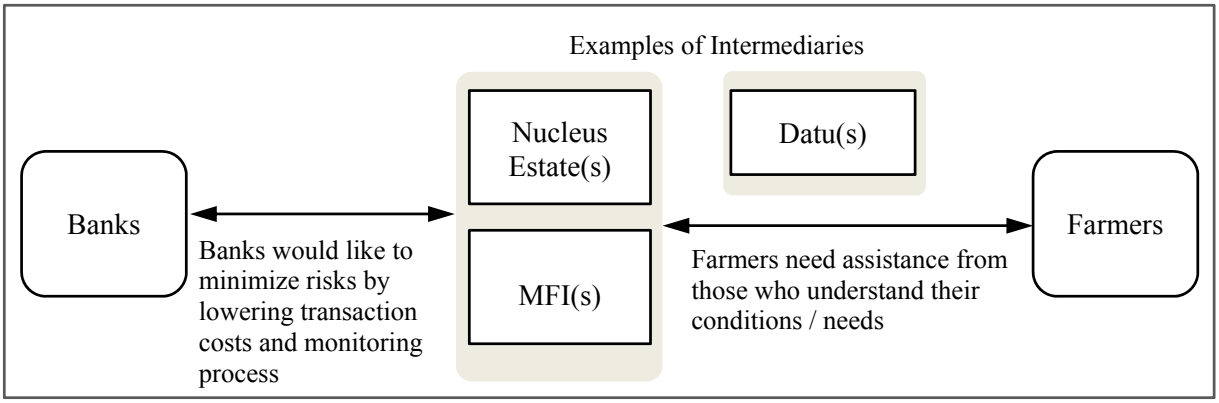


Figure 3.3 Model for Effective Financing on Agriculture in Bangsamoro

Much can be learned from the example of Agumil's palm oil plantation project. The company facilitated farmers' access to bank loans while providing them with seedlings and technical assistance in exchange for farmers' pledges to sell the pre-agreed quantity of their palm oil produce to the company. Instead of farmers applying for loans individually, Agumil was able to aggregate a number of farmlands to be registered as a guarantee upon credit application. Datu(s), regional chiefs respected by their community people, are also candidates of arbitrators between the two parties.

A number of MFIs operating in the Bangsamoro region have already received funds from several government institutions and the LPB as these MFIs are commonly more familiar with local needs.[103] [104] The success of microfinance depends on the level of social cohesion, which is confirmed and consolidated by MFIs through frequent visits and meetings. The grassroots activities that MFIs provide have made them competent of offering customized microfinance services as well as building a strong monitoring and evaluation system.

In any of these scenarios, the presence of a mediator that can become a single window for banks as well as a respected advisor for local people and farmers could be a key to the success of effective financing for Bangsamoro's agricultural projects.

The World Bank and JICA are currently conceiving a credit line to be provided to the LBP, which will be on-lent to agro-industries and MFIs in the Bangsamoro region. Technical assistance will be indispensable in ensuring the effectiveness of the fund. The LBP's loan monitoring functions, especially the capacity to evaluate the economic and social impact of individual loans, need to be strengthened. Technical assistance should also be provided to microfinance NGOs that facilitate the organizing of famers' groups and conduct financial literacy training to individual farmers; these activities are the prerequisite for expanding agricultural loans for small-scale farming in the area. Figure 3.4 presents the proposed institutional framework for agricultural finance in the region.

[103] Foundation for Economic Freedom, Strategic Road Maps for the Development of the Agribusiness Industry, Halal Food Industry, and Islamic Banking and Finance in the Bangsamoro, 2014
[104] JICA, Development Study on Local Industry Promotion in ARMM, 2011

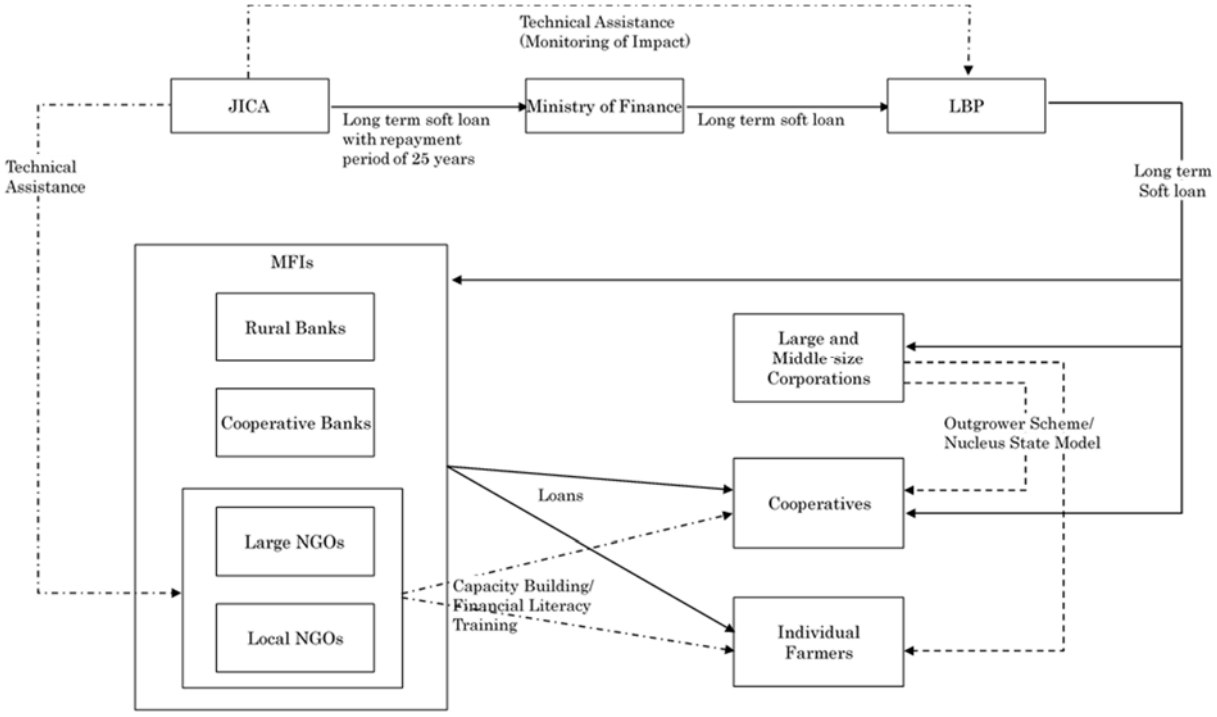


Figure 3.4 Proposed Implementation Framework of Agricultural Finance in Bangsamoro

3.3 Fishery

3.3.1 Fishery sector overview

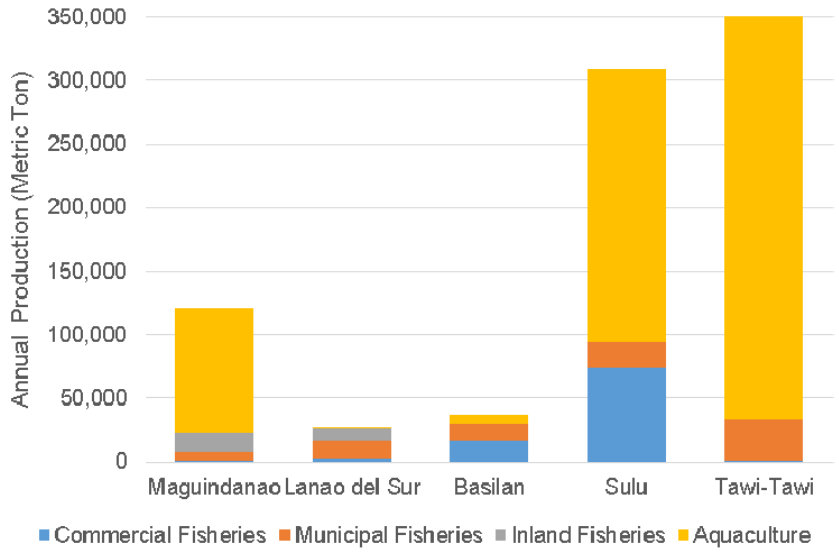
(1) Fishery production in Bangsamoro

According to the fisheries statistics, the aquaculture production is dominantly larger than those of other fishery activities (Table 3.20 and Figure 3.5). It accounts for about 75% in total fisheries production in Bangsamoro. Seaweed production is more than 90% in total aquaculture production. Besides the aquaculture, commercial and municipal fisheries account for about 10% in total fisheries production, respectively. The commercial fisheries are dominantly active in Sulu, compared with other provinces. In terms of municipal fisheries, Tawi-Tawi has the largest production. The production of inland fisheries accounts for only 3% of total fisheries production. The inland fisheries are commonly conducted only in Maguindanao and Lanao del Sur.

Table 3.20 Fisheries Production in Bangsamoro (2012)

Fishing type	Maguindanao		Lanao del Sur		Basilan		Sulu		Tawi-Tawi		Total	
	ton	%	ton	%	ton	%	ton	%	ton	%	ton	%
Commercial	949	0.8	2,851	10.8	17,090	46.6	73,822	23.9	728	0.2	95,442	11.3
Municipal	6,748	5.6	14,303	54.2	12,859	35.0	20,724	6.7	32,204	9.1	86,839	10.3
Inland	15,220	12.6	9,174	34.8	8	0.0	0	0.0	0	0.0	24,402	2.9
Aquaculture	98,308	81.1	61	0.2	6,748	18.4	214,258	69.4	319,177	90.6	638,553	75.5
Total	121,225		26,389		36,705		308,804		352,109		845,236	

Source: Fisheries Statistic in the Philippines.



Source: Fisheries Statistics in the Philippines.

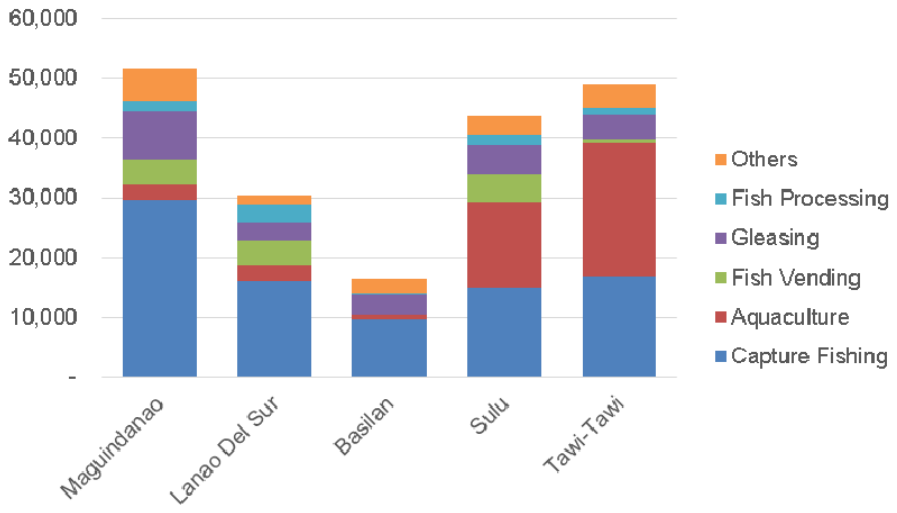
Figure 3.5 Fisheries Production and Composition in Bangsamoro (2012)

According to the Fish-R database of the fishers' registration system, the population of local fishers is about 212,000 in Bangsamoro (ARMM). It accounts for about 7% in total population (Table 3.21). The composition of work types in local fishers varies in respective provinces (Figure 3.6). In Maguindanao, Lanao del Sur, and Basilan, the fishers engaged in capture fisheries are a majority in their population. The population engaged in aquaculture is larger than that of capture fishing in Sulu and Tawi-Tawi. It means that the people engaged in seaweed culture are the largest sector group in these island provinces.

Table 3.21 Population of Registered Fishers in Bangsamoro (2014)

Province	Male	Female	Total	%
Maguindanao	39,619	18,670	58,289	27.5
Lanao Del Sur	22,655	9,621	32,276	15.3
Basilan	13,713	7,314	21,027	9.9
Sulu	26,193	21,004	47,197	22.3
Tawi-Tawi	29,825	23,053	52,878	25.0
Total	132,005	79,662	211,667	

Source: Fish-R Database in BFAR-ARMM.

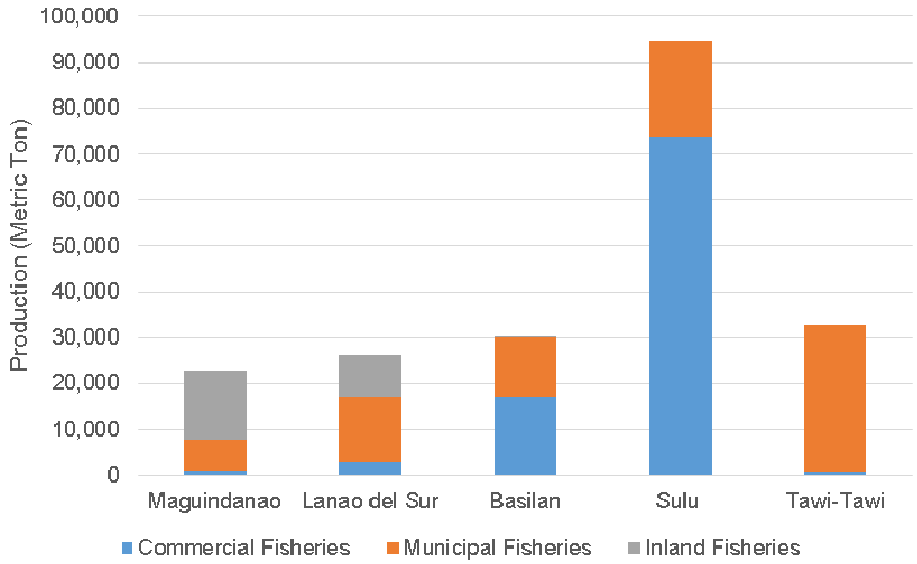


Source: ibid.

Figure 3.6 Composition of Fishers' Population by Work Types in Bangsamoro (2014)

(2) Capture fisheries

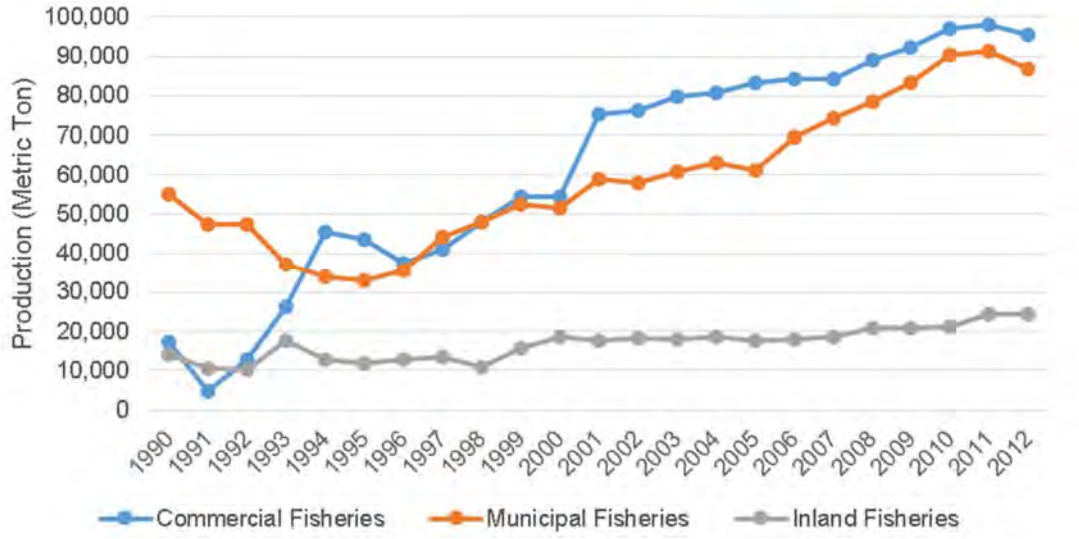
In terms of capture fisheries, Sulu is the largest productive province in the Bangsamoro region (Figure 3.7). The production of capture fisheries reaches 95,000 ton/year. Especially, in Sulu, the production of commercial fisheries dominates other municipalities. In Tawi-Tawi, the portion of commercial fisheries is very marginal, and the municipal fisheries produce most production of capture fisheries in the province. In Maguindanao and Lanao del Sur, inland fisheries has a certain portion in the production of capture fisheries in the respective provinces.



Source: Fisheries Statistic in the Philippines.

Figure 3.7 Production and Composition by Type in Capture Fisheries (2012)

The total production of marine capture fisheries has increased since the 1990s in Bangsamoro (Figure 3.8). Each production of commercial and municipal fisheries reached 100,000 MT at the peak in 2010. However, due to uncontrolled activities of commercial fisheries, the production of capture fisheries has been recently declined. The production of inland fisheries reaches 25,000 MT in the Region. It has been increasing gradually since 1990.



Source: Fisheries Statistics in the Philippines.

Figure 3.8 Production Trend of Capture Fisheries in Bangsamoro (ARMM)

According to the fisheries profile, only 129 fishing boats are operated for commercial fisheries in the

Region (Table 3.22). It is a small number, though the Region has a large sea territory. In case of municipal fisheries, totally 64,780 boats are operated for fishing activities in municipal and inland waters. About 40% of municipal fishing boats are equipped with engines. The remaining boats are non-motored.

Table 3.22 Number of Fishing Boats in Bangsamoro (2013)

Boat type	Maguindanao	Lanao del Sur	Basilan	Sulu	Tawi-Tawi	Total
Commercial fishing boats	8	38 (small)	26	37	20	129
Municipal fishing boats	8,233	2,186	10,801	23,165	20,395	64,780
Motorized boats	1,346	495	2,748	10,400	10,790	25,779
Non-motorized boats	6,887	1,691	8,053	12,765	9,605	39,001

Source: Fisheries Profile 2013 BFAR-ARMM.

Marine capture fisheries

Commercial fishing boats (more than 3 ton size boats) commonly use purse-sein nets, ring-nets, or bag-nets to catch pelagic fish at offshore areas. The commercial fisheries operation is commonly conducted at offshore areas farther than 15 km from a coastline. The main target fish of commercial fisheries are round scad (*galunggong* in Tagalog), frigate tuna (*tulingan*), bonito, big-eyed scad (*matang baka*), and skipjack (*gulyasan*) as indicated in Figure 3.9.

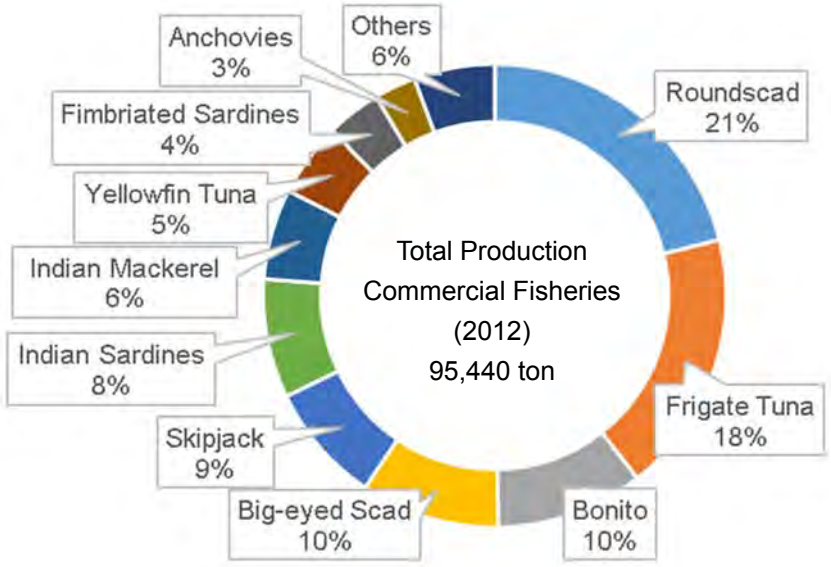


Figure 3.9 Composition of Fish Species in Commercial Fisheries in Bangsamoro (2012)

In the municipal fisheries, local fishers go fishing by small boats in coastal areas, which municipality LGUs manage within 15 km from a coastline. Some fishers use traditional *payao* units, fish aggregating devices (FAD), at their fishing grounds to catch mainly Tuna or Skipjack. The target fish species of municipal fisheries vary in the areas; commonly, big-eyed scad, yellow-fin tuna (*tambakol*), frigate tuna, round scad, and Indian mackerel (Figure 3.10).

Since the production peak in 2010, the production of marine capture production has been on a downward trend. Because of uncontrolled catch for coastal pelagic fish national wide, the Bureau of Fisheries Aquatic Resources (BFAR) has been enforcing the close season of three months, from December to February, against commercial fishing boats since 2012. This close season in the Region does not permit commercial fishing boats, operating purse-sein net, bag-net, ring-net or scoop-net, to catch six common sardine species in the Zamboanga Peninsula, the Basilan Strait, and the East Sulu Sea.

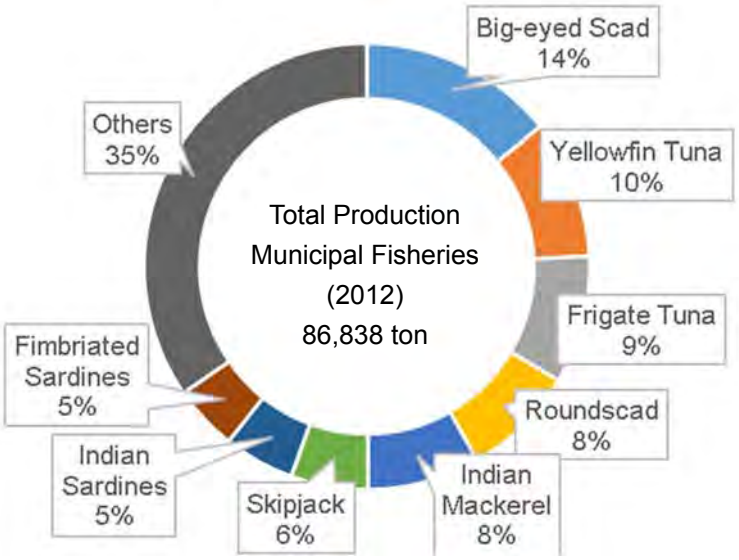


Figure 3.10 Composition of Fish Species in Municipal Fisheries in Bangsamoro (2012)

Inland fisheries

Inland fisheries are widely conducted in the mainland provinces, Maguindanao and Lanao del Sur. In Maguindanao, inland fisheries activities are popular in Liguasan Marsh, the largest marsh areas in the Philippines. In Lanao del Sur, they are also popular in Lake Lanao, the largest freshwater lake in the Philippines. Local fishers commonly use gill-nets to catch fish in rivers, lake, or marsh areas. The common target fish species of inland fisheries are tilapia, carp, mudfish, freshwater goby, and freshwater shrimp (Figure 3.11).

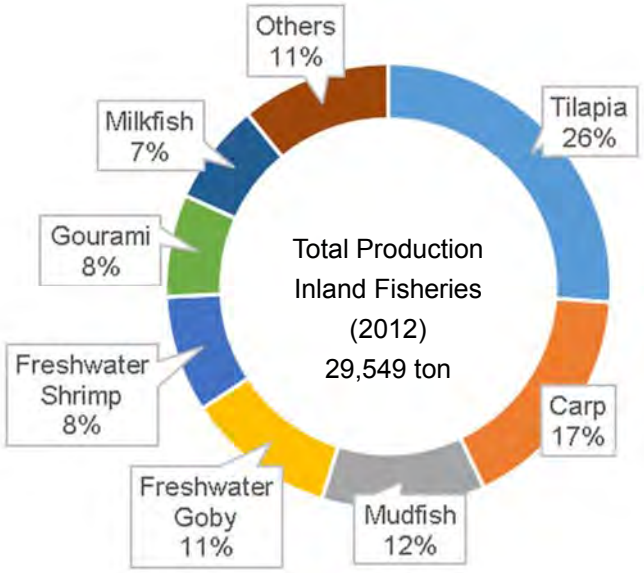


Figure 3.11 Composition of Fish Species in Inland Fisheries in Bangsamoro (2012)

(3) Aquaculture

Of aquaculture activities, seaweed culture is dominantly largest in the Region. It accounts for 98% in the total aquaculture production (Table 3.23). Freshwater and brackish-water aquaculture is popular only in Maguindanao. There is few aquaculture activity in Lanao del Sur.

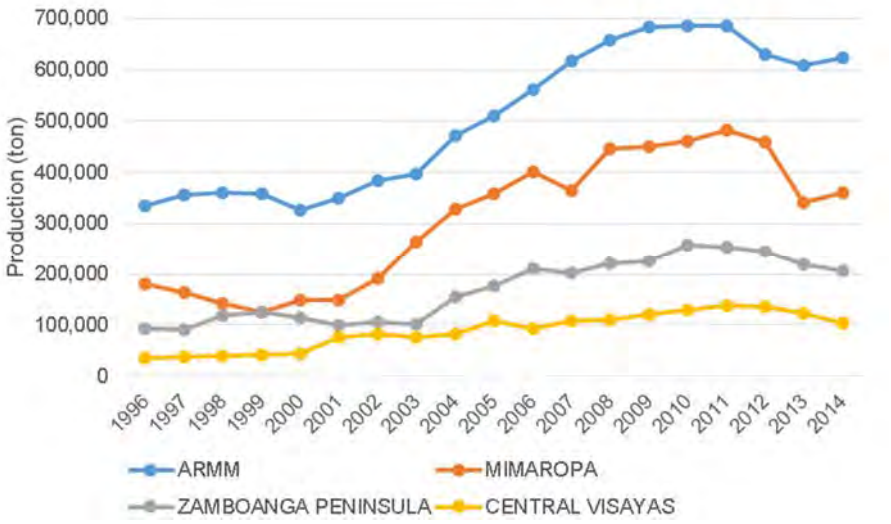
Table 3.23 Aquaculture Production by Type in Province (2012)

Aquaculture Type	Maguindanao	Lanao del Sur	Basilan	Sulu	Tawi-Tawi	Total	Percentage
Marine Culture	0	0	6	0	0	6	0.001%
Brackish-water Culture	3,399	4	265	0	0	3,667	0.6%
Fresh-water Culture	6,793	16	0.3	0	0	6,809	1.1%
Seaweed Culture	90,928	0	6,629	220,440	305,000	622,996	98.3%
Total	101,120	20	6,900	220,440	305,000	633,477	

Source: Fisheries Statistics in the Philippines.

Seaweed

There are four main production areas of seaweed culture in the Philippines: ARMM, Mimaropa (Palawan), Zamboanga Peninsula, and Central Visayas (Cebu, Bohol). As shown in Figure 3.12, Bangsamoro (ARMM) has the largest production of seaweed culture in the Philippines. The seaweed production in the Region reaches 500,000 to 600,000 ton/year in recent years. During the 2000s, the seaweed production had been on upward trend. Especially, the seaweed production in Bangsamoro in 2010 was twice as much as that in 2000. However, due to the nationwide outbreak of ice-ice disease, the seaweed production has suddenly dropped in the 2010s.

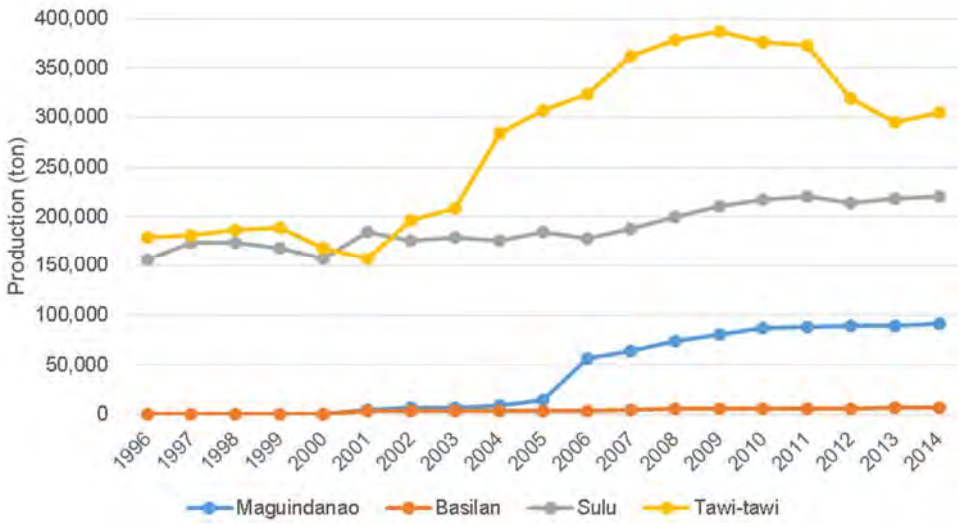


Source: ibid.

Figure 3.12 Production Trends of Major Regions in Seaweed Culture in the Philippines

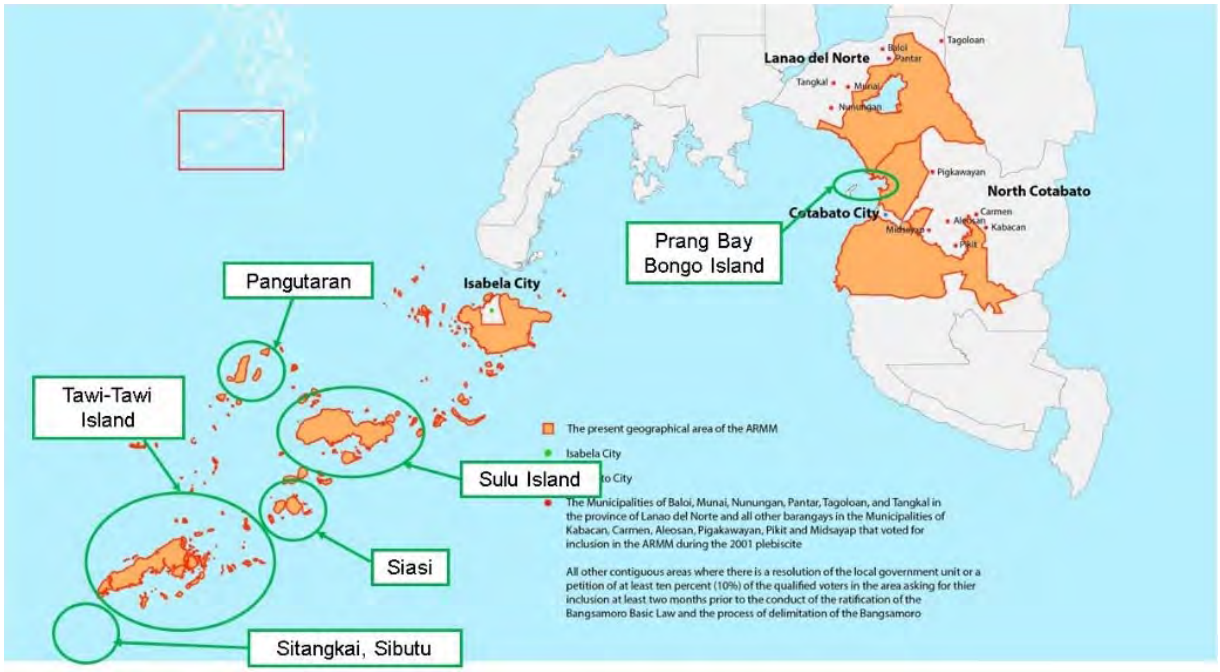
In the Bangsamoro region, Tawi-Tawi is the largest producer of all the provinces in farmed seaweed (Figure 3.13). Tawi-Tawi produces about a half of the seaweed production in the region. Especially, Sitangkai and Sibutu Islands are the largest production areas in seaweed culture. They produce about a half of seaweed in Tawi-Tawi. In other words, Sitangkai and Sibutu Islands account for one fourths in the total seaweed production in the Region.

Sulu Province is the second largest in famed seaweed production in the Region. Even though the seaweed production of Tawi-Tawi has been largely dropping by the outbreak of ice-ice disease in the 2010s, its production of Sulu has been gradually increasing in the range between 150,000 and 250,000 ton/year since the 1990s. In Maguindanao, seaweed culture started at Parang Bay and Bongo Island at the beginning of the 2000s (Figure 3.14). Its production has reached 100,000 ton in recent years. In Basilan, the seaweed culture activities are very limited. It is because the salinity of coastal water often fluctuates by inflow of freshwater from developed river system in the island.



Source: ibid.

Figure 3.13 Production Trend in Seaweed Culture by Province in Bangsamoro

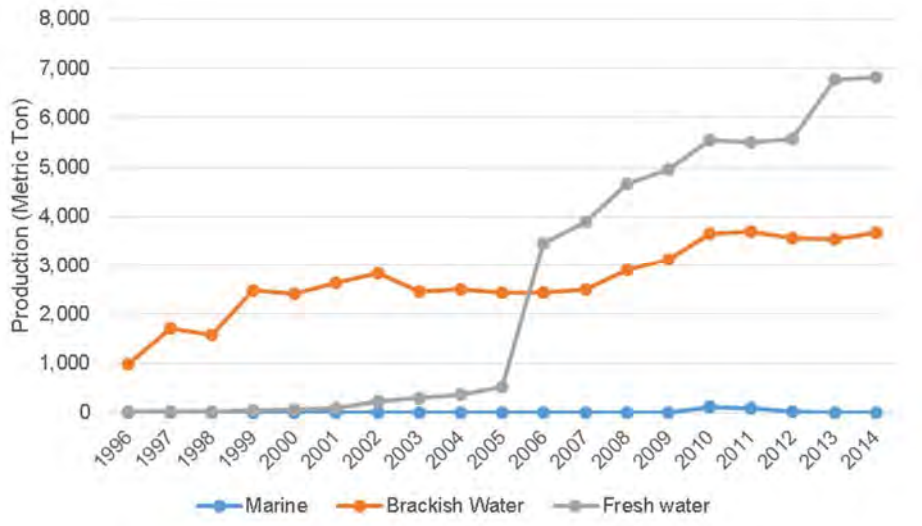


Source: Field survey in island provinces by JST.

Figure 3.14 Main Production Places of Seaweed Culture in Bangsamoro

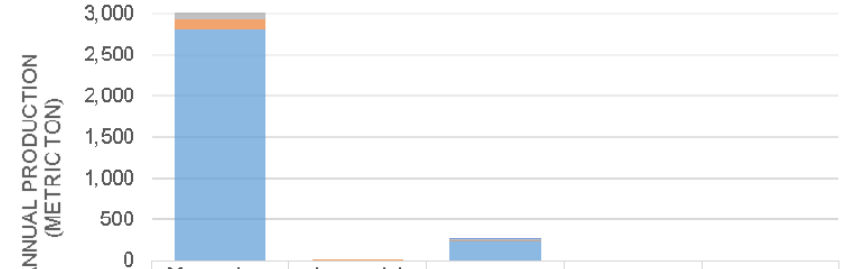
<u>Other aquaculture activities</u>

Other than seaweed culture, brackish-water and freshwater culture is popular in Bangsamoro (Figure 3.15). Both types of culture are mainly conducted in Maguindanao. Brackish-water culture is conducted at fish ponds in coastal land areas of only three municipalities: Datu Odin Sinsuat, Sultan Kudarat, and Sultan Mastura. The brackish-water ponds produces mainly milkfish (Figure 3.16). Some farmers operating brackish-water ponds also culture tilapia or tiger shrimp mixing with milkfish.



Source: Fisheries Statistics in the Philippines.

Figure 3.15 Production Trend in Aquaculture by Culture Type in Bangsamoro



	Magundanao	Lanao del Sur	Basilan	Sulu	Tawi-Tawi
White Shrimp	143	0	2	0	0
Mud Crab	85	0	0	0	0
Tiger Prawn	244	0	20	0	0
Tilapia	120	4	1	0	0
Milikfish	2,807	0	243	0	0

Source: ibid.

Figure 3.16 Brackish-water Culture Production by Species in Provinces (2014)

In freshwater culture, tilapia pen culture is very popular at Lake Buluan in Maguindanao. Tilapia pen culture in Lake Buluan was introduced and expanded in the 2000s (Figure 3.17). At present, it is the largest tilapia production site in Mindanao. In the 2010s, instead of tilapia, milkfish pen culture is also introduced in Lake Buluan. The milkfish production at Lake Buluan has been increasing in recent years.

(4) Fisheries infrastructure

Existing fisheries infrastructure

At present, seven fish ports and fish landing sites are recognized to function for commercial fisheries in ARMM (Table 3.24, Figure 3.18, and Photos 3.1 and 3.2). Those fishing ports are managed by the respective municipal LGUs. Only four fishing ports among them are equipped with ice making plants.

	Maguindanao	Lanao del Sur	Basilan	Sulu	Tawi-Tawi
Catfish	136	0	0	0	0
Milkfish	1,348	0	0	0	0
Tilapia	5,309	16	0	0	0

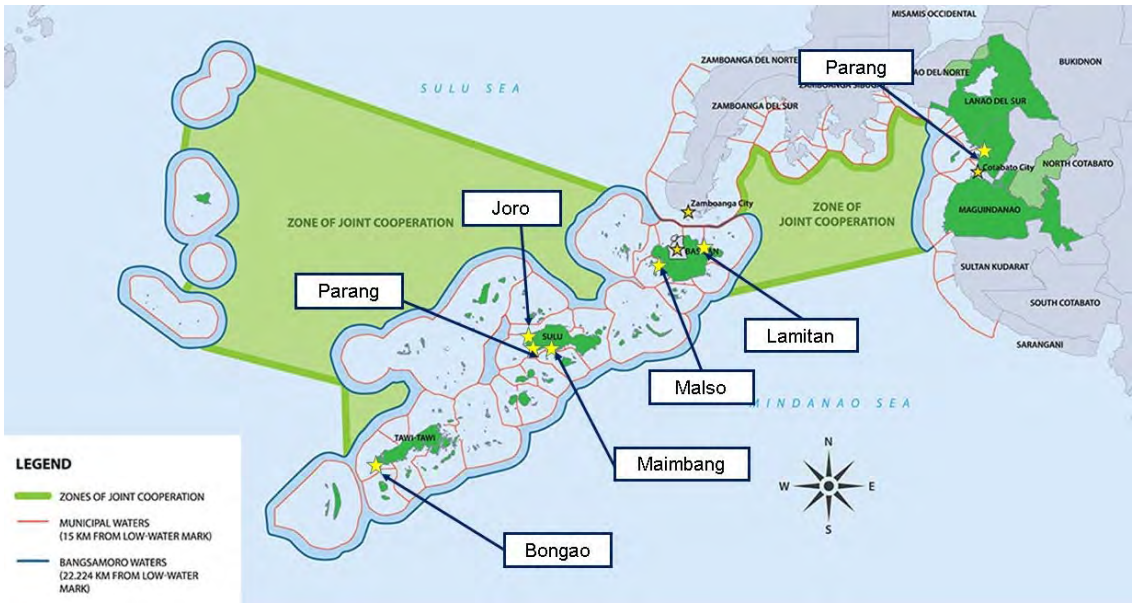
Source: ibid.

Figure 3.17 Freshwater Culture Production by Species in Province (2014)

Table 3.24 Functioning Fishing Ports/Landing Sites for Commercial Fisheries in Bangsamoro in 2014

Province	Fishing Port Site (Municipality)	Management Body	Capacity of Ice Plant
Maguindanao	Parang	Municipal LGU	2 ton/day (privately owned)
Basilan	Lamitan	Municipal LGU	10 ton/day (under construction)
	Malso	Municipal LGU	No ice plant
Sulu	Joro	Municipal LGU	5 ton/day
	Parang	Municipal LGU	No Ice Plant
	Maimbang	Municipal LGU	10 ton/day
Tawi-Tawi	Bongao	Municipal LGU	2 ton/day (privately owned)

Source: Field survey by JST.



Source: Field survey by JST.

Figure 3.18 Fishing Ports/Landing Places for Commercial Fisheries in Bangsamoro

	
Fish landing site in Lamitan, Basilan (Brgy. Bato)	Fish landing site in Malso, Basilan
	
Fish landing site in Joro, Sulu	Fish landing site in Bongao, Tawi-Tawi

Photo 3.1 Main Fish Landing Sites in Island Provinces

	
Ice making plant in Joro, Sulu, managed by BFAR-ARMM provincial office	Ice making plant in Maimbang, Sulu, managed by Municipal LGU

Photo 3.2 Existing Ice Plants for Fish Products in Island Provinces

In inland areas, only a private ice plant functions at Buluan Municipality, Maguindanao Province. The ice produced by the plant is supplied for fish distributors dealing with tilapia cultured at fish pens in Lake Buluan.

Ongoing fisheries infrastructure development projects

Philippine Fisheries Development Authority (PFDA) plans to construct or innovate seven fishing port/fish landing facilities under the Transition Investment Support Plan (TISP) for ARMM (Table 3.25 and Photo 3.3). According to the original plan, construction of all facilities would have been completed at the end of 2014. Due to the delay of procurement of construction materials, the construction work could not start as planned. The construction may be completed at the end of 2015.

Table 3.25 Construction Project on Fish Port Complex by PFDA in Bangsamoro

Province	Municipality	Barangay	Construction cost	Facility package
Maguindanao	Buluan	Maslabeng	PHP 30,429,000	Landing slope, market housing, ice plant, office building, access road, etc.
	Magudadatu	Tumbao	PHP 26,546,000	
Basilan	Lamitan	KulayBato	PHP 18,749,000	
	Sumisip	Buli-Buli	PHP 35,109,000	
Sulu	Parang	AluLayag-Layag	PHP 27,375,000	
Tawi-Tawi	Panglima Sugala	Bato-Bato	PHP 17,507,000	

Source: Field survey by JST.

New fishing ports in Lamitan, Basilan, constructed by PFDA Project.

New fishing port in Panglima Sugala, Tawi-Tawi, constructed by PFDA Project.

Photo 3.3 Fish Port Complex Construction in PFDA Project

The Philippine Development Program and Framework for Peace and Development (PAMANA) managed by OPPAP of the Central Government supports fisheries infrastructure development in Bangsamoro. Collaborating with municipal LGUs, BFAR-ARMM proceeds with infrastructure projects under the PANAMA program (Table 3.26, Photo 3.4, and Figure 3.19). In Maguindanao, the program constructs small-scale fish landing with cold storages. However, because of lack of public electric supply, it is difficult to operate cold storages at target sites. In Tawi-Tawi, it constructs a fishing port complex, including landing slope, marketing house, ice plant, and office building at Languyan. PANAMA also funds BFAR-ARMM to carry out a development program of seaweed culture in Sulu Province in 2014 (Table 3.27).

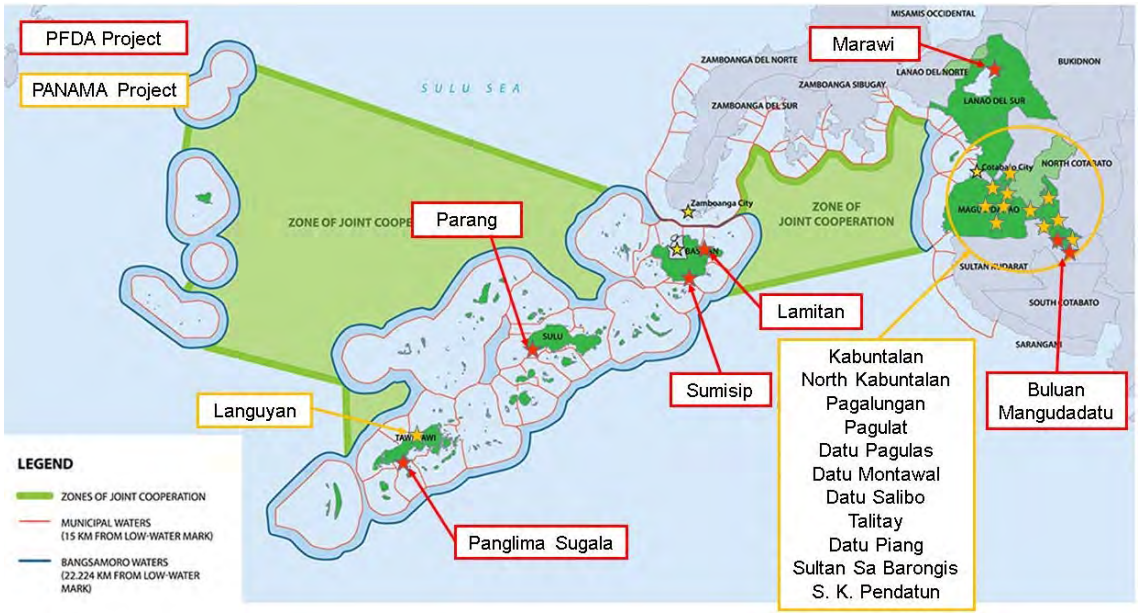
Table 3.26 Fisheries Infrastructure Project by PANAMA Program in Bangsamoro (2014)

Province	Municipality	Barangay	Construction facility (cost)
Maguindanao	Datu Montawal	Brgy. Talapas	Small-scale fish landing with cold storage (PHP 16,506,000)
	Datu Pinag	Brgy. Poblacion	
	Sultan Sa Barongis	Brgy. Darampua	
	Paglat	Brgy. Sitio Adteban	
	Pagalungan	Brgy. Dalgan	
	Talitay	Brgy. Bintan	
	North Kabuntalan	Brgy. Bagumbayan	
	S. K. Pendatun	Brgy. Sadangan	
	Datu Paglas	Brgy. Palao Sa Buto	
	Datu Salibo	Brgy. Butilen	
Tawi-Tawi	Languyan	Brgy. Darul-Akram	Fish port complex (PHP 33,005,000)

Source: Material of BFAR-ARMM and Annual Report of PANAMA Program.

	
Construction site of fish port complex at Languyan, Tawi-Tawi, by PANAMA program; construction has not started yet.	Small-scale fish landing place at Kabuntalan, Maguindanao, by PANAMA program

Photo 3.4 Fish Landing Place Construction by PANAMA Program



Sources: Materials of BFAR-ARMM and a field survey by JST.

Figure 3.19 Planned Project on Construction of Fishing Ports/Fish Landing Sites by PFDA and PANAMA Program

Table 3.27 Seaweed Culture Development Programs in Sulu Province Funded by PANAMA Program in 2014

Target municipality	Seaweed development programs	Budget (PHP)
Hadji Panglima Tahil Parang Panglima Estiso	Establishment of seaweed banks	1,000,000
	Construction of seaweed dryers	5,000,000
	Establishment of marine protected area	5,000,000
	Procurement of postharvest facilities and equipment	3,000,000

Source: Reports by BFAR-ARMM and PANAMA Program.

3.3.2 Fisheries distribution

(1) Local demand and supply of fisheries products

According to FAO Fisheries Profile, the consumption of fisheries products per capita in the Philippines is estimated to be 28.8 kg/year/person. Based on the figure, a local demand of fisheries products is estimated in each province (Table 3.28). In Sulu and Tawi-Tawi, there are large amount of excess

fisheries products in marine capture fisheries. Those excess products can be exported to other local markets. In Maguindanao, there are also a large amount of excess fisheries products, originally from brackish and fresh water aquaculture production. In Lanao del Sur, the fisheries production does not satisfy the local demand in the province.

At the regional level, 120,000 ton of fisheries products is estimated to be the excess fisheries production in one year. If the excess fisheries products are sold at PHP 40–50/kg in fresh or frozen fish, the total market sale should reach PHP 5–6 billion per year, excluding seaweed sale. It makes a great economic effect in the Region. However, especially in the island provinces, due to lack of establishment of distribution infrastructure for fisheries products such as ice plants or cold storages, only 20–30% of fish catch may be distributed in fresh or frozen fish to other local markets. The remaining 70–80% of fish catch is mostly processed as dried fish for long-term preservation. The value of dried fish is only a half or one thirds of fresh or frozen fish at farm-gate level.

Table 3.28 Comparison between Local Demand for Fisheries Products and Fisheries Production at Province Level

Province	Population (2010)	Local demand for fishery products (t)	Fishery production (t in 2012)*	Excess/shortage of fishery products (t)
Maguindanao	293,322	8,448	31,645	23,197
Lanao del Sur	933,260	26,878	26,389	- 489
Basilan	944,718	27,208	30,328	3,120
Sulu	718,290	20,687	94,574	73,896
Tawi-Tawi	366,550	10,557	32,932	22,375
Total	3,256,140	93,777	215,868	122,099

*Excluding seaweed production

Sources: FAO Fishery Country Profile (2005), Census of Population and Housing (2010), Fisheries Statistics in the Philippines (2013).

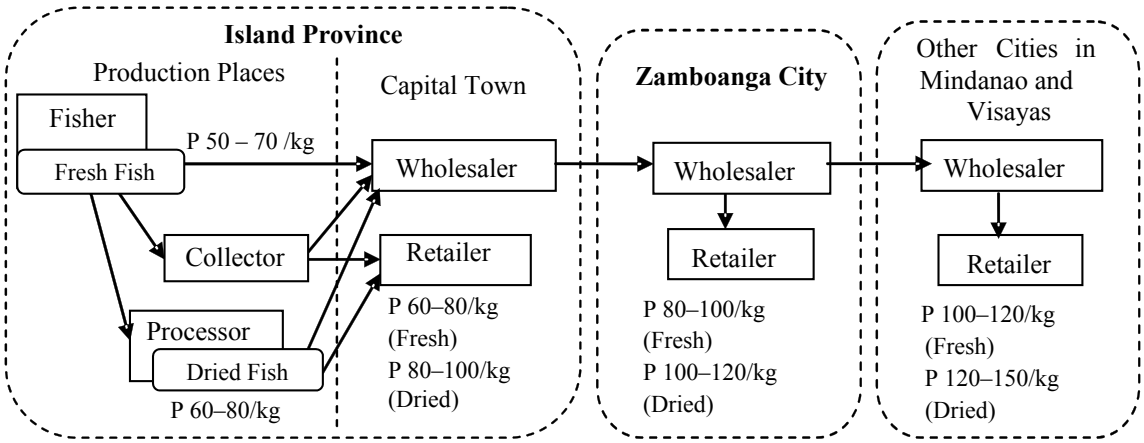
(2) Distribution and processing of fisheries products

Fresh fish distribution

In the island provinces, Basilan, Sulu, and Tawi-Tawi, local middlemen purchase fresh fish caught by local fishers at landing sites, and transport them to local markets in Zamboanga by sea. Due to lack of development of cold chain system for fisheries products like ice production, and a limited frequency of ferry operation, local middlemen have limited capacities for transporting fresh fish to outer island markets like Zamboanga. The fresh fish transported from islands are almost consumed only in Zamboanga. Little fresh fish originated from the island provinces are secondarily carried from Zamboanga to other markets. Some high-valued fish species like groupers, however, are often transported to Manila as fresh or live fish by air. It is because those fish species have higher demand as seafood materials of Chinese cuisines.

Most fish catch by local fisheries in the island provinces are processed as dried fish for long-time preservation. Local middlemen also deal with processed dried fish to be sold at outer island's markets. A large amount of dried fish produced in the island provinces are distributed in Mindanao areas. The distribution of fishery products from the island provinces to Zamboanga and other cities is illustrated in Figure 3.20.

The fisheries products produced in the mainland provinces, Maguindanao and Lanao del Sur, are distributed to local markets in the Region and other urban markets in Mindanao by land (Photo 3.5). The fresh fish caught by local fishers in the mainland provinces are transported to urban markets in ARMM, Cotabato and Marawi. Tilapia cultured at Lake Buluan is distributed not only to local markets in Cotabato and Maguindanao, but also to other areas of Mindanao such as Davao and Cagayan de Oro. In addition, live mud crab produced at brackish-water ponds in Maguindanao is often transported to Manila by air.



Source: Field survey by JST.

Figure 3.20 Distribution of Fresh and Dried Fish from Island Provinces to Outer Island Markets

Fresh fish are packed in styrofoam boxes, and transported to local markets (Maimbang, Sulu)

Most of fish catch are processed to dried fish for long-term preservation (Tawi-Tawi)

Photo 3.5 Fish Distribution and Processing in Island Provinces

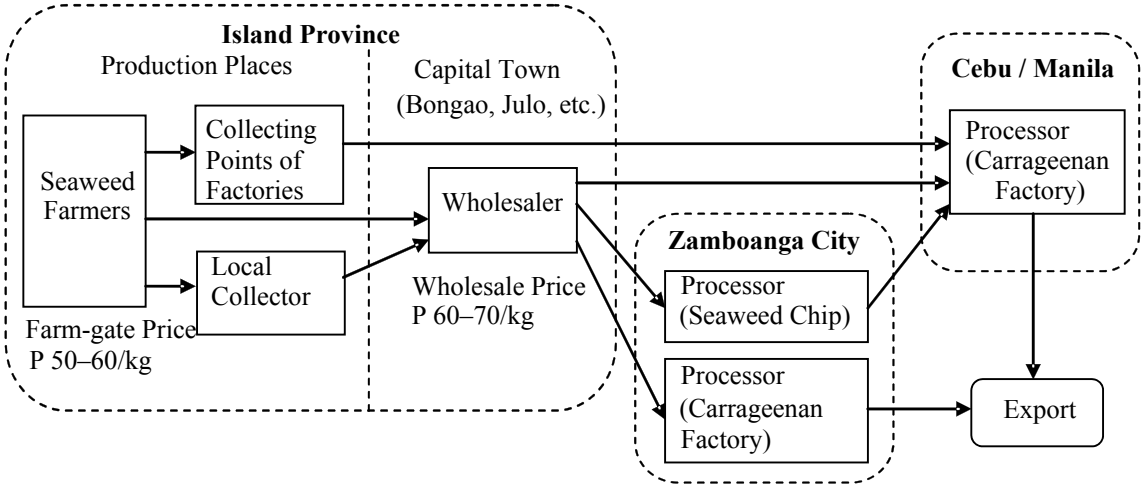
<u>Distribution of seaweed products</u>

In the island province, harvested seaweed is dried in the sun at production sites. Local middlemen or cooperative associations purchase packages of dried seaweed from farmers, and transport them to local factories located in Zamboanga, Cebu or Manila by sea or land (Figure 3.21 and Photo 3.6). Local factories processes dried seaweeds into carrageenan powders, which is utilized as natural binders for food, cosmetic, and etc. The carrageenan powders are exported mainly to U.S., Canada, Germany, France, and Japan. In Maguindanao, dried seaweed produced at Parang is mainly transported to carrageenan factories in Cebu. Possible degradation of carrageenan quality due to feeding with artificial feed practiced in some part of Tawi-Tawi is a matter of concern for export.

Local farmers usually continue to multiply the same strain seaweed for their culture in the sea. If the same strain seaweed is multiplied for a long time, the growth of seaweed gradually slows down. It seriously affects local seaweed production. Therefore, BFAR-ARMM has established a seaweed laboratory recently to maintain some pure strain seaweed in tissue culture. BFAR-ARMM also provides pure seaweed strains produced in the laboratory to local farmers regularly in order to renew locally cultured seaweed strains.

Especially in Tawi-Tawi, local farmers commonly use chemical fertilizers to accelerate the growth of cultured seaweed. They hang sacs with chemical fertilizers around cultured seaweeds to shorten the period of seaweed culture cycle. However, this manipulation worsens the quality of carrageenan which cultured seaweed contains. Currently, BFAR-ARMM warms them against using chemical fertilizers for seaweed culture to avoid losing a market value of local seaweeds.

BFAR-ARMM constructed two local seaweed-chip processing factories at Joro in Sulu and Parang in Maguindanao. However, the seaweed factory in Joro has never been operated since its establishment. The factory in Parang is only partially operated, because of unstable supply of public electricity and fresh water.



Source: Field survey by JST.

Figure 3.21 Distribution of Seaweed Products from Inland Provinces to Processing Factories

A local farmer harvests and carries a bulk of raw seaweed by local boat, bangka (Sitankai, Tawi-Tawi)

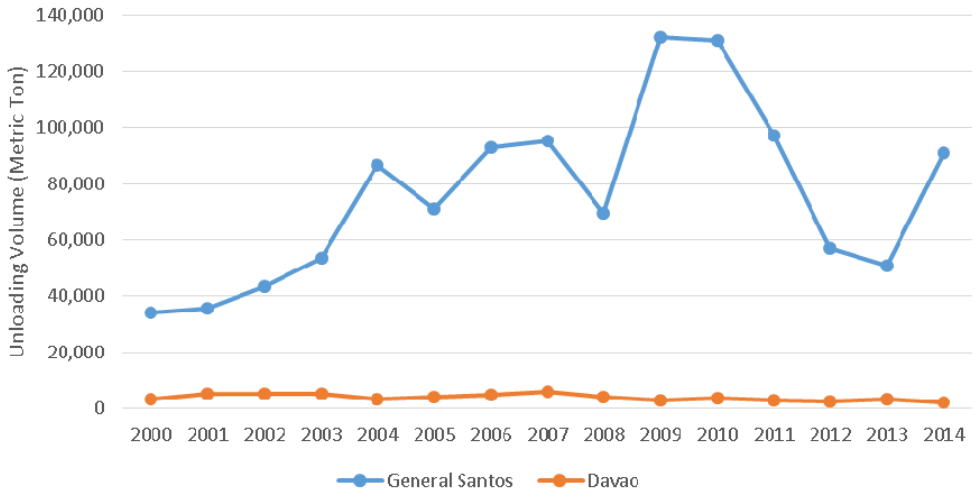
Local middlemen (distributors) transport dried seaweed from production sites to carrageenan factories (Zamboanga)

Photo 3.6 Seaweed Distribution in Island Provinces

<u>Tuna fisheries industry in Mindanao</u>

The major landing ports of tuna fishing in Mindanao are General Santos and Davao. Figure 3.22 indicates the recent trend of unloading volume of tuna fish species at both fishing ports. The category of tuna fish species comprises yellow-fin tuna, skipjack, and frigate tuna. The unloading volume of tuna fish by local boats reached 130,000 ton in 2009 and 2010 at the peak. However, in a few recent years, it has been drastically dropped. It may be an initial sign of over-exploration of tuna resources. It seems that the tuna fishing industry in Mindanao has already entered the saturation stage.

According to the agreement of exclusive economic zone (EEZ) boundary between Indonesia and Philippines, officially concluded in May 2014, the offshore fishing ground of Philippine side in Celebes Sea and Molucca Seas practically shrank (Figure 3.23). Therefore, Philippine's fishing boats are not allowed to enter the Indonesian EEZ areas without paying for fishing permission. The control of fishing ground by the determination of EEZ boundary is the best way for proper management of offshore fisheries resources. However, it may make a large drop of tuna catch by local fishing boats for a recent few years.



Source: Statistics of Fishing Ports by Philippine Fisheries Development Authority.

Figure 3.22 Recent Trend of Unloading Volume of Tuna Fish Species at General Santos and Davao Fishing Ports

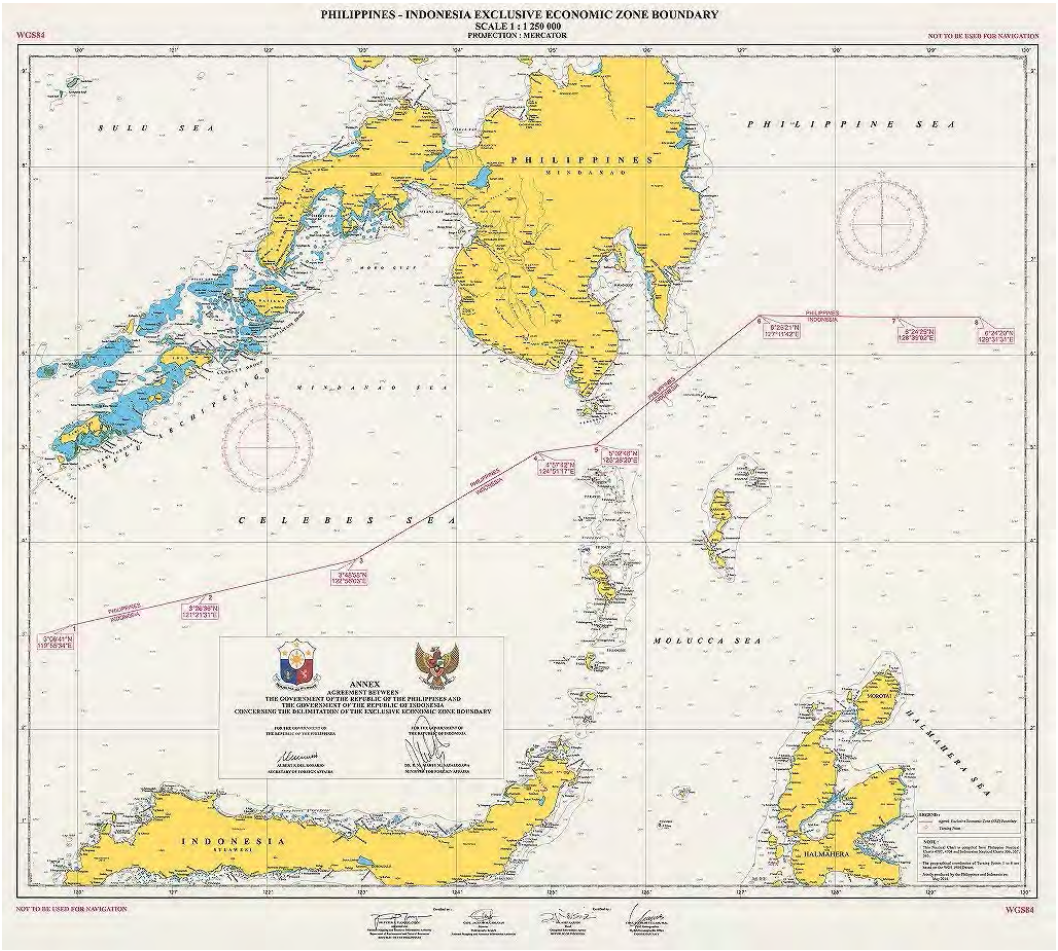


Figure 3.23 Boundary of Exclusive Economic Zone (EEZ) between Indonesia and Philippine (Concluded in May 2014)

In the Bangsamoro region, local fishers commonly catch small-size tuna species, mainly frigate tuna and skipjack, in coastal and offshore areas. In a field survey of the island provinces, many juvenile yellow-fin tuna were observed at landing sites or fish markets (Photo 3.7). To develop the tuna fisheries industry in Bangsamoro in the future, it is vitally important to take account of proper

management of tuna fish resources in Mindanao and Sulu Seas.

	
Yellow-fin Tuna are landed in General Santos Fishing Port.	A large amount of juvenile fish of Yellow-fin Tuna are still captured by local boats (Lamitan, Basilan)

Photo 3.7 Tuna Fishing Industry in Mindanao

3.3.3 Possible directions and measures for Bangsamoro fisheries development

Based on the actual situation in fisheries sector in Bangsamoro the following directions and measures may be pursued for fisheries development aiming at improvement of the production and market value of local fisheries products.

(1) Improvement of fisheries products distribution system

In order to preserve fresh fish and dried seaweed in proper conditions at community level, solar-powered cold storages, solar fish dryers, and seaweed storages should be introduced at local landing sites. At the same time, the fishing port's facilities at central towns in respective provinces should be innovated with introduction of ice making plants, cold storages, and dried seaweed storages. Local middlemen and Fishermen Cooperative Association take roles for collecting fish products and dried seaweeds at local landing sites, and storing them at the fisheries facilities of central towns. Those products will be transported in bulk to other markets by sea and land. The improved distribution system for fishery products is illustrated in Figure 3.24.

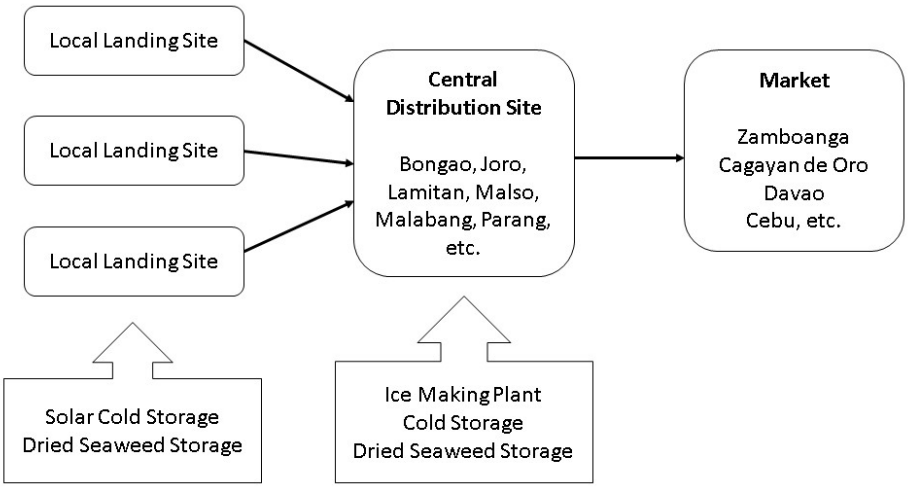


Figure 3.24 Image of Improvement of Distribution System of Fisheries Products

(2) Improvement of seaweed production facilities

To expand the areas of seaweed culture and improve the quality of dried seaweed, seaweed production facilities such as solar dryer platforms on the sea (Photo 3.8) or dry seaweed storages should be constructed at culture areas. Especially, a solar seaweed dryer platform is important to avoid mixing

dried seaweed with sands or other garbage. These facilities would be managed by local cooperative associations organized by seaweed farmers.

	
Solar seaweed dryer platforms are constructed on the sea to avoid mixing dried seaweed with sands. (Tawi-Tawi)	Harvested seaweed are dried on bamboo or wooden floor in the sun. (Davao)

Photo 3.8 Solar Seaweed Dryer Platform in Island Provinces

(3) Introduction of fish culture in unutilized freshwater areas in mainland provinces

A fish cage or pen culture system should be introduced in unutilized natural freshwater ponds or lakes in mainland provinces, Maguindanao and Lanao del Sur (Photo 3.9). Especially, Lake Dapao at Pulas municipality, Lanao del Sur province, has ideal natural conditions for fish culture development, because of clean water sources. Lake Lanao also has a higher potential for freshwater aquaculture development. Tilapia is the most suitable fish to be cultured in those lakes. Milkfish culture can be also introduced in those lakes.

	
Floating cages for tilapia culture in Lake Sebu, South Cotabato	Fish pens for tilapia culture in Lake Buluan, Maguindanao

Photo 3.9 Fish Culture at Freshwater Lakes in Mindanao

(4) Introduction of marine aquaculture of high value species in island provinces

Because Bangsamoro is out of typhoon routes, there is a high potential for marine aquaculture. However, unfortunately, marine aquaculture is not popular in Bangsamoro at present, because of technical difficulty and high initial investment. In case of fish culture for high value fish like grouper or *ponpano*, local farmers need to prepare a certain amount of initial investment to construct fish cages and purchase fish feeds. On the contrary, the culture and propagation of shellfish like abalone and oyster, or sea cucumbers needs less costs than fish culture, because they feed on natural seaweed or crustaceous in coastal areas. Therefore, the sea ranching of shellfish and sea cucumbers is appropriate for promotion in island provinces (Photo 3.10).

	
Abalone cage culture practice in USAID FISH Program. (Panglima Sugala, Tawi-Tawi)	Abalone grows in cages by feeding on seaweed.

Photo 3.10 Abalone Culture Practice in Island Provinces

3.4 Investment Promotion

3.4.1 Present situations of investment activities

(1) Overview of investments in the Philippines and Bangsamoro

Investments in the Philippines

The total investment to the Philippines by foreign and Filipino investors amounted to PHP 754 billion in 2013, increased by 8% from PHP 698 billion in the previous year. According to the projection by BOI, it is expected that the 2014 investment is likely to increase more favorably by more than 10%. The investment by Filipino investors is increasing year by year, accounting for more or less 70% of the total in recent years (Table 3.29 and Figure 3.25).

Out of entire investment, the foreign direct investment (FDI) is expected to increase steadily, viz. US$3.9 billion in 2013 to US$4.4 billion in 2014. In the background of this increase are the stability of politics and economy of the Philippines and the readiness of investors toward *China plus One* or *Post China*.

The number of approved investments by the authority is stable at more or less 300 annually. However, due to stable economy of the Philippines and stagnant transaction in EU and China, the investment amount will be projected to increase steadily for years to come.

The FDI from Japan is predominant after 2008 amounting to PHP 337 billion (US$7.95 billion) or approx. 25% of the total FDI to the Philippines (Table 3.30). Netherlands and U.S. follow, and these three countries together account for about 60% of the total. As for the comparison of FDI between the first semester of 2013 and 2014, it is observed that Germany, Singapore and China are increasing FDI, and on the contrary, U.S. and Virgin Is. reduced the amount. The investment from Chine has once reduced when territorial issues on Spratly Islands emerged in 2011, but it shows some signs of picking up in recent years.

Accumulative investment amount by industry sector during the period of 2008 and 2013 (Table 3.31) shows that four sectors, namely, (1) manufacturing, (2) electricity, gas steam, and air conditioning supply, (3) transportation and storage, and (4) real estate activities have larger shares in this order accounting in total for 84%. Investment amount of real estate-related sectors such as construction, utility, wholesale/retail trade show large increases for last two years. It is thought to be the result of increasing domestic demand backed by favorable economic growth of the Philippines.

Table 3.29 Total Approved Investment by Filipino and Foreign Nationals

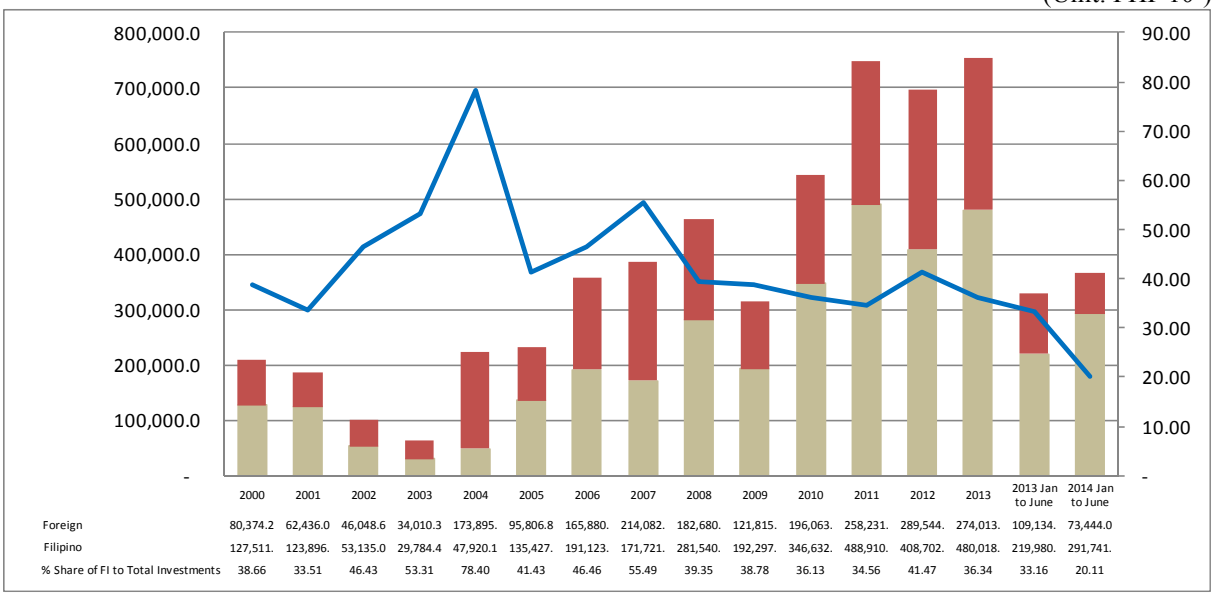
(Unit: PHP 10^6)

Industry	2008	2009	2010	2011	2012	2013	Accumulation 2008-2013	Growth Rate (S1 2013 - S1 2014)
A. Agriculture, Forestry and Fishing	91.2	2,405.5	1,217.7	1,264.6	4,514.3	2,678.8	12,172.1	608.40
B. Mining and Quarrying	3,360.2	630.8	6,074.5	544.7	229.6	1,976.7	12,816.5	(100.00)
C. Manufacturing	48,356.8	86,132.6	162,903.2	142,917.9	169,531.2	77,557.6	687,399.3	216.60
D. Electricity, Gas, Steam and Air Conditioning Supply	81,278.7	4,839.2	8,467.2	30,467.5	5,716.5	74,497.3	205,266.4	(96.00)
E. Water Supply; Sewerage, Waste Management and Remediation Activities	-	-	-	390.6	1,087.4	132.2	1,610.2	500.40
F. Construction	32.8	93.3	181.9	33.2	3,931.9	8.7	4,281.8	1,341.20
G. Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	322.2	152.7	202.2	71.8	280.5	155.0	1,184.4	446.30
H. Transportation and Storage	1,580.0	237.6	812.6	1,140.5	53,032.8	55,468.1	112,271.6	34.50
I. Accomodation and Food Service	-	-	2,180.0	1,014.3	8,049.0	25,380.8	36,624.1	(73.40)
J. Information and Communication	92.0	-	1,174.5	3,381.1	15,441.2	3,560.8	23,649.6	(49.10)
K. Financial and Insurance Activities	-	-	692.5	91.0	80.7	48.6	912.8	(31.80)
L. Real Estate Activities	11,557.3	16,433.0	4,273.7	61,716.3	9,997.0	6,434.7	110,412.0	124.90
M. Professional, Scientific and Technical Activities	-	-	437.7	263.1	182.8	632.0	1,515.6	376.20
N. Administrave and Support Service Activities	-	-	7,316.0	13,060.7	16,313.6	24,567.6	61,257.9	26.50
O. Public Administration and Defense; Compulsory Social Security	-	-	-	166.7	164.0	31.6	362.3	107.50
P. Education	-	-	10.1	23.3	540.1	254.7	828.2	(76.70)
Q. Human Health and Social Work Activities	-	-	80.0	-	0.8	1.2	82.0	100.00
R. Arts, Entertainment and Recreation	-	-	17.4	1,668.3	414.5	579.6	2,679.8	(99.20)
S. Other Service Activities	36,009.7	10,891.1	22.2	15.7	36.4	47.8	47,022.9	(100.00)
Total	**182,680.9**	**121,815.8**	**196,063.4**	**258,231.3**	**289,544.3**	**274,013.8**	**1,322,349.5**	**(32.70)**

Details may not add up to totals due to rounding.
In 2008 and 2009 under "Other Service Activities Sector", this industry includes hotel/restaturant/business, computer software development, health care program services, renting and leasing of water sport equipment, training services, protection/security training course, college education and other services.

Source: Philippine Statistics Authority (PSA)

(Unit: PHP 10^6)



Source: BOI.

Figure 3.25 Total Investment by Foreign and Filipino Investors, 2000–2013

Table 3.30 Inward Foreign Direct Investment to the Philippines

Unit Php million

	Country	2008	2009	2010	2011	2012	2013	Sum	Share	2013 1st Sem	2014 1st Sem	Growth Rate (S1 2013 - S1 2014)
1	Japan	16,115.6	70,737.1	58,333.1	78,321.2	69,037.0	44,784.4	337,328	25.5%	9,463.7	11,097.8	117%
2	USA	19,721.4	12,947.1	13,143.6	79,854.5	39,996.7	55,343.6	221,007	16.7%	44,294.7	4,865.6	11%
3	Korea	39,953.6	9,623.6	31,182.4	13,235.1	9,795.0	8,527.3	112,317	8.5%	1,727.9	1,501.4	87%
4	Gemany	3,765.3	1,001.0	1,096.7	980.0	1,911.8	3,046.3	11,801	0.9%	17.9	2,883.9	16111%
5	Netherlands	45,354.3	2,070.0	36,784.1	28,303.3	104,743.3	24,807.7	242,063	18.3%	5,994.1	5,384.9	90%
6	Singapore	6,564.6	3,468.0	7,283.0	2,217.1	12,951.6	9,242.1	41,726	3.2%	1,450.3	12,037.6	830%
7	UK	25,272.5	3,439.4	1,065.0	1,719.3	6,768.8	1,471.5	39,737	3.0%	617.0	1,505.4	244%
8	Taiwan	1,287.6	222.6	1,505.8	3,130.0	2,472.1	3,140.3	11,758	0.9%	1,096.3	916.4	84%
9	PROC	2,307.1	2,391.8	5,657.1	20,657.4	1,988.3	1,240.9	34,243	2.6%	245.5	9,621.3	3919%
10	Cayman Is	3,615.7	-	10,638.3	8,443.0	7,018.8	7,298.5	37,014	2.8%	-	9,978.8	NA
11	Vergin Is.	2,110.6	1,176.0	7,653.8	2,324.2	3,721.7	92,780.9	109,767	8.3%	36,344.3	5,784.6	16%
	Others	16,613	14,739	21,720	19,046	29,139	22,330	123,588	12.9%	7,883	7,866	100%
	Total	182,681	121,816	196,063	258,231	289,544	274,014	1,322,349	104%	109134.2	73443.9	-32.7%

Data: BOI

Table 3.31 Total Approved Investments from Foreign Nationals by Sector (2008–2013)

(Unit: PHP 10^6)

Industry	2008	2009	2010	2011	2012	2013	Accumulation 2008-2013	Growth Rate (S1 2013 - S1 2014)
A. Agriculture, Forestry and Fishing	91.2	2,405.5	1,217.7	1,264.6	4,514.3	2,678.8	12,172.1	608.40
B. Mining and Quarrying	3,360.2	630.8	6,074.5	544.7	229.6	1,976.7	12,816.5	(100.00)
C. Manufacturing	48,356.8	86,132.6	162,903.2	142,917.9	169,531.2	77,557.6	687,399.3	216.60
D. Electricity, Gas, Steam and Air Conditioning Supply	81,278.7	4,839.2	8,467.2	30,467.5	5,716.5	74,497.3	205,266.4	(96.00)
E. Water Supply; Sewerage, Waste Management and Remediation Activities	-	-	-	390.6	1,087.4	132.2	1,610.2	500.40
F. Construction	32.8	93.3	181.9	33.2	3,931.9	8.7	4,281.8	1,341.20
G. Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	322.2	152.7	202.2	71.8	280.5	155.0	1,184.4	446.30
H. Transportation and Storage	1,580.0	237.6	812.6	1,140.5	53,032.8	55,468.1	112,271.6	34.50
I. Accomodation and Food Service	-	-	2,180.0	1,014.3	8,049.0	25,380.8	36,624.1	(73.40)
J. Information and Communication	92.0	-	1,174.5	3,381.1	15,441.2	3,560.8	23,649.6	(49.10)
K. Financial and Insurance Activities	-	-	692.5	91.0	80.7	48.6	912.8	(31.80)
L. Real Estate Activities	11,557.3	16,433.0	4,273.7	61,716.3	9,997.0	6,434.7	110,412.0	124.90
M. Professional, Scientific and Technical Activities	-	-	437.7	263.1	182.8	632.0	1,515.6	376.20
N. Administrave and Support Service Activities	-	-	7,316.0	13,060.7	16,313.6	24,567.6	61,257.9	26.50
O. Public Administration and Defense; Compulsory Social Security	-	-	-	166.7	164.0	31.6	362.3	107.50
P. Education	-	-	10.1	23.3	540.1	254.7	828.2	(76.70)
Q. Human Health and Social Work Activities	-	-	80.0	-	0.8	1.2	82.0	100.00
R. Arts, Entertainment and Recreation	-	-	17.4	1,668.3	414.5	579.6	2,679.8	(99.20)
S. Other Service Activities	36,009.7	10,891.1	22.2	15.7	36.4	47.8	47,022.9	(100.00)
Total	**182,680.9**	**121,815.8**	**196,063.4**	**258,231.3**	**289,544.3**	**274,013.8**	**1,322,349.5**	**(32.70)**

Details may not add up to totals due to rounding.

In 2008 and 2009 under "Other Service Activities Sector", this industry includes hotel/restaurant/business, computer software development, health care program services, renting and leasing of water sport equipment, training services, protection/security training course, college education and other services.

Source: Philippine Statistics Authority (PSA)

Investments in Bangsamoro

At present 46 companies are registered and doing business in Bangsamoro. The investors who had invested to the Region before 2000 were only 13. Table 3.32 indicates the investment amount by Investment Promotion Agency (IPA). Investment amount to Bangsamoro is recorded by R-BOI. The table indicates that the investment to Bangsamoro was rather small in the past and it started practically after 2012. Invested amount is the least among 15 IPAs in the Philippines. The cumulative invested amount during the period of 2008 to the 1st semester of 2014 accounts for 0.05% of the total. Although

invested amount is still small, some early investments are observed after the signing to the Framework Agreement on the Bangsamoro (FAB) in December 2012.

Table 3.32 Total Approved Investments from Foreign Nationals by Promotion Agency

(Unit: PHP 10^6)

AGENCY	Year							Growth Rate (S1 2013 - S1 2014)
	2008	2009	2010	2011	2012	2013	2013 1st Sem	
AFAB	-	-	-	86.0	390.6	2,120.7	-	-
BOI	93,551.6	10,396.9	22,328.5	23,234.9	74,064.8	120,646.3	62,805.8	(81.70)
BOI ARMM	-	-	-	-	426.8	322.0	-	-
CDC	9,243.0	4,535.5	26,249.8	18,805.9	4,504.4	1,986.0	799.7	893.00
CEZA	-	-	-	233.5	128.9	599.8	114.9	(55.50)
PEZA	70,355.1	103,421.3	142,167.4	195,534.1	209,376.6	147,670.8	45,239.8	(7.00)
SBMA	9,531.2	3,462.2	5,317.7	20,336.9	652.3	668.0	174.1	6,509.40
TOTAL	**182,680.9**	**121,815.9**	**196,063.4**	**258,231.3**	**289,544.4**	**274,013.6**	**109,134.3**	**(32.70)**

Sources of Basic Data:

Board of Investments (BOI), Clark Development Corporation (CDC), Philippine Economic Zone Authority (PEZA), Subic Bay Metropolitan Authority (SBMA),Authority of the Freeport Area of Bataan (AFAB), and Board of Investments ARMM (BOI ARMM).

The latest investment data (January–September 2014) on the Bangsamoro show that the industries related to power generation, banana plantation, palm oil production and mining share more than 50% of investment (Table 3.33). According to RBOI, two other investment projects will be added to the 2014 list. It is considered that the investment aiming to grab earliest opportunities through establishing a joint venture with powerful partner in Bangsamoro will be carried out and such movements will increase before passing of the BBL.

Table 3.33 RBOI-ARMM Registered Firms as of 3rd Quarter (January–September), 2014

No.	Name of Firm	Project/Activity	Capacity	Investment Cost (PHP)	No. of Jobs Created
1	Lamsan Power Corporation, Sultan Kudarat, Maguindanao	Biomass Renewable Energy	15 MW	921 M	310
2	ABSCOR Multi Trading Company, Maluso, Basilan	Import & Export Trading	Per activity	10 M	153
3	S.R. Languyan Mining Corp., Tawi-Tawi	Nickel Ore Mining & Quarrying	1,000,000 MT/annum	520 M	650
4	Agumil Phil. Inc., Buluan, Maguindanao	Palm Kernel oil & Palm Kernel Copra	40-80 Tons/Hr.	170 M	554
5	Green Earth Enersource Corporation, Buluan, Maguindanao	Biomass Renewable Energy	4.5 MW	366 M	54
6	Philippine Trade Center, Sultan Kudarat, Maguindanao	Biomass Renewable Energy	3 MW	486 M	30
7	Powerup Ventures Incorporated, Parang, Maguindanao	Distribution of Petroleum Products	50 million liter/year	50 M	33
8.	Darussalam Mining Corporation, Languyan, Tawi-Tawi	Mining and quarrying operation of nickel ore for export to China	830,000 WMT/year	193 M	310
9.	Bangsamoro Oil and Fuels Corporation, Parang, Maguindanao	Importation, distribution and sales of petroleum products	9 million liter/year	86 M	33
10.	Al Mujahidun Agro-Resources and Development, Inc, Ampatuan, Maguindanao	Cavendish bananas plantation (550 ha)	2 M boxes/year	570 M	867
	Total			3.372 B	2,994

Source: R-BOI.

According to R-BOI, the field of investment is quite limited to agriculture and agri-business related areas, and investment destination from 1992 to the present is clustered mainly in the mainland provinces of Maguindanao and Lanao del Sur. However, out of the 46 nominal companies, 21 investors were

officially registered in R-BOI, including those that have expanded operations. Maguindanao investors account for 70% followed by that from Lanao del Sur at 19% and from islands at 11%. Seven out of the 21 are engaged in agriculture production (Cavendish banana production). Looking back the history, FDI from Malaysia and the Middle East was recorded in the second half of the 1990s when ARMM was relatively peaceful but investors were few, and fewer succeeded as peace was frittered away.

In the mid of 2015, ARMM-BOI accepted provisionally registration of the investment by Iron Blaze Petroleum, Inc. for building of 90 million liters of oil depot in Polloc Port. Also, the investment of 300 ha of expansion of banana plantation in Pandag by La Frutera was newly accepted. It is a welcomed event in the sense that a reform-oriented administration was favored by the investor, but the investment amount of oil depot was still small and the investment by La Frutera was not greenfield investment anymore.

According to the news feed by ARMM in its official website on February 5, 2015, the Mamasapano Massacre, which occurred on January 25, 2015, failed to weaken the interests of investors in the region. The copper-nickel mining and oil depot projects have been approved. Chan C Mining Inc. in Panglima Sugala in Tawi-Tawi invested PHP 741.8 million in a copper-nickel mining project and Tawi-Tawian Petroleum Trading in Tawi-Tawi invested PHP 121.25 million in oil depot. However, these projects had already been scheduled for approval before the Mamasapano incident.

Several news agencies reported that Mindanao could lose billions of dollars of potential investments pending the approval of the Bangsamoro Basic Law. There were reports of at least three foreign firms looking to have partnerships with local businessmen have put their investments on hold after the incident. Some foreign businessmen who are looking to build department stores and hotels, invest in banana farms have either cancelled their trips to Mindanao or have hurriedly left the country without finalizing a deal[105]. Many of the local investments to Mindanao also were postponed and investors are on a wait and see mode.

(2) Major establishments in Bangsamoro

Larger establishments

The bulk of activities in all sectors in Bangsamoro is of informal and small and medium scale. The 2010 ASPBI[106] counted only seven establishments in ARMM with 20 or more employees in agriculture, forestry, and fishing; all these establishments were involved in growing either Cavendish bananas or rubber trees. They had a total output of about PHP 1.1 billion and value-added of PHP 458 million[107].

The survey also counted only five manufacturing establishments in ARMM employing 20 or more persons. Of these, three were involved in manufacturing starches and starch products, one in manufacturing refined coconut and other vegetable oils and margarine, and one in the manufacture of veneer sheets and plywood.

Banking

Bank offices are usually located in urban areas where household incomes are higher and there is a wide customer base. Almost all the banking offices operating in or within the ARMM region are located in cities. In Basilan, for example, five banks have offices in Isabela City. In Lanao del Sur, three of its five banks offices are in Marawi City. All the bank offices in Sulu are found in the capital, Jolo. Cotabato City has the greatest banking presence with about 13 banks having a total of around 18 offices.

The 2011 JICA Study identified 13 micro finance institutions and two rural banks that provided microfinance service in the ARMM region. Together, they provided financial services to around 22,000 beneficiaries (4% of the ARMM's population) and covered 34 municipalities (29% of all the ARMM municipalities).

Islamic banking is yet to gain a strong foothold in Muslim Mindanao. Credit is not readily available

[105] Source: http://www.filipinoexpress.com/business-economy/1614-mamasapano-carnage-scaring-away-investors-business-group
[106] The Annual Survey of Philippine Business and Industry (ASPBI) conducted by the National Statistics Office.
[107] Agriculture and forestry contributed about PHP 44.6 billion (in current value) to ARMM's GDP in 2010.

in a manner consistent with Islamic Shari'ah principles, making it difficult for Muslims in Bangsamoro to live in full accord with Islam. The Development Bank of the Philippines (DBP) took over 69% of the shares of Al Amanah in 2008, wishes to privatize Al-Amanah, and expects it could be fully operational and geared to effectively serve the market again in 2015.

However, it is still quite uncertain whether Bangsamoro people strongly desire a complete set of Islamic banking. Most people in rural areas of Bangsamoro lack the basic knowledge on bank credits as well as on the requirements for a Shari'ah compliant banking system. Interviewed MFIs unanimously mentioned that Muslims in Mindanao accept to pay interest, responding to the explanation that banks need to collect interest to supply loans. Many of MFIs have offered their regular services to their Muslim clients without much difficulty, although at times phrasing *interest* in different terms such as *mark-up*, *administrative charge*, *service fee*, and the like. However, it should also be noted that there have been incidences where a village Muslim chief condemned his people of using banking services that are not Shari'ah compliant.[108] It is expected that the introduction of Islamic Banking will further facilitate the increase of bank loans in the Bangsamoro region.

The two government development banks - Land Bank of the Philippines (LBP) and Development bank of the Philippines (DBP) – have a presence in Bangsamoro. LBP is more active than DBP in the Region. LBP has some 10 offices throughout ARMM, including Isabela City and Cotabato City, while DPB has only three offices. DBP has no office in Lanao del Sur, Maguindanao, and Tawi-Tawi provinces, while LBP has five branches in these locations. Although there is only one DBP office in Cotabato City, there are three LBP offices. Neither bank has offices in Basilan outside Isabela City. Furthermore, government transactions, including handling of the employee payroll, are coursed through LBP.

DBP and LBP have provided funds to some of the larger entities. LBP, for example, provided funds to grower cooperatives for palm oil through its Innovative Financing Scheme production for the Agumil project in Maguindanao.

(3) Perception of private sector on investment in Bangsamoro

Foreign chambers of commerce

As the establishment of Bangsamoro political entity comes to a close, the perception of investment to the Region seems to change. The JICA Study Team examined such changes through interviewing to seven international chambers of commerce, having representative offices in Manila[109] (Table 3.34). The interviews were conducted two times in December 2014 and February 2015, respectively, to have insights on how the investor's mind changed during this period. Further, the interviews were conducted also to several tycoons belonging to the Chinese Chamber of Commerce in the Philippines, positioned under the umbrella of PCCI, who have storing influence to the economy of the Philippines[110].

Interests on investment toward Bangsamoro are still low among the investors in Metro Manila. The seven chambers of commerce also have little concerns to Bangsamoro with the exception of Japan, Canada, U.S., and the Philippines, which have branch office in Mindanao. However, the JICA Study Team noticed that there are several companies finding business opportunities in Bangsamoro outside the reach of chambers of each country.

Four chambers which have branch offices in Mindanao, mostly in Davao, mentioned that they will continuously watch the business environment of Bangsamoro for their member firms. The Chinese Chamber of Commerce of the Philippines and Chinese tycoons have shown no interest of doing business at all in Bangsamoro for now.

[108] Interview with Cooperative Bank of Cotabato

[109] Nationality of such chambers includes Japan (JCCIP), U.S. (Amcham), EC (ECCP), Korea, Canada, Australia, and the Philippines (PCCI). As for the PCCI, interview survey to the branch offices in Davao, Cagayan de Oro, and Cotabato was also conducted to see the difference of consciousness by region.

[110] The survey is aiming to analyze on time-series bases so that the second survey is planned after 1 year time from the first survey.

Table 3.34 Implication of Foreign/Filipino Chambers

Nationality of Chamber of Commerce	How do you see the investment to Bangsamoro after new autonomy starting after 2016?				The % of possibility to believe toward successful transactions of Bangsamoro political entity.
	The resource of Bangsamoro which attracts investors.	The country move for investing to Bangsamoro in the first place.	The moves of investors of own country toward new autonomy.	The condition to attract investors.	
Japan	Agriculture (fruits in particular)	China	Nakashin, Sumitomo Fruits (but they are formally saying "No interest".	Peace and Order	100%
USA	Agriculture, Agro-Processing	Malaysia	Wait and see. But always watching. (Delmonte is moving forward in the field.)	Polliok Port	Frankly 50% (but announcing 100%)
EU	Agriculture, Truism, Mining	USA	None so far. (No European enterprise was heard in the field.)	Peace and Order Proper legislative system to protect investors. Attractive incentives	100%
Korea	Unknown natural resources	Nearby Muslim Countries	None so far (Actually, Korea Rural Community Corp. was already approaching to ARMM-DAR for feed crops plantation)	Peace and Order Create own sources of revenue The trust from other Muslim country	50-60% Peace and Order not yet secured. Economic policies are still controlled by the Philippine Government.
Canada	Mining, Agriculture, and Truism	Malaysia and Indonesia (Canadian companies will not have strong power to do so.)	Canadian Chamber is negotiating with Central Government for easing condition on mining development.	Reconsidering of development policy on mining development of BBL.	100% But BBL will not be approved as it is.
Australia	NA				
Philippines (Manila)	Infrastructure, Agriculture, Tourism	Malaysia	Only the companies in Mindanao started to move.	Infrastructure Tax incentives	100% (members in Mindanao) 50% (members in Luzon)
Chinese	Infrastructure, Agriculture	Malaysia	None so far Most of investors have no intention to invest to Bangsamoro.	They do not know how to make business. Especially, they do not know how to deal with Muslim businessman or consumer.	No idea (depend upon next President of the Philippines)

Source: Interview by JICA Study Team

Companies based in Mindanao

In Mindanao, the JST interviewed the Cagayan de Oro Chamber of Commerce and Industry (CDOCCI) and the Davao City Chamber of Commerce and Industry (DCCCII) for the period from the end of 2014 to the beginning of 2015. DCCCII's interest in investing in Bangsamoro is strong compared to companies in Luzon Island because there are several member companies such as La Frutera and Agumil, which have already established ties with Bangsamoro and invested there. It is also the case with CDOCCI. Presumably companies in Mindanao have a great deal of interest in the region, and many a company has a plan to extend its business there. In this sense, the first target of attracting investment will be the companies locating in Mindanao.

The private sector in Mindanao is aware that the relationship with local bosses is a key factor for success in doing business in Bangsamoro. Sometimes there is a run-up case prior to full investment in the region, in which a private company invests in a business in Davao and Cagayan de Oro with a tycoon in Bangsamoro.

Neighboring countries

Neighboring countries such as Malaysia, Indonesia, and Brunei are also showing a strong interest in Bangsamoro (Table 3.35). Malaysia has already organized reconnaissance missions several times for the future investment in Bangsamoro with potential investors.

Major newspapers have reported that neighboring three countries are aiming to establish strong ties with Bangsamoro and that some neighboring countries such as Malaysia are proposing bilateral cooperation for institutional support and capacity development of the Bangsamoro. It should be noted that support for the establishment of Islamic banking system may take effect with the support of Malaysia because such development has not proceeded so smoothly in Bangsamoro so far. In contrast, media coverage

of Indonesia and Brunei on Bangsamoro-related matters is small as of the end of 2014.

Table 3.35 Interest of Bangsamoro by Malaysia, Indonesia and Brunei

Country	Date Reported	News Source	Interest in Bangsamoro
Malaysia	February 28, 2014	The Sun Daily (M'sia keen to offer expertise to Philippines: Najib)	Malaysia will offer capacity building to have new skills for the Bangsamoro people to handle (or manage) the future government.
BIMP-EAGA	June 19, 2014	The Brunei Times (Bangsamoro bullish on investments from EAGA)	The RBOI of ARMM expected the governments of Brunei, Malaysia and Indonesia to help in ensuring the peace process and to support the economic development of the new Bangsamoro through the investments that they or their nationals will pour in the area.
Malaysia	October 24, 2014	MindaNews (Malaysians eye Bangsamoro investment)	MindaNews noted that "a joint Filipino-Malaysian venture in the palm oil industry has existed in Mindanao through the Agumil Philippines Inc."
Indonesia	September 13, 2014	Manila Bulletin (Indon palm oil producer seeks investment security)	PT. Musim Mas, the second largest palm oil producer in Indonesia, was seeking assurance from the government as it was exploring possible palm plantation and refinery investments in Mindanao.
Malaysia	13 September 2014	Manila Bulletin (Indon palm oil producer seeks investment security)	Manila Bulletin reported that Felda, Malaysian government's cooperative for small palm oil growers, visited to explore investments in palm oil production in Mindanao.
Malaysia	26 September 2014	Philippine Daily Inquirer (Malaysian investment bankers exploring business prospects in PH)	Headed by MIDF Amanah Investment Bank, Malaysian investment bankers visited the Philippines. MIDF Amanah Investment Bank noted that the group was also considering the "massive untapped potential of Mindanao, mainly in agriculture supply chain."
Malaysia	3 November 2014	Gen San Times (Malaysians Bullish over Bangsamoro)	Malaysian businessmen are looking for possible joint venture with local corporations for oil palm and rubber plantations in the Mindanao.

Source: Major newspapers in the Philippines, Malaysia, Indonesia and Brunei.

3.4.2 Issues and challenges of investments in Bangsamoro

(1) Infrastructure issues

Transport infrastructure

Lack of infrastructure is a major constraint in attracting investment in Bangsamoro. Water, land, and air transport facilities need substantial improvement with more conscious efforts to integrate them into a logistical network between production areas and markets. High cost of inter-island shipping is a major constraint to the competitiveness of producers throughout Mindanao. It is caused by inefficiencies and poor freight handling facilities at most ports, and lack of competitiveness in inter-shipping operations. The repeal of the coastal shipping act and enhancement of road transportation will increase transportation power. The road network needs urgent upgrading.

The importance of constructing farm-to-market roads in previously neglected areas will be eyed from the viewpoint of agricultural development. Rehabilitation of national roads is less prioritized because the paved ratio in Bangsamoro is higher than other part of the Philippines. Instead, the secondary and tertiary roads need more attention to develop/rehabilitate.

Electricity

Power outages are common even in urban areas of Bangsamoro because the bulk of power supply is running short in Mindanao. At the retail level, system losses by rural cooperative distributers are very high due largely to poor management. Many communities do not have access to electricity or cannot satisfy their demand in time and quantity.

Other infrastructure

A similar structural problem can be seen in the provision of water supply to urban areas. Water supply in urban areas is suffering from serious management problems brought about from low level of fee

collection and high percentage of water leakage. Infrastructures related to water and environmental management, erosion, drainage and flood control are insufficient in watershed and river basin areas. Irrigation facilities also need urgent rehabilitation.

(2) Institutional issues

Banking system

A healthy banking system is not in place in Bangsamoro. Unless stable conventional banking and finance and Islamic banking system are not fit in, it is difficult for investors to gain sustainable foothold in the Region.

1) Physical issues

ARMM is the least banked region in the Country (Table 3.36). The number of banks and automated teller machines (ATMs) in ARMM is far less than in any other region of the Philippines. From 2006 to 2013, the number of banks declined from 26 to 20. Moreover, as of 2013, of the more than 12,000 ATMs in the Philippines, only 25 are located in the ARMM.

Table 3.36 Distribution of Banks and ATM[111]

		Distribution of Banks			Distribution of ATM		
Region		6-Dec	13-Mar	Cange (%)	2009	2012	Change (%)
	NCR	2,649	3,016	14	3,867	5,324	38
	CAR	110	148	35	114	162	42
I	Ilocos	379	419	11	241	356	48
II	Cagayan Valley	231	290	26	112	165	47
III	Central Luzon	812	982	21	681	1,066	57
IV-A	CALABARZON	1,170	1,417	21	1,133	1,748	54
IV-B	MIMAROPA	86	207	141	69	140	103
V	Bicol	219	318	45	178	261	47
VI	Weatewrn Visayas	439	547	25	400	518	30
VII	Central Visayas	503	632	26	605	921	52
VIII	Eastern Visayas	133	176	32	122	181	48
IX	Zamboanga Peninsula	122	190	56	129	176	36
X	Northern Mindanao	252	327	30	238	327	37
XI	Davao Region	253	360	42	301	480	59
XII	SOCCSKSARGEN	168	195	16	168	259	54
XIII	Caraga	114	198	74	77	115	49
	ARMM	26	20	-23	23	25	9
	Universal and Commercial Banks	21	17	-19			
	Thrift Banks	1	1	0			
	Rural Banks	4	2	-50			
TOTAL		7,666	9,442	23	8,458	12,224	45
Source: BSP (as of Apr.2008)							

On a per capita basis, there were only 0.1 banks and 0.1 ATMs per 10,000 adults in the Region in 2011 (Table 3.37). On the average, each bank office served 200,000 persons, far more than any other region in the Country. Almost all of the banks operating in the ARMM region are branch offices of universal and commercial banks. There is one thrift bank in addition to two rural/cooperative banks. Further, about 93% of municipalities in the ARMM region have no banking presence.

[111] Three tables in this section were referred from WB's *Working Paper No. 7 Banking and Finance in the ARMM*.

Table 3.37 Availability of Banking Service by Region

Region		Banking Services Coverage			Municipal Banking Presence(%)		
		2011		2013			
		Banks per 10,000 adults	ATMs per 10,000 adults	# of persons served by a banking office	No banking presence	No banks but with alternative access points	No access points at all
	NCR	3.5	5.1	4,066	0	0	0
	CAR	1.3	1.1	11,840	65	5	60
I	Ilocos	1.1	0.8	13,170	27	11	18
II	Cagayan Valley	1.2	0.6	12,339	27	5	22
III	Central Luzon	1.3	1.1	10,985	8	7	2
IV-A	CALABARZON	1.6	1.6	8,979	6	5	3
IV-B	MIMAROPA	1.0	0.4	16,212	37	21	8
V	Bicol	0.7	0.5	20,198	36	22	17
VI	Weatewrn Visayas	0.0	0.8	14,718	21	25	2
VII	Central Visayas	1.2	1.4	12,231	37	37	9
VIII	Eastern Visayas	0.6	0.5	26,324	70	44	39
IX	Zamboanga Peninsula	0.8	0.7	19,102	63	25	28
X	Northern Mindanao	1.1	0.8	13,401	35	6	29
XI	Davao Region	1.1	1.0	12,971	20	4	12
XII	SOCCSKSARGEN	0.7	0.7	21,835	34	10	15
XIII	Caraga	1.2	0.5	13,381	27	3	25
	ARMM	0.1	0.1	195,174	93	8	86
Source: BSP							

The minimal presence of banking offices in the Region could be attributed to the following reasons:

- Low level of household income[112],
- Inaccessibility to banks due to the poor state of Barangay or farm-to-market roads[113], and
- Investors to banking sector are hesitant to expand the banking network in ARMM due to security reasons.

2) Other issues

The conventional banking practices do not conform to the social and religious norms of the people of ARMM. It is sure that the needs are there to respect Islamic Shari'ah principles, but the attempt to establish an Islamic banking system such as Al-Amanah Islamic Investment Bank has failed due to the inadequate expertise in Islamic banking and the lack of a coherent legal and a regulatory framework that can support banks. Also, ARMM has the lowest levels of bank deposits and loan portfolio in the Country (Table 3.38). ARMM's basic loan-deposit ratio of just over 11% is the lowest at among all regions. The low loan deposit ratio also indicates that there are not many opportunities for lending and/or banks are hesitant to lend.

Banking regulation is also critical issue. The General Banking Law of 2000 (RA 8791) mandates the main lead taken by Bangko Sentral in regional financial operation, and it is obvious that without BSP there would be no aggressive operation by other banking institutions.

As for opening a BSP regional office, the following criteria are sought:

- The area must have significant economic activity. It must have at least 15 bank branches, at least 20 non-bank financial institutions, and at least PHP 5 billion deposit base.
- The regional government has to have proper business development plan for the region.

[112] The 2009 Family Income and Expenditure Survey (FIES) results tag ARMM as the poorest region in terms of average household income, some 80% lower than the country average.

[113] According to 2011 JICA's Development Study on Local Industry Promotion in ARMM, it is revealed that 32% of ARMM business-owners kept their money in banks while 78 percent kept their cash at home or in the business office. Among the reasons cited by respondents for not opening a bank account was the distance from a bank.

- There has to be infrastructure support - such as regular land, air or water transport facilities, and reliable telecommunications facilities - and the absence of significant security risks.
- The area should not be in the catchment area of an existing BSP regional or branch office.

The first criterion alone cannot be satisfied in Bangsamoro. In fact, financing facilities are necessary exactly because this conditions are not satisfied. The infrastructure criteria are also difficult to satisfy.

As for Islamic Banking, the lack of a legislative base and regulatory framework is one of the main obstacles for the development of Islamic banking in the Country. RA 6864 is specific to Al-Amanah, and no other law provides for the setting up and regulation of Islamic banking, whether government or privately owned.

Table 3.38 Regional Distribution of Deposits and Loans

Region		Distribution of Deposit and Loans (million pesos)		
		Deposit Liabilities	Loan Portfolio	Loan Deposit Ratio(%)
	NCR	3,581.2	2,908.3	81.2
	CAR	52.2	7.1	13.5
I	Ilocos	101.4	20.7	20.4
II	Cagayan Valley	59.6	20.1	33.7
III	Central Luzon	272.4	71.8	26.4
IV-A	CALABARZON	379.6	67.1	17.7
IV-B	MIMAROPA	30.5	8.8	28.8
V	Bicol	64.0	19.8	31.0
VI	Weatewrn Visayas	149.8	38.6	25.8
VII	Central Visayas	264.5	69.0	26.1
VIII	Eastern Visayas	47.4	12.3	25.9
IX	Zamboanga Peninsula	50.3	14.6	28.9
X	Northern Mindanao	78.9	23.3	29.6
XI	Davao Region	106.4	33.8	31.8
XII	SOCCSKSARGEN	55.5	17.3	31.1
XIII	Caraga	31.1	9.7	31.2
	ARMM	3.9	0.4	11.2
TOTAL		5,329	3,343	62.7
Source: BSP				

Land and property rights

Land and property rights constitute the root constraint of Bangsamoro. Migration and settlement of vast tracks of Mindanao further confound land issues among settlers, Muslims, and indigenous tribes. Dynamics of movement toward Bangsamoro autonomy is also originated from this issue.

Various laws and regulations introduced over the years by the Philippine Government made things more complex and generated conflicts between the property rights based on conventional rules and ownership based on the Philippine law. The government agencies responsible for resolving land issues are presented in Table 3.39. Competing claims over land ownership was a principal cause of conflict in Bangsamoro for a long time. Uncertainty of land ownership will weaken the development power of Bangsamoro authority, which will constrain investment activities in many localities toward the large-scale development such as agricultural plantation[114] and mining.

JICA[115] found that a plan to operate a large-scale palm oil plantation in Lanao del Sur was suspended due to issues with land titles. According to this study, even many microfinance institutions (MFIs)

[114] When investors need finance, banks normally ask for collateral and land readily comes in handy for the purpose. Agumil Investments Inc. (see 3-2 of this report), a palm oil manufacturer in Maguindanao, was turned down for a loan by the Development Bank of the Philippines (DBP) because of concerns over land titles.
[115] Development Study on Local Industry Promotion in ARMM, JICA, 2011

limit agricultural loans to those with proper land titles.

Without solving land issues, Bangsamoro cannot collect proper land property tax, and vulnerable financial situation will not improve. Further, the way people think the *Goberno a Saruang* syndrome (meaning, "It is a foreign government and we are neither obliged to contribute nor take care of it") will never change.

Table 3.39 Government Agencies Tasked for Land Registration and Dispute

Agency	Role
Land Registration Authority (LRA), Department of Justice(DOJ)	LRA endorses the commonest land title. It is most well known registering agency in the Philippines. The official registration is based on a Torrens title system for land ownership.
Land Management Bureau (LMB), Department of Environment and Natural Resources (DENR)	LMB administers the distribution of public alienable and disposable lands using patents of various forms. It also maintains technical information on land records based on cadastral surveys.
Forest Management Bureau (FMB) under DENR	FMB issues an instrument of land rights for inalienable public lands, such as uplands, to communities and private entities.
Department of Agrarian Reform (DAR)	DAR implements the Comprehensive Agrarian Reform Program (CARP), and issues the Certificate of Land Ownership Award (CLOA) as proof of land transfer. This is registered with LRA with encumbrances, i.e. a ten-year proscription period, and amortization over a thirty-year period.
National Commission on Indigenous Peoples (NCIP), Presidential Office (PO)	NCIP issues instruments over lands in the ancestral domain, i.e. Certificate of Ancestral Domain Title, and Certificate of Ancestral Domain Claim.
Court (Barangay Court, Civil Court, Shari'ah Court)	The courts have the power to settle ownership claims which are then reflected in the registered title. In Bangsamoro, Philippine law recognizes three justice systems to resolve land conflicts. In addition to Barangay and Civil court systems, Shari'ah system is also admitted in case where both claimant and defendant are Muslim.
Local government units (LGUs)	LGU collects real property taxes and enforce land use laws and ordinances. In the absence of formal title, a tax certificate is a key document to establish possession.

Source: JICA Study Team

(3) Issues on human resources

Bangsamoro fares poorly by all social indicators, including education achievements. The ARMM for example, has the lowest completion rates of elementary and high schools in the Philippines. More than one-third of the workforce is illiterate. It is rather tough for investors to find highly skilled staff such as lawyer, architect and engineer from local Muslim workforce. Those high skilled personnel have usually blood relationships with local strongmen. This fact underpins to the investor's partnership, that it is, the necessity to tie up with a local strongman.

Related literature on labor and employment in ARMM mentioned a lack of formal employment opportunities for the people, due to the limited number of formal business establishments in the region. For instance, established companies are mostly in agriculture, such as La Frutera, Matling Industrial Corporation, and Agumil Philippines, Inc. The type of work might not also require professional services; these companies will require more labor than professional services for daily operations.

In addition, formal education is a struggle in the region, as there are less number of established higher educational institutions and most families have financial constraints to send their children to school. Those richer families in ARMM will send their children in educational institutions in Metro Manila or other urban centers in the Country. They will have better employment prospects in Metro Manila than in ARMM.

With the lack of quality formal education and dearth of jobs in the formal sector in ARMM, three possible employment options are left as follows:

- *Seek employment in nearby urban centers in Mindanao*. Since most of the job seekers would be the out-of-school youth or those with lower educational attainment, they would be hired on part-time jobs, or low-paying services-oriented jobs.[116]
- *Seek employment in Metro Manila*. Similar with the job opportunities in urban centers in Mindanao, employment in Metro Manila would be in low-paying services sector, possibly in retail industries.
- *Seek employment in other countries, such as Malaysia and those in the Middle East*. Last option for the labor pool—for both the youth and the adults—would be seek for work in Muslim countries.[117] Due to low educational attainment, overseas contract workers from ARMM will be employed in labor intensive jobs, such as construction workers and domestic helpers.

Employment options for the Bangsamoro people are limited due to structural issues in labor and education. The type of work within and outside ARMM will be the same. The only difference is the salary that they may be able to get when they work in Metro Manila or in other countries.

To bridge the gap in the human resources issues in ARMM, both the level of education and type of employment should be improved. Currently, various scholarships and technical-vocational trainings are offered; it will be ideal if these initiatives are continued. In terms of employment, entrepreneurships are also encouraged, so that people will be self-employed in small, productive industries. More importantly, to encourage gainful employment in the region, there should be more investments in formal industries from potential locators (both local and foreign).

3.4.3 Potentials and opportunities for investment in Bangsamoro

(1) Existing investment promotion related laws

Governing law at present

Three legislative setups will affect the investors' business in Bangsamoro, namely, RA 9054, Muslim Mindanao Authority Act (MMAA) 25, and MMAA 154 (and Cotabato City Investment Code). Also, RA 9054 is recognized as environment regulation. The gist of these laws is presented in the subsequent pages (Table 3.40). As mentioned in the subsequent pages, these laws should be simplified and more investor-friendly.

Table 3.40 Investment Governing Laws Effective at Present

Governing Law	Summary	Remarkable Contents
RA 9054 (amendment to RA 6734 or ARMM Organic Law)	Regulations for operation of businesses and placing of investments within the autonomous region. The ARMM government regulates and exercises authority over foreign investments within the region. The national government may only intervene in matters concerning national security.	- Business entities whose main, central, or head offices are situated outside the region but are doing business within the ARMM's jurisdiction should pay income taxes corresponding to income realized from their operations within the ARMM to the municipality or city. - Investors in the autonomous region can avail of incentives granted by the Regional Legislative Assembly (RLA) of the ARMM - RLA has the authority to grant incentives inclusive of tax rebates and holidays for investors in industries. - Cooperatives that reinvest no less than 10% of their surplus and firms that reinvest at least 50% of their net profits into socially-oriented projects can also be given the same incentives - Traditional barter trade and counter-trade with Brunei, Malaysia, and Indonesia are subject to regulation by the regional government. However, this law states that items or goods bartered or counter-traded with these countries cannot be sold in other parts of the Philippines without the payment of appropriate customs or import duties.

[116] *Jobs for the 21st Century: Philippines/Autonomous Region of Muslim Mindanao (ARMM) Assessment*. USAID. December 2005.
[117] Feature Stories. MDG F Joint Programme on Youth Employment and Migration, International Labor Organization.

Governing Law	Summary	Remarkable Contents
Muslim Mindanao Autonomy Act (MMAA) No. 25	Authorities of ARMM provinces to impose tax to business entities.	- Local governments of Sulu, Tawi-Tawi, Basilan, Lanao Del Sur, and Maguindanao have the authority to levy taxes on businesses engaged in the printing, publication of books, posters, cards, leaflets, certificates, handbills, pamphlets, receipts, and others of comparable nature. - The provincial governments of the ARMM may also impose franchise and amusement taxes within their respective territorial bounds, the examples are lessees, operators, or proprietors of cinemas, theaters, circuses, concert halls, and boxing stadia. - The provinces have the power to impose an annual fixed tax for every van, truck, or any vehicle used by producers, manufacturers, dealers, wholesalers, or retailers in the distribution or delivery of cigars and cigarettes, fermented liquors, distilled spirits, soft drinks, as determined by the Sangguniang Panlalawigan, to consumers, sales outlets within the territories in an amount not more than P 500,000. - ARMM provinces can levy and collect taxes on sand, ordinary stones, gravel, and other quarry resources extracted from the beds of seas, rivers, lakes, creeks, stream, and other public waters, or from public lands situated within their respective territorial domains. The provincial governor exclusively issues permits to extract such quarry resources. - The power to grant fishery privileges in municipal waters and impose appropriate rentals, charges, and fees lies within ARMM municipalities.
Muslim Mindanao Autonomy Act No. 154 or ARMM Special Economic Zone Act of 2003	The trading mechanism offering both local and foreign businesses tariff and tax incentives. Similar to the Special Economic Zone Act of 1995.	- 2010, Polloc Port was declared a free port/zone, making it a non-Customs territory. - Investors are granted tax exemptions, as well as duty free importations.
Local Investments and Incentives Code (LIIC)	Investment policies of Economic Zone (now Polloc Port Zone only). The LIIC of Cotabato City is entrenched in Ordinance No. 1756 Series of 2000, or the Revised Cotabato City Investment Code of 2000	- Investment policy includes, i) Programs of a local government unit (LGU), ii) Investment Priority Areas (IPAs), iii) Incentives (fiscal, real property, green, and non-fiscal incentives) , iv) Procedure, v) Composition, functions, and roles of Investments Promotion Center (IPC) and the Local Investments/Incentives Board (LIIB). - Incentives that are available for registered enterprises in the city include exemptions from payment of; i) building permit fees and other charges, ii) mayor's permit fees, business sales taxes, and other fees and iii) basic real property tax on land and building improvements machinery. - Depending on category investment belong to, firms may enjoy these incentives for different number of years.
RA 9054	Laws for protection, rehabilitation, and the sustainable development of forests, coastal, and marine resources, including the adoption of projects to ensure the maintenance of ecological balance covering environmental regulations, policies, and institutional arrangements.	- Control, regulation, and supervision over the "exploration, utilization, development, and protection of the mines and minerals and other natural resources within the autonomous region" are vested in the ARMM government with the exception of strategic minerals. - ARMM regional assembly has the power to give concessions and franchises and the regional governor can grant licenses, permits, and leases over agricultural, mineral, and forest lands - Exploration, utilization, and development of natural resources—are allowed to "all citizens and to private enterprises, including corporations, associations, cooperatives with at least sixty percent (60%) of their capital investment or capital stocks directly controlled or owned by citizens. - The regional government is in charge of prohibiting "the use, importation, deposit, disposal, and dumping of toxic or hazardous substances within the autonomous region". - ARMM and the National Capital Region (NCR) are the only regions in the country that prohibit mining operations.

Investment incentives

According to RA 6734, the ARG is tasked to oversee, regulate, and "exercise authority over the foreign investments within its jurisdiction in accordance with its goal and priorities, subject, however, to the Constitution and National policies".

Fiscal incentives available to ARMM-RBOI-registered firms include

1) Income tax holiday (six years for non-pioneer and pioneer enterprises alike);
2) Tax credits (on domestic capital equipment, on duty portion of genetic materials and breeding stocks, and for duties and taxes on raw materials);
3) Further deduction from taxable income; reduced duty on the importation of capital equipment;
4) Tax exemption on breeding stocks and genetic materials;
5) Exemption from wharfage dues and export tax, duty, impost, and fees; exemption from taxes and duties on imported spare parts; and
6) Incentives for necessary and major infrastructure and public utilities.

Non-fiscal incentives that ARMM-RBOI-is authorized to grant consist of

a) Employment of foreign nationals,
b) Simplification of customs procedures,
c) Importation of consigned equipment, and
d) Privilege to operate a bonded manufacturing warehouse.

Registration with RBOI-ARMM is limited to business entities that are engaged in activities or have products that are listed in the annual Investment Priorities Plan prepared by the National Board of Investments, especially those belonging to the list pertaining to the ARMM. This list encompasses priority activities that have been determined by the ARMM-RBOI: 1) export activities, agriculture, agribusiness/aquaculture and fishery, basic industries (e.g., textile production), consumer manufactures; infrastructure and services, industrial service facilities, engineering industries, logistics, Brunei Darussalam–Indonesia–Malaysia–Philippines East ASEAN Growth Area (BIMP-EAGA) trade and investment enterprises, tourism, and health.

(2) Investment opportunities in Bangsamoro

Businesses are encouraged to position themselves in the ARMM or the Bangsamoro region as it still has huge potential for business because there is less market competition. Based on the website of the Regional Board of Investments of ARMM, the investment priority areas in the region are the following: 1) business process outsourcing (BPO), 2) agri-aqua industry, 3) builders/woodworks industry, 4) garments industry, 5) tourism industry and 6) halal industry. Agro-related investment opportunities are described in Section 3.2. Other opportunities are described.

Business process outsourcing

According to the IT Business Processing Association of the Philippines, the signing of the framework agreement with the Moro Islamic Liberation Front (MILF) to end the four decade armed conflict between the Country's military forces and Muslim secessionists in Mindanao in year 2012 made the area potential to be the next IT BPO hub[118].

It is expected that there will be increased investment in the educational and communications infrastructure in the region with the approval of the Bangsamoro Basic Law. The National Government has disclosed plans in 2012 to invest PHP 21 billion for the improvement of the basic services in the region that includes infrastructures and education. The region then can potentially offer new talent pool to support the growth of the IT-BPO industry.

In the next five years, the IT-BPO industry of the Philippines is expected to grow at 20% annually. Davao is already successful in attracting numerous IT-BPO operations that they are now rank 69 among the top 100 outsourcing destinations in Southeast Asia (from rank 70 in 2013)119. There is certainly great possibility that the Bangsamoro area can also attract many IT BPO operations in the future.

Builders and woodworks industry

Based on the report of the Forest Management Bureau (FMB), the ARMM has a total of 42,756 ha of established forest reserve and 483,837 ha of established timberland in 2013. The ARMM also has 43,064 ha of land (as of 2013) from the Integrated Forest Management Agreement of DENR, where

[118] http://www.bpohotjobs.com/index.php/explore/page-1/134-bangsamoro-next-it-bpo-hub
[119] http://www.wallacebusinessforum.com/wp-content/uploads/2014/03/I-MARBUS14.pdf

they can "develop, manage, protect and utilize a specified area of forestland and forest resources therein for a period of 25 years and may be renewed for another 25-year period"[120].

In 2012, the Department of Environment and Natural Resources (DENR) reported that 52% of the forest in the ARMM is already denuded due to rampant illegal cutting of trees. As a response, the local government agencies have issued policies to create the Provincial Anti-illegal Logging[121]. In addition, the ARMM has also embarked on the NGP wherein trees were planted in 1,810 ha of the ARMM land in 2013[122]. Mahogany seedlings were reproduced in many nurseries in the various ARMM provinces to help raise mahogany specie to be planted in the denuded areas of the forest.

The Advisory Committee on Paper and Wood Products of the Food and Agriculture Organization of the United Nations reported in 2007 that there is a huge potential for the industry as the average growth rate of international trade of forest is 6.6% annually (based on a 20 year period of up to 2007)[123]. The Philippines was reported to have exported only 0.1% of round wood, 7.9% of sawn wood, 2.3% of veneer and 0.2% of plywood of the total worldwide exports in 2013[124]. The large world market for builders' woodworks presents a good opportunity for the development of the industry, not just for the entire Philippines but also for the ARMM region as well given the resources. However, increasing the export volume of the Philippines is hampered due to the low level of skills of workers in the micro and small sector of the industry[125].

Garments industry

The garments and textile industry in the Country is underdeveloped and has been declining in the past years. The year on year value of exports based on the Philippine Statistics Authority has declined from US$1.57 billion in 2011 to US$170 million in 2012[126]. The Board of Investments has created a Manufacturing Industry Roadmap with a long term plan to resuscitate the industry[127]. Several buyers have already expressed interests in the textile and clothing products in Davao during the 2nd BIMP-EAGA and IMT-GT Trade Fair and Business Leader's Conference last year which was attended by 25,000 local and international visitors from all over the globe[128].

The Garments and Textile Industry Development Office and the Center for International Trade Expositions and Missions have identified the art of t'nalak weaving from South Cotabato and T'boli women of Lake Sebu whose traditional cloth weaves are made with abaca-woven fiber as few of the weaves that shows potential of global marketability[129].

Tourism industry

The Department of Tourism (DOT) is confident that Mindanao will be one of the major tourism areas in the Country with the Bangsamoro peace deal agreement. They expect that there will be more local and foreign visitors who would stay longer in Mindanao. In 2013, about 5.0 million tourists has visited

120 Philippine Forestry Statistics 2013
121 http://www.zamboangatoday.ph/index.php/news/13-top-stories/12050-denr-52-of-forest-in-armm-is-denuded.html
122 2013 Philippine Forestry Statistics
123 Global Wood and Wood Products Flow: Trends and Perspectives by the Advisory Committee on Paper and Wood Products of the Food and Agriculture Organization of the United Nations
http://www.fao.org/forestry/12711-0e94fe2a7dae258fbb8bc48e5cc09b0d8.pdf
124 International Tropical Timber Organization Statistics Database
http://www.itto.int/annual_review_output/?mode=searchdata
125 *Training Needs Analysis for the Builder's Woodworks Industry in the Philippines* by the Forest Products Research and Development Institute source)
http://www.itto.int/files/itto_project_db_input/2881/Competition/PPD-133-07-R1-I-Completion-Report.pdf
126 http://issuu.com/sudaria_publications/docs/westmin_91fff737793fe5
127 Manufacturing Industry Roadmap: Addressing the Jobs Challenge Toward Inclusive Growth by the Bureau of Investment September 2014 Source: http://dirp4.pids.gov.ph/webportal/CDN/EVENTS/04_DTI_Dichosa.pdf
128 http://www.minda.gov.ph/index.php/news/104-international-trade-fair-and-business-gab-clinch-p8-9-billion-in-sales-and-investments
129 http://www.manilatimes.net/weaving-the-philippines-local-textures-and-fabrics/108502/

Mindanao, up by 5% from 2012, majority of which goes to Davao City[130]. According to DOT, Bangsamoro will have their own Tourism Department and will conduct their own marketing communications program.

Some of the interesting tourist sites in the Bangsamoro region include Punta Beach, Tumingay Lake and Bogo Diving Spot in Maguindanao; Lake Lanano, Sumpitan Falls, and Barurao Springs in Lanao del Sur; the Walled City of Jolo, as well as its white beaches, and Jikiri Cave in Sulu; the tomb and mosque of Sheik Makhdum, Sibutu Natural Wildlife Sanctuary, and Pearl Farm in Tawi-Tawi; white-sand beaches in Malamaui Island; and Palm Beach and Balagtasan Falls in Basilan (http://tourismarmm.blogspot.com/).

There are three airports in the region (Cotabato, Jolo, and Tawi-Tawi), but the tourist spots are difficult to reach due to the lack in transport infrastructure. Development of roads, lodging and transport facilities, and retirement villages including health and medical facilities and amenities required by the Philippine Retirement Agency (PRA) is included in the investment priorities plan proposed in 2012 for the tourism industry in the region[131].

Halal industry

Part of the investment priorities plan of RBOI-ARMM is the halal industry. According to the RBOI-ARMM website, religious leaders and other stakeholders in the ARMM have approved the halal certification standards that will be observed in the region as it strives to take a share of the estimated US$580 billion[132] per year global market for halal products. Thailand is the 6th largest halal exporter in the world and earns US$73 billion in halal exports.

Malaysia is also one of the major halal players, but they do not have established standards governing what constitutes halal. In South East Asia alone, the Muslim market has a consumer base of 225 million. India, Pakistan, and China are emerging markets that has large Muslim populations.

According to the Department of Trade and Industry Export Marketing Bureau (DTI-EMB), the United Arab Emirates has expressed interests in expanding its business in the production of halal products in the Philippines as oil prices has decreased in the global market.

Based on the news report on RBOI-ARMM website, the ARMM is already being developed as the halal hub that will produce and market halal products not only in the domestic but also the ASEAN markets. The Zamboanga City economic zone is identified as the specific area to install facilities that will ensure that all steps of the production process will comply with the halal standards according to Director Senen Perlada of the DTI-EMB[133].

Other industries

According to the RBOI-ARMM website, PHP 1.77 billion of the total generated investments are from biomass renewable energy, PHP 1.2 billion in nickel mining industry and PHP 146 million in petroleum product distribution and trading.

Lamsan Power Corporation was the biggest investor in 2014 which built a PHP 921 million biomass power plant at Sultan Kudarat, Maguindanao. SR Languyan Mining Corp., a nickel ore mining and quarrying company, has invested PHP 520 million in Languyan, Tawi-Tawi.[134] Pax Libera Mining in Languyan, Tawi-Tawi PHP 495 million investment was also approved.

3.4.4 Directions of investment promotion in Bangsamoro

(1) Lessons learned from previous investments

Six cases have been selected as successful investments made to Bangsamoro as listed below. These

[130] http://dot.armm.gov.ph/agreement-boon-to-mindanao-tourism/
[131] Regional Board of Investments ARMM website
[132] http://www.worldoffoodasia.com/index.php?q=halal
[133] http://www.bworldonline.com/weekender/content.php?id=101336
[134] "More ARMM investments seen in 2015" (http://www.armm.gov.ph/more-armm-investments-seen-in-2015/)

cases have been examined as summarized in Appendix to this section. Based on these cases, success factors have been extracted as summarized below[135].

1. La Frutera Inc. (fruit production in Magindanao)
2. Agumil Philippines Inc. (Agusan del Sur and others：Palm Oil Plantation)
3. BJ Coconut Mill (coconut oil extraction in Sulu)
4. Matling Industrial & Commercial Corp (coconut plantation and starch manufacturing in Lanao del Sur)
5. EA Trilink Corporation (telecommunications and web development in ARMM Region)
6. Air21/FedEx (logistics in Marawi City)

Investment strategies derived from these case studies consist of the following. Further discussions will be provided based on the experiences found in case studies of these pioneer projects.

1) Find a partner who is influential enough to advocate, educate and convince local leaders.
2) Invest not only money but also time and efforts to gain trust from the local business partners, local leaders and residents.
3) Respect cultures and working styles of Bangsamoro and transform them into the positive drivers of the company.
4) Introduce adequate incentives in order to achieve higher productivity and loyalty of employees.
5) Implement well planned method/approach to motivate workers and to improve discipline and cooperative work behaviors.
6) Maximize the use of corporate resources by running complementary businesses that could contribute to reduce the cost of the primary business.
7) If possible, secure self-sustaining power supply by utilizing locally available reusable energy.

Each of the seven factors of investment strategy identified is further discussed.

1) Find a partner who is influential enough to advocate, educate and convince local leaders.

Having a local partner is mandatory especially for projects that need to use the land for a long period of time. Even if you have a partner who has a legitimate land title/land certificate document and certificate of tax return, that would not be sufficient[136] in doing business in Bangsamoro.

It is necessary that the leader has established trusted relationship with the political leaders such as MILF and MNLF. Another role of the partner is to act as an instructor and advisor who help improve the morals of the local employees and also to help them understand the employment contracts.

2) Invest not only money but also time and efforts to gain trust from the local business partners, local leaders and residents

Most of the successful investment cases have a common factor. That is to exert efforts to gain the trust of local leaders and employees by living under the same roof with them. It is not only for the business owners/managers but measures are needed to foster mutual understanding between the Catholics and the Muslims. To attain it, at times, employee rules will have to respect Muslim culture even more than usual employee rules used in the Philippines. Many companies pointed out such needs.

It is notable that Agumil is being able to purchase the palm at better prices than competitors because they have made the purchasing price transparent and gained trust from the farmers. As shown in this example, transparency in business is an important factor in wining trust. CARD Inc., an NGO-based

[135] Such special investment factors need to be emphasized because of the culture and human relationships that are unique to Bangsamoro economies. For example, reporting to office/work at a certain time (same time) every day is not common in the area (local people are not familiar with such concept). Many companies in the case study are facing this challenge. Also, in the case study of Air 21, the company experienced a difficulty that despite they had a market with higher profitability in the nearby area (Iligan City), they did not have choice but to do business in Marawi City which had lower profitability.

[136] *Braving It and Making It*, Cielito F. Habito, Australian Aid. 2012.

MFI, believes that earning the trust of the community is a prerequisite to expanding its operation in a new region. Before starting micro-finance operations, CARD Inc. first provides health and education services to the community so as to avoid arousing suspicion among people.[137] However, it cannot be established quickly. It requires efforts for long time.

3) Respect cultures and working styles of Bangsamoro and transform them into the positive drivers of the company.

Many attempts to make employees follow the usual company rules have failed. In many companies, the local partners are playing the role to handle employee management with better understanding of local culture and historical practices. At La Frutera, for example, they hire employees using locally practiced work sharing system called *Sumpat*. Their employee management system also follows the local hierarchy. On the other hand, there are companies such as EA Trilink who persistently believes that the emphasis should be on building trust with local partner. They say that by raising the sense of business ownership of the local partners, the company will be naturally advertised in the Muslim society and will become known widely.

4) Introduce adequate incentives in order to achieve higher productivity and loyalty of employees.

Successful investment projects included in the case study use various incentives effectively to improve productivity and to maintain peace and order. For example, La Frutera gives incentives to achievement that surpasses quota while Agumil provides incentives to leased land providers through event participation. Other samples of incentives include making purchasing price transparent to the local farmers and/or offering more advantageous price then competitors.

5) Implement well planned method/approach to motivate workers and to improve discipline and cooperative work behaviors.

Conducting training and company events such as sports event are the specific examples of this strategy. Promotion scheme in the company, as part of the employee management to be handled by the local partner, needs to include a system that drives motivation of the employees. However, the company must constantly pay attention to make sure that the motivation scheme adjusted to Muslim style does not violate the labor code of the Philippines.

Among the case studies mentioned in this report, Matling can transfer employees to another job function if he/she does not find the current certain job attractive/interesting. In Agumil, they believe that it is most important not to differentiate the benefit of employees working in a same place. In Air21, their salary is lower than legal minimum wage but they offer emergency loans to 80 employees and also pay their 13th month pay at Ramadan time instead of Christmas time. At BJ Coconut Oil, the ranking of employees is aligned with the social hierarchy.

6) Maximize the use of corporate resources by running complementary businesses that could contribute to reduce the cost of the primary business.

At BJ Coconut, they operate transport ship business, in order to reduce the cost of transporting palm oil and diesel (fuel). Further, they are trying to maximize the use of business resources by utilizing the by-product of their primary business (coconut active-carbon) and also planting and processing abaca in the unused land. Agumil is self-supplying the seedlings of oil palm. Air 21 utilizes the trucks in the area for various transportation purposes. EA Trilink offers services to ARMM by integrating international gateway to a call center in Makati.

7) If possible, secure self-sustaining power supply by utilizing locally available reusable energy.

It is safer not to rely on the power supply from the local power company. BJ Coconut Oil who needs quality power supply uses self-generated power. Due to increased cost of fuel oil and also to environment considerations, some companies have started biomass and/or hydroelectric power

[137] Interview with CARD Inc.

generation in recent years (BJ Coconut Oil[138], Agumil).

(2) Conditions for investment promotion in Bangsamoro

Infrastructure development

Primary aims of Bangsamoro Development Plan are the rehabilitation and expansion of infrastructure facilities. The Bangsamoro authority says that infrastructure development must be done with the holistic perspective, having the direction for the entire Mindanao in mind. For example, infrastructure development for the power sector needs to be linked with Mindanao transmission grid. In addition, particularly in Sulu Archipelago, power infrastructure development must collaborate with small-scale hydroelectric power generation and renewable energy resources[139].

In a similar manner, road network planning requires Mindanao-wide and even wider regional perspectives. When making decisions on the plans of ports and major roads that link Bangsamoro, Mindanao and other regions, it is not possible to judge the viability based only on individual economic indices. Although the local conditions and needs will be of the highest priority when planning the development of port (especially the port of Polloc which is underutilized), secondary and tertiary roads[140] and bridges, the situations at the destination to which such infrastructure leads should be considered as well.

Development of watershed conservation areas and river system must be done with special attention under holistic development plan. The Pulangi watershed and its river system are the major artery of the entire Bangsamoro. The areas around the upper Pulangi River which occupies half of the province of Bukidnon have significant influence over vast agricultural land in the lower Bangsamoro.

There are major dams (especially the Pulangi Dam) in the Pulangi River basins for hydroelectric power generation and the power is used for irrigation. The Liguasan Marsh is the largest marsh in Mindanao, and a major area in the Pulangi River system considered to be a spiritual home for Muslims in Mindanao. Development of the Liguasan marsh area must assess, very carefully, the environmental changes that could be caused by the infrastructure development. Lower Pulangi and Upper Pulangi development cannot be planned separately from each other. When there is heavy rainfall in the upper Pulangi River, drifted water causes floods in Maguindanao. This is mainly because of the soil erosion caused by illegal logging in upper Pulangi areas and slit in the Pulangi dam caused by soil erosion.

As seen from these impacts, development of the Pulangi watershed and the upper Pulangi River system should be planned as an integral ecosystem by considering various factors such as land use, water source and environment management, soil erosion, drainage and flood prevention infrastructure, irrigation system and logistic network. In the areas for plantation, the plan should include agricultural development by small-scale farmers and tree planting projects. Further, the plan should consider sustainable aquaculture projects in Liguasan Marsh.

Investment for related facilities

Investments are needed not only for the infrastructure development[141] but also infrastructure support projects. For example, the Bangsamoro government should consider making minimum investment without spending too much time in planning for the development of freezer and post-harvest processing

[138] However, BJ Coconut Oil does not use coconut shells for power generation. Biomass power generation is not always economically viable. Coconut shells are left on the field after harvesting copra. Collecting coconut shells is very costly and power generation using coconut shells does not make sense economically.

[139] When large plantation and mining companies start operations, it is common that they setup back-up or secondary power supply. If more power could be generated, it could contribute to the development of agricultural product processing and other industries. In order for it to happen, it is important to have good governance of power cooperatives through reducing power system loss and improving the efficiency of power supply.

[140] Such as provincial, municipal, city and Barangay Roads

[141] JICA has finished an extensive review of the region's physical infrastructure, and the MINDA has been engaged in formulating programs addressing Mindanao-wide infrastructure needs, especially for the various development corridors and river basins.

facility that are needed to manufacture high value added products.

The Development Study on Promotion of Local Industry by JICA and the Growth with Equity in Mindanao Program by USAID have analyzed the value chain of Bangsamoro. These studies will be used as guidelines for infrastructure development support. The infrastructure development here covers from upstream side of the value chain such as power, water supply and irrigation, to the downstream side of the value chain such as logistics, telecommunication and storage.

The same analysis can be applied to processing of agricultural products and other manufacturing. (It can cover not only infrastructure but also investment in services and human resources.) It is effective to approach the infrastructure support projects by matching them with the value chain of the businesses of potential large scale investors'. Further, because of the nature of private investments that tend to be attracted to low wage areas, the private sector investments can function as the driving force of poverty reduction. Therefore, infrastructure development projects should be implemented, in a phased manner, in the areas surrounding the site of private investment.

Possibility of public private partnership (PPP) in infrastructure development should be explored too. Especially for the large scale plantation and mining projects, innovative approaches that can harmonize with Islamic financial services and Muslim cultures would be important.

For example, when developing freezer and post-harvest processing facility, it would be normal such project to be implemented by purely private companies. However, during the transition period, until the government of Bangsamoro establishes peace and equitable investment systems, it seems participation of quasi private companies will have to be accepted. It is possible that both the Bangsamoro government and the National Government to be involved in some of the projects that go beyond the border of Bangsamoro. To handle such possibilities, it is proposed to establish a small committee with representatives from concerned departments of both Bangsamoro and the National Government, including MinDA.

Attention to social infrastructure is also important. Education-related social indices are very low in Bangsamoro. For example, in ARMM, rate of entering and graduating elementary school and high school is the lowest in the entire Philippines. Also in ARMM, it is said that one-third of the population is illiterate. Lack of skills and education needed for business is one of the reasons why private investments are not increasing in the area.

It is important to develop education system and training programs for elementary and secondary education at grade schools and high schools. In addition to learning technical and cognitive capabilities, the program should cover character development (discipline, trust, and curiosity), universal value of Muslim culture and social adaptability to pluralism.

Attention should be paid to the youth who cannot afford to go to school, as well as to the efforts to help children and youth stay in school. It is because such out of school youth faces the highest risk of becoming juvenile delinquents. In addition to the *Back to School* campaign, it will be necessary to provide financial support for vocational training. In Bangsamoro, training such as leadership, business administration and entrepreneurship are needed. The gap between the current educational programs and the training necessary for the corporate management should be highlighted too.

The issue that needs most urgent action is to eradicate illiteracy in the laborer class. The benchmark will be TESDA's vocational training and practical hands-on training provided by the private sector. Reading, writing and math are the most important vocational training.[142]

Especially, training and capability improvement for women are needed to build comprehensive and sustainable foundation for Bangsamoro. Improvement of women's capabilities directly impacts the improvement of productivity. It contributes to achieve high return on investment, high revenue from

[142] Training for improving quality of life and specific skills are nearly non-existent due to the reality that participants cannot read and write.

agricultural activities and better structure of population.[143]

Land and land ownership

The banana plantation of La Frutera overcame the challenge of land ownership 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 (datu system). However, there is no guarantee that the same method works in other areas. There is no guarantee the same method 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.

Because of such background, Bangsamoro Development Agency (BDA) would 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.

Of course the protection of property rights extend beyond the attributes of land and resources. In order to ensure the safety/security of investment contracts, it is necessary to legislate conflict/dispute resolution mechanism. Bangsamoro needs both official and unofficial judicial systems functioning. As official systems, judiciary at 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 widespread. And each judiciary system requires capabilities for proper enforcement

Cultural and environmental context

Cultural and environmental context poses challenges for many investors. It has significant connection with the issues of land and its ownership. Resolution of such disputes should be sought through public court, Shari'ah law (Islamic law) court or alternative traditional methods.

For companies whose business activities concern cultural systems of the community and/or environmental issues, especially mining, forestry and other industry which is exploitative in nature, would particularly face great challenge. Cross-cultural sensitivity and nurturing trust within the organization become the most critical success factors for these companies.

To handle this situation successfully, the Bangsamoro government should not work on the issues independently. Rather, it is important to make Bangsamoro as a gateway to neighboring nations such as Brunei, Indonesia and Malaysia by leveraging cultural and historical connections between Bangsamoro and the Muslim society in south west Asia. If possible, financial products should be offered, at early stage, through commercial banks or Islamic financial services.

(3) Business models and labor relations

System design to attract investments

Two prong approach is needed for the legislation of business and labor conditions:

- First is to grant options about business and employment rules/regulations (property, application, administration) that can be studied/examined within legal discretion of Bangsamoro.[144]
- Second is the initial mobilization policy that allows modifying the existing rules to support attracting investment and expanding businesses with immediate result.[145]

It is important to study business rules and investment promotion policies. In the Philippines, establishing and operating businesses is highly regulated. Its rules are significantly more complex than many other nations in south-east Asia. And under the current rules there are rooms for corruption.

[143] Healthy workforce is highly important. Considering the importance of health and hygiene, providing level 1 water supply for the remote villages should be of high priority.
[144] This issue needs mid to long term approach. Legislation will take time and it needs to be widespread.
[145] The latter is necessary in order to convince the investors (both new and existing) that business rules are consistent everywhere.

There are much to be improved in how business registration is done in the Philippines including simplifying the processes and reducing its cost. Especially in Bangsamoro, where the majority of businesses are illegitimate and business practices and models are different from the National Government, establishing proper business registration system is a serious challenge. The Bangsamoro government should further simplify the systems for business, eliminate unnecessary or inadequate systems and establish a flexible business system.

It makes sense for the government and the private sector of the Bangsamoro to establish the Regional Competitiveness Council in Bangsamoro by accepting the proposal from the National Competitiveness Council[146] under the National Government. It should be this council who reviews the existing rules and then design and implement competitive and productive programs. Bureaucratic red tape and lazy government work should be changed for the better, by simplifying the procedure through delegation of the authority to approve business registration to the autonomous government.

Further, the Bangsamoro government should have a system and structure that allows to flexibly establish rules and procedures of investment promotion by offering attractive incentives and assurances. The emphasis should be on simplifying the procedures and incentives for investment promotion. What is important is the broad-based approach in which incentives are granted automatically to all companies investing in Bangsamoro, either local market oriented or export oriented, as long as they satisfy the conditions with limitations defined by the autonomous government.

If it is difficult to adopt such broad-based approach, the possibility of creating special economic zones[147] (zone approach) needs to be studied. If zoned approach is adopted and the establishment of special economic zones (SEZs) can be decided at the provincial level, the Bangsamoro government will have to build an institutional framework that define conditions for creating SEZs and its incentives.

For the strategic areas that have good security and developed infrastructures, possibilities of creating industrial estates and industrial zones should be studied. The design should be made to expand the zone as security situation of the surrounding areas improves. Incentives and simplified procedures should be defined with due consideration to agricultural companies which are commonly located in remote areas far away from human habitation. Such agricultural businesses should also be able to enjoy the incentives and simplified procedures.

For the medium term, it is desirable to consider the entire Bangsamoro as an SEZ of PEZA. If some of the conditions to qualify as SEZ cannot be met (e.g., inability to control smuggling and delayed infrastructure development), at least some areas in Bangsamoro should be certified as SEZ. Suitable investment destinations should be created with flexibility as a step towards establishing agricultural processing SEZ in the future. Further, the Bangsamoro authority should define relatively wide corporate categories (e.g., agricultural processing and halal food manufacturing) as investment priority areas and grant them limited and favorable incentives.

Investment promotion activities

Promotion services and R&D support for agriculture and fishery and SME support projects continue to be important for Bangsamoro.

Providing promotion services in remote areas contributes to local communities by helping them solve problems and overcome challenges. If peace and order situation is stable and the improvement of access to local communities is prioritized, R&D promotion, technical and marketing support to the communities works effectively. Organizational capability is required, however, in order to provide effective services in the local communities.

Related to this matter, the focus should be on the promotion service for the priority areas in agricultural business sector. Especially, for halal food manufacturing, capacity development for the stakeholders will be carried out. This activity requires support from donors and NGOs.

[146] ARMM is the only region in the Philippines with no RCC.
[147] Types of special economic zones include industrial estate, export processing zone, and free trade zone.

Office/employees rules

Employee rules and office regulations of the Philippines are so complicated that many companies feel it is impossible to comply with.[148] Bangsamoro should validate the applicability of employment related regulations implemented by the National Government of the Philippines. Then, within the authority of the Bangsamoro government, it should study alternative options concerning worker protection and wage level definition that fits the conditions in Bangsamoro.

Bangsamoro should simplify the labor regulations of the Philippines and also use more flexible wage setting mechanism.[149] One way is for the Bangsamoro government to prepare a humane employee administration district/area where employment insurance, social security, and other provisions for desirable employee protection are practiced. This may be called a special employment zone or a version of special economic zone. Under this administration, the private sector can undertake the construction of the industrial employment zone and introduce its own rules on workforce, including the import of foreign technical labor, so that these areas can achieve the highest level of labor supply.

By allowing this, the areas with industrial employment zone could become a hub of high-level industrial human resource supply. That is to say that the special employment zone to be established by the private sector serves as a certain training center. The scenario envisioned in this Project is that employees aspiring to be employed in the SEZ recognized by the government in the future, develop skills and characters while working in the special employment zone.

If establishing such a special employment zone could be approved all over Bangsamoro within a certain time limit, and also if the locators could be exempted from applying regular rules implemented elsewhere in the Philippines by using the simplified employee regulation/rules and wage setting processes, investing to special employment zones in Bangsamoro will become more attractive for investors than any other incentives and assurance systems offered in other regular SEZs.

(4) Capacity development

Capacity development at companies

Business capacity development has not been given enough attention, even in other areas of the Philippines. Even if the Bangsamoro government is granted the authority to do away with conventional bureaucratic red tape, people and companies in Bangsamoro still needs to develop capability to respond to business opportunities as they arise. Filipino companies doing business overseas and/or other part of the Philippines can provide necessary capacity. Considering fairness and political as well as economic importance, SMEs in the region should actively pursue partnership with such Filipino companies, and such efforts by the local SMEs should be facilitated by LGUs and the Bangsamoro government.

As an approach to nurture business capacity in the whole region it is important to facilitate partnership between Filipino investors, who play the role of catalyst and local companies via JV and other forms. The current law that regulates investment to ARMM restricts employment of experts, foreign investment and technical transfer. Such restrictions are making partnership/alliance between SMEs in the region difficult. Efforts are needed to minimize such restrictions.

Expecting investors to help improve business capacity of the Region is not sufficient. The government of Bangsamoro needs to prepare a special comprehensive program for capacity development. At an early stage, however, the programs focused on the agricultural businesses seem to be sufficient.

[148] *Philippine Development Report* by the World Bank points out that a) many companies do not comply with the employment standards, b) standard cost of retaining employees is high, and c) employment in formal sectors is not increasing. High minimum wage in the Philippines contributes to the deterioration of competitiveness in labor intensive manufacturing industry.

[149] For example, Gerals Sicat, an economist of PhilippineStar newspaper, proposes the creation of "special employment zone" that is not bound by the employment regulations and minimum wage rules of the Philippines in order to develop manufacturing and agricultural industries in Bangsamoro. In "special employment zone", regulations on regular employment, probationary period, and other rules on employee protection will be suspended.

Basic education, apprentice and vocational training programs require long time to improve the skills of employees. In-house capacity building training is more effective than basic education and technical training. In-house training provides opportunities to learn how to manage business and what it is like to become an entrepreneur. Meanwhile, it would not be practical to expect the government of Bangsamoro to develop and maintain programs for basic education, vocational training and learning project for corporate management. A new approach is needed.

The capacity building approach using real case studies based on the experience of a partner company is useful. Subsidizing business matching to catalyze the process of building partnership between private companies is one effective way of spending public funds, instead of providing training directly to the private company using public funds. In such a scenario, the expenses should be split between SME, the beneficiary, and the government. Such a scheme can expand easily and can reinforce various learning mechanisms. For example, this scheme is applicable not only for the learning at individual company level but also group learning among multiple companies.[150] Providing business matching services can contribute to R&D, technical transfer, market development and halal product development at company level and it is useful for employee training. Business matching services also provide small companies with opportunities to participate in the market.

JICA and other donors have been supporting SMEs with business capacity development including business matching. They are to apply what they have learnt and achieved to the framework of Bangsamoro industry development.[151] As each of the donors have their own expertise and know-hows, it is proposed to create an opportunity and venue for mutual learning as to what programs are suited to be applied to the development of Bangsamoro, by gathering all donors in one place.

Capacity development in the public sector

The public sector in Bangsamoro also needs capacity development. Government agencies' influence on private investment manifests through business risks, transaction cost, and business cost for the private sector. When public institutions have poor capacity and political activities for public arbitration increase in response to it, it becomes difficult for the private sector to engage in business activities with long-term vision in mind. Conversely, when public institutions have high capacity, risk can be mitigated through effects such as the following:

- The private sector is given confidence in conducting sustainable business knowing that the governance of public institutions is founded on stable policies and social justice.
- A healthy relationship can be built between the public sector and the private sector, which supports business activities, because the chance of bureaucratic arbitration/intervention is low.
- The terms of contracts become clear as legal framework is provided for the monitoring system that complements conflict/dispute resolution mechanism used between private entities.

Where the public sector operates under bureaucratic red tape, it is inevitable that the cost of doing business increases. When bureaucratic red tapes are rampant, the money to be paid to incompetent government officials increases. Increase in public arbitration function leads to the need for money to influence and mobilize bureaucrats and politicians. And as a result, that leads to political corruption. Supporting the development of private sector and confronting corruption is synonymous to removing overbearing control from the public institutions and directing them towards supporting the private sector development.

In this sense, what is important in order to give confidence to existing and/or new investors is to provide universality to their business norms. Therefore, new laws that could lead to the involvement of incompetent politicians and government officials shall not be allowed to be enacted easily. What is

[150] An example of such activity would be to strengthen the function of business group/association for it to be able to provide more technical and highly productive services.

[151] For example, in the World Bank Group, IFC which finances and provides advice for private sector ventures and projects, is developing agricultural industry from scratch in the Philippines. Through this initiative, IFC provides funds and demonstration effect that are necessary for creating broad-based value chain in the Philippines.

most important is to send the message regularly to the investors and make them understand, that the government of Bangsamoro recognizes the importance of private sector, and that the government is constantly exerting efforts to make people's lives easier.

Though simplifying the laws concerning business and employment reduces the pressure from the public sector, but that alone is not sufficient. It is necessary to recognize which part of the bureaucratic system is increasing the pressure to the private sector and that particular part needs to be improved. It is in such high-pressure areas that public sector's capacity will be demonstrated. Therefore, those are the areas where capacity development and technical support should be provided.

What is required in this process is to incorporate the institutional structures and procedures to the Bangsamoro government institutions. However, the right approach is not to start from the scratch. First, the systems that do not fit the new government shall be removed while the systems that could still function without change shall be migrated to the new government as they are. Other systems will be gradually transitioned to the new government as modifications are implemented. Although Bangsamoro leaders (datus) may not find such process comfortable, such approach has certain advantages because it enables smooth migration while avoiding isolation/separation of capabilities.

ARMM-BOI will be playing a very important role and therefore it needs to be given very strong support. Some suggest reforming the mission of R-BOI. However, based on JICA research delegation's observation, R-BOI is one of the very well-functioning organizations among many organizations in ARMM.

Before and after the transition to the new government, it is expected that different administrative organizations have different levels of capacity. Such capacity gap shall be grasped at the early stage of the transition. By doing so, necessary actions could be taken. Simplifying rules and procedures should be handled together with the capacity development. It requires skills of legal experts who have deep understanding of Muslim culture in order to undertake these initiatives and to support companies.

It will be difficult to have a good grasp of such capacity gap during the transition period. Therefore, BDA shall conduct gap analysis immediately after the transfer to the new government, identify what the lacking capacities are, and study measures to address the capacity gap. Possible measures could include newly hiring skilled talents, securing sponsorship from donors for capacity development of the existing talents, temporarily getting technical support from external organization.

(5) Government-private sector relationship

Building good relationships between the government and the private sector is an important agenda that affects business. It is recommended to establish Bangsamoro Business Advisory Council (BBAC), composed of national government, local government, business sector from central, regional and provincial level, and BBAC should periodically make recommendations concerning business systems and investment policies to the government of Bangsamoro.

This council is not a representative agency of the government of Bangsamoro, but it is a supplemental agency that connects the Bangsamoro government with local business groups such as the ARMM Business Council and the Muslim Business Forum and other industry groups in order for the government to establish relationship with these organizations.

National Competitiveness Council is connected with many regional organizations but it does not have any partner organization in Bangsamoro. The council therefore is considering to partnering with the council (i.e., BBAC). It makes sense to eventually expand the council's scope to include other relevant labor and industrial organizations and to enable more inclusive dialogue on business development.

Attachment to Section 3.4: Case Studies of Previous Investments

Case 1: La Frutera

Key Factor: Partnership with economically and politically influential figure

Company Name: La Frutera	(1) About the Company: Joint venture of major banana exporter Unifrutti and local property (land) owner company Paglas Corporation. Exports 44 million boxes of bananas annually to Japan, South Korea, Iran, and Middle East. (2) Place of Investment (Datu Paglas, Magindanao: 1,251 ha) (3) Year of Investment (1977 during the time when kidnapping and ambush were rampant) (4) Amount of Investment (US$27 million) (5) Nationalities of Investors (Philippines, Saudi Arabia, Israel, and Italy)	
	Success Factors	Description
	1. Relationship of mutual trust with the local leader	Having relationship of mutual trust with Datu Toto, the head of Paglas Corporation, has helped procuring land, safety measures, employee management, and earning of trust from the local community. Particularly in the procurement of lands, Datu Toto provided not only the land of his own but also the land of nearby farmers by making the best use of his influence.
	2. Isolated/Independent corporate management that enabled the employment in accordance with the Muslim culture possible	Imposing employment practices from different culture to local employees leads to instability. The company has implemented the following based on Muslim culture: (1) Allowed job sharing (*Sumpat*); (2) Respect Muslim belief (even when it is superstitious); and (3) Pay salaries in accordance with stability of the company and productivity of employees.
	3. Incentives to employees and lessor of the land	Employment style with the payment on a "per piece" basis is quite effective. With this style, La Frutera achieved higher productivity and that allowed the company to pay their employees higher than minimum wage. The company also provides incentives to its land lessors by giving away raffle prizes at special occasions, such as parties.
	4. Nurturing motivation among employees	Their employees have a chance to be promoted to managerial positions depending on their motivation. The company was able to raise the motivation of their employees while respecting the Muslim culture by using Paglas Corp. when notifying and enforcing punitive actions.
	5. Among company members, create a sense that they are all in the same boat	The contribution of Paglas Corporation is that they made investors, other local companies, and their employees share the sense that they are all members of the family who are in the same boat.

Case 2: Agumil Philippines Inc.

Key Factor: Funding/financing and disclosure of information

<table>
<tr><td rowspan="7">Company Name: Agumil Philippines Inc.</td><td colspan="2">(1) About the Company
- In the 1980s, Malaysian company Guthrie started palm oil plantation business in Mindanao. Agumil inherited their capital and expanded their business in Tacuron and Buluan since the early 2000s.
- Presently operating 26,000 ha oil palm plantation in Agusan del Sur, Sultan Kudarat, Magindanao, and Bohol
- The company owns seed and seedling facility in Kabacan, Cotabato, Tacurong, and Buluan.
(2) Place of Investment (Agusan del Sur, Sultan Kudarat, Magindanao, Bohol)
(3) Year of Investment (1980s–present)
(4) Amount of Investment (Cumulative total is unknown)
(5) Nationalities of Investors (Philippines and Malaysia)</td></tr>
<tr><td>Success Factors</td><td>Description</td></tr>
<tr><td>1. Owner (Mr. Chang) has adapted himself with the local community</td><td>He had adapted himself to the area and local residents by living together with his employees in the seed and seedling facility of Agumil.</td></tr>
<tr><td>2. Effective application of the tripartite contract of Land Bank</td><td>Aside from Innovative Financing Scheme of Land Bank, Agumil provided a direct loan with the interest rate of 14% (utilized On-lending Scheme of Land Bank) even to individual farmers who are not the member of the cooperative.</td></tr>
<tr><td>3. Established a cooperative by organizing recipients of direct loan. Built a system that can receive government support (Land Bank loan) easier.</td><td>Initially grouped 664 individuals into 9 cooperatives. Currently the number has increased to more than 30 cooperatives.</td></tr>
<tr><td>4. Escrow type of contract with oil palm farmers</td><td>Agumil receives loan from Land Bank and loan it to cooperatives. Cooperatives, on the other hand, pay back the interest to Land Bank while Agumil manages this repayment by the cooperatives and at the same time, purchases products. Agumil is serving as a sort of escrow.</td></tr>
<tr><td>5. Information Disclosure to Farmers</td><td>Oil extractors are usually hesitant in disclosing information because they want to keep the price lower. Agumil, however, discloses their purchase price and the international price as benchmark on a monthly basis in order to be transparent with farmers so that they can understand and accept the price.</td></tr>
</table>

Case 3: BJ Coconut Oil Mill

Key Factor: Business development in islands area

Company Name: BJ Coconut Oil Mill	(1) About the Company - The largest coconut oil milling company in Sulu. The only coconut oil mill facility in Sulu Islands with the coconut forest of approximately 40,000 ha. - Established in 1997, the company had 10 local employees from Sulu Islands with the legal minimum wage before they cease its operation in 2009 due to the impact of recession. - Negotiation with the potential partner is presently ongoing for the resumption of their business. (2) Place of Investment (Idanan, Sulu Islands) (3) Years of Investment (1997–2009) (4) Amount of Investment (Cumulative total is unknown) (5) Nationality of Investors (Philippines)	
	Success Factors	Description
	1. Reduced cost by having a power generator in islands area	The company was able to cut the cost of diesel fuel by PHP 2.00 per liter and was able to use the saved amount to adjust the purchase price of materials. However, it should be reminded that in islands area, biomass energy is still not profitable.
	2. In islands area, key staffs of engineering department should be hired from outside the island.	Finding and hiring good engineering personnel in islands area is difficult. It is necessary to provide attractive offers and good HR management in order to retain them in the workplace in the island.
	3. Importance of having a partner who can exercise influence	In islands area, it is necessary to partner with someone who can support you in assuring the sustainable right to use the land and maintaining the morale of employees.
	4. Pay respect to the unique culture	For example, never assign an employee under any employee whose cultural position is lower than him/her.
	5. Utilize the government support	Should leverage/utilize government schemes that give favorable treatment to investment to a certain regions as well as investment incentives. The support from the government for the dispute resolution must be utilized as well.
	6. Utilize every possible resources	In order to cut down the cost of energy, the company took various measures, such as utilizing the vacant space in the barter ship and using free coconut shells and abaca as the energy source.

Case 4: Matling Industrial and Commercial Corp. (MICC)

Key Factor: Fairness and justice based on a devout faith in Christianity

<table>
<tr><td rowspan="6">Company Name: Matling Industrial and Commercial Corp. (MICC)</td><td colspan="2">(1) About the Company
- Foundation of its business is a coconut plantation in Malabang that was founded by Spencer Family who had migrated from U.S. At present, the company has grown into a prominent plantation enterprise that owns a total of 3,000 ha nationwide. The company is also famous as a top-class starch manufacturer.
- While maintaining a good relationship with local ARC and barangays, the company is managing their employees with strict rules and regulations--a style that is quite different from that of La Frutera in <Case 1> above. It has a firm attitude to fight against ambush and kidnapping by organizing its own private army.
- Such activities are supported by the devout faith of the founder in Christianity.
(2) Place of Investment (Malabang, Lanao del Sur)
(3) Years of Investment (Since the establishment of the company in 1928)
(4) Amount of Investment (Cumulative total is unknown)
(5) Nationality of Investors (Philippines with founder, an immigrant from U.S., descendant of the Thomasites)</td></tr>
<tr><td>Success Factors</td><td>Description</td></tr>
<tr><td>1. Company's stance to provide business opportunities to the local community</td><td>Advised local farmers to purchase trucks, then the company outsourced their transportation business to the buyers of the trucks. Such activities provided business opportunities to the local economy.</td></tr>
<tr><td>2. Pay respect to local ARC and farmers who are not members of cooperative</td><td>Promoted the trust relationship with the local community while directly/indirectly trained ARC and farmers who did not belong to any cooperative. ARCs trained by them have become prominent income earners in their province.
For example, the company offers the preparation for cassava plantation (provision of farming materials) at a price lower than the regular price even to farmers who are not the member of any cooperative. The company also supports farmers who wish to expand their business by leasing company-owned lands.</td></tr>
<tr><td>3. Strong local cooperative organized by ARC</td><td>Cooperative provides support to lower the burden of initial investment of the farmers. Production materials are first provided to the farmer by the cooperative and the cost of the materials are paid (back to the cooperative) by adjusting the proportion of revenue sharing. This cooperative is also known for full payment of loan from the Land Bank and high profitability. MICC being able to keep the common pace with this cooperative has led both of them to success.</td></tr>
<tr><td>4. Determination to carry out justice</td><td>The company firmly stands for justice, no matter how powerful the pressure is (this is the major difference between this company and La Frutera) and has a firm attitude to fight the evil. Devout faith to Christianity is behind it.</td></tr>
</table>

Case 5: EA Trilink Corp.

Key Factor: Business development that follows current trends

<table>
<tr><td rowspan="6">Company Name: EA Trilink Corp.</td><td colspan="2">(1) About the Company
- As the commitment of the Philippines to BIMP-EAGA economic corridor with Malaysia and Indonesia gets stronger, the role telecommunication sector plays is becoming more important.
- The company was established in 1996 as a joint venture with Malaysia. They have been taking various business opportunities inside and outside the Philippines as ARMM became safer and economic corridor shaped up.
- As of present, the company has four business domains: (1) international gateway facility (IGF), (2) information and communication technology (ICT), (3) broadband, and (4) wireless landline.
- The company has started a full-scale investment from 2012 onward. As for the broadband service, the company is aiming to have franchises in the entire ARMM region (targeting to have one franchise in every 2,400 villages) under E-Kiosk project.
(2) Place of Investment (ARMM and its vicinity, Cebu and Manila as information hub, and beneficiary areas of BIMP-EAGA such as Brunei)
(3) Years of Investment (Since the establishment of the company in 1996)
(4) Amount of Investment (Cumulative total is unknown)
(5) Nationalities of Investors (Philippines and Malaysia; current capital shares 60% Philippines and 40% other foreign countries)</td></tr>
<tr><td>Success Factors</td><td>Description</td></tr>
<tr><td>1. Advantages and disadvantages of the cooperation with BIMP-EAGA economic corridor project</td><td>An advantage is that it can get the commitment from the government and therefore, the reliability of the business increases. A disadvantage, on the other hand, is that the decision making takes time since the agreement from other countries is necessary.</td></tr>
<tr><td>2. A government official is the founder and shareholder of the company. The company can seek for better business opportunity by making the best use of his/her network.</td><td>Since the company has better foresight about the telecommunication industry/business and also is well-communicating with the governor, they were able to establish both company and business areas within the region smoothly. It also seems that they were able to take advantage of the same factors in knowing the moves of government agencies concerning the economic corridor as well as in negotiating with foreign governments.
There was once a movement to invite a competing investment in order to prevent a monopoly but then the competing investor had given up on entering the market. There is a possibility that it was the company's advantageous shareholder composition that created entry barrier for the competing investors.</td></tr>
<tr><td>3. Advantageous shareholder composition</td><td>Initially, the company was equal joint venture of Malaysia and the Philippines. However, the Philippine eventually increased its stake to 60 (Philippine capital):40 (foreign capital).</td></tr>
<tr><td>4. Timing with foreign and domestic policies of the Philippine government</td><td>The company was able to expand their business at the right time. Factors such as the active involvement of the Philippine government in the economic corridor, peace talk with MILF, and Bangsamoro autonomous government’s desire to have their own telecommunication company in the region, worked positively.</td></tr>
</table>

Case 6: Air 21–Malawi City

Key Factor: Start small then expand business as you gain trust

<table>
<tr><td rowspan="7">Company Name: Air 2100/Fedex–Malawi City</td><td colspan="2">(1) Introduction
- Delivery business started by Mr. Elian Malaca, who was successful in agriculture, aiming to revitalize the economy of Malawi City
- Large players such as LBP and FedEx seemed shrinking their business in ARMM.
- Mr. Elwin started as local delivery outlet of FedEx.
- Later, while large players continued shrinking, his company dominated the entire ARMM market.
- As Mr. Elwin's name became widely known, fear emerged among local politicians with speculation that Mr. Elwin might become a politician. And then he started experiencing disturbance to his business. Datu Toto who also supported La Frutela became his partner. He served as guarantor of local recipients and shippers. Datu Toto played a role in curbing the opposition elements.
(2) Place of Investment (Marawi City)
(3) Year of Investment (Dec. 2002)
(4) Amount Invested (Total amount is unknown)
(5) Nationalities of Investors (ARMM)</td></tr>
<tr><td>Success Factors</td><td>Description</td></tr>
<tr><td>1. Partnership with a local leader (influential person)</td><td>Datu Toto Pagras supported the business. (Same person as the case of La Frutela). Datu certified the identity of shippers and recipients because most of them did not have any ID.</td></tr>
<tr><td>2. Deep understanding of the local residents' needs and business challenges.</td><td>LBP was in the market ahead of Air 21. But they were very strict about checking identification (ID) of the customers. Because of that, they could not capture the potential customers enough. Hiring employees was difficult because the work of messenger performed by delivery service is seen as a job of very low status in Muslim culture. The company hires Christian employees as messengers.</td></tr>
<tr><td>3. Employee management know-how</td><td>Paid bonus at Ramadan time instead of Christmas time because Muslims do not celebrate Christmas.
Base salary was kept at low level but implemented systems that allow employees to borrow from company upon emergency, adjusting the local culture.</td></tr>
<tr><td>4. DTI ARMM as Contact Point</td><td>Local chamber of commerce is not always well organized. Many have gone out of control. ARMM Business Council is expected to demonstrate its administrative capacity and it is desirable they lead the chambers of commerce but they have not progressed that far yet.</td></tr>
<tr><td>5. Start Small and Expand as You Gain Trust</td><td>Cases of operating small businesses in diverse fields have more successes.</td></tr>
</table>

CHAPTER 4 EXISTING CONDITIONS AND DEVELOPMENT ISSUES OF LOGISTIC INFRASTRUCTURE IN BANGSAMORO

4.1 Road Network

4.1.1 Existing conditions of road sector

(1) Road administration

Road administration system in the Philippines

Administration of roads in the Philippines is classified into five categories such: National Road, Provincial Road, City Road, Municipal Road and Barangay Road as shown in Table 4.1. National roads are administered by DPWH-National, while national roads within the territory of ARMM are administered by DPWH-ARMM whose legal basis are RA 9054 (Organic Act) and other existing laws (e.g., Executive Order No. 426 dated 12 October 1990).

Table 4.1 Administrative Road Classification

Classification	Responsible Agency
National Road	DPWH-National (except ARMM) DPWH-ARMM (within ARMM)
Provincial Road	Provincial Government
City Road	City Government
Municipal Road	Municipal Government
Barangay Road	City/Municipal Government

Source: The Study on Infrastructure (Road Network) Development Plan for the ARMM, JICA, 2010.

Functional road classification

The functional road classification of the Country's national road was re-classified by DPWH in November 2014 through Department Order No. 119 (D.O. No. 119). Under this new functional classification, national roads are classified into three: Primary Road, Secondary Road and Tertiary Road (Figure 4.1 and Figure 4.2). Likewise, National Route Numbering System (RNS) was introduced to simplify and rationalized navigation along the network.

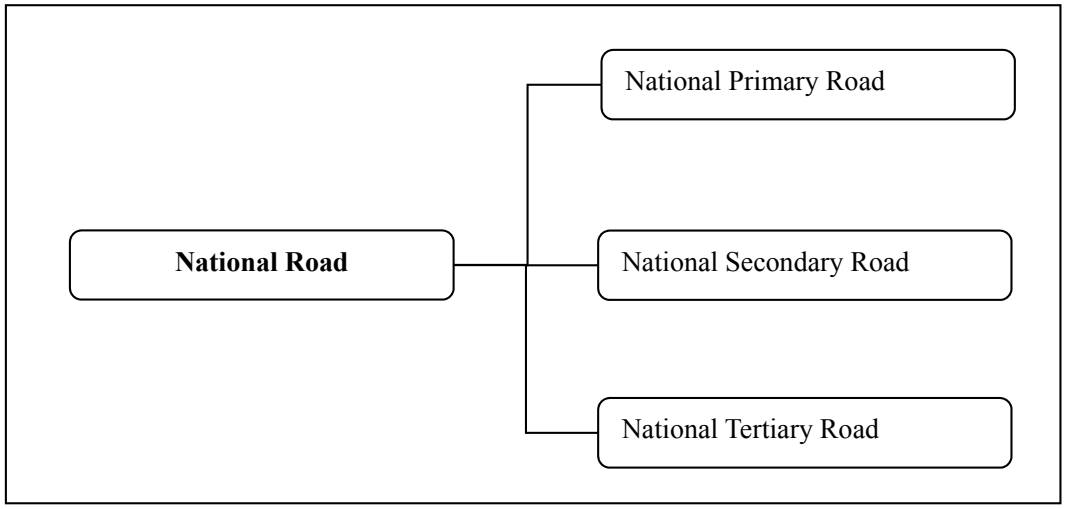


Figure 4.1 Functional Road Classification

Source: Road Numbering System, DPWH, 2014 (www.dpwh.gov.ph).

Figure 4.2 Functional Road Classification of Mindanao by DPWH

(2) Road development agencies in Bangsamoro

Currently, DPWH-ARMM is responsible for highways, flood control and water resource development systems, and other public works within Bangsamoro. The powers and responsibilities of ARMM pertaining to infrastructure programs and projects within the Bangsamoro territory may be gleaned from the provisions of RA 9054 (Organic Act) as well as other existing laws, including Executive Orders (EO) No. 426, dated 12 October 1990, EO 125, dated 16 September 2002, and EO 125-A, dated 29 November 2002, of the President of the Philippines, and the Local Government Code (LGC). These powers and responsibilities are exercised by DPWH-ARMM headed by the Department Secretary under the supervision of the Regional Governor.

Pursuant to EO 426, DPWH-ARMM performs the following responsibilities.

1) Undertake and evaluate the planning, design, construction and works supervision for the infrastructure projects whose location and impact are confined within ARMM.
2) Undertake the maintenance of infrastructure facilities within ARMM and supervise the maintenance of such local roads and other infrastructure receiving financial assistance from the national government.
3) Ensure the implementation of laws, policies, programs, rules and regulations regarding infrastructure projects as well as all public and private physical structures within ARMM.
4) Provide technical assistance related to their functions to other agencies within ARMM, especially LGUs.
5) Coordinate with other National and Regional Government departments, agencies, institutions, and organizations, especially LGUs within ARMM in the planning and implementation of infrastructure projects.

6) Conduct continuing consultations with the local communities, take appropriate measures to make the infrastructure services of the Regional Government responsive to the needs of the general public and recommend such appropriate actions as may be necessary.
7) Perform such other related duties and responsibilities within ARMM as may be assigned or delegated by the Regional Governor or as may be provided by law.

DPWH-ARMM is headed by a Regional Secretary appointed by the ARMM Governor. The Office of the Regional Secretary is composed of the Secretary and Assistant Regional Secretaries. They are supported by field offices, particularly the eight District Engineering Offices (DEOs), each headed by a District Engineer who reports directly to the Secretary, as follows: Lanao del Sur I, Lanao del Sur II, Maguindanao I, Maguindanao II, Sulu I, Sulu II, Tawi-Tawi and Basilan.

Attached to the DEOs are four Area Equipment Services (AESs) as follows:

1) Lanao del Sur Area Equipment Services (shared by Lanao I and Lanao II),
2) Maguindanao Area Equipment Services (shared by Maguindanao I and Maguindanao II),
3) Sulu Area Equipment Services (shared by Sulu I and Sulu II), and
4) Tawi-Tawi Area Equipment Services.

(3) Road development programs

Budgetary framework

In recent years, the budget for infrastructure in the Bangsamoro region has increased substantially. For instance, infrastructure budget in 2012 was about PHP 1.09 billion but this amount increased by 38% in 2013 to the amount of PHP 1.5 billion and by 97% in 2014 to the amount of PHP 2.97 billion. This upward trend in infrastructure budget continued and in 2015, the biggest increase was observed in the amount of PHP 10.08 billion which represent 239% increase compared to the previous year (Table 4.2). Overall, DPWH-ARMM is implementing projects worth of PHP 10.13 billion after inclusion of PHP 51.5 million road projects in support to peace by OPAPP.

Table 4.2 DPWH-ARMM Budget (2012–15)

Unit: PHP '000

Summary	2012[a]	2013[a]	2014[a]	2015[b]
A. Personal Services (PS)	105,159	198,293	194,256	
B. Maintenance and other operating expenditures (MOOE)	176,712	275,380	317,289	
C. Capital outlays (regular infra.)	1,096,630	1,510,181	2,971,000	10,083,000
Total DPWH-ARMM budget	1,478,501	1,983,854	3,482,545	10,083,000
PAMANA (Roads to Peace)[d]			2,052,400	51,500[c]
Total	1,478,501	1,983,854	5,534,945	10,134,500

Sources: [a] Presentation by DPWH-ARMM Sec. Emil Sadain on 3 September 2014; [b] DPWH-ARMM Infrastructure Projects (CY 2015), National Expenditure Program, DPWH-ARMM; [c] National Expenditure Program FY 2015 by DBM; [d] National government program by OPAPP to extend intervention to isolated, hard-to-reach, and conflict-affected communities managed.

Priority investment programs

Priority projects of DPWH-ARMM in 2014 are shown in Table 4.3. Bulk of the infrastructure budget is allocated to development of local roads sharing 65.4% of the total allocation. Funds dedicated for development of ports, water supply and drainage/canal combined for 26.7%. Aside from regular infrastructure program of DPWH-ARMM, OPAPP is also implementing numerous local road projects in support of the peace process amounting to about PHP 2.0 billion.

For the 2015 budget, of the PHP 10.03 billion fund allocated for infrastructure, PHP 8.10 billion is allocated to road network improvement which represents 80% of the budget Distribution of infrastructure budget among the five provinces revealed that Basilan Province has the highest share at 31% and followed by Sulu Province with a share of 24%. Bulk of the budget for road infrastructure (62.7%) is dedicated to road surface upgrading from gravel/earth to concrete pavement of major roads

(i.e., national road and provincial road) as presented in Table 4.4.

Table 4.3 Summary of DPWH-ARMM Priority Investment Programs/Projects (2014)

	2014					
	ARMM budget for infrastructures			OPAPP projects (Roads to Peace)		
Infrastructure	Projects (n)	Length (km)	Amount (PHP 10^6)	Projects (n)	Length (km)	Amount (PHP 10^6)
National roads (repair/rehab/reblocking)	18	14.923	241.299 (8.1%)	-	-	-
Local roads	107	179.55	1,944.10 (65.4%)	34	205.24	2,052.40
Provincial						
Municipality/brgy.						
Bridges	13	-	124.42 (4.2%)	-	-	-
Ports	17	-	288.52 (9.7%)	-	-	-
Water supply	30	-	264.07 (8.9%)	-	-	-
Drainage/canal improvements	12	-	59.01 (2.0%)	-	-	-
Other structures	9	-	49.581 (1.7%)	-	-	-
Total	206	226.04	2,971.00 (100%)	34	205.24	2,052.40

Source: 2013 DPW-ARMM Accomplishment Report, Presentation of Sec. Emil Sadain during 11th Expanded Cabinet Meeting, Dec. 21–22, 2013, Waterfront Hotel, Davao City.

Table 4.4 Details of DPWH-ARMM Road Projects (2015)

	Major roads			Local roads			Bridges	
Province	Projects (n)	km	PHP 10^6	Projects (n)	km	PHP 10^6	Projects (n)	PHP 10^6
Basilan	10	64.58	1,123.60	36	76.60	966.95	4	80.00
Sulu	42	84.67	1,587.93	30	41.99	340.49	1	30.00
Tawi-Tawi	17	21.95	438.99	24	26.70	376.41	19	127.00
Maguindanao	29	64.88	1,207.12	18	41.61	445.12	2	97.20
Lanao del Sur	31	38.69	721.16	35	43.64	480.40	7	84.00
Total	129	274.76	5,078.80	143	230.55	2,609.37	33	418.20

Source: DPWH-ARMM Infrastructure Projects (CY 2015), National Expenditure Program, DPWH-ARMM.

(4) New road development initiatives by DPWH-ARMM

DPWH-ARMM has launched several programs aimed to facilitate rapid improvement of the road network in Bangsamoro.

Rapid Infrastructure Development Assistance (RIDA) for ARMM

The Rapid Infrastructure Development Assistance for ARMM aims at 1) rapid and inclusive growth, zero backlog on ARMM infrastructure, and quality infrastructures and services. In improving the roads of ARMM, the targets are as follows:

1) National road: The target of DPWH-ARMM is 100% fully paved national roads by 2015; of the total 992.87 km of national roads, only 179.67 km are not yet paved.
2) Provincial road: The target in 2015 is that at least 54.3% of the roads will be funded for upgrading; the next target is 100% paved provincial roads by 2016 and beyond; of 1,343.95 km, only 277.77 km are paved and the remaining 79% are not yet paved.
3) Municipal road: The target in 2015 is that 45.8% of the municipal road will be funded for upgrading; the next target is to pave 1005 of the road by 2016 and beyond; currently, of the 2,100 km road, only 420 km is paved leaving about 1,680 km of road unpaved.

Expanded ARMM roads mapping and management system (e-ARMM system)

The e-ARMM System is a database system containing all roads information (national, provincial and local) in ARMM, their connectivity and conditions (i.e. pavement type) and other infrastructure facilities within the ARMM.

Creation of Information and Communication Technology (ICT) Division

On the institutional side, the proposal by DPWH-ARMM to create Information and Communication

Technology (ICT) Division was approved by the Department of Budget and Management (DBM) on 25 July 2014. The ICT Division with 19 technical personnel is geared towards upgrading the systems and enhancement of the operations of the existing management information service (MIS) to cover wider supervision of areas in the field of engineering and management information technology.

(5) Road network of Bangsamoro

Road length and road density

The Bangsamoro region has a total national road length of 891 km in 2007 and increased to 993 km in 2013 which represents about 3% of the total national road. It is the only region in the Country where its national road is less than 1,000 km. In terms of road density which was calculated supply of road taking into account land area and population, the region has the lowest road density (0.10) of the 17 regions and way below the Mindanao average (0.17) and not even half of the National average (0.25). A new road length of 800 km is necessary for Bangsamoro to achieve the Mindanao average. Table 4.5 presents the road density of the Country by region.

Table 4.5 National Road Length and Road Density per Region

Region		Population (10^3, 2010)	Land area (km^2)	Road length (km)			Road density	
				2007	2013	Difference (2013-2007)	2007	2010
Philippines (DPWH-National)		92,338	309,771	29,370	42,621	13,251	0.18	0.25
Luzon	NCR	11,856	620	1,032	1,141	109	0.39	0.42
	CAR	1,617	19,422	1,846	2,185	339	0.34	0.39
	Region I	4,748	13,013	1,610	1,655	45	0.21	0.21
	Region II	3,229	28,229	1,765	1,890	125	0.19	0.20
	Region III	10,138	22,015	2,032	2,343	311	0.14	0.16
	Region IV-A	12,610	16,873	2,404	2,462	58	0.17	0.17
	Region IV-B	2,745	29,621	2,185	2,285	100	0.25	0.25
	Region V	5,420	18,156	2,197	2,344	147	0.23	0.24
Visayas	Region VI	7,102	20,794	2,880	2,990	110	0.24	0.25
	Region VII	6,800	15,886	2,036	2,294	258	0.20	0.22
	Region VIII	4,101	23,251	2,372	2,511	139	0.25	0.26
Mindanao (average)		21,968	135,402	7,900	9,261	1,361	0.14	0.17
Mindanao	Region IX	3,407	17,047	1,218	1,622	404	0.16	0.21
	Region X	4,297	20,496	1,682	1,923	241	0.19	0.20
	Region XI	4,469	20,357	1,447	1,668	221	0.16	0.17
	Region XII	4,110	22,513	1,304	1,541	237	0.14	0.16
	Region XIII	2,429	21,478	1,358	1,514	156	0.19	0.21
	ARMM (DPWH-ARMM)	3,256	33,511	891	993	102	0.08	0.10

Note 1: Data for Luzon and Visayas is as of 11/9/2013; Data for Mindanao is as of 03 December 2013.

Source: DPWH Atlas, 2013 for road data and Philippine Statistics Authority for population.

Note 2:

$$\text{Road Density} = \frac{L}{\sqrt{P \times A}}$$

L : Road Length (km)
P : Population in 1,000
A : Land Area in sq. km

Pavement ratio

Pavement ratio of national roads by region is presented in Table 4.6. ARMM's national road paved ratio increased from 76.8% in 2007 to 81.9% in 2013. This means that a stretch of 50.6 km of national road in the ARMM was recently paved thus increasing the length of paved national road from 762.3 km in 2007 to 813.0 km in 2013. It should be noted however that this pavement ratio is still below the national average of 83%.

A further closer look at the ARMM's road data as shown in Figure 4.3 yields the following (Table 4.7):

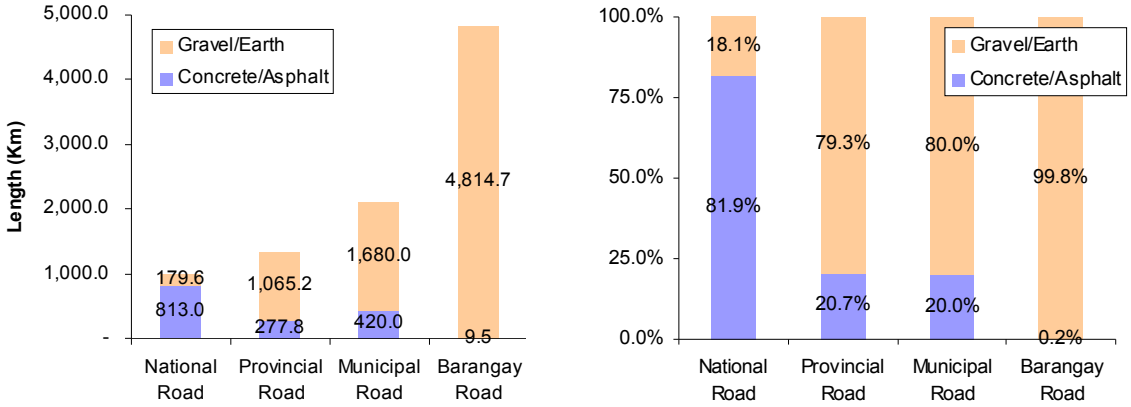
- National road: most roads are surfaced with concrete (81%) and only 18% are surfaced with gravel and earth which represents about 180 km.
- Provincial road: only 21% have concrete and asphalt surface and the remaining 79% have

gravel and earth surface which corresponds to 1,680 km.
- Municipal road: only 20% have concrete/asphalt surface and the rest which is about 1,680 have gravel/earth surface.
- Barangay roads/farm-to-market road: only 0.2% have concrete/asphalt surface and the remaining 4,814 km have gravel/earth surface.

Table 4.6 Pavement Ratio of National Road per Region

Region		Total (km)	Paved (km)	Unpaved (km)	Pavement ratio (%)	
					2007	2013
Philippines (DPWH-National)		33,219.5	27,585.9	5,633.6	71.5	83.0
Luzon	NCR	1,140.9	1,140.9	-	100.0	100.0
	CAR	2,184.8	1,304.5	880.3	35.7	59.7
	Region I	1,655.5	1,595.0	60.4	90.0	96.4
	Region II	1,889.5	1,578.9	310.7	69.5	83.6
	Region III	2,343.3	2,207.8	135.5	87.2	94.2
	Region IV-A	2,462.0	2,276.4	185.5	85.8	92.5
	Region IV-B	2,285.1	1,590.6	694.5	46.1	69.6
	Region V	2,344.1	2,047.4	296.7	72.2	87.3
Visayas	Region VI	2,989.9	2,736.0	253.9	75.6	91.5
	Region VII	2,293.6	2,095.3	198.4	85.7	91.4
	Region VIII	2,510.6	2,291.9	218.7	81.3	91.3
Mindanao	Region IX	1,567.5	1,088.0	479.6	68.6	69.4
	Region X	1,898.3	1,416.2	482.1	69.6	74.6
	Region XI	1,662.4	1,185.9	476.5	62.9	71.3
	Region XII	1,521.3	1,093.2	428.1	62.4	71.9
	Region XIII	1,478.4	1,125.1	353.3	46.3	76.1
	ARMM (DPWH-ARMM)	992.6	813.0	179.6	76.8	81.9

Source: DPWH Atlas, 2013 except data from ARMM which was obtained from DPWH-ARMM.



Source: DPWH-ARMM, 2014 except with barangay data which was culled from ARMM Regional Development Plan Medium Term Update, 2013.

Figure 4.3 ARMM's Road Type, Road Length, and Pavement Type

Table 4.7 Pavement Surface of ARMM's roads

Level	Concrete	Asphalt	Gravel & earth	Total (km)
National Road (km)	802.62	10.35	179.62	992.59
	81%	1%	18%	100%
Provincial Road (km)	277.52	0.25	1,065.18	1,342.95
	21%	0%	79%	100%
Municipal Road (km)	420	-	1,680.00	2,100.00
	20%	-	80%	100%
*Barangay Road (km)	9.51	-	4814.72	4,824.23
	0.2%		99.8%	100.0%

Level	Concrete	Asphalt	Gravel & earth	Total (km)
Total	1,509.65	10.60	7,739.52	9,259.77
	16.3%	0.1%	83.6%	100%

Source: DPWH-ARMM, 2014 except with * where data was taken from ARMM Regional Development Plan Medium Term Update, 2013.

By disaggregating further the data by provincial level, the following characterized the road network of Bangsamoro (Tables 4.8 and 4.9; Figures 4.4 and 4.5).

1) Lanao del Sur has the longest national road with a total of 306.53 km. Of these, only 14% has a surface of either earth or gravel. Provincial roads of this province have a total length of 396.34 km of which only 42% is unpaved.
2) Maguindanao has the second longest national road with a total of 282.26 km. Of these, only 6% is unpaved. Provincial roads of Maguindanao have different picture however where 90% of the 427.55 km provincial road is still unpaved.
3) Basilan has the third longest national road with a total of 153.87 km. Of these, only 18% is not yet paved. Provincial roads of Basilan are however close to the situation of Maguindanao where 89% of 172.65 km provincial road is still surfaced with gravel or earth.
4) Sulu has a total of 135.12 km of national road of which only 20% is still surfaced with gravel or earth. Provincial roads of Sulu however are mostly surfaced with earth/gravel accounting to almost 200 km. Paved provincial road has length of just about 16 km.
5) Tawi-Tawi has a total of 115.10 km of national road of which only 46% is paved and the rest is still surfaced with gravel or earth. This province has the longest national road in gravel/earth.

Table 4.8 Pavement Type of ARMM's National Road per Province

No.	Province	Roads			Bridges		Total roads & bridges (km)
		Paved (km)	Unpaved (km)	Total (km)	Number	Length (km)	
1	Basilan	125.87	28	153.87	35	1.02	154.89
		82%	18%	100%			
2	Sulu	107.5	27.62	135.12	29	0.24	135.36
		80%	20%	100%			
3	Tawi-Tawi	52.64	62.46	115.1	10	0.4	115.5
		46%	54%	100%			
4	Maguindanao	264.6	17.66	282.26	58	2.62	284.88
		94%	6%	100%			
5	Lanao del Sur	262.59	43.92	306.52	78	2.44	308.96
		86%	14%	100%			
Total		813.2	179.66	992.87	210	6.72	999.59
		82%	18%	100%			

Source: DPWH-ARMM, 2014.

Table 4.9 Pavement Type of ARMM's Provincial Road per Province

No.	Province	Roads			
		Paved (km)	Unpaved (km)	Total (km)	Proposed new (km)
1	Basilan	18.35	154.3	172.65	58.9
		11%	89%	100%	
2	Sulu	16.1	200.3	216.4	-
		7%	93%	100%	
3	Tawi-Tawi	19.5	110.51	130.01	82.8
		15%	85%	100%	
4	Maguindanao	44.12	383.43	427.55	108.8
		10%	90%	100%	
5	Lanao del Sur	230.94	165.4	396.34	-
		58%	42%	100%	
Total		329.01	1013.94	1342.95	250.5
		24%	76%	100%	

Source: DPWH-ARMM, 2014.

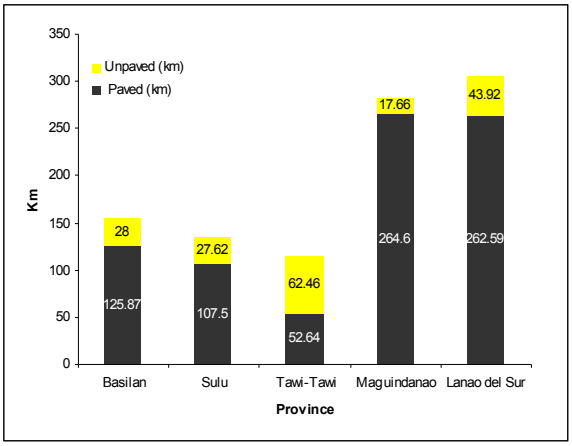


Figure 4.4 Pavement Types of National Roads within ARMM

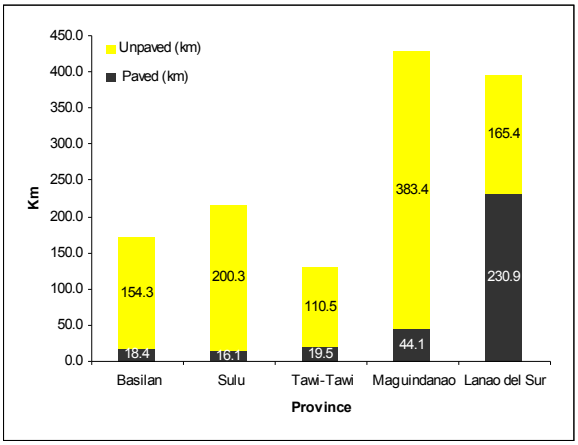


Figure 4.5 Pavement Types of Provincial Roads within ARMM

Road conditions

A road surface condition survey was undertaken by the JICA Study Team from February to October 2015 using the Dynamic Response Intelligent Monitoring System (DRIMS) to measure International Roughness Index (IRI). DRIMS was developed by the Bridge and Structures Laboratory at the University of Tokyo and this was the first time the equipment was utilized in the Philippines. The equipment gives estimated IRI of roads as a result of measuring and calculating acceleration according to vehicle motion.

The survey results indicate that the length of national roads in bad condition requiring immediate intervention is about 180 km, representing 20.7% of the total length of the national roads (Table 4.10). The length of those in poor condition is 281.45 km, and those in good and fair condition represent 47.2% of the network, corresponding to 412.60 km. Maps showing the IRI value of the national road network are presented in Figure 4.6 (1/2) for the mainland provinces and Figure 4.6 (2/2) for the island provinces.

Table 4.10 Condition of Paved National Roads

	Rating	Good	Fair	Poor	Bad	Total (km)
	IRI range	3<IRI	3<IRI<5	5<IRI<7	7>IRI	
Mainland	Maguindanao (km)	5.35	73.75	104.20	106.99	290.29
	Lanao del Sur (km)	41.15	131.35	76.85	32.50	281.85
	Subtotal (km)	46.5	205.1	181.05	139.49	572.14
	(%)	8.1	35.8	31.6	24.4	100.0
Island	Basilan (km)	14.90	73.95	41.50	16.10	146.45
	Sulu (km)	3.15	57.55	44.55	13.45	118.70
	Tawi-Tawi (km)	0.55	10.90	14.35	11.60	37.40
	Subtotal (km)	18.60	142.40	100.40	41.15	302.55
	(%)	6.1	47.1	33.2	13.6	100.0
	Total (km)	65.10	347.50	281.45	180.64	874.69
	(%)	7.4	39.7	32.2	20.7	100.0

Note: IRI = International Roughness Index

Source: JICA Study Team.

Paved provincial roads in good and fair condition in the region are quite limited, just 84.60 km representing about 23% of the total length of paved provincial roads. Lack of maintenance of these roads has led to the poor condition of a large section of provincial roads, of which more than half of the network is in bad condition as indicated in Table 4.11. This is significantly high compared to the national roads in bad condition that represent just 20% of the network. Maps showing IRI values of the provincial road network are presented in Figure 4.7 (1/2) for the mainland provinces and Figure 4.7 (2/2) for the island provinces.

Table 4.11 Condition of Paved Provincial Roads

	Rating	Good	Fair	Poor	Bad	Total (km)
	IRI Range	3<IRI	3<IRI<5	5<IRI<7	7>IRI	
Mainland	Maguindanao (km)	0.70	38.70	44.00	25.80	109.20
	Lanao del Sur (km)	-	6.40	24.30	120.20	150.90
	Subtotal (km)	0.70	45.10	68.30	146.00	260.10
	(%)	0.3	17.3	26.3	56.1	100.0
Island	Basilan (km)	1.00	9.20	10.60	15.30	36.10
	Sulu (km)	4.20	21.90	11.50	11.90	49.50
	Tawi-Tawi (km)	-	2.50	5.40	11.20	19.10
	Subtotal (km)	5.20	33.60	27.50	38.40	104.70
	(%)	5.0	32.1	26.3	36.7	100.0
	Total (km)	5.90	78.70	95.80	184.40	364.80
	(%)	1.6	21.6	26.3	50.5	100.0

Note: IRI = International Roughness Index

Source: JICA Study Team.

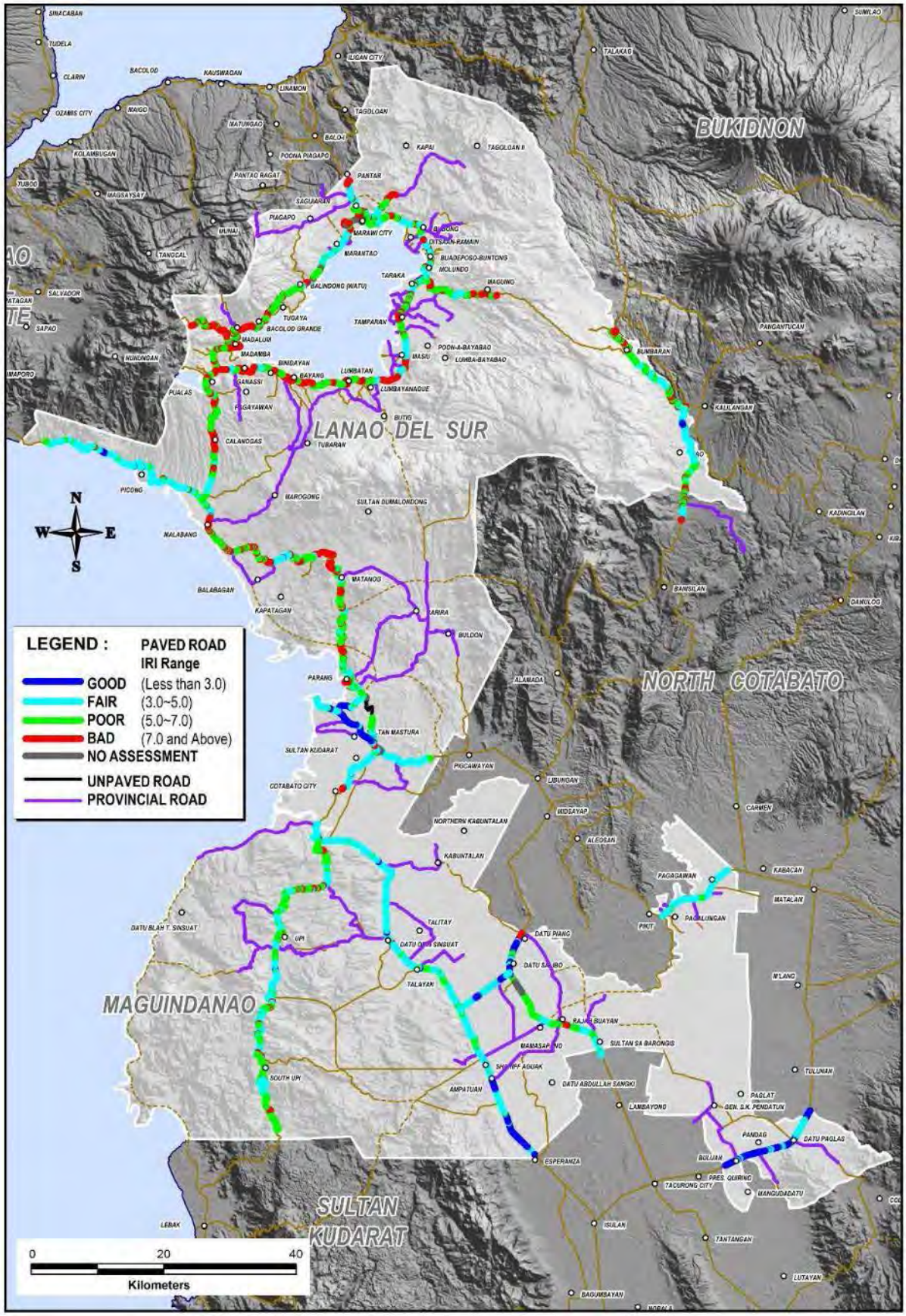
Missing links in road network

The JICA-assisted study, Infrastructure (Road Network) Development Plan for the ARMM, identified five missing links and six new roads as critical sections to complete the primary and secondary road network of Bangsamoro (Table 4.12). The lack of these roads affect accessibility to large area of the region and people are forced to take a long detour. Hence, there are many areas with accessibility problems in Bangsamoro. Another notable information derived from Figure 4.8 is the high presence of missing links inside the Bangsamoro region compared to the neighboring regions.

Table 4.12 Missing Link Roads and Their Lengths

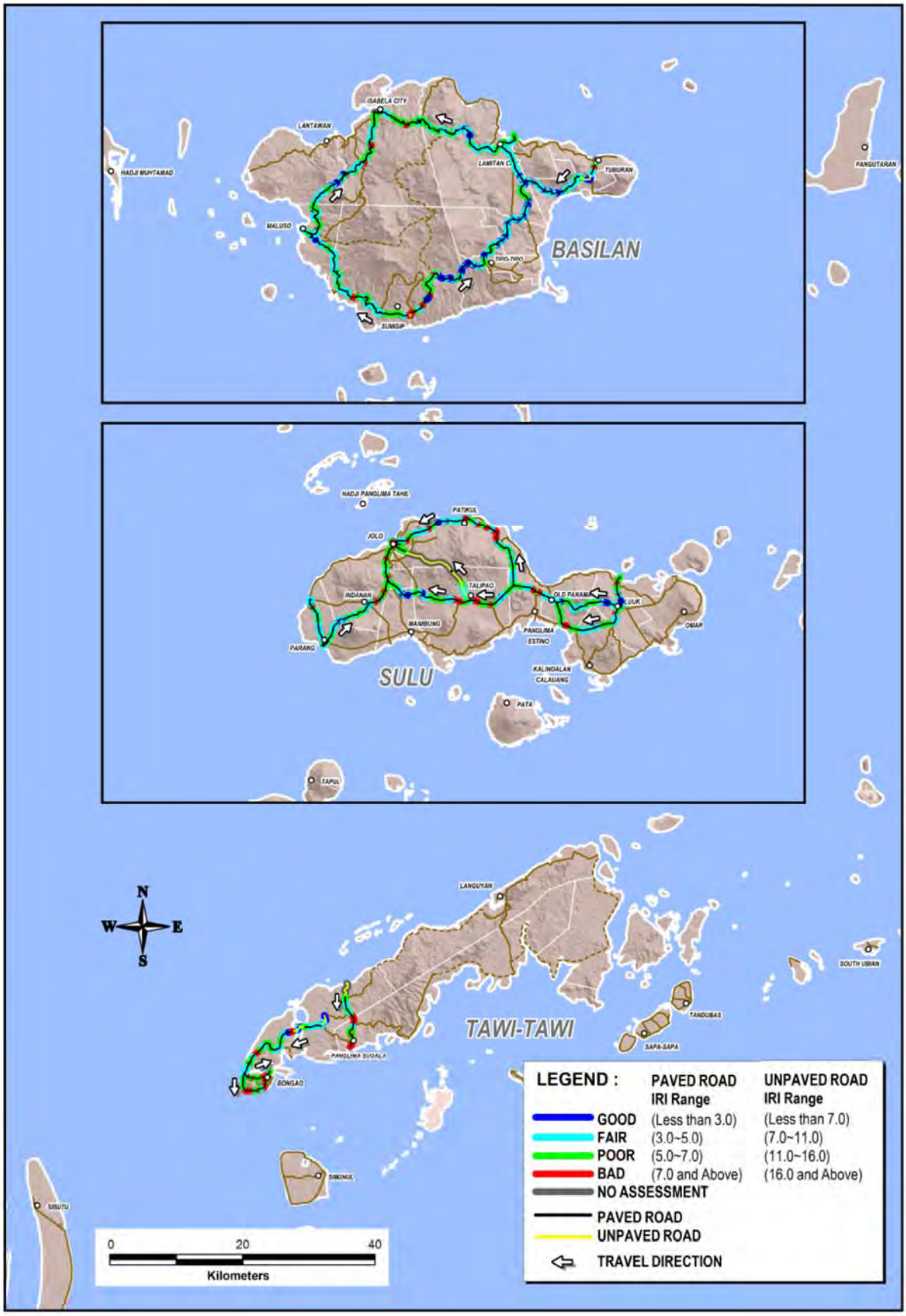
Road name	Length (km)	Road Class
Missing Links		
1. Molundo–Wao Road	30.4	Regional Primary Road
2. SK Border–Butig–Lumbayanague Road	25.0	Regional Primary Road
3. Malabang–Marogong–Tubaran–Bayang Road	25.0	Regional Secondary Road
4. Tapian–Lebak Road	50.0	Regional Secondary Road
5. Maganoy–Lebak Road	25.0	Regional Primary Road
Total	155.4	
New Road (Mainland)		
1. Parang–Balabagan Road	30.0	Regional Secondary Road
2. Matanog–Alamada Road (Matanog–Buldon section)	20.0	Regional Primary Road
3. Matanog–Alamada Road (Buldon–Alamada section)	15.0	Regional Primary Road
4. Manuangan–Parang Road	20.0	Regional Secondary Road
5. Midsayap–Datu Piang Road	20.0	Regional Primary Road
6. Molundo–Wao (part of Molundo–Wao missing link)	5.7	Regional Primary Road
Total	110.7	

Source: The Study on Infrastructure (Road Network) Development Plan for the ARMM, JICA, 2010.



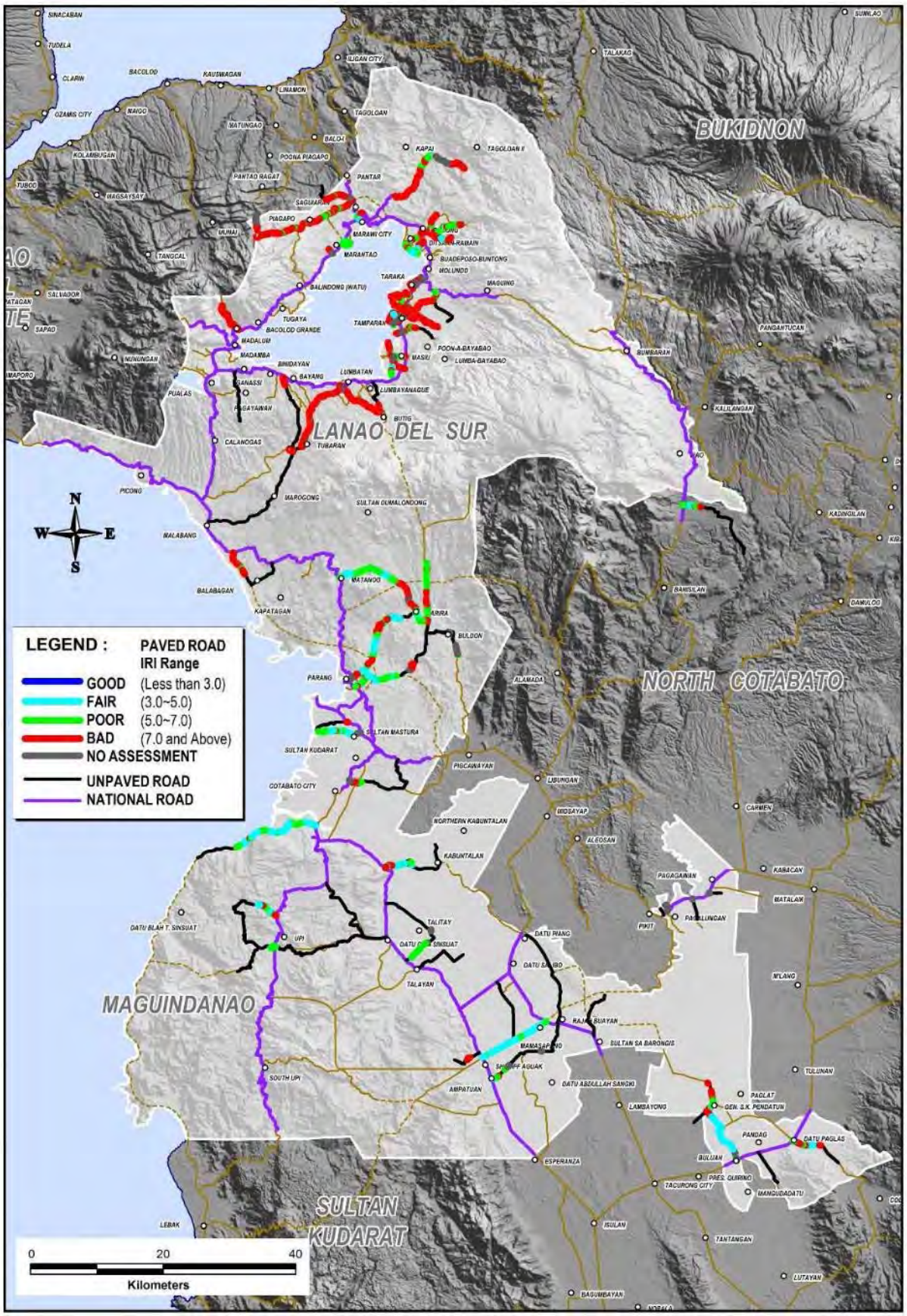
Source: JICA Study Team DRIMS Survey February–October 2015.

Figure 4.6 Surface Condition of National Roads in Bangsamoro (1/2): Mainland Provinces



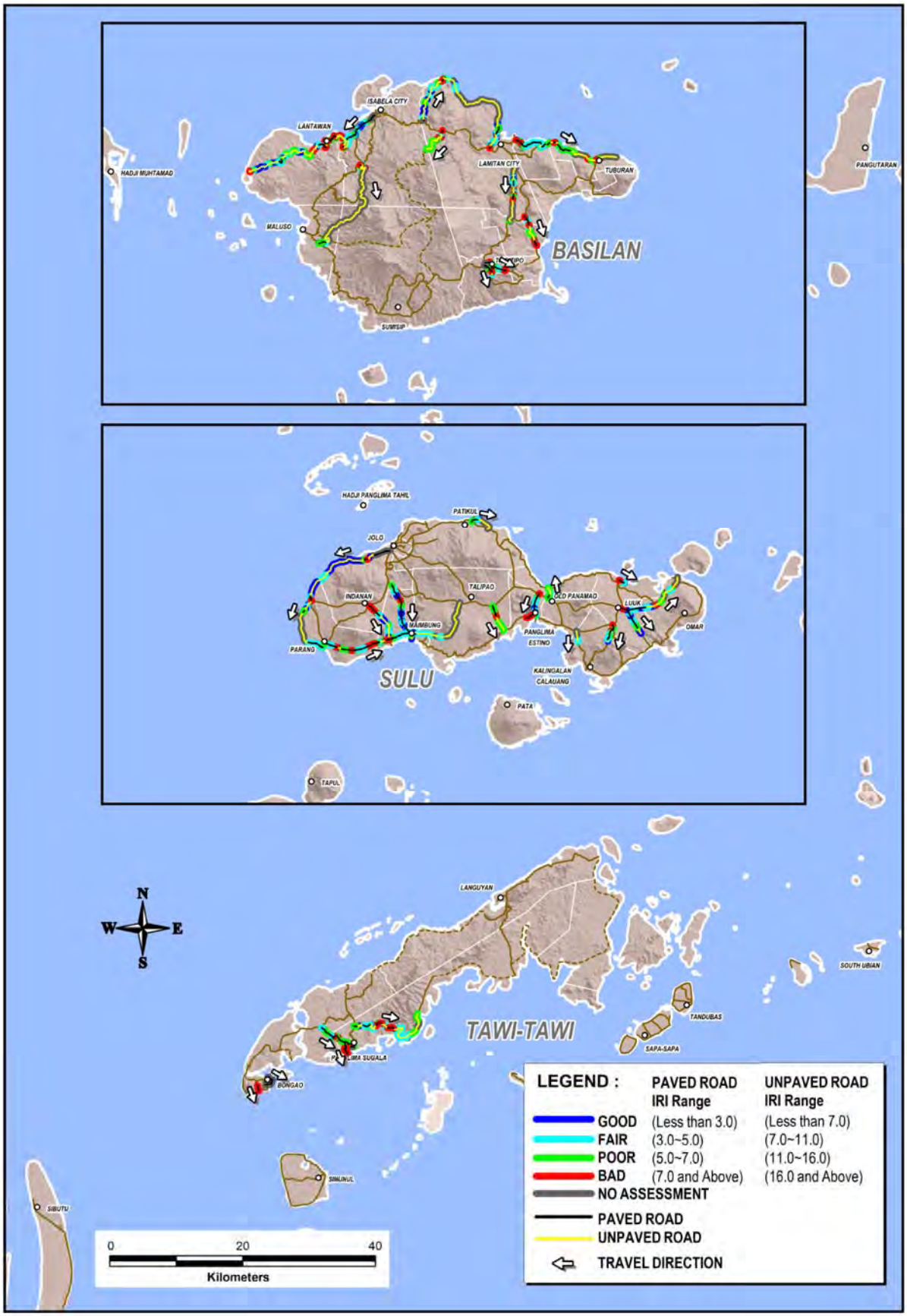
Source: ibid.

Figure 4.6 Surface Condition of National Roads in Bangsamoro (2/2): Island Provinces



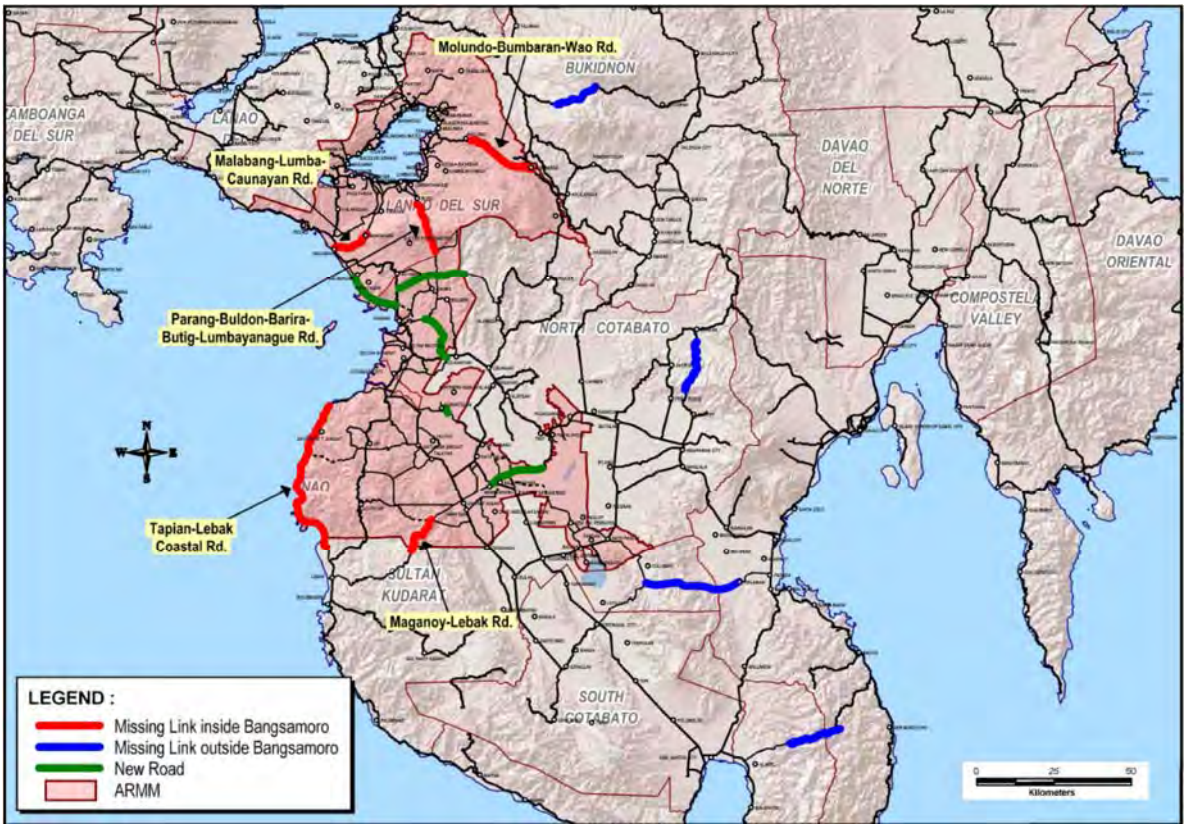
Source: ibid.

Figure 4.7 Surface Condition of Provincial Roads in Bangsamoro (1/2): Mainland Provinces



Source: ibid.

Figure 4.7 Surface Condition of Provincial Roads in Bangsamoro (2/2): Island Provinces



Source: ibid.

Figure 4.8 Missing Links in Bangsamoro Network and Surrounding Regions

(6) Traffic volume

The traffic volume on major roads of Bangsamoro is presented in Table 4.13 and depicted in Figure 4.9. Data were taken from the regular traffic count survey of the DPWH National. Since DPWH National is not undertaking traffic survey inside the Bangsamoro region, the 2008 survey data by the JICA study were used as base data to estimate current traffic in Bangsamoro. Annual growth rate of DPWH data (2008–2014) was used as guide to estimate growth rate inside the study area. Based on these traffic data, the following were observed.

1) Cotabato–Marawi corridor's traffic volume is about 1,500 vehicles per day, Cotabato–Davao corridor is about 3,200 and Cotabato–Gen. Santos is about 2,200.

2) If traffic growth is taken as an indicator to recent progress in the area, arterial roads of major cities of Bangsamoro (Cotabato City and Marawi city) have a lower growth rate (1–4% annually) than the arterial roads of Davao City and Gen. Santos which have an annual traffic growth of 5% to 16% annually.

(7) Freight transport

Polloc port and alternative ports for Bangsamoro

Operation of the Polloc port has considerable influence on how the freight transport in Bangsamoro is moved by both maritime and road transport. Over the years, the level of port operation has shrunk resulting to shippers in Bangsamoro to patronize other ports in Mindanao particularly the Sasa port of Davao, Macabalan port of Cagayan de Oro and Makar wharf of General Santos (Figure 4.10). This was confirmed by the 2009 survey of major agri-industries in Bangsamoro (e.g., Lamsan, La Frutera, Matling, etc.) as part of a JICA-assisted study, the Study on Infrastructure (Road Network) Development Plan for the ARMM, in which most of these firms used multiple ports outside of Bangsamoro to ship out their products. Of all the ports in Mindanao, the Davao port, Cagayan port and Gen. Santos port were preferred alternatives.

Table 4.13 Traffic Volume in Bangsamoro and Surrounding Areas

(Unit: No. of vehicles)

	Road Name	2008 AADT (DPWH)					2014 AADT (DPWH)				
		Car	Jeep	Bus	Truck	Total	Car	Jeep	Bus	Truck	Total
Mainland Mindanao	Digos–Makar Rd.	1,118	1,050	356	2,857	5,381	4,813	1,429	637	595	7,474
	Cotabato–Marbel Rd.	972	189	95	243	1,499	1,161	1,846	350	390	3,747
	Sarangani–SK Coastal Rd.	327	295	193	39	854	191	625	108	33	957
	Cotabato–Marbel Rd.	1,957	2,241	11	304	4,513	384	448	75	143	1,050
	Midsayap–Marbel Rd.	1,693	561	124	642	3,020	3,345	536	195	715	4,790
	Butuan City–CDO–Iligan Rd.	4,037	2,455	308	748	7,548	1,112	1,544	566	1,025	4,247
	Sayre Highway	1,118	1,050	356	2,857	5,039	1,235	968	415	485	3,104
	Kibawe–Kadingilan Rd.	554	57	46	92	749	135	80	-	188	403
	Sayre Highway	2,557	600	542	1,110	4,809	1,746	2,055	679	707	5,187
	Davao–Cotabato Rd. (Jct. Digos)	1,592	494	178	1,138	3,402	1,175	1,677	313	321	3,486
	Cotabato City Circle Rd.	3,320	2,590	743	1,119	7,772	2,390	1,380	246	358	4,373
	Davao–Cotabato Rd (Sultan Kudarat–Pigcawayan)	1,736	358	272	656	3,022	1,279	1,304	187	438	3,208
	Ozamis City–Oroquieta City Rd.	2,243	275	226	631	3,375	1,460	1,138	255	220	3,073
	Linamon–Zamboanga Rd.	1,202	436	859	635	3,132	966	1,429	634	489	3,518
	Misamis O.–Ma Cristina Rd.	5,054	3,872	5	517	9,448	6,195	4,712	1,183	831	12,921
	Pagadian –Zamboanga City Rd.	2,851	379	482	1,187	4,899	1,785	1,625	641	626	4,678
	Iligan City–Marawi City Rd.	3,134	598	13	248	4,157	3,414	367	-	268	4,049
	Maramag–Maradugao Rd.	621	114	58	243	1,036	642	683	222	220	1,767
	JICA's ARMM Infrastructure Masterplan Data						**Estimate by JICA Study Team**				
	Marawi–Saguiaran Rd.	3,163	734	-	259	4,156	4,112	954	-	337	5,403
	Balindong–Marantao Rd.	1,728	944	-	109	2,781	2,246	1,227	-	142	3,615
	Maguing–Molundo Rd.	381	579	-	113	1,073	495	753	-	147	1,395
	Calanogas–Pagayawan Rd.	97	260	-	15	372	126	338	-	20	484
	Tukuran–Karumatan Rd.	226	167	-	73	466	294	217	-	95	606
	Labangan–Tukuran Rd.	378	208	5	110	701	491	270	7	143	911
	Cotabato–Parang Rd.	783	432	1	153	1,369	1,018	562	1	199	1,780
	Cotabato–Polloc Rd.	191	63	-	143	397	248	82	-	186	516
	Cotabato–Kusiong Rd.	31	111	-	61	203	40	144	-	79	264
	Cotabato–Upi Rd.	113	35	-	164	312	147	46	-	213	406
	Upi–Lebak Rd.	61	2	-	40	103	79	3	-	52	134
	Cotabato – DOS Rd.	891	609	38	155	1,693	1,158	792	49	202	2,201
	Midsayap–Datu Piang Rd.	144	129	-	108	381	187	168	-	140	495
	Ampatuan–Esperanza Rd.	611	334	29	136	1,110	794	434	38	177	1,443
	Tacurong–Lambayong Rd.	488	149	-	172	809	634	194	-	224	1,052
	Kabacan–Pagalungan Rd.	1,410	379	122	323	2,234	1,833	493	159	420	2,904
	Carmen–Kabacan Rd.	689	480	35	282	1,486	896	624	46	367	1,932
	Kitaotao–Dangcagan Rd.	897	233	129	420	1,679	1,166	303	168	546	2,183
	Maramag–Quezon Rd.	997	81	70	469	1,617	1,296	105	91	610	2,102
	Magpet–Kidapawan Rd.	715	104	216	29	1,064	930	135	281	38	1,383
	Tacurong–Pres. Quirino Rd.	1,321	536	66	450	2,373	1,717	697	86	585	3,085
	Gen. Santos–Polomolok Rd.	2,629	1,232	201	656	4,718	3,418	1,602	261	853	6,133
	Bansalan–Makilala Rd.	2,386	1,034	140	915	4,475	3,102	1,344	182	1,190	5,818
	Gen. Santos–Malungon Rd.	2,759	683	243	343	4,028	3,587	888	316	446	5,236
	Balabagan–Malabang Rd.*	676	259	1	92	1067	879	485	1	172	1,536
Island Provinces	Isabela–Lamitan Rd.	1,208	345	309	677	2,539	1,570	449	402	880	3,301
	Isabela–Maluso Rd.	923	317	117	522	1,879	1,200	412	152	679	2,443
	Pasiagan–Patikul Rd.	546	414	-	592	1,552	710	538	-	770	2,018
	Jolo–Indanan–Parang Rd.	114	455	-	391	960	148	592	-	508	1,248
	Jolo–Talipao Rd.	80	689	-	127	896	104	896	-	165	1,165
	Nalil–Bongao Rd.	84	103	-	41	228	109	134	-	53	296
	Sanga Sanga–Bongao Rd.	110	93	-	52	255	143	121	-	68	332

* 2003 JICA data ARMM Infrastructure (Road Network) Development Plan, 2010.

Source: DPWH National Road Traffic Survey Program 2014; JICA's ARMM Infrastructure (Road Network) Development Plan, 2010.

Unless operation of the Polloc port is significantly improved, shippers in Bangsamoro will be forced to take the routes of bringing their cargoes to any of the ports above. In terms of distance, the Makar wharf of Gen. Santos City and the Iligan port are the closest (Table 4.14). However, the latter has the advantage of passing through more peaceful areas which could explain the preference for the Makar wharf.

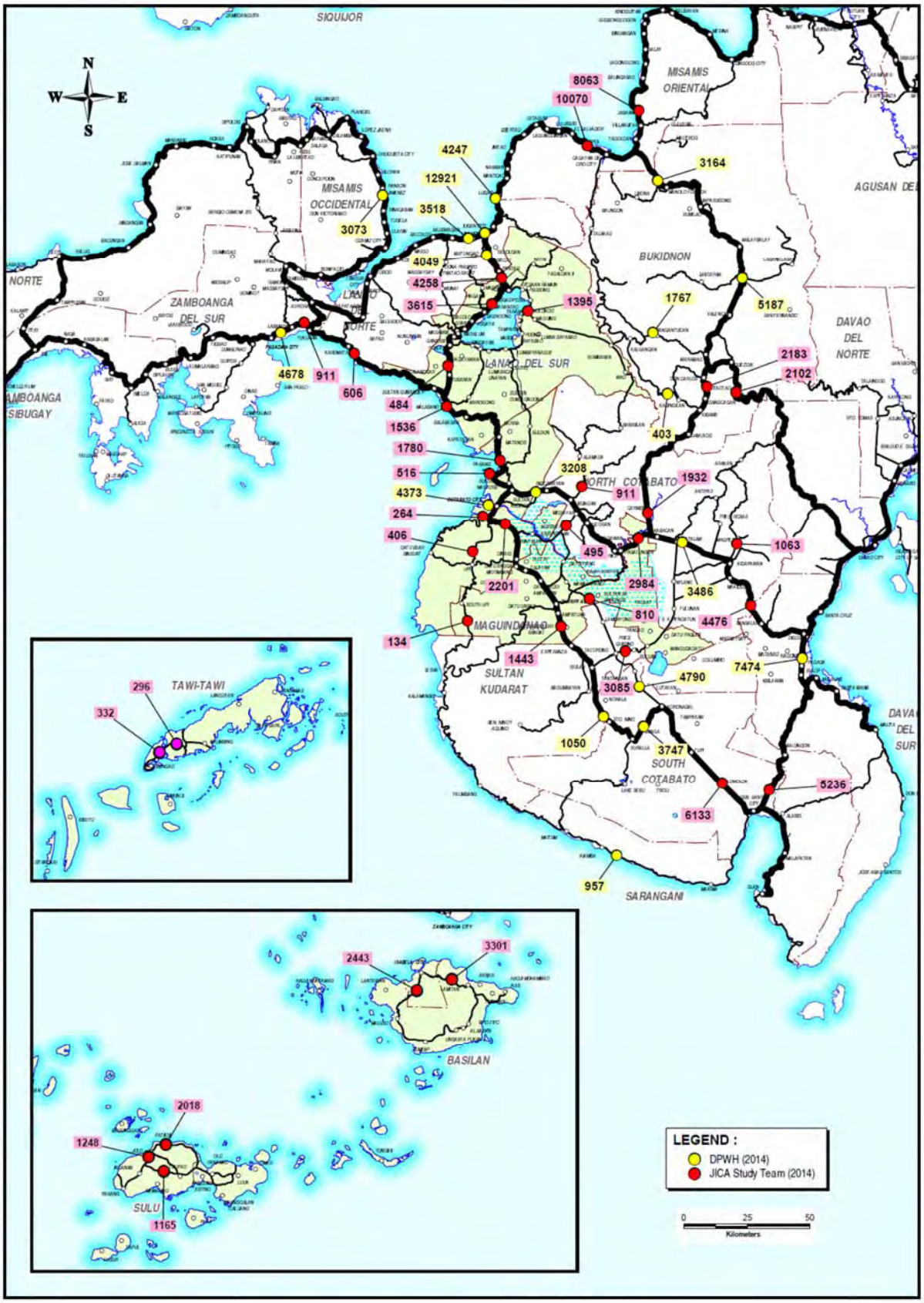


Figure 4.9 Traffic Volume in Bangsamoro and Surrounding Regions

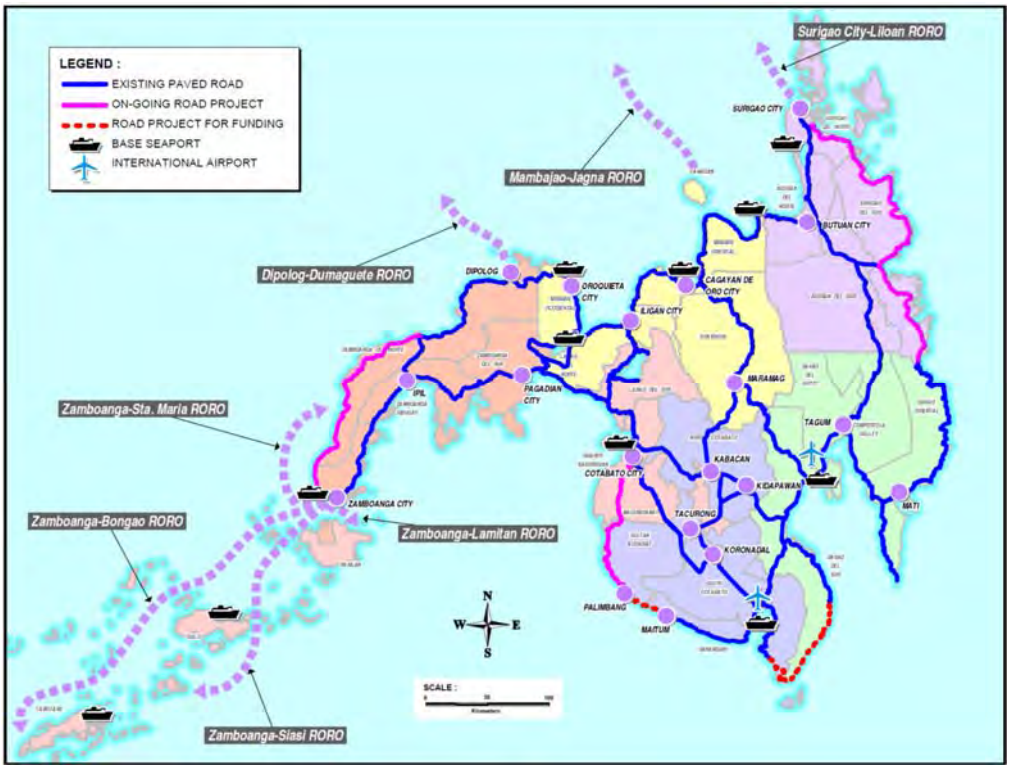


Figure 4.10 Locations of Alternative Ports for Bangsamoro

Table 4.14 Distances of Alternative Ports from Cotabato City

Port Name	Distance from Cotabato
i. Macabalan Port and Mindanao Container Terminal, Cagayan de Oro City	250 km (via Narciso Ramos Highway) 320 km (via Kabacan-Kibawe Road)
ii. Iligan Port, Iligan City	185 km (via Narciso Ramos Highway)
iii. Ozamis Port, Ozamis City	220 km (via Narciso Ramos Highway)
iv. Sasa Port, Davao City	220 km (via Cotabato–Davao road)
v. Makar Wharf, General Santos City	185 km (Tacurong–Koronadal Road)

Note: Distance is estimated based on Google map.

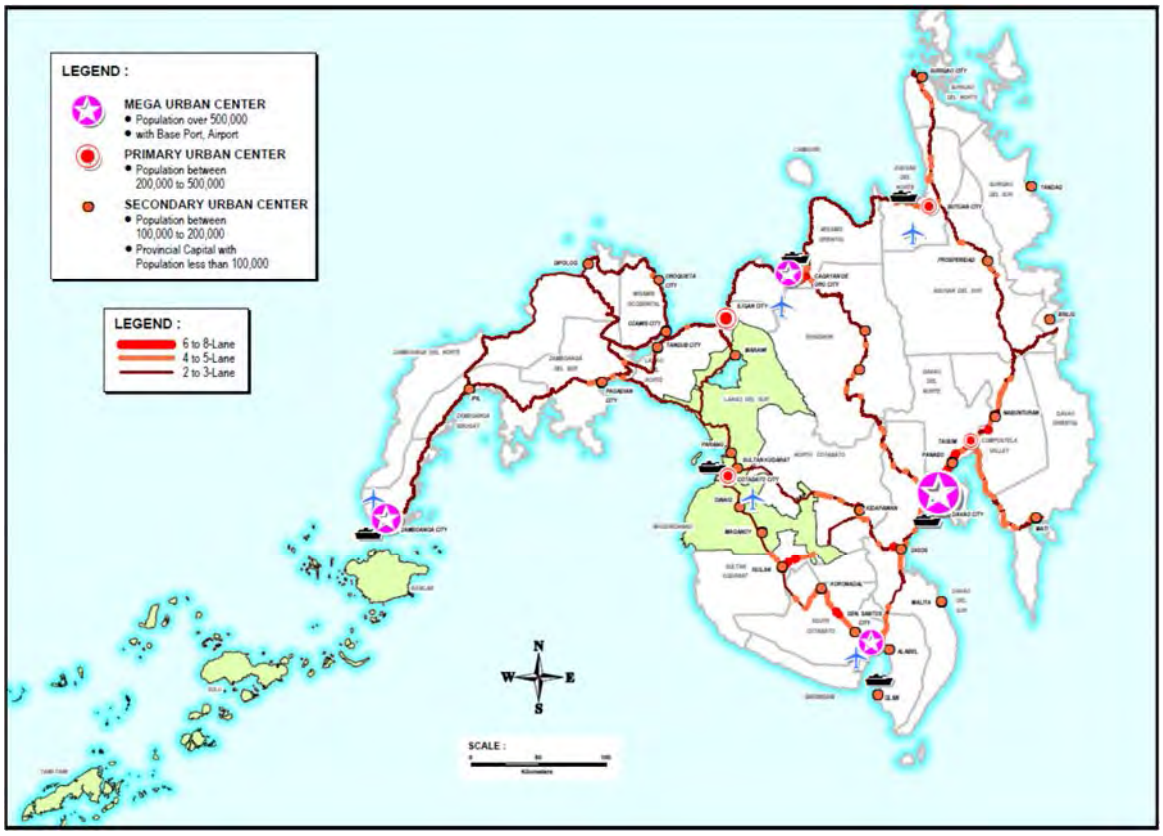
Road links to alternative ports

The arterial roads linking Bangsamoro to alternative ports are presented in Figure 4.11. Most of the roads are two-lane highways with some 4-lane sections. Road surface conditions of these roads are illustrated in Figure 4.12. Table 4.15 provides assessments of these roads linked to the ports.

(8) Exit ports and freight movement of agri-industry products

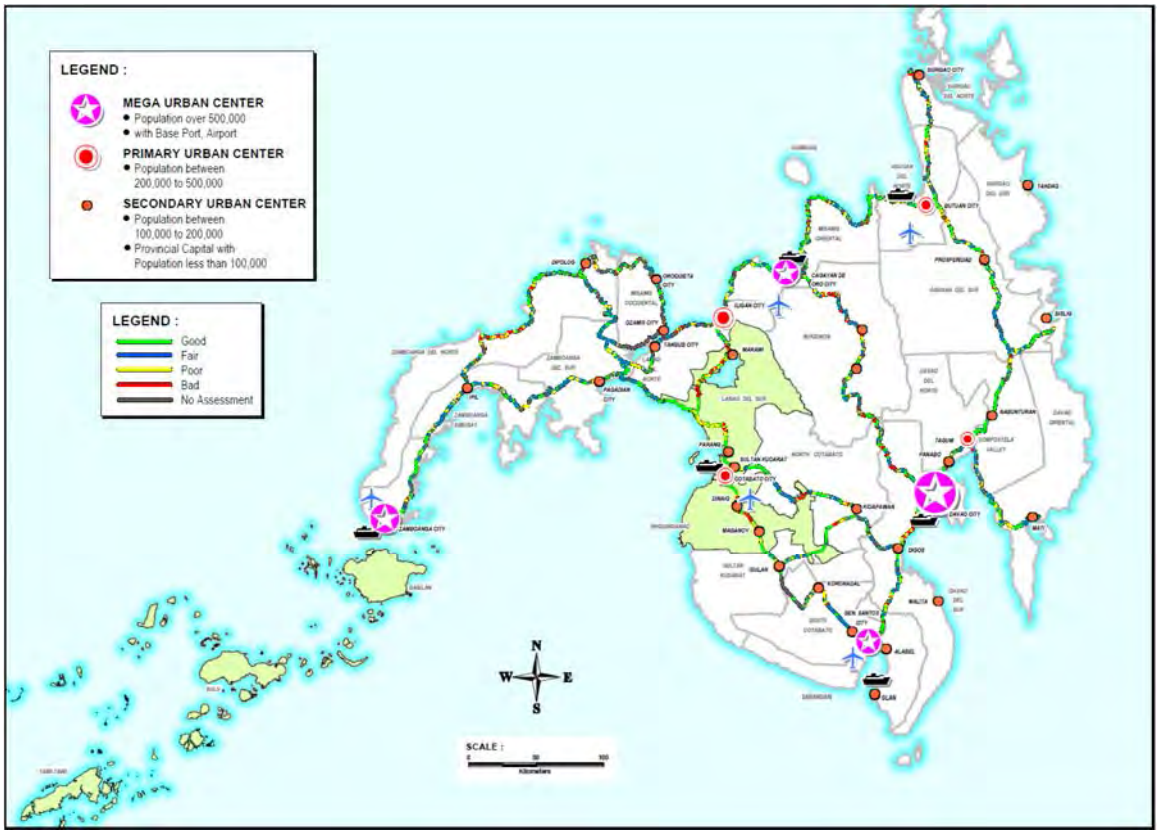
The exit port of products produced by agri-industry firms operating in the Bangsamoro region was clarified through interviews carried out by agri-industry experts of the JST with these firms. In some cases interview with people knowledgeable of the subject as well as review of relevant studies were carried out. Based on the above, the freight flow was clarified as shown in the Figure 4.12 and the following were observed.

1) Most of the agri-industries in Bangsamoro are using ports of Davao and Panabo to ship out their products. Ports of Cagayan de Oro and General Santos are preferred by some.
2) As far as agri-industry in Bangsamoro is concerned, users of Polloc Port seem to be limited to a very few firms such as Lamsan Trading, Philippine Trade Inc. and perhaps other small-scale firms.
3) Routes used to transport products by these agri-industries are as follows (Figure 4.13):
   - Wao and Bumbaran area to Davao (Wao–Kibawe–Carmen–Kidapawan–Digos–Davao)



Source: DPWH data (2014) and NSCB data.

Figure 4.11 Number of Lanes of Mindanao's Arterial Roads



Source: DPWH Road Condition Data and NSCB data.

Figure 4.12 Road Conditions of Mindanao's Arterial Roads

Table 4.15 Conditions Roads Leading to Alternative Ports

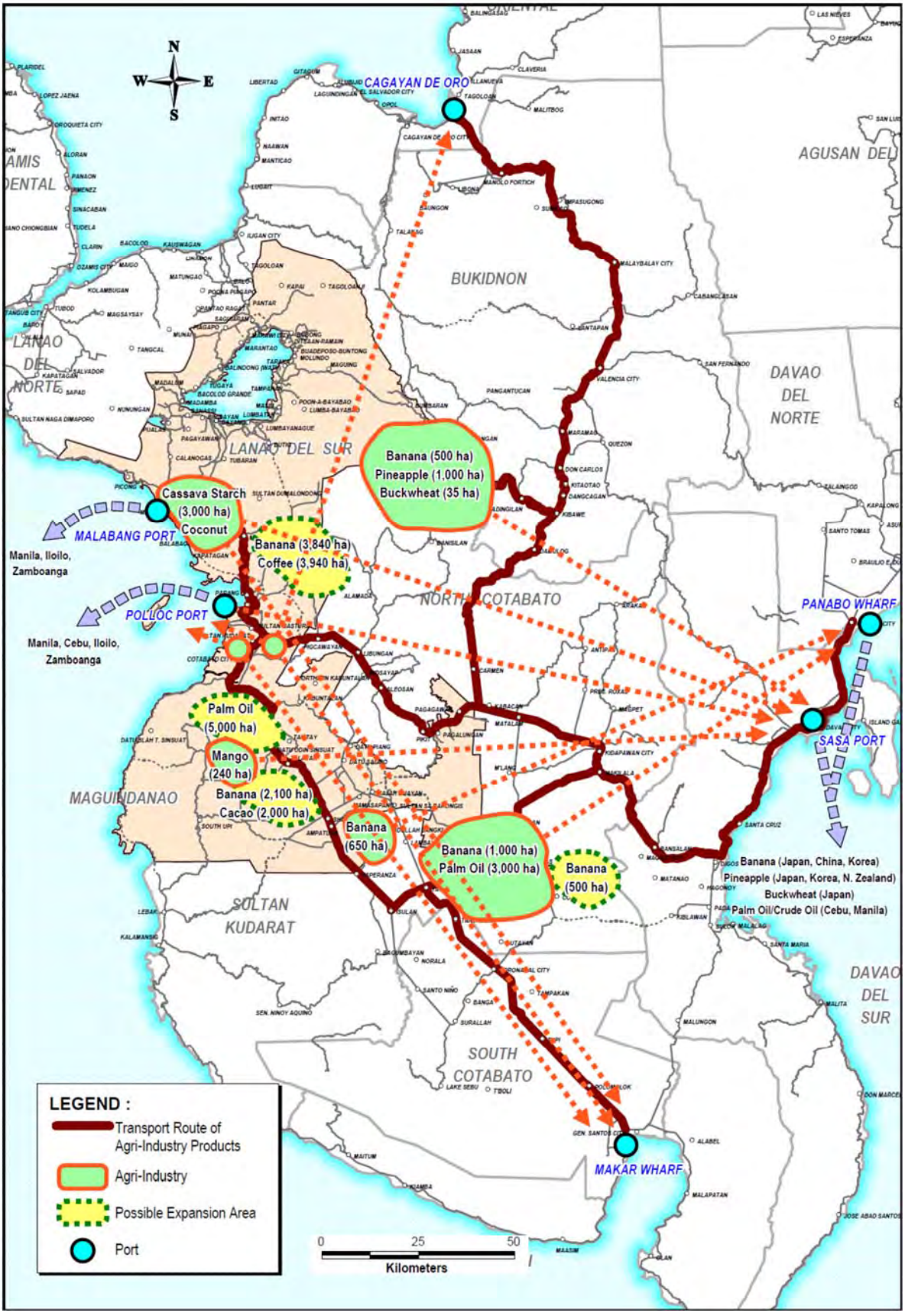
Road link	Assessment
Cotabato–Davao Road (to Sasa Port; L=220 km)	- 2-lane highway with some 4-lane sections particularly between Digos City and Davao City. - Traffic congestion at road sections passing town centers in Libungan, Midsayap, Pikit, Kidapawan, etc. due to mergence with local traffic and through traffic and also inside Davao city before Sasa Port. - Poor road condition particularly in Pikit, Pagagawan, and Pagalungan.
Cotabato–Gen. Santos Road (to Makar Wharf; L=185 km)	- 2-lane highway with some 4-lane sections; 4-lane highway in Isulan–Gen. Santos section except some short sections. - Generally good traffic flow except section passing inside Tacurong and Koronadal due to mergence with local traffic and through traffic. - Generally good road condition except Isulan–Sto. Nino–Suralla section and Koronadal–Tupi section.
Cotabato–Cagayan de Oro via Narciso Ramos Highway (to Cagayan de Oro Port and Mindanao Container Terminal; L=250 km)	- 2-lane highway until Iligan City; 4-lane highway inside Cagayan de Oro City. - Generally good traffic flow except section passing Marawi City, Iligan City and Cagayan de Oro City. - Generally poor road condition from Parang to Marawi due to large pot holes and serious cracks in pavement. - Poor road alignment resulting in sharp curves for large trucks. - Presence of security concerns.
Cotabato–Cagayan de Oro via Kibawe Road (to Cagayan de Oro Port and Mindanao Container Terminal; L=320 km)	- Most sections 2-lane highway with some 4-lane sections. - Generally good traffic flow except sections passing major towns such as Libungan, Pikit, Maramag, Valencia City, etc. - Freight destined to Cagayan de Oro Port (Macabalan Wharf) passing city center causing traffic congestion. - Road condition better than shorter Narciso Ramos Highway route. - Passing more peaceful areas than other routes.

- Malabang area to Davao (Malabang–Parang–Simuay–Kidapawan–Digos–Davao)
- Malabang area to Gen. Santos (Malabang–Parang–Cotabato–Isulan–Tacurong–Gen. Santos)
- Datu Paglas and Buluan area to Davao (Buluan–Datu Paglas–Makilala–Digos–Davao)
- Talayan and Datu Abdullah Sangki area to Davao (Isulan–Tacurong–Datu Paglas–Makilala–Digos–Davao)

The final destinations of agri-industry products from Mindanao including those coming from Bangsamoro were also identified through review of the Mindanao Logistics Infrastructure Network Study by the JICA undertaken in 2014.

i) Banana Cavendish: Japan (50%) and the rest to China, South Korea, the Middle East (particularly Iran) and other smaller markets.
ii) Coconut products/oil: U.S. (24%), Europe (25%) and the rest are distributed to other countries
iii) Pineapples: Major markets and their approximate shares are Japan (55%), Korea (16%), New Zealand (4%), Middle East (9%), among others.
iv) Mango-carabao: China, Japan, and others
v) Palm oil: Cebu and Manila for further refinement

The current flow of freight from these agri-industry firms appears to be irrational considering that Polloc Port is very close to location of these firms. However Polloc Port at present simply could not offer the services required by the industry. This unfortunate situation offers at least two clear disadvantages to Bangsamoro region: first, it deprived the region of business opportunity which could result to a number of jobs created; second, it deprived the region of additional income that could be generated from the use of port services.



Source: JICA Study Team.

Figure 4.13 Exit Port and Transport Route of Agro-industrial Products in Bangsamoro

In the future, it is reasonable to expect that if Polloc Port would offer the same level of service (coupled with facility requirements of these agri-industry firms) with the ports in Davao, Cagayan de Oro and Gen. Santos, freight traffic from Bangsamoro might be gradually shifted back to Polloc Port. The renewed interest of private sector to invest in agri-industry in Bangsamoro offers an opportunity for Polloc Port management to harmonize their development/improvement plan to the needs of these firms. These new prospective investments include banana plantation and coffee plantation located in the municipalities of Barira and Buldon with a total area of close to 8,000 ha. Likewise, there is also interest by private sector to develop palm oil plantation in Datu Odin Sinsuat Municipality, banana and cacao plantations in Talayan Municipality and another banana plantation in Buluan Municipality. Combining all together these new investments would cover about 12,500 ha, indicating that substantial freight traffic will be generated requiring port services for their export.

4.1.2 Road and logistics issues

(1) Logistics challenges in Mindanao

A 2014 JICA-assisted study, the Survey on Mindanao Logistics Infrastructure Network, identified issues and bottlenecks related especially to transport infrastructure that affect transport and distribution of agri-fishery products in Mindanao. Most of these findings are very much present in the Bangsamoro region. The challenges were categorized into two: 1) infrastructure and 2) logistics industry.

Infrastructure challenges are identified as follows:

1) Poor farm-to-market roads,
2) Fast deterioration of the roads due to heavy loads,
3) Incomplete DPWH Arterial North-South Backbone and East-West Lateral Road System that promote competition between ports,
4) Ports currently not well designed to cater to agri-products though in the long-run, ports should be able to handle containers.
5) Inadequate arterial roads in many sections as 'container highways' (i.e., pavement not designed for heavy loads, limited number of lanes, no climbing lanes, no direct routes to ports, non-all weather sections),
6) Use of inefficient port equipment and practices (e.g., pallets instead of containers, straight instead of articulated trucks, RoPAX instead of LoLo ships (using QSGC), straight instead of articulated trucks, etc.), and
7) Worsening traffic condition in Cagayan de Oro and Davao cities constraining expanded usage of the PPA base and Sasa Ports, respectively.

Logistics industry challenges are identified as follows:

i) Immature freight forwarding industry leading to low LCL (less container load) and backload rates,
ii) High transport cost by RoRo due to the low backloads,
iii) Shipping companies not too flexible and nimble enough to address the needs of shippers (e.g., high rentals of reefer vans, insufficient supply of fruit vans, livestock vans, and reefer vans),
iv) Low utilization of agri-financing windows catering to associations and cooperatives for loans to be used in consolidation facilities, and
v) Unpopularity of the use of containers, trailers, and prime movers as transport modes.

(2) Road and logistics issues

Based on the initial assessment of the road development of the Region as well as freight transport operation, the following issues were identified.

1) Road density: The Bangsamoro region's road density (0.10) remains lowest in the country which is not even half of the national average (0.25). A supply of 800 km of national road is necessary to reach Mindanao average (0.17). Further addition of 800 km is in order to reach national average.

2) Pavement ratio: Pavement ratio of national roads improved from 76.8% in 2007 to 81.9% in 2013.

However this pavement ratio is still below the national average of 83%. There are still 179 km of national roads with gravel or earth surface.

Provincial roads of the region are mostly surfaced with gravel or earth which accounts for 79% (1,680 km). This remains a major development issue to be addressed in the coming years. Municipal roads are also mostly surfaced with gravel or earth (80% or 1,680 km). Barangay road / farm-to-market roads are also mostly surfaced with gravel or earth road (4,824 km of which only 0.2% has gravel surface).

3) Road conditions of paved national roads: This will be confirmed after the road surface condition survey currently undertaken by another team using the Dynamic Response Intelligent Monitoring System (DRIMS).
4) Missing links: There are five missing links with a total length of 155.4 km, which prevent access to wide area in the Region. Likewise, these missing links affect mobility of communities living in these areas.
5) Road maintenance: Assessment will be made after the road surface condition survey.
6) Freight transport: Poor conditions of farm-to-market roads, poor conditions of secondary (provincial) roads, poor conditions of arterial roads connecting Marawi - Cotabato, and limited operation of the Polloc port constrain the development of freight transport in Bangsamoro.

4.1.3 Development directions of Bangsamoro road network

(1) Review of existing plans

BDP 1

A review of the Bangsamoro Development Plan (Phase 1) was carried out to confirm the strategic direction/investment as far as infrastructure development is concern. During the transition, the strategy for roads and bridges will be to: (a) sustain current efforts to improve national roads through rehabilitation, reconstruction, upgrading, and maintenance; (b) address the most immediate and most un-served needs/gaps, especially at the barangay or community level by paving FMRs and building new ones; and (c) develop capacity in infrastructure planning, feasibility preparation, project supervision/management, and monitoring and evaluation for infrastructure staff.

Table 4.16 shows the strategies the plan intends to pursue. It appears that the plan's primary concern is the strengthening of infrastructure system of the region. This is in recognition of the poor state of infrastructure which significantly hampered effort to bring to another level the socioeconomic condition of the region. Key to this overall effort to redress the Region's infrastructure is rehabilitation of farm-to-market roads that would directly benefits the poor.

Table 4.16 BDP Infrastructure Strategies and Project Types

Targeted Strategies	Project Types
Infrastructure to connect to economic growth centers	National, provincial roads and bridges; airports and seaports; telecommunications
Infrastructure to support production	Farm-to-market roads (FMRs), irrigation facilities, small landing ports, energy requirements for economic activity
Infrastructure for access/social justice	Access roads, household electrification (especially off-grid) for far-flung areas
Infrastructure to support security and normalization outcomes	Investments for the six priority camps and other requirements targeted for normalization
Infrastructure for climate-resilience, DRRM	Flood control, retrofitting of existing infrastructure

Source: Bangsamoro Development Plan—Integrative Report, May 2014, BDA.

The project implementation arrangement was also touched by the plan. It was envisioned that during the transition period, national road projects will be implemented by the Department of Public Works and Highways (DPWH), while provincial and municipal road projects will be done by the DPWH-ARMM. Barangay road and FMR projects shall be implemented by the Department of Agriculture (DA),

Department of Agriculture and Fisheries (DAF)-ARMM, Department of Agrarian Reform (DAR), and DAR-ARMM (Table 4.17).

Table 4.17 Project Implementation Arrangement

Project Type	Implementing Agency
National Road Projects	DPWH National
Provincial Road Projects Municipal Road Projects	DPWH-ARMM
Barangay Road Projects Farm to Market Road Projects	Department of Agriculture (DA) Department of Agriculture and Fisheries (DAF)-ARMM Department of Agrarian Reform (DAR), and DAR-ARMM.

Similarly, a review on the projects recommended for infrastructure (road) by the Transition Development Plan by JICA was carried out to see how these projects would fit in the overall plan and to confirm if any of these projects are funded by the National Government or Donor Institution for 2015 or 2016. The recommended projects for short term (2015-2016) are presented in Table 4.18. It was envisaged that in the short-term, priority should be given to address the main bottlenecks of connectivity including the poor condition of FMRs as well as incomplete and unpaved national roads and main arterial roads which led to low productivity and limited income opportunities for rural communities. Location of these projects is depicted in Figure 4.14.

Table 4.18 Proposed Projects for Transitional Plan Period

No.	Road	Road length (km)
1	Davao–Cotabato Road (reblocking)	8.8
2	Marbel–Ala–Cotabato Road (reblocking)	4.0
3	SK Border–Butig–Lumbayanague Road	31.0
4	Maganoy–Sultan Sa Barongis Road (Provincial Road)	13.5
5	Datu Saudi Ampatuan Road (Provincial Road)	9.0
6	Manuangan–Parang Road	20.0

Source: Transitional Development Plan, 2014, JICA-PhilKoe International, Inc.

The list of road projects was then compared to the road projects by the DPWH-ARMM funded for their 2015 budget. After cross checking, it was found out that identified projects in the Transition Plan are not in the list of 2015 priority projects of DPWH-ARMM. However two projects proposed by the BDP 1 for the medium and long term were included in the 2015 projects of the DPWH-ARMM. These are

1) Concreting of alternative road (Matanog–Barira–Buldon in Maguindanao Province; L=1.0 km and budget is PHP 20 million), and
2) Concreting of Lakit lakit–Mandulan road, Bongao in Tawi-Tawi Province (L=2.0 km with PHP 24 million budget).

It should be noted that the 2015 budget of DPWH-ARMM covers only 1 km of the 9 km unpaved sections of Matanog–Barira–Buldon.

ARMM's Regional Development Plan

The updated Regional Development Plan of the ARMM identified a couple of road projects critical to support social and economic development activities of the region. The projects are grouped into two based on the source of fund: (i) projects for funding by the Regional Government and (ii) projects for funding by the National Government or Official Development Assistance (Figure 4.15).

Priority projects to be funded by the ARMM are as follows:

1) Completion of trans-central road (Sulu),
2) Jolo island circumferential road (162 km), and
3) Sanga-Sanga–Saldang road (16 km).

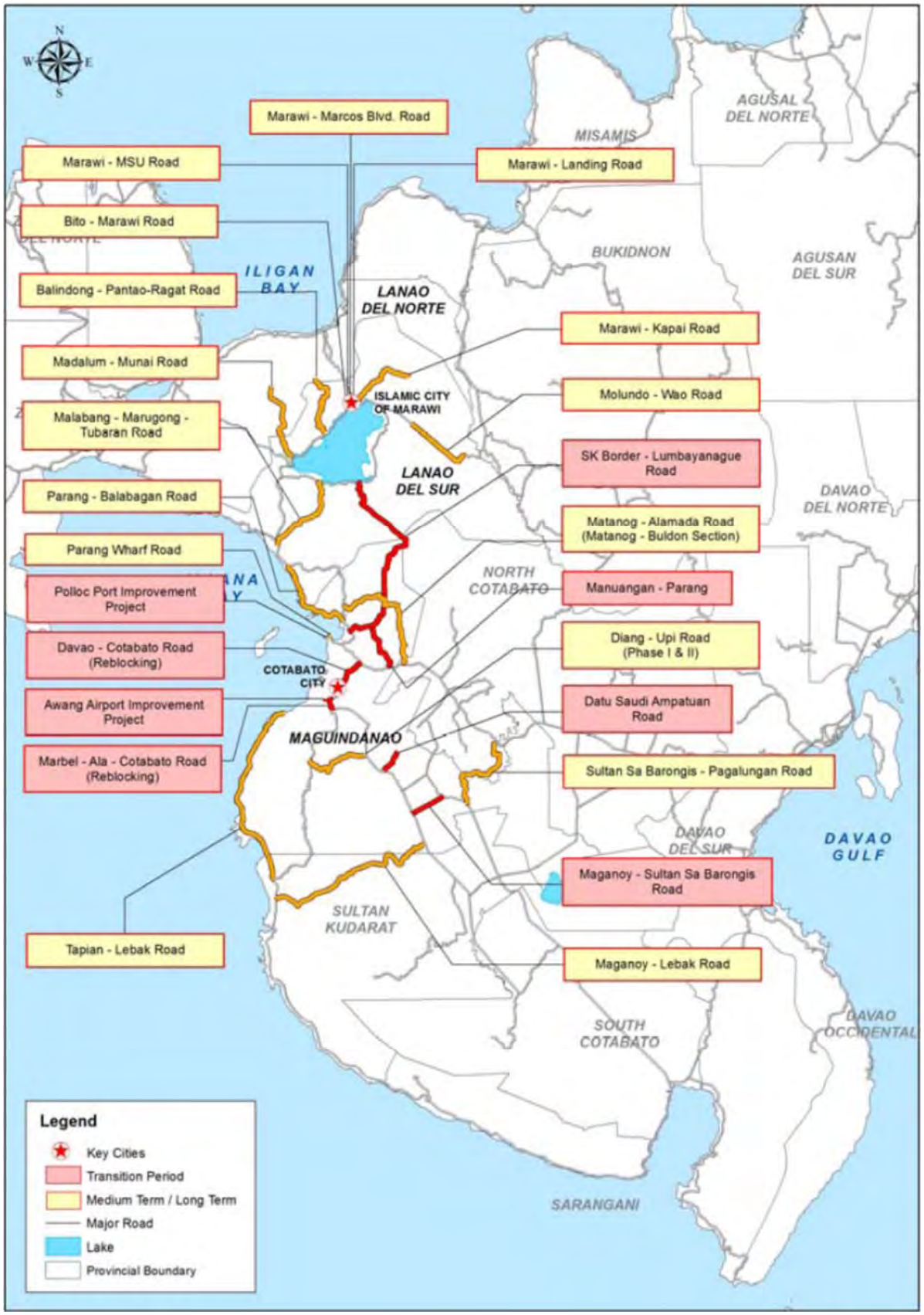


Figure 4.14 Locations of Proposed Transitional Period Projects (1/2): Mainland Provinces

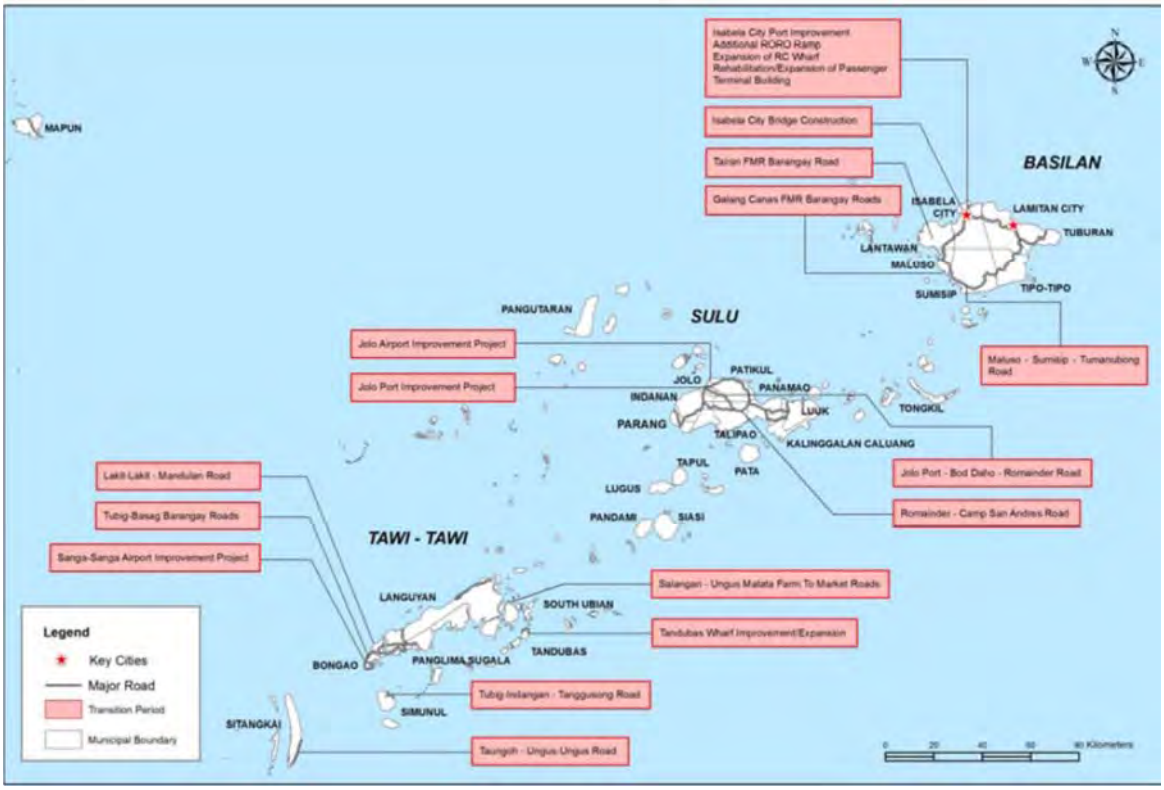
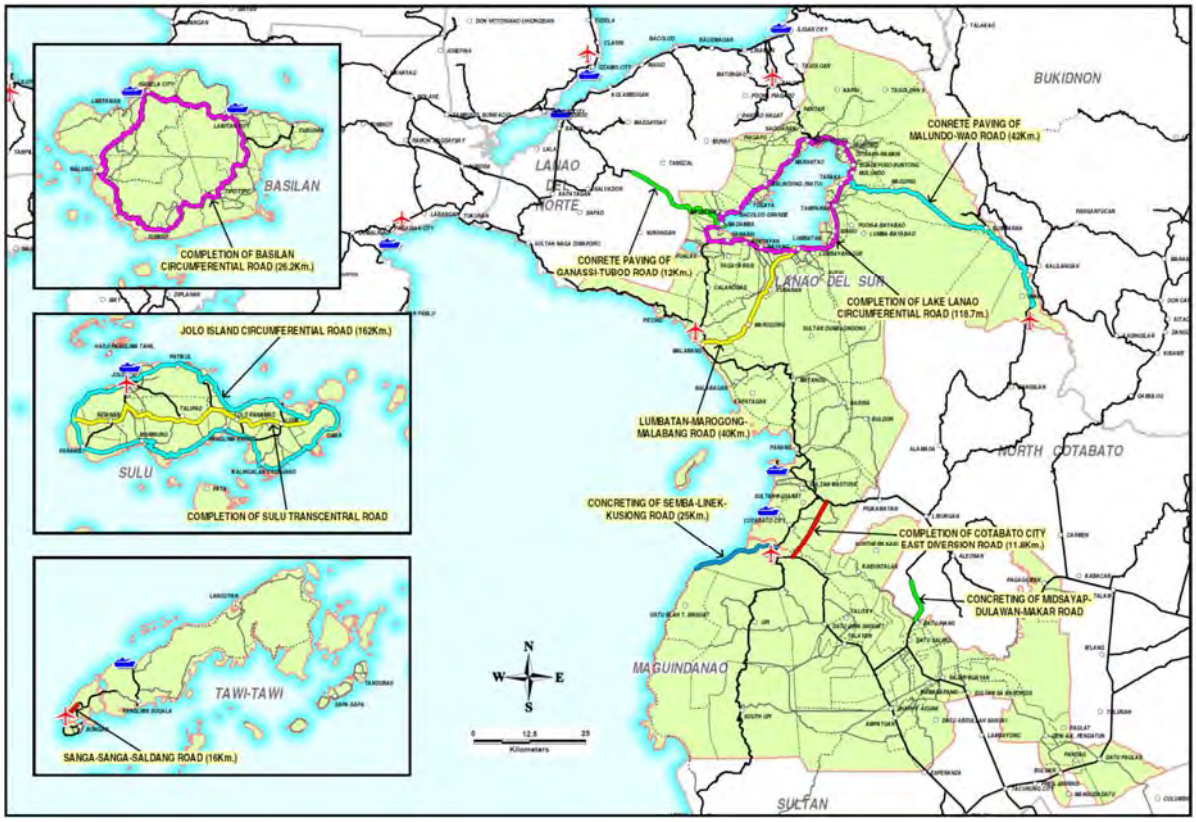


Figure 4.14 Locations of Proposed Transitional Period Projects (2/2): Island Provinces



Source: ARMM's RDP data.

Figure 4.15 Proposed Road Projects in ARMM's RDP (2013–2016)

Priority projects for funding by the National Government or Official Development Assistance (ODA)

are as follows:

i) Lake Lanao circumferential road (118.7 km),
ii) Concreting of Semba–Linek–Kusiong road (25 km),
iii) Lumbatan–Marogong–Tubaran–Malabang road (40 km),
iv) Completion of Basilan circumferential road (86.2 km),
v) Completion of Cotabato City east diversion road (11.8 km),
vi) Concrete paving of Mulondo–Wao road (42 km),
vii) Concreting of Midsayap–Dulawan–Makar road, and
viii) Concrete paving of Ganassi–Tubod road (12 km).

Asian highway (Mindanao section)

The Asian Highway (AH) has a strong influence to the future Bangsamoro development as it cuts through the heart of its territory. The Asian Highway network initiated in 1959 is a regional transport cooperation initiative among Asian and European countries. For the initiative, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) aimed at enhancing the efficiency and development of the road infrastructure in Asia, supporting the development of Euro-Asia transport linkages and improving connectivity for landlocked countries.

According to UNESCAP, the Asian Highway network now comprises over 141,000 km of roads passing through 32 member countries. The network extends from Tokyo in the east to Kapikule, Turkey in the west and from Torpynovka, Russian Federation, in the north, to Denpasar, Indonesia in the south. Philippines is part of this regional cooperation where the identified routes have a combined total length of 3,379 km that traverse from Laoag City in the north passing Metro Manila, moving further south to Bicol then to Visayas and enters Mindanao via Surigao City (Lipata) down to Davao City and continues to General Santos City before swinging back north to Cotabato City and ends at the International Port of Zamboanga City (Table 4.19 and Figure 4.16).

Table 4.19 Characteristics of AH26 Section in Mindanao

Section	Total length (km)	Surface type (km)			Surface condition (%)				
		Concrete	Asphalt	Gravel	Good	Fair	Poor	Bad	No rating
Lipata to Davao City	398.79	198.96	199.83	-	42.0	20.9	27.4	14.3	32.6
Davao City to Gen. Santos	144.48	63.38	80.98	0.12	12.4	10.0	12.8	16.8	1.8
Gen. Santos to Zamboanga	513.86	444.51	54.34	15.02	20.4	54.7	51.2	28.1	27.3
(Jct. Calinan) Davao City to CDO City	292.39	71.32	221.06	-	25.2	14.3	8.6	40.8	38.2
Total	1,349.52	778.17	556.21	15.14	100.0	100.0	100.0	100.0	100.0

Note: Surface condition is based on 2012 Road Condition Data of DPWH

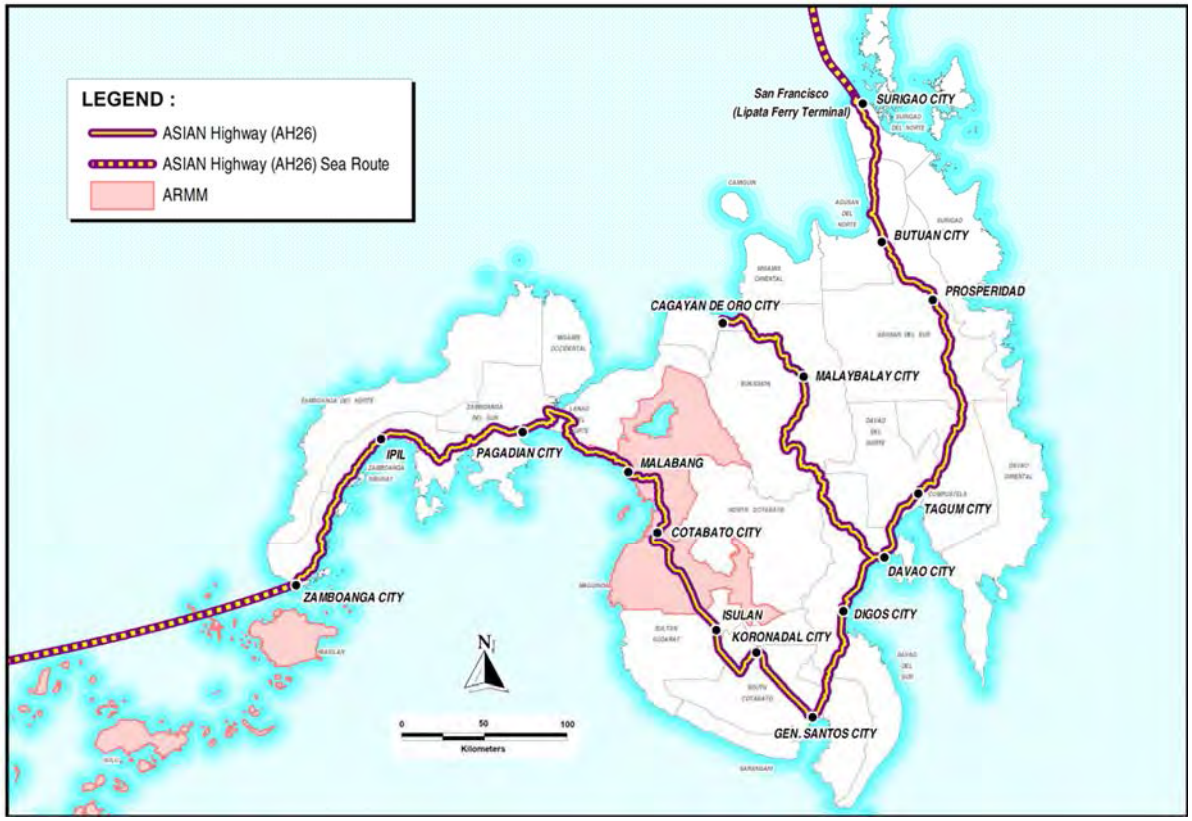
Source: Presentation of DPWH Assistant Secretary, Catalina Cabral, titled "Asian Highway (AH 26)" to UNESCO, 2013.

AH26 (route number given to the Philippines) is being developed as prime connector to other highways in neighboring countries to facilitate a smoother handling of trade and commerce in the region. To complete this connection, a dedicated sea route is necessary. Mindanao has two: port of Surigao City and port of Zamboanga City.

The entire stretch of AH26 in Mindanao is 1,349.52 km and connects the cities of Surigao, Davao, Gen. Santos, Cotabato, Pagadian, and Zamboanga. Another branch of AH26 connects Davao City to Cagayan de Oro City. The efforts by the DPWH to upgrade the AH26 to bring the network in conformity with Asian Highway classification and design standards will at the very least improve the horizontal and vertical curve of the highway linking Cotabato City to Marawi City which prevents the highway to function correctly.

This highway is Bangsamoro's primary corridor. Likewise, current efforts by the DPWH on AH26 indicate that there's an intention to elevate the network to Class I. An ADB-assisted study is currently ongoing (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project) which tries to explore feasibility of widening from two-lane into four-lane the road from Lanao to Pagadian to

Zamboanga. Most of these sections are part of the AH26. At present, four-lane (Class 1) sections of AH26 stands at 13.3% (Table 4.20 for road classification).



Source: DPWH data.

Figure 4.16 Asian Highway's Section in Mindanao

Table 4.20 Classification of Asian Highway

Classification	Description	Pavement Type
Primary	Access controlled motorway	Asphalt or cement concrete
Class I	Highway with 4 or more lanes	Asphalt or cement concrete
Class II	2 lanes	Asphalt or cement concrete
Class III	2 lanes (narrow)	Double bituminous treatment

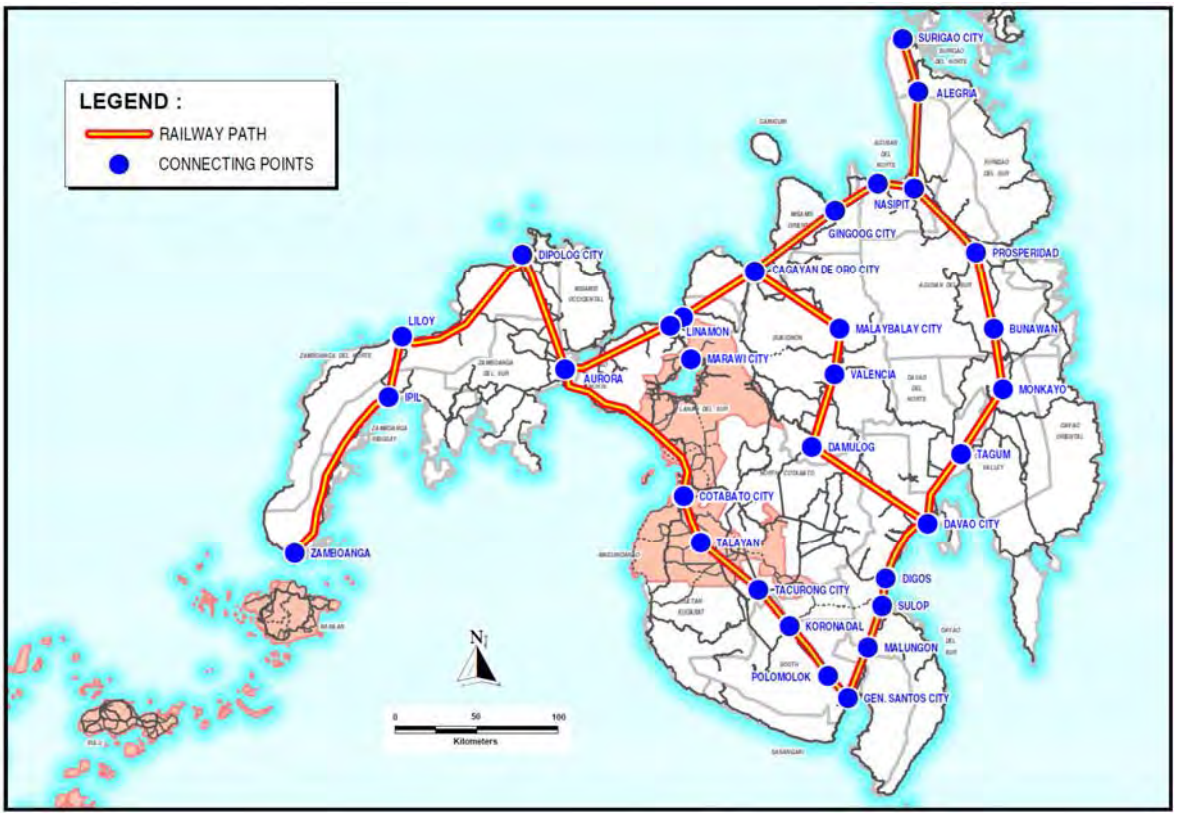
Source: Asian Highway Standards, UNESCAP, 1995.

Mindanao's railway plan

There is a wide clamor to build a Mindanao circumferential railway system, but this has not been realized due to its substantial investment requirement that puts to question its economic feasibility. Nonetheless, short-run railways in high traffic areas are being seriously considered (Cagayan–Iligan corridor). A feasibility study for an 82.5 km railway from Cagayan de Oro to Iligan has been completed and is undergoing review for possible external financing.

The Mindanao Development Authority (MinDA) initiated Mindanao 2020 Peace and Development Framework Plan (2011–2030); according to the plan, the construction of Mindanao's first railway will start by 2016 and its operation in 2020. In Phase I, the railway will be completed between Cagayan–Iligan Corridor with an estimated budget of PHP 57,733 million and financed through PPP.

Since the priority lines are outside of Bangsamoro and financing and implementation plans are not yet clear, the impact of this project to the Study seems to be minimal. The alignment and stations of the railway are illustrated in Figure 4.17.



Source: Data from BDP1.

Figure 4.17 Mindanao Railway Plan

(1) Overview of issues, objectives and strategy

The issues and challenges that need to overcome to establish a properly functioning road network that respond to the socio-economic development needs of Bangsamoro have been identified in the previous section. At the outset, the road network is not complete leaving wide area inaccessible. Likewise, the narrow and poor condition and alignment of Narciso Ramos Highway affects transport of agri-products from this agricultural corridor. Further, the limited operation of the Polloc port has forced shippers in the Bangsamoro region to truck out their cargoes either to Gen. Santos, Davao or Cagayan de Oro. The issues, objectives and strategies to pursue in establishing plan for the road sector are illustrated in Figure 4.18.

Development Issues	Development Objectives	Development Strategies
- Conflict affected areas and poorest region in the country - Agriculture is the mainstay of the economy - Poor and incomplete road network - Limited operation of the primary port to support freight transport	- To supply a road network supporting peace building and poverty reduction - To develop road network supporting agroindustry and tourism development - To pursue completion of the road network - To revitalize primary port and pursue road network supporting freight transport	- Establishment of road network supporting poverty alleviation - Establishment of road network for agro-industry and tourism development - Establishment of road network for balance development of all Bangsamoro areas - Establishment of logistics corridors

Figure 4.18 Road Sector's Development Issues, Objectives, and Strategies

(2) Development objectives

The development objectives are further described as follows:

1) To provide road network supporting peace building and poverty reduction
   - Roads supporting development of MILF camps
   - Roads providing access to areas with high poverty incidence
   - Roads facilitating easy access to services such as hospitals, government centers, markets, etc.
3) To develop road network supporting agri-industry development
   - Roads which provide access to agricultural potential areas
   - Roads which connect agricultural production areas to agri-processing centers
   - Roads linking agri-processing centers to market centers
4) To pursue completion of the road network
   - To pursue roads which serve as missing links in the network
   - To pursue identified new roads essential for the completion of the network
5) To revitalize primary port and pursue road network supporting freight transport
   - Roads linking ports/airports to agricultural production areas/agro-processing centers
   - Strengthening of roads that link Bangsamoro region to alternative ports
   - Roads supporting strengthening of primary urban functions

(3) Development strategies

Establishment of road network supporting poverty alleviation

One of the development issues to be addressed in Bangsamoro is the widespread poverty primarily caused by armed conflicts that has been there for decades and shortages of infrastructure supply like roads. Figure 4.19 shows the locations of municipalities identified as having the highest poverty incidence (i.e., more than half of the population). Some of the areas experiencing extreme poverty happened to be hosting some of the missing links. Elimination of these missing links coupled with program addressing the poor condition of farm-to-market roads will significantly contribute in the overall effort to alleviate poverty in the Region. Thus, the following strategies should be pursued:

1) Rehabilitate/strengthen primary roads down to farm-to-market roads located in the poverty areas to provide reliable means of transportation; and
2) Explore the suitability of labor-based approach to construction of farm-to-market and other roads, and to maintenance for provincial, municipal and farm-to-market roads to provide employment opportunities to these socially deprived people.

Establishment of road network for agri-industry development

One of the strategies being pursued in the plan to energize the economy of the Region is the promotion of agri-industries having comparative advantage. An interview survey conducted by the agri-industry experts of the JST has revealed that efforts by the private sector to invest in plantation development composed of banana, coffee and cacao are in advance stage. Locations of these newly planned plantations are depicted in Figure 4.20.

Currently, access road of these areas identified for agri-industry development are in poor condition and major upgrading of existing roads as well as construction of new roads are necessary to provide reliable means of transportation. Likewise, the Cotabato - Marawi road has potential to become agricultural growth area thus strengthening of this corridor as well as upgrading of its secondary roads (provincial, municipal and farm-to-market roads) is vital. These efforts should be extended as well to roads leading to rice paddies and cultivated lands. The following strategies therefore will be pursued:

1) Strengthening of Cotabato–Marawi road to serve future growth of agriculture and agri-industry plants along this corridor,
2) Rehabilitate farm-to-market roads leading to rice paddies and cultivated areas, and
3) Development of tourism infrastructure along the corridor and strengthening access roads leading to tourism sites.

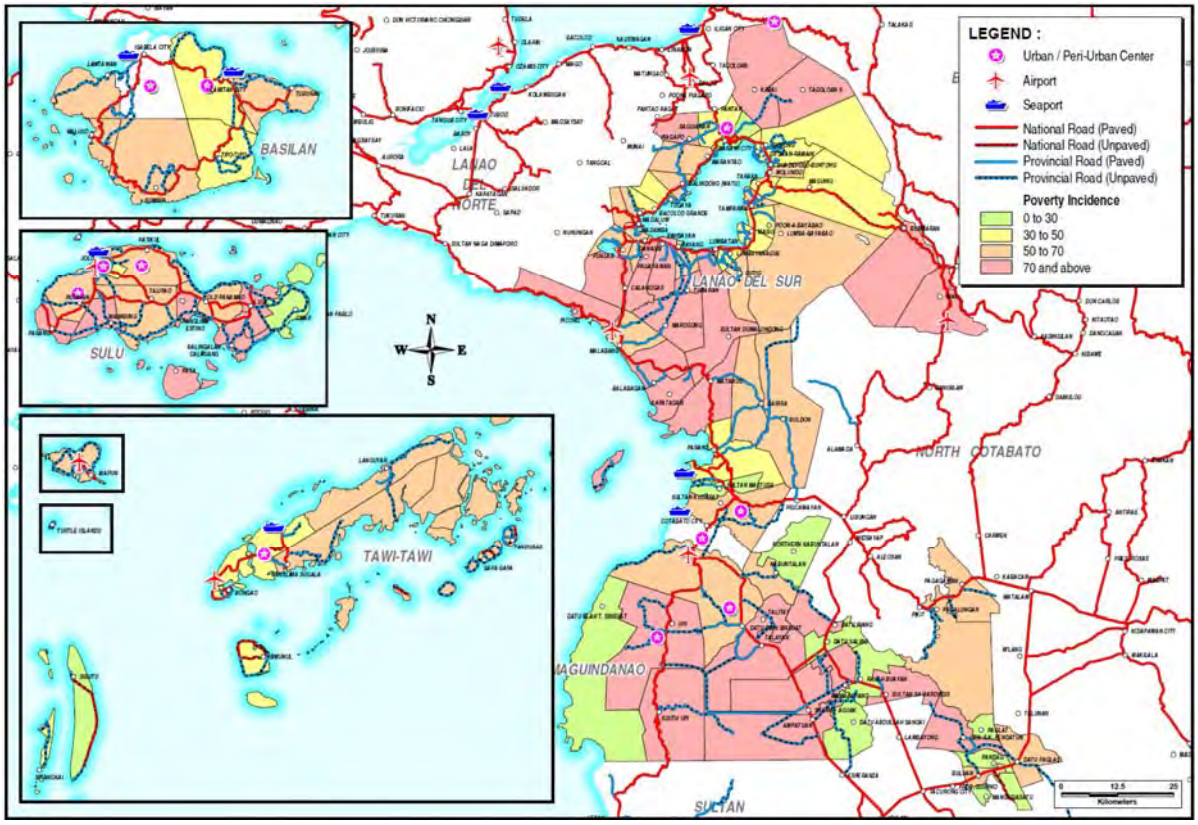


Figure 4.19 Poverty Incidence (2012), Road Network and Road Conditions

Establishment of road network for balance development of all areas

As mention, one of the issues affecting development of the Bangsamoro region is the absent of access roads to some potential areas. This lack of roads isolates the communities and hold back development in the areas. Likewise, agro products produced by farmers greatly suffer from high transportation cost further aggravating the little income they could get. Further, these missing links of the network affect law enforcement. The following strategy will therefore pursue:

1) Eliminate identified missing links to attain balance development of the Bangsamoro region; and
2) Pursue realization of the identified new roads necessary for the whole network of Bangsamoro to function effectively

Establishment of logistics corridors

1) Definition of logistics corridors

A logistics corridor may be defined as a transport link formed to serve as the major trunk route between terminals and play an important role for an effective transport of cargoes and passengers. The transport corridor often traverses a number of major urban centers and is composed of road, ports at both terminals of the link, trade facilities, major telecommunication link, power grid, oil pipeline, and alike. Terminals of a transport link are commonly composed of major urban centers, sea ports, inland container depots (ICDs), economic zones, and other major industrial areas (Figure 4.21).

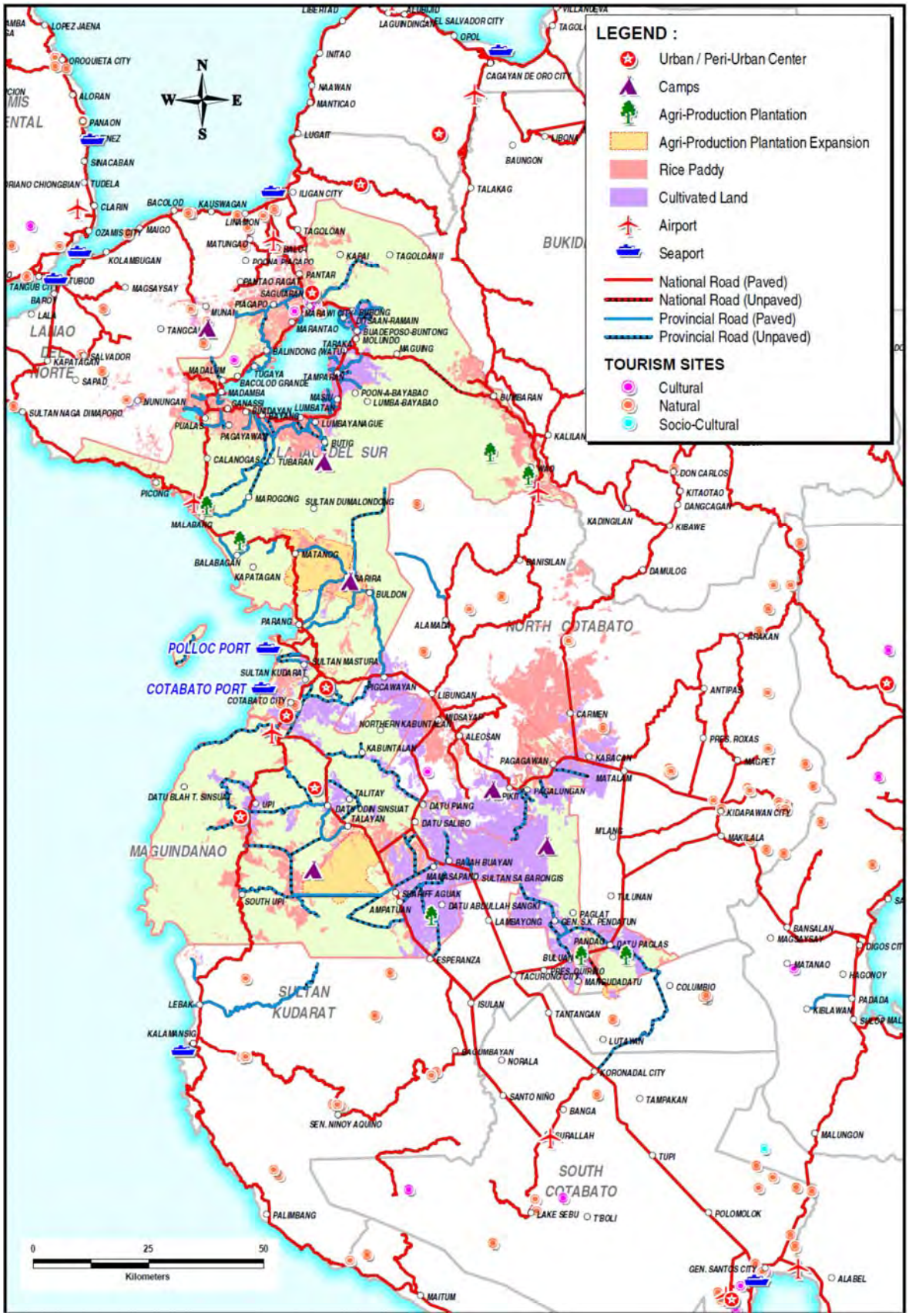


Figure 4.20 Location of Existing Agri-industry, Possible Expansion and Road Network Conditions

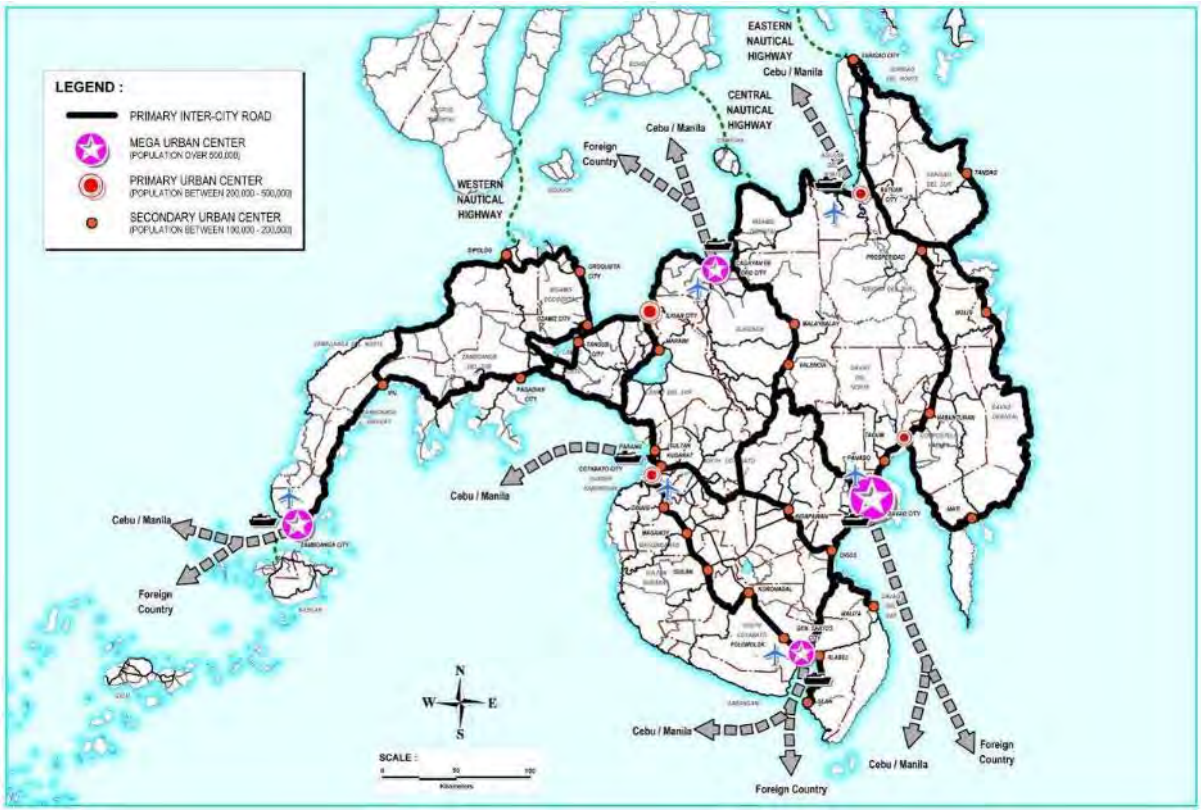


Figure 4.21 Inter-city Road Network of Mindanao as Logistics Corridors

2) Identified logistics corridors in Bangsamoro

In the Bangsamoro region, there are at least three roads that have potential to become logistics corridors and critical for strengthening to support the revitalization of the Polloc port (Figure 4.22). Once the port is revitalized, the intention is not only to capture back the lost traffic to other ports but also offer a reasonable alternative to both domestic and international port cargoes produced outside the Bangsamoro region. These are (i) Cotabato–Marawi–Iligan–Cagayan de Oro referred as Northern Corridor (ii) Cotabato–Kidapawan–Davao referred as Central Corridor, and (iii) Cotabato–Koronadal–Gen. Santos referred as Southern Corridor. The Cotabato–Kabacan–Kibawe–Cagayan de Oro might serve as alternative route for the Northern Corridor. The outlines of these identified logistics corridors are as follows and their key components are summarized in Table 4.21:

a. Northern Corridor: This corridor traverses from central to north of Mindanao originating from Cotabato City and passing the major towns of Parang, Malabang, and the cities of Marawi, Iligan before linking up to Cagayan de Oro City. This corridor has high potential for agricultural growth due to suitability of soil and availability of large agricultural land. The conditions of road however are currently poor in terms of road surface and road alignment. This road is not yet suitable for container traffic due to sharp curves that limit maneuverability.

   An alternative route to the Northern Corridor is via Kabacan–Kibawe. This corridor follows the Cotabato–Davao road before move north in the city of Kabacan to follow Sayre Highway passing the cities of Valencia and Malaybalay until it hit the city of Cagayan de Oro.

b. Central Corridor: This corridor serves from west to east passing the thriving municipalities of Sultan Kudarat, Pigcawayan, Midsayap, Pikit, Kabacan and the cities of Kidapawan and Digos. This corridor is passing Mindanao's largest plain and produces most of the region's rice supply. The road conditions are generally good and there is an ongoing effort by DPWH to widen the road carriageway from two-lanes to four-lanes.

c. Southern Corridor: This corridor links the Bangsamoro region to the thriving city of Gen. Santos passing the major towns of Datu Odin Sinsuat, Shariff Aguak, Esperanza, Isulan and the cities of

Tacurong and Koronadal. Newly identified sites for banana and cacao plantations are along this corridor in the town of Talayan. Road conditions of this corridor are generally good and efforts by DPWH for expansion from two-lane to four-lane have been ongoing for years.

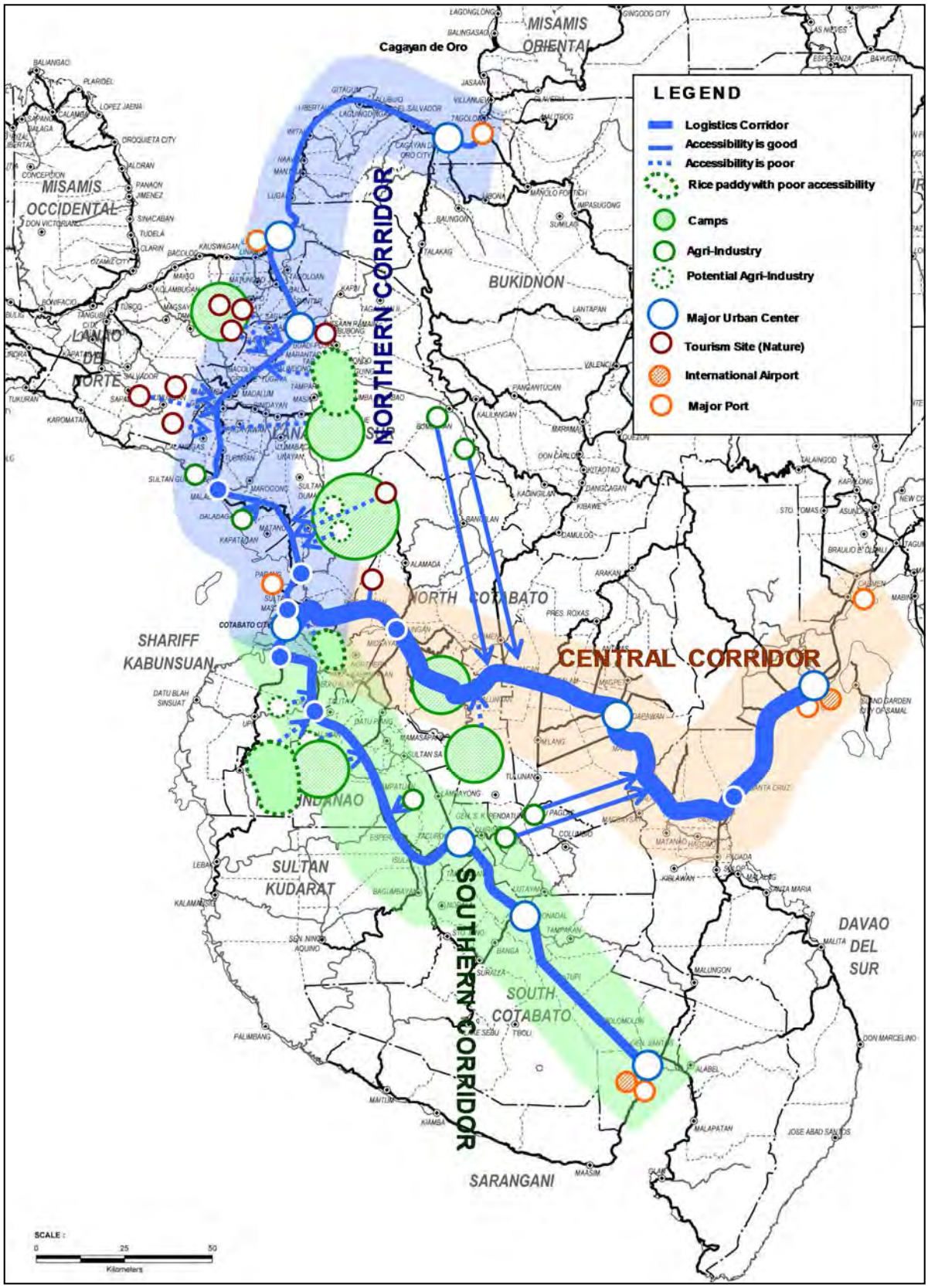


Figure 4.22 Possible Logistics Corridor for Bangsamoro

Table 4.21 Key Components of Three Logistics Corridors

Corridor	Trunk road			Port	Airport
	From	via	To		
a. Northern Corridor	Cotabato City	Marawi Carmen	Cagayan de Oro City	Macabalan Port and Mindanao Container Terminal	Laguindingan International Airport
b. Central Corridor	Cotabato City	Kidapawan	Davao City	Sasa Port	Davao International Airport
c. Southern Corridor	Cotabato City	Koronadal	Gen. Santos City	Makar Wharf	Gen. Santos International Airport

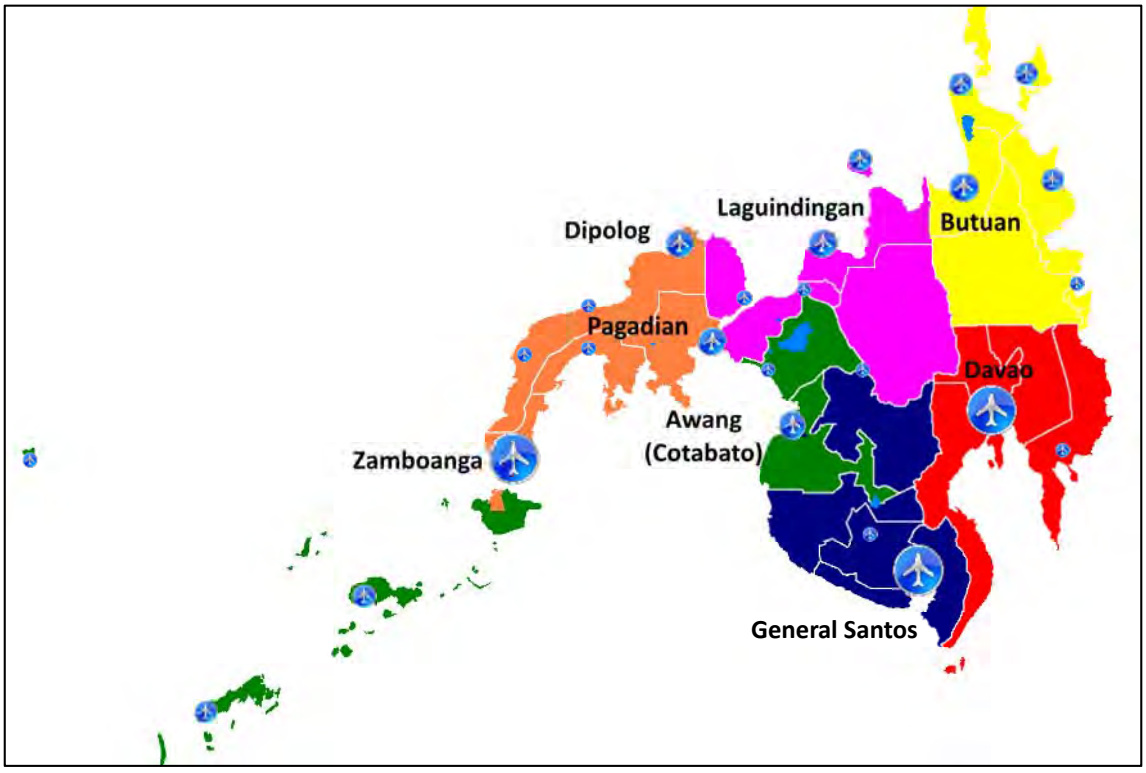
These Bangsamoro corridors should be reflected in the Mindanao logistic corridors pursued by MinDA and DPWH with the support of ADB.

4.2 Air Transport

4.2.1 Existing air transport

(1) Airports in Mindanao

Mindanao has three international airports located in Davao, General Santos, and Zamboanga; five principal class I airport located in Cagayan De Oro (Laguindingan), Butuan, Pagadian, Dipolog and Awang (Cotabato); six principal class II airports located in Surigao, Siargao, Tandag, Camiguin, Jolo and Sanga-Sanga; and more than 10 community airports in each region (Figure 4.23; Table 4.22).



Source: JICA Study Team.

Figure 4.23 Locations of Airports in Mindanao

These airports serve air transport needs according to the airport classification of the Philippines. *International airports* are airports capable of handling international flights. Airports in this category include airports that currently have or have previously served international destinations. *Principal airports* are airports that only serve domestic destinations. There are two types: *Class 1 principal*

airports capable of serving jet aircraft with a capacity of at least 100 seats and *Class 2 principal airports* capable of serving propeller aircraft with a capacity of at least 19 seats. *Community airports* are airports that are used primarily for general aviation. Most feeder airports belong to this category.

Table 4.22 Airports in Mindanao by Category

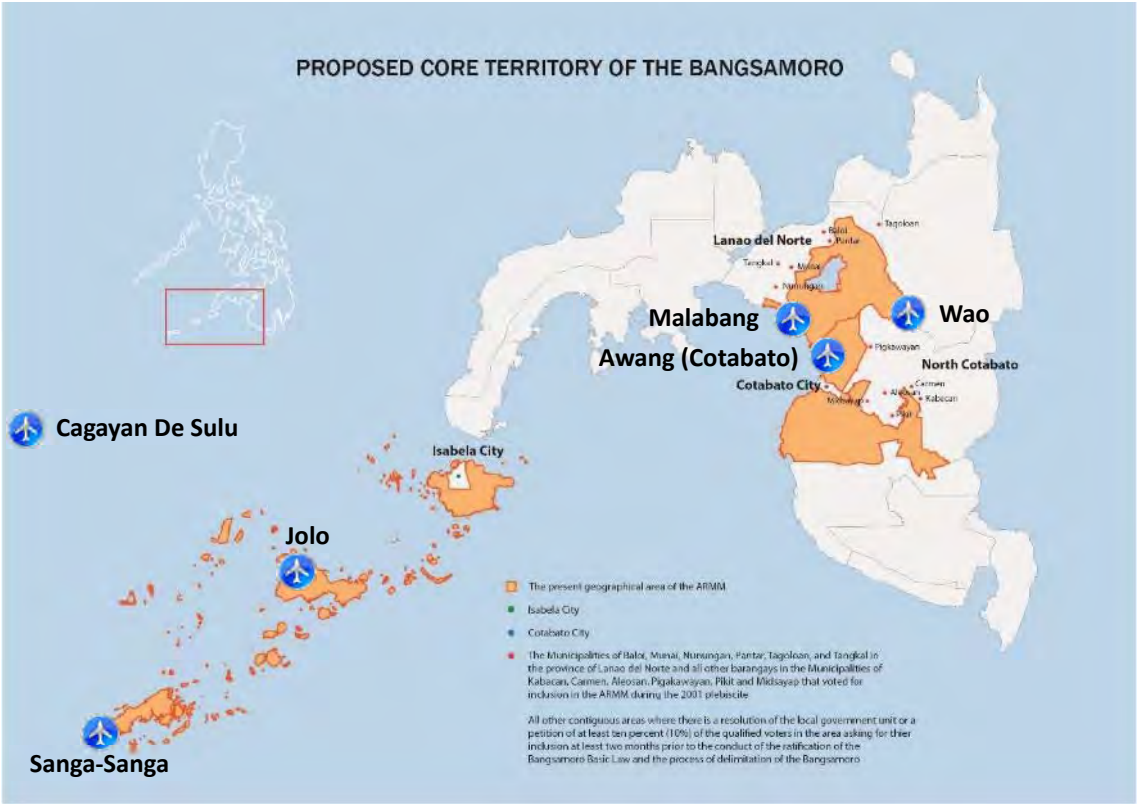
Category	Airports
International	Davao, General Santos, Zamboanga
Principal Class 1	Laguindingan (Cagayan De Oro), Butuan, Pagadian, Dipolog, and Awang (Cotabato)
Principal Class 2	Surigao, Siargao, Camiguin, Tandag, and Jolo, Sanga-Sanga
Community	Bislig, Mati, Iligan, Ozamiz, Allah Valley, Liloy, Ipil, Siocon, Malabang, Cagayan De Sulu, etc.

Source: CAAP.

(2) Airports in Bangsamoro

Overview

Bangsamoro has one principal class I airport located in Awang, Datu Odin Sinsuat, Maguindanao; two principal class II airports located in Sanga-Sanga, Tawi-Tawi and Jolo, Sulu, and two community airports in Malabang in the province of Lanao del Sur, and Cagayan De Sulu (Mapun), Tawi-Tawi (Figure 4.24). There is a newly established feeder airport in the municipality of Wao which is now operational.



Source: JICA Study Team.

Figure 4.24 Location of Airports in Bangsamoro

Cotabato airport

Cotabato airport is serving the general area of Cotabato City, located in the province of Maguindanao. The airport is classified as a class 1 principal (major domestic) airport by the Civil Aviation Authority of the Philippines, a body of the Department of Transportation and Communications (DOTC) that is responsible for the operations of not only this airport but also of all other airports in the Philippines

except the major international airports. While the airport services Cotabato City, the airport is located in Barangay Awang in neighboring Datu Odin Sinsuat, Maguindanao. The existing airport facilities and the operational status are summarized in Table 4.23.

Jolo airport

Jolo airport is serving the general area of Jolo, located in the province of Sulu. It is the only airport in the province of Sulu. The airport is classified as a class 2 principal (minor domestic) airport. The existing airport facilities and the operational status are summarized in Table 4.24.

Sanga-Sanga airport

Sanga-Sanga airport is serving the general area of Bongao, the capital of the province of Tawi-Tawi. The airport is classified as a class 2 principal (domestic) airport. The existing airport facilities and the operational status are summarized in Table 4.25.

Cagayan de Sulu airport

Cagayan de Sulu Airport (in Filipino, *Paliparan ng Cagayan de Sulu*; in Cebuano, *Tugpahanan sa Mapun*) also known as Mapun Airport is a remote community airport located in the island and municipality of Mapun, Tawi-Tawi. It is classified as a community airport. Presently, there is no airlines in service at this airport but it is used by the military. The existing airport facilities and the operational status are summarized in Table 4.26.

Malabang airport

Malabang airport is an airport of the Malabang municipality in the province of Lanao del Sur. It is the only airport in the province. This airport is classified as community airport or a minor commercial airport by the Civil Aviation of the Philippines. Presently, no airlines are serving this airport and mainly the runway is utilized for drying corns and coconuts. The existing airport facilities and the operational status are summarized in Table 4.27.

Wao airport

Wao community airport is located in the province of Lanao del Sur. This airport has only a few flights for personal use. The existing airport facilities and the operational status are summarized in Table 4.28.

Table 4.23 Existing Facilities at Cotabato Airport

	Classification	Item	Airport facilities	Status*
1	Technical Information	Name of airport	Cotabato (Awang) Airport	
		Airport codes	ICAO Code: RPMC	
			IATA Code: CBO	
		Location	Town/City, Province: Awang, Datu odin Sinsuat, Cotabato City	
			Region: ARMM XI	
			Aerodrome Area Cluster: XI	
		Classification	Principal Class 1	
		Land area	36.1 ha	
		Threshold 10	Latitude: 07° 10’ 0.2496” N Longitude: 124° 12’ 6.89217” E Elevation: 54.6027 m	
		Threshold 28	Latitude: 07° 09’ 45.84695” N Longitude: 124° 13’ 7.57687” E Elevation: 46.9204 m	
		Airport reference point	Latitude: 07° 09’ 53.0483’ N Longitude: 124° 12’ 37.2345 E	
		Runway designation no.	10/28	
		Runway elevation	54.6027 m AMSL	
		Runway efficient grade	0.406% downhill towards threshold 28	
		Runway pavement	PCN 44 R/A/W/u	

	Classification	Item	Airport facilities	Status*
		strength		
		True bearing	THR10-THR28: 103° 21’ 58.0”	
			THR28-THR10: 283° 22’ 05.6”	
2	Aircraft Movement Area	Runway	1,913 m x 45 m (paved w/ concrete, overlaid w/ asphalt)	
		Apron	256 m x 100 m (concrete)	
		Taxiway	2–18 m x 83 m (asphalt overlay)	
		Stopway	43.9 m x 45.3 m/44.7 m x 44.3 m	
		Clearway	60 m x 45 m both ends	
		Runway shoulder	Macadam	
		Strip	2,100 m x 130 m	
3	Airport Facility	Passenger terminal bldg.	72.00 m x 16.00 m	
		Staff house	10.00 m x 8.00 m (proposed)	
		Fire station bldg.	22.00 m x 13.00 m	
		Administration bldg.	19.00 m x 16.00 m	
		Parking area	72 m x 110 m	
4	Airport Equipment	Service vehicle	L-300	Not in use (repairs needed)
		Tractor mower		
		Runway sweeper	None	
		Airlines in service	Philippine Airlines, Cebu Pacific	
		Critical aircraft	A 320	
		Airport category	Actual CAT. 4, required CAT. 6	
5	Aerodrome Rescue and Firefighting (ARFF)	Actual capacity	Water (L): 4,300; AFFF (L): 420; DCP (kg): -	
		Minimum ICAO requirements	Water (L): 7,900; AFFF (L): 474; DCP (kg): 225	
		Existing workforce	11 firefighters (9 permanent, 0 casual, 2 on job order)	
		Required	22 firefighters	
6	ANS and ATS Facilities	Radio NAVAID equipment	VOR (conventional, Wilcox 585B)	N (both systems)
			DME (ASI 1119)	Sys #1: Y Sys #2: N
		Communications equipment	VHF AM transmitter (main), 123.3 freq.: Aerocom 310	N
			VHF AM transmitter (standby), 123.3 freq.: Aerocom 310	N
			VHF AM receiver (main), 123.3 freq.; Aerocom 320	N
			VHF AM receiver (standby), 123.3 freq.: Aerocom 320	N
			VHF AM transceiver, 118.7 freq.: PAE T6TR, 50W	Y
			VHF AM transceiver, 123.3 freq.: Mentor MB, 50W	Y
			VHF AM transceiver, 123.3 freq.: PAE T6M, 10W	Y
			VHF AM transceiver, 121.5 freq.: PAE 1660, 10W	Y
			HF transceiver (M), 6.795 freq.: Yaesu FT-180A	Y
			Voice logging system (VLS): Stancil E-Series	Deck #1: N Deck #2: Y
			Integrated communication Switching System (ICSS): Denro ICSS-466	N
			CADAS: Comsoft	Y
		Meteorological equipment	WSI, WDI, and PTH: Vaisala	Y

	Classification	Item	Airport facilities	Status*
		Airfield lighting equipment	PAPI 10 (pilot side)	Y
			PAPI 28 (pilot side)	Y
			Wind cones 10 (WDIL)	Y
			Wind cones 28 (WDIL)	Y
			RTIL 10	Y
			RTIL 28	Y
			TWY edge light	Y
			RWY edge light	Y
			Threshold light 10 (elevated type)	Y
			Threshold light 28 (inset type)	Y
			Rotating beacon	Y

*Y = operational; N = non-operational; †PTB = passenger terminal building

Source: CAAP (updated by JICA Study Team).

Table 4.24 Existing Facilities at Jolo Airport

	Classification	Item	Airport facilities	Status*
1	Technical Information	Name of airport	Jolo Airport	
		Airport codes	ICAO Code: RPMJ	
			IATA Code: JOL	
		Location	Town/City, Province: Barangay Bus-Bus, Jolo, Sulu	
			Region: Region IX	
			Aerodrome Area Cluster: AACIX	
		Classification	Principal Class 2	
		Land area	22.837 ha	
		Threshold		
		Airport reference point	Latitude: 6° 03'15"N Longitude: 121° 00'30"E	
		Runway designation number	9/27	
		Runway elevation	36 m. AMSL	
		Runway efficient grade	Eff. 2.02% uphill to E (AIP data)	
		Runway pavement strength	PCN 41 R/A/W/T	
		True bearing	N 16° 14' E	
2	Aircraft Movement Area	Runway	1,845 m total length (concrete), (1,535 m x 30 m @ RWY09, 310 m x 45 m @ RWY27)	
		Apron	150 m x 60 m (concrete)	
		Taxiway	2–22.5 m x 45 m (concrete)	
		Stopway	0 m/60 m	
		Clearway	0 m/100 m	
		Runway shoulder	Macadam	
		Strip	Approx. 1,900 m x 150 m	
3	Airport Facility	PTB†	20 m x 10 m	
		Staff house		
		Fire station bldg.	25 m x 12 m	
		Administration bldg.	None	
		Parking area	70 m x 47 m (concrete)	
4	Airport Equipment	Service vehicle	None	
		Tractor mower	None	
		Runway sweeper	None	
5	Aerodrome Rescue and Firefighting	Airlines in service	PAL Express, GEN AV	
		Critical aircraft	Q400 & D328	
		Airport category	Actual CAT. 4, required CAT. 6	
		Actual capacity	Water (L): 4,800; AFFF (L): 600; DCP (kg) 270	
		Minimum ICAO	Water (L): 7,900; AFFF (L): 474;	

	Classification	Item	Airport facilities	Status*
		requirements	DCP (kg): 225	
		Existing workforce	43 (9 permanent, 18 casual, 16 on job-order)	
		Required	16 firefighters	
6	ANS and ATS Facilities	Radio NAVAID equipment	NDB	Y
		Communications equipment	VHF AM transceiver, 122.2 freq.	Y
			VHF AM transceiver (M), 122.2 freq.	Y
			VHF AM transceiver (S), 122.2 freq.	Y
			HF transceiver (M), 6.795 freq.	Y
			HF transceiver (S), 6.795 freq.	Y
		Airfield lighting equipment		n/a

*Y = operational; N = non-operational; †PTB = passenger terminal building

Source: ibid.

Table 4.25 Existing Facilities at Sanga-Sanga Airport

	Classification	Item	Airport facilities	Status*
1	Technical Information	Name of airport	Sanga-Sanga Airport	
		Airport codes	ICAO Code: RPMN	
			IATA Code: SGS	
		Location	Town/City/Province: Tubig Sallang, Bongao, Tawi-Tawi, Sulu	
			Region: ARMM	
			Aerodrome Area Cluster: IX	
		Classification	Principal Class 2	
		Land area	32 ha	
		Threshold 02	Latitude: 5° 02' 26.48129" Longitude: 119° 44' 27.26439" Elevation: 4.545 m	
		Threshold 20	Latitude: 5° 03'23.94805" Longitude: 119° 44'46.29439" 6.635 m	
		Airport reference point	Latitude: 5° 02' 55.21467" Longitude: 119° 44' 36.77939"	
		Runway designation number	02/20	
		Runway elevation	8.536 m AMSL	
		Runway efficient grade	0.442% uphill towards threshold 20	
		Runway pavement strength	PCN 39 R/A/W/T	
		True bearing	THR02-THR20: 18° 22' 9.5"	
			THR20-THR02: 198° 22' 10.3"	
2	Aircraft Movement Area	Runway	1,920 m x 30 m w/ turnaround pad @ rwy 20 (concrete)	
		Apron	156m x 50m (concrete)	
		Taxiway	None	
		Stopway	0/60m x 30m	
		Clearway	0/60m x 30m	
		Runway shoulder	(7.50 m min. both sides, macadam)	
		Strip	2,395 m x 200 m	
3	Airport Facility	PTB	10 m x 30 m	
		Staff house		
		Fire station bldg.	11.00 m x 20.00 m	
		Administration bldg.	None	
		Parking area	Under construction by DOTC	
4	Airport Equipment	Service vehicle	None	
		Tractor mower	None	
		Runway sweeper	None	

	Classification	Item	Airport facilities	Status*
5	Aerodrome Rescue and Firefighting	Airlines in service	Cebu Pacific	
		Critical aircraft	A319	
		Airport category	Actual CAT. 4, required CAT. 6	
		Actual capacity	Water (L): 2,400; AFFF (L): 300; DCP (kg): 360	
		Minimum ICAO requirements	Water (L): 7,900; AFFF (L): 474; DCP (kg): 225	
		Existing workforce	8 firefighters	
		Required	8 firefighters	
6	ANS and ATS Facilities	Radio NAVAID equipment		n/a
		Communications equipment	VHF AM transceiver (M), 122.1 freq.	N
			VHF AM transceiver, 122.1 freq.	Y
			HF transceiver, 6.795 freq.	Y
		Airfield lighting equipment		n/a

*Y = operational; N = non-operational; †PTB = passenger terminal building

Source: ibid.

Table 4.26 Existing Facilities at Cagayan De Sulu Airport

	Classification	Item	Airport facilities
1	Technical Information	Name of airport	Cagayan de Sulu (Mapun) Airport
		Airport codes	ICAO Code: RPMU
			IATA Code: CDY
		Location	Town/City/Province: Mapun, Cagayan de Sulu, Zamboanga del Sur
			Region: IX
			Aerodrome Area Cluster: IX
		Classification	Community
		Land area	No data
		Threshold	
		Airport reference point	Latitude: 7° 00' 45" Longitude: 118° 29' 43"
		Runway designation number	13/31
		Runway elevation	30 m. AMSL
		Runway efficient grade	Nil
		Runway pavement strength	17,010 kg/0.50 MPa
		True bearing	N 134° 00' E
2	Aircraft Movement Area	Runway	1,300 m x 30 m (macadam)
		Apron	60 m x 50 m (macadam)
		Taxiway	None
		Stopway	None
		Clearway	None
		Runway shoulder	Macadam
		Strip	1,410 m x 100 m
3	Airport Facility	Passenger terminal bldg.	Repair needed: terminal shed (not std.)
		Staff house	None
		Fire station bldg.	None
		Administration bldg.	None
		Parking area	None
4	Airport Equipment	Service vehicle	None
		Tractor mower	None
		Runway sweeper	None
5	Aerodrome Rescue and Firefighting	Airlines in service	GEN. AV
		Critical aircraft	Cessna & Islander
		Airport category	Actual CAT. 2, required CAT. 2
		Actual capacity	
		Minimum ICAO requirements	DCP (kg): 90

	Classification	Item	Airport facilities
		Existing workforce	8 firefighters
		Required	8 firefighters
6	ANS and ATS Facilities	Radio NAVAIDS equipment	None
		Communications equipment	None
		Airfield lighting equipment	None

Source: ibid.

Table 4.27 Existing Facilities at Malabang Airport

	Classification	Item	Airport facilities
1	Technical Information	Name of airport	Malabang Airport
		Airport codes	ICAO Code: RPMN
			IATA Code: MLP
		Location	Town/City/Province: Malabang, Lanao del Sur
			Region: Region X-ARMM
			Aerodrome Area Cluster: X
		Classification	Community
		Land area	16.05 ha
		Threshold	
		Airport reference point	Latitude: 7° 37' 6.83" Longitude: 124° 3' 15.51"
		Runway designation number	06/24
		Runway elevation	3.23 m AMSL (AIP data)
		Runway efficient grade	-/+0.578 %l
		Runway pavement strength	PCN 11 F/C/ZT
		True bearing	THR06-THR24: 061° 06' GEO, 061° 11' MAG
			THR24-THR06: 241° 06' GEO, 241° 11' MAG
2	Aircraft Movement Area	Runway	1,360 m x 18 m (concrete)
		Apron	100.00 m x 150.00 m (asphalt)
		Taxiway	None
		Stopway	100 m/35 m (macadam)
		Clearway	100 m/35 m (macadam)
		Runway shoulder	Macadam
		Strip	1,662 m x 100 m
3	Airport Facility	Passenger terminal bldg.	8.00 m x 30.00 m (old)
		Staff house	None
		Fire station bldg.	None
		Administration bldg.	None
		Parking area	None
4	Airport Equipment	Service vehicle	None
		Tractor mower	None
		Runway sweeper	None
5	Aerodrome Rescue and Fire Fighting	Airlines in service	GEN. AV
		Critical aircraft	Cessna & Islander
		Airport category	Actual CAT. 2, required CAT. 2
		Actual capacity	
		Minimum ICAO requirements	DCP (kg): 90
		Existing workforce	
		Required	
6	ANS and ATS Facilities	Radio NAVAIDS equipment	None
		Communications equipment	None
		Airfield lighting equipment	None

Source: ibid.

Table 4.28 Existing Facilities at Wao Airport

	Classification	Item	Airport facilities
1	Technical Information	Name of airport	Wao Airport
		Airport Codes	ICAO Code: None
			IATA Code: WAO
		Location	Town/City/Province: Wao, Lanao del Sur
			Region: X-ARMM
			Aerodrome Area Cluster: AAC X
		Classification	Community
		Land area	To be verified
		Threshold	
		Airport reference point	Latitude: 7° 38' 19" N Longitude: 124° 43' 57" E
		Runway designation number	18/36
		Runway elevation	536 m. AMSL
		Runway efficient grade	-/+ 0.70 %
		Runway pavement strength	To be verified
		True bearing	To be verified
2	Aircraft Movement Area	Runway	1,000.00 m x 30.00 m (macadam)
		Apron	80.00 m x 50.00 m (macadam)
		Taxiway	None
		Stopway	50.00 m/50.00 m (macadam)
		Clearway	50.00 m/50.00 m
		Runway shoulder	Macadam
		Strip	To be verified
3	Airport Facility	Passenger terminal bldg.	To be verified (Nipa Hut)
		Staff house	None
		Fire station bldg.	None
		Administration bldg.	None
		Parking area	None
4	Airport Equipment	Service vehicle	None
		Tractor mower	None
		Runway sweeper	None
5	Aerodrome Rescue and Firefighting	Airlines in service	GEN. AV
		Critical aircraft	Cessna & Islander
		Airport category	Actual CAT. 2, required CAT. 2
		Actual capacity	
		Minimum ICAO requirements	DCP (kg): 90
		Existing workforce	
		Required	
6	ANS and ATS Facilities	Radio NAVAIDS equipment	None
		Communications equipment	None
		Airfield lighting equipment	None

Source: ibid.

(3) Air transport related organizations

DOTC

The Department of Transportation and Communications (DOTC) is the executive department of the Philippine Government responsible for the maintenance and expansion of viable, efficient, and dependable transportation and communications systems as effective instruments for national recovery and economic progress. The department is responsible for the Country's land, air, sea and communications infrastructure.

CAAP

The Civil Aviation Authority of the Philippines (CAAP) is the national aviation authority of the Philippines and is responsible for implementing policies on civil aviation to assure safe, economic and

efficient air travel. The agency also investigates aviation accidents via its Aircraft Accident Investigation and Inquiry Board (AAIIB). Formerly Air Transportation Office, it is a government-owned and controlled corporation attached to DOTC for the purpose of policy coordination.

Airlines

The Philippine Airlines (PAL) is the national flag carrier of the Philippines, and it is the first commercial airline in Asia. The Philippine Airlines remains as the Country's biggest airline company, it has the largest number of international flights to the Philippines as well as domestic flights.

PAL Express, formerly Air Philippines and Airphil Express, is operating under business name of Air Philippines Corporation. The PAL Express is Philippine Airlines' answer to Cebu Pacific Air's dominance on the low cost travel market in the Philippines. As a code share of Philippine Airlines, PAL Express is operating as a full service carrier with low-cost management.

The Cebu Pacific Air is the low fare leader in the Country, it is the Country's leading domestic airline. After offering low fares to domestic destinations, the Cebu Pacific launched its international operations on November 2001. The airlines currently operate hubs in Manila, Cebu and Davao. Other low-cost airlines in the Country include AirAsia Zest, PAL Express, and Tigerair Philippines. These airlines have routes to several tourist destinations in the Country at low prices.

(4) Related policies

The concerns and suggestions for the air transportation in the ARMM Regional Development Plan Midterm Update (2013–2016) are summarized as follows.

Concerns on airport transport development in the Region

Improving air transportation in the ARMM area is consistent with the national policies and strategies for the transportation sector. Airports development in the ARMM area reflects the Government's commitment to pursue its peace and development agenda for Mindanao and supportive to the peace agreement between the Government of the Republic of the Philippines and MILF. This will also establish transport and trade links to the Philippines within the BIMP-EAGA.

The main challenges of the air transport services in the ARMM area are attributed to high oil prices and slow economic progress. Airlines traffic or routes in the ARMM area are focusing on efficiency and reasonable costs of air services operation. Evolving concerns that hamper the development on air transportation services are attributed to continued high fuel cost, regressive regional economy and inadequate infrastructure development, which must be given priority consideration to meet future demand.

Suggestions of regional spatial strategy for air transportation

Airports development shall focus on the Cotabato airport in Maguindanao as an entry to mainland Bangsamoro and the Sanga-Sanga airport in Tawi-Tawi for the island provinces. The Cotabato and the Sanga-Sanga airports shall be developed to attain the CAAP quality standards and encourage more investors in these provinces.

The siege in Zamboanga City paralyzed the economy of the island provinces, hence, the Autonomous Regional Government of ARMM shall pursue air connectivity of Tawi-Tawi to Metro Manila and vice-versa as an alternate gateway to Zamboanga City. This will be complemented by the opening of the Sabah, Malaysia to Tawi-Tawi route because of its proximity. This will formalize and enhance the barter trading activities in the province and will maximize the current cooperation under the BIMP-EAGA.

Another air connectivity being proposed is the Davao City to Tawi-Tawi route to facilitate and expedite the flow of goods and services. This development strategy, if materialized, will trigger economic growth of the province and the Region in general for this will increase revenue generation and employment opportunities in the area.

(5) Air traffic

Scheduled flights and frequency

The scheduled flight and frequency are shown in Table 4.29.

Table 4.29 Scheduled Flights and Frequencies (March 2015)

Airports	Destinations	Aircraft	Frequencies
Cotabato (CBO)	Manila (MNL)	A320 [180]*	Philippine Airlines operated by PAL Express (GAP): Arrival: 11:00, Departure: 11:40 (Daily) Cebu Pacific Air (CEB): Arrival: 06:35, Departure: 07:20 (Daily)† Arrival: 12:10, Departure: 12:50 (Mo/Tu/Th/Sa/Su) Arrival: 12:45, Departure: 13:25 (We/Fr)
Jolo (JOL)	Zamboanga (ZAM)	Q400 [76]*	Philippine Airlines operated by PAL Express (GAP): Arrival: 10:00, Departure: 10:20 (Mo/We/Fr)
Sanga-Sanga (TWT)	Zamboanga (ZAM)	A319 [156]*	Cebu Pacific Air (CEB): Arrival: 07:40, Departure: 08:20 (Daily)

* seating capacity; † only a few times per month

Source: Airlines.

Air traffic statistics

1) Cotabato airport

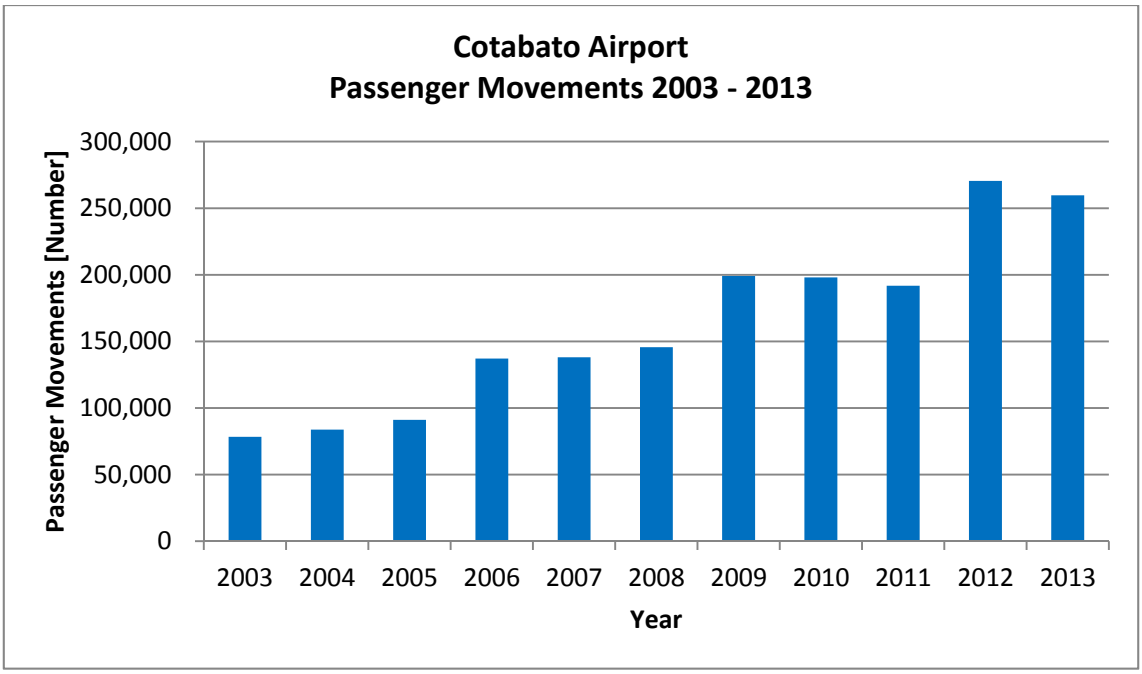
Traffic movements increased steadily at the Cotabato airport due to the A320 scheduled flight operation by the Cebu Pacific Air commenced in 2009 (Table 4.30). The inbound cargo movements also increased steadily after 2009. The outbound cargo movements, consisting of eel, crab, frozen fruits and fighting cocks, however, remained almost unchanged from the point of view of the total cargo volume (Figures 4.25 through 4.28).

Table 4.30 Air Traffic Movements at Cotabato Airport

Year	Passengers (n)			Aircraft (n)			Cargo (ton)		
	In	Out	Total	In	Out	Total	In	Out	Total
2003	38,533	39,796	78,329	718	718	1,436	392	276	668
2004	41,911	41,875	83,786	727	727	1,454	438	292	730
2005	45,692	45,411	91,103	857	857	1,714	469	351	820
2006	67,705	69,404	137,109	1,028	1,028	2,056	504	318	822
2007	68,948	69,162	138,110	1,053	1,053	2,106	599	449	1,048
2008	71,796	73,849	145,645	1,230	1,230	2,460	582	303	886
2009	97,069	102,035	199,104	1,681	1,681	3,362	800	335	1,135
2010	97,167	100,838	198,005	1,355	1,355	2,710	989	428	1,417
2011	96,596	95,184	191,780	1,409	1,409	2,818	1,095	421	1,516
2012	131,345	139,100	270,445	1,738	1,738	3,476	1,412	463	1,874
2013	127,109	132,589	259,698	1,843	1,843	3,686	1,613	482	2,095

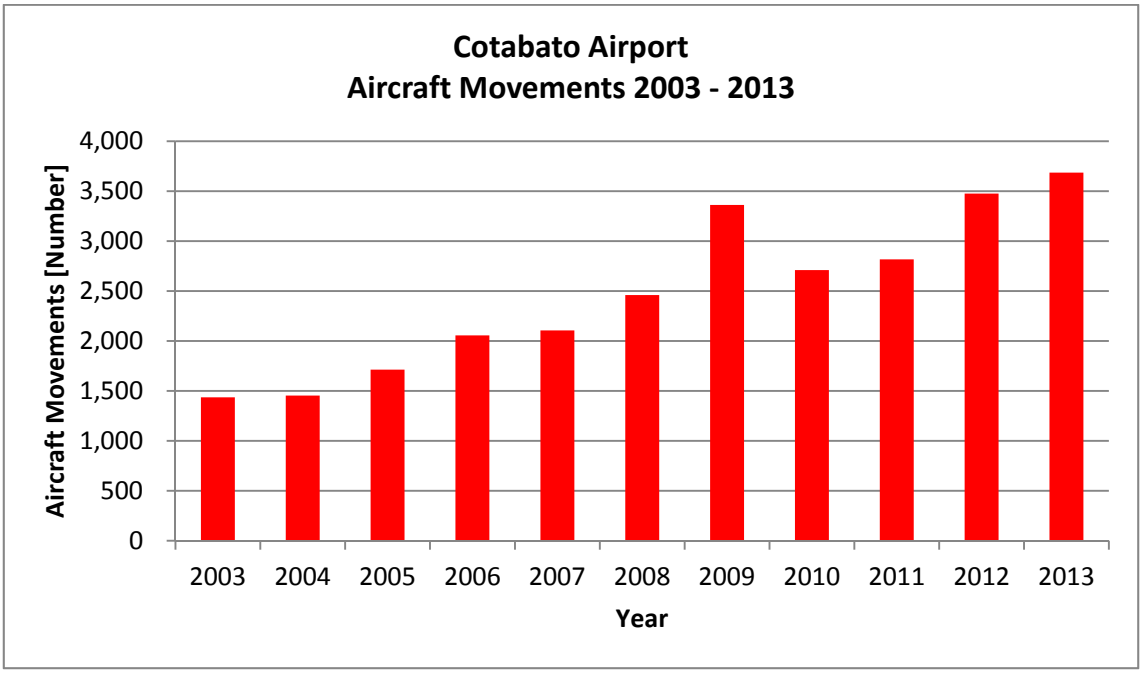
Source: CAAP-CBO.

The other notable occurrences which might have adversely affected the air traffic movement at the Cotabato airport are: outbreak of SARS, and bombing at the terminal building in 2013, global financial crisis during 2007–08, and runway maintenance in 2011.



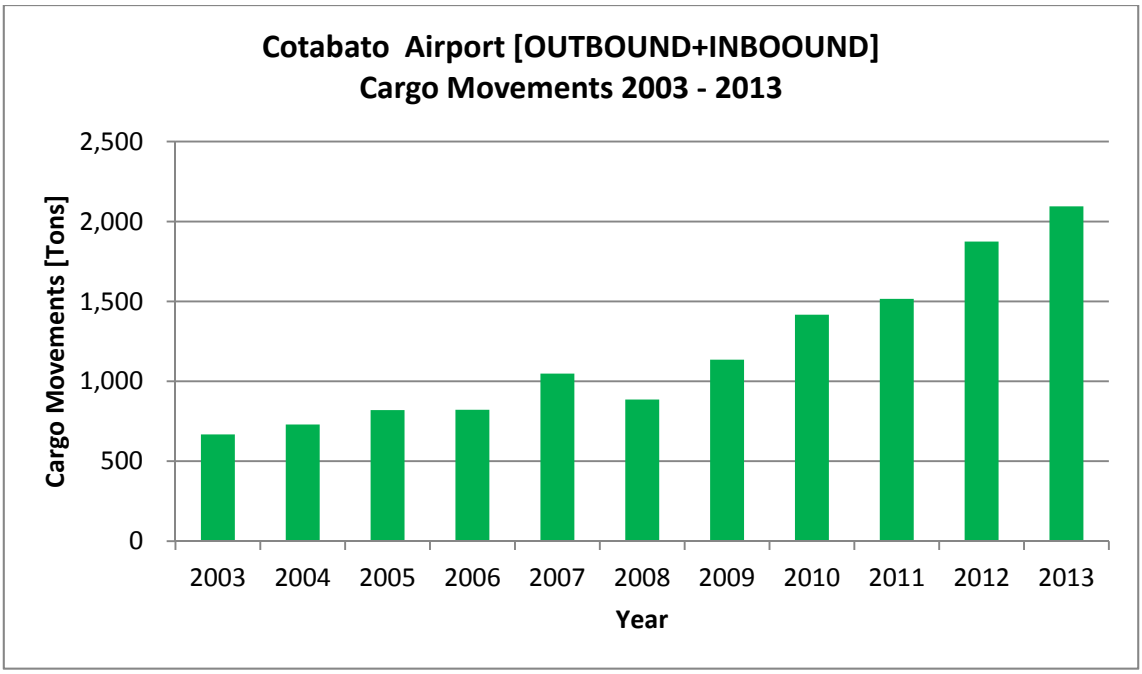
Source: CAAP-CBO.

Figure 4.25 Air Passenger Movement at Cotabato Airport (2003–2013)



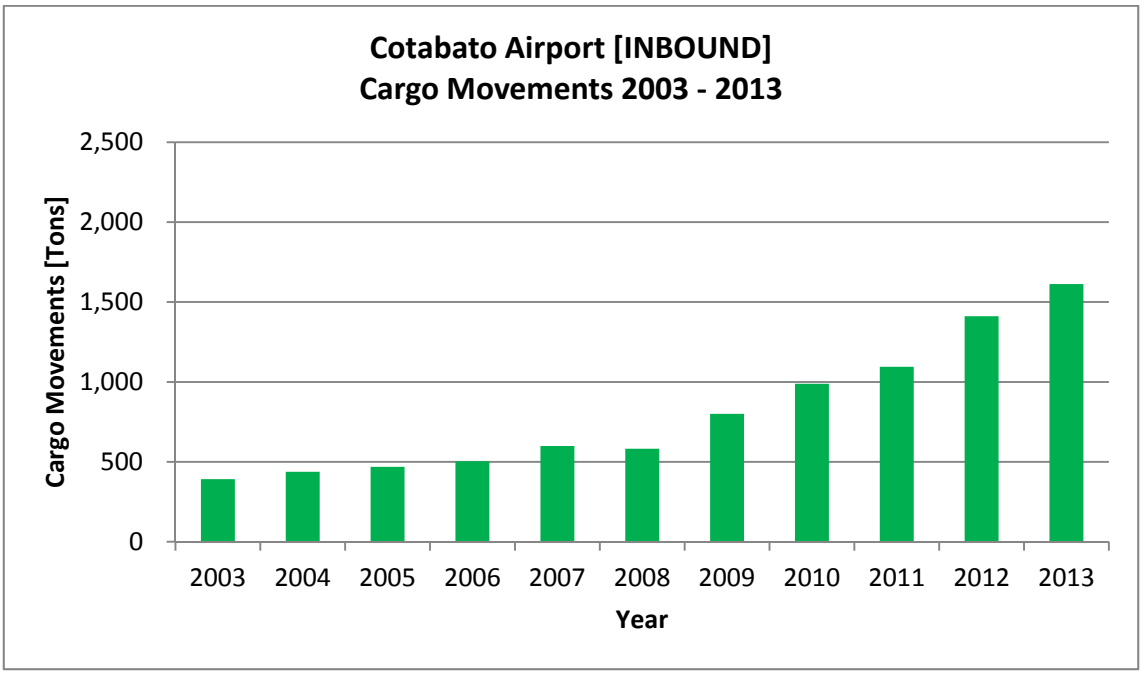
Source: CAAP-CBO.

Figure 4.26 Air Traffic Movement at Cotabato Airport (2003–2013)



Source: CAAP-CBO.

Figure 4.27 Outbound of Air Cargo Movement at Cotabato Airport (2003–2013)



Source: CAAP-CBO.

Figure 4.28 Inbound of Air Cargo Movement at Cotabato Airport (2003–2013)

2) Jolo airport

The passenger movement at the Jolo airport remains almost unchanged from 2007. The aircraft movement was decreased since the small aircraft with 17 seats was operated until 2008 but PAL and CEB started the flight to the airport by bigger aircrafts from 2009 until 2014. Then CEB finished the operation in 2014. Currently, PAL only operates the flight to the airport up to now. The cargo movement was drastically increased by the operation of the courier companies from 2013 (Table 4.31).

Table 4.31 Air Traffic Movements at Jolo Airport

Year	Passengers (n)			Aircraft (n)			Cargo (ton)		
	In	Out	Total	In	Out	Total	In	Out	Total
2003									
2004									
2005									
2006									
2007	6,434	7,731	14,165	485	485	970	8	2	10
2008	6,079	6,158	12,237	454	454	908	7	5	13
2009	3,356	3,505	6,861	263	263	526	8	6	15
2010	4,890	5,016	9,906	243	243	486	12	8	20
2011	8,525	8,908	17,433	152	152	304	18	6	24
2012	8,381	8,239	16,620	154	154	308	34	5	39
2013	7,482	7,793	15,275	171	171	342	136	302	439

Source: CAAP-JOL.

(6) Tourist arrivals in Bangsamoro

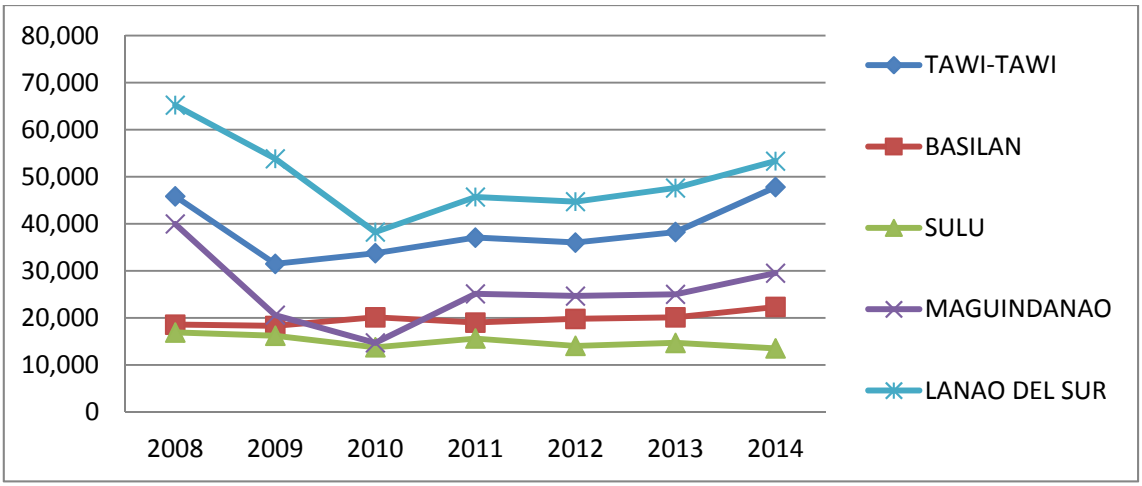
Changes are observed in the tourist arrivals in the ARMM region from 2008 to 2014, according to the data obtained from the Department of Tourism (DOT)-ARMM (Table 4.32, Figures 4.29 through 4.31). The tourist arrival data were collated based from the furnished documents of LGU Provincial Tourism Offices in the ARMM, and hotel/hostel/inns records. Marawi City tourism arrival data is included in Lanao Del Sur province.

The incident of Maguindanao massacre in 2009 is considered to be related to the decreasing trends during 2008 to 2010. Tourist arrivals in Lanao del Sur, Maguindanao and Tawi-Tawi tend to increase in recent years. On the other hand, the numbers in Basilan and Sulu tend to decrease or remain unchanged. The ratio of foreign tourists to the total tourist arrivals still remains around only 1% although drastic increase in Maguindanao was observed partly reflecting influx of donor assistance.

Table 4.32 Tourist Arrivals in ARMM (as of November 15, 2014)

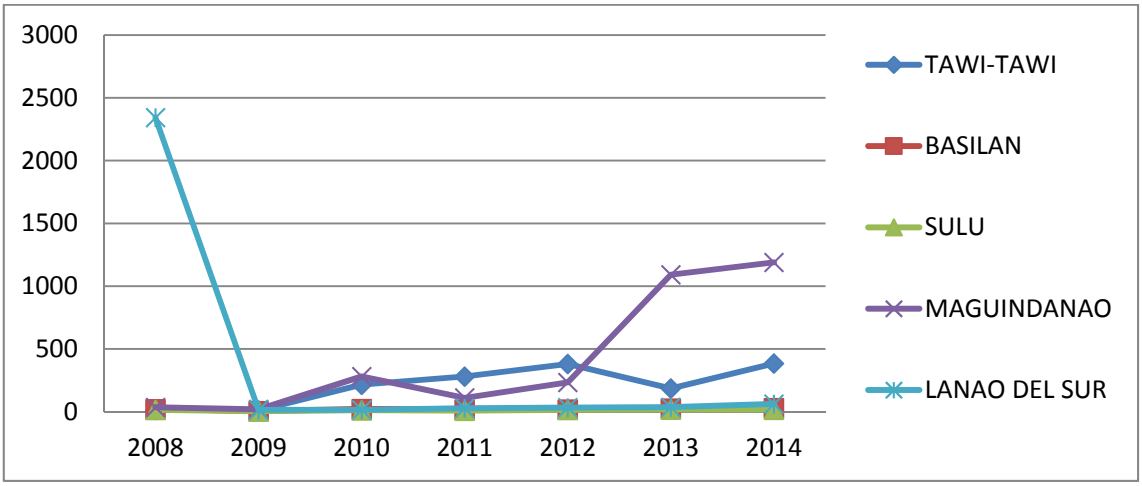
Particulars		Province					ARMM
		Tawi-Tawi	Basilan	Sulu	Maguin-danao	Lanao Del Sur	
Domestic	2008	45,840	18,570	16,900	39,970	65,210	186,490
	2009	31,500	18,300	16,200	20,600	53,830	140,430
	2010	33,755	20,130	13,763	14,720	38,240	120,608
	2011	37,067	19,019	15,636	25,117	45,693	142,532
	2012	36,025	19,799	14,067	24,663	44,700	139,254
	2013	38,244	20,117	14,690	25,014	47,619	145,684
	2014	47,805	22,330	13,515	29,517	53,333	166,500
Foreign	2008	15	20	14	34	2,343	2,426
	2009	10	4	3	18	14	49
	2010	215	21	11	280	14	541
	2011	280	16	8	110	27	441
	2012	380	17	14	233	32	676
	2013	185	25	17	1,091	35	1,353
	2014	384	28	16	1,189	61	1,678
Total	2008	45,855	18,590	16,914	40,004	67,553	188,916
	2009	31,510	18,304	16,203	20,618	53,844	140,479
	2010	33,970	20,151	13,774	15,000	38,254	121,149
	2011	37,347	19,035	15,644	25,227	45,720	142,973
	2012	36,405	19,816	14,081	24,896	44,732	139,923
	2013	38,429	20,142	14,707	26,105	47,654	147,037
	2014	48,189	22,358	13,531	41,506	53,394	168,178

Source: DOT.



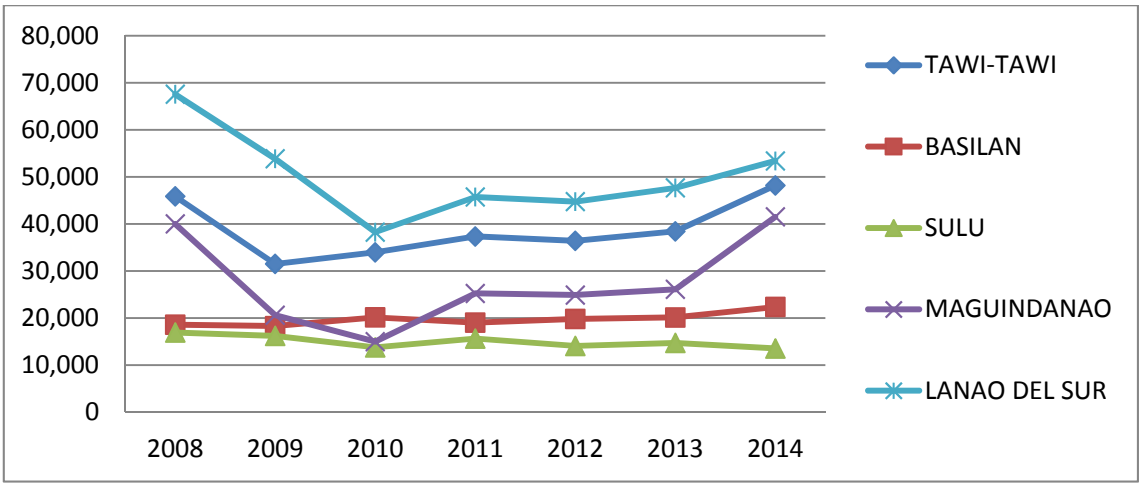
Source: DOT-ARMM.

Figure 4.29 Domestic Tourist Arrivals in Bangsamoro (2008–2014)



Source: DOT-ARMM.

Figure 4.30 Foreign Tourist Arrivals in ARMM (2008–2014)



Source: DOT-ARMM.

Figure 4.31 Total Tourist Arrivals in ARMM (2008–2014)

(7) Air linkage program of BIMP-EAGA

Currently, there is no operation for the BIMP-EAGA (Brunei, Indonesia, Malaysia and the Philippines East ASEAN Growth Area) air linkage from/to Bangsamoro airports, although the Sanga-Sanga airport is part of the air linkage program for possible international flights. The only air link exists from BIMP-EAGA to Bangsamoro is between Davao and Manado, Indonesia by charter flight operated by Sriwijaya Air of Indonesian airline.

According to the Mindanao Development Authority (MinDA), a multi-stakeholder group from Mindanao and Indonesia is poised to revive the air connectivity between Mindanao and North Sulawesi starting off with a market development strategy for the Davao-Manado route. In a meeting recently convened by MinDA, key players from tourism, trade, academe, and government line agencies agreed to take more proactive and aggressive steps in re-establishing the connectivity between the two BIMP-EAGA cities.

Reviving air links between Philippines and its EAGA counterparts is currently one of the priorities of MinDA in order to maximize the travel tax exemption approved by the Philippine government for travelers from Mindanao and Palawan heading to any of the BIMP-EAGA destinations (Figure 4.32). MinDA serves as the Philippine National Secretariat for BIMP-EAGA and coordinates with DOT and the Manado Transport and Tourism Ministry in developing the market for the Davao-Manado linkages. Among the strategies to be pursued to promote the Davao-Manado route are the development of tour packages, business matching, trade sessions, and student exchange programs. The direct flight from Davao to Manado offers a shorter route for travelers and will allow the faster movement of goods and products. Currently, passengers bound for Manado take the circuitous and costly route of Davao–Manila–Jakarta–Manado.

Source: MinDA.

Figure 4.32 Air and Sea Transport Linkage Program of BIMP-EAGA

4.2.2 Existing airport development plans

(1) Airport infrastructure programs

Airport infrastructure programs from CY 2015 to CY 2018 are shown in Table 4.33. The budget for CY 2015 program was already approved by the Government in 2014. The budget for CY 2016 programs is still in the process for finalization to submit for approval procedures this year. The budget for CY 2017 and CY 2018 will be revised depending on the progress of the other programs by the previous years.

Table 4.33 Airport Infrastructure Program for Bangsamoro Airports

(Unit: PHP 1,000)

Airport	Project	Program			
		2015	2016	2017	2018
		Approved	Proposed	Proposed	Proposed
	Total	263,250	826,600	281,005	20,000
Cotabato		5,000	51,540	0	0
1	Rehabilitation of terminal bldg.	5,000			
2	Expansion of terminal bldg. from 1,150 to 2,870 m^2 (1,718 m^2)		51,540		
Jolo		0	36,250	20,000	0
1	Payment of lot rental		19,600		
2	Runway strip grade correction		10,000		
3	Construction of VPA[1] (650m^2)		1,650		
4	Construction of temporary terminal shed (700m^2)		5,000		
5	Site development at land side area			20,000	
Sanga-Sanga		248,250	648,760	261,005	20,000
1	Site acquisition of runway extension, strip width correction, land side area and provision of RESA[2]	62,250			
2	Removal of trees/ structures/ improvement at the affected site	32,000			
3	Widening of runway from 30 m to 45 m (1,920m x 7.5m, both ends) including runway shoulder	154,000			
4	Provision of filling/embankment materials, slope protection for runway extension, apron, taxiway and land side area		371,700		
5	Asphalt overlay of existing runway		181,440		
6	Construction of CHB[3] perimeter fence		44,000		
7	Runway strip grade correction		21,650		
8	Runway extension to 2,100m (180m x 45m)		28,350		
9	Construction of stopway (60m x 45m)		1,620		
10	Construction of new apron (240m x 125m)			105,000	
11	Construction of new 2-taxiways (105m x 23m)			16,905	
12	Construction of new PTB[4] including utilities (2,100m^2)			80,000	
13	Construction of fire station bldg.			14,400	
14	Construction of administration bldg. (350m^2)			10,500	
15	Construction of control tower bldg.			25,000	
16	Construction of vehicle parking area (3,675m^2)			9,200	
17	Replacement of military camps/facilities				
18	Site development at land side area				20,000
Cagayan de Sulu		10,000	90,050	0	0
1	Construction of perimeter fence 3,020m with 1,208 bays of barbed wire with concrete posts	10,000			
2	Completion of construction of perimeter fence		9,000		
3	Concrete paving of existing runway (1,300m x 18m) with runway shoulder and clearing of runway strip		75,600		
4	Rehabilitation of terminal bldg. (280m^2) including airport utilities		5,000		
5	Payment of old obligation (improvement on public land)		450		

[1] vehicle parking area; [2] concrete hollow block; [3] runway end safety area; [4] passenger terminal building

Source: DOTC.

(2) Cotabato airport development plan

Consolidated improvement plan

According to the Airport Infrastructure programs, the expansion of the Cotabato airport is requested by the airport manager through Executive Secretary, Office of Regional Governor, ARMM, since August 2014. The expansion of the PTB would improve the capacity of the airport to serve passengers and airlines operations. The layout of the proposed plan obtained from CAAP-CBO is shown in Figure 4.33.

The proposed plan includes:

1) Improvement of existing terminal building,
2) Improvement of security fence,
3) Provision of cargo building and airlines offices,
4) Provision of airport security office and quarters,
5) Provision of CAAP guest/staff house,
6) Provision of deep well with elevated water tank,
7) Provision of access road center-island,
8) Provision of standby generation set/power house,
9) Repair and improvement of drainage system, and
10) Landscaping, ground improvement and beautification.

Other proposed improvement plans

Improvement programs were proposed for the Cotabato airport in the previous JICA study of the Master Plan Study on the Strategy for the Improvement of National Airports in the Republic of the Philippines, 2006. The JICA Study Team has clarified the status of the update on the programs with CAA-CBO and also summarized its recommendations, which can be proposed as a priority project in this study. The summary of the update is presented in Table 4.34.

(3) Jolo airport development plan

Recently, the runway improvement project was implemented with assistance from Growth with Equity in Mindanao (GEM) Program by the USAID. The runway upgrade is a partnership project of DOTC, CAAP, and USAID's GEM Program, through its Regional Impact Project component. GEM is implemented under the oversight of the Mindanao Economic Development Council.

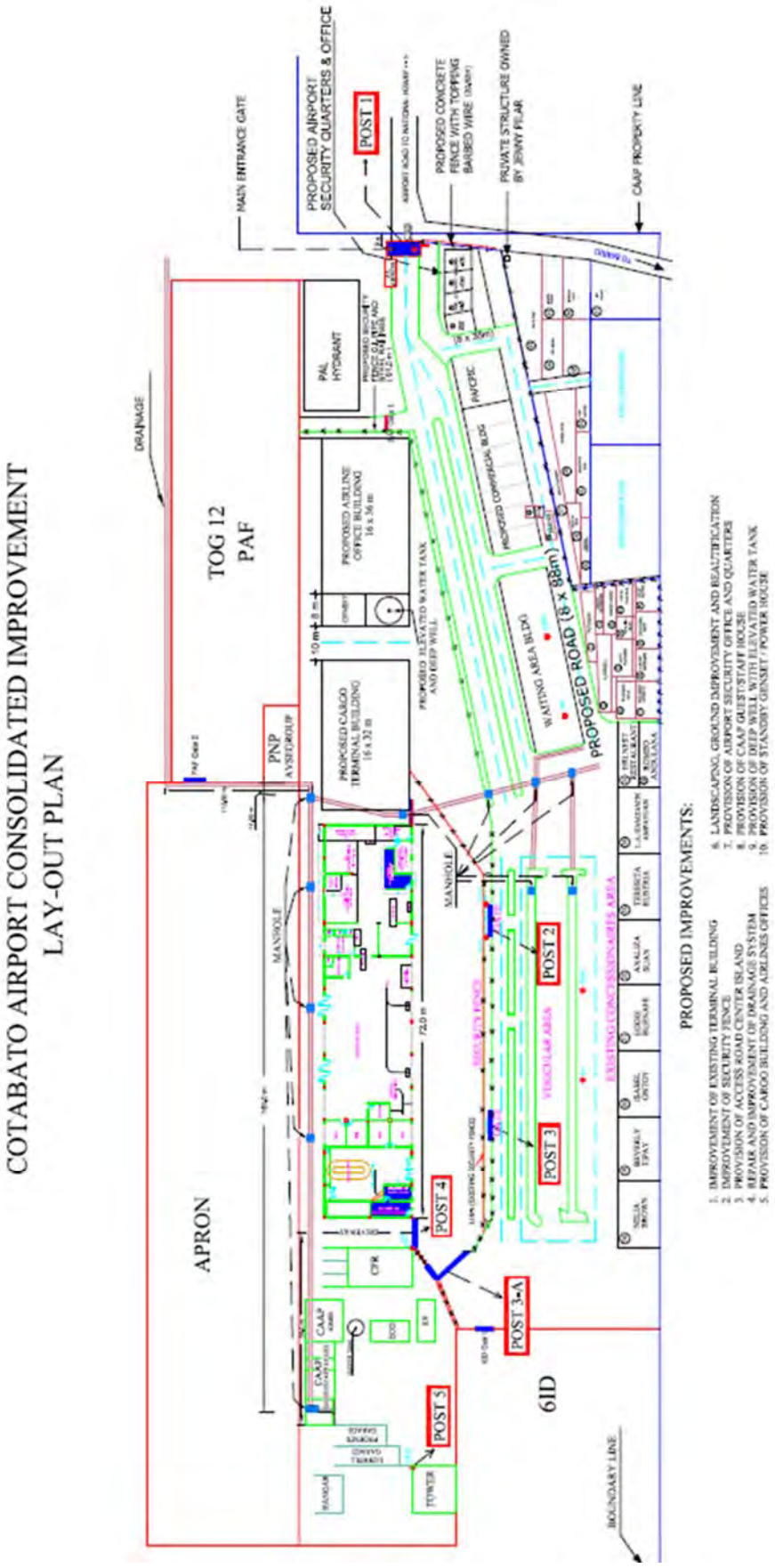
According to the site survey, civilians often intrude the runway since the perimeter fencing has not completed yet in the airport. Currently, the clearance of the runway when the aircraft take-off and landing is secured by military guards. Accordingly, the fence shall be established as high priority to ensure the security and safety of the airport in addition to the above mentioned national budget programs. Furthermore, X-ray baggage screening equipment shall be installed along with metal detector to ensure the security in accordance with the relevant regulations since the passenger baggage is currently screened one by one by manually in the airport.

(4) Sanga-Sanga airport development plan

Currently, the airport runway is being extended to 1,930 m through partnerships between DOTC, CAAP, USAID, the regional government of ARMM and the Tawi-Tawi provincial government. The Sanga-Sanga airport is part of the BIMP-EAGA linkage program for possible international flights. The proposed master plan obtained from DOTC is shown in Figure 4.34.

Like the Jolo airport, X-ray baggage screening equipment shall be installed along with metal detector to ensure the security in accordance with the relevant regulations in addition to the above mentioned national budget programs since the passenger baggage is screened one by one by manually in the airport.

According to the site survey, the land acquisition for the runway extension to the eastern side is still ongoing under negotiation with the land owners. It is expected that the negotiation will be settled without serious issue since the land owners are willing to sell the land where it cannot be utilized for the farm or the other purposes effectively.



Source: CAAP-CBO.

Figure 4.33 Cotabato Airport Consolidated Improvement Plan

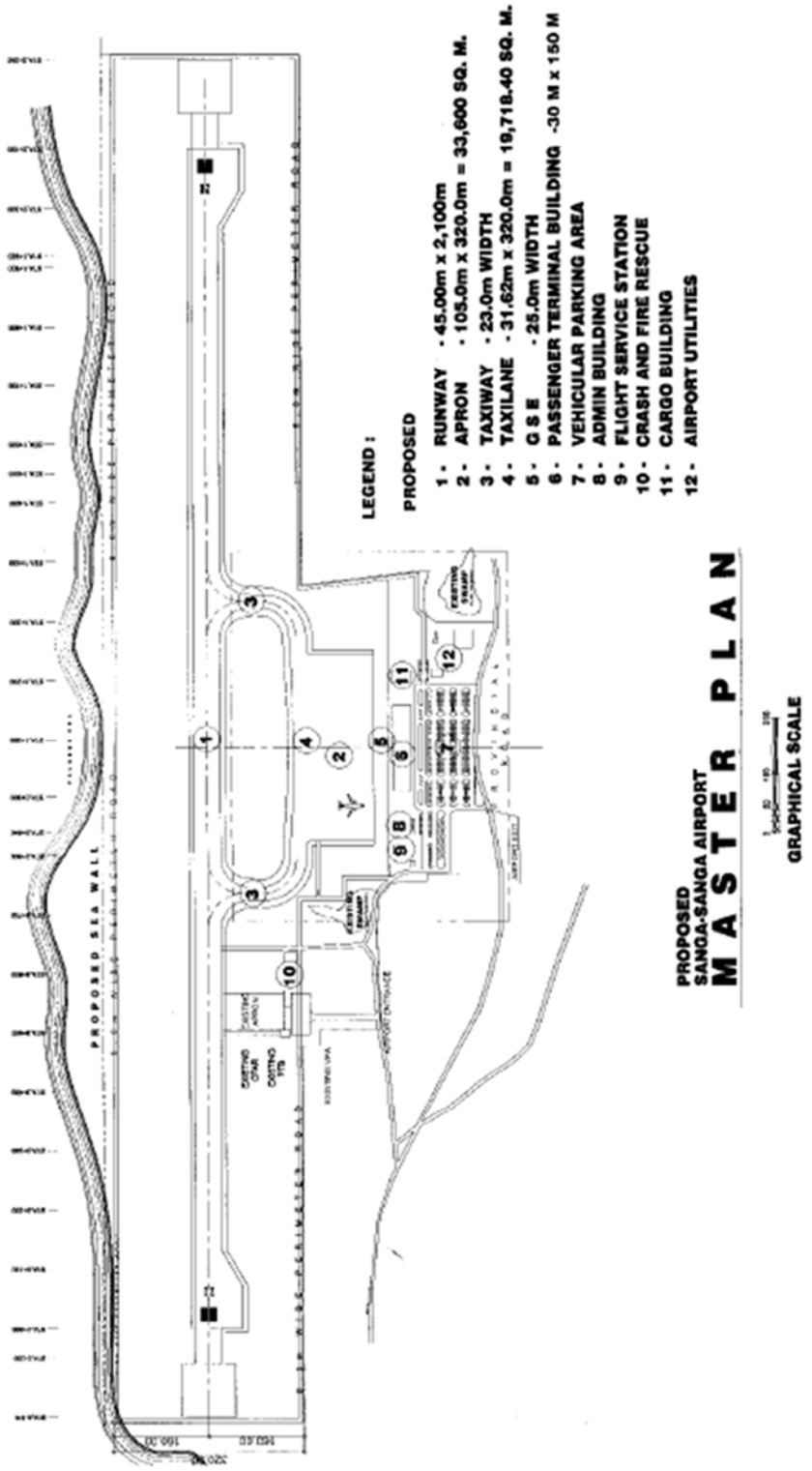
Table 4.34 Update on Cotabato Airport Improvement in Accordance with Previous JICA Study and Other Recommendations from CAAP-CBO

Classification	Item	Airport facilities	Operation status*	Proposed development plan by previous JICA study	Update in accordance with previous study	Recommendations from CAAP-CBO
Aircraft movement area	Runway	1,913 m x 45 m		Widening of the runway to 45 m to comply with ICAO Code C	Completed.	
				Extension of the runway by 135 m to the east and at the same time shifting the runway some 80 m to the east (1,970 m x 45 m), which requires extensive embankment in the western end	Not carried out.	
				Runway rehabilitation and overlay on the exiting part of the runway	Not carried out.	
	Apron	256 m x 100 m (concrete)				
	Taxiway	2 - 18 m x 83 m (asphalt overlay)				
	Stopway	43.9 m x 45.3 m / 44.7 m x 44.3 m		Provision of paved blast pads in the extension of runway ends	Not completed.	
	Clearway	60m x 45m both ends		Construction of runway end safety area (RESA)	Not completed.	
	Runway shoulder	Macadam				
	Strip	2,100 m x 130 m		Provision of a 2,090 x 150 m runway strip, including grading and landscaping	Not completed.	
				Perimeter fencing along the airside/landside border	Not completed. (On going)	
Airport facility	PTB	72.00 m x 16.00 m		Refurbishment of the existing passenger terminal (for traffic in 2029)	To be improved by the above mentioned renovation plan (still waiting budget allocation)	
				X-ray machines and metal detectors	Already installed	
	Staff house	10.00 m x 8.00 m (proposed)				
	Fire station building	22.00 m x 13.00 m				
	Administration building	19.00 m x 16.00 m				
	VPA	72 m x 110 m				
Airport equipment	Service vehicle	L-300 (not-in-use; need of repair)		1 utility vehicle	Already installed but not in use any more	Recommendations: provision 1 unit service vehicle for ANS use
				1 tractor	Already installed	
	Tractor mower			1 lawn mower	Already installed	
	Runway sweeper	None				
	Airline operator	Philippine Airlines, Cebu Pacific				
	Critical aircraft	A 320				
	Airport category	Actual CAT. 4, required CAT. 6				
Aerodrome rescue and firefighting	Actual capacity	Water (L): 4,300 AFFF (L): 420 DCP (kg): -		1 new main fire vehicle	Already installed	
	Minimum ICAO requirements	Water (L): 7,900 AFFF (L): 474 DCP (kg): 225				
	Existing workforce	11 firefighters				
	Required	22 firefighters				
ANS and	Radio NAVAID	VOR (conventional; Wilcox 585B)	N (both systems)			Recommendations: Installation of new VOR/DME

Classification	Item	Airport facilities	Operation status*	Proposed development plan by previous JICA study	Update in accordance with previous study	Recommendations from CAAP-CBO
ATS facilities	equipment	DME (ASI 1119)	Sys #1: Y Sys #2: N			equipment stipulated on the Manual of Standards (MOS); Doppler type VOR
	Communications equipment	VHF AM transmitter (main) – 123.3 freq.: AEROCOM 310	N	Communication system including VHF, Digital voice recording system, HF, etc.	To be improved based on approved CAAP APP† 2015	Recommendations: Installation of 6 new units of 50 W VHF transceiver with new antenna system; provision of test instruments for communication equipment; installation of new communication console.
		VHF AM transmitter (standby) – 123.3 freq.: AEROCOM 310	N			
		VHF AM receiver (main) – 123.3 freq.: AEROCOM 320	N			
		VHF AM receiver (standby) – 123.3 freq.: AEROCOM 320	N			
		VHF AM transceiver – 118.7 freq.: PAE T6TR; 50W	N			
		VHF AM transceiver – 123.3 freq.: Mentor MB, 50W	Y			
		VHF AM transceiver – 123.3 freq.: PAE T6M, 10W	Y			
		VHF AM transceiver – 121.5 freq.: PAE 1660, 10W	Y			
		HF transceiver (M) – 6.795 freq.: Yaesu FT-180A	Y			
		Voice logging system (VLS): Stancil E-Series	Deck #1: N Deck #2: Y			Recommendations: Installation of new voice recording system
		Integrated communication switching system (ICSS): Denro ICSS-466	N			
		CADAS: Comsoft	Y			
	Meteorological equipment	WSI, WDI, and PTH: Vaisala	Y	Meteorological equipment including meteorological stations	Already installed	Recommendations: Relocation of existing MET equipment on site
	Airfield lighting equipment	PAPI 10 (pilot side)	Y	PAPI lights	Already installed	
		PAPI 28 (pilot side)	Y			
		Wind cones 10 (WDIL)	Y			
		Wind cones 28 (WDIL)	Y			
		RTIL 10	Y	Threshold identity lights	Already installed	
		RTIL 28	Y	Ditto	Already installed	
		TWY edge light	Y	Taxiway and apron edge lights	Already installed	
		RWY edge light	Y	Runway edge lights	Already installed	
		Threshold light 10 (elevated type)	Y	Runway threshold lights	Already installed	
		Threshold light 28 (inset type)	Y	Ditto	Already installed	
		Rotating beacon	Y			
				Apron flood lighting	Not yet installed.	
				Obstacle lights for all relevant obstacles not removed	Not yet installed.	
				Simple approach lighting system (SALS) for both runway approaches	Not yet installed.	
	Control tower			Refurbishment of the existing control tower, and other buildings	To be rehabilitated based on the approved CAAP APP* 2014	Recommendations: Relocation of control tower building; provision of multi-function building for ANS/ATS technical personnel; provision of 1 unit service vehicle for ANS use

*Y=operational, N=non-operational; †Annual Procurement Plan

Source: CAAP-CBO.



Source: DOTC.

Figure 4.34 Sanga-Sanga Airport Master Plan

(5) Cagayan de Sulu airport development plan

The perimeter fencing is the first priority development for the airport to ensure the safety and security. Then the runway shall be paved to accommodate scheduled commercial aircrafts safely.

4.2.3 National airports master plan

In 2006, JICA conducted the Master Plan Study on the Strategy for the Improvement of National Airports, presenting various action plans to deliver rational improvements for the Philippines' aviation industry. However, much time has passed since then and now a new master plan for airport development is needed that suits the changes in the aviation market home and abroad, as well as economic situations.

To this end, the Philippine Government made a request to the Korean Government to establish a new master plan in line with changed conditions based on which the Korea International Cooperation Agency (KOICA), on behalf of the Korean government, has commenced the Master Plan Study on the Strategy for the Development of National Airports since December 2013 and completed in May 2015. The KOICA Master Plan Study carried out a review of the existing master plan, air traffic demand forecast, requirements analysis for future airport facilities, and establishment of airport development plan by stage (Short-Term by 2020, Mid-Term by 2025 and Long-Term by 2030).

With regard to priority of expanding nighttime operation at regional airports, among the airports where airlines have raised the need for nighttime flights, those with a non-instrument runway (Butuan, Basco, Catarman, Masbate, Clabayog, and Dumaguete) will be suggested to provide aeronautical lighting to enable nighttime flights. In addition, improvement plans are deemed necessary for the existing aeronautical lighting system under operation in consideration of its operation period after the installation.4.2.4 Development needs for Bangsamoro airports

(1) Cotabato airport

Currently, the Cotabato (Awang) airport has sufficient runway capacity to accommodate A320 aircraft as the maximum aircraft size. Although the airport still maintains essential capacity of terminal facilities to accommodate a single A320 aircraft at a time, it is desirable to improve the facilities. The capacity of the airport terminal facilities are evaluated, based on the Federal Aviation Administration's advisory circular, FAA AC 1505360-9 - Planning and Design of Airport Terminal Facilities at Non-Hub Locations.

Capacity of existing terminal building facilities

The capacity of the existing airport terminal facilities in the airport is assessed based on the advisory circular mentioned above as shown in Table 4.35. According to the evaluation, the conditions of the lobby and waiting area and the arrival area (e.g., baggage claim public space and baggage claim counter lengths) are suitable for the existing passenger movements. On the other hand, the conditions of public automobile parking spaces, concession space and the departure area (e.g., ticket counter queuing space, airline ticket counter lengths, and airline office and operational space) are not suitable for the existing passenger movements (Table 4.36).

Table 4.35 Proposed Terminal Facility Requirements for Cotabato Airport

No.	Item	Unit	Recommendation
1	Public parking spaces	n	200–270
2	Lobby and waiting area	m^2	190–240
3	Ticket counter queuing space	m^2	130–150
4	Airline ticket counter lengths	m	19–22
5	Airline office and operational space	m^2	550–650
6	Baggage claim public space	m^2	100–115
7	Baggage claim counter lengths	m	10–13
8	Concession space	m^2	170–230

Source: JICA Study Team.

Table 4.36 Capacity of Existing Terminal Facilities at Cotabato Airport

No.	Item	Unit	Value	Evaluation
1	Public parking spaces	n	150	Insufficient
2	Lobby and waiting area	m^2	400	Sufficient
3	Ticket counter queuing space	m^2	100	Insufficient
4	Airline ticket counter lengths	m	15	Insufficient
5	Airline office and operational space	m^2	170	Insufficient
6	Baggage claim public space	m^2	100	Fair
7	Baggage claim counter lengths	m	19	Sufficient
8	Concession space	m^2	80	Insufficient

Source: ibid.

Capacity of ungraded terminal building facilities

The upgraded capacity of the airport terminal facilities of the consolidated improvement plan is evaluated as shown in Table 4.37. According to the evaluation, the conditions of the ticket counter queuing space, airline office and operation space will be improved by the renovation plan although the conditions of the public automobile parking spaces and concession space still remain unimproved. Besides, the arrival area (e.g., baggage claim public space, baggage claim counter lengths) still remains the existing capacity which can accommodate only one (1) A320 aircraft arrival at the same time. It shall be expanded to the adequate capacity which can accommodate at least two (2) A320 aircraft arrival simultaneously to deal with the various styles of the scheduled flight operation flexibly in the future.

Table 4.37 Capacity of Terminal Facilities by Consolidated Improvement Plan of Cotabato Airport

No.	Item	Unit	Value	Evaluation
1	Public parking spaces	n	150	Insufficient
2	Lobby and waiting area	m^2	400	Sufficient
3	Ticket counter queuing space	m^2	160*	Sufficient
4	Airline ticket counter lengths	m	20*	Fair
5	Airline office and operational space	m^2	700*	Sufficient
6	Baggage claim public space	m^2	100	Fair
7	Baggage claim counter lengths	m	19	Sufficient
8	Concession space	m^2	80	Insufficient

*Assumed value

Source: ibid.

(2) Jolo airport

According to the advisory circular mentioned above, the proposed terminal facility requirements in accordance with the current traffic movement in the airport are recommended as shown in Table 4.38. It can be evaluated in detail once the detail of the terminal development layout drawing is confirmed.

Table 4.38 Proposed Terminal Facility Requirements for Jolo Airport

No.	Item	Unit	Recommendation
1	Public parking spaces	n	50
2	Lobby and waiting area	m^2	100–140
3	Ticket counter queuing space	m^2	40–50
4	Airline ticket counter lengths	m	5–7
5	Airline office and operational space	m^2	200–250
6	Baggage claim public space	m^2	70–80
7	Baggage claim counter lengths	m	7–9
8	Concession space	m^2	100–130

Source: ibid.

(3) Sanga-Sanga airport

According to the advisory circular, the proposed terminal facility requirements in accordance with the current traffic movement in the airport are recommended as shown in Table 4.39. It can be evaluated in detail once detail of the terminal development layout drawing is confirmed.

Table 4.39 Proposed Terminal Facility Requirements for Sanga-Sanga Airport

No.	Item	Unit	Recommendation
1	Public parking spaces	n	75–100
2	Lobby and waiting area	m^2	200–240
3	Ticket counter queuing space	m^2	70–80
4	Airline ticket counter lengths	m	10–13
5	Airline office and operational space	m^2	320–380
6	Baggage claim public space	m^2	100–110
7	Baggage claim counter lengths	m	10–13
8	Concession space	m^2	170–230

Source: ibid.

4.2.4 Review of flagship projects in BDP I

(1) Cotabato airport improvement

A feasibility study on the Cotabato airport was undertaken by ADB in 2006, which proposed to establish a new terminal area at the opposite side of the existing terminal area. The development plan presented above was proposed including the proposal of previous JICA study, "The Master Plan Study on the Strategy for the Improvement of National Airports in the Republic of the Philippines, 2006".

The proposed plan includes the following.

Airside facilities and works

- Runway strip widening and grading works
- Rehabilitation of existing runway
- Widening of existing runway from 30 m to 45 m
- Runway shoulders, turning eave and blast pads at both ends
- Taxiway and apron
- Runway extension of 110 m
- Airside roads (rescue and firefighting, apron, and maintenance and air service roads)
- Perimeter fence and roads
- Demolition of various obstacles

Landside facilities and works

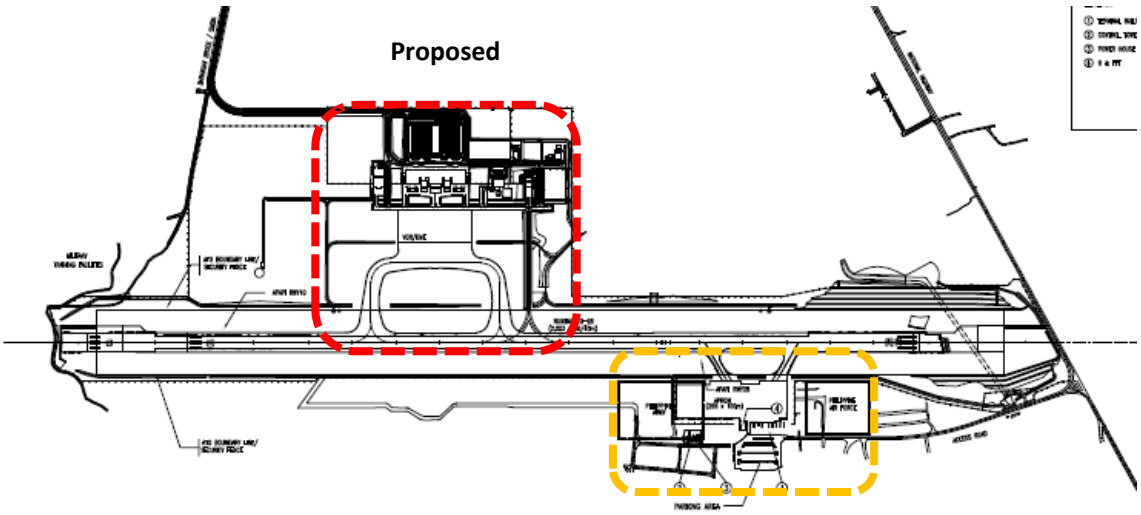
- New the PTB
- New cargo terminal building
- Other new buildings (administration and operations, rescue and fire-fighting, power house, solid waste disposal, chiller pump house, and control tower)
- New landside roads, security fences, and parking facilities
- Drainage (runway strip, apron, road, and parking)

Equipment

- Navigational aids (DVOR, DME, remote control, and power supply)
- ATC and communications (VHF system, voice switch control system, recording equipment, and UPS
- Airfield ground lighting (high intensity simple approach lighting system for RWY 30 and 12; high intensity runway edge lighting; high intensity runway end lighting; high intensity runway threshold lighting; medium intensity taxiway edge lighting; apron flood lighting; obstacle lighting; illuminated wind cones)
- Airfield maintenance (tractor; grass mower; utility vehicle)

- One fire fighting vehicle

The layout of the proposed master plan for new terminal area development is shown in Figure 4.35.



Source: ADB.

Figure 4.35 New Terminal Area Development Plan of Cotabato Airport

The outstanding issues for the Cotabato airport development are presented as follows.

1) Land acquisition

The formal compensation procedure had already been done properly but the settlement with unjustified claimers still remains. The development plan shall be commenced after completion of the settlement.

2) Visibility of control tower

Currently both of the runway edges are not visible from the control tower, which violates the relevant regulations due to the obstacles by the military facilities. The inappropriate condition shall be improved in accordance with the relevant regulations.

3) Constraints on runway expansion

The eastern edge of the existing runway is adjacent to the arterial road. Therefore, it is difficult to extend the runway in that direction. The western edge of the runway is located on the top side of the cliff. Therefore the massive embankment is required for the extension on this side. The development shall be undertaken including the alternatives of new airport development.

4) Relocation of the existing VOR/DME facility

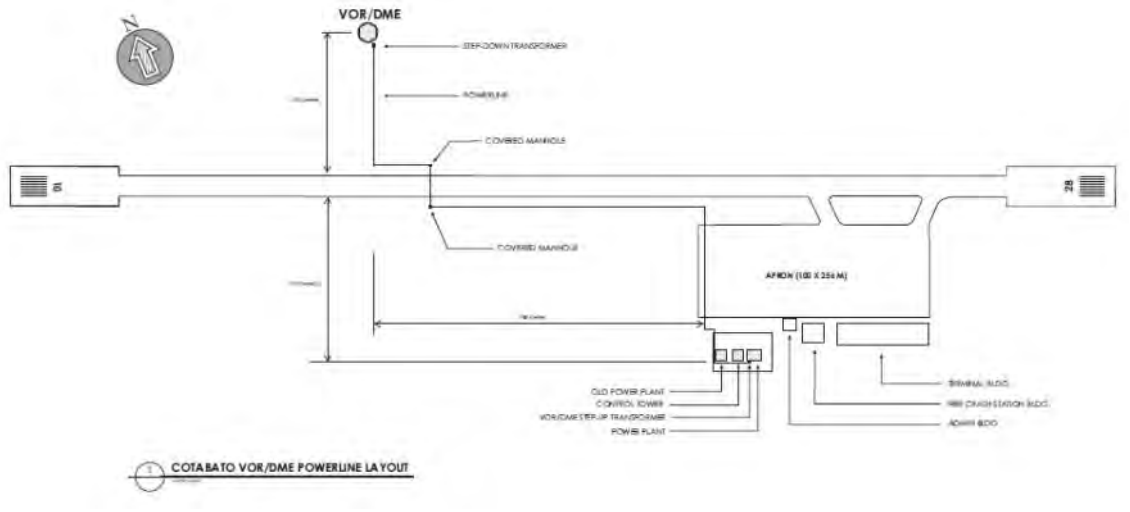
The existing VOR/DME facility is located in the proposed new terminal area (Figure 4.36). Therefore, the facility shall be relocated to the proper area in compliance with the relevant regulations as necessary.

(2) Baloi airport improvement

The Baloi airport also known as the Iligan (Maria Christina) airport is an airport serving the general area of Iligan City, located in the province of Lanao del Norte. It is the only airport in the province. The airport is classified by CAAP as a secondary airport, or a minor commercial domestic airport. Located some 400 m above the sea level, the Baloi airport has the distinction of being the highest airport in Mindanao and the second-highest in the Philippines, next to the Loakan airport in Baguio City.

The Laguindingan airport was constructed in Barangay Moog, Laguindingan, Misamis Oriental, and is located 46 km away from Cagayan de Oro City, Misamis Oriental. The airport is located only 65 km away or at most 35 to 40 minutes away from Iligan City. With the construction of the Laguindingan airport, designed to serve the Cagayan de Oro-Iligan corridor (CIC), the Baloi airport could be replaced

by the new airport along with the Lumbia airport in Cagayan de Oro City. The Lumbia airport now serves as a military base for the Philippine Air Force (PAF). In consideration of the situation of the airport development in this region, it is necessary to examine how to ensure and expand the air traffic demand at the Baloi airport.



Source: CAAP-CBO.

Figure 4.36 Location of Existing VOR/DME Facility at Cotabato Airport

(3) Study on creation of Bangsamoro international airport

The Cotabato airport still has sufficient capacity on runway to accommodate A320 aircraft as maximum size aircraft. Furthermore, the airport also still has essential capacity on terminal facilities for accommodating a single A320 aircraft at one time. It is considered, however, that it is not easy to increase the frequency of flights between Manila and Cotabato due to the congested slot coordination at the NANA even if the traffic demand is increased in the future. In consideration of the situation, careful consideration is necessary to ensure the viability of a new airport in advance starting from the discussion regarding the candidate sites.

4.2.5 Air traffic demand

Air traffic demand forecasts until 2030 of the Cotabato, Jolo and Sanga-Sanga airport were carried out by the KOICA Master Plan Study in consideration of socio-economic development projected for population, gross domestic product (GDP), and gross regional domestic product (GDRP). The results for each airport are summarized as shown in Tables 4.40 through 4.42, respectively.

(1) Cotabato airport

The demand forecast for the airport is summarized as shown Table 4.40. For the domestic passenger movement, the ratio of demand in 2030 to that in 2012 is 2.78 times with the compound annual growth rate (CAGR) in 2012–30 at 5.8%. For the domestic cargo movement, the ratio of demand in 2030 to that in 2012 is 2.48 times with the CAGR in 2012–30 at 5.2%.

(2) Jolo airport

The demand forecast of the airport is summarized as shown in Table 4.41. For the domestic passenger movement, the ratio of demand in 2030 to that in 2012 is 1.36 times with the CAGR in 2012–30 at 1.7%. For the domestic cargo movement, the ratio of demand in 2030 to that in 2012 is 1.41 times with the CAGR) in 2012–30 at 1.9%.

(3) Sanga-Sanga airport

The demand forecast of the airport is summarized as shown in Table 4.42. For the domestic passenger movement, the ratio of demand in 2030 to that in 2012 is 2.79 times with the CAGR in 2012-30 at 5.9%. For the domestic cargo movement, the ratio of demand in 2030 to that in 2012 and the CAGR in 2012-30 are not set due to the lack of cargo data in 2012 as the base year.

Table 4.40 Air Traffic Demand Forecast for Cotabato Airport (2015–30)

Item	Year				
	2012 (actual)	2015	2020	2025	2030
1. Passenger					
International		-	-	-	-
Domestic	240,484	329,158	442,920	556,216	669,139
General aviation		2336	2504	2,684	2,878
Subtotal		331,494	445,424	558,900	672,017
2. Cargo (ton)					
International		-	-	-	-
Domestic	1,748	2,276	2,960	3,645	4,329
General aviation	-	-	-	-	-
Subtotal	1,748	2,276	2,960	3,645	4,329
3. ATM* International					
4. ATM* Domestic					
Large jet		-	-	-	-
Medium size jet		-	-	-	-
Small jet	2004	2,082	3,048	3,827	4,604
Turboprop	-	694	1,016	1,276	1,535
Short takeoff and landing		-	-	-	-
Subtotal	2004	2,777	4,064	5,103	6,139
5. ATM* GA	405	417	446	479	513
Total	2409	3,194	4,510	5,582	6,652

*ATM = air traffic movement

Source: KOICA Master Plan Study Report.

Table 4.41 Air Traffic Demand Forecast for Jolo Airport (2015–30)

Item	Year				
	2012 (actual)	2015	2020	2025	2030
1. Passenger					
International		-	-	-	-
Domestic	16,912	18,259	20,009	21,605	23,077
General aviation		-	-	-	-
Subtotal	16,912	18,259	20,009	21,605	23,077
2. Cargo (ton)					
International		-	-	-	-
Domestic	40	30	38	47	56
General aviation	-	-	-	-	-
Subtotal	40	30	38	47	56
3. ATM International					
4. ATM Domestic					
Large jet		-	-	-	-
Medium size jet		-	-	-	-
Small jet		-	-	-	-
Turboprop	304	332	378	408	444
Short takeoff and landing	-	-	-	-	-
Subtotal	304	332	378	408	444
5. ATM GA	-	-	-	-	-
Total	304	332	378	408	444

Source: ibid.

Table 4.42 Air Traffic Demand Forecast for Sanga-Sanga Airport (2015–30)

Item	Year				
	2012 (actual)	2015	2020	2025	2030
1. Passenger					
International		-	-	-	-
Domestic	16,295	23,550	31,193	38,460	45,427
General aviation		-	-	-	-
Subtotal	16,295	23,550	31,193	38,460	45,427
2. Cargo (ton)					
International		-	-	-	-
Domestic	-	31	41	50	59
General aviation	-	-	-	-	-
Subtotal	-	31	41	50	59
3. ATM International					
4. ATM Domestic	-	-	-	-	-
Large jet					
Medium size jet	-	-	-	-	-
Small jet	-	-	-	-	-
Turboprop	-	453	600	740	874
Short takeoff and landing	-	-	-	-	-
Subtotal	-	453	600	740	874
5. ATM GA	-	-	-	-	-
Total	-	453	600	740	874

Source: ibid.

4.3 Port Development

4.3.1 Port system and water traffics

(1) Philippine port system strategy

The Philippine Development Plan (PDP) 2011–16 was formulated by the National Economic Development Authority (NEDA) through coordination and collaboration of all departments/agencies of the National Government, government-owned and controlled corporations (GOCCs), government financial institutions (GFIs) and State Universities and Colleges (SUCs) in identifying and prioritizing key programs and projects.

As part of the PDP, "The Study on the Master Plan for the Strategic Development of The National Port System in the Republic of the Philippines" was carried out by the Department of Transportation and Communications (DOTC) with support from JICA in January 2004. The Philippine Port System Strategy (PPOSS) was drawn up in the study as summarized in Table 4.43.

For strategic ports development in Mindanao, Davao, Cagayan de Oro, Zamboanga and General Santos are selected as the international ports out of nine ports in the Philippine to be a major "window" to the global market that will be developed until 2024. This means that Mindanao Island is considered very important for the sea transportation network especially transportation of agricultural and marine products.

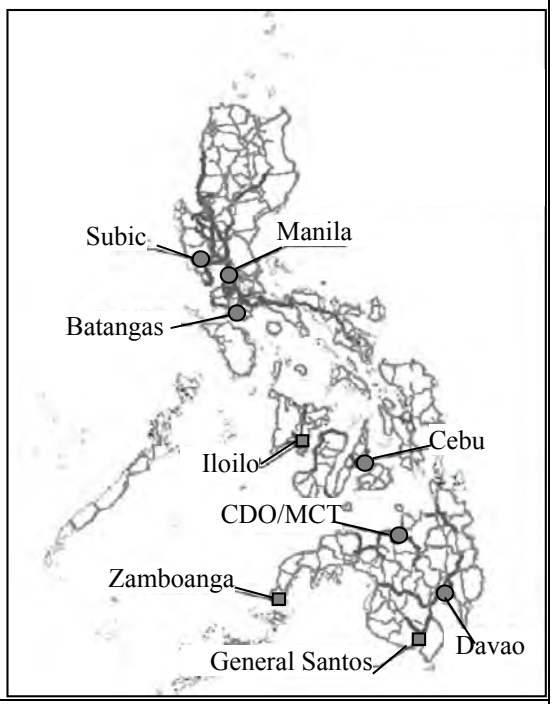
(2) Existing ports networks

Ports network in Mindanao

The existing ports network in Mindanao is shown in Figure 4.37. The ports are classified as follows:

1) Base ports as major ports operated by the Philippine Port Authority (PPA),
2) Terminal ports for lesser activities operated by PPA,
3) Secondary ports,
4) Private ports, and
5) Fishing ports.

Table 4.43 Philippine Port System Strategy

Mission	1. Establishment of a fast, economical, reliable and safe maritime transport network accelerating the development of national economy 2. Formation of maritime transport bases to support regional society	
Planning Strategies	Establishment of a nationwide port development plan coordinated with the plans of various port management public corporations	
	Port classification LEGEND International Gateway Port Principal International Trade port 2-lane national road 4-lane national road  	
	Principles for planning	
	1) Establishment of nationwide maritime transport	1) Concentrated Development of Specific International Container Gateway Bases 2) Improvement of Domestic Container Transport Efficiency 3) Development of Facilities for Break Bulk and Bulk Cargo 4) Port Planning at the Greater Capital Region 5) Formation of Major Corridors
	2) Formation of maritime transport bases to support regional society	1) Enhancing the Mobility of People and Goods in the Region 2) Securing Transportation Bases to Support Daily Life in Remote Islands 3) Supporting Social Reforms
	Strategic development port	Investment in long term development plan (2004-2024); about 150 billion pesos Investment in short term development plan (2004-2009); about 41 billion pesos
Management and Operation	Modification of port administration as well as improvement of port management/operation - Establishment of National Plan for Port Development (NPPD) Council - Increasing cargo handling efficiency - Appropriate port tariff setting	
Investment and Financing	Investment scheme and proper financial resource allocation for feasible port development - Proposed financial policies for public port development - Acceleration of private sector participation to port projects	

Source: The Study on the Master Plan for the Strategic Development of the National Port System in the Republic of the Philippines.

Administratively, PPA is mandated to develop commercial ports all over the Philippines as well to regulate private ports and control port tariffs. Other small municipal ports are operated by respective LGU's.

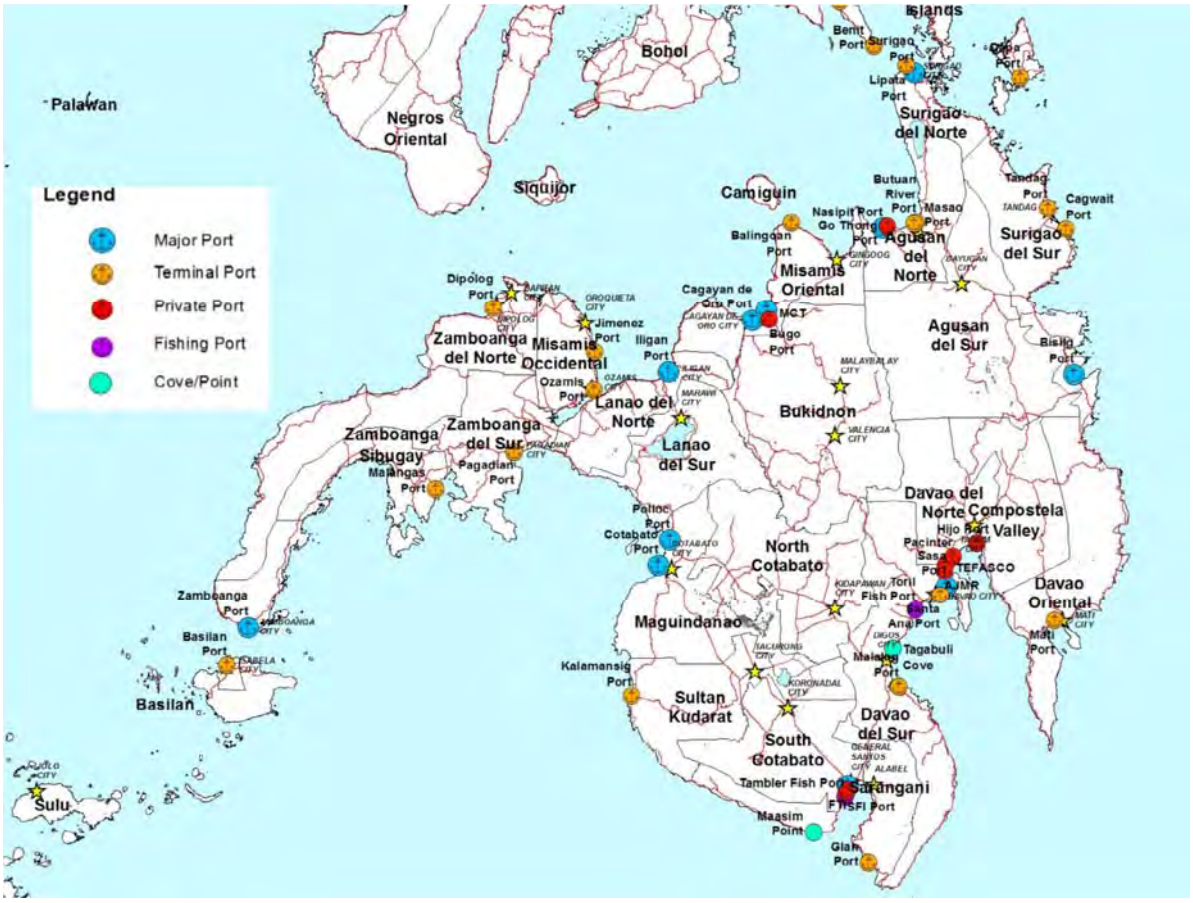


Figure 4.37 Existing Ports in Mindanao

Ports network in Bangsamoro

The port network in the Bangsamoro region includes 13 major ports as shown Figure 4.38 (*Final Report* of the Survey on Mindanao Logistics Infrastructure Network, Volume 1, *Main Report*, January 2014, Applied Planning and Infrastructure, Inc.). One is under the Regional Economic Zone Authority (REZA), 11 ports under the Regional Ports Management Authority (RPMA) and one under the Philippine Ports Authority (PPA).

(3) Cargo and passenger traffics and ship calls

Water traffics and ship calls at major ports in Mindanao

There are four major ports surrounding the Bangsamoro region: Davao, General Santos, Zamboanga, and Cagayan de Oro. Figures 4.39 to 4.41 show the historical change of cargo throughput, passenger traffic and ship calls for four major ports, respectively. An average annual growth rate of cargo throughput at the Davao port is 5.7%. Other ports exhibit the annual growth rates between 2.1% and 5.0% as shown in Figure 4.39.

The average annual growth rate for passenger traffic at the Zamboanga port decreased significantly at -3.9% in recent years as shown in Figure 4.40. Cagayan de Oro, General Santos and Davao recorded also a decline at -1.8%, -14.4%, and -18.5%, respectively. The decrease in the number of passengers could be attributed to introduction of low cost carrier (LCC) by the air transport companies which directly compete with existing sea routes.

The number of ship calls at Zamboanga has drastically decreased, while cargo throughput has slightly increased. This means that the average ship size calling at the Zamboanga port has become larger and larger. For other three ports, the number of ship calls remained the same, but cargo throughput has increased as the average ship size calling these ports has also increased. These tendencies are observed commonly in the Philippines and the worldwide as well.

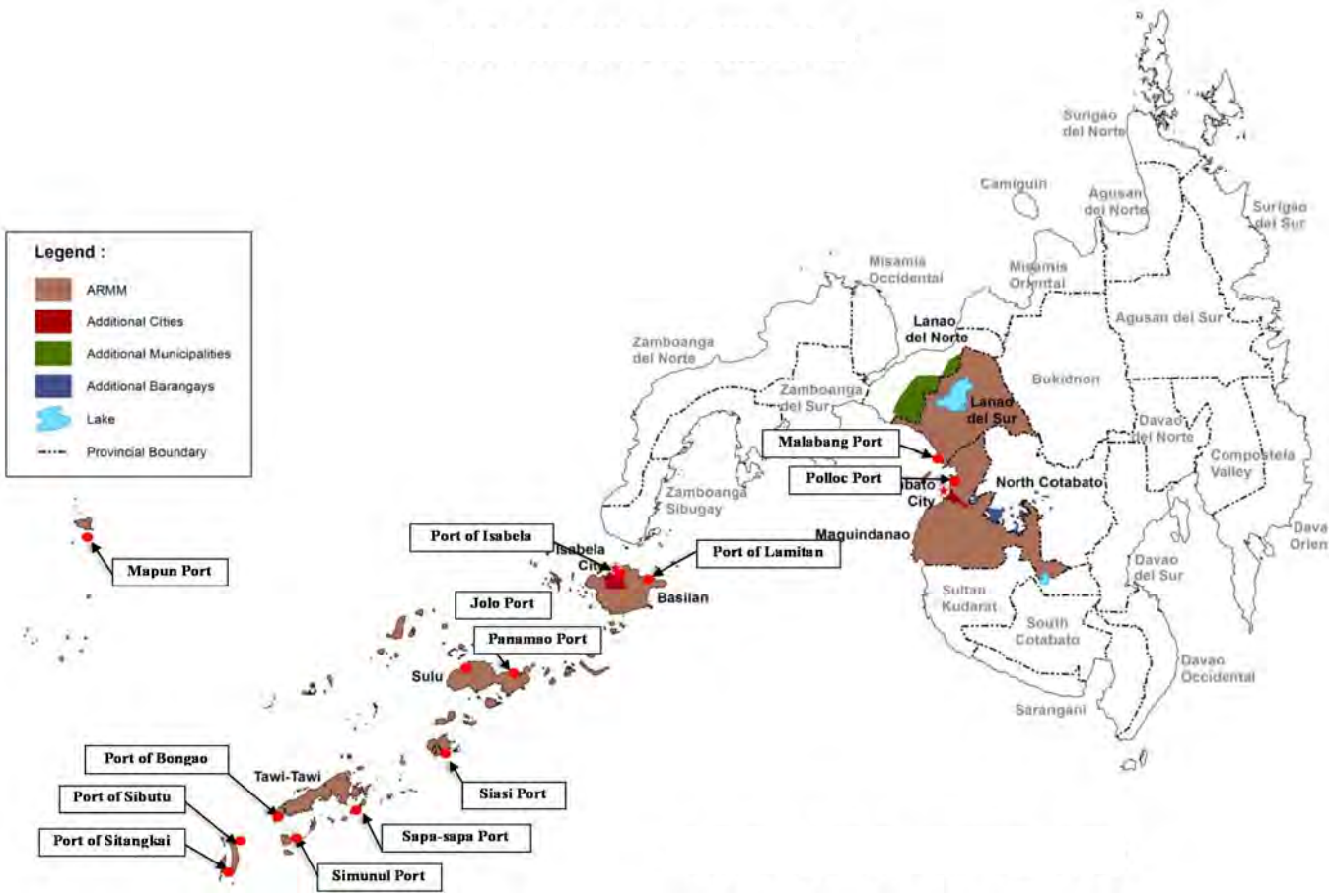


Figure 4.38 Existing Ports in Bangsamoro Region

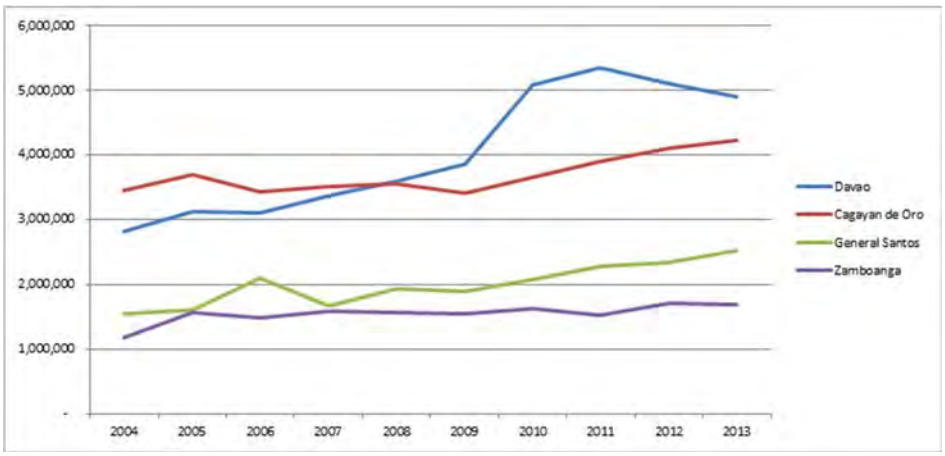


Figure 4.39 Cargo Throughput for Davao, Cagayan de Oro, General Santos and Zamboanga

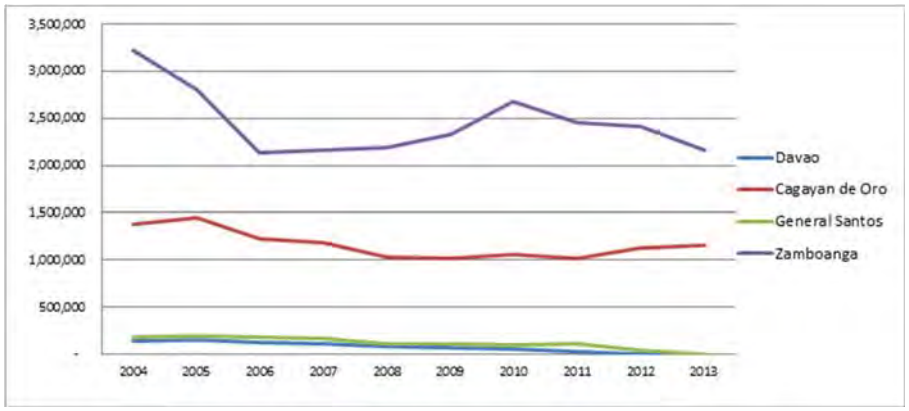


Figure 4.40 Passenger Traffic for Davao, Cagayan de Oro, General Santos and Zamboanga

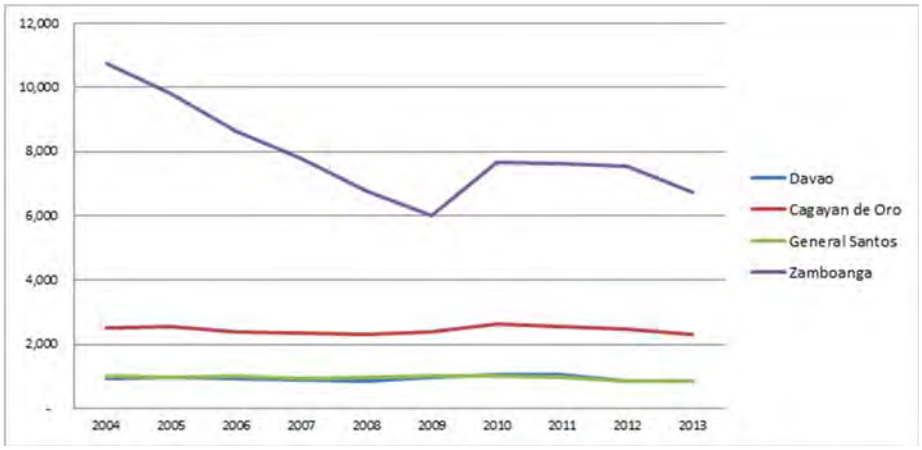


Figure 4.41 Ship Calls for Davao, Cagayan de Oro, General Santos and Zamboanga

Water traffics and ship calls at major ports in Bangsamoro

The historical change of cargo throughput, passenger traffic and ship calls for the major ports are shown in Figures 4.42 to 4.44. Cargo throughput for Isabela and Cotabato had gradually decreased from 2004 to 2013, but that of Bongao and Lamitan had increased as indicated in Figure 4.36. The largest cargo handling volume in 2013 in Bangsamoro was at the Polloc port. There are no data available for the Polloc port from 2006 to 2012 due to confusion during the changes in port administration. Data from 1995 to 2003 are available as attached in Appendix A. According to this record, the maximum cargo throughput at the Polloc port was 742,923 ton in 1992.

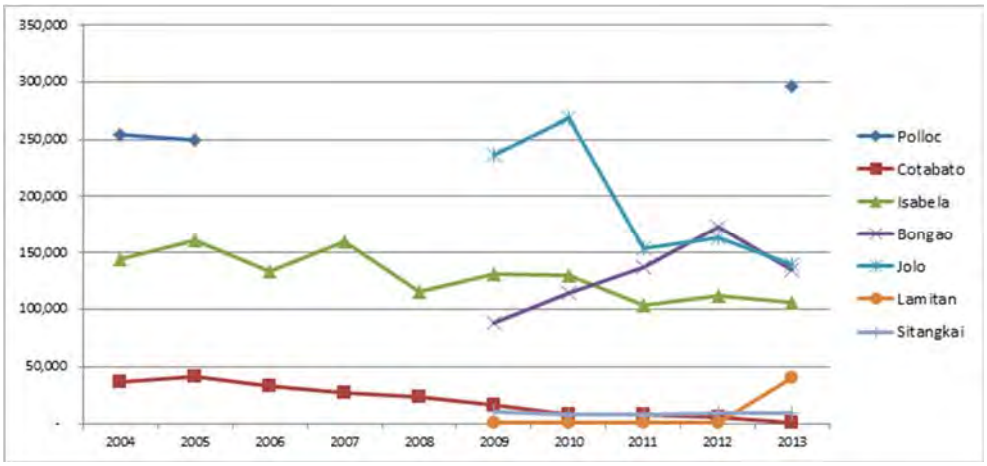


Figure 4.42 Cargo Throughput for Major Port in Bangsamoro Region

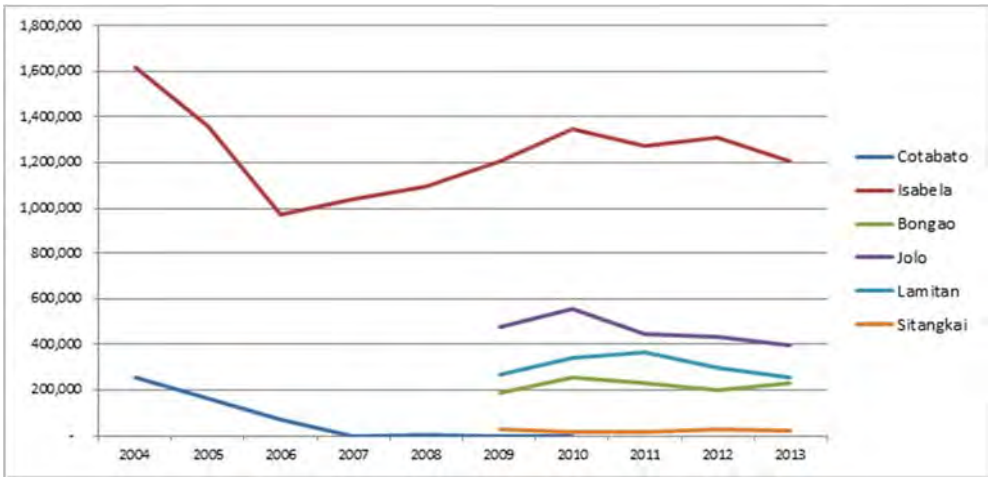


Figure 4.43 Passenger Traffic for Major Port in Bangsamoro Region

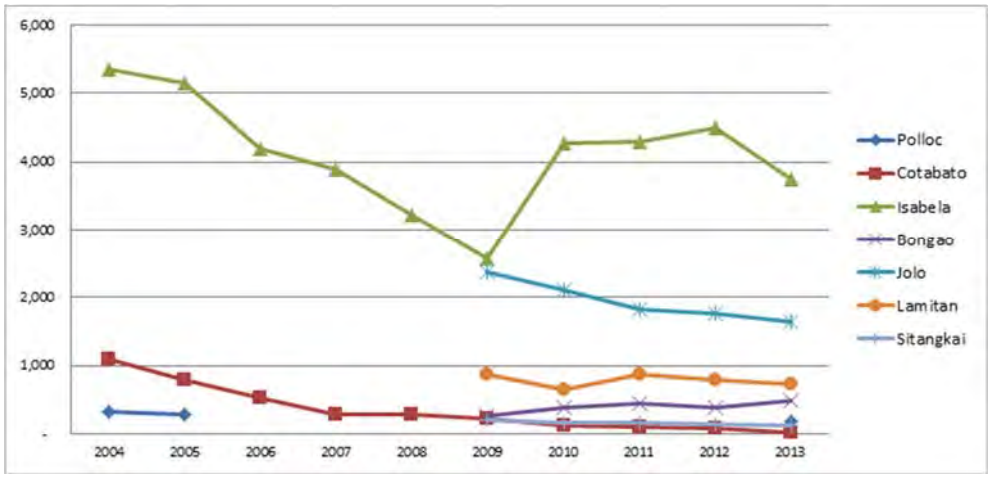


Figure 4.44 Ship Calls for Major Port in Bangsamoro Region

Except Isabela and Lamitan, passenger traffic volume basically has not changed as shown in Figure 4.42. Considering that the population of Basilan is about 300,000, passenger traffic of 1.2 million is quite large. This reflects active economic activities between Isabela and Zamboanga as well as commuting students from Basilan to Zamboanga.

The number of ship calls at Isabela decreased consistently by 2009, but drastically increased in 2010 as shown in Figure 4.41. Ship calls for other ports gradually decreased or unchanged, and the cargo volume of other ports is also unchanged. This indicates that economic activities around these ports were stagnant during this period. Bongao's cargo throughput increased more rapidly than the number of ship calls. This means the average ship size has become larger recently.

4.3.2 Characteristics of ports in Bangsamoro

(1) Overview of all the ports

Major ports

All the data and information collected in this study for the ports in the Bangsamoro region are summarized in Table 4.44. All the major ports are under the management of REZA, RPMA and PPA, while small ports are under LGUs. The Polloc port has the largest volume handled among the ports in Bangsamoro which is about 300,000 ton per annum followed by Bongao and Isabela. Isabela has the largest volume of passenger traffic and the main origin and destination are Zamboanga, followed by Jolo and Bongao. The Polloc port has the most modern and developed port facilities among all ports including berth, apron, backup area building facilities, port access, etc. A freeport and an ecozone are

located behind the port. All the ports are operated by private operators including cargo handlers. Privatization of operations and management of port facilities has been promoted throughout the world even at small ports in order to establish a more efficient operation and keep competitive power against other ports. Advantages of privatization generally include efficiency, prompt response to needs, and flexibility in operation to meet the demand for profitability.

There are feasibility studies for the ports of Polloc, Bongao, Jolo, Sitangkai, and Isabela. These ports are considered to have high potential to be developed by PPA, ADB and ARMM. Accordingly, cargoes handled at these ports are copra, banana, rice, sugar, flour of agricultural product, fresh/dried fish, shell and seaweeds of marine product, general cargo, bottled cargo of consumable materials and cement, plywood, log, equipment of construction materials.

Table 4.44 Characteristics of Ports in Bangsamoro

Name of Port	Body/ Owner	Cargo throughput	Passenger Traffic	Ship call	Berthing Facility Length and depth	Other facility	Backup area	Building Facility	Operator	Operating Shipping Company	Main Commodity
Polloc	REZA	296,354t in 2013	0	181 in 2013	Marginal wharf 400m (-10.5m), Lighter dock 67m(-3m)	Anchorage, area for private warehouse 75,645m2, parking area 23,364m2	Open storage area 42,940m2	Transit shed 2x 5,980m2, PTB 600 persons, Amenity Bldg. 760m2, Barter trade bldg. 900m2	Lamsan (PTC) till 2022	Lorenzo shipping corp., Philippine Span Asia Carrier Corp	OUT: Corn 95,289t, River sand 63,076t, Plywood 5,622t, Rolling cargo 2,142t, IN: Iron steel 52,243t, Corn 44,832t, Rice 16,578t
Bongao	RPMA	125,331t in 2013	223,522 in 2013	392 in 2012	Main wharf 139x9m(-6 to 7m), RORO 24x9m(-8m), Fast craft 21x9m(-4.5 to 5m)	Causeway20x10m, Channel 680m(-15.3 to 18m), B. Dolphin2set	None	MPTB35x12m	3K Corporation	Aleson Shipping Lines, Ever Shipping Lines	OUT: Seaweeds, Copra, Live fish/Octopus, Dried fish, Sea shells
Jolo	RPMA	157,027t in 2013	459,826 in 2013	1,746 in 2013	Total berth length 585m	Coast buard, BFAR, SULU Barter Trade, Ice plant	1.0ha	ADM, PTB, Ticketing office, Gate house	Piyagsulutan, INC.	Katrafar shipping lines, Aleson shipping lines, Ebenezer Shipping Lines	IN: Cement, Salt, Flour, Sugar, Fresh eggs, Dress chicken, Lard/Margarine OUT: Copra, Seaweeds, Abaca, Charcoal, Dried fish, Fresh fish
Siasi	RPMA	276 May 9 to31, 2013	4,064 May 9 to31, 2013	20 May 9 to31, 2013	Main wharf 65m, RoRo ramp 15x10m	Gate house	None	Terminal Management office	SIASI Arrastre and Stevedoring Services	Magnolia Shipping Lines, Ever Shipping Lines	IN: Cement, Flour, Sugar OUT: Copra, Dried fish
Sitangkai	RPMA	10,526t in 2013	26,466 in 2013	150 in 2013	Main wharf 60m (3.02m depth), Maneuvering area (6.03m)	Rock causeway	60mx36m	Terminal Management office, CHO office, PCG Detachment, Warehouse	Anakmoslem Multi-Purpose Cooperative	Aleson Shipping Lines	OUT: Seaweeds, Copra, Dried fish, Sea shells
Isabela	PPA	106,195t in 2013	1,203,187 in 2013	3,745 in 2013	209x9m(-5m) in 2000, Extension to 300m in 2014	Seawall 275, Rock bulkhead 235m	Open storage area 1,242m2	Passenger terminal 91m2, Temporary storage 12m2, ADM 80m2	Basilan Dockhandlers Corp.	Aleson Shipping Lines	Out; Copra, General cargo, In; Bottled cargo, Petroleum product, Palay/Rice, Cement
Lamitan	RPMA	39,965t in 2013	255,908 in 2013	740 in 2013	Total berth length 82m	Causeway 50m	None	Passenger terminal bldg.	Lamitan Dockholder, INC.		Out: Copra, rubber, fish, banana In: rice, sugar, fish, equipment
Mapun	RPMA	8,664t in 2013	4,857 in 2013	246 in 2013	Pier (30m x 11.5m) Piles for 30m extension are installed at site	None	None	None	Tripler Muti-Purpose Cooperative	Charter only	OUT: Copra, Dried fish

Small ports

In addition to the major ports in the Bangsamoro region, there are small ports under LGUs according to the information from RPMA as listed below. There are no available data and information such as cargo volume, passenger traffic, size of port facility, ancillary facilities, etc. for the Region.

1. Sulu

1) Banguingui, Municipality of Tongkil
2) Pata, Municipality of Pata
3) Maimbung, Municipality of Maimbung
4) Poblacion, Poblacion Parang, Parang

5) Tando Bato port, Tando Bato, lunk
6) Pangutaran
7) Panamao port, Brgy. Su'uh

2. Tawi-Tawi

1) Port in Balimbing, Panglima Sugala
2) Port in Sapa-sapa, Poblacion
3) Chinese pier, Municipality of Bongao
4) Ubol Simunul
5) Tubig Indangan
6) Nusa Simunul
7) Languyan

3. Basilan

Sub-port of Maluso, Municipality of Maluso

4. Malabang

Sub-port of Malabang, Municipality of Malabang

(2) Polloc port

General information

General information of the Polloc port is summarized below.

Location:	Lat. 07' 21' 22" Long 124' 113'E of Polloc harbor
Port limits:	Entrance to Bay
Navigational approach:	Mariga Bato Point
Entrance channel:	Parang Channel
Turning basin:	Polloc Anchorage
Description:	RC structure, general purpose marginal wharf with two lighter docks on both sides, handling conventional and containerized cargo
Area:	129 ha
Pilotage:	Compulsory pilotage for all vessels 100 GRT and above
Total berth length	
a. Marginal wharf:	400 LM
b. Lighter dock:	67 LM
Draft Limitation	
a. Main wharf:	Depth 10.5 m
b. Lighter dock:	Depth 3.0 m
c. Anchorage:	No draft limitation
d. Transit shed 01:	5,980 m^2
e. Transit shed 02:	5,980 m^2
Total backup area	
a. Open storage:	42,940 m^2
b. Private warehousing:	75,645 m^2
c. Parking area:	23,364 m^2
Engineering/navigational aids	
a. Beacon light:	1
b. Service roads:	127, 836 m^2
c. Buoys:	1 pilot station
d. Weighbridge:	52 tons
e. Passenger terminal bldg.:	Capacity 600 passengers
f. Amenity bldg.:	760 m^2
g. Public restrooms:	48 m^2 x 2
h. Water resource facility:	Capacity 1,060 m^3
i. Barter trade center bldg.:	900 m^2

Advantages of natural and physical environment

The Polloc port has high potential for the construction, operation and management, and it is one of the best ports in the Philippine with respect to the followings natural and physical conditions.

1) Wind

According to the wind rose analysis for the south of Cotabato taken from the daily data for the period 1971–2000, 43.5% of the time the wind directions are from the south with 43.4% ranging in 1–4 meters per second (mps), 0.1% in the range of 5–8 mps, and 0.0% greater than 8 mps. The prevailing wind direction throughout the year is south followed by north direction with wind speed 99.2% ranging in 1–4 mps.

2) Wave

No wave behavior data from direct measurement are available in the south of Cotabato, but according to interviews with concerned port authorities, no significant wave has occurred to prevent the port operation throughout the year. It should be considered that the port and marine structure be given adequate protection from destructive waves related to cyclonic activities. The Polloc port is protected topographically from the southwest monsoon wave and sheltered from the west wave by the Bongo Island in front of the port.

3) Current

Current outside of the Moro Gulf is 0.01–0.02 knot based on the PAGASA data. Tidal current in front of the Polloc harbor is north to south during flood tide and south to north during ebb tide based on the Chart. It is expected that velocity in front of the Polloc harbor is small considering from the topographic point of view.

4) Water depth of the approach to the port

Water depth around the Polloc port is suitable for ship anchorage and maneuvering for docking to the berth. Water depth can reach 4,000 m at 80 km to the southwest from the Polloc port, and 400 m within 7 km near the port and the depth of the Polloc harbor in front of berth is 40 m.

5) Accessibility to the port

The Polloc port is accessible by land from Cotabato city through a 13-km modern 2-lane concrete paved road.

6) Siltation issues

There is no siltation problem as no large river flows around the port and no littoral drift from outside of the Polloc harbor.

Current conditions of port facilities

1) Berth structure

The main berth structure, constructed in 1977, is generally fine despite more than three decades of service operations after its completion except some damage/deterioration. The following are observed by inspection on the structure and facilities.

a) All upper portions of the steel pipes supporting concrete deck have been corroded and some of concrete cover is peeled off and re-bars are corroded (Photos 4.1 and 4.2). It is imperative to repair the pile head immediately to protect it from the re-bar corrosion.

b) All rubber fenders are either broken or totally damaged (Photos 4.3 and 4.4).

c) Many bollards are totally damaged but several new bollards are installed on the wharf (Photos 4.5 and 4.6).

d) Concrete cover on the concrete beam of the deck slab is peeled off and re-bar is corroded (Photo 4.7).

Photo 4.1: Corroded upper portions of piles

Photo 4.2: Exposed and corroded re-bars

Photo 4.3: Totally damaged fender

Photo 4.4: Broken fender

Photo 4.5: Damaged bollard

Photo 4.6: New bollard

Photo 4.7: Corroded re-bar

Even with proper design, reinforced concrete structures in the coastal zone normally undergo a process of deterioration as illustrated in Figure 4.45. At the initial stage, re-bars in concrete are statically corroded in the concrete. The expansion of corrosion causes small cracks of concrete and some rust gradually appears on the surface at the next stage. Width of concrete cracks is widening and rust on the concrete surface is widely expanded on the surface at the third stage. At the final deterioration stage, stripping of concrete cover is found at many locations to expose re-bars, which are corroded. The deterioration/damage of pile head and concrete beam investigated above are evaluated to be at the final deterioration stage.

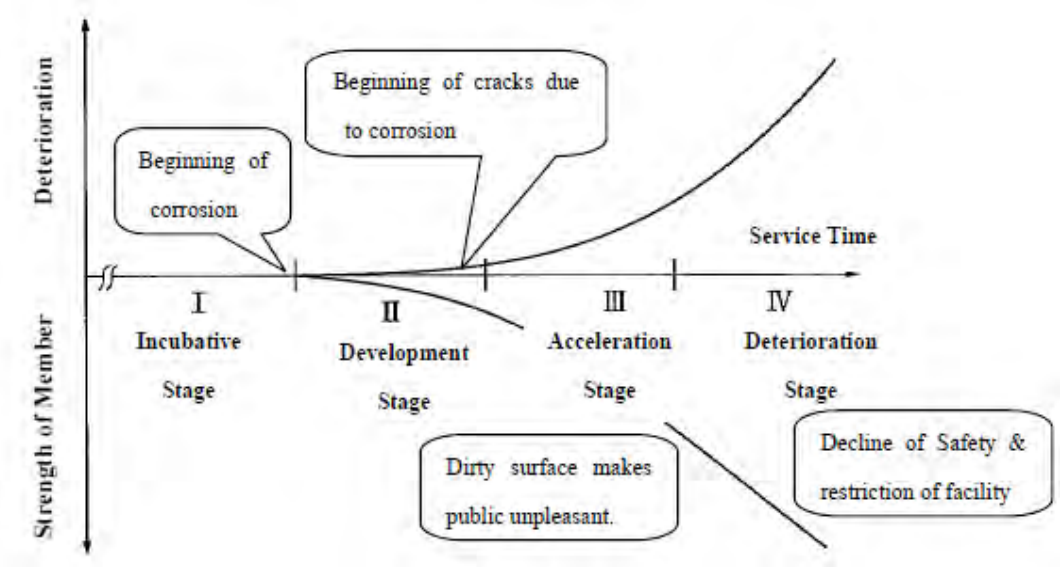


Figure 4.45 Process of Concrete Deterioration

2) Berth-front water depth

Based on the hydrographic survey in front of the wharf, the average water depth below LWL is -10.7m which is more than design depth of -10.5m but the shallowest point is -8.5m and about 10% of survey points are shallower than -9.5m. The shallow area is located at the north and the south ends of the wharf. Although the maximum draft of present calling vessel of full container of 1,500 DWT is 5.0m, water depth of -10.5m shall be maintained as the original design depth in order to accommodate larger vessels in the nearest future.

3) Two transit sheds and other buildings

The floor concrete of a transit shed has been repaired due to the crack and loose concrete at many locations (Photo 4.8). According to the inspection, the concrete cover of re-bars is too small and substandard (Photo 4.9).

Photo 4.8: Removed concrete surface

Photo 4.9: Re-bar arrangement

4) Water supply

There is an existing water supply system with water source about 3.9 km from the port. The water pipelines were damaged and deteriorated. The deep well and narrow right of way along the regional road are shown in Photos 4.10 and 4.11.

Photo 4.10: Existing deep well

Photo 4.11: Narrow right of way

Existing port layout plan

The existing port layout plan is shown in Figure 4.46. Main cargos of container are loaded/unloaded on the apron and transported to the container stack yard behind two transit sheds by using a trailer (Photos 4.12 and 4.13). After several dwelling days at container yard, containers are loaded/unloaded on tracks by the land cranes to its destination (Photo 4.14). River sand from Simuay River is stockpiled at the back yard temporarily and is loaded to the bulk barge and transported to the Sulu archipelago as construction materials (Photo 4.15).

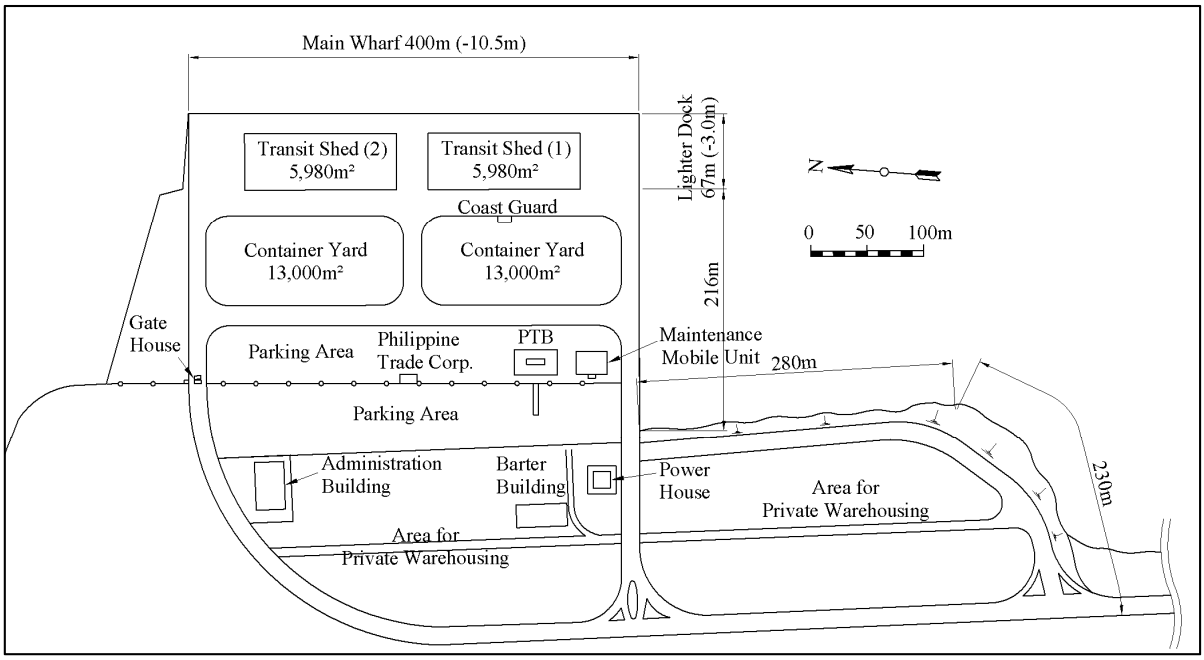


Figure 4.46 General Layout Plan of Existing Polloc Port

Photo 4.12: Container handling

Photo 4.13: General cargo handling

Photo 4.14: Bulk cargo handling

Photo 4.15: Liquid bulk handling

(3) Bongao, Jolo, Sitangkai and Isabela ports

Overview

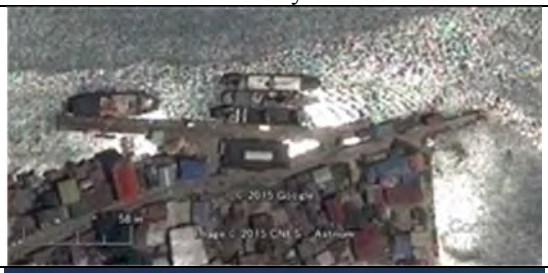
A feasibility study for Bongao, Jolo and Sitangkai ports were conducted through the Intermodal Transport Development Project (ITDP) by Asian Development Bank (ADB) in September 2006. Bongao and Jolo ports are expected as important sub-hubs connecting numerous smaller nearby island ports to other ports in the Sulu Archipelago as well as regional hub of Zamboanga and west Mindanao by improving and expanding the port facilities to increase the port capacity. While the Sitangkai port can function as a maritime linkage between remote islands and the sub-hub for Zamboanga and to BIMP-EAGA as well by improvement of the port facilities.

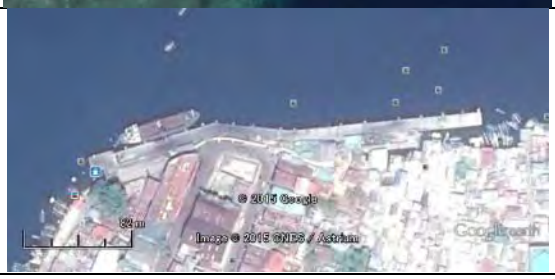
The volume handled at the Port of Isabela was decreasing over the year in 2000 due to the limited working area, the low operating hours and limited back up area in the port. In view of this, PPA conducted the feasibility study of transferring the existing port to an alternative site (about 1 km from the town) where a modern seaport would best answer for the economic growth of the entire Basilan Island.

Present port facilities

Present port layout, dimensions of the port facilities, cargo and passenger traffic are summarized in Table 4.45. The Jolo port is the largest port handling largest cargo traffic among the four ports, but the Isabela port handles the largest passenger traffic volume at present.

Table 4.45 General Layout of Bongao, Jolo, Sitangkai, and Isabela Ports

	Port Layout	Major Port Facilities	Traffic Volume
Bongao		- Main wharf 139 m - RORO 24 m - Fast craft 21 m - MPTB 35 x 12 m	Cargo: 125,331 t in 2013 Passenger: 223,522 in 2013
Jolo		- Total berth length 585 m - Part of wharf (left) has been improved based on FS	Cargo: 157,027 t in 2013 Passenger: 459,826 in 2013

	Port Layout	Major Port Facilities	Traffic Volume
Sitangkai		- Main wharf 60 m	Cargo: 10,526 t in 2013 Passenger: 26,446 in 2013
Isabela		- General cargo berth length 280m - RORO berth 20 x 12 m	Cargo: 106,195 t in 2013 Passenger: 1,203,187 in 2013

Traffic forecast

Traffic forecast for the Bongao, Jolo, Sitagkai and Isabela ports was made in 2006 by ADB and in 2000 by PPA as summarized in Table 4.46. The cargo throughput of both Bongao and Jolo in 2013 was 140,000 ton but the average annual growth rate of Bongao is 5.1%, higher than that of Jolo which is 3.2% only. For passenger traffic, the average annual growth rate of Bongao and Jolo is 7.2% and 6.2%, respectively. Based on this, it is judged that the development of the Bongao port is slightly prioritized than Jolo.

Table 4.46 Cargo, Passenger, and Ship Call Forecast for Bongao, Jolo, Sitangkai, and Isabela Ports

Port		2020	2030	2036
Bongao	Cargo	283,912	377,256	447,470
	Passenger	776,554	1,032,034	1,224,073
	Shipcall	4,788	6,362	7,546
Jolo	Cargo	192,995	253,055	297,660
	Passenger	1,078,922	1,426,169	1,677,703
	Shipcall	3,509	4,601	5,412
Sitangkai	Cargo	59,934	96,790	129,217
	Passenger	180,260	239,564	284,142
	Shipcall	856	1,383	1,846
Isabela	Cargo	435,800	530,000	
	Passenger	1,931,000	2,212,000	
	Shipcall	8,490	9,129	

Note: Values of 2020 and 2030 for Isabel are those of 2017 and 2022, respectively.

Proposed development

The proposed development works for Bongao, Jolo and Sitanagkai are shown in Table 4.47. The proposed Isabela port is a totally new port recommended 1.0 km from the town proper.

Table 4.47 Proposed Development Works by Feasibility Study

Major Scope of Work (SOW) of Bongao	Major SOW of Jolo	Major SOW of Sitangkai
Expansion of Back-up area Rehabilitation of existing pier Reclamation for motor launch berth PTB, Cargo shed, etc. Utilities (Water, Power, etc.)	Banca landing quay Motor launch berth Fast craft berth Conventional berth PTB, Cargo shed, etc. Utilities (Water, Power, etc.)	Expansion of wharf PTB, ADM, etc. Utilities (Water, Power, etc.)

Economic analysis

According to the existing tariff structure, the proposed development of the ports is not financially feasible, while it may be justified economically (Table 4.48). Therefore, the revenue sources such as dockage, wharfage, arrastre, stevedoring, etc. shall be increased to cover operation and maintenance costs as well as construction costs.

Table 4.48 Investment Costs and Economic Rates of Return for Island Port Development

	Bongao	Jolo	Sitangkai	Isabela
Total cost for development (PHP)	428,621,000	673,720,000	179,292,000	220,000,000
Base case of EIRR	30.7%	19.9%	32.0%	41.5%

Master plan of Isabela and Jolo ports

The master plan of Isabela prepared by the feasibility study is shown in Figure 4.47. The master plan includes first phase development and second phase development for the target year of 2008 and 2022, respectively. The port facilities for the general cargo and passenger vessels in one area and fast craft vessels in the other area are separate. The berthing for the fast craft vessels are exclusively for their use. The close storage facilities or transit sheds shall be provided behind the wharf with a wide road. A the PTB and parking area for vehicles are provided behind the fast craft berth.

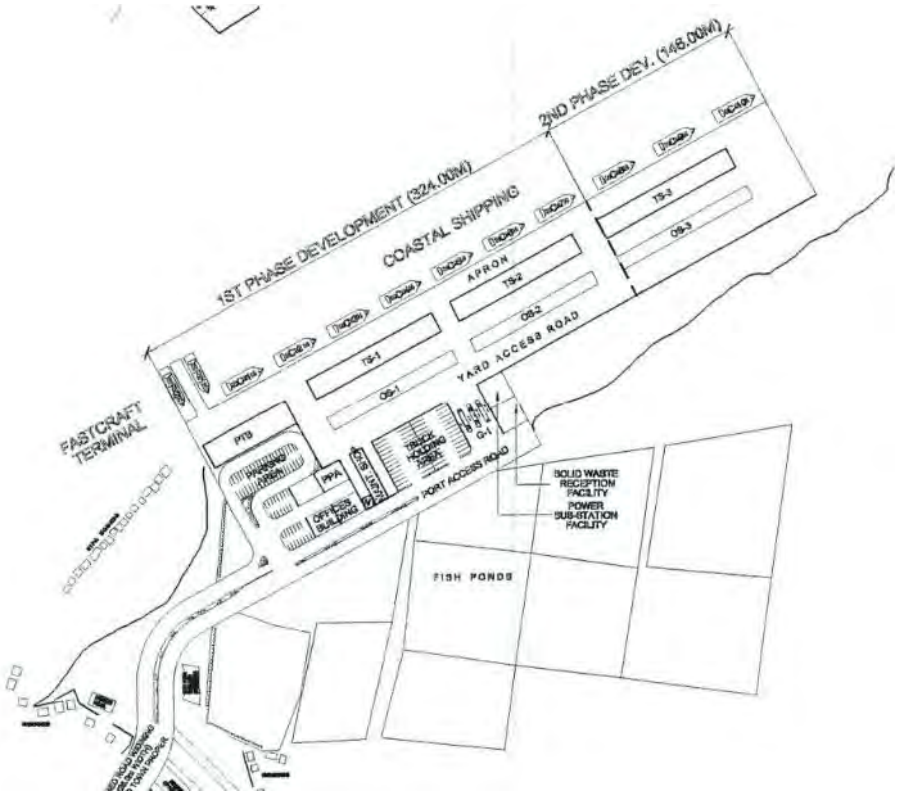


Figure 4.47 Master Plan of New Isabela Port

Aside from the feasibility study by ADB, PPA prepared a master plan for the Jolo port as indicated in Figure 4.48. The berths are allocated from the left motorized banca, fast craft, RORO and conventional and liner berth. Motorized banca berths are provided for transportation to/from the surrounding islands and other berths are provided to transport cargo and passengers collected from the surrounding islands to/from sub-hub ports in Bangsamoro.

The Jolo port is the busiest port at present among these ports. Prior to loading of the cargoes to the ship, all cargoes are temporary stacked on the berth; therefore, narrow berths are occupied by the loading cargos leaving no space for the passage of the vehicles. This causes the low productivity of the cargo handling.

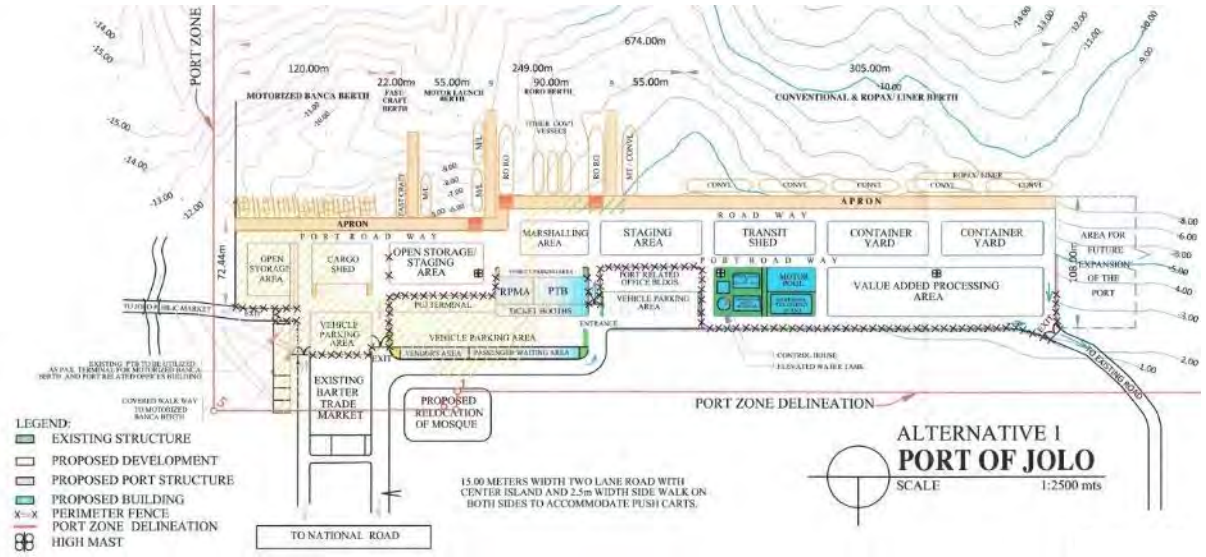


Figure 4.48 Master Plan of Jolo Port

4.3.3 Demand forecast for Bangsamoro ports

(1) Cargo traffic projection for Bangsamoro

Total cargo traffic

Based on cargo traffic projection for Mindanao, the cargo traffic for Bangsamoro is projected to reach 4.7 million ton in 2019 and 5.4 million ton in 202, and it will further increase to 7.7 million ton in 2030 as shown in Table 4.49.

Table 4.49 Projected Port Cargo Traffic in Mindanao and Bangsamoro

	Mindanao Total (10^3)				Bangsamoro (10^3)			
Commodity	2013	2019	2022	2030	2013	2019	2022	2030
Total	25,310	32,980	37,770	54,850	3,730	4,790	5,440	7,740
Inbound	13,100	18,600	22,200	35,600	1,600	2,300	2,800	4,400
Outbound	12,300	14,400	15,600	19,300	2,100	2,500	2,700	3,300

Shares of island ports in cargo traffic

Assuming that the five ports handle all the port cargo traffic in the island provinces, their share in the Bangsamoro's total cargo traffic will be 12.5% in 2019, 13.7% in 2022, and 13.3% in 2030 as shown in Table 4.50. It is assumed then that the remaining cargo traffic has its origin/destination in the mainland, going out/in via the Davao, Cagayan de Oro, General Santos, and Polloc ports.

Table 4.50 Cargo Traffic Volume at Ports in Bangsamoro and Island Provinces

Port	2013 (ton)	2019 (ton)	2022 (ton)	2030 (ton)
Bangsamoro total	3,730,717	4,785,359	5,438,968	7,741,208
1. Isabela	114,653	129,118	145,240	170,172
2. Bongao	182,709	253,363	348,384	538,728
3. Jolo	167,795	196,880	230,528	285,291
4. Lamitan	4,747	5,473	6,300	7,616
5. Sitangkai	9,428	12,490	16,444	23,928
Share of ports in island provinces (%)	12.8	12.5	13.7	13.3

Share of Polloc port in total Bangsamoro cargo

The latest available data of cargo traffic at the Polloc port are for 2005 (249,788 MT). From 2000 to 2005, the cargo traffic was estimated by applying an annual rate of -6.3%. As no major improvement has been effected since then, it is reasonable to assume that the decrease continued from 2005 to the

present. Assuming that this is the case, the cargo traffic in 2014 was about 138,232 MT.

The share of the Polloc port and the island provinces in the total port traffic generated in and attracted to the Bangsamoro region was 16.8% in 2013 (Table 4.51). Of that, the Polloc port's share was only 4%. Given this, it can be assumed that more than 80% of the cargo traffic enter and exit the ports of Davao, General Santos, and even Cagayan de Oro.

Table 4.51 Cargo Traffic Volume at Ports in Bangsamoro and Their Shares, 2013

Port	2013 (MT)	Share (%)
Bangsamoro ports total	3,730,717	100
1. Polloc	147,625	4.0
2. Isabela	114,653	3.1
3. Bongao	182,709	4.9
4. Jolo	167,795	4.5
5. Lamitan	4,747	0.1
6. Sitangkai	9,428	0.3
Island provinces total	479,333	12.8
Polloc and island provinces total	626,957	16.8

Growth of cargo traffic

The annual growth rates of cargo traffic in the Bangsamoro region are assumed to be 4.2% for 2013–2019, 4.4% for 2019–2022, and 4.5% for 2020–2022. The Polloc port's share in 2013 is estimated to be about 4.0% of the total Bangsamoro cargo traffic as shown in Table 4.52. If at least 5% of the total cargo traffic is to pass through the Polloc port in 2019, traffic volume must increase by 8.4% annually taking 2013 as the base year. This will bring the share of the Polloc port and the island provinces in the total cargoes passing through Bangsamoro ports to 17.5%.

Table 4.52 Share of Ports in Total Bangsamoro Cargo Traffic for 2013, 2019, 2022, and 2030

Port	2013 (%)	2019 (%)	2022 (%)	2030 (%)
1. Polloc (target share)	4.0	5.0	10.0	15.0
2. Isabela	3.1	2.7	2.7	2.2
3. Bongao	4.9	5.3	6.4	7.0
4. Jolo	4.5	4.1	4.2	3.7
5. Lamitan	0.1	0.1	0.1	0.1
6. Sitangkai	0.3	0.3	0.3	0.3
Island provinces total	12.8	12.5	13.7	13.3
Polloc and island provinces total	16.8	17.5	23.7	28.3

If the Polloc port's share in the cargo traffic increases to 10% by 2019, the traffic volume must grow at an annual rate of 31.5%. Such increase may be possible if the needs of shippers are met and all the plantations in Bangsamoro planned for expansion will use the Polloc port instead of the Davao port or the General Santos port.

It should be noted that a 10% share of all the cargoes at Bangsamoro ports in 2022 means 543,897 MT. The Polloc port once handled a traffic volume of 742,923 MT in 1997. Thus, the port capacity is not an issue. The Bangsamoro cargo volume is projected as shown in Table 4.53.

(2) Future passenger traffic

The only passenger traffic data available for the Polloc port are for the period between 1992 and 1997. During this period, the annual growth rate was 31.4%. Assuming this trend continued, the traffic volume in 2013 was about 23 million, which may not be a reasonable estimate. Passenger traffic is projected by applying the average growth rate for 1992–97 as shown in Table 4.54.

(3) Cargo and passenger traffic for Bangsamoro ports

Future port traffic at the ports in Bangsamoro projected as above is summarized in Table 4.55.

Table 4.53 Cargo Volume at Ports in Bangsamoro for 2013, 2019, 2022, and 2030

Port	2013 (ton)	2019 (ton)	2022 (ton)	2030 (ton)
Bangsamoro total	3,730,717	4,785,359	5,438,968	7,741,208
1. Polloc	147,625	239,268	543,897	1,161,181
2. Isabela	114,653	129,118	145,240	170,172
3. Bongao	182,709	253,363	348,384	538,728
4. Jolo	167,795	196,880	230,528	285,291
5. Lamitan	4,747	5,473	6,300	7,616
6. Sitangkai	9,428	12,490	16,444	23,928
Island provinces total	479,333	597,325	746,896	1,025,735
Polloc and island provinces total	626,957	836,593	1,290,793	2,186,916

Table 4.54 Projected Passenger Traffic for Bangsamoro Ports

	Projected Data					
Particulars	1998	2013	2019	2022	2030	AAGR (92-97)
Passenger Traffic	394,988	23,749,738	122,261,240	277,398,295	2,465,720,028	31.40%
Disembarking	181,854	8,024,062	36,497,493	77,839,029	586,618,489	28.72%
Embarking	213,629	17,408,306	101,203,370	244,013,697	2,550,735,864	34.09%

Table 4.55 Future Cargo/Passenger Traffic at Bangsamoro Ports (2015–2030)

Port	Item	2015	2019	2022	2030
Polloc	Cargo (MT)	432,598	921,197	1,060,318	1,542,860
Isabela	Cargo (MT)	119,285	129,118	145,240	170,172
	Passenger	1,365,269	1,443,345	1,568,013	1,752,480
Bongao	Cargo (MT)	203,746	253,363	348,384	538,728
	Passenger	213,974	233,434	265,623	316,135
Jolo	Cargo (MT)	282,950	314,769	368,564	456,118
	Passenger	471,158	524,141	613,720	759,511
Lamitan	Cargo (MT)	4,978	5,473	6,300	7,616
	Passenger	332,271	384,245	476,015	636,577
Sitangkai	Cargo (MT)	10,355	12,490	16,444	23,928
	Passenger	28,576	32,037	37,941	47,691

Appendix A: Historical Data on Cargo and Passenger Traffic at Existing Polloc Port

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Decrease	GR (%)
1. Total Cargo Throughput (MT)	742,923	504,840	525,115	704,633	559,981	606,043	570,875	414,789	347,000	452,370	322,105	361,505	284,486	249,788	454,845	2.05
a. Domestic	712,610	481,035	484,733	552,613	459,679	496,567	471,622	340,540	284,887	371,396	264,448	296,795	233,564	205,076	347,527	1.35
Inbound	274,418	180,714	198,934	243,401	206,195	222,424	250,834	152,897	127,914	166,757	118,737	133,261	104,870	92,079	151,322	2.26
Breakbulk	19,840	39,502	33,549	50,997	89,805	97,400	109,364	66,657	55,770	72,706	51,769	58,102	45,723	40,146	10,851	3.94
Bulk	254,578	53,742	63,279	79,299	0	0	0	0	0	0	0	0	0	0	79,299	
Containerized	0	87,470	102,106	113,105	116,390	125,024	141,470	86,240	72,144	94,051	66,968	75,159	59,147	51,933	61,172	4.37
Outbound	438,192	300,321	285,799	309,212	253,484	274,143	220,788	187,643	156,973	204,639	145,711	163,534	128,694	112,997	196,205	1.08
Breakbulk	313,983	123,904	111,525	108,855	95,418	103,078	83,016	70,554	59,022	76,944	54,787	61,489	48,389	42,487	66,368	0.67
Bulk	117,666	10,665	6,493	17,016	0	0	0	0	0	0	0	0	0	0	17,016	
Containerized	6,543	165,752	167,781	183,341	158,066	171,065	137,772	117,089	97,951	127,695	90,924	102,045	80,305	70,510	112,821	6.75
b. Foreign	30,313	23,805	40,382	152,020	100,302	109,476	99,253	74,249	62,113	80,974	57,656	64,710	50,923	44,712	107,308	5.14
Import	26,396	10,151	30,490	120,694	76,443	82,659	75,631	56,578	47,330	61,702	43,934	49,309	38,803	34,071	86,623	5.29
Breakbulk	22,479	10,151	30,490	120,694	76,443	82,659	75,631	56,578	47,330	61,702	43,934	49,309	38,803	34,071	86,623	5.11
Bulk	3,917	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Containerized	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Export	3,917	13,654	9,892	31,326	23,859	26,817	23,622	17,671	14,783	19,272	13,722	15,401	12,120	10,641	20,685	4.64
Breakbulk	3,917	13,654	9,892	31,326	23,859	26,817	23,622	17,671	14,783	19,272	13,722	15,401	12,120	10,641	20,685	4.64
Bulk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Containerized	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
c. Transit cargo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Domestic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Inward	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Outward	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Foreign	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Import	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Export	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
d. Foreign (transshipment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2. Passenger Traffic (n)	76,728	124,526	149,196	159,501	299,492	300,593	--	--	--	--	--	--	--	--	159,501	1.62
Disembarking	39,981	58,837	74,297	77,212	140,659	141,279	0	0	0	0	0	0	0	0	77,212	1.53
Embarking	36,747	65,689	74,899	82,289	158,833	159,314	0	0	0	0	0	0	0	0	82,289	1.61

Appendix B: Detailed Projections of Polloc Port Cargo Traffic

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
AAGR	7.9%								6.3%					
1. Total Cargo Throughput (MT)	742,923	504,840	525,115	704,633	559,981	606,043	570,875	414,789	347,000	452,370	322,105	361,505	284,486	249,788
a. Domestic	712,610	481,035	484,733	552,613	459,679	496,567	471,622	340,540	284,887	371,396	264,448	296,795	233,564	205,076
Inbound	274,418	180,714	198,934	243,401	206,195	222,424	250,834	152,897	127,914	166,757	118,737	133,261	104,870	92,079
Breakbulk	19,840	39,502	33,549	50,997	89,805	97,400	109,364	66,657	55,770	72,706	51,769	58,102	45,723	40,146
Bulk	254,578	53,742	63,279	79,299	0	0	0	0	0	0	0	0	0	0
Containerized	0	87,470	102,106	113,105	116,390	125,024	141,470	86,240	72,144	94,051	66,968	75,159	59,147	51,933
Outbound	438,192	300,321	285,799	309,212	253,484	274,143	220,788	187,643	156,973	204,639	145,711	163,534	128,694	112,997
Breakbulk	313,983	123,904	111,525	108,855	95,418	103,078	83,016	70,554	59,022	76,944	54,787	61,489	48,389	42,487
Bulk	117,666	10,665	6,493	17,016	0	0	0	0	0	0	0	0	0	0
Containerized	6,543	165,752	167,781	183,341	158,066	171,065	137,772	117,089	97,951	127,695	90,924	102,045	80,305	70,510
b. Foreign	30,313	23,805	40,382	152,020	100,302	109,476	99,253	74,249	62,113	80,974	57,656	64,710	50,923	44,712
Import	26,396	10,151	30,490	120,694	76,443	82,659	75,631	56,578	47,330	61,702	43,934	49,309	38,803	34,071
Breakbulk	22,479	10,151	30,490	120,694	76,443	82,659	75,631	56,578	47,330	61,702	43,934	49,309	38,803	34,071
Bulk	3,917	0	0	0	0	0	0	0	0	0	0	0	0	0
Containerized	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Export	3,917	13,654	9,892	31,326	23,859	26,817	23,622	17,671	14,783	19,272	13,722	15,401	12,120	10,641
Breakbulk	3,917	13,654	9,892	31,326	23,859	26,817	23,622	17,671	14,783	19,272	13,722	15,401	12,120	10,641
Bulk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Containerized	0	0	0	0	0	0	0	0	0	0	0	0	0	0
c. Transit Cargo	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inward	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Outward	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Import	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Export	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d. Foreign (transshipment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Particulars	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
AAGR	6.36% (projected)									
1. Total Cargo Throughput (MT)	233,894	219,012	205,077	192,028	179,810	168,369	157,656	147,625	138,232	129,436
a. Domestic	192,027	179,809	168,368	157,655	147,624	138,231	129,436	121,200	113,488	106,267
Inbound	86,220	80,734	75,597	70,787	66,283	62,066	58,117	54,419	50,956	47,714
Breakbulk	37,592	35,200	32,960	30,863	28,899	27,060	25,338	23,726	22,217	20,803
Bulk	-	-	-	-	-	-	-	-	-	-
Containerized	48,629	45,535	42,637	39,924	37,384	35,005	32,778	30,693	28,740	26,911
Outbound	105,807	99,075	92,771	86,868	81,341	76,165	71,319	66,781	62,532	58,553
Breakbulk	39,784	37,252	34,882	32,663	30,584	28,638	26,816	25,110	23,512	22,016
Bulk	-	-	-	-	-	-	-	-	-	-
Containerized	66,024	61,823	57,889	54,206	50,757	47,527	44,503	41,671	39,020	36,537
b. Foreign	41,867	39,203	36,709	34,373	32,186	30,138	28,220	26,425	24,743	23,169
Import	31,903	29,873	27,973	26,193	24,526	22,966	21,505	20,136	18,855	17,656
Breakbulk	31,903	29,873	27,973	26,193	24,526	22,966	21,505	20,136	18,855	17,656
Bulk	-	-	-	-	-	-	-	-	-	-
Containerized	-	-	-	-	-	-	-	-	-	-
Export	9,964	9,330	8,736	8,180	7,660	7,172	6,716	6,288	5,888	5,513
Breakbulk	9,964	9,330	8,736	8,180	7,660	7,172	6,716	6,288	5,888	5,513
Bulk	-	-	-	-	-	-	-	-	-	-
Containerized	-	-	-	-	-	-	-	-	-	-
c. Transit Cargo	-	-	-	-	-	-	-	-	-	-
Domestic	-	-	-	-	-	-	-	-	-	-
Inward	-	-	-	-	-	-	-	-	-	-
Outward	-	-	-	-	-	-	-	-	-	-
Foreign	-	-	-	-	-	-	-	-	-	-
Import	-	-	-	-	-	-	-	-	-	-
Export	-	-	-	-	-	-	-	-	-	-
d. Foreign (transshipment)	-	-	-	-	-	-	-	-	-	-