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Northern Mindanao
DRR-CCA Enhanced Regional Physical Framework Plan
2013-2040
Final Draft

Message

The formulation of this DRR/CCA-Enhanced RPFP, 2013-2040 is hastened after the region was badly hit by TS Sendong in December 2011. The approval of the Enhancing Capacities on DRRM/CCA Project by the Project Board of the Integrating DRR/CCA Project[1] of the NEDA[2] is our concrete contribution to the region in terms of reducing the vulnerability and improving preparedness of its disaster-prone communities.

The Enhancing Capacities on DRRM/CCA Project complements the Integrating DRR/CCA project which provides technical assistance in the preparation of the DRR/CCA-Enhanced PDPFPs of its two pilot provinces, Bukidnon and Camiguin. Remarkably, Region X is the only region that comprises all five provinces in the implementation of the Integrating DRR/CCA Project, even with only two pilot provinces *(not 2 but 5 in 10).* The coverage even extends to the three cities that were severely affected by TS Sendong: Cagayan de Oro, Iligan and Valencia in the preparation of DRR/CCA-Enhanced CLUPs. Further, to have a more holistic and comprehensive perspective of mainstreaming DRR/CCA in development and physical planning, the ~~riverbasin~~river basin/watershed approach is adopted in the formulation/updating of the regional physical framework plan.

As early as 2005, the National Land Use Committee (NLUC), with the NEDA as the Chair~~person~~ has come up with an action agenda on disaster risk management, primarily to strengthen DRR in physical planning. It has developed methodologies as embodied in the Guidelines on Mainstreaming DRR in Land Use/Physical Planning. This project is a starting point for raising the capacity of regions and provinces in DRR, using physical planning as our entry point. There were several milestones on DRR mainstreaming in planning that followed. It was in October 2009 when the Integrating DRR/CCA Project was launched. The project aims to enhance awareness and understanding of climate change and its aggravating effect on existing natural hazards and develop tools for the formulation of physical framework/land use and development plans.

Both projects operationalized Administrative Order No. 1 issued by the President of the Republic on September 17, 2010. This AO direct~~s~~ing local government units, particularly provinces, to adopt and use the Guidelines for Mainstreaming Disaster Risk Reduction in Subnational Development and Land Use/Physical Framework Plans, and NEDA to

[1] With fund support from AusAiD, New Zealand Aid Program and UNDP
[2] ~~With fund support from AusAiD, New Zealand Aid Program and UNDP~~

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conduct capability-building activities for planning offices at the local, regional and national levels on the use of the Guidelines.

I am proud of the initiatives undertaken by Region X. It went ahead in the preparation of the Disaster Risk Assessment Report (DRAs) and the rest of the DRR/CCA mainstreaming efforts. With the methodologies/tools that were developed, the region undertook several initiatives to enhance the methodologies through the conduct of several experts fora, technical sessions and capacity building with the engagement of local and in-house experts.

Now, we are a witness to this major deliverable of the project, the DRR/CCA-Enhanced RPFP, 2013-2040. It aims to significantly contribute to risk reduction efforts and help make communities more resilient to natural hazards and at the same time ensure that development efforts shall not be compromised by these hazards. The plan has five chapters: Chapter I – Introduction; Chapter 2 – The Vision, Major Goals and Objectives, Chapter 3 – The Planning Environment; Chapter 4 – The Plan Proper According to the Four Major Land Use Areas; and Chapter 5 – Plan Implementation.

I highly recognize that this RPFP is a concrete result of our passionate and collective efforts in mainstreaming DRR/CCA into the physical/land use plans. It is evident that these are the fruits of hard labor and perseverance of the select pool of regional and provincial project core teams, as well as the RDC and RLUC-members, the LGUs, PSRs/NGOs, academe, among others.

We all believe that wise land use planning will reduce the adverse impacts and costs caused by disasters. As I am overwhelmed of the region's efforts in terms of DRR/CCA mainstreaming, I am more concerned on the utilization or the practical application of all the outputs of the project. This is a major challenge on how we can influence the policy and decision-makers in prioritizing resources particularly on the DRR/CCA strategic options that will be identified and eventually be implemented.

On our part at the regional level, we continue to shepherd and capacitate the provinces and highly urbanized cities along DRR/CCA through our continuing and strengthened collaboration among the RLUC member-agencies, as well as with the ODA community to complement the needed resources in reducing the region's vulnerabilities.

Finally, my heartfelt thanks to all of the stakeholders in Region X who continue to support all our development endeavors, especially in serving as our strong and active partners in helping us build disaster-free and resilient communities. I encourage everyone to continue to actively participate in the technical work and in advocating /adopting DRR/CCA in your respective fields and communities.

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LEON M. DACANAY, JR., CESO III
Chairperson, Regional Land Use Committee-X
Vice Chairperson, Regional Development Council-X
Regional Director, NEDA-X

Acronyms and Abbreviations

4Ps	*Pantawid Pamilyang Pilipino Program*
A & D	Alienable and Disposable
AACCUP	Accrediting Agency of Chartered Colleges and Universities in the Philippines
AACGR	Annual Average Compounded Growth Rate
AADT	Annual Average Daily Traffic
AAGR	Average Annual Growth Rate
ADB	Asian Development Bank
ADSDPP	Ancestral Domain Sustainable Development and Protection Plan
AGILA	Alubijid-Gitagum-Laguindingan
AHFF	Agriculture, Hunting, Fishery and Forestry
AMCR	Average Monthly Crime Rate
APEC	Asia-Pacific Economic Cooperation
ARBs	Agrarian Reform Beneficiaries
ARCs	Agrarian Reform Communities
ARMM	Autonomous Region of Muslim Mindanao
~~**ASEAN**~~	~~Association of Southeast Asian Nations~~
ASEAN	Association of Southeast Asian Nations
ASEAN	Association of Southeast Asian Nation
ASTI	Advanced Science and Technology Institute
AUSAid	Australian Aid
BAI	*Basura Atbp., Inc.*
BCIR	Butuan-Cagayan de Oro- Iligan Road
BFAR	Bureau of Fisheries and Aquatic Resources
BHW	Barangay Health Worker
BnB	*Botika ng Barangay*
BNS	Barangay Nutrition Scholar
BSU	Bukidnon State University
BUSECO	Bukidnon Second Electric Cooperative, Inc.
CAB	Civil Aeronautics Board
CAC	Competency Assessment and Certification
CADT	Certificate of Ancestral Domains Titles
CALT	Certificate of Ancestral Land Titles
CAMELCO	Camiguin Electric Cooperative, Inc.
CARP	Comprehensive Agrarian Reform Program
CATV	Cable TV
CBDRM	Community-Based Disaster Risk Reduction and Management
CCA	Climate Change Adaptation
CCE	Crime Clearance Efficiency
CCER	Crime Clearance Efficiency Rate
CENRO	Community Environment and Natural Resource Officer
CEPALCO	Cagayan Electric Power and Light Company
CGS	Child Growth Standards
CHD-NM	Center for Health and Development – Northern Mindanao
CHED	Commission on Higher Education
CIC	Cagayan de Oro-Iligan Corridor
CIDSS	Comprehensive and Integrated Delivery of Social Services
CIIF	Coconut Industry Investment Fund
CIS	Communal Irrigation System
CLRF	Contingent Liability and Rehabilitation Fund
CLUP	Comprehensive Land Use Plan
CMP	Community Mortgage Program
CMTS	Cellular Mobile Telecommunication Service
CMU	Central Mindanao University
COD	Center of Development
COE	Center of Excellence
COWD	Cagayan de Oro Water District
CPP/ NPA	*Communist Party of the Philippines*/New People Army
CRMO	Coastal Resource Management Organization
CSER	Crime Solution Efficiency Rate
CSR	Cohort Survival Rates
CU	Capitol University
DA-BSWM	Department of Agriculture - Bureau of Soils and Water Management
DBM	Department of Budget and Management
DCC	Day Care Center
DENR	Department of Environment and Natural Resources
DENR-LMB	Department of Environment and

	Natural Resources – Lands Management Bureau
DepEd	Department of Education
DILG	Department of Interior and Local Government
DJF	December, January, February
DOE	Department of Energy
DOH	Department of Health
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
DR/CC	Disaster Risk/Climate Change
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRR/CCA	Disaster Risk Reduction/Climate Change Adaptation
DSWD	Department of Social Welfare and Development
DTI	Department of Trade and Industry
DU	Distribution Utilities
EC	Electric cooperative
ECS	Ecotour Central Station
EFA	Education for All
EIA	Environmental Impact Assessment
EMB	Environmental Management Bureau
EPREP	Environmental Protection and Rehabilitation Programs
EPZ	Export Processing Zone
ESA	Emergency Shelter Assistance
ESC	Environmentally Sustainable Cities
ESWMA	Ecological Solid Waste Management Act
ETEEAP	Expanded Tertiary Education Equivalency and Accreditation Program
FAAP	Federation of Accrediting Agencies of the Philippines
FDP	Faculty Development Program
FIBECO	First Bukidnon Electric Cooperative, Inc.
FIES	Family Income and Expenditure Survey
FLEMMS	Functional Literacy, Education and Mass Media Survey
FNRI	Food and Nutrition Research Institute
FP	Family Planning
FPIC	Free, Prior and Informed Consent
FR	Forest Reserve
FRIMP-CDOR	Flood Risk Management Project for Cagayan de Oro River
GDP	Gross Domestic Product
GER	Gross Enrollment Ratio
GHPSC	Golden Heritage Polytechnic State College
GRDP	Gross Regional Domestic Product
GVA	Gross Value Added
HCNPL	Hill Cave Network Protected Landscape
HEIs	Higher Education Institutions
HEP	Hydro Electric Power
Hh/HH	Household
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IBA	Important Bird Areas
ICM	Integrated Coastal Management
~~**ICT**~~	~~Information Communication Technology~~
ICT	Information and Communications Technology
ICTO	Information and Communications Technology Office
IDP	Internally Displaced Population
IEC	Information, Education and Communication
~~**IEC**~~	~~Information Education and Communication~~
iGovPhil	Integrated Government Philippines
ILO	International Labor Organization
ILPI	Iligan Light and Power, Inc.
IMC	Integrated Motorists' Center
IMR	Infant Mortality Rate
IP	Indigenous Peoples
IPAS	Integrated Protected Area System
IPCC	International Panel on Climate Change
IT	Information Technology
JICA	Japan International Cooperation Agency
~~**JICA**~~	~~Japan International Cooperation Agency~~
JJA	June, July, August
KALAHI	*Kapit Bisig Laban sa Kahirapan*
KASH	Enterprise-Based Training
LANECO	Lanao del Norte Electric Cooperative, Inc.
LCE	Local Chief Executive

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LCP	League of Cities of the Philippines
LCUs	Local Colleges and Universities
LDCU	Liceo de Cagayan University
LDN	Lanao del Norte
LDPE	Low-density polythylene
LEP	Ladderized Education Program
LGU	Local Government Unit
LTI	Land Tenure Improvement
LTO	Land Transportation Office
LWUA	Local Water Utilities Administration
MAM	March, April, May
MBTP	Mindanao Backbone Transmission Project
MCP	Mindanao Container Port
MCT	Mindanao Container Terminal
MICT	Mindanao International Container Terminal
MDGs	Millennium Development Goals
MGB	Mines and Geosciences Bureau
MILF	Moro Islamic Liberation Front
MIRAIC	Metro Iligan Regional Agri-industrial Center
MisOrTel	Misamis Oriental Telephone System
MKRNP	Mt. Kitanglad Range Natural Park
MMR	Maternal Mortality Rate
MMTs	Multi-Partite Monitoring Teams
MOB	My Own Bag
MOELCI I	Misamis Occidental I Electric Cooperative, Inc
MOELCI II	Misamis Occidental II Electric Cooperative, Inc.
MORESCO I	Misamis Oriental I Electric Cooperative, Inc
MORESCO II	Misamis Oriental II Electric Cooperative, Inc
MPS	Mean Percentage Scores
MRF	Mine rehabilitation Fund
MRS	Mindanao Railway System
MSU-IIT	Mindanao State University – Iligan Institute of Technology
MTF	Monitoring Trust Fund
MUST	Mindanao University of Science and Technology
NAAQGV	National Ambient Air Quality Guideline Values
NAMRIA	National Mapping and Resource Information Authority
NAPC	National Anti-Poverty Commission
NAT	National Achievement Test
NATCAC	National TVET Competency Assessment and Certification
NCC	National Computer Center
NCMA	North Central Mindanao Area
NCR	National Capital Region
NDHS	National Demographic Health Survey
NEA	National Electrification Administration
NEDA	National Economic and Development Authority
NEMA	North Eastern Mindanao Area
NFP	Natural Family Planning
NGA	National Governors Association
NGA	National Government Agency
NGAs	National Government Agencies
NGCP	National Grid Corporation of the Philippines
NGO	Non-Government Organization
NHA	National Housing Authority
NHTS-PR	National Household Targeting System for Poverty Reduction
NIA	National Irrigation Administration
NIPAS	National Integrated Protected Areas System
NIS	National Irrigation System
NMEC	Northern Mindanao Ecology Center
NMRTMP	Northern Mindanao Regional Tourism Master Plan
NNC	National Nutrition Council
NPAAAD	Network of Protected Areas for Agriculture and Agro-industrial Development
NPAAD	Network of Protected Areas for Agricultural Development
NPC	National Power Corporation
NPS-ENRMP	National Program Support for Environment and Natural Resources Management Project
NSCB	National Statistical Coordination Board
NSO	National Statistics Office
NSWMC	National Solid Waste Management Commission
NSWMFP	National Solid Waste

	Management Framework Plan
NTC	National Telecommunications Commission
NWMA	North Western Mindanao Area
NWRB	National Water Resources Board
OCD	Office of Civil Defense
ODA	Official Development Assistance
OFWs	Overseas Filipino Workers
OSY	Out-of-School Youth
P/CMRB	Provincial/City Mining Regulatory Boards
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAR	Philippine Area of Responsibility
PAWD	Philippine Association of Water Districts
PCO	Public Calling Office
PD	Presidential Decree
PDAO	Persons with Disability Affairs Office
PDNA	Post Disaster Needs Assessment
PDPFP	Provincial Development and Physical Framework Plan
PEENRA	Philippine Economic, Environmental & Natural Resources Accounting
PEP	Philippine Energy Plan
PESFA	Private Education Students Financial Assistance
PEZA	Philippine Economic Zone Authority
PFAs	Priority Focus Areas
PHIC/ PhilHealth	Philippine Health Insurance Corporation
PhilCeC	Philippine Community eCenter
PhilCom	Philippine Global Communications, Inc.
PhilFIS	Philippine Fisheries Information System
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PI	Poverty Incidence
PIA	Phividec Industrial Authority
PIE-MO	Phividec Industrial Estate-Misamis Oriental
PLDT	Philippine Long Distance Telecommunications
PLS	Protected Landscape and Seascape
PMO	Port Management Office
PNP	Philippine National Police
PPA	Philippine Ports Authority
PPC	Philippine Postal Corporation
PPFP	Provincial Physical Framework Plan
PR	Participation Rate
PRECIS	Providing Regional Climates for Impact Studies
PS/PN	Private Sectarian/Private Non-Sectarian
PSALM	Power Sector Assets and Liabilities Management Corporation
PSC	Philippine Sinter Corporation
PTMP	Philippine Tourism Master Plan
PWD	Person with Disability
PZD	Port Zone Delineation
RA	Republic Act
RCE	Recyclables Collection Event
RDP	Regional Development Plan
RDRA	Regional Disaster Risk Assessment
REALDEAL	**R**each the grassroots, **E**mpower the reached, **A**ssure quality training and **L**ifelong Education **D**evelopment **E**nable and **A**ctively-engage **L**abor Force
RoRo/RORO	Roll-on Roll-off
SAFDZ	Strategic Agro-Forestry Development Zone
SAFDZs	Strategic Agriculture and Fishery Development Zones
SALINTUBIG	*Sagana at Ligtas na Tubig sa Lahat*
SAP	Strategic Action Plan
SDAs	Strategic Development Areas
SDMP	Social Development Management Program
SEMA	South Eastern Mindanao Area
SMEs	Small and Medium Enterprises
SMFI	San Miguel Foods Incorporated
SMIS	Strategic Mineral Information System
SND	Sultan Naga Dimaporo
SNPLP	Study-Now- Pay- Later Plan
SOCCSKSARGEN	South Cotabato, Cotabato, Sultan Kudarat, Saranggani and General Santos
SOP	September, October,

	November
SoTelCo	Southern Telecommunications Company, Inc.
STEAG	STEAG State Power, Inc.
STUFAPs	Student Financial Program
SUCs	State Universities and Colleges
~~**SUCs**~~	~~State Universities and Colleges~~
SWMA	South Western Mindanao Area
SWMP	Solid Waste Management Plan
SY	School Year
Telof	Telecommunications Office
TESDA	Technical Education and Skills Development Authority
TEU	Twenty-foot Equivalent Unit
TIC	Tourism Information Center
TMSI	Telecommunications Management Services, Inc.
TS	Tropical Storm
TSP	Total Suspended Particulates
TVET	Technical Vocational Education and Training
TVIs	Technical Vocational Institutions
UDHA	Urban Development and Housing Act
UHC	Universal Health Care
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
UPOU	University of the Philippine Open University
UTPRAS	Unified TVET Program Registration and Accreditation System
VMS	Vessel Monitoring Device
WACS	Waste Assessment and Characterization Study
WB	World Bank
WHO	World Health Organization
WQMA	Water Quality Management
WSSD	World Summit on Sustainable Development
XU	Xavier University
YP4SC	Youth Profiling for Starring Careers

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Chapter 1

INTRODUCTION

This chapter discusses the overview and rationale for the preparation of the Disaster Risk Reduction/Climate Change Adaptation-Enhanced Regional Physical Framework Plan or the DRR/CCA-Enhanced RPFP, and the role it plays in ensuring the optimum and sustained utilization of the region's natural and man-made resources. It also provides details the general assumptions and principles underlying the urgent need to mainstream DRR/CCAdisaster risk reduction and climate change adaptation strategies into the land use and physical framework plan. It likewise further presents the purposepurpose and the objectives behindin the preparation of the plan.

This chapter also briefly discusses the parts and components of the plan.

1.1. OVERVIEW AND RATIONALE OF THE PLAN

The history of planning in Northern Mindanao (Region X) goes dates back into 1976 when the newly organized RDC-X published the "1976-2000 Perspective Plan of Region X" (then composed of 10 ten provinces and nine9 cities), which which was formulated through the coordinative efforts ofon by then two2-year old National Economic and Development Authority Regional Office No. X (NEDA-X). That historic document came in three impressively thick volumes reflecting the wild abandon with which instant regional agency/LGU planners registered their dreamed-of scenarios carved out of scanty data bases, on what or how Northern Mindanao will be in the year 2000.

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Concerned primarily with basic needs attainment, the first long-term and the first four4-year plans in the 70's and the three medium-term plans in the 80's were largely for socio-economic and other forms of growth.

To differentiate from the socio-economic planning process, physical framework and land use planning stresses the need to shape development, to provide the framework, to delineate the scope, and to define the limits for socio-economic and other forms of growth.

The Letter of Instructions 1350 provided the legal mandate in the formulation of the Regional Physical Framework Plans (RPFPs) to synchronize and coordinate efforts toward the optimum utilization of the region's land and other related resources. The first set of RPFP for Region X formulated in the early 1990s adopted a more integrated planning, and deviatinged from the usual sectoral approach. On March 18, 1994, the Regional Development Council of Region X (RDC-X) approved the 1993-2022 RPFP of Region X.

With the passage of Republic Act 7901 (dated February 23, 1995), iInitial plan updating efforts were undertaken in 1997 when Region X was reconfigured. The with the passage of RA 7901 (dated February 23, 1995) which transferred the provinces of Agusan del Norte, Agusan del Sur, Surigao del Norte and the cities of Butuan and Surigao were transferred to the newly created region, that is, region Region XIII (Caraga CARAGA Administrative Region), which also included Surigao del Sur, which was formerly belonging tofrom Region XI).

The formulation of the Northern Mindanao 2004-2030 RPFP ~~took into~~ considered~~ation~~ the ~~newly~~ reformulated National Framework for Physical Planning (NFPP) and the various developments that have ~~occurre~~taken place. These developments included ~~d, i.e.~~ changes in various land use and physical plans, enactment of new laws that have direct and indirect implications on land use, new data sets generated from the latest census and other related reports, and the issuance of Executive Order No. 36, ~~(~~reverting the province of Lanao del Norte and the city of Iligan back to Region X~~)~~.

The 2004-2030 RPFP ~~of Northern Mindanao~~ serve~~d~~s~~~~ as the region's blueprint to guide decisions on how land and other natural resources may be put to ~~the~~ its most beneficial use~~,~~ ~~and~~ while, at the same time, indicate~~d~~s~~~~ how such resources may be managed and conserved for the benefit of the present and future generations.

The ~~Plan~~ RPFP has four major components, namely: S~~S~~ettlements Development; Production Land Use; Protection Land Use; and Infrastructure and Utilities Development. As an indicative planning document, however, the RPFP has to be operationalized into ~~the~~ various land use plans, particularly at the local level.

In 2008, t~~T~~he National Economic and Development Authority (NEDA), with assistance from the United Nations Development Program (UNDP) and the European Commission Humanitarian Aid Department, formulated the "Guidelines on Mainstreaming DRR in Subnational Development and Land Use~~ ~~/Physical Planning" as an instrument ~~to direct natural disaster risk reduction efforts in the development planning processes.

The Guidelines supplement the 2007 NEDA-ADB "Guidelines on Provincial/Local Planning Expenditure Management" (PLPEM), mainly the volume on the formulation of the Provincial Development and Physical Framework Plan (PDPFP)~~.~~.

The President of the Republic of the Philippines issued Administrative Order No. 1 (~~,~~ series of~~.~~ 2010), d~~"D~~irecting the local government units, particularly provinces, to adopt and use in their planning activities the "G~~g~~uidelines on M~~m~~ainstreaming D~~d~~isaster R~~r~~isk R~~r~~eduction (DRR) in Subnational Development and Land use/Physical Planning". Methodologies in said Guidelines, however, are also applicable in other subnational levels, such as the regional level and even at the municipal and city levels (although land use planning measures at the municipal or city levels are more precise given their zoning powers). ~~However, the application of the Guidelines can be extended to a region, since the region is the "sum of the province" or maybe considered as a big "province". The methodologies may also be applied at the municipal and city levels, although at these levels, land use planning measures are more precise given the zoning powers of these LGUs.~~

~~In view of T~~the above-indicated recent developments, along ~~nd~~ with the huge devastation caused by Tropical Storm Sendong in the region in December 2011, necessitate~~d~~s~~~~ the reformulation or updating of the DRR/CCA-Enhanced RPFP, covering the period 2013-2040. The preparation of this Plan aspires ~~envisions to have~~ a more holistic and comprehensive perspective of mainstreaming DRR/CCA in development and physical planning through the watershed/river basin approach.

1.2. GENERAL ASSUMPTIONS AND PRINCIPLES UNDERLYING THE PLAN

The following are the basic assumptions and principles ~~that are~~ considered in ~~the~~ DRR/CCA-~~sensitive~~enhanced ~~/updating of the~~ RPFP~~Plan to make it DRR/CCA-sensitive~~:

a) A~~a~~s mandated in~~by the~~ Letter of Instructions No. 1350 (dated August 2, 1983), which provides ~~for~~ the institutional framework for national physical planning, the RPFP as~~, which will be~~ the blueprint of the region's long-term development, shall be consistent with and supportive of the country's development directions ~~and shall be~~ geared towards a more coordinated and synchronized effort~~s~~ in the ~~towards the~~ optimum utilization of the country's land and other natural resources;

b) T~~t~~he RPFP considers the constitutional provision "to protect…~~..~~ the rights of the people to a balanced and healthful ecology…" (Article ~~,~~II, Section 16 of the 1987 Philippine Constitution);

c) C~~c~~ognizant of Republic Act No. 7586 (dated June 1, 1992), otherwise known as the National Integrated Protected Areas System (NIPAS) Law, which provides for the establishment and management of national integrated protected areas system, the RPFP recognizes that the use of these protected areas must be consistent with the principles of biological diversity and sustainable development;

d) ~~c~~Considers the need for "equitable access of the different segments of the population to the development and use of the country's natural resources" (pursuant to EO 192 and Art. XII, Section 1 of the 1987 Constitution);

e) ~~s~~Supports the comprehensive disaster risk reduction management framework and climate change adaptation in line with the Hyogo Framework of Action, 2005-2015, the National Disaster Coordinating Council Framework and the NEDA Board- National Land Use Committee Action Agenda on Disaster Risk Reduction and Management;

f) T~~t~~hat all activities must not in any way affect or hamper the productivity of adjoining economic activities and shall be undertaken in full harmony with the environment;

g) ~~t~~That land shall be utilized according to the highest and best use;

h) ~~p~~Promotes industrialization through sound agricultural development and agrarian reform;

i) T~~t~~hat the process of the RPFP includes a detailed scrutiny of how the different components of the plan are linked and examined their complementarities;

j) C~~c~~onsiders the existing and potential inter-regional linkages—the benefits from economies of scale, as well as adverse impacts of specific activities like upstream and downstream effects which may require appropriate corrective policies for national as well as regional action;

k) ~~a~~As a result of exhaustive analysis of the region's resources, potentials and constraints to development and having undergone the legitimization process, this plan is considered reflective of the people's aspirations and development vision for the next 30 years; as such, its implementation in the next three 10-year period~~s~~

is assumed to be smooth without the risk of being disrupted by changing political climates and environments;

l) The indicative nature of the RPFP allows its translation into more implementable terms at the provincial/city and municipal levels based on the following assumptions:

   i. that the LGUs will be effective implementers of the RPFP and will enact and enforce DRR/CCA - sensitive zoning laws that will give teeth to the realization of the RPFP's spatial strategies and zoning requirements for development; and

   ii. that the legislators will be interested in the legislation of budget appropriations, that will ensure sub-regional RPFP translations affecting the specific districts of their concern and lend their utmost support to the RPFP implementation; and

m) That the effective implementation and institutionalization of the RPFP

   i. requires its integration into the existing mechanisms, processes, and outputs of planning at the national and local levels;

   ii. deems important the setting-up of a continuing capability building program for the RLUC-TWG to ensure the technical quality of the various processes of physical land use planning in the region;

   iii. needs to strengthen and better systematize data/information gathering and analysis which shall be part of the regional data banking and management information system of the RDC-X; and

   iv. counts on the proactive support of the private sector whose investments are the engine and/or dynamo of ~~our~~ economic growth and which in turn are fuelled with the government's support and motivation through various interventions and provision of the necessary socio-economic overhead capital.

1.3. PURPOSE AND OBJECTIVES OF THE PLAN

The DRR/CCA-Enhanced RPFP aims to significantly contribute to risk reduction efforts and help make communities more resilient to natural hazards and at the same time ensure that development efforts shall not be compromised by these hazards (Mainstreaming DRR/CCA Guidelines, 2008). Specifically, the plan intends to:

a) provide a firmer basis for sectoral plans especially those that relate to the physical aspects of development like land, natural resources, and infrastructures, as well as the socioeconomic dimensions that aim to lessen vulnerabilities and improve resilience of communities to disasters;

b) reconcile and rationalize land use and development proposals among adjoining localities and with higher level framework plans;

c) guide government agencies and private developers, particularly those undertaking large-scale projects, on the proper project location and the implementation of the necessary mitigation works; and

d) provide a basis for adjudicating conflicts arising from the implementation of land use plans, development projects, and similar activities that straddle the boundaries of two or more municipalities within the province;

1.4. ORGANIZATION AND PARTS OF THE PLAN

The DRR/CCA-Enhanced RPFP is composed of five~~r~~ chapters: Chapter I – Introduction; Chapter 2 – The Vision, Major Goals and Objectives, Chapter 3 – The Planning Environment; Chapter 4 – The Plan Proper According to the Four Major Land Use Areas; and Chapter 5 – Plan Implementation.

Chapter I contains the following: (1) Overview and Rationale of the Plan; (2) General Assumptions and Principles Underlying the Plan; (3) Purpose and Objectives of the Plan; (4) Organization/Parts of the Plan.

Chapter 2 presents the vision, comparative advantages and the goals and objectives of the region.

Chapter 3 presents the analysis of the planning environment or assesses the region's performance, particularly in terms of meeting the goals and objectives and in implementing the development and spatial strategies for the first eight years of the RPFP, 2004-2030. It likewise highlights disaster risk assessment and climate change vulnerabilities of communities in order to recognize and address the risks posed by natural hazards.

This chapter also provides an analysis of the region's resources and their interrelationships in relation to existing development trends, which are the bases in formulating the strategies. Specifically, this highlights the following: (1) population, demographic characteristics and settlements; (2) physical and land resources, (3) economy, (4) transportation and access, ~~-~~and (5) income, services and poverty

Chapter 4 details the specific strategies according to the four major land use policy areas and the overall spatial strategies. This chapter contains the following:

- Development challenges
- The region's spatial strategies ~~and spatial framework for DRR/CCA~~
- Settlements development
- Production land use
- Protection land use
- Infrastructure development
- ~~Development challenges~~
- ~~The region's spatial strategies and spatial framework for DRR/CCA~~
- Policies, targets, programs and projects, by major land use/policy area

Chapter 5 discusses the plan implementation. It describes the institutional, political and administrative arrangements for implementing the Plan; the advocacy and support activities necessary for plan implementation; and the monitoring and evaluation system

which specifies, among others, the monitoring agency or unit and the frequency of monitoring indicators to measure the extent to which the plan's objectives and strategies are met.

Chapter 2

THE VISION, MAJOR GOALS AND OBJECTIVES

2.1. VISION

For the planning period, 2013-2040, the region is envisioned to be: *"the leading industrial core and trade center in Southern Philippines with dynamic men and women enjoying equal opportunities in sustainably harnessing its agricultural and natural resources and in building a decent, harmonious and safe environment".*

It shall exhibit rapid, inclusive and sustained economic growth, a kind of growth that creates massive and decent employment, and reduces poverty. It shall also have resilient industries and communities to ensure no or minimal impact of disasters risks/climate change to growth gains.

The region will be positioned as a gateway and industrial core and trade center in the south with the most competitive, efficient and attractive transshipment hub and venue for industrial ventures. It shall assert its role as the leader in high-value agri-based and fishery products, and key player in manufacturing and other high-productivity sectors. The pursuit of the vision shall be guided by the development plan framework and the framework of enhancing competitiveness.

In affirming its role as the Gateway to Mindanao, it shall implement strategic interventions that will address the collective concerns of the **GATEWAY** (Figure 1). **G** for Good Governance and Peace and Order; **A** for Access, Logistics and Other Infrastructure; **T** for Trade, Industry and Tourism; **E** for Environment and Sustainable Development; **W** for Well-being and Improved Welfare; **A** for Agriculture and Fishery; and **Y** for Education and Youth Empowerment. Supportive of these concerns are interventions along Science, Technology and Innovation. Embedded also in the development framework are DRRM/CCA measures to sustain the gains the region has achieved over the years.

The competitiveness framework (Figure 2) seeks to reduce poverty and attain inclusive growth by building more vibrant communities, secured workforce and families, and sustainable enterprises and businesses. This shall be done by increasing productivity, expanding exports and providing opportunities to raise incomes. Strategic interventions shall look at cluster development and innovation, infrastructure and utilities development, technology development, effective governance and human resource development. The emphasis of this framework is the identified priority focus areas (PFAs) that the region has competitive and comparative advantages.[1] These PFAs are expected to supply the huge domestic and foreign markets for agriculture and fishery products while creating opportunities for value adding and development of local industries with forward and backward linkages to the region. Value chain and SWOT analyses of these specific

[1] Region 10's PFAs: high value agricultural crops; livestock, poultry and fishery; fresh and processed foods; tourism, metals and engineering; tourism; and other emerging sectors are discussed in the appropriate chapters of the plan.

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industries/commodities were undertaken to identify development gaps and opportunities in order to sustain the region's overall competitiveness.

2.2. COMPARATIVE ADVANTAGES

The region enjoys a number of competitive advantages over the other regions in Mindanao, and even in Visayas and Luzon.

1. Its strategic location gives the region its biggest competitive advantage over all the other regions in Mindanao. It is physically linked to all regions in the island through a network of roads. Moreover, with its deep harbor, the region is the best jump-off point for sea-based trading with Visayas and Luzon, and the international market such as the ASEAN.
2. Agriculture potential is enormous with its vast agricultural lands, soils highly suited for the growing of many crops, and a relatively favorable climate for agriculture activities relative to other regions. It is also Mindanao's largest agriculture producer with pineapple, banana, corn, coconut, and chicken being its key products.
3. Having the biggest industrial output among all regions in Mindanao, as well as the presence of the biggest industrial estate in the country are best manifestations of the huge potential for industrial development.
4. It has large potential and abundant reserves for hydro-electric power. Industries locating in the region can be well supported by the presence of electric power generation service providers of which the region supplies at least 60 percent of the total power capacities of Mindanao.
5. With a generally peace-loving people, and highly literate, skilled and productive labor force.

2.3. GOALS AND OBJECTIVES

The ultimate goal of the region's growing into a self-sustaining industrial core and trade center of the South is the attainment of a decent and sustainable standard of well-being and general welfare for every family and individual resident.

Specifically and in consonance with the overarching goal of inclusive growth and poverty reduction, the region aims to achieve the desired spatial arrangement of land and resources to:

- Effect the desired level and distribution of regional population towards relatively safer areas;

  DRR/CCA, in order to obtain the maximum possible social and economic benefits.

FIGURE 1. REGIONAL DEVELOPMENT PLAN FRAMEWORK

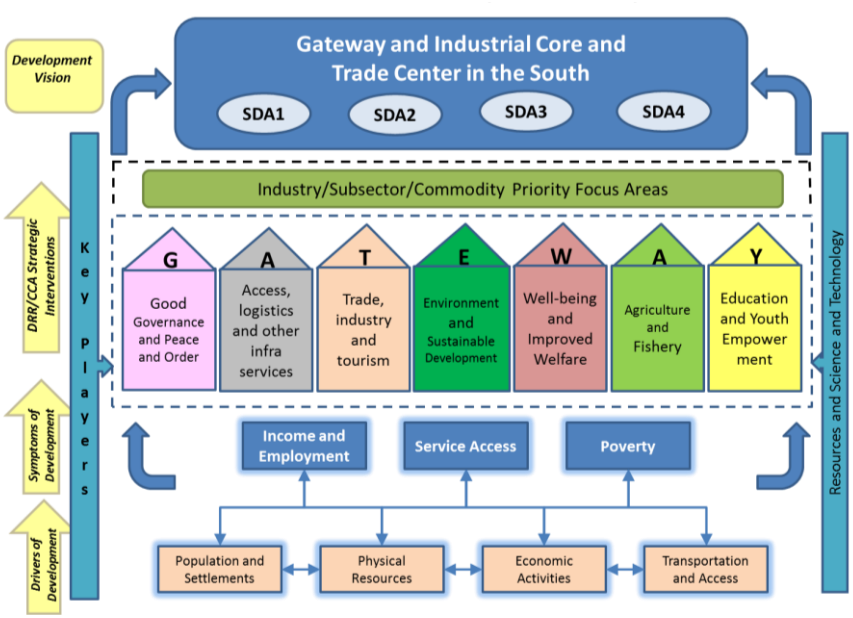
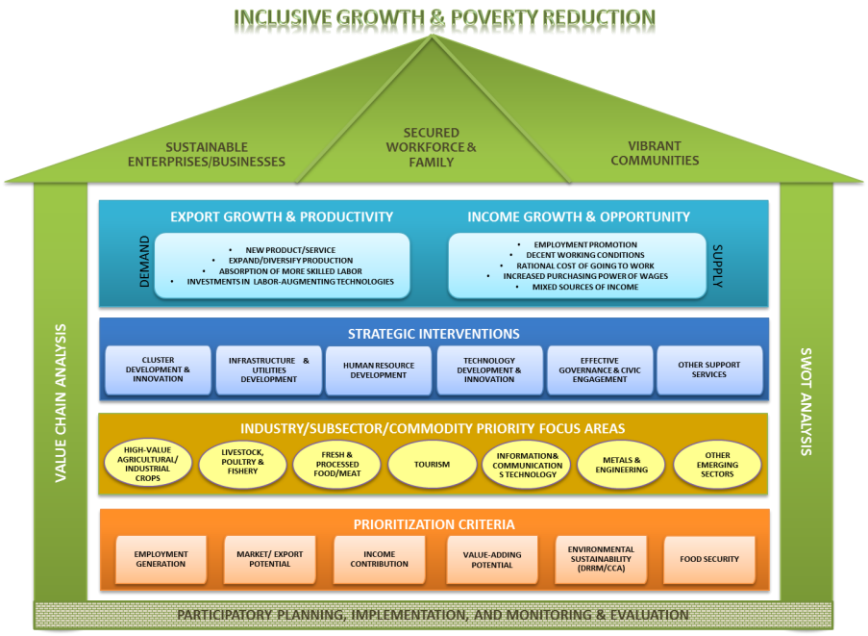


FIGURE 2. REGION X COMPETITIVENESS FRAMEWORK



Chapter 3

THE PLANNING ENVIRONMENT

3.1. LOCATION, LAND AREA AND POLITICAL SUBDIVISION

3.1.1. Geographic Location

Northern Mindanao or Region X is located within 7015' to 9015' north latitude, and 123030' to 125030' east longitude. It is bounded on the north by Bohol Sea; on the east by Agusan del Norte and Agusan del Sur; on the south by Davao del Norte, Davao City and North Cotabato; on the southwest by Lanao del Sur and on the west by Zamboanga del Norte and Zamboanga del Sur.

In the national geographical setting, Region X is located in the southern Philippines and in the northern part of the Island of Mindanao (Map 1).

The Philippines as a tropical region lies along the typhoon belt in the Pacific. As such, it is prone and frequently subjected to various types of hydrometeorological hazards. An average of 20 tropical cyclones per year enters the Philippine Area of Responsibility (PAR) which renders it vulnerable to typhoons and its adverse effects such as flooding and rain-induced landslides.

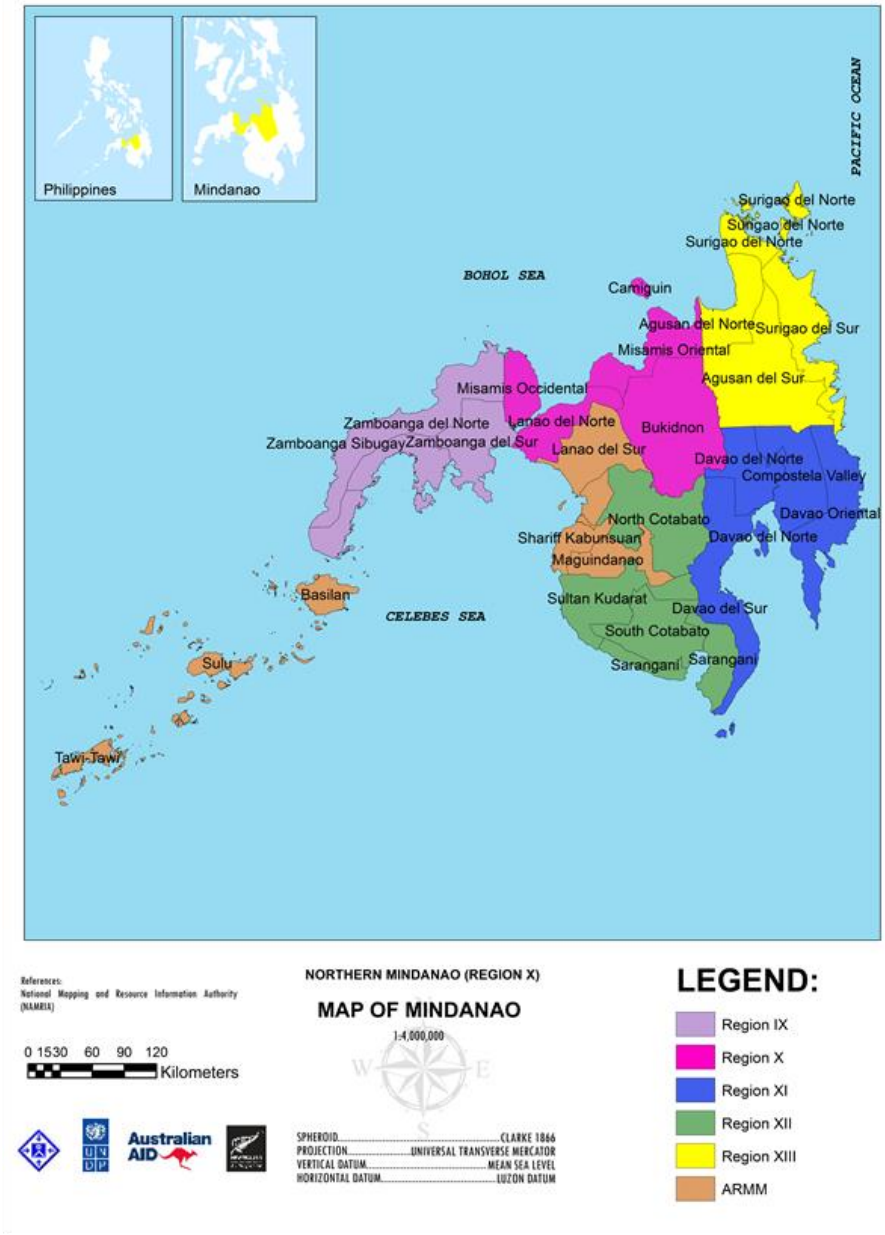
Also, being an archipelago is surrounded by vast oceans and faces the Pacific Ocean to its east where tropical cyclones mostly develop. Hence, the country is likewise exposed to storm surges and sea level rise.

Moreover, as a country located along the Pacific Ring of Fire makes it inherently prone to geologic hazards (Map 2). The country is home to 300 volcanoes, of which 23 are active. Every day, 20 earthquakes are recorded, and 200 are felt every year. For the past 400 years, 90 earthquakes were damaging[1] ~~(Map 2)~~.

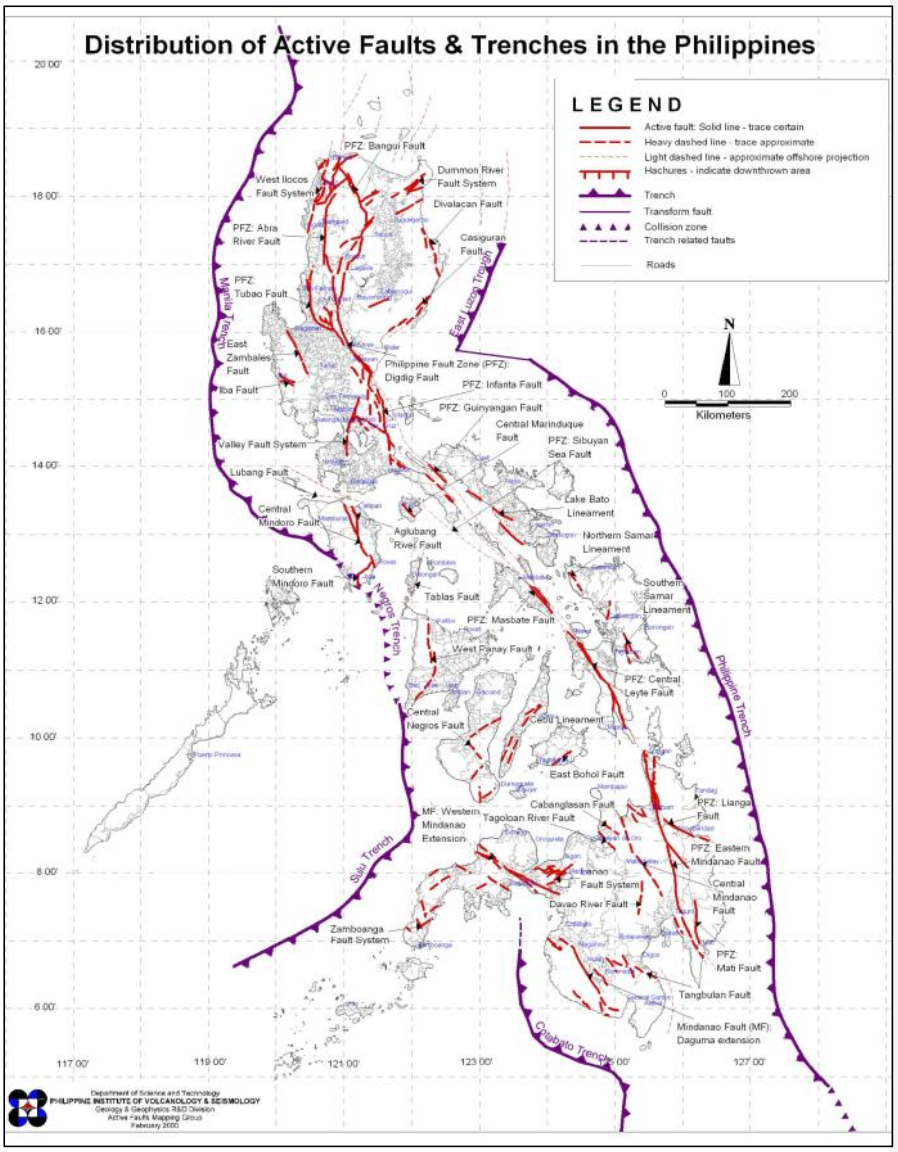
Given the foregoing national geographical context, Northern Mindanao has its share of disaster events caused by typhoons and other weather-related disturbances. As shown in a geohazard map prepared by Mines and Geosciences Bureau (MGB)-X, Northern Mindanao is potentially at risk not only to hydrometeorologic, but to geologic hazards as well. The potential geohazard types and distribution map details the risk of the region to flooding (coastal, riverine), tsunami, landslides (rain-induce, earthquake-induced), tsunami, lahar, earthquake, volcanic landslides and others (Map 3).

[1] Philippine Institute of Volcanology and Seismology (PHIVOLCS)

MAP 1. MAP OF MINDANAO

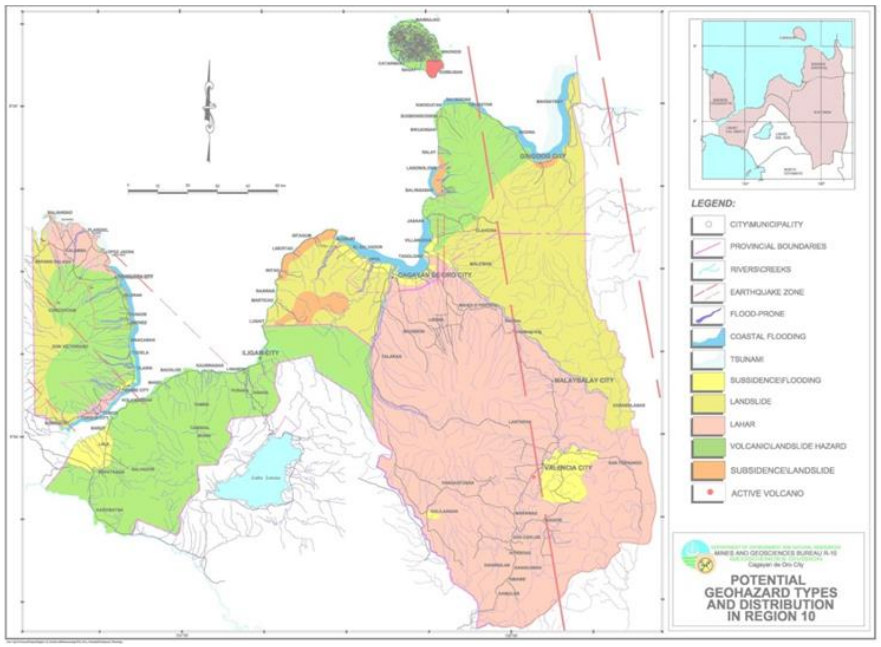


MAP 2. DISTRIBUTION OF ACTIVE FAULTS AND TRENCHES IN THE PHILIPPINES



Source: PHIVOLCS-X

MAP 3. POTENTIAL GEOHAZARD TYPES AND DISTRIBUTION MAP



3.1.1. Land Area

The region has a total land area of 20,186 square kilometers, representing around seven percent of the total land area of the country; ranks number five area-wise among the 17 regions and ranks number one area-wise among the Mindanao Regions.

Of the total regional land ~~area of 20,186 sq km~~, about 20 percent (598 sq km) ~~of which~~ is hazards, specifically flooding and 17 percent (3,432 sq km) has high level susceptibility to rain-induced landslide.

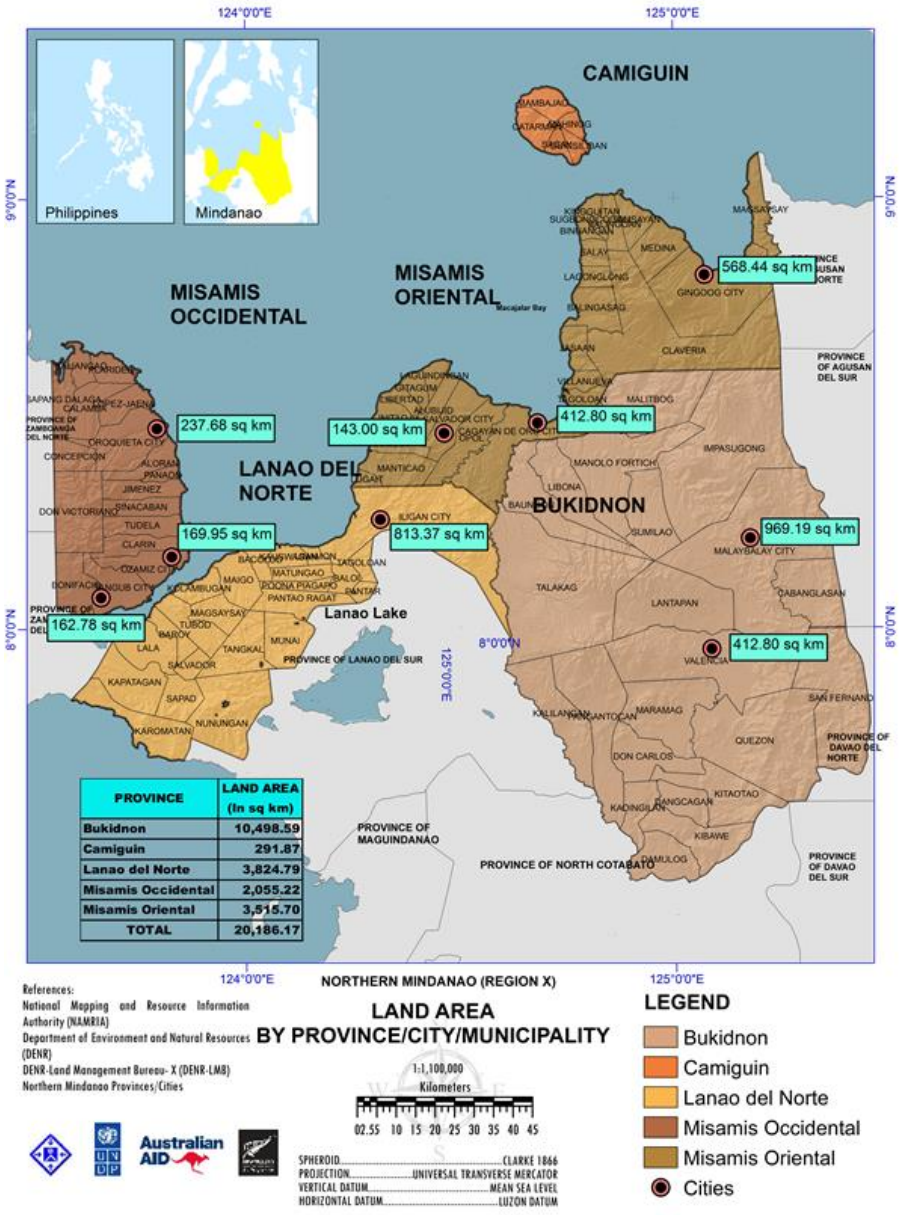
3.1.2. Political Subdivisions

3.1.2.1. Present Composition

Region X is composed of five provinces and two highly urbanized cities, seven component cities, 84 municipalities and 2,020 barangays. These are the provinces of Bukidnon, Camiguin, Lanao del Norte, Misamis Occidental and Misamis Oriental, the highly urbanized cities of Cagayan de Oro and Iligan and the component cities of El Salvador, Gingoog, Malaybalay, Oroquieta, Ozamiz~~s~~, Tangub and Valencia (Map 4).

The highly urbanized city of Cagayan de Oro, approximately 225 kilometers from Cebu and 800 kilometers from Manila, serves as the regional center. On the other hand, Iligan City, also a highly urbanized city, now serves as the secondary regional center.

MAP 4. LAND AREA, REGION X



The region is divided into 13 congressional districts: four in the province of Bukidnon, two each in the provinces of Lanao del Norte, Misamis Oriental, Misamis Occidental, and in the city of Cagayan de Oro and lone districts in the province of Camiguin and in the city of Iligan.

3.1.2.2. Past Composition

From 1972 onward, Region X underwent several changes in its political subdivisions. The concept of regional administration to enhance and promote socio-economic development, which has been pursued in the country since 1954, was put into action during the martial law regime of then President Ferdinand E. Marcos. The Integrated Reorganization Plan embodied in Presidential Decree No.1 issued in 1972, created eleven regions, three of which are in Mindanao (Regions IX, X, and XI).

Under PD. No. 1, Region X was among the bigger regions in the country then composed of the provinces of Agusan del Norte, Agusan del Sur, Bukidnon, Camiguin, Lanao del Norte, Lanao del Sur, Misamis Occidental, Misamis Oriental, Surigao del Norte and Surigao del Sur; and the cities of Butuan, Cagayan de Oro, Gingoog, Iligan, Oroquieta, Ozamiz and Tangub.

In 1975, then President Marcos issued Presidential Decree No. 742, later amended by Presidential Decree 743, creating Region XII and transferring thereto the pProvinces of Lanao del Norte and Lanao del Sur and the cities of Iligan and Marawi. The same Presidential Decree transferred Surigao del Sur to Region XI.

In February 1995, then President Fidel V. Ramos signed into law Republic Act 7901 creating Region XIII (the Caraga Administrative Region), which further trimmed down Region X's jurisdiction, as the two Agusan provinces and Surigao del Norte including the cities therein became part of the new region.

Under the administration of President Gloria Macapagal-Arroyo, the province of Lanao del Norte and the city of Iligan were reverted to Region X through Executive Order No. 36 issued on September 19, 2001.

By virtue of Republic Act No. 9435 (RA 9435), the municipality of El Salvador, Misamis Oriental was converted into a city in 2007, although, the cityhood of El Salvador was only made final in 2011 through the 15 February 2011 Supreme Court resolution upholding the constitutionality of RA 9435.

3.2. POPULATION AND SETTLEMENTS

3.2.1. Early Settlements

This section of the plan presents the early settlements, and original political subdivision of the former Northern Mindanao Region.

The early settlement of Northern Mindanao (Region X) is partly –traced and can be attributed to its capital, Cagayan de Oro. History reveals that the first settlement started in a village on the bank of Taguanao River, eight kilometres from the city proper. This was originally part of the territory of Bukidnon. Later on, inhabitants move to the bank of

Kalambagohan River filled with "lambago trees" and where it got its present name 'Kalambagohan". For a time, the natives of the place lived in prosperity until the end of the sixteenth century when the Maguindanaos, a rival tribe from Lanao raided and occupied the area. After which, the 'Bukidnons' were forced to retreat to the hills. Then, between 1780 and 1840 the population substantially increased because of the immigrants from Luzon and Visayas islands.[1]

It was on June 15, 1950 that Cagayan de Oro became a chartered city through Republic Act No. 571.[2] During that period, Cagayan de Oro has a population of 54,321 and with a land area of 300 square kilometres. It ranked third among the cities of Mindanao and due to its strategic location, it has been tagged as the "center of trade" in Northern Mindanao.

Over the years, Cagayan de Oro has been consistently considered as the most highly developed urban center in the region brought about by in-migration and eventually spilled over the rest of the cities and provinces. With the unprecedented urban growth, the region was spatially reorganized to have a more focused development direction.

Total population for the region registered at 1,297,345 in 1960, increased to 1,952,735 in 1970 and further increased to 2,314,205 in 1975. Annual growth rates for the region however, decreased from four percent for the period 1960-1970 to 3.40 percent for 1970-1975. The annual growth rate for the period 1960-1975 was 3.81 percent.

3.2.2. Regional and National Context

By virtue of Executive Order 36 (2001), Northern Mindanao then comprised the five provinces and eight cities.

In 2006 and 2007, there had been two major changes in the political subdivision of the province of Misamis Oriental in the region. The first was the creation of two new *barangays* in the Municipality of Villanueva.[3] The second change was the conversion of the Municipality of El Salvador, into a city,[4] which is now added to the existing eight cities.

[1] LGU-Cagayan de Oro (Photos: courtesy of LGU-CDO)
[2] Ibid.
[3] The creation was made through the Provincial Ordinance No. 914-2006, which was approved in July 2006.
[4] Conversion was made by virtue of Republic Act 9435, approved in April 2007.

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The Philippines' population of– 923 million people in 2010 is a true mix of ethnic, linguistic, and religious Groups[1], and similarly that of Northern Mindanao. Moreover, the country's cultural diversity is a blend of both from its geographic location and centuries of colonization by the Spanish and the Americans. High population density, as well as official encouragement prompted some to migrate to Mindanao where they continue to identify themselves as Visayan.[2]

The population of the region reached 4,297,323 as of the 2010 census. It comprised 19.56 and 4.65 percent to Mindanao's and the country's total population of 21,968,174 and 92,337,852, respectively. The region's population size in 2010 ranks 9th among the 17 regions in the country (including the National Capital Region). Among the Mindanao regions, Northern Mindanao placed 2nd to Davao region in terms of population in the past three censal years.

In the past two decades, the average annual growth rates (AAGR) between the three censal periods continue to decelerate. Although, a little higher than the national AAGR, the region posted a reduction of 0.17 percentage points from 2.23 percent between 1990-2000 to 2.06 percent between 2000-2010. Among the regions in the country, Northern Mindanao ranks 5th in terms of population growth rate in the past 20-year period.

Over the 20-year period, the population density of the region increased to 213 persons per square kilometer in 2010 from only 140 in 1990. These were lower than the national average in 1990 of 202 to 308 in 2010. Among the 17 regions in the country, it ranked 12th in terms of population density in 2010.

3.2.3. Population size, density and growth rate

3.2.3.1. Size and distribution

The population of Region X increased from 3,505,708 in 2000 to 4,297,323 in 2010, or an increase of 791,615 people over the ten-year period. Thirty-nine percent of the region's population live in its nine cities. Cagayan de Oro, the region's primate city, has a population of 602,088 in 2010, almost twice the population of Iligan, the next largest city.

Region X experienced a slowdown in population increase between the last two decades (1990-2000 and 2000-2010) from 24.69 percent to 22.58 percent or a reduction of 2.11 percentage points.

The succeeding maps show the population of Region X in 2000 (Map 5) and 2010 (Map 6).

[1] Central Intelligence Agency. TheWorldFactbook. "Philippines." 9 November 2010. https://www.cia.gov/library/publications/the-world-factbook/geos/rp.html (Philippines in Perspective)

[2] University of Hawaii at Manoa, Center for Philippine Studies. Colmenares, Serafin. "The Visayans in Hawaii." August 2003. http://www.hawaii.edu/cps/visayans.html(Philippines in Perspective)

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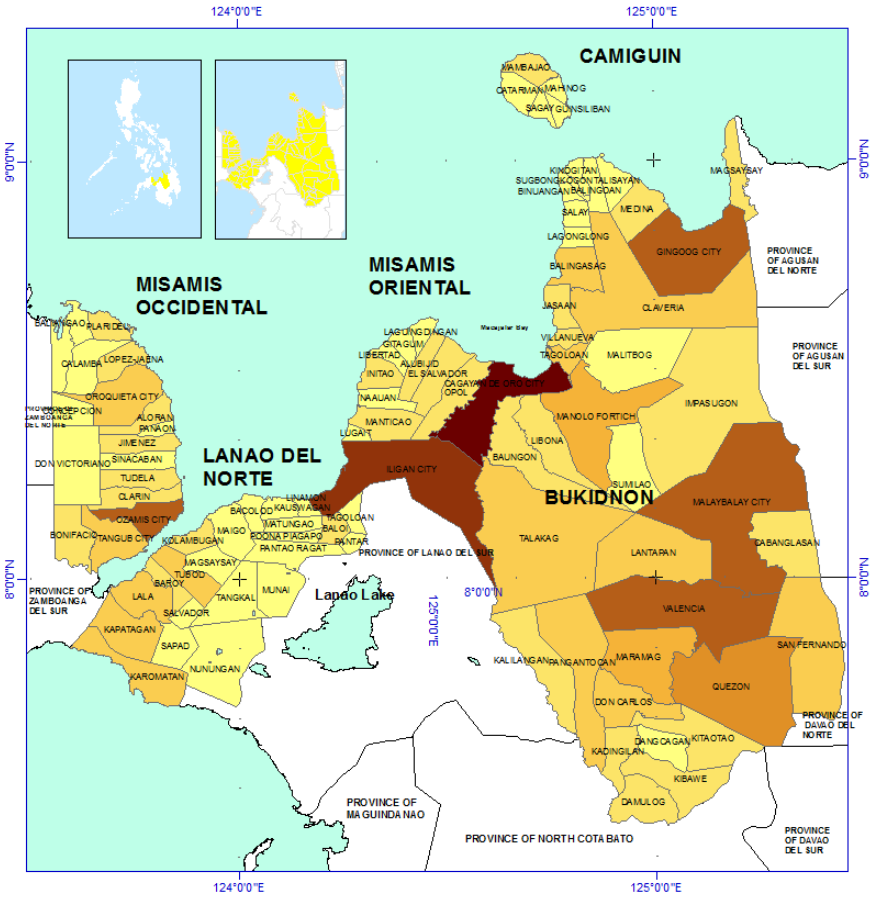
MAP 5. POPULATION, REGION X: 2000



Source of Basic Maps:
National Mapping and Resource Information Authority (NAMRIA)
National Economic and Development Authority (NEDA)
Population from National Statistics Office (NSO)

NORTHERN MINDANAO (REGION X)
POPULATION MAP, 2000

1:1,100,000
Kilometers
0 2.5 5 10 15 20 25 30 35 40 45

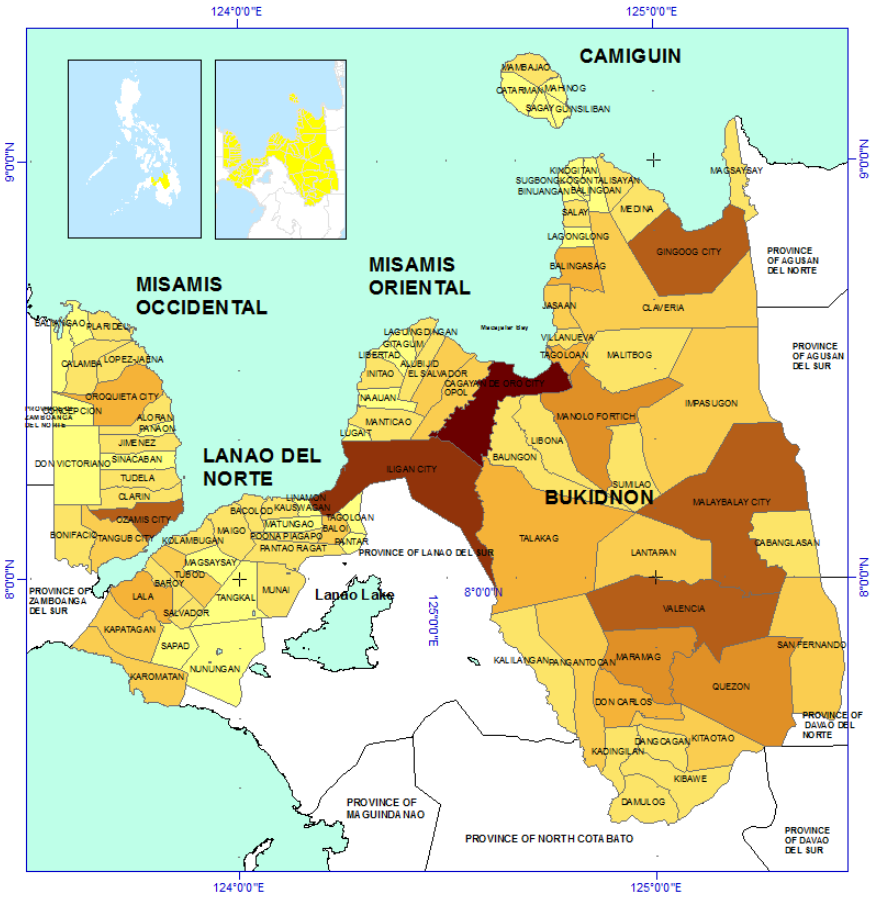
SPHEROID.....CLARKE 1866
PROJECTION.....UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....LUZON DATUM

LEGEND

- 350,001-461,877
- 200,001-350,000
- 100,001-200,000
- 80,001-100,000
- 60,001-80,000
- 40,001-60,000
- 20,001-40,000
- <20,000

Planning Environment

MAP 6. POPULATION, REGION X: 2010



3.2.3.1.Density and urbanization

Region X is still relatively sparsely populated, its density consistently lower than national average, however higher than the Mindanao regions. Among the provinces (excluding cities) in 2010, Camiguin, the smallest in terms of land area, has the highest density at 352 persons per ~~sq.km.~~sq. km. followed by Misamis Oriental, the second largest, at 314 per ~~sq.km.~~sq. km. (Region's average density is 213). Bukidnon, the largest province lowest at 108 persons per ~~sq.km.~~sq. km.

The city of Cagayan de Oro (the capital of the province of Misamis Oriental) has the highest density (1,459), which increased by 340 persons per sq. km. compared to that of year 2000, being the center of trade and industry in the region.

Cities with population density lower than 300 persons per sq. km. cover the cities of Oroquieta with 290 persons per ~~sq.km.~~sq. km., followed by Gingoog with 207 persons per km., and Malaybalay (the largest in terms of land area) with 158 persons per ~~sq.km.~~sq.

Among the municipalities, Laguindingan of Misamis Oriental (where the new airport is located) had a~~emerged to have the highest~~ population density of ~~1.307~~ 504 persons per sq. per sq.km compared in 2000. The remaining municipalities like Mambajao of Camiguin, Sapad and Sultan Naga Dimaporo of Lanao del Norte, Lugait, Villanueva, and Jasaan of Misamis Oriental have densities above 500 persons per ~~sq.km.~~sq. km. Overall, these municipalities especially Mambajao and Tubod (both capital municipalities) have wide influence to help propel the growth of other adjacent and nearby municipalities.

3.2.3.2. Growth Rate and Doubling Time

The region's population in the past 20 years has grown faster than many other regions in the country, at an annual growth rate of 2.14 percent, compared to the national average of 2.12 percent. In Mindanao, Region X, along with Region XII~~–~~ (2.72%), and ARMM (2.20%) registered higher than national average population growth rates.

Like all other regions in the country, Region X's population growth in the 2000-2010 censal~~us~~ periods has slowed down. Compared with most regions, however, Region X's deceleration was much lower: 0.17 percentage points versus~~.~~ 0.44 percentage points of the national average. Among Mindanao regions, it had the lowest population growth deceleration.

Lanao del Norte and Misamis Oriental grew faster than the other provinces, with above the region's average population growth rates, at 2.54 percent, and 2.13 percent, respectively. Lanao del Norte and Misamis Occidental were two provinces in the region that had accelerated population growth rates: 2.01 percent to 2.5 percent, and 1.17 percent to 1.42 percent, respectively.

Aside from Cagayan de Oro ~~c~~City (2.69%), population growth among cities in 2000- was highest in El Salvador (2.61%), Malaybalay (2.16%), and Valencia (2.07%) ~~cities~~. Population growth of the nine cities combined decelerated by 0.47 percentage points, whereas that of the five provinces accelerated slightly by 0.2 percentage points.

With the 2000-2010 average growth rate, the region's population in 2010 will double in 34 years or in 2044 faster than the national average by three years and that of Mindanao

by two years. Among the provinces, Lanao del Norte will double its 2010 population in 27 years. Meanwhile, the city of Cagayan de Oro will double its 2010 population in 26 years.

3.2.4. Existing settlements pattern

This section presents the existing structure of the network of settlements (cities and municipalities) in Region X based on the 2010 Census of Population. The existing settlement pattern is described as a seven-level hierarchy (Table 1) ~~as classified in the~~

TABLE 1. HIERARCHY OF URBAN CENTERS, REGION X

	Population Level
Regional Metropolitan Center	>600k
Sub-regional Center	300k-600k
Large Cities	120k-300k
Medium-small Cities	50k-120k
Emerging Growth Centers	35k-50k
Urbanizing Centers	26k-35k
Small-medium towns	<26k

Note: Population size for some level of hierarchy may have some overlaps but the classification is based on the functional distinction/roles of said areas as confirmed by local knowledge particularly about the flows/exchanges of goods and services among settlements.

3.2.4.1. Regional Metropolitan Center: Metro Cagayan de Oro (composed of Cagayan de Oro City, Opol, the newly created city of El Salvador and Tagoloan)

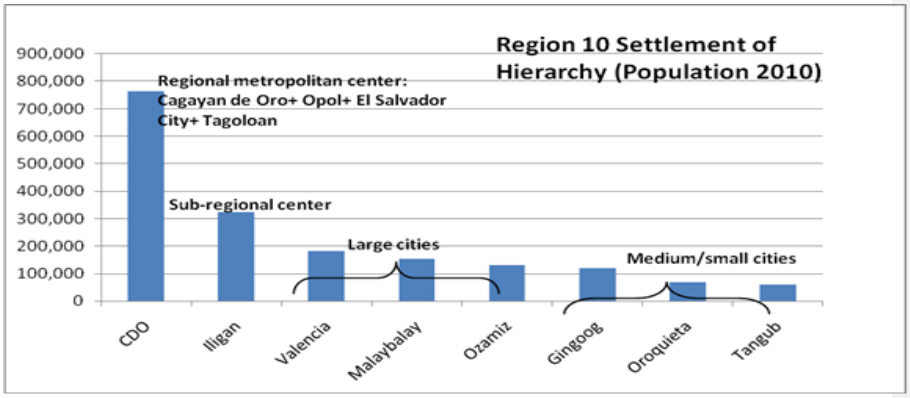
The Cagayan de Oro metropolitan area is one of the major metropolitan areas of the country. With its strategic location and the presence of major seaport and the proximity of the Laguindingan ~~airport~~ Airport (with international standards), it will sustain its strong inter-regional linkages to Metro Cebu, Metro Manila and Metro Davao, and to other cities and provincial centers in the region such as Iligan ~~City~~, Malaybalay and Ozamiz cities.

Tagoloan hosts the large industrial estates and economic zones like the Mindanao Container Terminal (MCT) and the PHIVIDEC industrial estate. Situated in the stretch of Cagayan-Iligan Corridor, El Salvador is strategically poised to serve as service provider and home to small and medium industries which can spur economic development to the growing populace along the Corridor.

3.2.4.2. Sub-regional center: Iligan City

Iligan City exhibits the role of a sub-regional center in the region. It is also home to large industries in the region serving not only Region X, but other regions in the country. With the expanded Cagayan-Iligan Corridor, Iligan plays a key role together with other proximate growth centers that have existing base of heavy and large industries capable for expansion along manufacturing and processing.

FIGURE 3. REGION X SETTLEMENT HIERARCHY (POPULATION 2010)



Source of basic data: NSO

3.2.4.3. Large Cities: Valencia, Malaybalay and Ozamiz Cities

The central part of Bukidnon shall continue to be the main source of agricultural products and raw materials for the processing plants in the region. Hence, Malaybalay and Valencia will serve as large growth centers that will drive agri-business and trading not only the province, but as well as the region closest to it like Davao region.

~~Also the~~The growing population density of ~~the city of~~ Ozamiz City can be attributed to its port and large commercial trading which pave the influx of people even from the Visayas and Luzon islands.

3.2.4.4. Medium/Small Cities: Gingoog, El Salvador, Oroquieta and Tangub

Gingoog with its influence in the Gingoog-Camiguin ~~Toursim~~Tourism Adventure in the forms part of the integrated adventure-type coastal and/or expanded tourism highway passing the tourism sites in Misamis Oriental. With the recent creation of El Salvador City, it serves to complement the Cagayan-Iligan Corridor (CIC) growth area.

Oroquieta City serves as the provincial capital of Misamis Occidental, and Tangub City is another city in the province in which both cities play a complementary role to Ozamiz City to facilitate the movement of goods and services of the province and the adjoining areas.

The **emerging growth centers** covers six municipalities of Bukidnon, four in Lanao del Norte, two in Misamis Oriental and one in ~~Camguin~~Camiguin and Misamis Occidental. areas are expected to spur development within and adjoining municipalities. There are 28 municipalities from all five provinces which comprised the **urbanizing centers** which contribute in the agriculture-based ventures in the region. The rest of the provincial 38 municipalities are categorized as **small to medium towns** which provide support to the economic activities in the region.

3.3. PHYSICAL RESOURCES

3.3.1. General land and water characteristic and resources

3.3.1.1. Topography, Elevation and Slope

Topography and Elevation

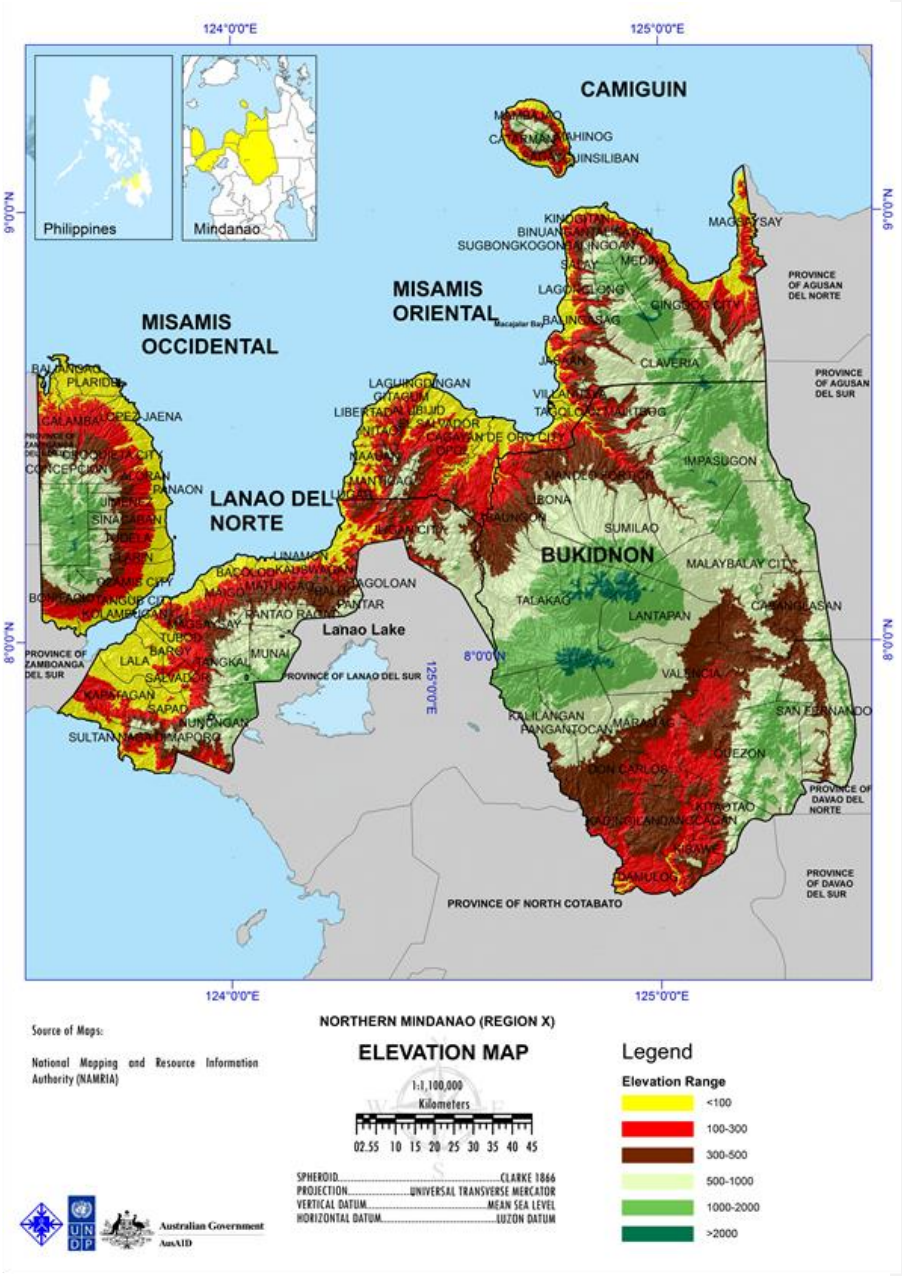
The region is a combination of flatlands (mostly floodplains and plateaus) and undulating hills and mountainous terrain.

total land area is of high elevation which is between 500-1000 meters above sea level (masl) and only 10 percent is~~–~~ located less than 100 meters elevation which are also referred to as lowlands (Map 7).
About 53 percent of the total land area of the region has more than 500 meters elevation, referred to as high altitude cool areas. Areas of highest elevations are mostly found in Bukidnon.

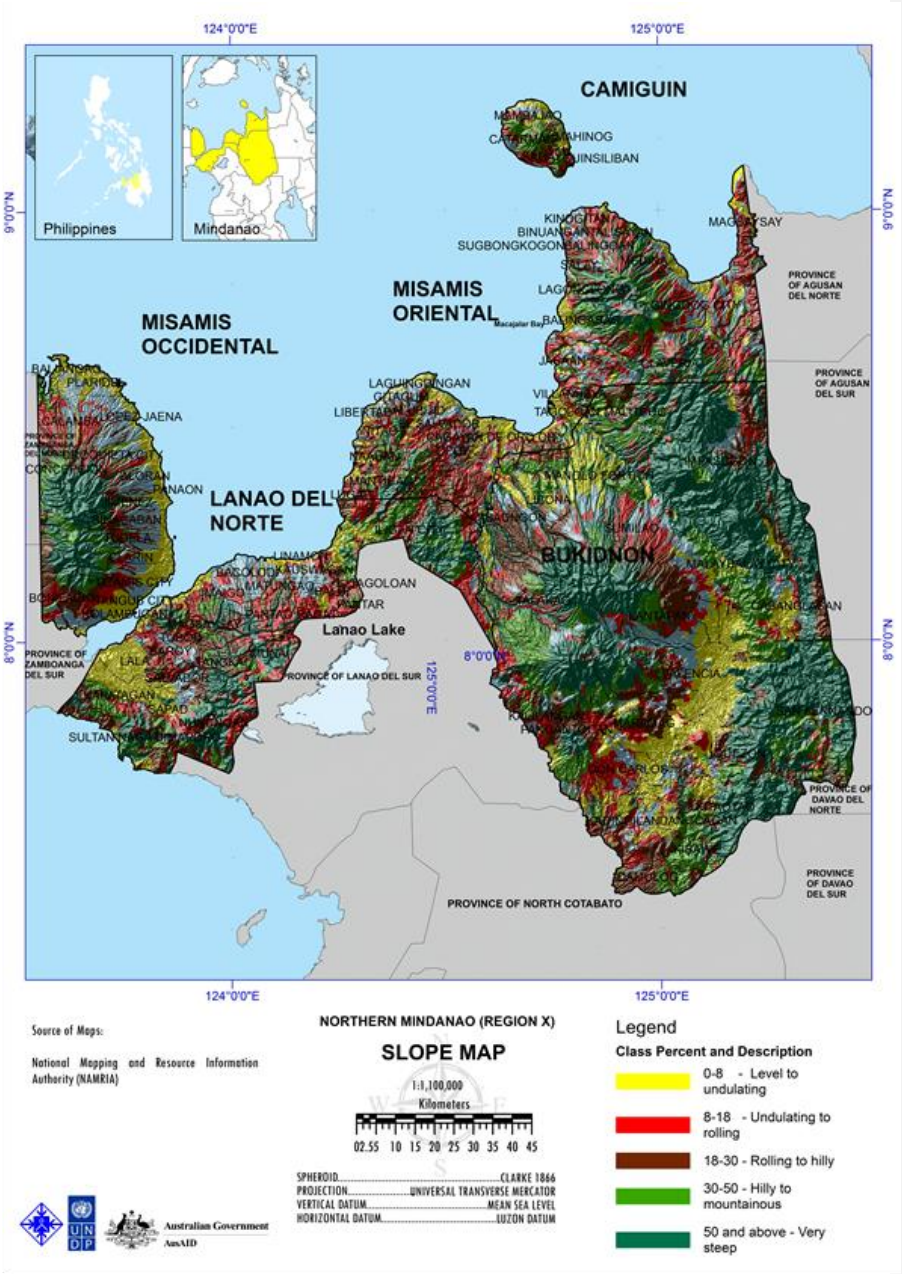
Slope

Of the region's total land area, about 22 percent belongs to the 0-8 percent slope class or flatlands (Map 8). T~~-~~these are irrigable and highly suitable for agricultural, urban, industrial and other related uses. M~~;~~ore than 12 percent ~~are~~ is within the 8-18 percent class, which are gently sloping to undulating lands that have wide variety of uses for agricultural development, ranging from seasonal to permanent crops. A~~;~~bout 16 ~~are~~ ha~~v~~es 18-30 percent slope that include hilly to mountainous areas generally marginal lands for most of the agricultural crops requiring tillage. Some have deep friable soils which when planted with economic trees can be productive given ideal environmental conditions. N~~;~~early 15 percent ~~are~~ is within the 30-50 percent slope consisting of rough, hilly dissected mountainous areas. These areas are reserved for forest trees to attain the required balance between forest and agriculture. T~~;~~he remaining 35 percent are areas with slopes more than 50 percent. Extraction of trees is difficult and/or uneconomical in these very steep and extremely mountainous areas.

MAP 7. ELEVATION MAP, REGION X



MAP 8. SLOPE MAP, REGION X



3.3.1.2. Water Resources

Watersheds/River Bbasins

Water is one of the important assets of the region. It is being harnessed towards the provision of dependable and safe water supply for agricultural, domestic, commercial and industrial uses.

There are 64 identified watershed[1] areas in the region, 20 sites with an aggregate area of 1,152,065.74 hectares already characterized and profiled (Map 9).

Considered as major river basins are the following:

1) *Pulangui River Basin*. The Pulangui River is the main drainageway of the basin and heads from the mountainous portion of Bukidnon ~~Province~~ and flows in a direction through Agusan, Davao, Cotabato and finally joining the Mindanao River. It is also the primary source of irrigation systems ~~that irrigates~~for the vast of Bukidnon and is the source of the largest hydroelectric power plant in the whole of Mindanao, the Pulangui IV Hydroelectric Plant located in the municipality of Maramag. This plant generates 255 megawatts of electricity, which is by far, the largest among all the power generating plants in Region X. *(Bukidnon PDPFP)*
2) *Tagoloan River Basin*. It ~~-~~has a drainage area of 1,577 square kilometers and covers a small portion of the province of Misamis Oriental in the north and part of Bukidnon in the south.
3) *Cagayan River Basin*. T~~ ~~~~t~~he bigger portion of this basin is located in the of Bukidnon while the rest are within the province of Misamis Oriental. The devastation brought about by Tropical Storm (TS) Sendong on December 16-17, 2011, which affected the three major cities of the region, namely Cagayan de Oro, Iligan and Valencia and recorded a huge amount of damage of about PHP 4.9 billion to properties, was attributed to the sudden rush and overflow of Cagayan River Basin, among other factors.
~~4)~~ *Agus River Basin*. ~~ drains~~It drains an area of 1,645 square kilometers emptying Iligan Bay through Iligan City. Like the Pulangui, this basin also feeds hydroelectric plants that are the main sources of electric power for Mindanao.

~~4) The two river basins, Agus and Pulangui, feed the hydroelectric plants, which are the main sources of electric power for the whole island of Mindanao.~~

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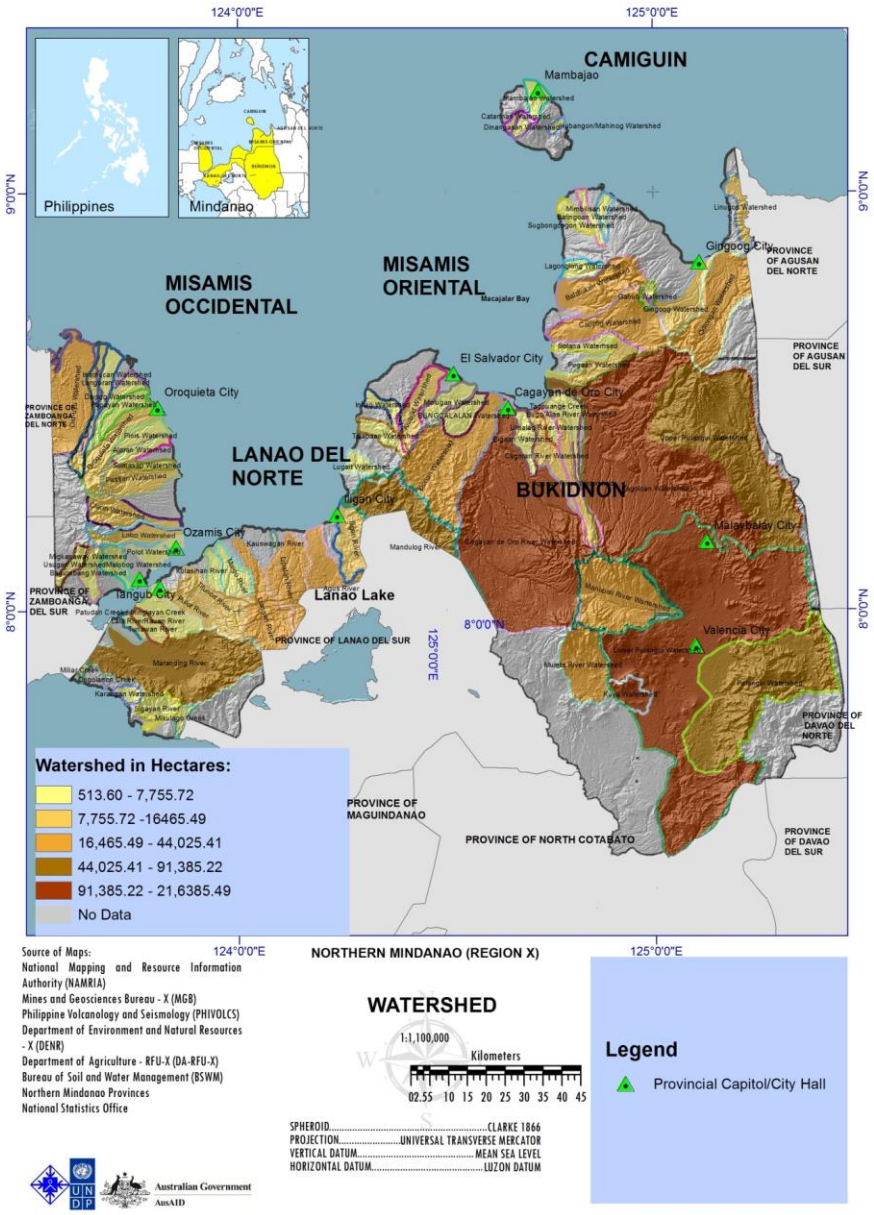
These major river basins must be properly managed to reduce risk, as well as, to prevent major disasters from happening that may cause fatalities and severe damages to properties of the surrounding communities. The adverse impacts of climate change are becoming inevitable such as drought, which can be caused by extreme temperature rise. The proper management of water resources, therefore, is very important to protect water bodies, especially surface water resources, in order to ensure a secured water supply for domestic, commercial, agricultural, and other uses of these resources to the communities who are dependent on them.

[1] Major watershed refers to river basins having a drainage area of at least 1,400 square kilometers, whereas the principal watersheds are those having 41 to not more than 1,400 square kilometers of drainage area.

MAP 9. WATERSHED MAP, REGION X



Coastline

Of the five provinces in the region, four are coastal provinces, which are composed of six coastal cities and 51 coastal municipalities. The total coastline stretches to about 663.4 km, which is equivalent to more or less 926,400 hectares of municipal coastal resource management area.

The region's major fishing grounds include the Macajalar Bay, Iligan Bay, Panguil Bay, Gingoog Bay, Illana Bay and Murcielagos Bays (Map 10).

TS Sendong exposed into plain view the inadequacies in land use planning including coastal resource management, inadequacies of mitigation measures, and vulnerability of the region's population and infrastructure to disasters. Preventive and adaptive planning for coastal areas should find its way into the LGUs' comprehensive land use plans, and into NGAs' development plans and policies.

3.3.1.3. Land Resources

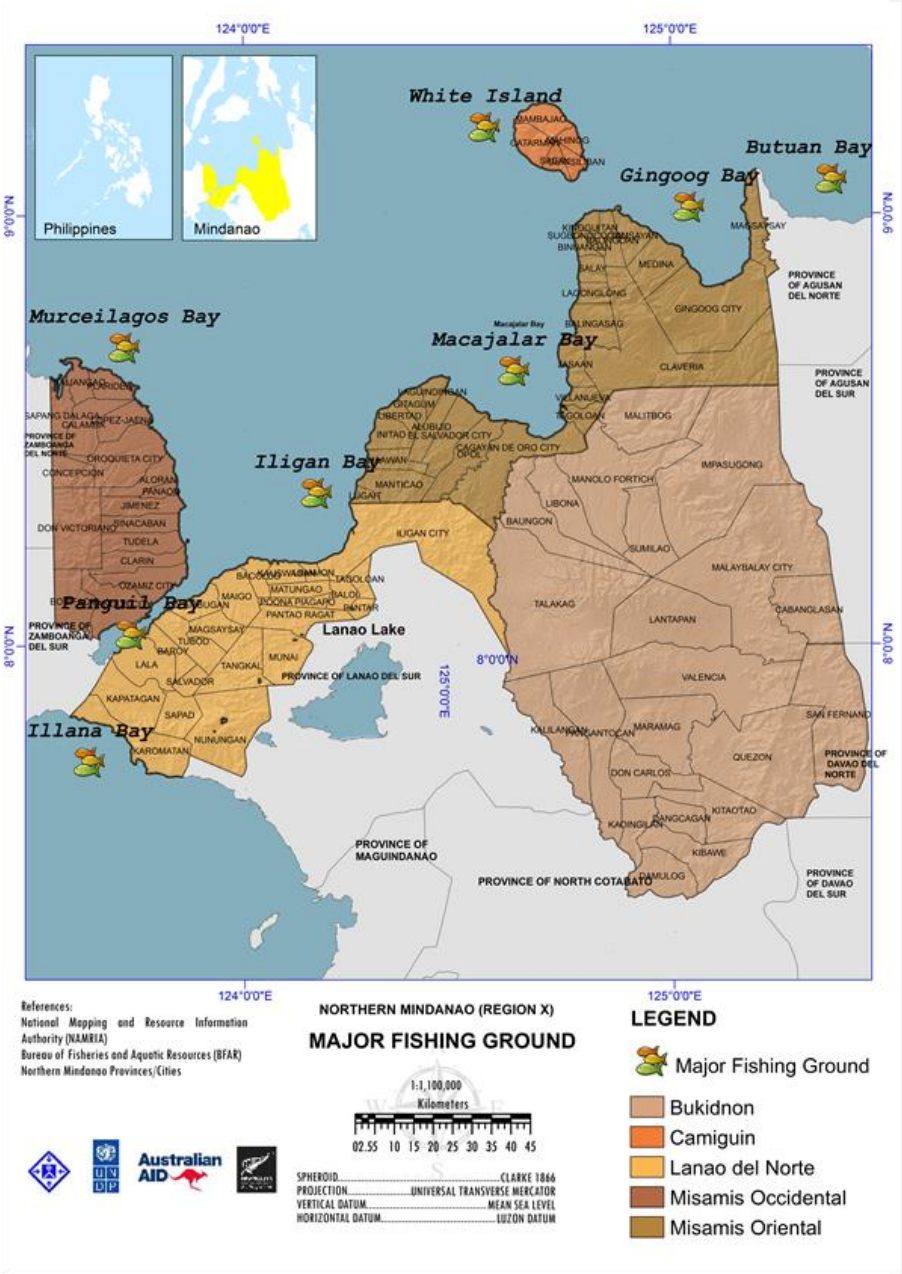
Mountain Ranges: The region has the following mountain ranges, namely: 1) Mt. Kitanglad Range, Mt. Hibok-Hibok, and Mt. Malindang Range.

Canyons: The region has two famous canyons, which are both found in the province of Bukidnon. The Mangima Canyon is located in the municipality of Manolo Fortich while the Atugan Canyon is located in the municipality of Impasugong.

Valleys/Plains: Lanao del Norte has two valleys and a major plain. The major valley is Kapatagan Valley, which greatly contributes to the economic life of the province. It is considered as the rice granary of Lanao del Norte. Another valley is the Kalibao Valley in the municipality of Sultan Naga Dimaporo. It is mainly utilized for rice crop production. The Baloi Plains within the municipality of Baloi is utilized primarily for rice and corn production. Smaller plains are found in the municipality of Sultan Naga Dimaporo, which are also cultivated for rice and corn production (PDPFP of Lanao del Norte, 2007-2013).

Islands: Camiguin which is an island province has two famous islets~~ands~~. The White serves as fish sanctuary and is a potential marine park. It has an uninhabited white sandbar from which the towering Mt. Hibok-Hibok and Old Vulcan can be viewed. The Mantigue Island covers a four-hectare evergreen forest fringed with white granule sand beaches. It is a habitat for marine turtles, fruit bats and birds. It also serves as a buffer for Mahinog, protecting the mainland during monsoon and easterly winds.

MAP 10. MAJOR FISHING GROUNDS, REGION X



3.3.1.4. Geological Features

The geological feature of the region is predominantly of volcanic origin. It includes the northeastern tip of Zamboanga Cordillera; the Lanao- Bukidnon Highland; the West Central Cordillera; and the Camiguin-Balatucan Range.

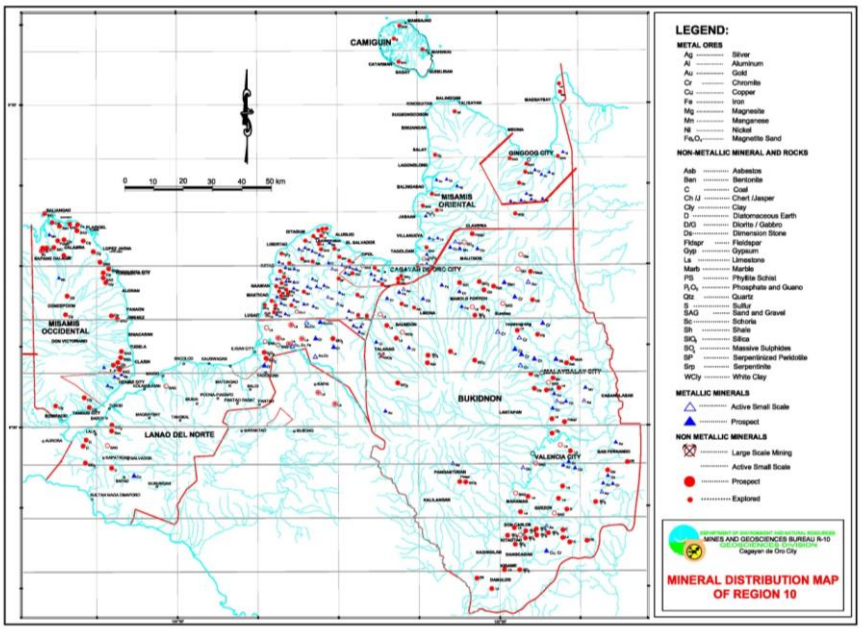
3.3.1.5. Mineral Resources

The transfer of the mineral-rich province of Surigao del Norte to the Caraga Region in 1995 vastly diminished the mineral resources of Region X, particularly the metallic reserves for gold, silver and nickel. Nevertheless, Region X has still its own mineral resources - metallic and non-metallic, which are still mostly untapped (Map 11). Metallic mineral deposits include precious metals (gold and silver), iron and ferro-alloys (iron, chromite, manganese), base metals (copper), and non-metallic minerals (limestone, guano and phosphate rocks, bentonite, clay, dolomite, feldspar, silica, sulfur, diatomite, structural and building materials, coal).

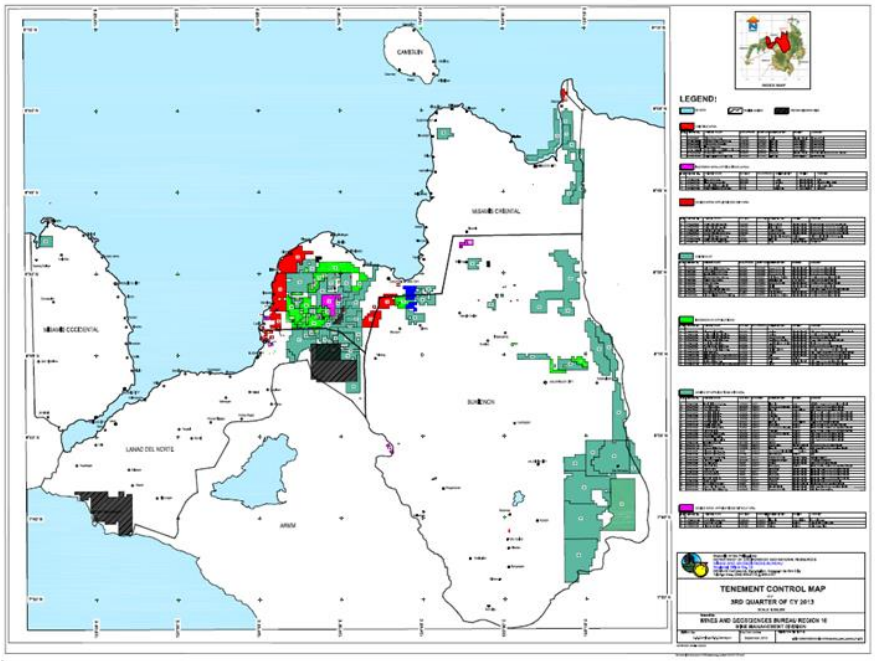
Mining Activities

As of the third quarter of 2013, MGB Region X has issued 28 permits/contracts/ agreements to firms for various mining and quarrying purposes mostly for non-metallic minerals. These permits/contracts/agreements covered around 8,030 hectares. The approximate location of the mining activities in the region is showed in the tenement control map (Map 12).

MAP 11. MINERAL DISTRIBUTION, REGION X



MAP 12. TENEMENT CONTROL MAP, REGION X, 3RD QUARTER 2013



Source: MGB-X

3.3.1.6. Climate and Weather

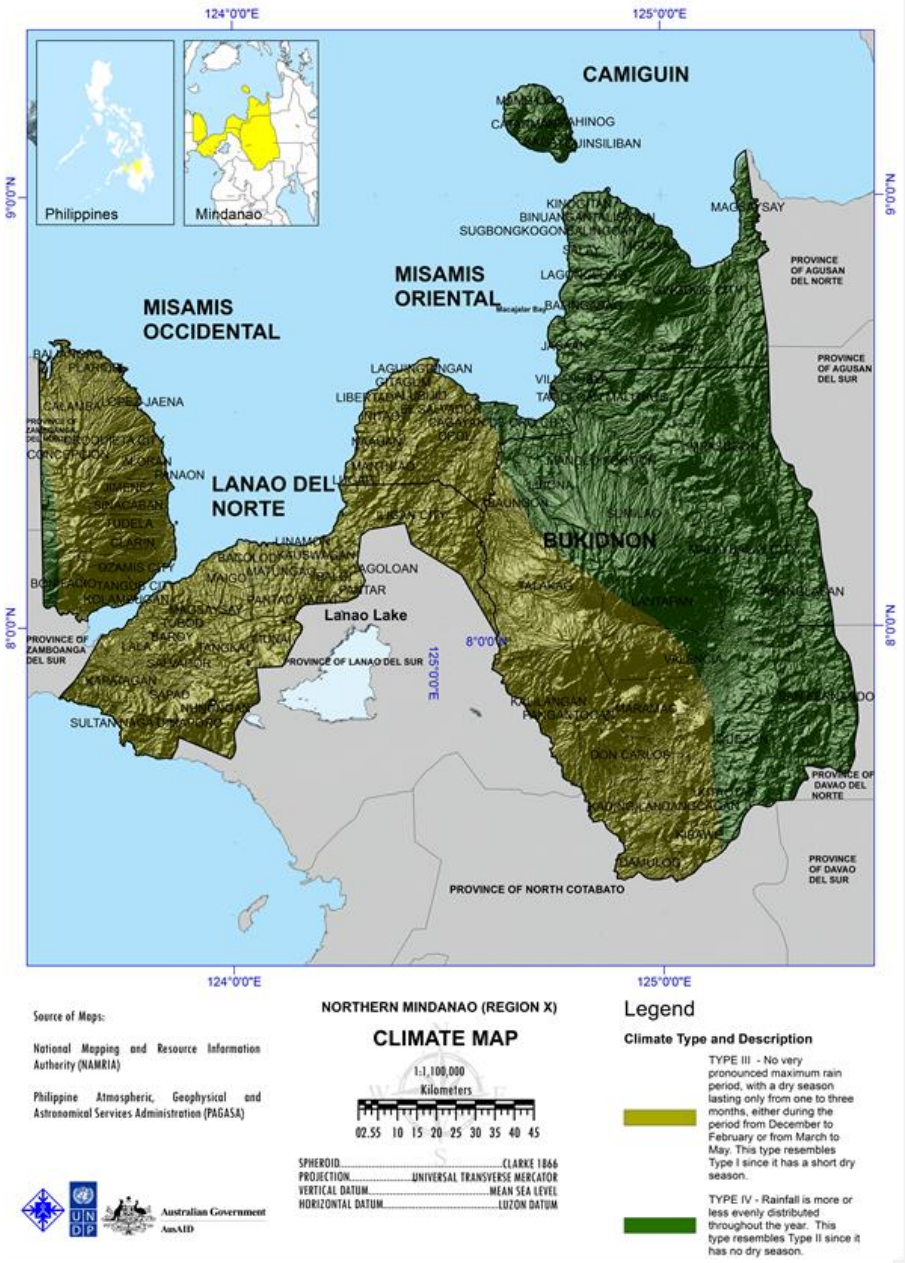
Climatic classification

The region generally has a climate favorable to both industry and agriculture (Map 13). Two types of ~~of~~ general climates based on the Modified Coronas classification prevail~~s~~ the region distributed as follows:

Type III: No very pronounced maximum rain period, with a short dry season lasting only from one to three months. Areas of this climate type are partly shielded from the northeast monsoon but are exposed to the southwest monsoon and are also benefited by the rainfall caused by the tropical cyclones. This type of climate covers the areas of Cagayan de Oro City, the western side of Misamis Oriental from Balingasag to Lugait, the eastern portion of Lanao del Norte, Iligan City and the central part of Bukidnon.

Type IV: Rainfall is more or less evenly distributed throughout the year. This affects the provinces of Camiguin, Misamis Occidental, the cities of Oroquieta, Ozamiz and Tangub, the western part of Lanao del Norte, the northeastern part of Misamis Oriental, and the easternmost portion of Bukidnon.

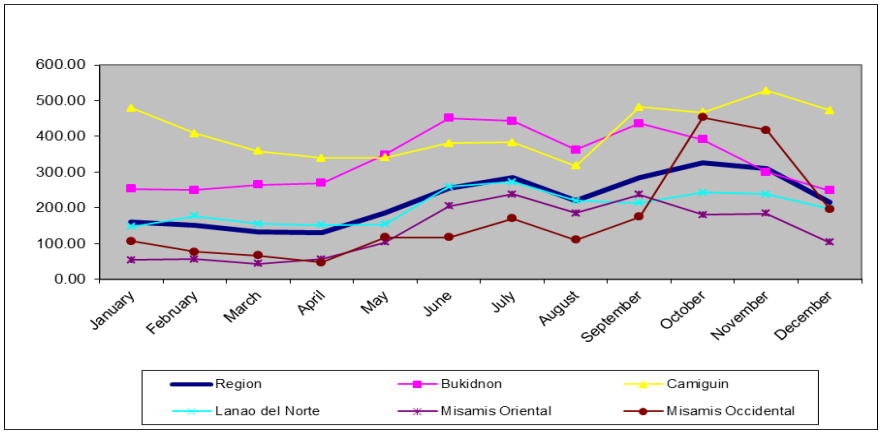
MAP 13. CLIMATE MAP, REGION X



Rainfall

Heavy rains characterize the region's rainfall pattern during the months of June to November and moderate rains during the months of December to May. The province of Camiguin has the highest precipitation at an average of 4,958.42mm annual rainfall, while the province of Misamis Oriental had the lowest at 1,649.18mm.

FIGURE 4. TEN-YEAR (1993-2002) AVERAGE MONTHLY RAINFALL, REGION X



3.3.1.7. Land classification

The region has a total land area of 2,018,617 hectares, 46 percent of which is classified as alienable and disposable (A & D) and the remainder is forestlands.

Among the five provinces of the region, Bukidnon has the bulk of the A & D ~~alienable &~~ forestlands at 41 percent and 62 percent, respectively, of the total A&D and forest lands of the region. Although, Misamis Oriental has smaller land area than Lanao del Norte, it shares 25.34 percent to the total A & D lands of the region.

TABLE 2. LAND CLASSIFICATION BY PROVINCE, REGION X: AS OF 2007 (IN HECTARES)

Province	Alienable & Disposable	% Dist.	Forestland	% Dist.	Total Land Area	% Dist.
Region X	935,297.39	100.00	1,083,319.27	100.00	2,018,616.66	100.00
Bukidnon	380,332.75	40.66	669,526.25	61.80	1,049,859.00	52.01
Camiguin	23,723.00	2.54	5,464.00	0.50	29,187.00*	1.45
Lanao del Norte	187,736.66	20.07	194,742.00	17.98	382,478.66	18.95
Misamis Occidental	106,533.71	11.39	98,988.29	9.14	205,522.00	10.18
Misamis Oriental	236,971.27	25.34	114,598.73	10.58	351,570.00	17.42

Source: Planning & Management Division, DENR-X: RSET 2011
**Total land area different from the land area used in the computation of IRA (as of 2010, source DBM 10)*

~~*3.3.1.8. Land suitability*~~

Strategic Agriculture and Fisheries Development Zones (SAFDZ)

~~*Strategic Agriculture and Fisheries Development Zones (SAFDZ)*~~

of 1997. SAFDZs are prime and contiguous agricultural areas suitable for productive farming, particularly for the production of priority agricultural commodities.
SAFDZ is further classified into several categories such as cCrop sSub-zone, lLivestock zone, fFishery sSub-zone, and iIntegrated cCrops/lLivestock/fFishery sSub-zZone (Map ~~with the break~~down as follows:

SAFDZ Sub-Zone	Areas (In Hectares)	% Share to Total Area
Crops	512,045	90.57
Fisheries	33,156	5.86
Livestock~~s~~	20,128	3.56
Total	565,329	100.00

Note: Areas were GIS-derived and are approximate only.

3.3.1.9. Protection Areas

Protection areas pertain to those set aside for rehabilitation, conservation, and management, especially those sensitive/critical ecosystems which integrity needs to be preserved, to allow degraded resources to regenerate, and to protect the human population from environmental hazards. These areas include the following:

a) Areas declared as belonging to the National Integrated Protected Areas System (NIPAS) per Republic Act No. 7586;
b) Areas outside the NIPAS requiring equivalent amount of protection; and,
c) Areas prone to natural hazards termed as environmentally constrained areas.

Network of Protected Area System (NIPAS)

There were 21 sites in Region X initially considered as initial components of the NIPAS. These include the existing national parks, old growth forest, declared watershed forest reserve and mangrove swamp forest reserve. Based on the evaluation, 16 sites were found suitable for the establishment as Protected Areas (Map 15). As of January 2013, there are 12 sites officially covered as protection areas under the NIPAS. These are all covered with Presidential Proclamations and other pertinent legal basis for conservation, protection development and management with an aggregate area of 157,476.76 hectares of which 91,326.73 hectares are within the protected areas and the remainders are within the buffer zone. Of the 12 NIPAS sites, three are covered by Republic Acts, namely: 1) Mt. Kitanglad Range Natural Park in the province of Bukidnon (Republic Act No. 8978 of 2000); 2) Mt. Malindang Natural Park in Misamis Occidental (Republic Act No. 9304 of 2004); and, 3) Mimbilisan Protected Landscape in Misamis Oriental (Republic Act No. 9494 of 2007).

Although there was a change in the land balance ratio (forestland to A & D) from 62:38 in 1993 to 54:46 in 2003, the region is still within the standard of having an ecologically sound environment.

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MAP 14. SAFDZ MAP, REGION X

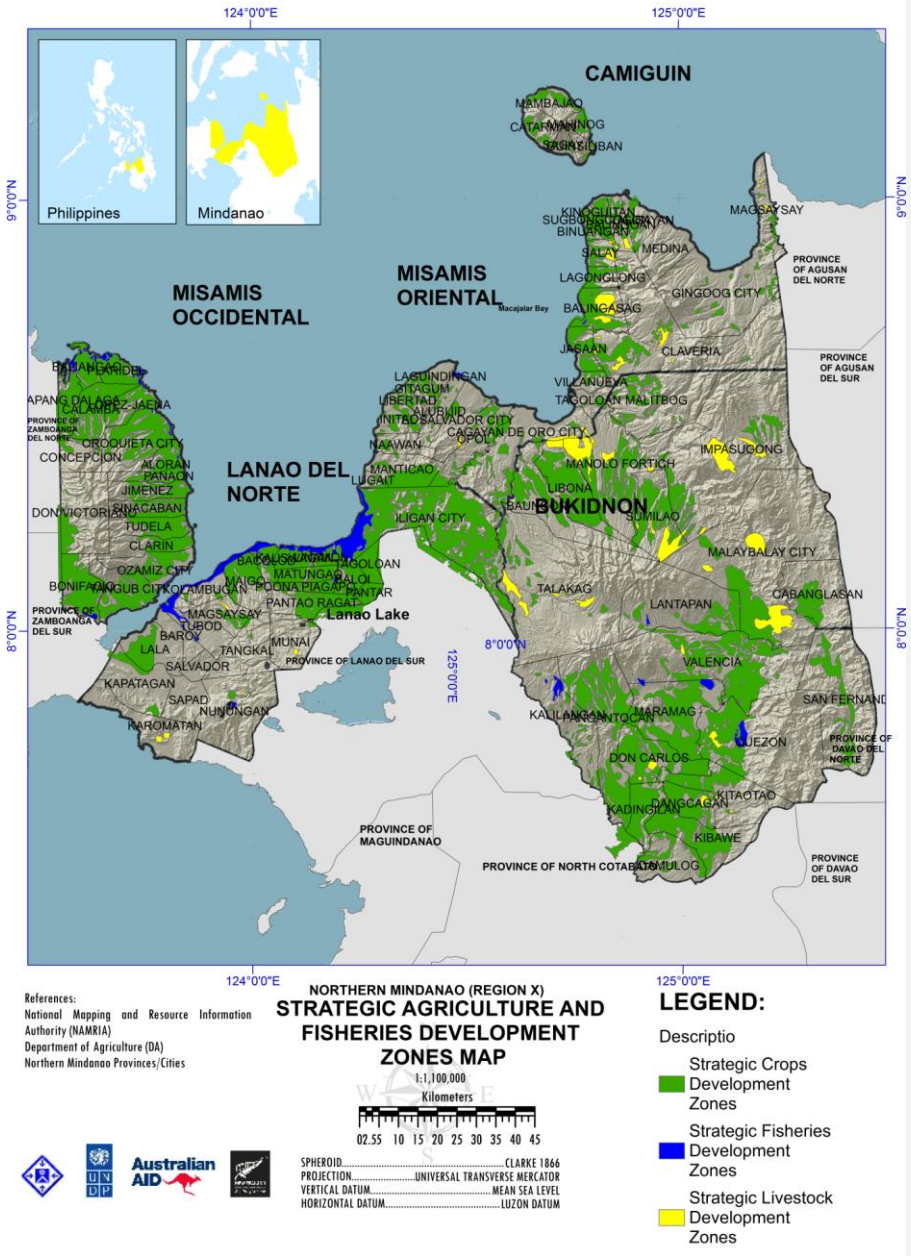


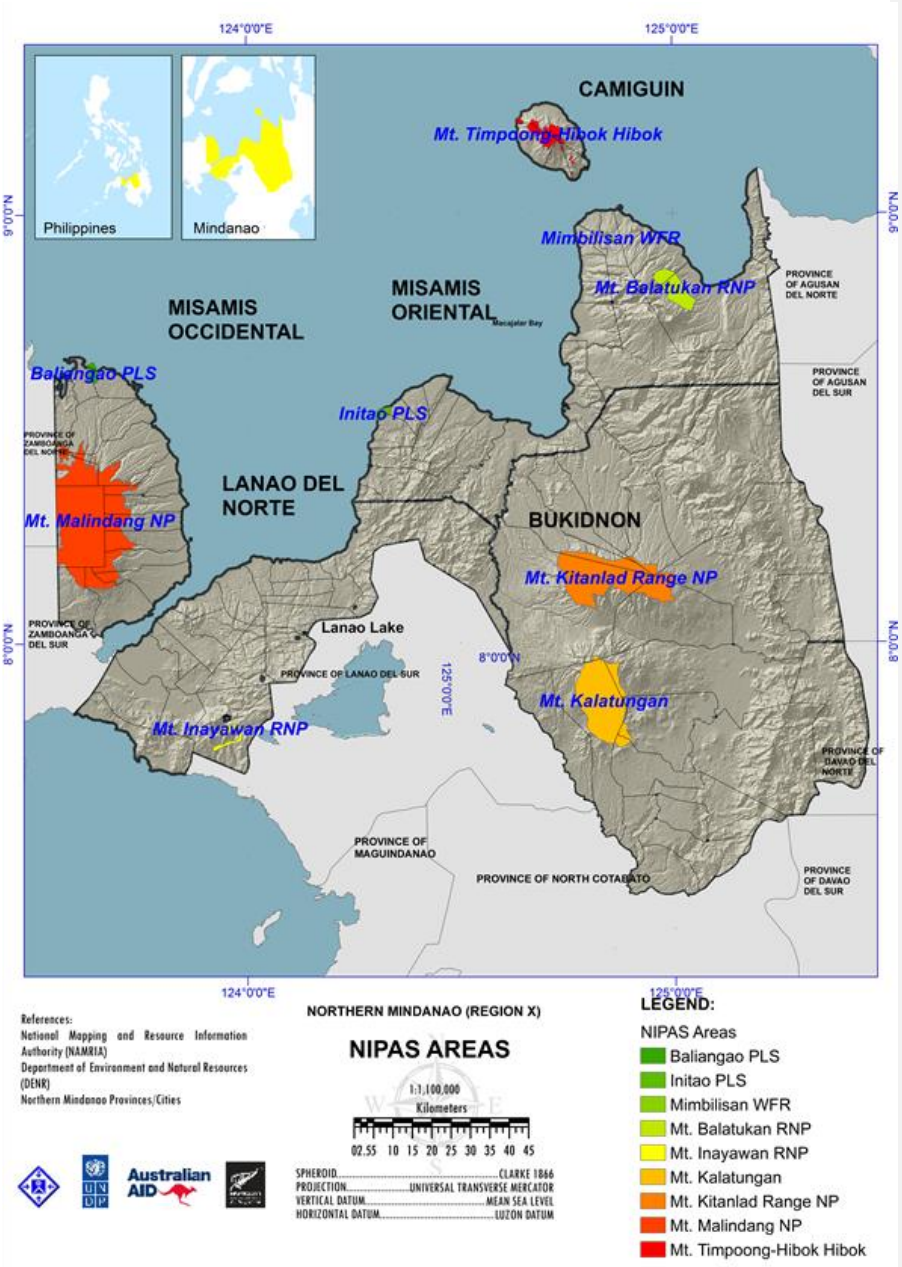
TABLE 3. NIPAS PROTECTED AREAS, REGION X: AS OF JANUARY 2013

Province/Name Protected Area	Total Land Area (in Hectares)	Area * (in Hectares)	Legal Support/Date	Remarks
Bukidnon	1,049,859.00	82,409.23	Presidential Proc. No. 896/ Oct 24, 1996 & Republic Act No. 8978/ Nov 9, 2000	With Legislative Enactment
1. Mt. Kitanglad Range Natural Park		47,270.00		
2. Mt. Kalatungan Range Natural Park		35, 139.23	Presidential Proc. No. 305/ May 5, 2000	For endorsement to Congress
Camiguin	29,187.00	3,649.00	Presidential Proc. No. 570/ March 9, 2004	
3. Timpoong Hibok-Hibok Natural Monument		3,649.00		
Lanao del Norte	382,478.66	4,521.78		
4. Mt. Inayawan Range National Park		4,521.78		
5. Mangrove areas from Liangan River up to Lipatan River of Libertad (formerly Lapayan), Kauswagan, Lanao del Norte **			Proc. 2152 of 29 December 1981	
Misamis Occidental	205,522.00	53,323.00		
6. Mt. Malindang Range Natural Park		53,028.00	Presidential Proc. No. 228/ August 2, 2002	With Legislative Enactment
7. Baliangao Protected Landscape and Seascape (PLS)		295.00	Presidential Proc. No. 418/ Nov 22, 2000	Bill undergone Senate hearing
8. Bo. Bagumbang to Malautan River (Ozamiz City) **				For endorsement to Congress
Misamis Oriental	351,670.00	13,437.75		
9. Initao-Libertad Natural PLS		2,101.23	Presidential Proc. No. 260/ Sept 16, 2002	Bill sponsored by Cong. Baculio
10. Mimbilisan PLS		66.52	Presidential Proc. No. 134/ July 5, 1999	For endorsement to Congress
11. Mt. Balatukan Range Natural Park		11,270	Proc. 470 4/29/1932	
12. Mahugunao Watershed Forest Reserve (Cagayan de Oro)**		136.00		
Regional Total	**2,083,319.27**	**157,476.76**		

**Areas of proclaimed Protected Areas include buffer zones as sourced from DENR-PAWD-X*

*** Initial NIPAS component (i.e., declared prior to NIPAS Act) as indicated in Annex A of DENR-PAWB Technical Bulletin No. 2013-01 of January 2013.*

MAP 15. NIPAS AREAS, REGION X



Non-NIPAS

Equal importance should be accorded to non-NIPAS areas in terms of conservation and sustainable development since these areas are also experiencing various forms of exploitation and degradation. The areas initially identified outside the NIPAS are the following: a)Wetlands (coastal and freshwater), b) Important Bird Areas, c) Second growth forests (>50 percent slopes and > 1000 meter elevation), d) Protected agricultural lands, e) Buffer strips and easements, and f) Ecotourism sites (natural/cultural heritage areas).

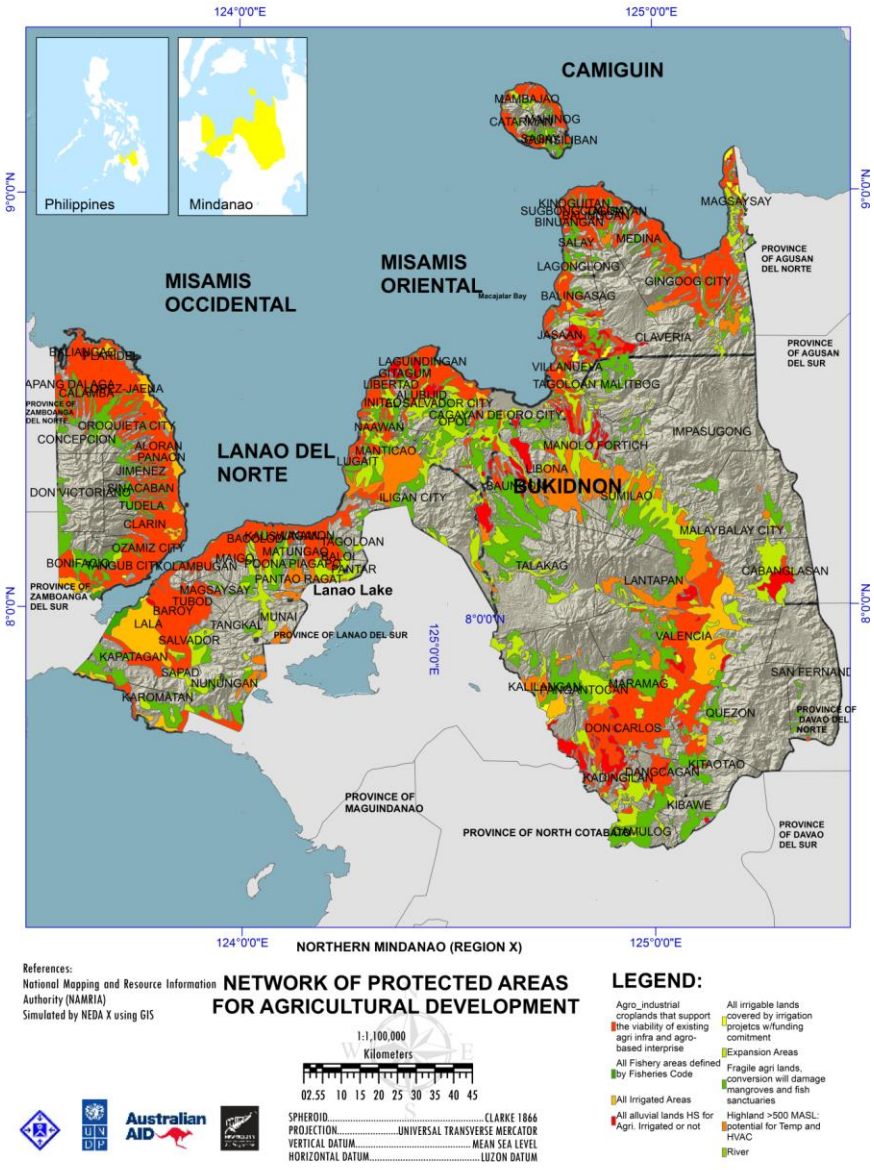
Protected Agricultural Lands

The Department of Agriculture recognizes ~~the fact that~~ that the critical stage of land reached and that land use conversion may only be allowed where the cost of agricultural production can ~~not~~ be recovered by the existing traditional cropping systems and other alternative cropping systems. To address this, the Network of Protected Areas for Agricultural Development (NPAAD) in Region X has been identified to cover the following:

a) all irrigated and potentially irrigable lands;
b) all alluvial plain lands highly suitable for agricultural production and/or can be devoted to food production as determined by DA/BSWM;
c) all sustainable lands that are traditional sources of food;
d) all croplands that support the existing economic scale of production required to sustain the economic viability of existing agricultural infrastructure and agro-based enterprises in the region and/or province;
e) all productive lands in the low calamity-risk areas that are suitable for the production of economic trees and other cash crops; and
f) all agricultural lands that are ecologically fragile and whose conversion will result in serious environmental problems.

Moreover, in line with the national government's pursuit for food security, the highly restricted agricultural lands within the NPAAD are included in the restricted areas for development (Map 16). These areas are delineated as Strategic Agriculture and Fishery Development Zones (SAFDZs). Of the total 840,165 hectares of NPAAD, about 79 percent is delineated as SAFDZ areas. The SAFDZ areas are prime agricultural lands that can provide optimum and sustainable yield with a minimum of inputs and development costs.

MAP 16. NETWORK OF PROTECTED AREAS FOR AGRICULTURAL DEVELOPMENT (NPAAD) IN REGION X



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3.3.1.10. Areas prone to natural hazards

Natural hazards can be classified as geologic and hydrometerologic. Geologic hazards may be related to earthquake and volcanic activities and may include the following:

- *Earthquake related :* ground shaking, liquefaction, subsidence, landslide, debris flow, fault rupture and tsunami
- *Volcanic activities related :* ballistic projectile, pyroclastic flow, lava flow, steam explosion, ashfall, debris avalanche, sector collapse, lahar, volcanic gas

~~Hydrometeorologic~~Hydrometeorological hazards include extreme rainfall, tropical tornado, thunderstorm, flood, rain-induced landslides, ground subsidence/ settlement, coastal and inland erosion and aggradation.

From period October 2005 to April 2012, there were 112 natural disaster events recorded. Flash flood reported the highest in number with 34 occurrences. For flood events, there were 24 occurrences in which 15 happened in 2011 alone. In the years 2008-2011, there were 13 storm surge events recorded.

On an annual basis, year 2011 posted the highest in number with 49 natural disaster events. This is followed by year 2008 with 28 events and year 2007 with 15 events.

Based on OCD reports, among the provinces, Misamis Oriental is the most frequented by natural disasters with 44 disaster occurrences, followed by the provinces of Bukidnon (35 occurrences) and Lanao del Norte (26 occurrences). The province of Camiguin recorded the least number of disaster occurrences with 10.

Over 142,088 families, equivalent to 471,846 individuals, were affected by the natural events for the period October 2005-April 2012. Flood with storm surge affected the most number of families equivalent to 46,130 constituting about 48.14 percent of the total number of families affected.

Of the 1,317 recorded deaths, 1,226 were caused by flash flood. With this event, there were a total of 6,039 injured and 167 missing. Flood with storm surge and flood with landslide each posted over 20 fatalities.

TS Sendong that struck the cities of Cagayan de Oro and Iligan in December 2011 claimed the highest number of casualties for a flooding incident in recent years. As of 10 February 2012, among the regions affected by TS Sendong, Region X has the highest number of casualties with 1,206 dead, 6,036 injured, and 162 missing (PDNA, 2012).

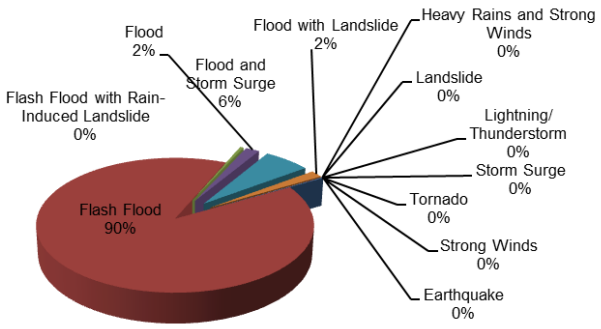
For events with reported damage costs, PHP13.6 billion worth of properties were damaged. Affected properties include houses, agricultural crops, fisheries, and public infrastructures.

Flash flood posted the greatest impact accounting for 90 percent of the total estimated damage cost during the period. The flash flood trigged by ~~Tropical Storm~~TS Sendong PHP12 billion across all sectors. Majority of the damages occurred in Cagayan de Oro

and Iligan cities. A total of 28,032 houses were totally damaged and 11,439 partially damaged.

Flood with storm surge also posted substantial damage to properties, valued at PHP831.5 million pesos. The combined total of damages caused by flood, and flood with rain-induced reached half a billion pesos.

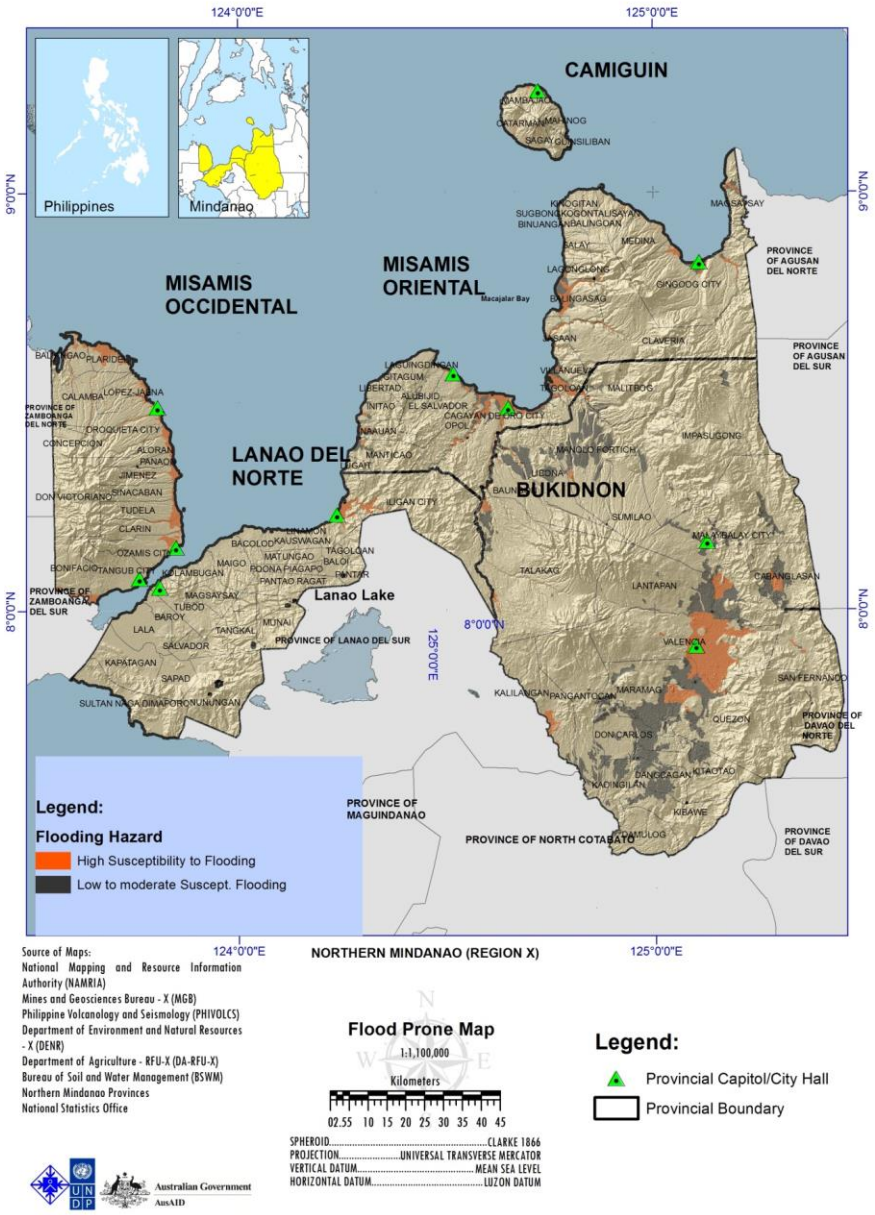
FIGURE 5. DISTRIBUTION OF ESTIMATED COST OF DAMAGE BY TYPE OF NATURAL DISASTER, REGION X: OCTOBER 2005 – APRIL 2012



Source of Data: OCD-X

The succeeding maps show the areas in the region prone to flooding (Map 17), the distribution of active, potentially active and inactive volcanoes (Map 18), the areas prone to earthquake-induced landslide (Map 19), and the erosion map (Map 20).

MAP 17. AREAS PRONE TO FLOODING, REGION X



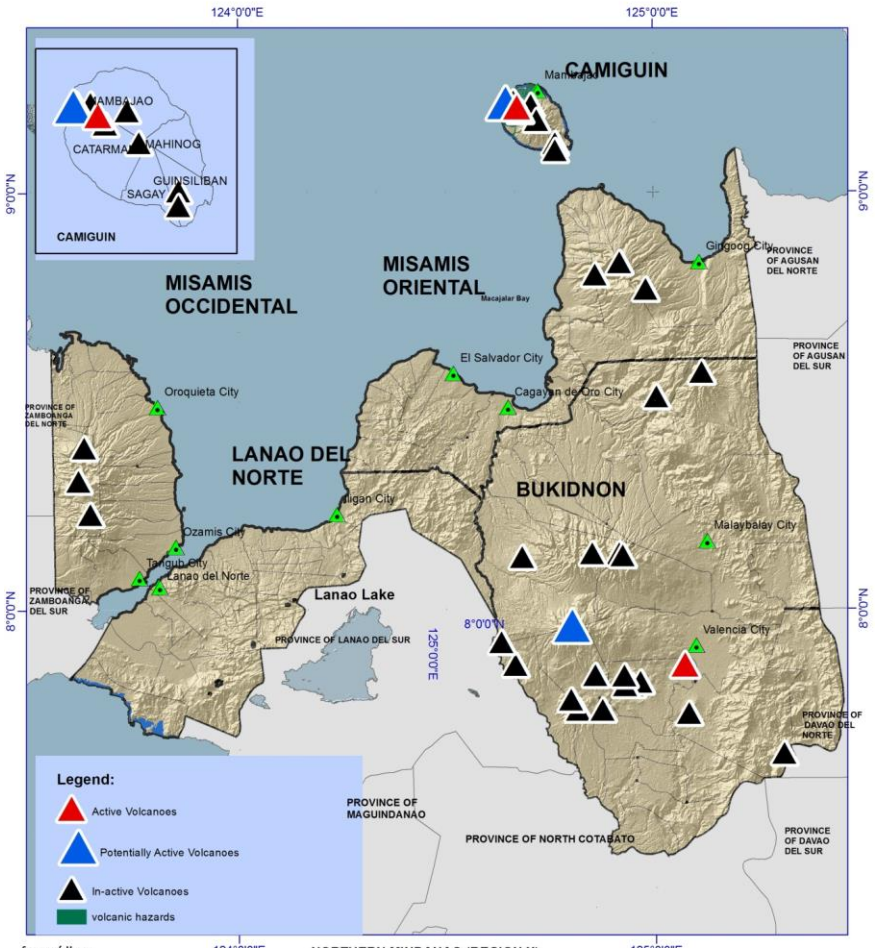
Source of Maps:
National Mapping and Resource Information Authority (NAMRIA)
Mines and Geosciences Bureau - X (MGB)
Philippine Volcanology and Seismology (PHIVOLCS)
Department of Environment and Natural Resources - X (DENR)
Department of Agriculture - RFU-X (DA-RFU-X)
Bureau of Soil and Water Management (BSWM)
Northern Mindanao Provinces
National Statistics Office

Flood Prone Map
1:1,100,000
Kilometers
0 2.5 5 10 15 20 25 30 35 40 45

SPHEROID.....CLARKE 1866
PROJECTION.....UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....LUZON DATUM

Legend:
Provincial Capitol/City Hall
Provincial Boundary

MAP 18. DISTRIBUTION OF ACTIVE, POTENTIALLY ACTIVE AND INACTIVE VOLCANOES, REGION X



Source of Maps:
National Mapping and Resource Information Authority (NAMRIA)
Mines and Geosciences Bureau - X (MGB)
Philippine Volcanology and Seismology (PHIVOLCS)
Department of Environment and Natural Resources - X (DENR)
Department of Agriculture - RFU-X (DA-RFU-X)
Bureau of Soil and Water Management (BSWM)
Northern Mindanao Provinces
National Statistics Office
Note: No hazard assessment yet produced by PHIVOLCS on Mt. Kalayo (Musuan) in Bukidnon

NORTHERN MINDANAO (REGION X)

ACTIVE, POTENTIALLY ACTIVE, AND IN-ACTIVE VOLCANOES

1:1,100,000

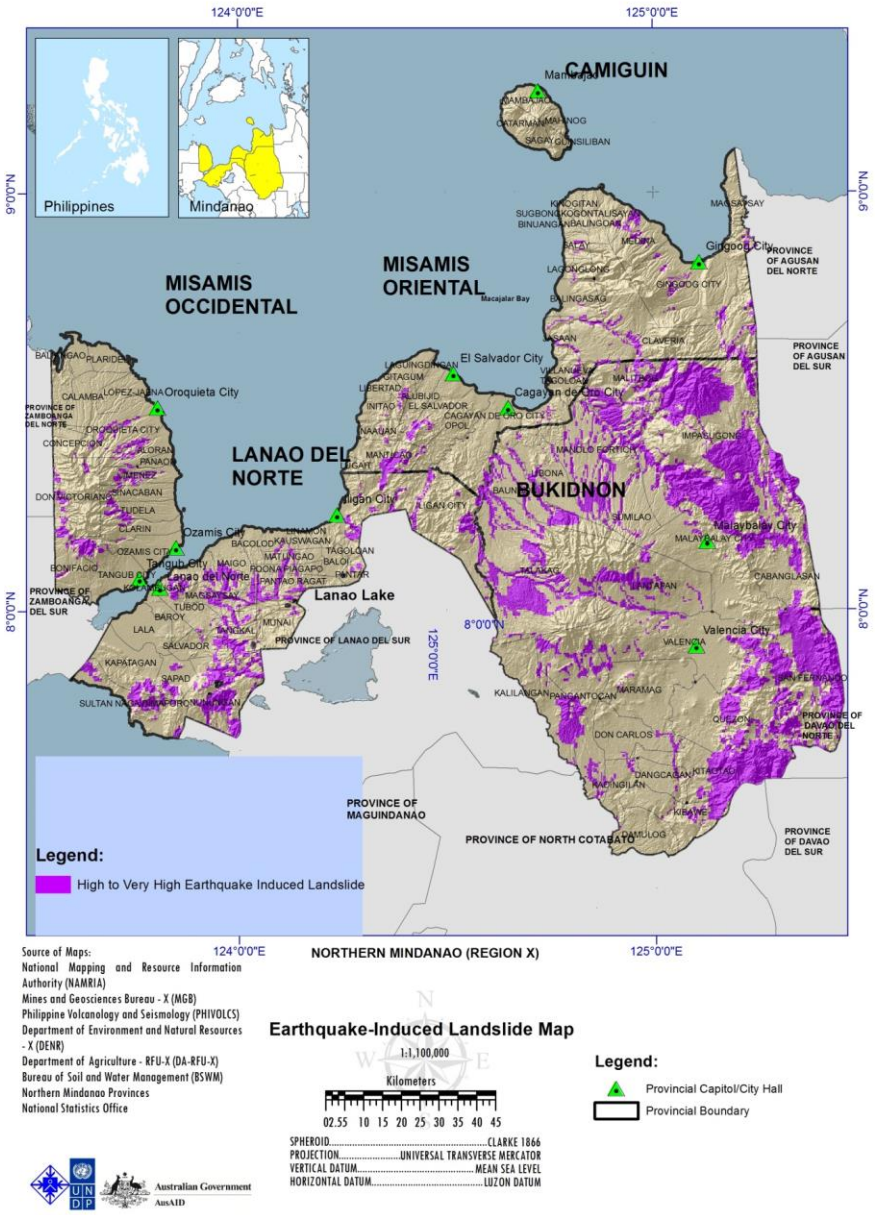
Kilometers

0 2.5 5 10 15 20 25 30 35 40 45

SPHEROID.....CLARKE 1866
PROJECTION.....UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....LUZON DATUM

Legend:
Provincial Capitol/City Hall
Provincial Boundary

MAP 19. AREAS PRONE TO EARTHQUAKE-INDUCED LANDSLIDE, REGION X



Source of Maps:
National Mapping and Resource Information Authority (NAMRIA)
Mines and Geosciences Bureau - X (MGB)
Philippine Volcanology and Seismology (PHIVOLCS)
Department of Environment and Natural Resources - X (DENR)
Department of Agriculture - RFU-X (DA-RFU-X)
Bureau of Soil and Water Management (BSWM)
Northern Mindanao Provinces
National Statistics Office

Earthquake-Induced Landslide Map

1:1,100,000

Kilometers

0 2.5 5 10 15 20 25 30 35 40 45

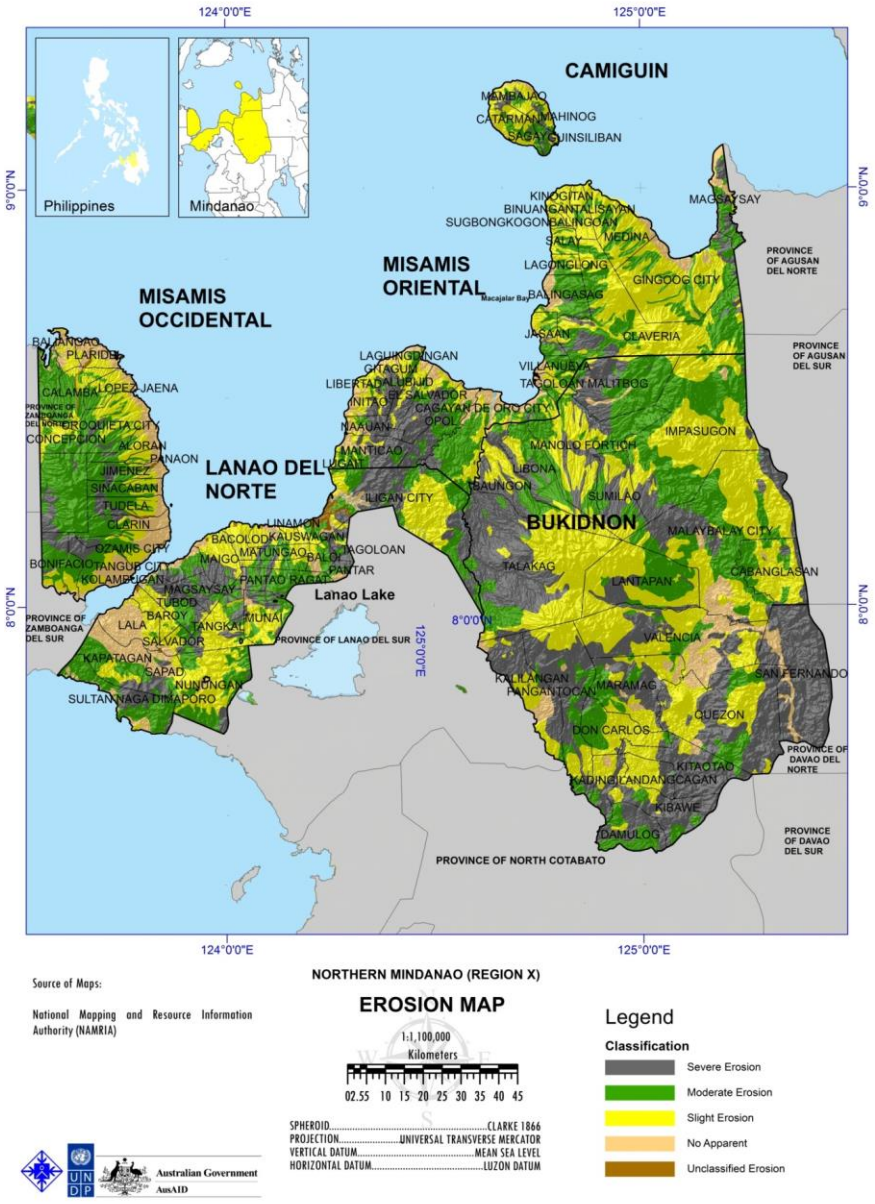
SPHEROID.....CLARKE 1866
PROJECTION.....UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....LUZON DATUM

Legend:

Provincial Capitol/City Hall

Provincial Boundary

MAP 20. EROSION MAP, REGION X



3.3.1.11. Climate-related hazards and assessment of risks

Based on the report by the UN, the Philippines ranked third in the list of countries most at risk to climate change. The report cited the country's high exposure to climate change-related hazards such as sea level rise, increase in surface air temperature, and changes in intensity and number of tropical storms.

These climate change trends were summarized by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) in its study using observed data over a 50-year period until 2009. The following are the key findings:

- Annual mean temperature has increased by 0.57°C (with increases ranging from 0.35°C to 0.94°C);
- On the average, 20 tropical cyclones per year form within or cross the Philippine Area of Responsibility (PAR); and
- There has been a significant increase in number of hot days but decrease of cool nights, while analyses of trends of extreme daily rainfall are unclear.

The PAGASA also made climate projections using computer-based climate models, and results show that by 2020 and 2050:

- In all Philippine regions, weather will get warmer, more so in the summer months;
- Surface air temperature in all areas in the country will increase by 0.9°C – 1.1°C in 2020, and by 1.8°C – 2.2°C in 2050;
- Disparities across regions will exist in terms of rainfall, specifically during southwest monsoon (*Habagat*) season, with Luzon and Visayas generally having larger increases in rainfall, but lesser rainfall for most Mindanao provinces.

Vulnerability of Provinces to Climate Change

Based on a study by the Manila Observatory under the *Mapping Philippine Vulnerability to Environmental Disasters* Project, a set of risk maps were prepared to identify areas in the country that are highly vulnerable to climate change.

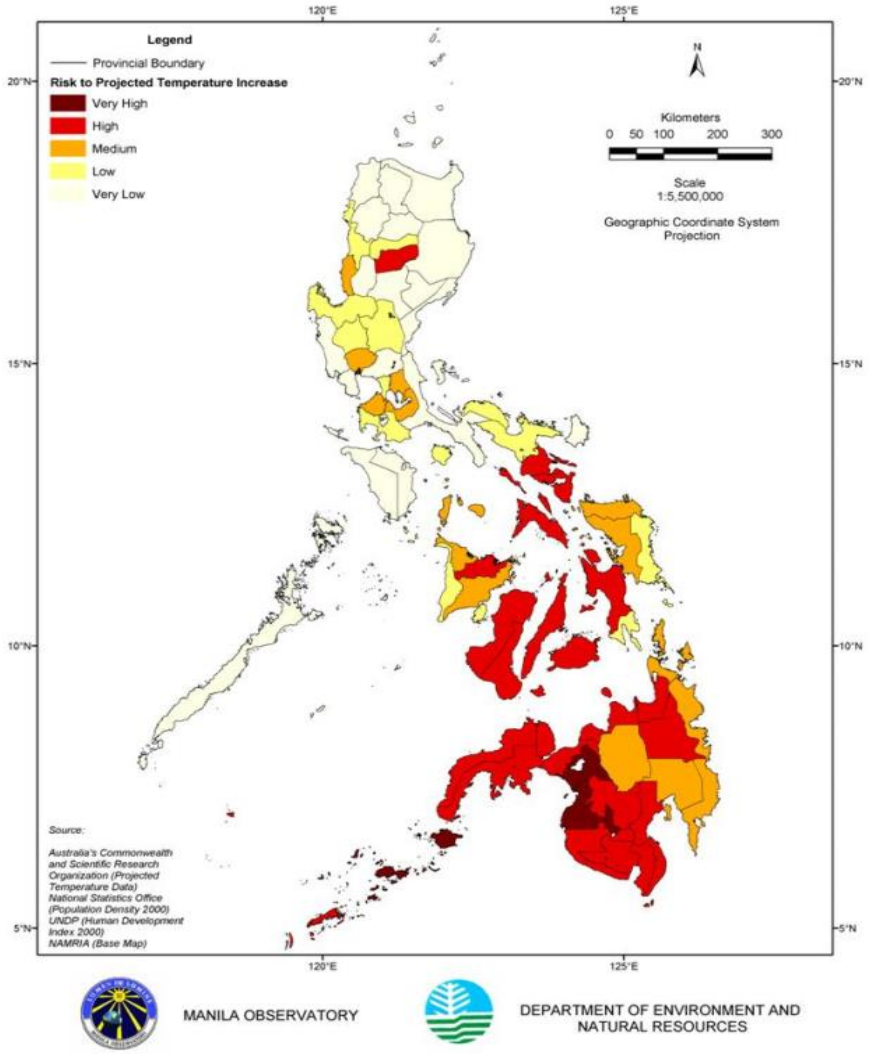
Map 21 ~~on projected temperature increases~~ depicts the classification of provinces by risk are the more at risk to temperature increase. As seen in the map, all provinces in the region, except Bukidnon, are among the most at risk.

Map 22 ~~on~~ shows the risk to projected rainfall change. The projection ~~–~~incorporates decrease during the dry season and rainfall increase during the wet season. The areas most at risk to projected rainfall changes are mostly in Luzon. In Region X, Lanao del Norte faces moderate risk while the other four provinces face low risk.

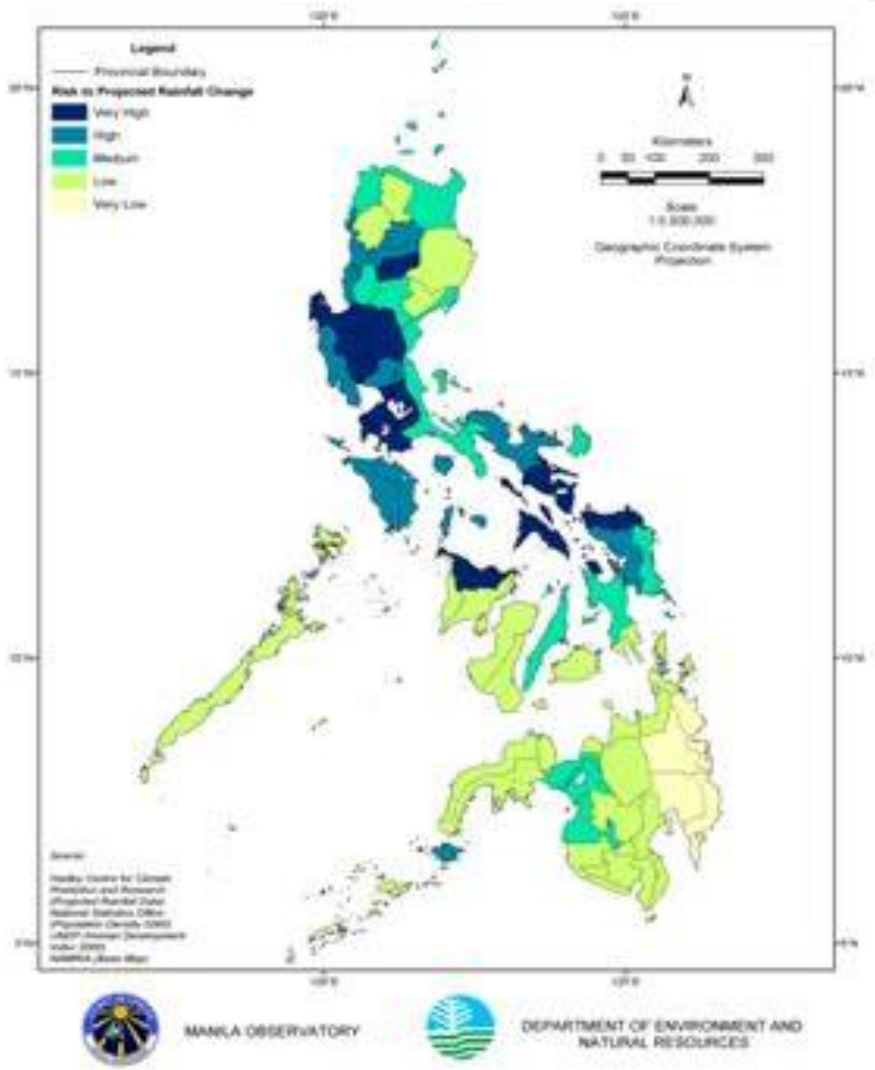
Most of the areas highly at risk to typhoons are in Luzon and Eastern Visayas. While Region X is not frequented by typhoons, extreme and rare weather conditions – such as the recent TS Sendong that occurred in December 2011 – can cause huge damages to property, and loss of lives.

In terms of El Niño-induced drought, the areas which have the highest risk scores are mostly in Mindanao, including all the provinces in Region X.

MAP 21. TRENDS RISK TO PROJECTED TEMPERATURE INCREASE



MAP 22. TRENDS RISK TO PROJECTED RAINFALL CHANGE



Likely Sectoral Impacts of Climate Change

Very apparent is the impact of climate change to the region's development prospects, and not adapting to it would increase the vulnerability of the regions, particularly the poor communities. A warmer climate will affect ecosystems and sectors, with the following being considered as most vulnerable to climate change: agriculture, forestry, water resources, coastal resources, and human health.

Agriculture. The region's agriculture sector contributes roughly 30 percent to the gross regional domestic product. It is considered as the backbone of the regional economy, and feeds not only the region's but also its neighboring regions' and the country's industries. About 40 percent of the region's population is employed in the sector - most of them are poor and live in subsistence farming, and therefore highly vulnerable.

Changes in temperature and changing crop patters coupled with extreme weather patterns could severely affect agriculture. Crop production will decrease whenever temperatures exceed threshold levels, or extreme climate events such as drought, tropical storms and floods occur more frequent. Such is the case of the TS Sendong aftermath, wherein the agriculture sector incurred an estimated PHP0.6 billion worth of damages, and leveled thousands of hectares of farm lands. Similarly, the serious dry-spell due to the El Niño phenomenon in early 2010 damaged at least PHP150 million worth of agricultural crops in most parts of the region.

Decreases in farm yields would persist even more if appropriate farming management techniques will not be established. This will further strain the meager income of farmers, and consequently their adaptive capacity to manage disaster risks.

Forestry. There is no denying the importance of protecting our forests as it provides ecosystem services such as provision of safe water, food, shelter, livelihood, and flood mitigation. Unfortunately, our forest is under severe pressure due to human activities and changing climate patterns. Today, the total forest cover is only one-fifth of the region's total area, and the rate of deforestation is still alarmingly high.

Climate change could cause out-migration or extinction of some flora and fauna species sensitive to changes in temperature. Further, drier and warmer climate episodes especially during El Nino could cause forest fires. As ecosystems change, the people who depend on it may face the need to change their customs and livelihood. These changes in ways of living could stress further the environment as people encroach more forestlands for agriculture uses.

Watersheds/Water resources. Impact of climate change continues to threaten not only the supply of safe water, but the life itself of human populations in the watersheds. Extreme weather events such as TS Sendong revealed how land cover change in the watersheds can lead to tragic consequences.

Temperature rise could undermine our water resources that provide irrigation to our farms and safe water supply to our households causing grave threat to the region's industries, and the populace in general.

The region's energy production in our hydropower facilities will suffer future significant decreases as rivers and streams leading to our dams dry-up. In the region, the Lake

Lanao-Agus River complex supplies more than half of Mindanao's power requirements, and charges the major industries with the needed electricity. Severe drought episodes such as in 1992, which resulted to 10-15 hour blackouts daily, caused huge economic losses and opportunities.

Coastal resources. More than half of the region's population live in urban areas which lie along the coasts. Many of them are dependent on fishing and seaweed farming, while others live and work along the shore.

These areas are ~~also~~ highly vulnerable to sea level rise due to global warming, and will submerge in the future. The people living in these areas will face more serious risk when threats of climate change-related hazards such as storm surge, floods, and tropical storms come into play.

Human health. Climate change imperils human health directly and indirectly. Based on a report by the International Panel on Climate Change (IPCC), climate change may increase injuries, illness and deaths caused by storms and floods, droughts, forest fires and heat waves. Related studies also show positive correlation between climate change factors, and cardio-respiratory diseases and water- and vector-borne tropical diseases such as malaria and dengue.

Indirectly, it endangers human health if production chains are disrupted. Decrease in farm yields, and degraded water and coastal resources, and forestry ecosystems will surely dent on the livelihood and incomes of farmers and fisher folks most especially – thus reducing even further their capacity to support their families' food and health requirements.

3.3.1.12. Other Environmentally Constrained Areas

Areas Experiencing Air Pollution

Ambient air quality monitoring in the region in 2012 was pursued, though with a different criteria pollutant (TSP or Total Suspended Particulates[1]). The monthly average TSP readings from April to December 2012 were below the DENR standard of 230 micrograms per normal cubic meter (ug/Ncm) for 24 hours as provided for ~~under~~ National Ambient Air Quality Guideline Values (NAAQGV). The numbers indicate that the ambient air quality in the vicinity is compliant to national standard.

Areas Experiencing Water Pollution

The Water Quality Management (WQMA) program recognizes that water quality management issues are inherently related and cannot be detached from concerns on water sources, ecological protection, water supply, public health, as well as, quality of life. In 2011, water samples from the rivers of Iponan, Cagayan de Oro and bathing beaches in Macajalar Bay were ~~taken and~~ assessed based from certain parameters. Based on the analysis, the following water quality parameters indicated exceedances in DENR Criteria (DAO 34) to wit: Total Suspended Solids in Iponan River; Fecal and Total coliform in all three water bodies; Nitrates and Phosphates.

[1] The Total Suspended Particulates are small solid or liquid particles with diameters less than 100 micrometres suspended in air. Major sources of TSP are diesel vehicles and industrial plants. Dusts, which can come from unpaved roads and construction activities, is also a major source of TSP especially during the dry months.

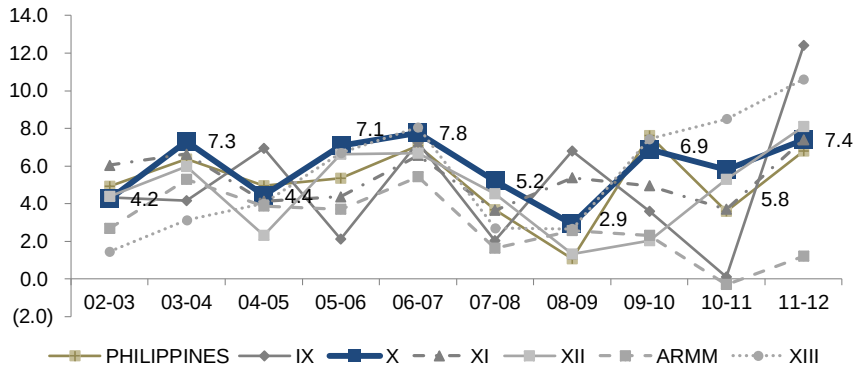
3.4. ECONOMY

3.4.1. Regional Economic Performance

3.4.1.1. Size and Structure

Region X remains the economic leader in Mindanao registering the fastest average growth in GRDP at 5.8 percent over the last 10 years. From 2010 to 2012, the economy grew by 6.6 percent, higher than the country average of 6.0 percent.

FIGURE 6. GRDP GROWTH RATES, BY INDUSTRY ORIGIN (AT CONSTANT 2000 PRICES), PHILIPPINES, REGION X, AND MINDANAO REGIONS: 2002-2012



Source: NSCB

While running ~~close~~ second ~~second~~ to ~~the~~ Davao R~~r~~egion in terms of size in economy regions in 2012 with GRDP value amounting to PHP 409.6 billion (at~~at~~ current prices), region is still the leading agricultural producer.~~,~~ ~~t~~ The region also leads in industrial ~~and~~ and ~~a~~ close second to Davao Region in services. Its GDP per capita is also the highest among Mindanao regions.

The economic structure is gradually shifting to the services sector, which provides nearly 42 percent share of the regional economy. Over the last seven reporting periods since 2006, the sector's share has increased by 2.3 percentage points, a trend which is seen to be sustained in the next few years, holding other things constant.

3.4.1.2. Sector/Sub-sector Contributions

Agriculture, Hunting, Forestry and Fishing

Trends over the period 2010-2012 reveal that the AHFF sector has grown less robustly ~~than any~~compared to other sectors. However, in several cases, the AHFF provided the cushion when external risks tested the economy. In the down period 2010-2011, the AHFF posted a remarkable growth in GVA of 6.5 percent, higher than the regional average of 5.8 percent.

The region ~~in 2012~~ shared 8.51 percent to the country's total AHFF in 2012, the fourth the country, and highest among Mindanao regions. This ascertains the role of Northern Mindanao as a major provider of agriculture products not only in Mindanao, but also the entire country.

Industry

The industry sector expanded by 9.2 percent in 2012 largely due to the growth in the manufacturing and construction sub-sectors. Among the regions, its share to the country's GVA in 2012 was 3.95 percent, fifth among all regions, and better than its Mindanao counterparts. This highly productive sector, however, only employs about 10 percent of the total employed persons in the region.

Services

The services sector remains the largest economic bloc, accounting for 42 percent of the regional economy. Over the period 2010-2012, the sector's growth averaged 6.8 percent, higher than the region average of 6.6 percent. In 2012, the region was the seventh largest contributor to the total GVA in services, and recorded the fourth fastest growth among all regions in the country. The sector also employs most of the region's workforce, accounting for 46 percent share of the employed persons.

~~By~~ In terms of subsector contributions, the regional economy in 2012 was driven mainly Agriculture and Fishery (21.9 percent share), Manufacturing (20.4 percent share), and Trade (14.9 percent share).

Disaster and climate change risks clearly pose significant threat to the region's economic sectors. Disaster episodes damaged about PHP13.6 billion worth of properties over the period October 2005-April 2012.

Estimate~~s~~ of damages and losses brought about by TS Sendong alone was placed conservatively at PHP 5 billion. While the total damages and losses can be huge and could even go up further upon detailed accounting, TS Sendong's impact on the overall regional economy was rather moderate. The reported estimated damage is equivalent to about PHP192 million in gross value added (at current prices) or PHP116.7 million at constant 2000 prices. These losses, however, were not enough to negate the expected growth in the economy for the year 2011. It was estimated that it slowed down the growth by about 0.5 percent at current prices or 0.9 percent at constant prices.

While the impact on the overall macro economy may not cause a decline in overall regional level of production, huge negative impacts are expected to be felt by certain sectors and at the micro economy level. In case of TS Sendong, hardly hit were the micro, small and medium establishments which directly lost their capital and business opportunities, and some sectors in the informal economy (i.e. home-based enterprises) which experienced profit loss due lower purchasing power of households.

3.4.2.1. Exports

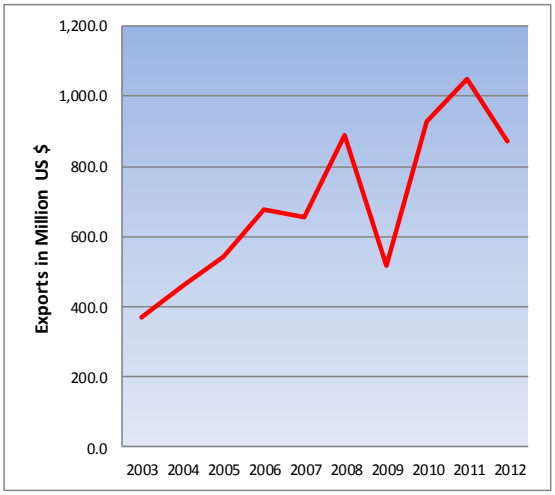
From 2003 to 2012, the region's exports grew from USD368.7 in 2003 to USD926.9 million in 2012. Within this 10-year period, decline in earnings was only experienced

during the years 2009 and 2012. The decrease in exports was due to the decline of sugar exports from Bukidnon and cold rolled coils and abaca pulp from Lanao del Norte and the decline in shipments on some of the region's major exports such as coconut-based and sugar cane products, minerals, abaca pulp and iron & steel products, respectively.

FIGURE 7. GROWTH IN EXPORTS, REGION X: 2003-2012

Year	Value (in Million US$)
2003	368.7
2004	459.1
2005	541.4
2006	674.7
2007	655.7
2008	889.6
2009	518.4
2010	926.9
2011	1,050.9
2012	869.7
Total	**6,955.0**

Source: DTI-X, NEDA-X QRES and RDR



During the 10-year period, except in 2006, Misamis Oriental was the leading exporting province of the region, recording an annual share ranging from 46 percent to 64 percent of the total value of exports. The second top exporter in the same period was Lanao del Norte.

Oleochemicals was region's top dollar earner for 2012 amounting to $224.593 million or 25.83 percent of the total value of exports. The product registered a slight increase by 4.40 percent from $215.121 million registered in 2011. This was followed by Crude Coconut Oil & Cochin Oil accounted for 19.23 percent valued at $167.24 million, down by 47.67 percent from $319.58 M in 2011. The combined earnings of these two coconut-based products registered at 45.06 percent of the region's total exports.

3.4.2.2. DTI-Monitored Investments

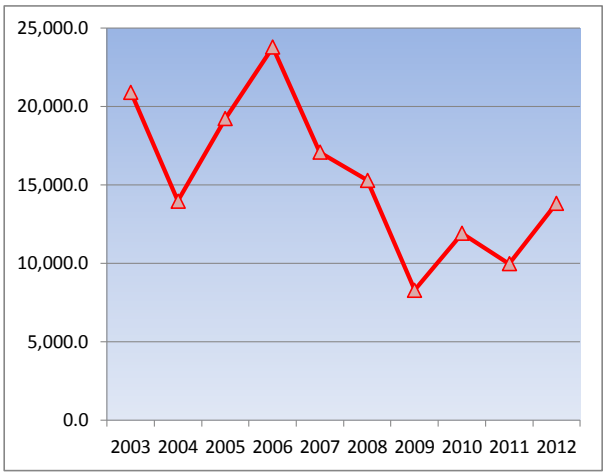
For the period 2003-2012, the aggregate value of the investments poured into the region amounted to PHP154.3 billion. The general trend of the annual investments in 2003-20102 could be described as a roller coaster motion, increasing in periods 2005-2006, 2010 and 2012. While in years 2004, 2007-2009 and 2011, a downhill trend was noted.

The peak in investment in 2006, valued at PHP 23,777.7 million, was primarily attributed to the expansion activities of chemical-based, trading, and services sectors in Misamis Oriental (the bulk of which was the expansion project of Pilipinas Kao, Inc.) and agri-based investments in Bukidnon. The Bukidnon investments included expansion projects of Crystal Sugar Milling Corporation and a number of banana growers like DOLE South

Skyland, JIKKA Fruits Corporation and the Pangantucan Banana Growers Association. On the other hand, during the same period, 2009 recorded the lowest value of investment in the region amounting to PHP8,288.7 million.

FIGURE 8. DTI-MONITORED INVESTMENTS, REGION X: 2003-2012

Year	Value (in Million US$)
2003	20,908.0
2004	13,965.5
2005	19,219.7
2006	23,777.7
2007	17,074.5
2008	15,297.1
2009	8,288.7
2010	11,914.6
2011	9,968.5
2012	13,843.4
Total	**154,257.5**



Source of Basic Data- NSCB's 2011 RSET, DTI X

3.4.3. Labor and Employment

3.4.3.1. Lack of Employment Opportunities and Low Quality Employment

While employment rate was high at 95.3 percent in 2012, as much as 28.6 percent of these were looking for additional work and income. Underemployment in the region is second highest among all regions in 2012 exceeding the national average by 8.6 percentage points.

High economic growth has not provided proportionate employment opportunities for Filipinos entering the labor market. While economic expansion registered a respectable growth over the period 2003-2009, increases in employment was rather anemic with an annual average growth rate of 1.6 percent.

Joblessness is heightened by external economic shocks, such as climate change and disasters, which upset employment via decreases in demand and impairment of production chains. While it is difficult to gauge in number the impact of disasters to employment, most recent disasters, notably ~~tropical storm~~TS Sendong, has resulted to serious damages in the productive and employment sectors.

Employment Structure and Labor Productivity

High income inequality, which is described in the proceeding section, may be explained by the region's employment structure and labor productivity. The agriculture sector,

which has a far lower labor productivity than the services and industry sectors, accounts for a substantial proportion (42.9 percent) of total employment. In contrast, the industry sector, where labor productivity is highest, accounts for only 10 to 11 percent of total employment.

The manufacturing sub-sector in the industry sector, which generates higher employment for both skilled and unskilled workers, accounts for only about five percent of the region's employed. Moreover, the employment generated in the services sector, which has grown more than the other two sectors, has probably benefited the more skilled and educated workers who are more likely to be the non-poor.

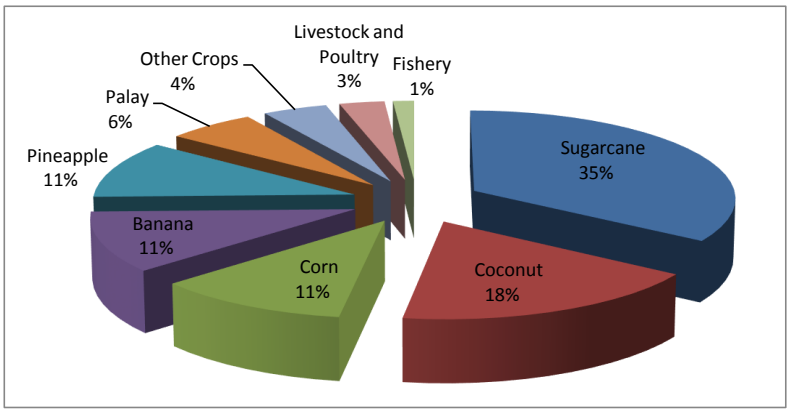
3.4.4. Region's Economic Specialization and Concentration

3.4.4.1. Agriculture and fishery

The region's agriculture and fisheries sector has proven its resilience in the face of severe natural disasters. Recovering from the long dry spell in 2010 and TS Sendong in 2011, both palay and corn recorded positive growths in volume between 2000-2011 at an average annual production level of 522,817 metric tons of rice and 969,765 metric tons of corn. The 4.19 percent growth achieved in rice production between 2010 and 2011 is the highest in the last 10 years.

The average annual growth rate of the overall agricultural production in 2000-2012 was 5.9 percent. Boosted by the increase in production of other crops like sugarcane, coconut and pineapple, the crops subsector contributed 95.6 percent to total agricultural output while the remaining subsectors such as livestock and poultry contributed much to the sector's 31.6 percent share in the GRDP and its 7.2 percent average growth.

FIGURE 9. PERCENT SHARE OF AGRICULTURAL PRODUCTION OF MAJOR CROPS, REGION X: 2000-2011



The Agri-Pinoy Rice Program stabilizes supply and producers' income through the Value Chain Approach which involves partnering with many stakeholders such as the national and regional government agencies, local government units, and the private sector.

Farmers from Central Luzon to Northern Mindanao are benefitting from being part of the value chain systems of the country's largest corporations, particularly in the onions used for the burger patties of Jollibee Foods Corp, as well, the cassava supplies as the principal tapioca ingredient of San Miguel Foods Incorporated (SMFI).

Palay and Corn

Palay production grew at an average of two percent between 2000-2012. Though the region posted a higher yield of 4.12 MT/ha in 2012 compared to the national average yield of only 3.84 MT/ha, it is still below the potential productivity based on ASEAN performance of 5 MT/ha, thus, the need to provide the appropriate interventions to reach the potential level.

For the period 2000 to 2012, Northern Mindanao posted 2.05 and 3.88 percent growths in rice and corn production, respectively lower thano that of the national average which by 3.2 percent and 4.2, respectively. The area harvested of both yellow and white corn slightly declined in its average annual growth rate by 0.17 percent; however, its production level and yield notably increased by 3.88 percent and 4.05 percent, respectively.

Endowed with the biggest palay and corn areas, Bukidnon and Lanao del Norte are the top rice and corn producers in the region. There are areas in Bukidnon which are prone to riverine flooding such as Valencia City. Due to its proximity to Pulangui River, the city's irrigated ricelands were badly affected by the December 2011 flooding. A flood consequence analysis of Valencia City revealed that the city could incur PHP257.690 million worth of damage to its agriculture, fishery and forestry sector, which is 82 percent of the estimated value of flood damage to Bukidnon.

In Lanao del Norte, the low-lying municipalities of Lala, Kapatagan, Sultan Naga Dimaporo, and Sapad are prone to flooding. Results of the flood consequence analysis of the province show that the combined value of flood damage to these four municipalities would reach P 47.6 million, which is 78 percent of the estimated value of flood damage to the entire province. Apart from flooding, Lanao del Norte also faces the risks posed by storm surge and rain-induced slides. It has been reported that 26 percent of the province's total land area is highly susceptible to rain-induced landslide. Seven coastal municipalities of the province are also susceptible to storm surges. It has been estimated that 2,419.34 hectares of agricultural/fishery lands or almost one percent of the total land area of the province shall be badly affected by storm surges causing PHP9.1 million worth of damages to the agriculture sector.

Occurrences of floodings in Bukidnon and Lanao del Norte can destroy rice and corn farms and rice irrigation systems in these provinces. These which can result to decline in and corn production and productivity levels.

In terms of commodity specialization, the province of Bukidnon specializes in production of three major commodities such as: pineapple, sugarcane, and banana. Lanao del Norte, on the other hand, specializes in coconut industry, which consistently ranks first among the five provinces in terms of production level.

Among the crops, corn and rice posted the widest areas affected and biggest value of damages brought by TS Sendong. In anticipation of massive devastation to the prime

agricultural areas of Bukidnon and Lanao del Norte due to flooding, rain-induced landslides and storm surges, it is necessary to identify strategies to reduce risks associated with these hazards.

~~*Among the crops, corn and rice posted the widest areas affected and biggest value of*~~

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Favorable production performance was experienced by most of the permanent crops which posted positive growths from 2000-2012. Oil Palm, which was given focus starting 2010, showed remarkable increase between 2002 and 2012 at 138 percent growth. Cashew, cacao, coffee, and abaca posted declines in their average annual growth rates.

Similarly, area harvested for permanent crops mostly registered positive annual growth rates with only three commodities, ~~(~~i.e., cashew, cacao, and coffee~~)~~ showed decreases (at 34.69, 7.52, and 1.93 percent, respectively).

Meanwhile, only tobacco experienced a negative average annual growth rate (10 percent) between 2000-2011. The rest of the other temporary crops recorded increases led by cassava at 16 percent; followed by tomato, 7.5 percent; cabbage, 7.4 percent and sugarcane, 6.9 percent for period 2000-2012.

Rice and Corn Sufficiency Level

The region recorded almost the same rice sufficiency levels in 2011 and 2012 at 68.58 percent and 70.14 percent, respectively. Both levels were more than 30 percentage points below the 100 percent RDP target in 2016. Meanwhile, corn sufficiency level in 2012 reached 74.41 percent, which is ~~registering~~ 25.59 percentage points below the 100 targeted sufficiency level in 2016.

Livestock and Poultry

Livestock inventories, specifically, for both backyard and commercial large animals like carabao and cattle decreased annually between 2001 and 2012 by 1.24 and 0.48 percent, respectively. In contrast, goats and hogs showed favourable annual growths at 2.07 percent and 2.12 percent, respectively.

The poultry industry showed a sustained growth, with chicken inventory (for all categories: native, layer and broiler) at an average annual growth of 10.29 percent between 2001 and 2012. Duck inventory, however, declined by 0.79 percent for both backyard and commercial categories.

In 2011, the flooding brought by TS Sendong damagaged physical facilities of commercial poultry establishment which was estimated at PhP29.072 million.

Fish Production

For more than a decade, the production of the fisheries sector in the region had been growing substantially at 7.06 percent yearly from 2000-2012.

Aquaculture. Aquaculture, which contributed 49 percent of the total fishery production, continued to be the main engine in the fisheries sector with its average growth of almost 14 percent annually. While the sector's output posted a 2.44 percent growth at the

national level, a negative growth of 0.40 percent was recorded in the region during the two~~2~~-year period, 2010-2011.

Commercial Fishing. A minimal growth of 1.65 percent annually was posted by commercial fisheries from 2000-2012. Various factors contributed to this performance such as decrease in fishing efforts due to bad weather conditions, dry docking of fishing vessels and depletion of fish species in some fishing grounds. This sector did not perform well in 2011 and 2012 as its production dropped by nine percent annually below its level in 2010.

Municipal Fishing. Municipal fisheries ranked second to aquaculture in terms of growth and percent share contribution to fishery production. It grew by 5.62 percent annually from 2000 to 2012 and contributed about 27 percent of the total fishery output for the period.

3.4.4.2. Industrial Centers and~~&~~ Economic Zones

Growth of economic and service centers all over the region is critical to link production areas and markets, as well as develop resource-rich areas. Among the major ones are the PHIVIDEC Industrial Estate-Misamis Oriental (PIE-MO), Metro Iligan Regional Agri-Industrial Center (MIRAIC) and several Export Development Zones and IT parks. Map 23 shows the development plan of the PIE-MO.

3.4.4.3. Tourism

Arrivals

For the period 2001-2011, Region X received a total of 10,572,643 visitors, 96 percent of which were domestic tourists. Total arrivals increased by 20.2 percent annually, from 491,627 in 2001 to a high of 1,396,330 in 2007. Compared with other regions in the country, Region X ranked seventh among the top 10 regional tourism destinations in 2011, lead by Region 4.

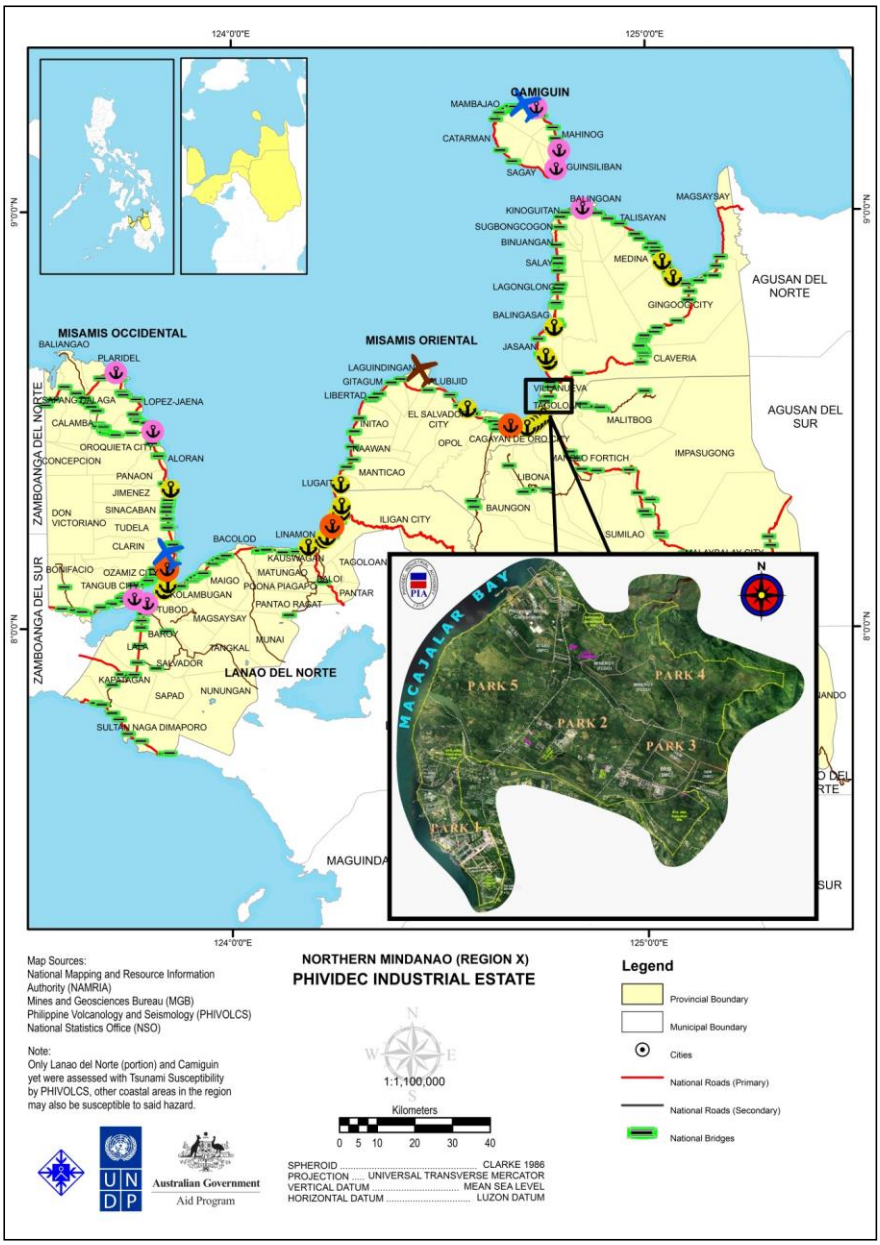
For 2004-2011, total regional arrivals reached 8,901,885. A~~, a~~bout 30 percent of which shared by Misamis Oriental.

Accommodation Facilities in the Region

A total of 392 establishments (380 existing and 12 under construction) are recorded in the region as of May 2012, which are mostly in Cagayan de Oro City.

ready for occupancy. Additional 1,526 rooms are underway with the expansion of existing establishments and completion of those under construction. As compared to the rest of the country, Region X rankeds ~~eighth~~eighth among the 17 regions in terms of the number of rooms.

MAP 23. PHIVIDEC INDUSTRIAL ESTATE-MISAMIS ORIENTAL, REGION X



3.5. TRANSPORTATION AND COMMUNICATION, ACCESS AND CIRCULATION

3.5.1. Transportation and Access (External and Internal Circulation)

Strategically located in the northern part of Mindanao, the region is accessible to all areas in Mindanao, as well as to Luzon and Visayas through its integrated intermodal land, sea and air transportation system.

All access points, the road, air and sea network systems are vital link for efficient trade, tourism, service activities and flow of commodities. All-paved national highway connects the major cities outside the region. Airports and seaports provide direct link to Luzon and Visayas, and to other key cities in Mindanao.

Travel time from Manila to the regional center of Cagayan de Oro City in Misamis Oriental by plane is about 1 hour and 30 minutes, by sea at 24-30 hours, by land through the RoRo Terminal System via Surigao City is about 38 hours. Cebu and Iloilo cities are linked to Cagayan de Oro City by plane and sea transport. Davao and Zamboanga cities can also be reached by land and plane. The following major cities in Mindanao are accessible by land and other key cities are accessible by air transport:

- Butuan City from the east via the Butuan-Cagayan de Oro-Iligan Road;
- Zamboanga City from the west via Linamon-Zamboanga Road;
- Dipolog City from the north-west via Oroquieta City-Plaridel-Calamba-Sapang Road;
- Pagadian City from the west via Ozamiz -Pagadian Road;
- Cotabato City from the South via Junction Sayre Highway-Damulog Poblacion Road;
- Davao City from South-east via Bukidnon-Davao Road; and,
- Marawi City from Central Mindanao via Iligan-Marawi Road..

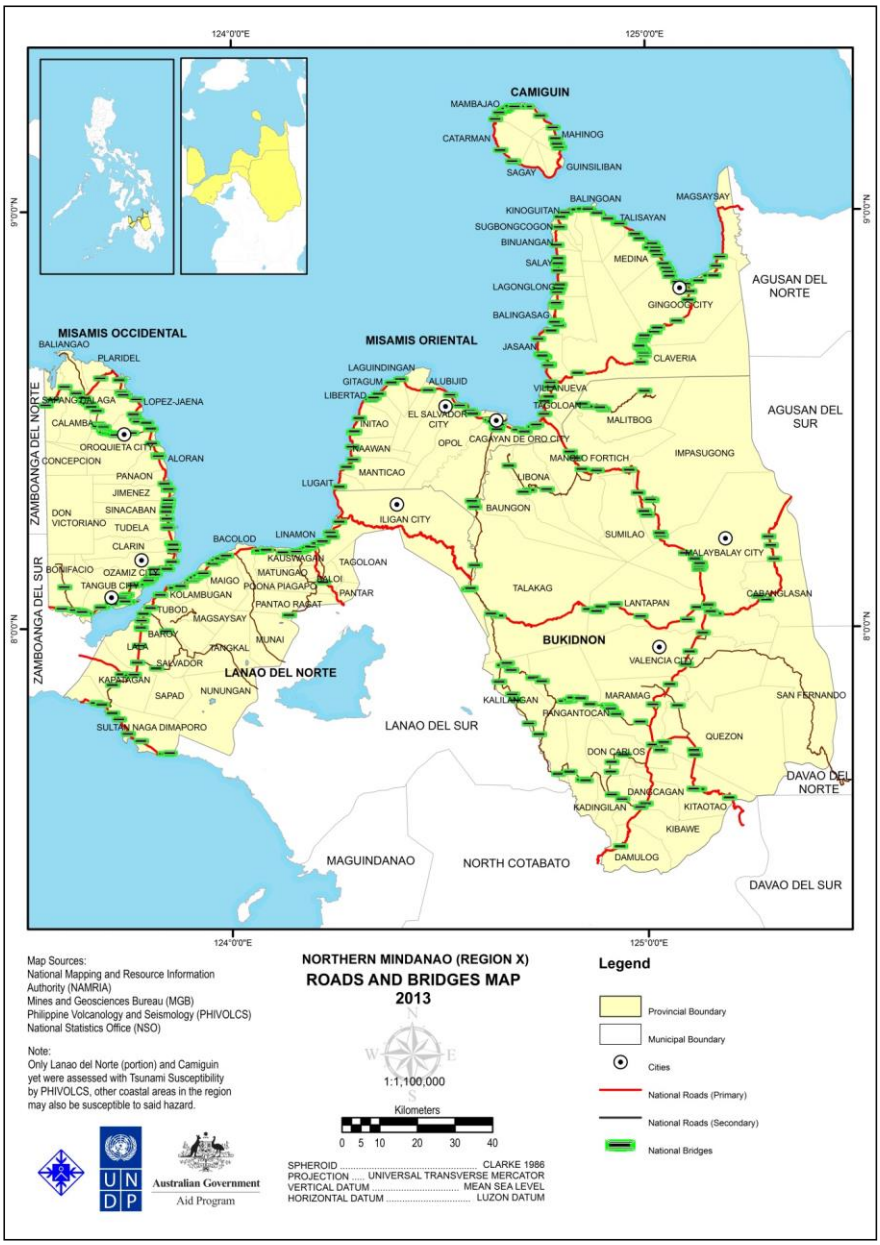
The said roads also serve as transit points for users of the ~~MCT Port~~Mindanao Container and the Laguindingan Airport. The roads also provide access and movement of agricultural and fishery products from Davao Region, Lanao del Sur and Zamboanga.

3.5.1.1. Land Transport

The region has a total road network of 22,580.39 kilometers as of December 2012, of which 91.52 percent are local roads while 8.48 percent are national roads. Among the Mindanao regions, Region X has the longest in terms of total length of national roads and length of paved national roads.

Road density of 1.119 km. per square kilometer of land area or 5.25 kilometer per 1,000 population. Road density varied considerably throughout the region and was highest in Cagayan de Oro City followed by Camiguin province and lowest in Bukidnon.

MAP 24. NATIONAL ROADS AND BRIDGES, REGION X



The total length of the national road network (Map 24) of the region is about 1,899.93 kilometers plus 15.13 kilometers of national bridges. This represents about 6.28 percent of the 30,476.54 kilometer total national road network system in the country and 23.96 percent of the total Mindanao national road network system.

Out of the total national road network in the region, about 71.10 percent (1,350.92 kilometers) are paved with either concrete or asphalt while 28.90 percent (549.01 kilometers) are unpaved.

For the local roads, about 88 percent of the local roads are still unpaved. Majority of the unpaved local roads are located in the provinces of Misamis Oriental and Bukidnon.

There are 375 bridges in the region with total length of 15,132.20 lineal meters (LM) Permanent bridges (360) account for about 96 percent of the total national bridges. Reinforced concrete type of bridge accounted for the largest share with 12,010.68 LM (81.87 percent of total length) followed by steel bridge with 2,7,92.99 LM (16.13 percent of total length). Total length of Bailey Bridges is 298.53 LM while Timber Bridges has an aggregate length of 30.10 LM. The remaining temporary bridges are located in the provinces of Bukidnon, Misamis Occidental, and Lanao del Norte.

These are the main circulation routes/major road networks in the region:

- Butuan-Cagayan de Oro-Iligan Road
- CDO-Airport-Bukidnon Road
- Gingoog-Villanueva-Claveria Road
- Misamis Oriental-Bukidnon-Agusan Road
- Camiguin Circumferential Road
- Sayre Highway
- Bukidnon-Davao Road
- Kapalong-Talaingod-Valencia Road
- Linamon-Zamboanga Road
- Ozamiz-Pagadian Road
- Oroquieta City-Plaridel-Calamba-Sapang Road

The above roads boost the trade and services sectors, and other economic activities in the region such as movement of agricultural produce from Talakag, Bukidnon to the Mindanao Container Terminal and for shipment abroad and other produce from Lanao del Sur and Zamboanga for shipment in Cagayan de Oro Seaport, among others.

These roads strategically linked the growth centers of the region to other regions in Mindanao. Strategic Development Areas (SDAs) are also connected by the primary arterial road network system. The areas in the Cagayan de Oro-Iligan Corridor are connected mainly by the BCIR from Villanueva, Misamis Oriental to Tubod, Lanao del Norte.

Cagayan de Oro City as the regional center has the busiest road network system in terms of volume of traffic. Its strategic location and presence of major seaport and airport links it directly to Luzon, Visayas and Mindanao.

Road network in settlements in urban areas are fairly developed. Adjacent municipalities of urban centers like Cagayan de Oro City, Iligan City, Tagoloan, Malaybalay City and

Valencia City are strategically connected, together with other social facilities such as schools, hospitals, malls and other recreational facilities.

In 2012, there were 226,351 registered motor vehicles in the region. This translates to an average of ten motor vehicles/km. of road and 53 motor vehicles/1,000 population. An average of about 6,829 vehicles passed along the national road system of the region for the period 2010 and 2011 (Annual Average Daily Traffic). The 2011 AADT showed that about 2,148 motor vehicles or 31.34 percent of all type of vehicles passed daily along the major thoroughfares in the region particularly the Butuan-Cagayan de Oro-Iligan Road (BCIR) and Sayre Highway. Major road vehicle users are motor-tricycle at 40 percent followed by passenger car at 30.72 percent. Trucks and buses comprised 12 percent of the vehicles that passed through the major thoroughfares in the region and about 35 percent of the vehicles ply along the national roads within Cagayan de Oro City.

There are ~~top~~ 20 busiest national road sections in the region based on the 2011 AADT from DPWH. The busiest among the road sections is the BCIR in Misamis Oriental and Cagayan de Oro City which provide link to Caraga Region and Zamboanga Region via Linamon-Zamboanga Road.

Given the potentials of the region as the transshipment point of Mindanao for trade and services, various vital road links still need to be developed and improved. Based on the March 1999 JICA-DPWH Master Pan Study for Visayas and Mindanao, by 2016 traffic capacity problem is expected along BCIR, Sayre Highway and Tangub-Ozamiz-Oroquieta Road. The results of the study supports the region's priorities to widen into four lanes the BCIR and Sayre Highway with the operation of the Laguindingan Airport and Mindanao Container Terminal in PHIVIDEC.

Priority routes going to the region that should be improved/developed were already identified. The assessment was based on its economic and social impacts considering its major role in the mobility of people, goods and services going into and out of the region. DPWH as the mandated agency to maintain national roads and bridges, already considered in its annual budget the appropriation for the proposed priority routes including costing for disaster mitigation/climate change adaptation measures.

The national roads and bridges located near or along the coast lines and flood plains are exposed to flooding (Maps 25, 26 and 27). Approximately 218.60 kilometers of national roads are prone to rain-induced flooding and riverine flooding. About 44 percent of the total kilometers of national roads in Misamis Oriental are susceptible to flooding, followed by Misamis Occidental (23%), Lanao del Norte (19.17%), and Bukidnon (12%).

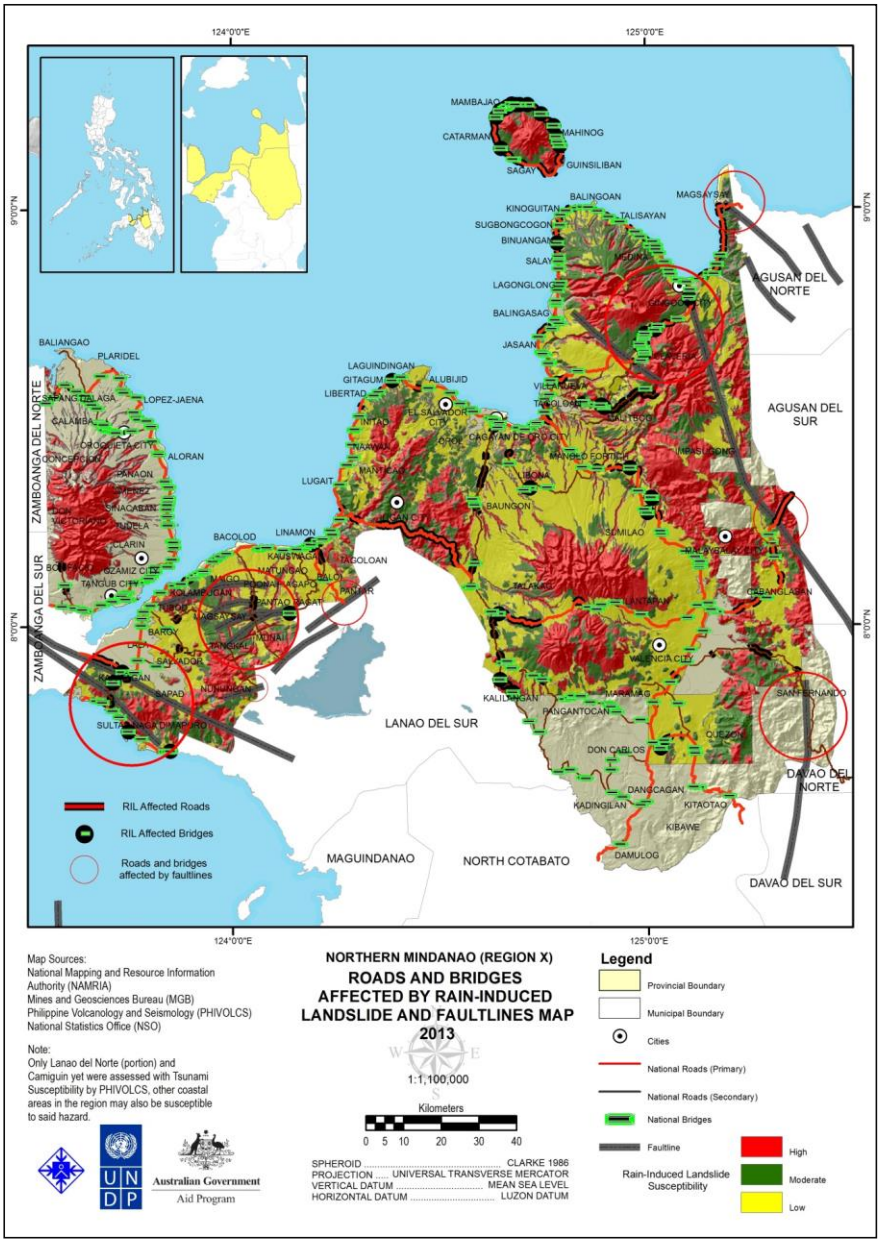
National roads along 47 municipalities and nine cities are susceptible to flooding. There are 21 municipalities and 2 cities in Misamis Oriental that are susceptible to flooding. In Bukidnon, 2 cities and 3 municipalities are exposed to flooding while national roads in 8 municipalities and 1 city are prone to flooding.

On a per LGU flood susceptibility analysis of national roads, Valencia City has the longest length of road susceptible to flooding at 19.06 kms, followed by Iligan City (18.56 kms), Gingoog City (14.17 kms) and Cagayan de Oro City (12.51 kms). These are key growth areas in the region; hence, proper flood mitigating measures should be put in place to protect lives and properties.

MAP 25. EXISTING NATIONAL ROADS SUSCEPTIBLE TO FLOOD HAZARD, REGION X

MAP 26. EXISTING NATIONAL BRIDGES SUSCEPTIBLE TO FLOOD HAZARD, REGION X

MAP 27. ROADS AND BRIDGES AFFECTED BY RAIN-INDUCED LANDSLIDE AND FAULTLINES, REGION X



Major flood events that occurred in the region greatly affected its major road system. Landslide and flooding events caused by heavy rainfall affected major portions of the BCIR in 2009. This resulted to major road sections of the BCIR impassable particularly the sections along the municipalities of Binuangan, Salay, Lagonglong and Balingasag in the eastern part of the province of Misamis Oriental.

The infrastructure sector suffered massive damages on national and provincial/local roads and bridges due to TS Sendong. Damages to roads and bridges reached PHP1.19 billion, 69.7 percent (or PHP830 million) of which was accounted by national roads and bridges while the remaining 30.3 percent was attributed to provincial or local roads and bridges.

Most of the incurred damages were attributed to the total destruction of Mandulog Bridge 1 in Iligan City and Cabula Bridge in Baungon, Bukidnon, and partial damages of Mandulog Bridge 2, also in Iligan City.

Susceptibility assesment to rain-induced landslide and faultlines of roads and bridges was also undertaken to guide in the formulation of disaster resilient policies of future projects.

Challenges and Constraints

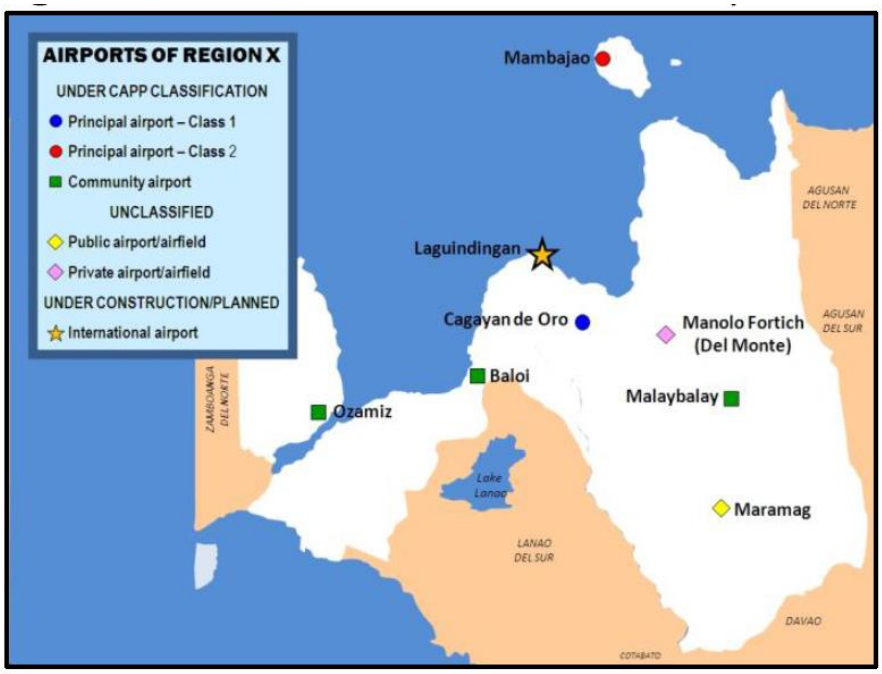
1. Underdeveloped local road networks;
2. Roads and bridges susceptibility to flooding and rain-induced landslide;
3. Access roads are sparse in some remote but productive agricultural areas and potential tourism sites;
4. Traffic signs and safety devices are not properly installed/implemented;
5. Poor implementation of policies on gross vehicle weight limits for trucks and trailers;
6. Traffic congestion in major urban roads; and
7. Acquisition of road right-of-way prior to project implementation to avoid delay and cost overruns.

3.5.1.2. Air transport

There are seven airports/airfields located in the region (Map 28). Only three airports in the region are operational for commercial operation as of 31 December 2013 located in Cagayan de Oro, Ozamiz and Camiguin. There are daily direct flights from Manila to Cagayan de Oro and Ozamiz Cities and the travel time is about 1 hour and 30 minutes. There are also direct flights going to Cagayan de Oro City from Davao, Zamboanga, Cebu and Iloilo. Flights are also available from Ozamiz City to Cebu City and Camiguin to Cebu City.

Lumbia Airport in Cagayan de Oro City is one of the busiest airports in the country. There are 15,540 total flights in 2012 or an average of 43 daily incoming and outgoing flights. Average increase in the number of flights in Lumbia Airport is about 19 percent over the last five years. Volume of argo traffic also increased by an average of 22.86 percent in the last five years. Incoming and outgoing passengers reached 1.62 million in 2012. The average increase in the number of passengers over the last five years is about 16 percent. The design capacity of the current passenger terminal building of the Lumbia Airport already exceeded its limit which resulted to over crowding.

MAP 28. AIRPORTS IN REGION X



Source: CAAP

The new Laguindingan Airport started its commercial operation on June 15, 2013. The design capacity of the airport is to accommodate 1.5 million passengers annually. The 1.62 million recorded passengers in Lumbia Airport in 2012 are expected to transfer to the this airport. Thus, the design capacity of the Laguindingan Airport passenger terminal building has already been anticipated to accommodate increasing number of passengers.

The airport is within the safe zone, not prone to flooding or rain-induced landslides. The airport is also outside the major fault lines in the region. Further, the airport is situated 190 feet above sea level which makes it visible even during rainy season. With this elevation, the airport is less susceptible to storm surges and tsunamis.

Challenges and Constraints

1. The design capacity of the Laguindingan Airport passenger terminal building has already been ~~anticipated to accommodate the~~reached due to increasing number of
~~1.~~2. Improve air transport connectivity to boost economic activities in the province of Bukidnon and for the whole region; and
~~2.~~3. Improve airport facilities in Camiguin and Ozamiz City and install mitigating measures since portions of the runway are flooded during heavy rains.

There are major three base ports under the Philippine Ports Authority-Port Management Offices in the region – Cagayan de Oro, Iligan and Ozamiz. Other ports are managed by the PPA-PMOs (Map 28). These ports connect the region to Manila, and other parts of the country such as Dumaguete City, Cebu City, Jagna, Bohol and Iloilo City. The region is also accessible through Roll-on Roll-off (RoRo) Terminal System through the Western, Eastern and Central Nautical Highway Systems. Regular ferry services connect Balinga~~a~~oan, Misamis Oriental to Camiguin Island then Camiguin to Jagna, Bohol. Fast craft services likewise connect Cagayan de Oro to Camiguin then to Jagna, Bohol.

As of March 2013, there are 22 private ports under PPA PMOs which are engaged in manufacturing, petroleum, cement and food processing.

The number of ship calls increased by 2.79 percent annually in the last five years. About 4.24 million embarking and disembarking passengers were recorded in 2012 in the three major PPA ports in the region. About 1.2 million passengers, representing 29 percent of the total passengers from outside the region passed through Cagayan de Oro and Iligan ports. PPA Ozamiz recorded about 1.5250 million disembarking passengers. About 80 percent are RoRo passengers from Port of Mukas in Tubod, Lanao del Norte. RoRo passengers engage economic activities in Ozamiz City such as procurement/exchange of goods and services.

In terms of cargo throughput in metric tons, an average of 3.78 percent growth was recorded in the three major ports over the last five years. Containerized cargoes likewise posted an uptrend of 11.25 percent average annual growth which is reflective of the robust movement of goods to and from the region.

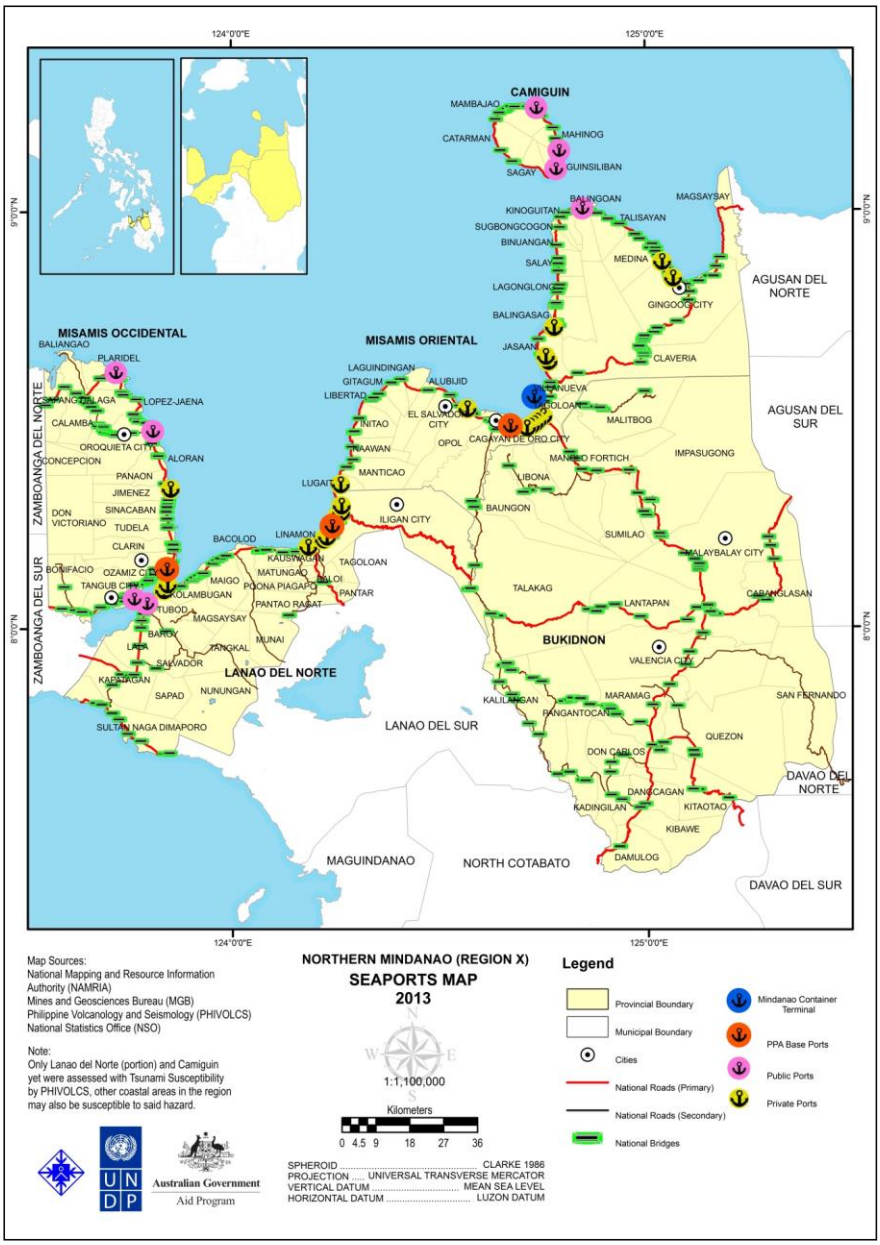
With the increasing number of ship calls, passengers and cargoes, various port developments should be implemented such as construction of passenger terminal building, enhancing berthing facilities and additional port facilities.

Port zone delineation of ports of Balingoan, Balbagon, Benoni and Guinsiliban has been approved by President Aquino. Submitted to the Office of the President for consideration and approval are the proposed Port Zone Delineation of Iligan and Plaridel Ports. With the port zone delineation, expansion of development programs shall be undertaken and appropriate port facilities shall be ~~shall be~~ constructed in support of the region's trade, and tourism activities.

The proposed Laguindingan Seaport complements the Laguindingan Airport and enhances sea transport in the region. It shall be part of the intermodal transportation system for convenient access of the Laguindingan Airport ~~airport~~ from various strategic locations, as well as to address vehicular traffic congestion.

~~Since~~ Considering that seaports are ~~naturally~~ exposed to natural hazards because of its there is the need to consider natural disaster risk implications for planning and design of infrastructures for future port developments.

MAP 29. SEAPORTS 2013, REGION X



The Mindanao Container Terminal in the PHIVIDEC Industrial Estate Misamis Oriental (PIE-MO) registered about 215,000 TEUs in 2012 in containerized cargoes or 79 percent of its design capacity (270,000 per year expandable to 500,000 TEUs). Ship calls registered an average of 5.37 percent increase over the last five years. While domestic ship calls posted a significant increase at 30 percent annual average, foreign ship calls decreased at an annual average of 8.87 percent. Market competition essentially made cargo handling more efficient as reflected in the 18.54 percent average annual growth rate of TEUs registered at MCT. Foreign cargoes comprised 59 percent of the total cargoes handled.

There are also locators in PHIVIDEC Industrial EstatePIE-MO, with private ports being Philippine Sinter Corporation, ; STEAG, ; Phoenix, ; Limketkai Manufacturing Common Berth (PSC but used by Filipinas Shell), ; Jetti, ; and, Kitrol. A total of 9.419 million MT of domestic and foreign cargoes at 9.419 million MT were handled in these

Challenges and Constraints

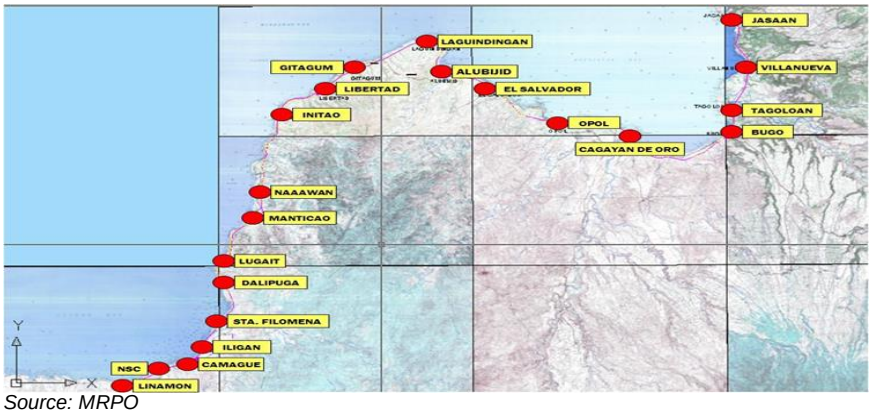
a) Deficient and congested ports and and RoRo facilities that require expansion of and improvement of passenger terminal buildings.

b) Need for Provide support infrastructure support to fully utilize the Mindanao as the Alae-PHIVIDEC By-pass Road, road widening of the BCIR and Sayre Highway.

3.5.1.4. to fully maximize usage of the Mindanao Container Terminal Rail

There is no existing rail transport system yet in the region. The 1st phase of the Mindanao Railway System (MRS) is proposed to be implemented along the Cagayan de Oro-Iligan Corridor (CIC). The CIC Rail segment of the MRS would be a 124.65-kilometer rail mainline (single and double track) from the municipality of Jasaan, Misamis Oriental to municipality of Linamon, Lanao del Norte, covering 14 municipalities and the two cities: Cagayan de Oro and Iligan. The repackaging of the project FS for PPP/BOT undertaking is ongoing.

FIGURE 10. PROPOSED CAGAYAN DE ORO-ILIGAN CORRIDOR RAILWAY SYSTEM PROJECT RAIL LINE



Source: MRPO

3.5.2. Communications

3.5.2.1. Postal Communication

As of September 2013, a total of 86 post offices in the region are owned and operated by the Philippine Postal Corporation (PPC). Although a few of these post offices are stationed in populous barangays, most of them are located in the poblacion area of the municipalities/cities. The region has a postal density of 53,116 persons per post office.

Even with the standard of one post office per municipality, ~~there are~~ four municipalities Malitbog, Concep~~t~~ion~~,~~ and Binuangan) ~~that~~ do not have post offices~~.~~. In addition, due implementation of rationalization in the PPC, ~~there are~~ 16 municipalities in the region ~~that~~ post offices ~~since~~ because they did not meet the minimum revenue and mail volume requirements as mandated by the DBM. Post offices in the neighboring municipalities are providing ~~Their~~ postal services in these areas~~are being served by the post offices in the~~

~~A total of 107 letter carriers are employed to serve the region. Each letter carrier caters to~~ number of private firms have been operating and providing postal services to profitable areas in the region. Moreover, with the access to internet, many individuals and organizations have switched to alternative online bill payment and sending of letters through electronic mails as a quick and easy way to communicate across the region, the country and ~~across~~ the world.

3.5.2.2. Telecommunications

The basic telecommunications services in the region are provided by 12 telephone exchange carriers, which are regulated by the National Telecommunications Commission (NTC). Of the 93 cities and municipalities in the region, 73 or 78.49 percent have telephone connection. Per standard, there should be one telephone station per city/municipality.

As of the fourth quarter of 2012, there were 153,975 equipped telephone lines or an equipped telephone line density of 3.58 lines per 100 persons. Of these available telephone lines, 46.63 percent or 71,802 lines were subscribed or a subscribed telephone line density of 1.64 lines per 100 persons. The province of Misamis Occidental has the highest telephone line subscription rate at 61 percent, while the province of Misamis Oriental had the lowest at 43.70 percent.

3.5.2.3. Broadcast Stations

In broadcast communications, the region has 20 AM and 36 FM radio stations in 2012. There were also 51 CATV companies servicing the region.

3.5.2.4. Public Calling Offices

There were 1,091 public calling offices (PCOs) in the region as of 2011. Majority of the PCOs are located in the province of Lanao del Norte (667 PCOs), followed by the provinces of Misamis Oriental (165 PCOs), Misamis Occidental (140 PCOs), Bukidnon (107 PCOs) and Camiguin (12 PCOs).

3.5.2.5. Mobile Telecommunications

Digitel Mobile Philippines, Inc., Globe Telecom, Inc., and Smart Communications, Inc. provide the cellular services in the region. As of end of 2012, there were 757 Cellular Mobile Telecommunications Service (CMTS) stations in the region. Of the total CMTS, the Smart Telecommunications Inc.accounts the highest share of 40.16 percent, followed by Globe Telecommunications Inc. at 38.97 percent, and Digital Telecommunications Philippines Inc. at 20.87 percent.

3.5.2.6. Internet Connections

A total of 24,248 internet subscribers are available in the region as of end of 2012. About 84 percent of the internet users are PHILCOM subscribers. Other users connect to the internet through Cable 21 (5.73 percent), ICC-Bayantel (2.93 percent), PLDT (2.59 percent), TMSI (1.81 percent) and SOTELCO (1.24 percent).

3.5.2.7. Electronic Government

With the challenges on sustained economic growth and impact of climate change, it is crucial to develop a faster, timely and more effective response to the needs of the people. With the utilization of ICT and other web-based telecommunication technologies, the government is implementing the electronic government (e-Government) system to improve the efficiency in delivering its services. Among the programs/projects implemented through the DOST-ICTO and DOST-Advanced Science and Technology Institute (ASTI) are the Philippine Community eCenter (PhilCeC) and the Integrated Government Philippines (iGovPhil) launched in 2011 and 2012, respectively.

The PhilCeC Program seeks to build ICT literate, self-reliant communities by providing computer and internet facilities as well as ICT trainings. The region has a total of 67 cities/municipalities that have CeC presence (20 in Misamis Oriental, 16 in Bukidnon, 14 in Misamis Occidental, 12 in Lanao del Norte and 5 in Camiguin). The iGovPhil launched some of the toolkits and services (Public Key Infrastructure, Government Cloud, Agency Service Registry, Government Web Template, and Government-wide E-mail System) that are essential to streamline government operations.

However, the National Computer Center and the National IT Industry Promotion Agency, reported that there are still municipalities and academic institutes in the Philippines that are deprived of connectivity as of 2012. The fiber network is still not distributed throughout the country and the PC penetration rate is very low. Also, the existing internet speed is not enough for e-Government system.

The occurrence of TS Sendong and Pablo caused damages to outside plant facilities such as fixed lines, remote line ~~units,~~units, telephone cabinets, poles and fiber optic cables, as as subscriber distribution remain unfixed. As reported by the TELOF-ICTO, the affected telephone facilities were already condemned since there is no funding for repair/rehabilitation. The situation affected the delivery of quality ICT and worldwide access to information.

a) Unserved/underserved rural areas in terms of postal and telecommunications services that calls for more private service providers to expand its services in the said areas;
b) Disaster resiliency of ICT facilities; and
~~a)~~
unstable network backbone, shortage of electricity, etc.) resulting to low maturity level in e-Government system.
~~b)~~

3.6.1. Family Income

3.6.1.1. Income and Expenditure

Between 2006 and 2009, family income and expenditure decreased by 3.9 percent, respectively. This translates to a decrease in savings by 16 percent. On the average, a family of five earns 98 thousand pesos a year.

3.6.1.2. Income Inequality

The failure of the relatively high economic growth of the region to translate to significant poverty reduction may be traced partly to region's high degree of inequality in income distribution. Studies show that "high income inequality, limits the effectiveness of growth in reducing poverty".

Northern Mindanao is among the regions in the country with the most unequal income distribution, as indicated by Gini concentration ratios and family income distribution by income deciles. Gini coefficient for Region X has been persistently above the national average, hardly improving from 0.4817 in 2003 to 0.4737 in 2009. The slight improvement has also been lower than observed for most other regions.

3.6.2. Social Services

3.6.2.1. Health and Nutrition

Infant Mortality Rate (IMR). The region's IMR has significantly improved over the 13-year period, from 1998 to 2011. The IMR dropped drastically to 5.49 per 1,000 in 2011 from 11.15 per 1,000 livebirths in 1998. If the trend persists, there is a high probability of attaining the Millennium Development Goal (MDG) of reducing the IMR by two-thirds, between 1990 and 2015.

Maternal Mortality Rate (MMR). There was a slight improvement in terms of MMR over the 13-year period from 0.70 per 1,000 livebirths in 1998 to 0.67 per 1,000 livebirths in 2011. Over the said period, there have been erratic movements in MMR with the highest at 0.94 per 1,000 livebirths in 2002 and 2009.

Nutritional Status. Based on the 2011 Survey by the FNRI and DOST, prevalence of malnutrition continued to be a public health challenge in all areas of the region. Percent of underweight children in the region posted a slightly increasing trend at 21.6 percent in

2008 to 21.9 percent in 2011. Stunting posted a slight reduction during the same period but the prevalence is greater than underweight and wasting. There is a need to address chronic malnutrition particularly in the first two years of life to prevent risk to delayed mental development, poor school performance and reduced intellectual capacity.

Low Birth Weight. Among the regions in the country, Region X was one of the few regions which posted lower percentage of low ~~birthweight~~birth weight children (0-3 years only 13.5 percent in 2011. This is much lower than in Western Visayas at 19.3 percent (or two in every 10 children born with low birth weight), the highest in the country.

Government Health Services

Over the past 10 years, increase had been minimal on the total count of government health practitioners and workers in the region, particularly for physicians and dentists. In 2011, the government health practitioners and workers in the region remained inadequate. Except for nurses, most of the ratios of medical and allied personnel to population were lower than the standard in almost all areas of the region.

Of the 107 hospitals in the region, 44 belong to Level 1 and 39 belong to Level II with a combined bed capacity of 2,604. Level 3 hospitals reached 21 with 2,267 bed capacity. Only three hospitals are classified under Level IV with a bed capacity of 390. Two of these Level IV hospitals are located in Cagayan de Oro City while the other one is in Iligan City (Map ___).

Private hospitals dominated the total number of hospitals in the region at 66%. Among the provinces, Bukidnon posted the highest at 19 hospitals. Expectedly, Cagayan de Oro posted the highest among the cities at 14 hospitals (11 private and 3 public~~government~~). population to bed ratio showed wide disparities both in the provinces and cities. For the provinces, the highest was in Misamis Oriental with 3,018 population per bed. However, with the proximity of the province to Cagayan de Oro as the regional capital, access to hospitals is being facilitated.

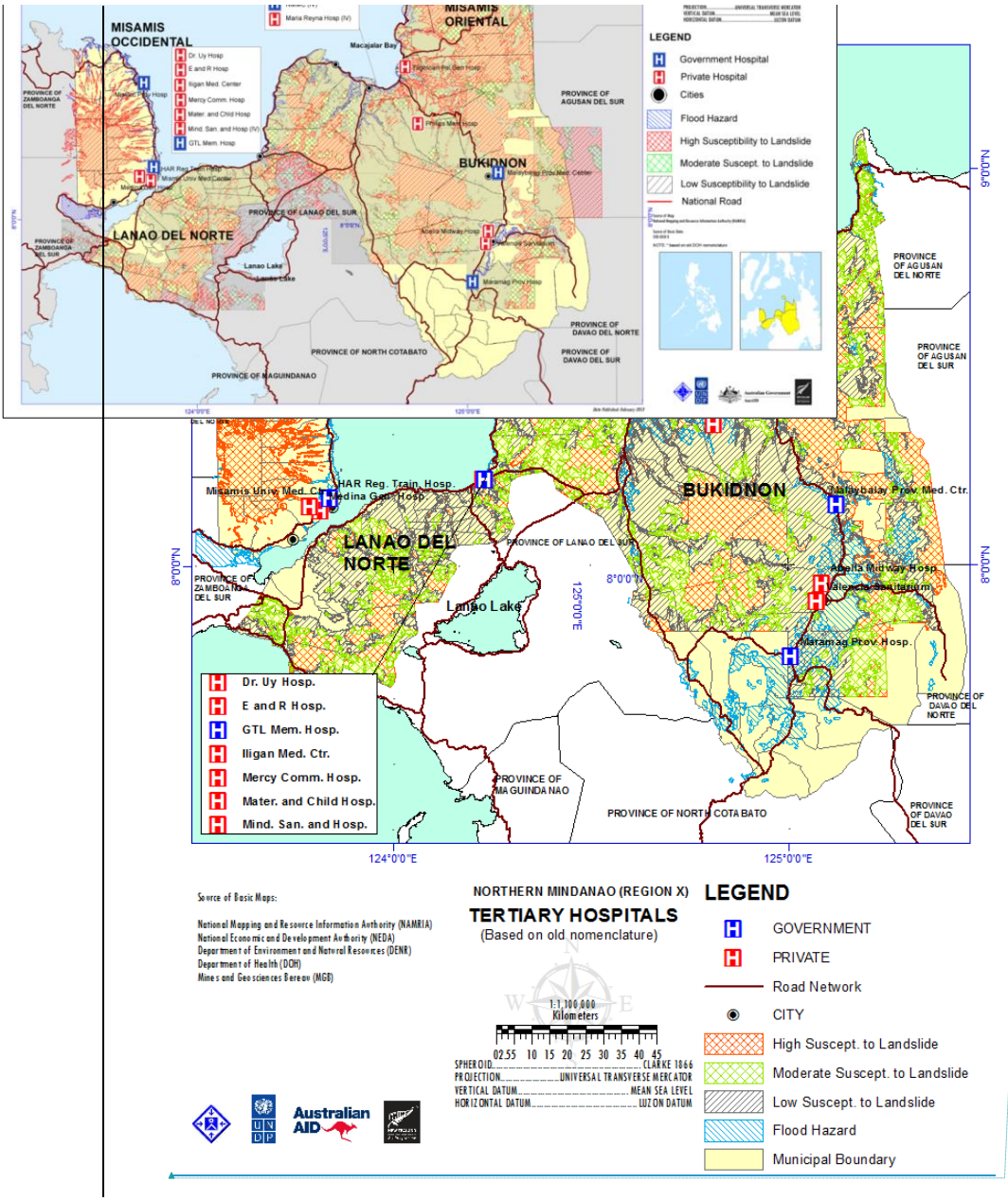
Susceptibility of the Health Sector to Disasters

Although there have been several natural disaster events in the region between October 2005 to April 2012 (RDA, 2012), there were no severe damages reported in terms of the health sector. It was only the occurrence of TS Sendong in December 2011 which recorded the highest number of casualties and damages (PDNA, 2012) including the health sector. Based on the said report, there were six health centers in Cagayan de Oro City that were heavily flooded/severely damaged, four health centers that were partially damaged and three *Botika ng Barangay* that were also flooded.

In Iligan City, eight public health centers were partially damaged and a private hospital, Mindanao Sanitarium and Hospital, was flooded with various equipment destroyed.

The Strategic Action Plan for TS Sendong Affected Areas also indicated that in ~~Misamis~~ Occidental, two hospitals and one health center were flooded and reported damages to building and equipment.

MAP 30. TERTIARY HOSPITALS, REGION X, 2013



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The 2012 PDNA report likewise cited that consequent diseases such as leptospirosis heightened the health risks of not only the survivors but also the indirectly affected residents of the flooded areas. Due to the disaster, vulnerability to other diseases increased because of the reduced capacity of the government to deliver timely and adequate medical services to both the directly and indirectly affected population. Damage to water supply systems may have affected the quality of water for drinking and domestic use putting at risk those who are already vulnerable including health personnel who are operating the health posts in the affected areas.

Damaged roads and bridges hindered the efficient transport of patients to hospitals and medical facilities in the cities, placing the life of victims and the sick in peril. On the other hand, the nutritional status of internally displaced population (IDP) may either have improved due to the continuous supply of food and relief goods or worsened especially those who were already suffering from poor health due to the supply of unhealthy food items (e.g. noodles) which have not been well-regulated. This situation, however, needs to be validated and further studied.

The congested condition and poor sanitation in the evacuation sites which resulted to prevalence of ailments and cases of mental disturbance affect the most vulnerable groups (women, children and the elderly) among the IDPs. The nutritional status of pregnant and lactating mothers, as well as children under 5 years old in the IDP evacuation sites needed close monitoring.

3.6.2.2. Basic Education

The overall performance of the basic education sector in the last ten years was characterized by continuous struggle to implement the needed interventions to address gaps in providing equitable access to, and improve the efficiency and quality of education. On top of these, there is urgency ~~concerns~~ in ~~s to~~ making ~~e~~ the education resilient ~~towards~~ to hasten the attainment of educational outcomes stipulated in the development plans, the Education for All (EFA) and the MDGs.

In Region X, the education sector incurred huge damages and losses with the occurrence of TS Sendong. Among the immediate consequences of disasters on the sector are disruption to classes, damage to school facilities and equipment. Other major adverse impacts are poor student performance (or reduced educational outcomes), increased incidence of student dropouts, reduced ~~enrollment~~enrolment among students from groups, need for psychosocial intervention among students and school personnel.

On the positive note, the sector plays a key role in building and/or strengthening society's resilience to disasters and climate change, and in preventing hazards from turning into a disaster (UNICEF, 2010). Risk and climate sensitizing the education sector results to a quality education that educates, empowers and protects lives. ~~Among the expected key~~

~~Enrollment~~Enrolment

There were more modest accomplishments in increasing access to basic education. As of school year SY 2012-2013, the region has a total of 3,289 schools ~~in the region~~ offering education services, 73.8 percent of which are public schools.

TABLE 4. NUMBER OF SCHOOLS, REGION X: SY 2012-2013

LEVEL	PRESCHOOL	ELEMENTARY	SECONDARY	TOTAL
Public	0*	2,086	341	2,427
Private	321	290	251	862
Total	**321**	**2,376**	**592**	**3,289**

Source: DepEd-X
** located in existing elementary schools*

The combined ~~enrollment~~enrolment for all levels in SY 2012-2013 reached 1,111,913. Overall, there has been an erratic trend in total ~~enrollment~~enrolments in the basic education sector for the period SY 2010-2011 to SY 2012-2013.

In pursuit of inclusive growth, the education system continued to encourage increased participation by all individuals - male and female, and from all socio-cultural background. As a result, the number of Muslim students and those from various indigenous groups have been continually increasing. In addition, the efforts to provide basic education services to out-of-school children, youth and adults through Alternative Learning Systems have been continually pursued.

Meanwhile, reports reveal that disasters have adversely affected the provision of access to basic education. ~~Flashfloods~~Flash floods, rain-induced landslides and earthquakes left damaged school facilities and equipment, and caused disruption of classes.

TS Sendong in December 2011 affected 31 public elementary and secondary schools, with a total of 30,396 students, in the cities of Cagayan de Oro and Iligan. About 60 percent of the affected students were from 15 affected schools in Cagayan de Oro City, while the remaining 40 percent were from Iligan City, which has 16 affected schools.

Net ~~Enrollment~~Enrolment Rate[1]

In terms of net ~~enrollment~~enrolment rate, there has been an increase of 4.70 percentage points between SY 2011-2012 and SY 2012-2013, from 86.56 percent to 91.26 percent. The SY 2012-2013 rate is short by 8.74 percent from the MDG target by 2015 of 100 percent.

On the other hand, the secondary level posted a dismal net ~~enrollment~~enrolment rate of 40.26 percent for SY 2012-2013. This is lower by 0.89 percentage point than that of the previous school year and short by 59.74 percent from the MDG target of 100 percent.

Efficiency

Cohort survival rates (CSR) at the elementary and secondary levels posted erratic trends between the period SY 2003-2004 and SY 2012-2013. Overall, the SY 2012-2013 rates of 63.29 percent and 68.96 percent at the elementary and secondary levels, respectively, are lower than those in SY 2003-2004. Moreover, the SY 2012-2013 rates are far below the MDG target for 2015 of 100 percent.

Other key indicators of efficiency likewise posted declines during the same period. The region's retention rate declined from 90.55 percent in SY 2010-2011 to 89.21 percent in

[1] Previously called Participation Rate

SY 2012-2013 in the elementary level, and from 88.21 percent to 87.47 percent in the secondary level during the same period. Meanwhile, transition rates declined by 2.23 and 4.88 percentage points in the elementary and secondary levels, respectively, between SY 2010-2011 and SY 2012-2013.

As for repetition rate, that in the elementary level worsened from 2.67 percent in SY 2010-2011 to 3.15 percent in SY 2011-2012. Conversely, there has been an improvement in the secondary level as repetition rate fell from 3.5 percent to 3.21 percent during the same period.

Meanwhile, completion rates in the elementary and secondary levels posted downtrends. The latest rates hovered around 60 percent, far below the end-of plan target of 83 percent. Elementary level promotion, ~~graduation~~graduation, and school leavers rates further signal to increase the schools' holding power. While the secondary level promotion and graduation rates showed uptrends, the increments were very minimal.

On top of the immediate effects of the disasters (such as damage to facilities and equipment) on the education system are medium- to long-term impacts. Working towards attaining the EFA and MDG targets become even more of an uphill attempt. Post-disaster participation rates in both elementary and secondary levels may further fall far below the MDG target of 100 percent.

Quality

Another alarming concern is the performance of students in the National Achievement Test (NAT). The Mean Percentage Scores (MPS) have remained very low over time, indicating that students are far from achieving subject mastery.

For SY 2012-2013, NAT MPS are 73.31 percent for the elementary level and 50.83 percent for the secondary level. MPS in each of the subject areas is below the standard of 75 percent.

In terms of student performance by subject area in SY 2012-2013, elementary students performed poorest in Science with an MPS of 68.52 percent, and followed by English with 69.73 percent. Overall, there has been an increase of 3.79 percentage points, from 69.52 percent in SY 2011-2012 to SY 2012-2013.

Meanwhile, overall performance of secondary students improved by 1.91 percentage points. In SY 2012-2013, students scored lowest in Critical Thinking with 38.11 percent, Science with 41.15 ~~percent~~percent, and Math with 47.25 percent.

The shortages in teachers and classrooms, chairs, and textbooks largely determined the quality of education provided by the public education system. In addition, these affected the extent of learning by students. As the adequate provision of these needs lays the foundation for more effective learning, this is an area that needs priority intervention in the succeeding years.

The problem of classroom shortages is evident at the secondary level, with a classroom-pupil ratio of 1:49 in SY 2008-2009, far above the standard of 1:40. It is noted that, although the average ratio at the elementary level meets the standard, disparities exist and

there remains the need for additional classrooms. There are schools where cases of overcrowding of students in classrooms are still observed.

3.6.2.3. Higher Education

The higher education institutions (HEIs) remain steadfast in the exercise of sound resource allocation to ensure effective management of the higher education system and the achievement of its four thrusts: a) quality and excellence; b) efficiency and effectiveness; c) relevance and responsiveness; and d) access and equity.

Promoting Quality and Excellence

As of SY 2012-2013, Region X has a total of 82 public and private HEIs. The public schools consist of State Universities and Colleges (SUCs) and Local Colleges and Universities (LCUs), while the private schools are subdivided into sectarian (PS) and non-sectarian institutions (PN). These comprised six LCUs, ten SUCs, and 66 private schools (Map __).

These HEIs are offering various disciplines such as Arts and Sciences, Agriculture, Business Education, Health-related, Engineering, Maritime, Information Technology, Teacher Education, Criminology, and Law.

Centers of Excellence/Development

Eight from among the program offerings are recognized as Center of Excellence (COE), and 17 programs are given the Centers of Development (COD) status distributed in six universities and one college. The 17 COD have been maintained since 2008 until 2012 as higher education standards and quality are met by qualifying HEIs.

Consistent with the strict enforcement of standards and evaluation, the region has now a total of 144 accredited programs categorized as Level I (47), Level II (51), and Level III (40) and the newest, Level IV (6) in 2012. Levels I, II and III posted positive performances in terms of AAGR in the last five years of which Level I recorded the highest (31%), followed by Level III (25.5%), and Level II (14.5%).

Although it registered a fluctuating trend in the last five years, academic programs issued with government recognition and temporary permits posted positive AAGR of 0.98 percent and 39.31 percent, respectively.

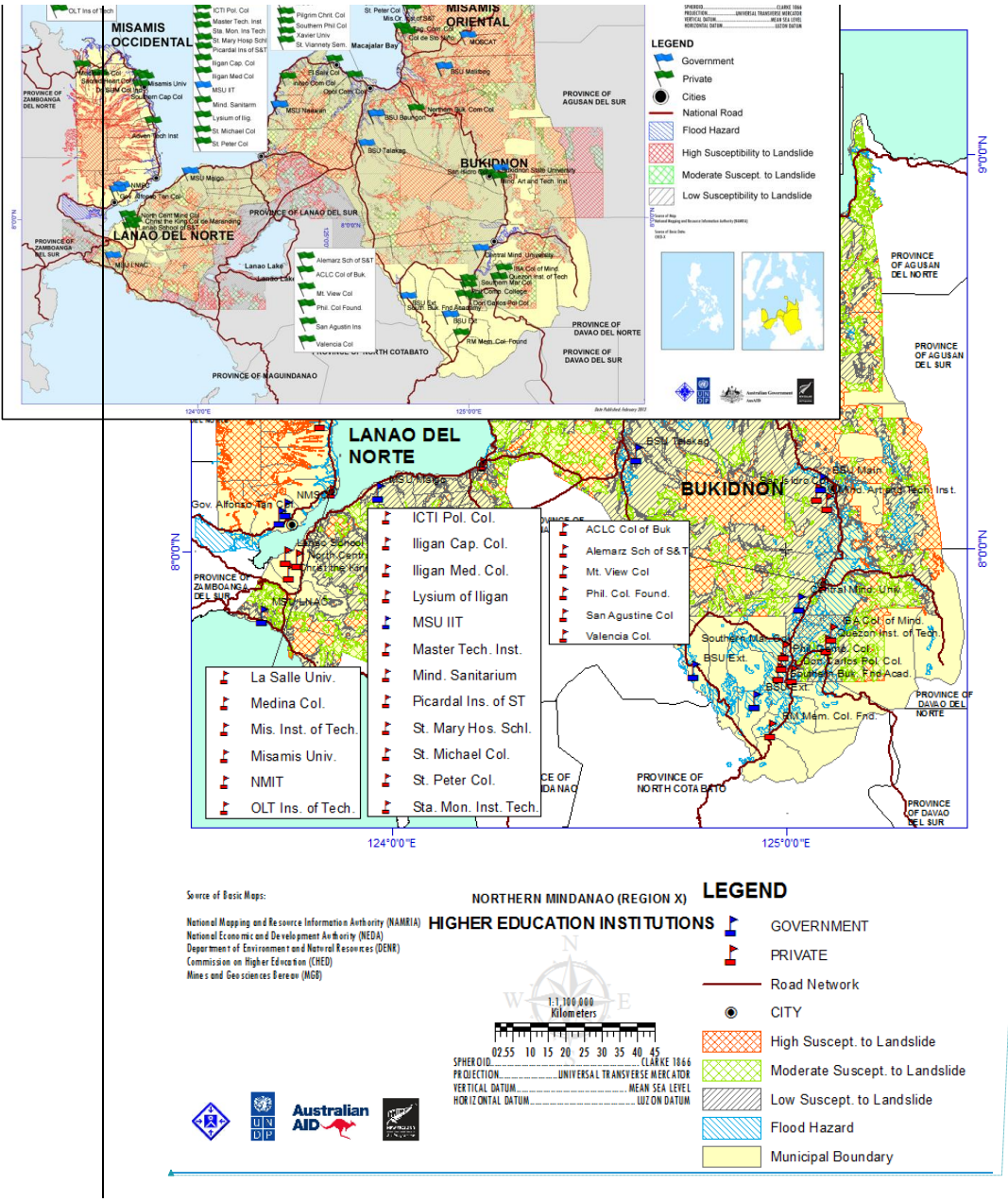
Promoting Relevance and Responsiveness

Enrollment

With the growing number of HEIs in the region offering various courses, the tertiary enrollment registered an annual growth rate (AAGR) of 6.65 percent in the last five school years (Sys 2008-2009 to 2012-2013).

Considering the increasing number of school populace, the region is expected to produce and eventually meet the growing demand for highly skilled work force. Likewise, there is also a need to identify a zonal/regional training center for excellence that will require higher-order skills and competencies for the region.

MAP 31. HIGHER EDUCATION INSTITUTIONS, REGION X, 2013



Source of Basic Maps:

National Mapping and Resource Information Authority (NAMRIA)
National Economic and Development Authority (NEDA)
Department of Environment and Natural Resources (DENR)
Commission on Higher Education (CHED)
Mines and Geosciences Bureau (MGB)

NORTHERN MINDANAO (REGION X)

HIGHER EDUCATION INSTITUTIONS

1:1,100,000
Kilometers
0 2.5 5 10 15 20 25 30 35 40 45

SPHEROID..... CLARKE 1866
PROJECTION..... UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM..... MEAN SEA LEVEL
HORIZONTAL DATUM..... LUZON DATUM

LEGEND

- GOVERNMENT
- PRIVATE
- Road Network
- CITY
- High Suscept. to Landslide
- Moderate Suscept. to Landslide
- Low Suscept. to Landslide
- Flood Hazard
- Municipal Boundary

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Based on the study conducted by the Philippine Institute for Development Studies (PIDS) and the Department of Budget (DBM)[1], the share of the private sector (60.6%) in total HEI enrolment in Region X is close to that of the national average (60.9%) in 2009.

Covering the period SY2008-2009 to SY2012-2013, Education and Teacher Training posted the highest AAGR of 14.7 percent, closely followed by Business Administration and related courses (14.2%), and Information Technology (11.7%). Meanwhile, Medical and Allied courses posted a negative growth of about 13 percent in the same reference period.

In terms of number, the Business Administration and related courses accounted the highest (40,080), followed by Education and Teacher Training (26,784), Engineering and Technology Group (17,012), Medical and Allied Courses (13,354), and Information Technology (12,773) in SY 2012-2013.

Graduates

During the last five SYs (SY 2007-2008 to SY 2011-2012), Region X posted a fluctuating trend in the number and growth rate of graduates. This irregular trend in the region is due to voluntary phasing out of some nursing programs with less number of takers, and closure of two schools particularly in 2012.

Among the top five disciplines, for the last five school years (SY2007-2008 to SY2011-2012), Information Technology posted the highest AAGR of 32 percent, followed by Engineering and Technology group (24%), while the rest have lower AAGR of three percent and below.

In SY2011-2012, Medical and Allied courses accounted the highest (6,215) number of graduates, followed by Business Administration and related courses (3,397), Education and Teacher Training (3,140), Engineering and Technology group (2,749), and Information Technology (2,355).

Broadening Access and Equity

The three types of student financial programs (STUFAPs) are: 1) traditional grants/scholarship; 2) congressional grants; and 3) Study-Now-Pay Later Plan (SNPLP). Although, scholarship provision in the country is said to be highly fragmented[2], the region managed to consistently provide fund support to a total of 16 types of scholarships/grants.

In the last five school years (SY2008-2009-SY2011-2012), the region's provision of scholarship/grants showed unfavorable trend at Traditional Grants/Scholarship (-4.52%) and Congressional Grants (-2.34%). Although, the Study-Now-Pay Later (SNLP) accounted a minimal number of 13 availers in SY 2011-2012, it posted an 8.3 percent AAGR in the last five SYs.

Issues or concerns confronting broadening access and equity include among others the following: a) dwindling scholarship slots due to low or limited fund scholarship scheme

[1]Manasan, Rosario G. "Rationalizing National Government Subsidies for State Universities and Colleges"
[2]Manasan, Rosario G. "Rationalizing National Government Subsidies for State Universities and Colleges". Ibid.

and support; b) increasing cost of tuition and other fees in various HEIs and the high cost of living which are shouldered by some scholarship programs also resulted to the reduction of slots; c) the need to increase financial support to scholars/grantees to be able to respond to their basic needs; and d) limited and delayed releases of students' allowance which affected their performance in school and the prevalence of dropouts.

Improving Efficiency and Effectiveness

Accreditation is reflective on the quality of programs being offered by HEIs. As of SY2011-2012 a total of 15 private HEIs and five State Universities/Colleges have accredited programs under the Federation of Accrediting Agencies of the Philippines (FAAP), and Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACCUP).

Meanwhile, in SY2012-2013, Xavier University and Liceo de Cagayan University (LDCU) maintain their Autonomous status which was granted in 2009.

As for the Expanded Tertiary Education Equivalency and Accreditation Program (ETEEAP), the region posted an increasing trend in the number of graduates from 2008 to 2011. Hence, although it slightly dropped in 2012 by 3.3 percent, it however posted an AAGR of 43.55 percent in the last five years.

TS Sendong affected one state university and four private HEIs located in the cities of Cagayan de Oro and Iligan. These five schools recorded significant damages especially to equipment and facilities with a total estimated value of about PHP20 million.

3.6.2.4. Technical Vocational Education and Training (TVET)

Supportive to the national thrust of "inclusive growth", the sector's priority programs revolve around the overarching goal of "investing in the country's human resources to be more competitive and employable, while promoting industrial peace based on social justice." With the REALDEAL TESD Stewardship Platform or (**R**each the grassroots, **E**mpower the reached, **A**ssure quality training and **L**ifelong Education **D**evelopment **E**nable and **A**ctively-engage **L**abor Force members in job opportunities through employability and Livelihood Skills), quality TESD services that are outcome-based and performed in accordance with the ISO 9001:2008-anchored Government Quality Management System Standards (GQMSS) are continuously provided.

With the implementation of K to 12, there is continuing upgrading of TVET curriculum and teaching metholodogies, expansion of capability of TVET assessors and assessment centers, as well as study alternative options for quality control in assessment. With this, the Program Registration, Assessment and Certification and Support Services earned ISO to ensure quality standard of the delivery of programs and services.

It also pursued active participation of various concerned sectors especially the industry in identifying Tech-Voc skills needs and requirements and in promoting industry-based training standards and assessment instruments. Moreover, the regular updating of the skills demands indicate that the Tech-Voc programs offered are labor market-based.

Recently, the e-learning or e-TESDA Online Program has been put in place to make some TVET qualifications available through the internet for students nationwide. Thus, making

technical vocational education more accessible, especially for Overseas Filipino Workers (OFWs) who are still wanting to hone their skills or learn other skills. The trainings offered under this program are along ICT/Electronics, Tourism, and Agribusiness sectors.

Likewise, the Mobile Training Plus through the technology-based community training program is also made available for skills training to be more accessible to the public, especially those in remote areas. Courses offered are along ICT, Electrical and Automotive sectors.

Over the years, the TVET sector generated increasing number of globally competitive skilled workers by strengthening its quality assurance mechanisms specifically in improving the access to quality, relevant and affordable education and training through: 1) Program Registration, 2) Massive Training 3) Ladderized Education Program, 4) Scholarship and Youth Profiling for Starring Careers.

Program Registration

The overall performance of the Unified TVET Program Registration and Accreditation System (UTPRAS) has been erratic in the last five years (2008-2012). Reduction was noted in 2012 due to the serious drive to regulate TVET programs to be aligned to the skills priorities of the region. The alarming proliferation of various TVET program offerings like "caregiving" that continue to saturate the market prompted TESDA to address the issue. Otherwise, if TVET program offerings are not properly and strictly regulated, excessive supply of graduates would consequently contribute to the increase of unemployment rate.

Similarly, the deployment of the Program Registration Policy and Procedures, although has been consistently intensified with the conduct of compliance audit to existing programs, also registered an irregular trend during the same period. This however, posted an AAGR of 55.7 percent in the last five years.

Massive Training

In terms of the magnitude of TVET skills supply, all modes of training programs have been intensified. Although accomplishment is erratic, graduates of the technology institutions were highest in 2012 of 15,200 or an increase of 12 percent compared in 2011. This can be attributed to the strengthened collaborative partnership with the LGUs and other private organizations which facilitated the provision of quality training.

Graduates from the Technical Vocational Institutions (TVIs), although drastically reduced in 2010 (5,736) from 21,977 in 2009, posted a significant increase of about 39 percent in 2012, compared in 2011 due to the massive scholarship provision.

Declining performance was posted by the enterprise-based programs (KASH). The condition calls for strengthening the collaborative efforts of DOLE and TESDA through intensified TVET sector monitoring. Moreover, further advocacy on the program is needed to spawn more industry participation.

Competency Assessment and Certification

Competency assessment and certification is regularly conducted as part of the quality assurance mechanisms of the TVET sector. Accomplishment was highest in 2012 with 24,722 persons assessed, while the lowest was in 2008 (11,233). It also posted an AAGR of about 30 percent in terms of persons certified from 2008-2012. The positive performance was due to the intensification of the conduct of compliance audit of assessment centers.

The Ladderized Education Program (LEP) was initially implemented in previous years and a policy review was conducted requiring legislation at the national level to improve its implementation. With this, the institutionalization of the Philippine Qualifications Framework through Executive Order No. 83 s. 2012 and the approval of its implementing rules and regulations, the pathways and equivalencies are already accessible for students/trainees to move easily and readily from TVET to higher education.

Education/Scholarship Grants

In 2009, a total of 18,147 grantees were awarded scholarship under the PGS/PGMA-Training for Work Scholarship. Although at par from the 2009 performance, 2012 managed to post an increase of 187 percent (6,086 scholars) compared in 2011. Meanwhile, PESFA recorded the lowest number of scholars in 2010 at 314, and highest in 2012 at 1,666.

Youth Profiling for Starring Careers (YP4SC)

The performance of the YP4SC posted a significant reduction in 2008, as well as in 2010 and 2011. This was due to TVET institutions' non-compliance on the directives on the use of YP4SC. It however, recorded the highest in 2009 of 15,329 persons who took the career profiling examination to facilitate employment.

Tracking of Graduates

The Impact Evaluation Study (IES) has been conducted to measure the external efficiency of TVET delivery, mainly in terms of the employment rate of graduates. Based on the survey in 2011, the overall employment rate of the TVET graduates was registered at 60.9 percent.

The TVET Sector's Commitments to Disaster Risk Reduction

The TVET sector facilitated the conduct of the following skills/livelihood trainings for affected families/communities by TS Sendong: 1) Construction Skills Training cum Production; 2) Technopreneurship/—Livelihood Skills Training; 3) Lifelong Skills/Sustainability; 4) TESDA Specialista—Technopreneurship Program; and 5) Rehabilitation of TS Sendong-affected Areas.

A total of 1,895 TS Sendong survivors have benefitted from the scholarship programs under the TWSP in 2011 and 2012. Majority of them took training programs along the sectors in Construction, Metals and Engineering, ICT and Health, Social and other services.

Effects of Disaster to the Higher Education/TVET Sector

Suspension of classes is one of the direct impacts to the education sector especially that major facilities like computers, equipment, school supplies and materials were destroyed apart from the ~~the~~ gymnasium or covered courts utilized as evacuation centers or storage damaged properties. There were also disruptions to classes as students and teachers cleaned the huge garbage and wastes found both in school and affected areas.

Reports also showed that there were a number of students and teachers who were victims of the calamity that delayed their attendance in school. Thus, psychosocial debriefings to the victims/survivors were conducted to help cope and stabilize their situations. Massive clean-up and repair of destroyed furniture/equipment were continuously conducted to fast track resumption of classes.

3.6.2.5. Security and Services

Areas affected by Armed Conflicts

While the region ~~generally~~ enjoys a generally peaceful and safe environment, few areas confronted by ~~ideology-based~~ armed threat groups, and their breakaway groups. These areas are located mostly in rural areas where basic services remain very inadequate, and where poor communities live. Structural problems at the political front, wide income gap among social classes, ~~and~~ demographic and ethnic divide, and the interplay of these provide the impetus for armed conflicts.

As of 2011, there are 334 areas in some parts of region affected by armed-conflict in varying scale: 66 areas are influenced, 118 areas are considered less influenced, while 150 areas are said to be threatened. ~~Most of the threatened areas by the CPP/NPA are in~~ between the government and the MILF has to some degree eased the tension in critical areas, and is hoped to bear lasting peace.

Crime Situation

Total crime volume decreased from 45,240 in 2009 to 12,257 in 2012 or an average annual reduction of 18.2 percentage points. All types of crimes except murder posted declines over the same period. Crime Solution Efficiency Rate (CSER) and Crime Clearance Efficiency Rate (CCER) also improved by 14.1 and 15.2 percentage points, respectively. Average Monthly Crime Rate (AMCR) was also on a downtrend from 89.8 to 24.3 crimes per 100,000 population during the same period.

3.6.2.6. Other Social Services

Poor Households

The National Household Targeting System for Poverty Reduction (NHTS-PR) is an information management system that serves as a common tool to identify and target the poor beneficiaries of social protection and poverty reduction programs. Executive Order No. 867 (s. 2010) has directed the National Government Agencies (NGAs) to adopt the results of NHTS-PR in identifying prospective beneficiaries for the social protection programs nationwide.

In Region X, a total of 338,749 poor households comprising 1,861,141 poor individuals are identified through the NHTS-PR. Among the five provinces, Bukidnon (29%), Lanao del Norte (28%) and Misamis Oriental (28%) posted the highest number of poor households while Cagayan de Oro and Iligan topped the list among the cities. The Pantawid Pamilyang Pilipino Program (4Ps) identifies and selects eligible households who have children aged 0-14 years and/or pregnant women from the NHTS-PR database of poor households. The 4Ps provides conditional cash grants to improve the living conditions of poor households while encouraging them to invest on the education and health of their children.

In 2012, the 4Ps has reached 233,831 household beneficiaries with a total grant release of PHP4.48 billion since the program started in 2008.

Based on an impact evaluation conducted by the World Bank (WB) in 2012, it was found that the children beneficiaries of the program, aged 3-11 years have higher school ~~enrollment~~enrolment rates (10 percentage points for 3-5 year olds and by 4.5 percentage 6-11 year olds) compared to poor households who did not receive grants from the program. In health, the program has helped in improving the long-term nutritional status of children 6-36 months old. The improvement was 10 percentage point reduction in severe stunting compared to *barangays* that did not have the program where 24 percent of young children 6-36 months old were severely stunted.

Persons with Disabilities

For censal year 2000, the region has a total of 38,601 disabled persons. Persons with low vision shared 39 percent of the total number of disabled persons followed by persons with partial blindness (8.5%) and mentally retarded (7.6%). In the occurrence of natural and man-made disaster, the sector is identified among the affected vulnerable groups together with the children, women and senior citizens.

Based on the NHTS-PR result, there are 13,349 (3.9%) poor households in the region who have members with disability(ies). The most common disabilities among poor households include visual, orthopedic and multiple disabilities.

In order to realize the rights of disabled persons to participate fully in the social life and development of the societies in which they live, *Batas Pambansa Blg.* 344 entitled "An a~~A~~ct to enhance the mobility of disabled persons by requiring all buildings, institutions, establishments and public utilities to install facilities and other devices" was issued. However, little progress has been made over the years in strictly enforcing the provisions of the law.

The LGUs continued to organize the PWDs in their respective territiotial jurisdictions. Based on RA 10070, otherwise known as the "Magna Carta for Disabled Persons" as amended, LGUs are encouraged to provide for the establishment of the Persons with Disability Affairs Office (PDAO) in every province, city and municipality. National agencies and LGUs have entered into joint ventures with PWD organizations to undertake livelihood and other undertakings that shall enhance health, physical fitness and the economic and social well-being of PWDs.

Elderly People

The elderly persons (ages 60 and up) in the region totaled 228,973 for censal year 2007. Health care, housing, income security and other social services of the elderly persons shall be addressed. The results of the NHTS-PR showed that there are 62,857 poor senior citizens in the region or 27 percent of the total number of senior citizens. However, this comprised 3.4 percent to the total number of poor individuals in the region..

There are 24 senior citizens centers that are accredited by the DSWD as provided in RA 7876 (Senior Citizens Act), with recreational, educational, health and social programs and facilities designed for the full enjoyment and benefit of senior citizens.

A total of 13,169 indigent senior citizens were provided a monthly stipend of PHP500 under the government's Social Pension Program as mandated by RA 9994 (Expanded Senior Citizens Act of 2010). The priority beneficiaries of the DSWD's Social Pension are indigent senior citizens 77 years old and above who have no regular source of income and/or support from any member of the family, and not receiving other pension benefits from government and private agencies.

Children

A total of 3,117 day care centers (DCCs) catered to the needs of 107,906 day care children in the region. Some centers are located in flood-prone areas making the children likely to be affected in times of disaster. Likewise, the children are also vulnerable during economic crisis, peace and order related conflict and displacement situations.

The Supplemental Feeding Program has contributed to the improvement in the nutritional status of 107,906 children (3-5 years old) in the region. It provides hot meals at PHP 13/child for 120 days for children currently enrolled in day care and supervised neighborhood play.

A number of DCCs and instructional materials particularly in the cities of Cagayan de Oro and Iligan were flooded and damaged due to the TS Sendong in December 2011 and TS Pablo in December 2012. Day care classes were suspended while some centers were used as evacuation centers. Construction and/or rehabilitation of DCCs specially those located in identified disaster-prone areas are strictly prohibited to avoid future risks.

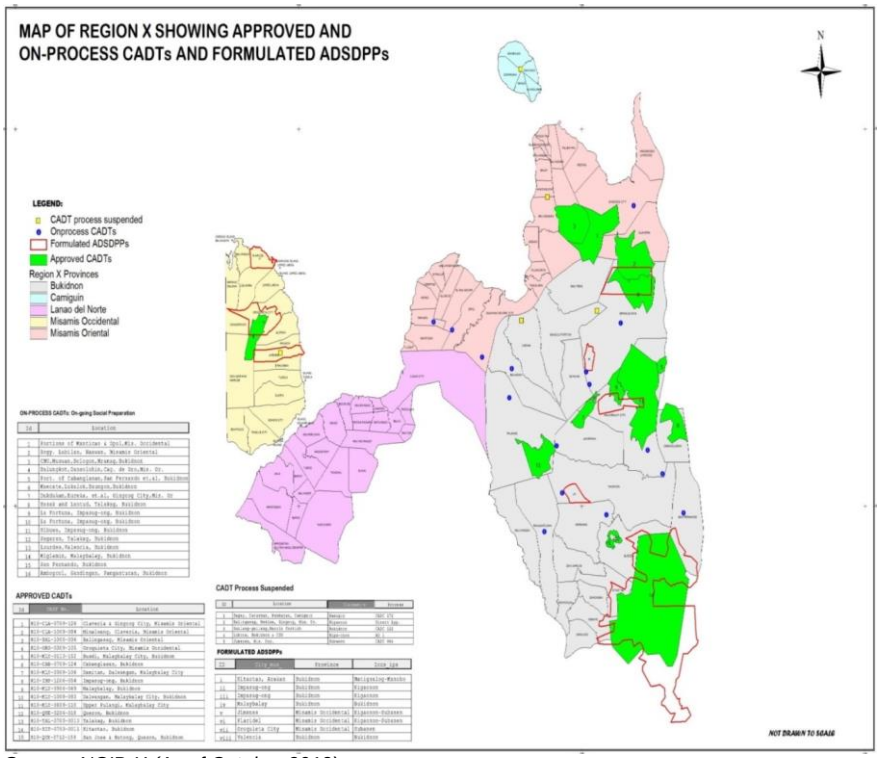
Indigenous Peoples (IPs)

The population of IPs is estimated at 980,385 with nine ethnic tribes inhabiting the region: *Subanen, Umayamnon, Pulangihon, Higaonon, Talaandig, Kamigin, Manobo, Matigsalog* and *Bukidnon*. The delivery of basic socio-economic services to IPs included the provision of financial assistance on traditional craft projects, assistance on legal matters including the facilitation of the free, prior and informed consent (FPIC) issues and land disputes between conflicting parties. Likewise, 1,866 IP students were provided with scholarships through the Educational Assistance Program. A total of 51 IP clients were provided legal assistance to enforce their rights to resolve conflicts in accordance with their customary laws.

The NCIP facilitated the formulation of eight Ancestral Domain Sustainable Development and Protection Plan (ADSDPP) which guides the identification and

implementation of programs and projects to strengthen self-governance, reduce poverty, protect the environment and cultural integrity.

FIGURE 11. ADSDPP, CADTS & CALTS, REGION X



Source: NCIP-X (As of October 2012)

As of October 2012, there are 16 ancestral domain areas with approved Certificate of Ancestral Domains Titles (CADTs) and five Certificate of Ancestral Land Titles (CALTs) in the region with a total approved area of 242,986.24 has and 1,924.9314 has, respectively. The tribes of *Higa-onon, Matigsalog-Manobo, Manobo, Bukidnon, Bukidnon-Higaonon, Bukidnon-Umayamnon, Bukidnon* (MAMACILA), Bukidnon-Pulangiyen and *Talaandig* are among the beneficiaries of the approved CADTs. Meanwhile, a total of 31 ancestral domain areas in the region are on-process for CADT application.

Emergency Relief Assistance to TS Sendong Affected Families

The aftermath of TS Sendong in December 2011 caused damages to the jobs and livelihood of some 14,627 families with 85,601 individuals in the cities of Cagayan de Oro and Iligan. The immediate provision of livelihood support through food and cash-for-work activities and emergency employment for the displaced workers on the cleaning of debris (de- clogging of canals and waterways, road cleaning) helped the families

recover. Cash for work activities implemented by DSWD and DOLE employed 13,258 workers with the amount of PHP26.354 million and PHP3.225 million, respectively.

DOLE disbursed PHP2.452 million to provide immediate response in restoring the income of 327 heavily affected workers in the informal sector. The assistance was in the form of starter kits with capital assistance for various projects such as food processing, fruit and vegetable vending, backyard hog raising and putting up of electronics shops. Likewise, the DSWD released the amount of PHP2.3 million providing PHP5,000.00 livelihood cash assistance each to 460 families.

TS Sendong victims with damaged houses were provided Core Shelter Assistance (CSA) in the amount of PHP70,000.00 per unit. A total of PHP445.20 million was released to 6,360 families. On the other hand, through the Emergency Shelter Assistance (ESA), there were 14,506 families provided with PHP5,000.00 and PHP10,000.00 cash assistance for partially and totally damaged houses, respectively.

Relief supplies including food/water and non-food items such as tents, clothing, mats, utensils, water purifiers, hygiene kits, medicines, blankets, mosquito nets, kitchen set, among others were distributed to the affected families. The collaboration of the different sectors was able to mobilize resources and manage the distribution of relief goods and provision of immediate response measures of affected families.

3.6.3. Utility/Infrastructure Services

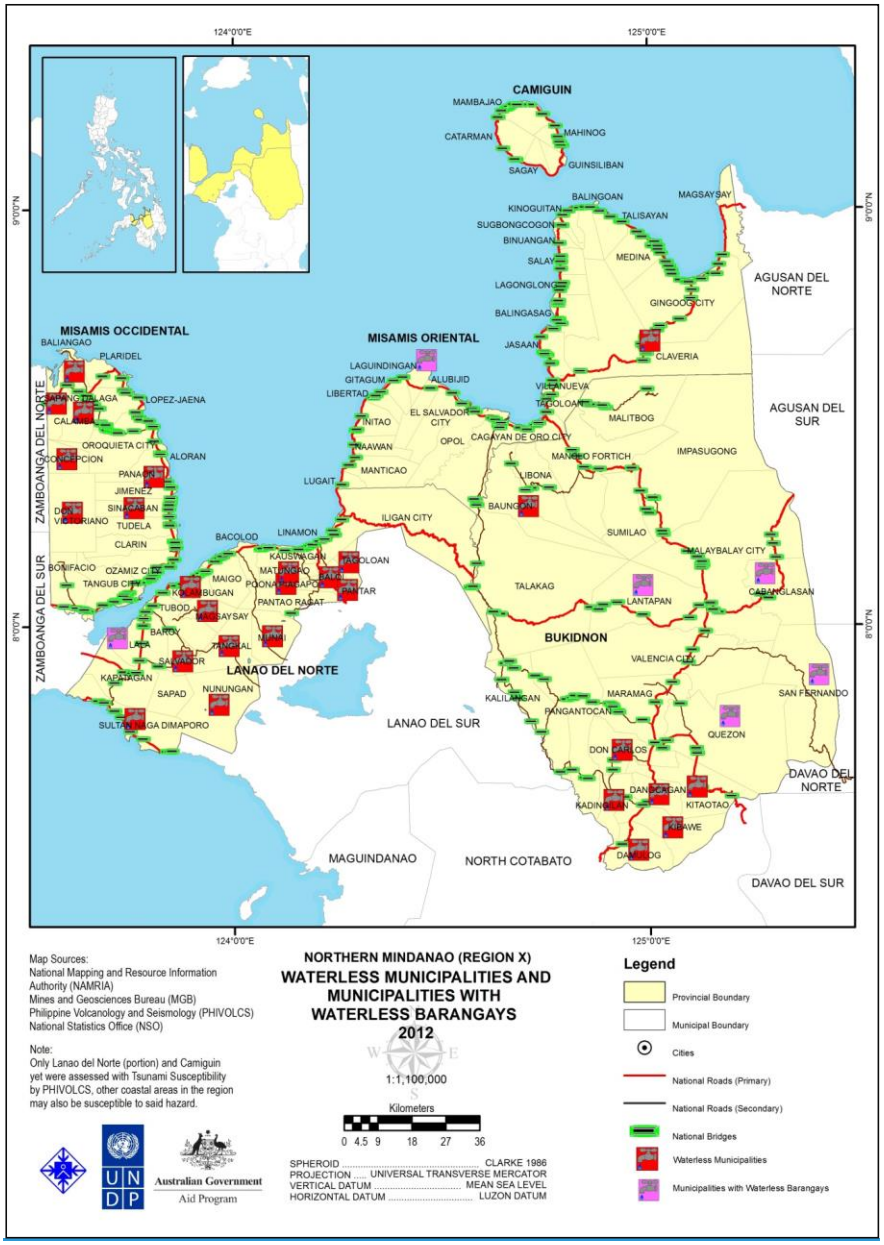
3.6.3.1. Water Supply and Sanitation

Water Supply

Provision of dependable and safe water supply is important for agricultural, domestic, commercial and industrial uses. The region's water supply comes from different sources such as rainfall, surface water resources (i.e., rivers and reservoirs), and groundwater resources (i.e., wells and springs). As of 2011, the Local Water Utilities Administration (LWUA) recorded 1,105 groundwater resources in the region. The existing water infrastructure system in the region is categorized broadly into three classifications – Level I, Level II and Level III. Fifty-two percent o~~O~~f the 782,411 households were provided Level III water supply services;~~, 52 percent were provided by Level III,~~ almost 28 percent Level I.

Based on the 2012 report of DOH-X, of the total 853,160 households in Region X, there were 782,411 households or 92 percent have access to potable water sources, the remaining eight percent may have doubtful sources of drinking water. All the provinces and cities in~~of~~ the region have more than 90 percent of their households with water coverage~~ of their households~~, except for ~~the province of~~ Lanao del ~~Norte which~~Norte, and~~to~~ 83 percent in 2012.

MAP 32. WATERLESS MUNICIPALITIES AND MUNICIPALITIES WITH WATERLESS BARANGAYS, REGION X



Waterless Municipalities

The National Anti-Poverty Commission (NAPC) reported 28 waterless municipalities in Region X in 2010 (Map 32). As of 2011, there were 11 of the 28 waterless municipalities enrolled as beneficiaries of the *Sagana at Ligtas na Tubig sa Lahat* (SALINTUBIG) Program, a tripartite partnership project implemented among the NAPC, DILG and the DOH. Six other municipalities in the region with waterless barangays also benefited from the said program. A total of PHP152.2 million was allocated for the water system projects of the LGU-beneficiaries. Thus, Region X has 17 waterless municipalities (11 in Lanao del Norte, 5 in Misamis Occidental and 1 in Bukidnon) awaiting assistance for the provision of water services.

Challenges and Constraints

a) Inadequate access to safe drinking water (8 percent of the region's total households do not have access to safe water);
b) 17 waterless municipalities awaiting assistance to enhance provision of and access to potable water services;
c) Not all municipalities of the region have Level III water supply system in their urban areas and some Level II and Level III water supply systems have limited water supply due to insufficient water sources, limited facility capacity, and management problems; and
d) Some water supply systems are not installed in safe areas and are affected by natural or man-made hazards.

Sanitation

There was an improvement of sanitation coverage from 2009 to 2012 with a reduction in open defecation. The total percentage of households in the region with sanitary toilet facilities increased from 77 percent in 2009 to 81 percent in 2012.

Data from DOH-X showed that there was a fluctuating sanitation coverage in 2007 to 2011 due to low investments combined with a rapidly increasing population and increasing frequency of natural disasters that affected existing facilities. For sanitation facilities to be sustainable, proper sewerage and septage management support is required. Unfortunately, there have been less investments in proper sewage collection and treatment, particularly in highly urbanized cities and urbanizing areas. This situation poses major health and environmental problems especially during and after the occurrence of natural hazards.

As of 2011, of the total 37,797 food establishments monitored by DOH-X in the region, around 28,033 or 74 percent operated with sanitary permits. On the other hand, of the total 61,500 food handlers, about 51,050 or 83 percent were issued with health certificates. Only the food handlers in Camiguin and the cities of Gingoog, Iligan and Oroquieta recorded 100 percent compliance in terms of approved sanitary permits and health certificates.

Challenges and Constraints

a) Inequitable access to basic sanitation facilities and sewerage and septage management services;
b) Low investments and financing for sanitation, sewerage and septage facilities; and
c) Lack of awareness on the value of sanitation and its services.

Irrigation is very essential in the development of agriculture, as well as in the attainment of the region's food sufficiency. As of December 2012, the irrigation system in the region serviced 56 percent of the total potential irrigable area of 121,432 hectares. About 31,987 hectares have been served by the National Irrigation Systems (NISs). The Communal Irrigation Systems (CISs), other government agency, and private systems served 25,652 hectares, 3,779 hectares, 6,247 hectares, respectively.

Irrigation facilities are still inadequate particularly in areas with great potential for agricultural production such as in Bukidnon with below 50 percent level of irrigation development. While over 70,000 hectares in the region remain undeveloped for agriculture, these areas are threatened by ongoing changes in land use such as conversion into housing development, golf courses, etc. It is still unclear whether such conversion is necessary to the long term development trends of the region or responses on issues related to the artificially repressed state of agriculture and the prolonged unsettled status of property rights in agricultural lands. Thus, it is ~~ajudicious~~a judicious act to protect from rapid and irreversible conversions to non-agricultural uses.

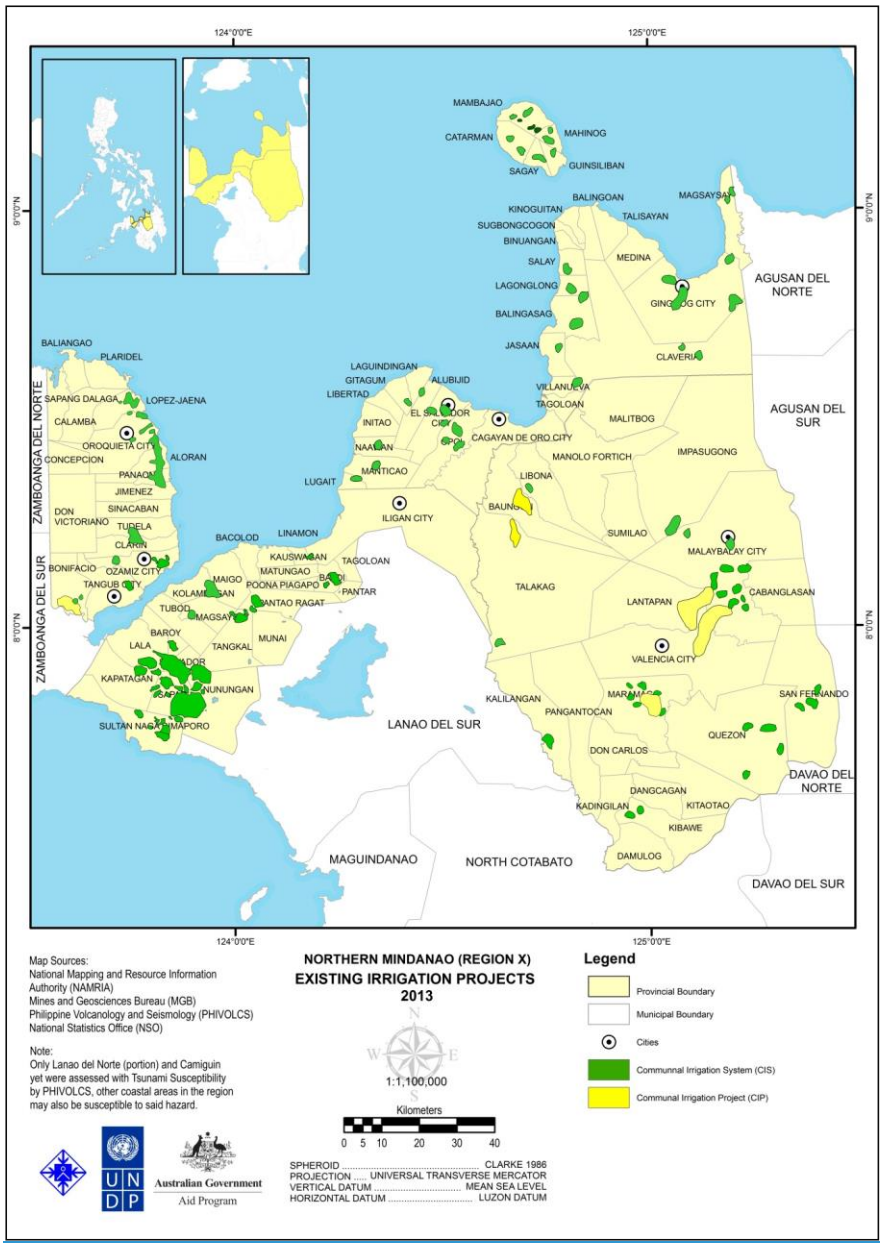
Reports from MGB-X also included issues of uncontrolled issuance of mining permits, which resulted to unregulated or ~~/~~irresponsible mining activities in upstream~~ss~~ and downstream~~ss~~ that cause siltation and affected some irrigation structures and canals. Meanwhile, NIA-X also reported project implementation concerns such as road right-of-way acquisition and~~,~~ prior consent to/approval of Indigenous Peoples (IPs) as the areas within the ancestral domain claims, which caused delay in the implementation and completion of irrigation projects.

The implementation of irrigation projects was also affected due to lack of comprehensive irrigation development packages that would include farmers' assistance for land conversion and institutional development for irrigators' association to maximize utilization of irrigation facilities. The recent policy of NIA already integrated the costs of development of newly irrigated areas in the project design of new irrigation projects.

There is an increasing trend of irrigation development in the region from 48.4 percent in 2010 to 55.7 percent in 2012. The provision of irrigation facilities has substantially contributed to increases in the yield per hectare of paddy and other crops as well.

Some irrigation facilities, such as dams and canals, were damaged (estimated at PHP ~~-~~253.9 million) due to TS Sendong. Bukidnon was the hardest hit among the LGUs affecting 11 barangays with total damage at PHP 138.9 million or 54.7 percent of the total damage on irrigation systems. In addition to the implementation of ongoing, carry-over and new projects in 2012, NIA has undertaken projects for the repair and rehabilitation of existing irrigation facilities that were damaged by TS Sendong (Map 33).

MAP 33. EXISTING IRRIGATION PROJECTS 2013, REGION X



Challenges and Constraints

a) Develop irrigation facilities particularly the remaining 53,767 hectares of the potential irrigable area to attain food ~~secutiy~~security;
b) Address indiscriminate conversion of potential irrigable areas for housing development, golf courses and other non-agricultural uses;
c) Destruction/denudation of watershed that cause decreasing discharges of water from rivers and other sources for irrigation development;
d) Uncontrolled grants/permits of upstream and downstream mining activities which affect~~s~~ irrigation structures and canals due to siltation;
e) Identified areas for irrigation development are within the ancestral domain claims; and
f) Need to ensure willingness of the farmers to accept and maintain irrigation facilities.

3.6.3.3. Flood Control and Drainage

Poor flood control and drainage system, and heavy siltation in rivers and creeks increased the flood hazard and vulnerability of the region. Hence, the construction and improvement of drainage canals and flood control measures should be prioritized in the budget of the LGUs and DPWH. Disaster risk reduction should also be mainstreamed in flood control and drainage system, especially in highly susceptible areas.

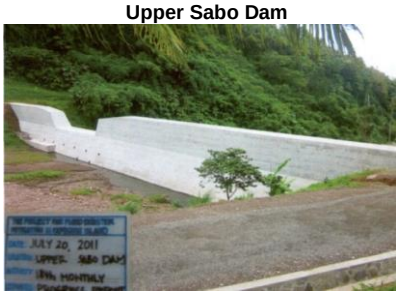
The Tagoloan River and the Cagayan de Oro River are identified as priority river basin systems in Region X for inclusion in the Japan International Cooperation Agency (JICA) assisted study on Nationwide Flood Risk Assessment and the Flood Mitigation Plan to formulate the national strategy for flood control projects. The Master Plan and Feasibility Study of the Tagoloan River was completed and endorsed by the Regional Development Council in 2009. In February 2011, the RDC-X endorsed the preparation of the Master Plan and Feasibility Study for the flood control and drainage projects along the Cagayan de Oro River. Likewise, it supported the conduct of the preparatory survey for Flood Risk Management Project for Cagayan de Oro River (FRIMP CDOR) in 2013. The updated Master Plan and FS are being prepared for the project funded by Japan through JICA.

Completed in July 2011 was the Flood Disaster Mitigation Project in Camiguin funded by Japan under its FY 2009 Grant Aid Program through JICA. The project aims to mitigate the damage caused by disasters, such as flood and debris flow in the province during the Typhoon Nanang in 2001, which brought enormous damage to properties, infrastructure and casualties. The scope of works consisted of the reconstruction of the heavily damaged Hubangon Bridge, and the construction of two Sabo Dams, including access roads.

To minimize and prevent damages from flood to lives, properties, crops and livestock and public infrastructure, the DPWH started implementing 22 flood control and drainage projects in 2011 regionwide of which two projects were already completed, namely: the construction of drainage canal in Palao, Iligan City covering the length of 65.5 lineal meters and the construction of drainage system in Kauswagan, Cagayan de Oro City with a length of 228 lineal meters.

Lower Sabo Dam

Upper Sabo Dam



~~To minimize and prevent damages from flood to lives, properties, crops and livestock and public infrastructure, the DPWH started implementing 22 flood control and drainage projects in 2011 regionwide of which two projects were already completed, namely: the construction of drainage canal in Palao, Iligan City covering the length of 65.5 lineal meters and the construction of drainage system in Kauswagan, Cagayan de Oro City with a length of 228 lineal meters.~~

TS Sendong also caused a lot of damage to the region's flood control facilities. For Cagayan de Oro, damages to flood control structures included overtopped/breached dike along Barangays Carmen, Kauswagan and Bonbon while the seawall in Barangay Macabalan with approximate length of 1.80 km. revetment was washed out.

~~Rehabilitatation~~Rehabilitation and repair of flood control project damaged by TS Sendong in December 2011 were among the priorities of DPWH starting 2012. Disaster mitigating projects along the Mandulog River and Iligan River are also being pursued.

Challenges and Constraints

a) Existing flood control structures in identified high risk areas did not withstand the impact of TS Sendong and Pablo;
b) Unsustainable operation and maintenance of structural and non-structural infrastructures;
c) Limited funds of LGUs and implementing agencies for regular operation and maintenance of existing flood control programs; and
d) Non-consideration of DRR/ CCA in the planning and design of flood management structures.

3.6.3.4. Energy, Power and Electrification

In times of climate change and increasing disaster risk amid robust economic growth in most emerging economies, the global call focuses on sustainable energy security to sustain economic development. Thus, attaining sustainable energy in the context of energy security, poverty alleviation and environmental management is an imperative. The region supports the 2012-2030 Philippine Energy Plan which directs the country in creating a future with less carbon and making energy efficiency a way of life through the use of alternative fuels and renewable energy as intelligent choices.

The power structure of Mindanao is unique as it is connected in one grid and majority of power is distributed by electric cooperatives (ECs).

Installed and Dependable Capacity

In 2012, the total installed capacity of power plants in Region X was 1,045 megawatts which already included the embedded powers of ECs and electric companies. Dependable capacity was only 905 megawatts or 86.62 percent of the installed capacity. Dependable capacity increased by about 14.56 percentage points or about 115 megawatts in 2012 from 2011 level. The significant increase was due to the new embedded powers installed by CEPALCO and FIBECO in 2012.

The embedded power of CEPALCO and FIBECO allowed Cagayan de Oro City and Bukidnon, respectively and the rest of their coverage areas to benefit stable supply of power unlike other areas connected to the Mindanao Grid which suffered 4-6 hours a day brown out because of the net system deficiency of power supply in the grid.

About 66.51 percent of the dependable capacity of all Mindanao power plants that are either controlled and/or owned by NPC/PSALM are generated by power plants located in Region X. Majority of the actual power generation mix in Mindanao Grid comes from hydro- power plants at 60.42 percent, followed by coal fired (16.03 %), diesel (15.76 %), geothermal sources (7.71%), and the least from solar (0.08 %).

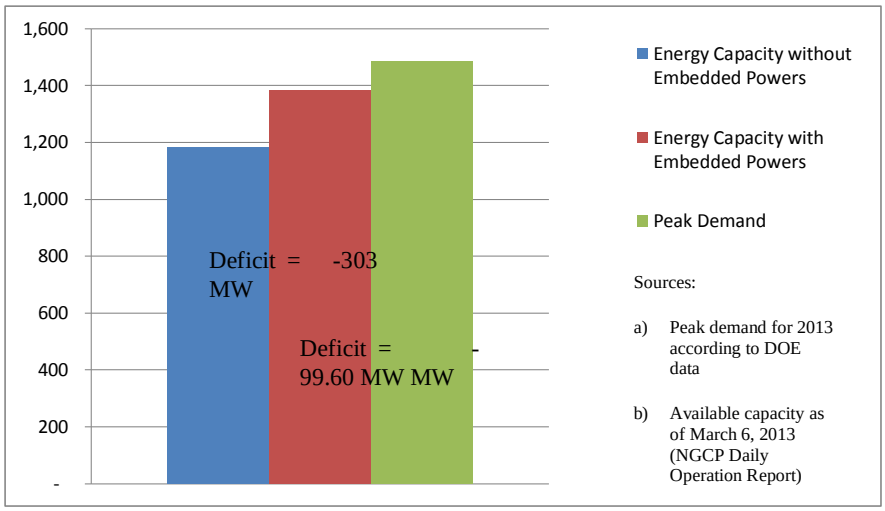
Historical Demand for Electricity

The demand for electricity in the Mindanao Grid posted an Annual Average Compounded Growth Rate (AACGR) of 3.51 percent for 2002-2011. After a high AACGR of 5.91 percent from 2001 to 2004, demand growth was sluggish from 2005 to 2010 at 1.61 percent due to the overall reduced power requirements from large non-utility customers. From 2004 onwards, the historical growth in the Mindanao Grid was volatile with alternating periods of increase and decline. These demand dips can be attributed to the global financial crisis and El Niño phenomenon experienced in 2008 and 2010.

According to DOE, the average available capacity of the Mindanao Grid in 2012 was 1,140 megawatts while the maximum peak demand recorded in the same year was 1,257 megawatts, thus, incurring a power supply deficit of about 93 megawatts. This deficiency in the grid forced the implementation of power curtailment among distribution utilities (DUs) which caused brown outs in areas where the DUs do not have embedded powers.

The Demand-Supply Outlook for 2013 shows that the Mindanao Grid would suffer an energy supply deficit of about -303 megawatts if the energy capacity would remain at 1,181 megawatts without embedded generators and a deficit of about -99.60 megawatts if with embedded powers.

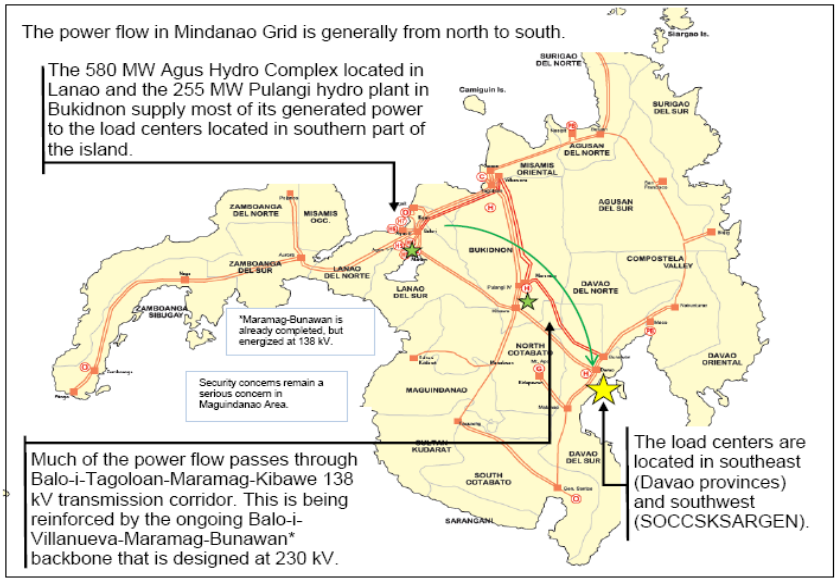
FIGURE 13. DEMAND –SUPPLY OUTLOOK FOR 2013, MINDANAO GRID



Power Transmission

The power requirement of the region is supplied through the Mindanao Power grid and is distributed mostly by electric cooperatives (ECs).

FIGURE 14. TRANSMISSION FLOW FROM SOURCES TO LOAD CENTERS, MINDANAO



Source: Transmission Development Plan 2012, NGCP

The NGCP is currently implementing the Mindanao Backbone Transmission Development Program (MBTP) in Mindanao with a total cost of PHP9.483 Billion and with three component projects, namely: Abaga-Kirahon 230 kv TL, Kirahon- Maramag 230 kv TL and Maramag-Bunawan 230 kv TL.

Abaga-Kirahon and Kirahon- Maramag projects are on-going while the Maramag-Bunawan Project was completed in 2011. These projects strengthen the existing transmission system and ensure the stability, efficiency and reliability of power transmission in the entire Mindanao Grid. Specifically, the MBTP works to: a) lower transmission losses in the entire Mindanao Grid by decreasing network impedance; b) provide security to the transmission of power generated in Region X to the load centers in southern and southeastern Mindanao areas; and c) decongest transmission bottleneck in the Mindanao Grid during maximum hydro generation at Agus HEP plants.

FIGURE 15. MBTP TRANSMISSION LINE

The TS Sendong Post Disaster Needs Assessment (PDNA) revealed that some existing transmission lines traversing Iligan – Misamis Oriental – Bukidnon were adversely affected and thus, contributed to power blackout during the height of the storm and immediately after. The assessment results underscore the need to climate-proof the power facilities.

MAP 34. POWER PLANTS AND TRANSMISSION LINES 2013, REGION X

Energy Sales

Energy sales in Region X increased at an average of 34.31 percent annually over the past five years from 2008 to 2012. Camiguin had the highest growth rate at about 37 percent. Misamis Oriental which had the lowest growth at 33.45 percent shared the biggest (55%) in terms of energy sales among provinces over five years. This explains the role of the province as the manufacturing and trade and service center of Region X.

Electrification

Region X achieved universal barangay electrification since December 2010. Household connections reached about 87 percent (634,836 households) of the total 742,374 potential households as of December 2012. Households energized has an annual average growth rate of -4.14 percent from 2007 to 2012. Plan target is universal household coverage by 2016.

There are ten electric cooperatives/power companies that are distributing power and serving the needs of customers in the region, namely:

- BUSECO – Bukidnon Second Electric Cooperative
- CAMELCO – Camiguin Electric Cooperative
- CEPALCO - Cagayan Electric Power & Light Co., Inc.
- FIBECO – First Bukidnon Electric Cooperative
- LANECO – Lanao Norte Electric Cooperative
- ILPI – Iligan Light and Power Light Co., Inc.
- MOELCI I – Misamis Occidental I Electric Cooperative, Inc.
- MOELCI II – Misamis Occidental II Electric Cooperative, Inc.
- MORESCO I – Misamis Oriental I Electric Cooperative, Inc.
- MORESCO II - Misamis Oriental II Electric Cooperative, Inc.

LANECO posted the lowest household coverage among utilities in the region with only 78.27 percent of its potential households while only CEPALCO attained 100 percent coverage of household electrification.

Sitio electrification in Region X stood at around 67.58 percent or about 5,711 out of the total 8,451 *sitios* regionwide. Although universal barangay electrification has been achieved, the greater challenge is to expand the energization to all sitios in Region X.

Challenges and Constraints

a) Deficiency in power generation will persist, unless new power plants come into the Mindanao Grid. The Mindanao Grid requires at least 500MW of new capacity by 2016, another 500MW by 2020, and 1,600MW by 2030 at an average 4.7 percent annual growth rate;
b) Vulnerability of the power system especially during long dry season due to its heavy reliance on hydropower plants; and
c) Share of fossil fuels in the energy mix is still rising. Clean, renewable and indigenous power sources have not yet been fully harnessed to minimize environmental costs.

3.6.3.5. Solid Waste Management

Solid waste management has remained as the most visible and silently dangerous environmental problem. Streets and open spaces are lined with garbage, and drainage systems are clogged with trash. The indiscriminate throwing of garbage contaminates water; ~~cloggs~~clogs the drainage, and habitat for insect breeding as carriers of diseases. It contributes to flooding which is a common site in urban areas during rainy season.

As provided for in Section 16 of the RA 9003 Philippine Ecological Solid Waste Management Act of 2000, all LGUs shall prepare their 10-year Solid Waste Management Plan (SWMP). As of May 2013, based on the monitoring by the Environmental Management Bureau –X, 40 (7 cities and 33 municipalities) out of the 93 LGUs in the region, formulated their respective 10-year SWMP and 26 municipalities passed environmental ordinances incorporating solid waste management concerns.

The National Solid Waste Management Framework Plan is anchored on the basic principle of waste management that is, 3 Rs (reduce, reuse and recycle). While individual or personal commitment is inculcated, the Local Government Units (LGUs) are mandated to provide for a comprehensive waste management program to include, but not limited to the provision of efficient collection system, waste recovery, and the establishment of appropriate and environment-friendly disposal facilities.

As of 2012, the waste management facilities that are being operated by the LGUs in the region include the disposal facility, materials recovery (MRF), and composting facility.

Challenges and Constraints

a) Solid Waste Management programs are not properly or strictly enforced due to lack of political will of LCEs, the non-functionality of the local Solid Waste Management Board, and the lack of participation from the barangays;
b) Inadequate capacity of LGUs to prepare SWM plans and inability to meet requirements that prevented them to access financial assistance from national government and ODA;
c) Some LGUs do not have available areas for the establishment of sanitary landfill because those which were identified are considered "exclusion areas" or unbuildable for landfill purposes;
d) About 58 LGUs do not have approved and implementable 10-year SWM Plan (lack of short and long term solutions to properly address problems on SWM);
e) Slow progress in the implementation of the Ecological Solid Waste Management Act;
f) Lack of massive advocacy on the implementation of 3Rs (reduce, reuse, recycle) at the household and barangay levels; and
g) Regional Ecology Center is not fully utilized to assist LGUs in the SWM related activities.

~~g)~~

3.6.4. Poverty Situation

3.6.4.1. High Poverty Incidence

Despite the high economic growth rate experienced by Region X in the period 2003 – 2009, poverty in the region has remained high, and has even increased, albeit very slightly. The official poverty data shows that the region's poverty incidence (PI) among families has stayed at over 32 percent in all three survey years 2003, 2006, and 2009, one of the highest among all regions in the country. Among the six Mindanao regions, Region X ranks third in terms of PI among families, next to ARMM and Caraga.

The number of poor families has likewise been increasing, by almost 18,000 in between the survey years, or almost 6,000 families per year. The share of the region's poor families to the country has remained at around seven percent.

Across Region X provinces, Lanao del Norte, Misamis Occidental, and Camiguin had the highest PI among families, averaging over 36 percent over the period 2003-2009. In 2009, Lanao del Norte registered 39 percent PI, the region's highest since 2003.

Small area poverty estimates done by NSCB for years 2003 and 2009 show that the nine (9) cities of the region had, on average, a poverty incidence among population of 36 percent over the 6-year period.

The overall rates of decrease, however, were not sufficient to prevent a net increase of the number of poor population (+41,262). Only four cities managed to bring down the number of poor population led by Ozamiz (-58% or 24,859 lifted out of poverty). In contrast, Cagayan de Oro, the region's capital, added +55,408 to its poor population.

Most of the poor in the region live in urban slums on makeshift housing, and along the rivers or low-lying plains, thus exposing them to social and environmental risks. This is a telling signpost to where planners and decision-makers should focus their efforts in providing social protection services.

3.6.4.2. Progress in Attaining the Millennium Development Goals

Based on the probability of attaining the targets, the region will highly likely achieve the targets along reducing malnutrition among children, reducing infant and child mortality, reducing the incidence of malaria, and making available the benefits of communications. Meanwhile, there is moderate likelihood of achieving universal access to primary education, eliminating gender disparity in secondary education, and sustainable access to safe water and sanitary toilets.

The region will have difficulty in reducing the proportion of poor population, eliminating gender equality in primary education, and providing universal access to reproductive health. With only about three years before the 2015 MDG deadline, doubling of efforts of all stakeholders and duty bearers is an imperative. Getting as close as possible to the targets, if not surpass them, is crucial in realizing a more inclusive development where it benefits everyone.

Chapter 4

THE REGIONAL PHYSICAL FRAMEWORK PLAN

4.1. DEVELOPMENT CHALLENGES

4.1.1. Poverty

The region has shown solid economic growth over the past 10 years, but this growth regime has not translated into an inclusive growth - one that reduces poverty across the board. Poverty persists with one-third of families still considered poor amid a decade-long growth.

There is disparity in the poverty situation across provinces, with poverty incidence among families in 2009 ranging from a low 26.3 percent (Misamis Oriental) to a high of 39.6 percent (Lanao del Norte). Disparity is even more pronounced among cities/municipalities with poverty incidence among families ranging between 22.8-48.7 percent.

Based on the 2009 Poverty Statistics for Basic Sectors, farmers and fishermen remained the poorest sector in the region. On the contrary, urban residents posted the lowest poverty incidence among the sectors in the region. This may imply that the economic growth in the region have marginally benefited the rural sector.

~~In urban areas, poverty is evident in blighted areas. Most of the poor therein reportedly live in slums on makeshift housing, and along the rivers or low-lying plains, thus exposing them to social and environmental risks.~~

4.1.2. Increasing population and limited land resources

With population increasing at 2.06 percent, this relates unfavorably to limited land resources if settlements are not managed. Population density was observed to have increased by half over two decades to 213 persons per square kilometer. Given growth trends, population is also expected to double in 2044, four years past the plan period. Such growth is likely to require more areas for settlement, and public resources for housing.

The problem of rapid population is further aggravated by the uneven distribution of population. For instance, the 2010 population density of Cagayan de Oro City is almost 7 times higher than the regional average and nearly 5 times higher than the national average. On the other hand, upland municipalities such as in Bukidnon have significantly lower-than-region averages. The imbalance has greatly strained the existing physical infrastructure of overpopulated areas while the sparse population obtaining in other areas cannot fully justify the provision of needed facilities.

Simultaneous with the population increase is the rising demand for land to be devoted for urban services and facilities such as transportation networks, industrial sites, housing facilities and others. There is also a need to reassess the suitability of areas for settlements given the pressure of hazards and climate change.

4.1.3. Land use conflicts

Rapid increase in population and its movement to urban areas have unduly increased pressure for providing urban services. Due to proximity and accessibility to existing urban and growth areas, many productive agricultural lands have been converted to non-agricultural uses. Environmentally critical and hazard prone areas, inside and in the periphery of urban areas, have likewise become alternative sites for economic activities as well as for residential uses. Some forestlands have been encroached for economic activities such as agriculture. Deforestation of these areas paves the way to conversion to agriculture or other non-forest uses.

4.1.4. Threatened environmental integrity

There is no denying the importance of protecting the environment as it provides ecosystem services such as provision of safe water, food, shelter, livelihood, and flood mitigation. Unfortunately, local ecosystems, especially the region's watersheds, are under severe pressure due to economic and human activities, and changing climate patterns. Recent disaster episodes such as TS Sendong revealed how land cover change from ridges to reef can lead to tragic consequences.

4.1.4.1. Upland/forest ecosystem

Illegal economic activities (such as illegal logging) and illegal settlements in upland/forest ecosystem continue to threaten ecological integrity. Deforestation is usually a consequence of human intrusion into the region's various national parks and other protected areas. Even the buffer zones of protected areas where economic activities are allowed, have not been spared from resource extraction abuse. In addition, several instances of small-scale mining have been reported in some protected areas and watersheds.

4.1.4.2. Lowland/agricultural ecosystem

The lowland/agriculture ecosystem has been affected by inadequate or conflicting policy implementation. For instance, efforts to increase agricultural production to achieve food security require intensive use of fertilizers, pesticides, fungicides, or herbicides which are feared to bio-accumulate and undermine land integrity. Also, both legal and illegal land conversion from agricultural to non-agricultural uses has resulted in decreases in areas devoted to agriculture, thereby threatening food security. Meanwhile, severe soil erosion has largely affected the productive capacities of agricultural lands.

4.1.4.3. Freshwater ecosystem

The region's freshwater ecosystem is threatened by pollution as agricultural runoff, domestic waste, and industrial effluent are continuously emptied into the region's river systems. The unregulated discharges of wastewater by industries also contribute to degradation of water quality (euthrophication) of rivers, which heavily constrains the biological processes in this ecosystem. Increasing population and industrialization contribute to depletion of water supply itself.

Meanwhile, the discharge of untreated and incompletely treated domestic wastewater, industrial effluents, and agricultural runoffs into the region's marine water bodies threaten the region's coastal/marine ecosystem. This practice not only degrades habitats (e.g., mangroves), which leads to loss of marine species variety and reduced fish production, but also jeopardizes human health.

4.1.4.5. Urban ecosystem

The urban ecosystem is similarly challenged by population growth due to natural increase, as well as migration from rural areas to urban centers. This results in informal settlements and increased solid waste generation, among other as major urban environmental problems.

4.1.5. Inadequate infrastructure and utilities support facilities

The perceived inadequate inflow of financial capital which has retarded the growth of other potential sub-regional areas and growth centers is traced to the reluctance of investors to go into areas where intra/inter-regional transport, telecommunications, water and power services are inadequate and ~~ineffecient~~inefficient.

TS Sendong exposed into plain view the vulnerability of the region's infrastructure to disasters. Most glaring is the major gap in flood control and drainage system in the urban centers. There is need for a comprehensive assessment of the region's vulnerabilities to disasters and in constructing appropriate disaster-resilient infrastructures.

4.1.6. Disaster and climate change risks

Disasters certainly have serious implications to the region's ecosystems and sectors, most especially to those which have high exposure and sensitivity. Climate change is closely associated with disaster risks as the latter aggravates the number and scale of disasters.

Prolonged drought episodes, will severely affect the agriculture sector and the people who depend on it. Large decreases in rainfall will also adversely affect the watersheds which provide irrigation to farms, and water to the region's hydropower facilities.

Conversely, more intense tropical storms coupled with sea level rise will cause serious flooding especially in low-lying areas and coastal communities in the region. The poor living in these areas and those who have limited capacity to reduce the impact of disasters will experience strain to their livelihood, access to basic services, as well as, shelter.

4.2. THE REGION'S SPATIAL STRATEGIES

The region shall define its desired spatial structure to cause smart growth in its centers and corridors, efficient production and service delivery systems, sustainable management of resources, and reduction of disaster and climate risks. Land use and physical development will be anchored on the National Spatial Strategy (NSS) three key areas: *concentration, connectivity, and vulnerability reduction*.[1]

As the region pursues its vision as the gateway and the leading industrial core and trade center in southern Philippines, the spatial development of the region looks at the commonality or resources, potentials and concerns in order to effect more focused interventions. Thus, the strategic development areas (SDAs) are identified which will serve as areas of efficiency, innovation and creativity. In view of concentration, the SDAs will develop strategic corridors, and develop a network of urban centers therein.

To enhance connectivity, the region shall improve access and efficiency of services via improved linkages within each and among SDAs, and the settlements and key production/economic areas. It also reduces vulnerability by developing and increasing strategic redundant transportation and communication routes in the region.

Along vulnerability reduction, the region shall protect its key production areas and settlements from environmentally-contrained areas. This reduces conflicts in land uses, and provide resiliency of the region's resources, and the population which depends on it.[2]

The consequences on lives and property of the major disaster and climate-related events that occurred in Region X signal the imperative to integrate DRR/CCA into this Regional Physical Framework Plan (RPFP). As climate change aggravates the number and scale of disasters, the region's strategies should include reducing the risks caused by extreme future weather events.

With the burgeoning settlement (formal and informal) and commercial establishments in hazard prone areas, particularly those along the major rivers, it is imperative to review land use planning and zoning. Developments along high-risk areas must be strictly prohibited, hence prompting the densification of existing built-up in safe areas to prevent sprawl and preserve agricultural land. Equally as important as the mainstreaming of

[1] Corpuz, Arturo G., National Spatial Strategy: Mindanao Integration, 16 October 2013
[2] Ibid

DRR/CCA into development and physical/land use plans at all levels is the strict enforcement of zoning ordinances, and environmental and related laws at the local level.

For infrastructure development projects and resettlement, geohazard data maps should be considered and building codes adhered. For localities recurrently and/gravely affected by disasters, structures may need to be transferred and informal settlement areas abandoned to make way for forest parks/buffers and infrastructure mitigating measures. The region shall also move to disaster- and climate-proof its key production areas in order to boost both production and productivity.

Integrated watershed management[1] and rehabilitation should be top priority. In terms of management of watersheds/water resources, there is a need to stop the indiscriminate cutting of trees, encroachment of settlements in protected areas, which together cause land cover change in the watersheds.

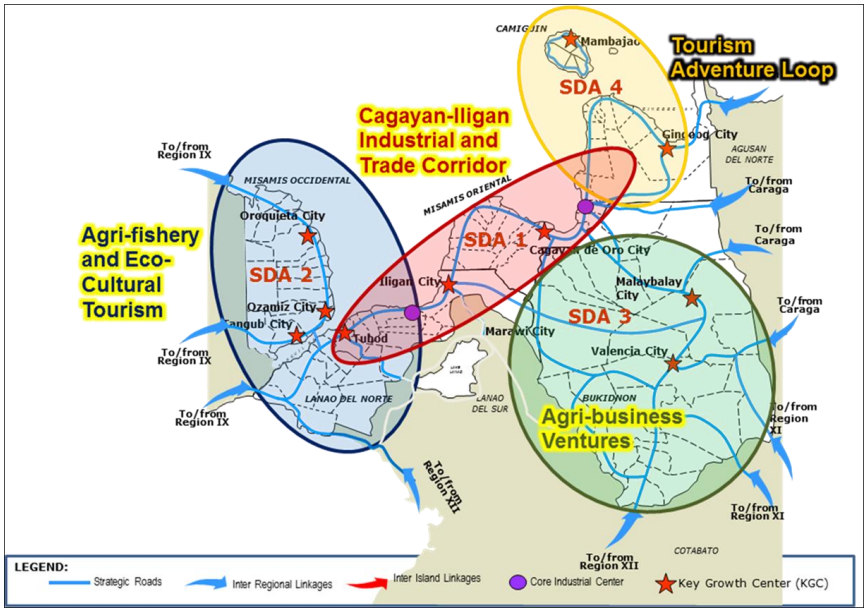
Successful integrated watershed management entails understanding the current state of ridge-to-reef resources and their inter-locking relationships, and even its vulnerability to expected changes to weather patterns. In this context, sustainable land use with the adoption of appropriate land use policies should be undertaken with the integrated objective of reducing risks of natural disasters and climate change, boosting productivity and achieving sustainability~~le development~~.

4.2.1. Strategic Development Areas (SDAs)

The SDAs are identified to guide the desired directions given their functional roles to the region's and country's economy.

[1] An integrated watershed management is a holistic approach to natural resources management which seeks to provide sustainable development. Such an integrated approach has been recommended in the Agenda 21 for all sectors dealing with the development and management of water resources.

MAP 35. REGION X STRATEGIC DEVELOPMENT AREAS

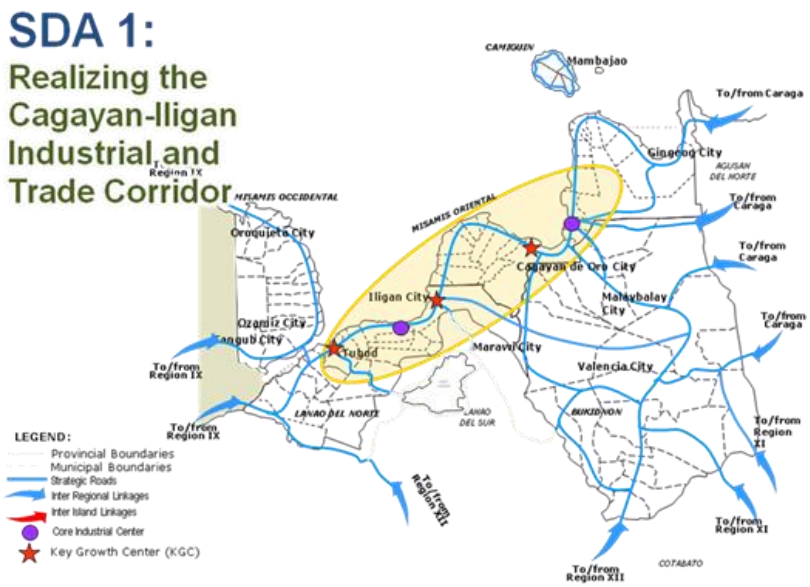


SDA 1: Realizing the Cagayan-Iligan Industrial and Trade Corridor

This cluster includes the western part of Misamis Oriental, eastern part of Lanao del Norte and northern part of Bukidnon (Map 36). This expanded Cagayan-Iligan Corridor, which will be the center of industrial development, stands to fully realize its potentials of becoming a rapidly industrializing area with a large export base. Cagayan de Oro and Iligan, with their existing base of heavy and large industries, serve as twin development poles that will draw more expansions along manufacturing and processing. There are also several emerging growth centers in the corridor to disperse development, as well as link resource-rich rural areas to growth and market centers. This spatial layout creates potential for intra-regional linkages and complementary growth in the whole island of Mindanao.

~~SDA 1 builds on its strategic location as it is situated on the north central coast of~~

MAP 36. STRATEGIC DEVELOPMENT AREA 1



SDA 1 builds on its strategic location as it is situated on the north central coast of Mindanao, with the safest and most direct sea linkages to the growth areas of Visayas and Luzon. The deep shorelines which allows large shipping vessels and with the available and continuing upgrading of shipping facilities and relatively protected and more direct sea lanes/routes, the Corridor offers a competitive edge in commodity transport and trading over other centers in Mindanao. The Mindanao Container Terminal Port in the PHIVIDEC industrial estate is seen to become the south-gate of the Philippines for international trade with the development of agri-business centers and improvement of access or farm-to- market roads linking to the port.

In terms of land transport, the Corridor is directly linked by a relatively good road network to the nearby resource-rich catchment areas of Misamis Oriental, Bukidnon, Lanao del Norte, Lanao del Sur, and the Caraga region. Cagayan de Oro and Iligan are proximate growth centers that have existing base of heavy and large industries, as well as area for expansion of manufacturing and processing. This spatial layout in the Corridor creates potential for intra-regional linkages and complementary growth which are expected to extend to the surrounding areas.

Cagayan de Oro City remains to be the primary growth center in the region with Iligan City as the sub-regional growth center. There are also a number of emerging growth centers in the corridor to disperse development, as well as link resource-rich rural areas to growth and market centers.

Davao, Zamboanga and General Santos are also seen as agri-processing centers but their respective catchment areas are distinct, and thus, they do not compete for the same physical resources. These areas will remain their direct trade links with BIMP-EAGA.

Lanao del Norte and Misamis Occidental

This cluster covers the western part of the region and radiates its influence to Lanao del Norte and Misamis Occidental, capitalizes on the Agri-Fishery and Eco-Cultural Tourism endowments of the two provinces covered (Map 37). Improving physical accessibility and the utilization of productive resources shall be the focus of activities in the next six years to hasten economic growth and eventually make the area self-reliant and productive.

With its rich agriculture, fishery and aquamarine and tourism resources and potentials, this development area is targeted to become self-reliant and productive. An atmosphere promotive of public and private investments should be created to spur economic activities in resource rich yet poverty-stricken communities.

As the SDA is bounded by Panguil Bay, Murciellagos Bay and Iligan Bay, conservation and protection ~~shemes~~schemes should be undertaken to safeguard its marine resources. ~~Menawhile~~Meanwhile, it will capitalize on its rich eco-tourism potentials especially the Malindang Range Natural Park and in the municipalities of Sultan Naga Dimaporo and Baloi, Lanao del Norte.

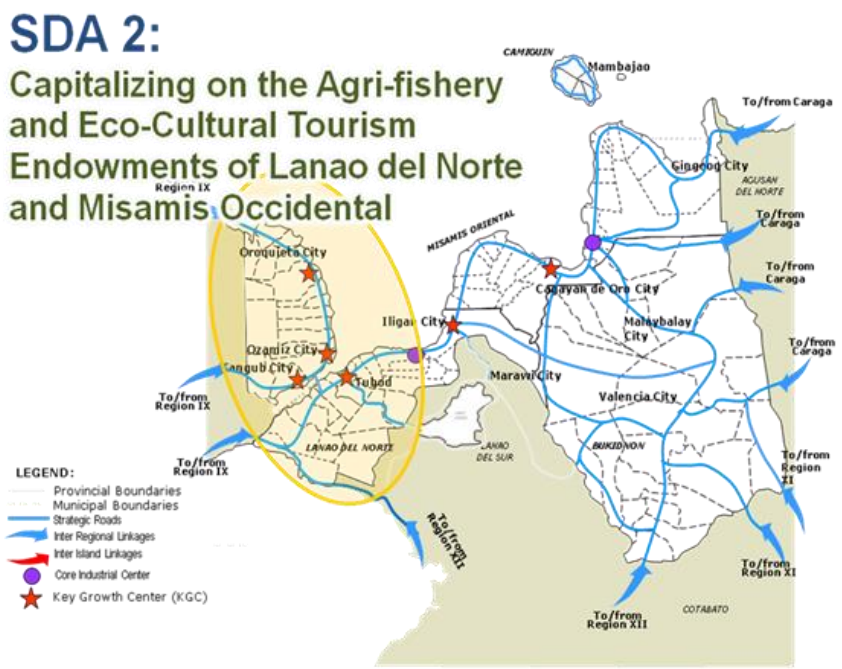
To complement the Metro Iligan Regional Agri-Industrial Center in Linamon, the municipality of Lala, which is located in the heart of Kapatagan Valley, will cater the financial, commercial, research and technology processing, as well as market information services of the SDA and neighboring municipalities.

While the SDA is disrupted with outbreaks of family feud, and land and armed conflicts in some pocket areas in Lanao del Norte, it shall continue to implement the peace initiatives and unification programs. ~~, putting up of s~~Structures/mechanisms for the conflicts and family feuds shall be put in place, ~~provision of~~ basic amenities for conflict barangays provided, and ~~strengthen~~ peace and order councils strengthened. Communities participate in all economic activities

The SDA shall also establish a special growth center that will showcase the cultural diversity in the communities within the Iligan-Lanao del Norte- Lanao del Sur Triangle. The cultural mix among Christians, Muslims and indigenous tribes in these areas shall be turned into a strong foundation for forging the continued development of the SDA and the region as a whole.

Accessibility and presence of established transportation links to Cebu and Manila, provinces of Zamboanga del Norte and Zamboanga del Sur and cities of Dipolog~~,~~, Zamboanga~~,~~, Dumaguete, Iligan~~,~~, and Cagayan de Oro will enhance the economic and development of the SDA. The Panguil Bay Bridge is seen to hasten the agro-forestry, fishery and eco-tourism activities.

MAP 37. STRATEGIC DEVELOPMENT AREA 2



Cluster 3 mainly covers the province of Bukidnon (MAP 38). The central part of Bukidnon shall continue to be the main source of agricultural products and raw materials for the processing plants in the region. ~~While the two cities of Malaybalay and Valencia~~ agri-business shall also be developed especially with the opening of major roads linking the province to Davao and Cotabato.

Having the biggest agricultural area with soils and climate highly suited to agriculture, this SDA shall continue to be the main source of agricultural products and raw materials that will feed the processing plants within the province of Bukidnon and the major processing centers of the region.

The SDA shall pursue improvements of production of food crops, industrial crops, high value crops, poultry, piggery and large livestock. Maximizing the outputs from agriculture will be derived from the efficient utilization of agricultural lands, through the use of appropriate and sustainable technologies and strong agri-business linkages. Value-adding activities will be encouraged through the establishment of processing centers.

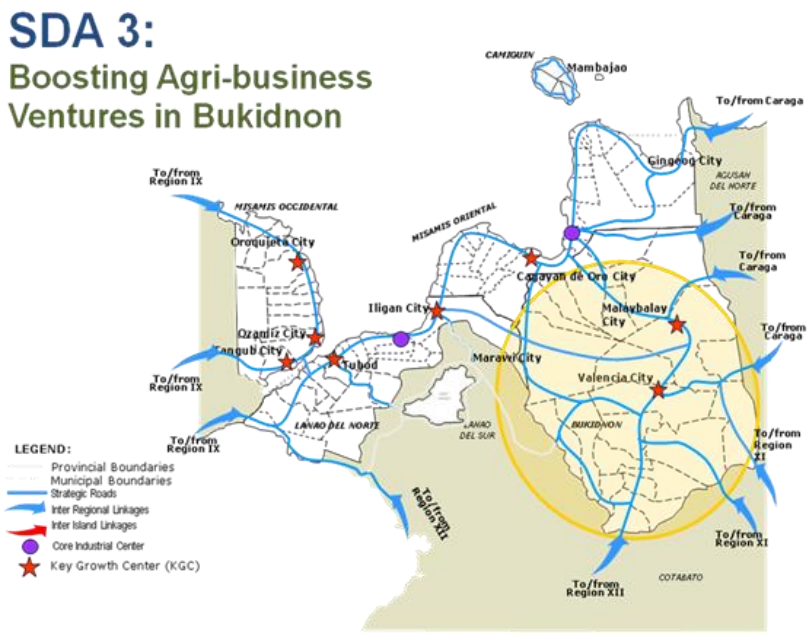
While the two cities of Malaybalay and Valencia are the main growth centers that will drive development of the SDA, the emerging urban center of Maramag is expected to spur development in the southern part of the area.

Aside from these three growth centers, other sub-areas of special strengths will be developed:

- The Temperate Crop Zones around the Mt. Kitanglad Range, which is fast becoming the vegetable bowl of the region and highly suited for high value cash crops and vegetables.
- The Highlands of the Bukidnon-Davao area, which has also a temperate climate, can be developed as a summer capital and retirement and vacation destination.

The expansion and widening of the Bukidnon – Davao, Bukidnon – Cotabato into four lanes will not only hasten the flow of goods and people but also give opportunities for tourism and recreation center development of the area. Another alternate route connecting Davao is the opening of the Valencia-Talaingod-Kapalong Road where the exit is at Tagum, Davao del Norte.

MAP 38. STRATEGIC DEVELOPMENT AREA 3



SDA 4: Harnessing the Gingoog-Camiguin Tourism Adventure Loop

For Camiguin to become a major tourist destination in the country, the framework is to create an integrated adventure-type coastal and/or expanded tourism highway (MAP 39). While working on the improvement of access to tourism sites and facilities, tour packages shall be arranged to connect tourists in Cagayan de Oro passing the tourism sites in Misamis Oriental, such as Mantangale in Balingoan and Duka Bay in Medina to

Camiguin, and then to Bohol and Cebu and vice versa, through the nautical highway. This would complement the development of adventure tourism in Bukidnon and other areas of the region.

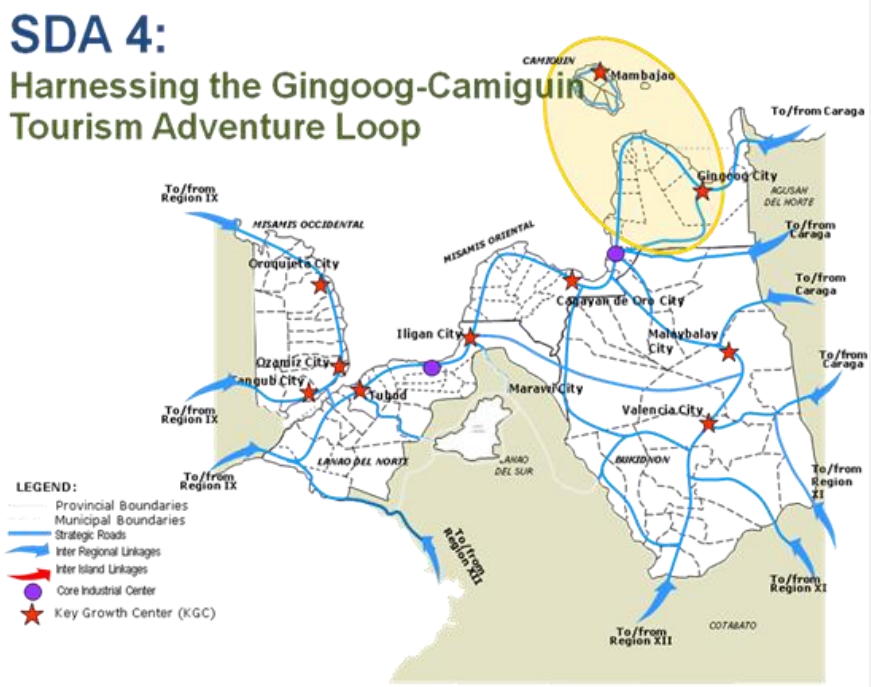
Camiguin is strategically positioned with its link in the Bohol and Cebu islands in the Visayas, thru the RoRo and other sea ports and to the 10 coastal towns in Misamis and onwards to the city of Butuan in Caraga region for an integrated coastal and or expanded tourism-highway in the Visayas and Mindanao regions. Thus, the island of Camiguin is being groomed as a major tourist destination in the country.

The framework is to create a tour package which connects tourists in Cagayan de Oro passing the tourism sites in Misamis Oriental such as Mantangale in Balingoan and Duka Bay in Medina to Camiguin and then to Bohol and Cebu and vice versa. A strategic linkage towards the other major coastal resort destinations in the adjoining Caraga region will also be packaged and promoted.

Emanating from ~~either Cagayan~~Cagayan de Oro, Butuan ~~City~~, Cebu ~~and~~ or Bohol, ~~by done~~ established in each island group through supercat or other ship vessels. ~~, where~~ able to enjoy leisure and recreation trips; ~~and~~ arrays of entertainment, featuring the and other unique characteristics of the island; and ~~and also including~~ health, wellness and services, as well.

Local small scale enterprises supportive of agriculture and fishery resources and potentials will be developed to ensure a steady supply of agri and food products and souvenir items to support the tourism industry. Thus, the raw material base along agriculture and fishery especially aqua marine will be intensified so that the creation of sustainable livelihood projects and enterprises will be sustained.

MAP 39. STRATEGIC DEVELOPMENT AREA 4



4.3. THE REGION'S LAND USE

4.3.1. Settlements Development

Settlements are areas where concentrations of population engage in economic, political, cultural, and other social activities. Meanwhile, Settlements Development focuses on the spatial distribution of shelter, infrastructure and networks, and services. It is also concerned with the interrelationships of settlements as they develop and establish functional linkages based on their respective resource endowments and comparative advantages.

4.3.1.1. Goals and Objectives

Goal: To provide a framework for defining the spatial and physical dimensions of economic and social activities where people can live, learn and work harmoniously in conditions of safety, comfort, productivity, efficiency and good governance.

***Objectives*:**

a) To preserve the natural and cultural characteristics of every settlement that would create a humanely satisfying living environment;
b) To provide and strengthen the social and physical infrastructure and economic base employment opportunities both in urban and rural areas to support a more systematic transition towards achieving the region's vision of becoming an industrial core and trade center;
c) To identify safe settlement sites, renew blighted areas and improve the housing conditions of the poor;
d) To address and manage urbanization to cater the growing population demands;
e) To define an array of goods and services in which people can have access, such as educational, cultural, medical facilities, housing, and other social services, infrastructure/basic utilities, and amenities;
f) To integrate provisions of standard installations of PWDs and other vulnerable groups-friendly infrastructure and amenities in all areas of settlements development;
g) To provide social protection to the vulnerable sectors as the most affected elements at risk in the occurrence of natural and man-made disasters; and
h) To improve governance and participation by strengthening coordination among various levels of government and the private sector, civil society and academe, and improving the administrative, financial and technical capabilities of local government as front liners in the delivery of basic social services.

4.3.1.2. Challenges and Concerns

Apart from the increasing land requirement, the rapid and unprecedented population growth in the region over the years faces a number of settlement challenges and issues that need appropriate interventions. These include: 1) population changes and settlement issues; 2) housing needs and informal settlements; 3) environmental issues confronting settlements, and 4) settlements located in hazard-prone areas. These challenges/issues if not properly addressed will contribute to the region's unabated poverty incidence and degradation of the environment.

Population Changes and Settlement Issues

The changing and increasing population trend, will likely result to the sprawling of settlements especially in critical and protected areas, like the forestlands, agricultural lands, and coastal areas which would eventually deplete the region's physical resources. Likewise, high vulnerability of people to displacement and consequent disruption of socio-economic activities is experienced as concentration of population in highly urbanized areas increases. For hard to reach and far-flung areas down to the coastal areas, there is a wide service access divide, hence poverty is still prevalent. Meanwhile, land conversion of agricultural lands to non-agricultural uses (aside the shift from food to cash crop production) may threaten the food security of the region.

In addressing these issues, there is a need to protect and conserve the limited physical resources of the region brought about by the burgeoning population, and sprawling of settlements. As such, there is a need to improve access to basic services, utilities and amenities to prevent encroachment of settlement in critical or protected areas, and to provide assistance and economic opportunities to rural and poor population.

Humankind is innately an urban species. People are drawn to urban areas for its wealth opportunities and networks. This is supported by data showing the percentage of people in the Philippines living in urban areas which almost doubled from 27.1 percent in 1950 to 48.6 percent in 2010. If existing conditions prevail, this may rise to 65.6 percent by 2050 (World Urbanization Prospects: The 2011 Revision, CD-ROM Edition, 2012). In Northern Mindanao, the AAGR of its urban population increased from 1.99 percent from 1990 to 2000 to 2.13 percent (2000-2010) as opposed to the growth trend of its rural population which decreased from 2.32 percent (1990-2000) to 2.01 percent (2000-2010).

TABLE 5. URBAN POPULATION, TEMPO OF URBANIZATION, REGION X, 200-2010

YEAR	PROPORTION OF URBAN POPULATION (%)	ANNUAL AVERAGE GROWTH RATE OF URBAN POPULATION (%)	TEMPO OF URBANIZATION (%)
2000	37.55	1.99	-0.33
2010	37.81	2.13	0.12

Source: NSO 2010 Census of Population

The trends along urban development imply that the well-being of Filipinos depends on the performance and efficiency of urban areas . With the 2015 MDG target to attain the improvement of the lives of slum dwellers, the need to fast track the establishment of safe and sustainable communities is imperative, putting emphasis on reducing the distance between people and economic opportunities.

As of 2012, it is estimated that families living in blighted areas constituted about 8.5 percent of the total families in Northern Mindanao. Blighted land area is about 2.6 percent of the total Alienable and Disposable (A&D) lands in the region.

The exposure to current and future climate and disaster risk of the the families in the region living in blighted areas necessitates their relocation to safer areas. The city of Cagayan de Oro posted the highest magnitude of families living in blighted areas. Due to its long coastline where majority of settlements are located, Cagayan de Oro, and the country at large, may face threats to sea level rise in a changing climate[1]. PAGASA projections along extreme and more frequent storms entail higher risk for communities in low lying and coastal areas particularly those living in salvaged/improvised materials.

The impact of natural disasters on housing and economic development is serious and even impedes consequent delivery of social services. Regular development programs will be in a constant state of flux as government resources are redirected towards emergency housing and construction for disaster rehabilitation. In a span of eight years (from 2005 to 2012), a total of 15,848 houses in Northern Mindanao were partially and totally damaged due to natural disasters. Among all disaster events, bulk of the damage was due to flood and storm surge at 51.7 percent of the total number of damaged houses. Meanwhile, of the total damage cost in the same period, 18.29 percent was in the housing sector[2]. This is apart from the 39,584[3] damaged houses as a result of the onslaught of TS Sendong in December 2011, costing PHP2.96 billion. In addition to the physical loss of housing, the indirect impacts of said disaster are countless affected and homeless

[1] Climate Change in the Philippines. PAGASA: February 2011
[2] For comparison purposes only; no data on cost of housing damage in the region.
[3] Tropical Storm Sendong Post Disaster Needs Assessment Report, June 2012

households unable to work; its long-term effects include investors that may have shied away from the locality leading to an impaled economy.

With the need to counter the adverse effects of climate change and increasing urbanization (particularly in and around Misamis Oriental with the operationalization of the Laguindingan Airport and its allied projects), the estimated housing need may rise in the succeeding years. In addition, the increasing prices of construction materials and land necessitate the integration of livelihood component in vertical housing projects for low income families.

Environment Issues Confronting Settlements

The increasing population contributes to the proliferation of settlement in hazard prone-areas. This resulted to continuing degradation of ecosystems, either in uplands, prime agricultural lands, watersheds, and even coastal resources. Thus, the physical resources are exploited, and mismanaged which eventually expose communities to different kinds of hazards.

Nestled in the heart of the Mt. Malindang Range Natural Park, the 17,184 and growing population in the municipalities of Conception and Don Victoriano Chiongban in Misamis Occidental is a potential stressor to the ASEAN Heritage Park. This protected area is the watershed of the provinces of Misamis Occidental, Zamboanga del Sur and Zamboanga del Norte.

The devastations brought about by TS Sendong, as well as TS Pablo are manifestations that the condition of environment in the region is deteriorating. Logging and mining (both legal and illegal), encroachment of illegal settlers in protected areas and ~~depletion waterbasins~~water basins in various parts of the region are among ~~of~~ the major issues adversely affecting the environment.

Moreover, the ecological impact especially on the watershed areas shared by Bukidnon, Lanao del Norte, and Cagayan de Oro are already evident with the erosion of farm lands and flooding in lowland areas.

Other practices detrimental to the environment are unsustainable farming and consequent adverse effects (e.g. siltation of waterways, denudation, and soil erosion, and soil degradation), and illegal fishing which resulted to devastations of mangrove and other freshwater habitats found in the region.

Settlements Located in Hazards-prone Areas

The region is prone to both hydrometeorologic and geologic hazards that potentially cause deaths, injuries and damage to property.[1] It is not also free from climate-related ~~hazards which~~hazards, which are seen to aggravate the deteriorating condition of the

Specifically, the region is prone to the following hydrometeorologic hazards namely: flood, rain-induced landslide, and storm surge. Among the provinces, only Bukidnon is not prone to storm surge as it is landlocked, and has high elevation. As to geologic

[1]Regional Disaster Risk Assessment Report, 2012.

hazards which result from geologic processes acting on or beneath the earth, areas in the region have varying levels of susceptibility.

The cities/municipalities located in hazard–prone areas were identified based on the Regional Disaster Risk Assessment (RDRA 2012).

4.3.1.3. Settlements Hierarchy Scenario

As the region's population in 2010 is estimated to double by 2044~~3~~, it is expected that the urbanization rate and pattern will be even faster compared in the past decades. With the increased integration of settlements, both in urban and rural settings attributed by an improved transportation and road networks, sophisticated technology and access to worldwide communication, cultural and industry linkages, and with the growing services sector and demands shall consequently bring about more concentration of population during the plan period.

TABLE 6. ESTIMATED POPULATION PROJECTIONS, BY PROVINCE/CITY, REGION X, 2020, 2030, AND ~~&~~2040

Province/City	Alienable & Disposable Land Area (Sq. Km.)	Pop 2010	Est Pop 2020	Est Pop 2030	Est Pop 2040	2040 Pop Density per A&D ~~Sq.Km.~~Sq. km.
Region X	**9,352.97**	**4,297,323**	**5,146,057**	**6,162,418**	**7,523,884**	**789.00**
Total Provinces	**6,445.69**	**2,614,653**	**3,089,136**	**3,649,725**	**4,385,382**	**667.94**
Bukidnon	3,031.82	964,551	1,197,359	1,486,358	1,844,887	608.58
Camiguin	237.23	83,807	94,617	106,821	120,600	508.37
Lanao del Norte	1,545.27	607,917	644,894	684,121	718,734	469.65
Misamis Occidental	705.88	307,278	361,027	424,178	497,558	706.03
Misamis Oriental	935.50	651,100	804,092	993,034	1,203,603	1,310.93
Total Cities	**2,897.28**	**1,682,670**	**2,058,404**	**2,518,039**	**3,138,502**	**1,063.17**
Cagayan de Oro	172.07	602,088	784,863	1,023,122	1,333,708	7,750.84
El Salvador	87.13	44,848	58,047	75,132	97,244	1,116.08
Gingoog	1,175.01	117,908	135,792	156,390	180,111	153.28
Iligan	332.10	322,821	365,583	414,009	468,850	1,411.77
Malaybalay	397.14	153,085	189,493	234,561	290,346	731.09
Oroquieta	101.12	68,945	79,431	91,513	105,432	1,042.64
Ozamiz	153.42	131,527	156,669	186,616	222,288	1,448.89
Tangub	104.92	59,892	72,181	86,992	104,842	999.28
Valencia	347.37	181,556	222,835	273,498	335,681	896.66

Source of A&D: Planning and Management Division, DENR-10; Population Projection/Density computed by NEDA-X

Hierarchy of Functions and Services

Understanding the present hierarchy allows the region to plan for the future. Thus, the identification of settlements and facilities for constructing a functional matrix (scalogram) is used to categorize settlements into levels of functional complexity, and determine the types and diversity of services and facilities. This way, the scalogram shows the degree of access that people have to services and facilities and eventually assists the region in arriving at appropriate investments for settlements on a hierarchical basis.

This hierarchy of functions and services is derived from centrality index (CI) of which a total of 23 major services and or key facilities were considered. There are at least seven levels of functional hierarchy of settlement used in the scalogram as shown in the table below:

TABLE 7. FUNCTIONAL HIERARCHY OF SETTLEMENTS, REGION X

Level of Hierarchy	Population Level	Level	Centrality Index	Number of Services/Facilities
Regional Center	>600k	1	>100	23
Sub-regional Center	300k-600k	2	80-100	20-22
LargeCities	120k-300k	3	60-80	17-20
Medium-small Cities	50k-120k	4	40-60	14-17
Emerging Growth Centers	35k-50k	5	20-40	11-14
Urbanizing Centers	26k-35k	6	10-20	9-11
Small-medium towns	<26k	7	0-10	0-9

Among the 9~~3~~ cities and 74 municipalities that comprised Region X, Cagayan de Oro City (CDO) emerged as the only dominant center in terms of the availability of all the identified 23 services and facilities. Thus, both in terms of population and facilities/services, Cagayan de Oro serves as the Regional Center. This is reflective of its role as the regional capital, and stands as the major "GATEWAY" and transhipment hub to the rapidly industrializing area, as well as business, trade and other services in Northern Mindanao.

With the operationalization of the Laguindingan Airport and its allied projects (e.g., seaport), the development of Cagayan de Oro and Iligan Corridor Growth Area will be intensive. Cagayan de ~~Oro which~~Oro that is at present a primary urban ~~center,~~center will stand to be the concentration of development and urbanization. This will be further spurred and revitalized by the various industries and intensification of commerce, trade and services and full operationalization of the Mindanao Container Terminal Port (MCTP), and continuing improvement of the transport and communication facilities.

By the end of the plan period, Cagayan de Oro will have over one million population, which will eventually elevate it to a secondary metropolitan center. It will also continue to be the prime educational center in the region with three private universities and one state university. All these universities have Centers of Excellence (COE) and Centers of Development (COD) that will cater the human resource needs of the industry sector, and the economy as well.

Iligan City which presently serves as a sub-regional center, will increase its population to nearly half a million by 2040, and will remain to be highly urbanized and industrialized. Like Cagayan de Oro, it will have easy access to the Laguindingan Airport and its allied projects that will also facilitate the inflow and outflow of resources and services in the city. With its key role in SDA 1, it will complement in the development of the Cagayan-Iligan Industrial and Trade Corridor. With its large industrial-resource base located in the city and its immediate periphery, it will also continue to serve as the secondary growth center throughout the plan period.

The several locational advantages including the presence of rich power source and availability of cheap power, and adequate harbour serve as the impetus of Iligan as host to a number of heavy industrial plants. Meanwhile, the presence of a state university will also provide more opportunities to the influx of students in and from outside the region.

In terms of population, Ozamiz City falls under the hierarchy of Large Cities, yet it also functions that of a sub-regional center having a broad spectrum of facilities and services. Thus, it will serve as one of the sub-regional centers in the region at the end of the plan

period due to the presence of its national airport and seaport, serving as strong entry point to and from the Visayas and Luzon. It likewise maintains its role as the commercial and trade center with the large number of goods, facilities, and services.

The cities of Malaybalay and Valencia with mostly a number of facilities and services ranging from 17-20 serve as Large Cities. Malaybalay City (the capital of the Province of Bukidnon) serves as a main growth center that drives development of boosting the agri-business ventures and eco-tourism in Bukidnon (SDA3). Valencia City, on one hand is another large city taking its role as the agri-business and trade center of the province.

Among the Medium-Small cities are El Salvador[1] Gingoog, Oroquieta, and Tangub. In terms of population and the number of facilities/services available, Gingoog is seen to contribute and perform its role as a key tourist destination, and as an important part of the Gingoog-Camiguin Adventure Loop (SDA 4). As its population continues to increase, as well as the number of facilities/services, it will become a large city between 2030 and 2040.

Moreover, the cities of Tangub, and Oroquieta (the capital of Misamis Occidental), will continue to complement Ozamiz City to facilitate movement of goods and services within and outside the province. These areas and immediate periphery, given their rich agri-fishery resource base, and broadening promotion of eco-cultural tourism will further contribute to the "Agri-fishery and Eco-Cultural Tourism" (SDA 2) development on this part of the region. While El Salvador City, given its strategic location which is close to the Laguindingan Airport, will likewise complement in the economic activities of the Cagayan de Oro-Iligan Corridor Growth Area (SDA1) during the plan period.

Meanwhile, in terms of population, the Municipality of Mambajao serves as a key emerging growth center. It is even covered under the Level 3 in the hierarchy having a total of 19 facilities/services available. With its airport and seaport, it is a key entry point to Camiguin which serves as a major tourist destination in the country.

Moreover, other emerging growth centers, but still under the Level 3 hierarchy in terms of facilities/services ranging from 17-20 are the municipalities of Quezon and Maramag (Bukidnon), Tagoloan (Misamis Oriental), and Tubod (Lanao del Norte). Notably, the municipality of Jimenez (Misamis Occidental) has a total of 17 facilities/services, but has a population of 25,234. Opol has population over 50,000, yet with around 13 facilities/services, may now be among the emerging growth centers considering its role in the CIC. Thus, both Tagoloan and Opol are important growth centers complementing the realization of SDA1.

Maramag and Quezon are emerging growth centers and are seen to further spur development in the southern part of Bukidnon. Apart from these, Tagoloan serves to fully support the expanded CIC to further realize its potentials of a rapidly industrializing area with the presence of the large export base facilities. Likewise, Tubod, Lanao del Norte plays a critical role in the realization of the expanded CIC to widely disperse development, and to serve as a link to resource-rich areas to growth and market centers within the province.

[1] Newly created city per Republic Act 9435 (Source: www.nscb.gov.ph)

Laguindingan could now be considered as an emerging growth center (with 14 facilities/services available), because of the rapid development in the area. It has a higher centrality index (CI) of 54.49 which considerably falls under Level 4 hierarchy. This can be attributed to the presence of the newly operational airport which is attracting several economic activities.

Other emerging growth centers with facilities/services ranging from 14-17 and with population ranging from 50,000 to 120,000 are the municipalities of Manolo Fortich (Bukidnon), Balingasag, and Jasaan, (Misamis Oriental), and Lala, and Kapatagan, (Lanao del Norte). Although Don Carlos, Lantapan and, Talakag (Bukidnon) and Sultan Naga Dimaporo (LDN) have facilities/services between 11-14 or less, these are however having population more than 50,000, hence may serve as emerging growth centers. All these growth centers will complement the current services and trading functions of its large cities and other adjacent or immediate areas.

Among the urbanizing centers with facilities/services ranging from 11-14 and population not over 50,000 are the municipalities of Baungon, Damulog, Kalilangan, Kitaotao, and Sumilao (Bukidnon), Aloran, Clarin, and Plaridel (Misamis Occidental), and Alubijid, Manticao, Medina, Salay, and Villanueva, (Misamis Oriental). Except for the Municipality of Initao with population lower than 30,000 yet, with about 14 facilities/services, may still be considered as an urbanizing center. This municipality may eventually emerge as a growth center by the end of the plan period considering its increasing population and number of facilities/services and its role in the development of the CIC.

Still with facilities/services ranging from 11-14, Dangcagan, and Malitbog (Bukidnon), Bacolod and Linamon (Lanao del Norte), Calamba (Misamis Occidental) and Balingoan and Sugbongcogon (Misamis Oriental) are a few exceptions from among to be considered as urbanizing centers due to population lower than 25,000 or even less. Hence, these areas are still classified under small-medium towns together with the rest of the 52 municipalities covered under the hierarchy of Levels 6 or 7 due to slow population growth and economic activities.

Meanwhile, the nine municipalities of Lanao del Norte, namely Munai, Poona Piagapo, Pantao Ragat, Sapad, Pantar, Nunungan, Tangkal, Matungao, and Tagoloan lack facilities and services. These areas are classified as small-medium towns and are usually located in the hinterland and hard to reach part of the province. Apparently, there is a need to focus development interventions in these areas to achieve inclusive growth.

In summary, the region's existing functional hierarchy of settlement in terms of population vis-à-vis number of functions and services are as follows:

- One Regional Center (Cagayan de Oro);
- One Sub-Regional Center (Iligan City);
- Three Large Cities (Ozamiz, Malaybalay, and Valencia);
- Four Medium/Small Cities (El Salvador, Gingoog, Oroquieta, and Tangub);
- 17 Emerging Growth Centers;
- 15 Urbanizing Centers; and
- 52 Small-Medium Towns.

The classification of settlements for 2013, 2020, 2030, and 2040 is shown in Table 9. summary is shown below:

TABLE 8. SUMMARY OF CLASSIFICATION OF SETTLEMENTS, REGION X: 2013, 2020, 2030, AND 2040

Level of Hierarchy	No. of Centers			
	2013	2020	2030	2040
1. Primary Metropolitan Center (Metropolitan A)				
2. Secondary Metropolitan Center (Metropolitan B)				1
3. Primary Urban Center				
3.1 Regional Center	1	1	1	
3.2 Sub-Regional Center	1	1	1	2
4. Secondary Urban Center				
4.1 Large Cities	3	4	4	3
4.2 Medium/Small City	4	3	3	10
5. Emerging Growth Centers	17	19	21	28
6. Urbanizing Centers	15	17	17	21
7. Small-medium towns	52	48	46	28
Total	**93**	**93**	**93**	**93**

TABLE 9. CLASSIFICATION OF SETTLEMENTS IN REGION X: 2013, 2020, 2030, & 2040 (INDICATIVE FUNCTIONAL HIERARCHY OF SETTLEMENTS)

Level of Hierarchy	Current Centers 2013	Centers in 2020	Centers in 2030	Centers in 2040
1. Primary Metropolitan Center (Metropolitan A)				
2. Secondary Metropolitan Center (Metropolitan B)				**Metro Cagayan de Oro**
3. Primary Urban Center				
3.1 Regional Center	**Cagayan de Oro**	**Cagayan de Oro**	**Cagayan de Oro**	
3.2 Sub-Regional Center	Iligan	Iligan	Iligan	Iligan and Ozamiz
4. Secondary Urban Center				
4.2Large Cities	Ozamiz Malaybalay Valencia	Ozamiz Malaybalay Valencia Gingoog	Ozamiz Malaybalay Valencia Gingoog	Malaybalay Valencia Gingoog
4.2 Medium/Small City	El Salvador Oroquieta Gingoog Tangub	El Salvador Oroquieta Tangub	El Salvador Oroquieta Tangub	El Salvador Oroquieta Tangub Balingasag Maramag Quezon Manolo Fortich Lala Opol Tagoloan

Level of Hierarchy	Current Centers 2013	Centers in 2020	Centers in 2030	Centers in 2040
5. Emerging Growth Centers	**Bukidnon** Don Carlos Lantapan Maramag Quezon ManoloFortich Talakag **Camiguin** Mambajao **Lanao del Norte** Lala Kapatagan Sultan Naga Dimaporo Tubod **Misamis Occidental** Jimenez	**Bukidnon** Don Carlos Lantapan Maramag Quezon ManoloFortich Talakag **Camiguin** Mambajao **Lanao del Norte** Lala Kapatagan Sultan Naga Dimaporo Tubod **Misamis Occidental** Clarin Jimenez Plaridel	**Bukidnon** Don Carlos Lantapan Maramag Quezon ManoloFortich Talakag **Camiguin** Mambajao **Lanao del Norte** Lala Kapatagan Sultan Naga Dimaporo Tubod **Misamis Occidental** Aloran Calamba Clarin Jimenez Plaridel	**Bukidnon** Baungon Damulog Don Carlos Impasug-ong Kalilangan Kibawe Kitaotao Lantapan Malitbog Sumilao Talakag **Camiguin** Mambajao **Lanao del Norte** Bacolod Kapatagan Sultan Naga Dimaporo Tubod **Misamis Occidental** Aloran Calamba Clarin Jimenez Plaridel
	Misamis Oriental Balingasag Jasaan Laguindingan Opol Tagoloan	**Misamis Oriental** Balingasag Jasaan Laguindingan Opol Tagoloan	**Misamis Oriental** Balingasag Jasaan Laguindingan Opol Tagoloan	**Misamis Oriental** Alubijid Initao Jasaan Laguindingan Medina Salay Villanueva

Level of Hierarchy	Current Centers 2013	Centers in 2020	Centers in 2030	Centers in 2040
6. Urbanizing Centers	**Bukidnon**	**Bukidnon**	**Bukidnon**	**Bukidnon**
	Baungon Damulog Kalilangan Kitaotao Pangantucan Sumilao	Baungon Damulog Kalilangan Kitaotao Pangantucan Sumilao	Baungon Damulog Kalilangan Kitaotao Pangantucan Sumilao	Dangcagan Kadingilan San Fernando Pangantucan
	Camiguin **none**	**Camiguin** **none**	**Camiguin** **none**	**Camiguin** Catarman
	Lanao del Norte	**Lanao del Norte**	**Lanao del Norte**	**Lanao del Norte**
	none	Bacolod Linamon	Bacolod Linamon Salvador	Kauswagan Kolambugan Linamon Magsaysay Salvador
	Misamis Occidental	**Misamis Occidental**	**Misamis Occidental**	**Misamis Occidental**
	Aloran Clarin Plaridel	Aloran Calamba Lopez Jaena	Bonifacio Lopez Jaena	Baliangao Bonifacio Lopez Jaena SapangDalaga Sinacaban Tudela
	Misamis Oriental	**Misamis Oriental**	**Misamis Oriental**	**Misamis Oriental**
	Alubijid Initao Manticao Medina Salay Villanueva	Alubijid Initao Manticao Medina Salay Villanueva	Alubijid Initao Manticao Medina Salay Villanueva	Lugait Magsaysay Manticao Naawan Talisayan
7. Small-medium towns	**Bukidnon**	**Bukidnon**	**Bukidnon**	**Bukidnon**
	Cabanglasan Dangcagan Impasug-ong Kadingilan Kibawe Libona Malitbog San Fernando	Cabanglasan Dangcagan Impasug-ong Kadingilan Kibawe Libona Malitbog San Fernando	Cabanglasan Dangcagan Impasug-ong Kadingilan Kibawe Libona Malitbog San Fernando	Cabanglasan Libona
	Camiguin	**Camiguin**	**Camiguin**	**Camiguin**
	Catarman Guinsiliban Mahinog Sagay	Catarman Guinsiliban Mahinog Sagay	Catarman Guinsiliban Mahinog Sagay	Guinsiliban Mahinog Sagay
	Lanao del Norte	**Lanao del Norte**	**Lanao del Norte**	**Lanao del Norte**
	Bacolod Baloi	Baloi Baroy	Baloi Baroy	Baloi Baroy

Level of Hierarchy	Current Centers 2013	Centers in 2020	Centers in 2030	Centers in 2040
	Baroy Kauswagan Kolambugan Linamon Magsaysay Maigo Matungao Munai Nunungan PantaoRagat Pantar Poona Piagapo Salvador Sapad Tagoloan Tangkal	Kauswagan Kolambugan Magsaysay Maigo Matungao Munai Nunungan PantaoRagat Pantar Poona Piagapo Salvador Sapad Tagoloan Tangkal	Kauswagan Kolambugan Magsaysay Maigo Matungao Munai Nunungan PantaoRagat Pantar Poona Piagapo Sapad Tagoloan Tangkal	Maigo Matungao Munai Nunungan PantaoRagat Pantar Poona Piagapo Sapad Tagoloan Tangkal
	Misamis Occidental	**Misamis Occidental**	**Misamis Occidental**	**Misamis Occidental**
	Baliangao Bonifacio Calamba Concepcion Don Victoriano Lopez Jaena Panaon SapangDalaga Sinacaban Tudela	Baliangao Bonifacio Concepcion Don Victoriano Panaon SapangDalaga Sinacaban Tudela	Baliangao Concepcion Don Victoriano Panaon SapangDalaga Sinacaban Tudela	Concepcion Don Victoriano Panaon
	Misamis Oriental	**Misamis Oriental**	**Misamis Oriental**	**Misamis Oriental**
	Balingoan Binuangan Claveria Gitagum Kinoguitan Lagonglong Libertad Lugait Magsaysay Naawan Sugbongcogon Talisayan	Balingoan Binuangan Claveria Gitagum Kinoguitan Lagonglong Libertad Lugait Magsaysay Naawan Sugbongcogon Talisayan	Balingoan Binuangan Claveria Gitagum Kinoguitan Lagonglong Libertad Lugait Magsaysay Naawan Sugbongcogon Talisayan	Balingoan Binuangan Claveria Gitagum Kinoguitan Lagonglong Libertad Sugbongcogon

Source: Municipal/Provincial LGUs; Classified by RLUC-X.

MAP 40. HIERARCHY OF SETTLEMENTS, REGION X, 2010

NORTHERN MINDANAO (REGION X)

HIERARCHY OF SETTLEMENT (2010)

Source of Maps:
PDPFPs of 5 Provinces of Reg. X
National Mapping and Resource Information Authority (NAMRIA)
Mines and Geosciences Bureau (MGB)
Philippine Volcanology and Seismology (PHIVOLCS)
Department of Environment and Natural Resources (DENR)
National Economic and Development Authority (NEDA)
National Statistics Office (NSO)

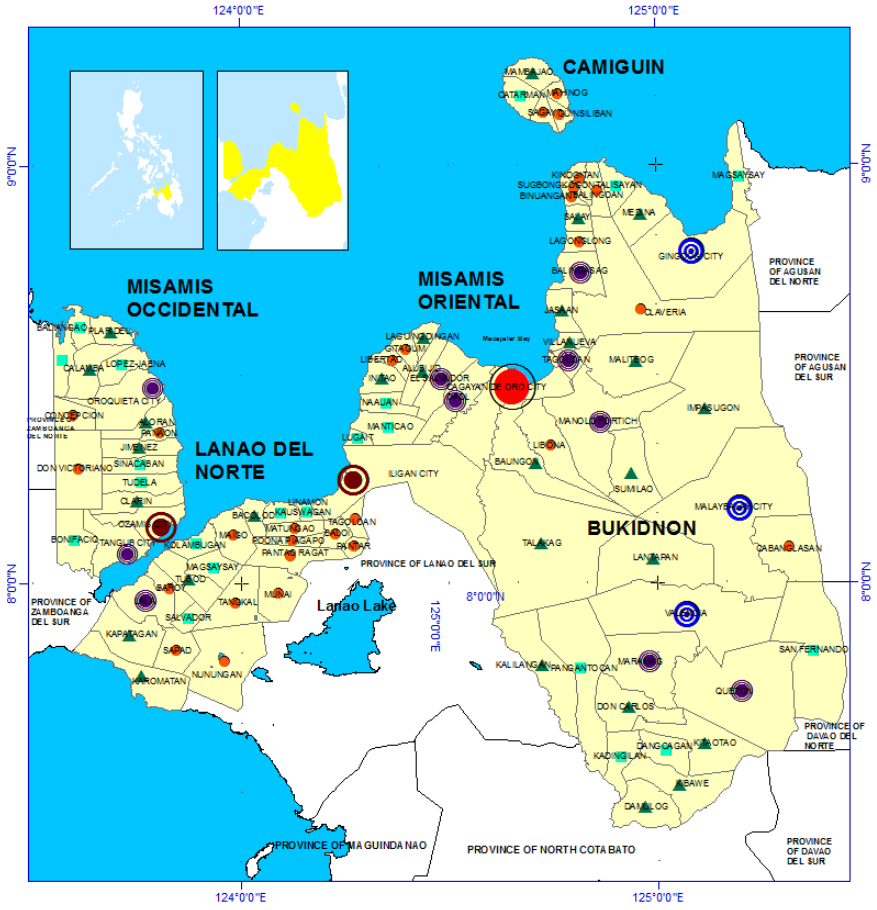
1:1,100,000
Kilometers
0 2.5 5 10 15 20 25 30 35 40 45

SPHEROID..... CLARKE 1866
PROJECTION..... UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM..... MEAN SEA LEVEL
HORIZONTAL DATUM..... LUZON DATUM

LEGEND

- Regional Center
- Sub-Regional Center
- Large Cities
- Medium/Small Cities
- Emerging Growth Centers
- Urbanizing Centers
- Small-Medium Towns

MAP 41. HIERARCHY OF SETTLEMENTS, REGION X, 2040



NORTHERN MINDANAO (REGION X)

INDICATIVE HIERARCHY OF SETTLEMENTS (2040)

LEGEND

- Metropolitan Center
- Sub-Regional Center
- Large Cities
- Medium/Small Cities
- Emerging Growth Centers
- Urbanizing Centers
- Small-Medium Towns

Source of Maps:
PDPFPs of 5 Provinces of Reg. X
National Mapping and Resource Information Authority (NAMRIA)
Mines and Geosciences Bureau (MGB)
Philippine Volcanology and Seismology (PHIVOLCS)
Department of Environment and Natural Resources (DENR)
National Economic and Development Authority (NEDA)
National Statistics Office (NSO)

1:1,100,000
Kilometers
0 2.5 5 10 15 20 25 30 35 40 45

SPHEROID..... CLARKE 1866
PROJECTION..... UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM..... MEAN SEA LEVEL
HORIZONTAL DATUM..... LUZON DATUM

4.3.1.4. Population Size Distribution

The table below shows the distribution of municipalities among the provinces according to population size. The largest municipalities are concentrated in Bukidnon, while the smallest ones are found mostly in Lanao del Norte (13) and Misamis Oriental (12), followed by Misamis Occidental (8), Camiguin (4) and Bukidnon (2).

TABLE 10. DISTRIBUTION OF MUNICIPALITIES, BY SIZE (TOTAL POPULATION), 2010

Provinces	50,000-96,0000	25,000-49,000	5,000-24,999	Total
Bukidnon	7	11	2	20
Camiguin		1	4	5
Lanao del Norte	4	4	14	22
Misamis Occidental		6	8	14
Misamis Oriental	4	8	11	23
Total	**15**	**30**	**39**	**84**

Source: Municipal/Provincial LGUs; Classified by RLUC-X.

In terms of population growth rates, more municipalities in Lanao del Norte grew the fastest, followed by the municipalities of Bukidnon, Misamis Oriental, and Misamis Occidental. However, one municipality in Bukidnon has zero growth rate.

Meanwhile, Bukidnon and Lanao del Norte also accounted more municipalities which growth rates range from 2.0-2.99 percent, followed by Misamis Oriental. Growth rates within the range of 1.0-1.99 percent are more from Misamis Oriental (11), followed by Bukidnon (7), and Misamis Occidental (7). The rest of the municipalities (12) in the region have growth rates lower than one percent.

TABLE 11. DISTRIBUTION OF MUNICIPALITIES, BY POPULATION GROWTH RATES, REGION X, 2000-2010

Provinces	>3.0%	2.0-2.99%	1.0-1.99%	<1%	0	Total
Bukidnon	4	7	7	1	1	**20**
Camiguin			2	3		**5**
Lanao del Norte	9	7	3	3		**22**
Misamis Occidental	3	1	7	3		**14**
Misamis Oriental	4	6	11	2		**23**
Total	**20**	**21**	**30**	**12**	**1**	**84**

4.3.1.5. Urban Centers Which Growth Must Be Restrained or Encouraged

By the end of the plan period (2040), the total population of Region X is projected to reach over 7.5 million. Similarly, population of urban centers like Cagayan de Oro is projected to reach over 1.3 million. That will put its net density at around 7,751 persons per sq. km. (A&D lands).

Given the foreseen congestion and its negative effects brought about by the burgeoning population at the urban centers, population movement into the city must be restrained. This is to avoid prevalence of urban blight and decay caused by informal settlers and

would consequently add up to the mounting garbage and rising demand for basic social services and facilities.

Moreover, if not prevented, ~~spillover~~spill over effects of urbanization will put pressure on agricultural land conversion to other uses like housing settlements and industry which would eventually threaten food security of the region.

Hence, proper settlement planning and management should be in place. As such, other growth areas must be identified such as developing further the sub-regional growth and urban centers like Iligan, Ozamiz and other highly ~~other~~ urbanizing cities like Valencia.

Medium and small cities shall likewise be developed to prevent migration of people to already urbanized cities. The small towns especially those showing slow or zero growth and confronted with problems on inaccessibility, lack of livelihood, and limited farm income opportunities, and peace and order should be given focus and appropriate development interventions.

4.3.1.6. Initial Built-Up Areas

The total built-up area of the region is estimated at 25,566.40 hectares in 2010. Among the five provinces, the Province of Misamis Oriental accounted the highest at 11,266.06 hectares (44%), followed by Misamis Occidental at 5,449.45 hectares (21%), Lanao del Norte at 4,509.70 hectares (18%), Bukidnon at 2,913.89 hectares (11%), and Camiguin at 1,427.31 hectares (6%).

By the end of plan period (2040), the region shall have an estimated built-up area of 34,260.08 hectares, and shall require an estimated additional land requirement or expansion area of 310.36 hectares.

Among the provinces, only three provided possible expansion areas: Misamis Oriental (165.29 has.), followed by Lanao del Norte (140.18 has.) and Misamis Occidental (4.89 has.).

TABLE 12. FUTURE LAND DEMAND FOR BUILT-UP AREAS IN~~OF~~ REGION X BY 2040

Provinces	Population 2010	Population Projection 2040	Additional Population (2010-2040)	Built-Up Area in 2010 (has)	Pop Density (person /built-up area) 2040	Built-Up Area in 2040 (has)	Estimated Expansion Area by 2040 (has)
Region X	**4,297,323**	**7,523,884**	**3,226,561**	**25,566.40**	**220**	**34,260.08**	**310.36**
Bukidnon	1,299,192	2,470,914	1,171,722	2,913.89	1,008	4,348.83	-
Camiguin	83,807	120,600	36,793	1,427.31	280	429.97	-
Lanao del Norte	930,738	1,187,584	256,846	4,509.70	88	13,500.24	140.18
Misamis Occidental	567,642	930,120	362,478	5,449.45	534	1,740.37	4.89
Misamis Oriental	1,415,944	2,814,666	1,398,722	11,266.06	198	14,240.67	165.29

Source: NSO for Population; for Built-up area-PDPFPs and/or GIS-generated by NEDA-X with basic data from DENR; population projection and estimated land requirement is computed by NEDA-X.

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Moreover, population density shall likewise increase to 220 persons per person per built-up area in 2040.

4.3.1.7. Projected Settlements Development

Settlements development sets the physical parameters for future growth and development of urban expansion. Specifically, this covers the projected expansion of settlements in relation to other land use policy components such as production, protection and infrastructure.

In arriving at the initial settlement development areas of the region, the overlaying of nine thematic maps of land classification, land use, protected areas, SAFDZ, NPAAAD, slope, earthquake-induced landslide, flood susceptibility, and rain-induced landslide through sieve mapping was undertaken and covered in the analysis.

As a result of this sieve analysis, out of the total 34,260 hectares [1] of built-up areas in the region, Misamis Oriental has the largest share of built-up areas of 14.240.67 hectares (39%), followed by Lanao del Norte 13,500.24 (39.41%), and Bukidnon 4,348.83 (13%). Meanwhile, the province of Misamis Occidental and Camiguin have the least share of built-up areas of five percent and one percent, respectively.

The huge portion of the built-up areas, 27,601.16 (81%) are considered hazard-free. However, about 6,659 hectares (19%) are considered unsafe or constrained areas due to the possible occurrence of natural hazards, physical/topographic, and environmental ecological conditions. For instance, areas which are prone to flood cover a total of 5,389.37 hectares (80%), followed by areas prone to tsunami, 527.22 hectares (8%), rain-induced landslide areas, 508.15 hectares (7%), volcanic hazards areas, 136.94 (2%), and earthquake-induced landslide areas, 97.26 hectares (1%). With DRRM/CCA strategic options, these areas can still be utilized.

The foregoing analysis provides an indicative picture of the region in terms of future land demands, and may help determine the possible areas where development can likely take place with DRRM/CCA mitigating measures in place.

Overall, the region's settlement development direction ~~will be anchored on~~supports the Development Areas (SDAs) where urban growth and development are expected to transpire and progress within the plan period, and beyond.

The four policy options for settlements development are the following: a) redevelopment/renewal (in the case of SDA1), b) growth of other towns/cities (especially those identified in the SDAs), c) urban expansion/metropolitan growth (i.e., Cagayan de Oro together with its adjacent municipalities/cities), and new town/city development (i.e., El Salvador City and other areas along the four SDAs).

In effect, the region hopes to achieve the desired spatial arrangement of land and resources to: a) have a rational distribution of regional population, b) facilitate access to and improve availment of social services and economic/productive opportunities by everyone in the region, c) ensure optimum and sustained use of natural and man-made

[1] Figure is based from the five provincial GIS-generated sieve maps.

resources, and d) safeguard, as well as protect environmental integrity to obtain the maximum possible social and economic benefits for the people in the region.

The initial settlements development for 2010 and the indicative settlements development for 2040 are shown in Maps ~~38~~ 40 and 41~~39~~.

4.3.1.8. Strategies for Settlements Development

There is considerable scope for an orderly development of the network of settlements in the region at this time when most of the urban centers are still small to medium size, and before the largest of them have become large metropolitan areas.

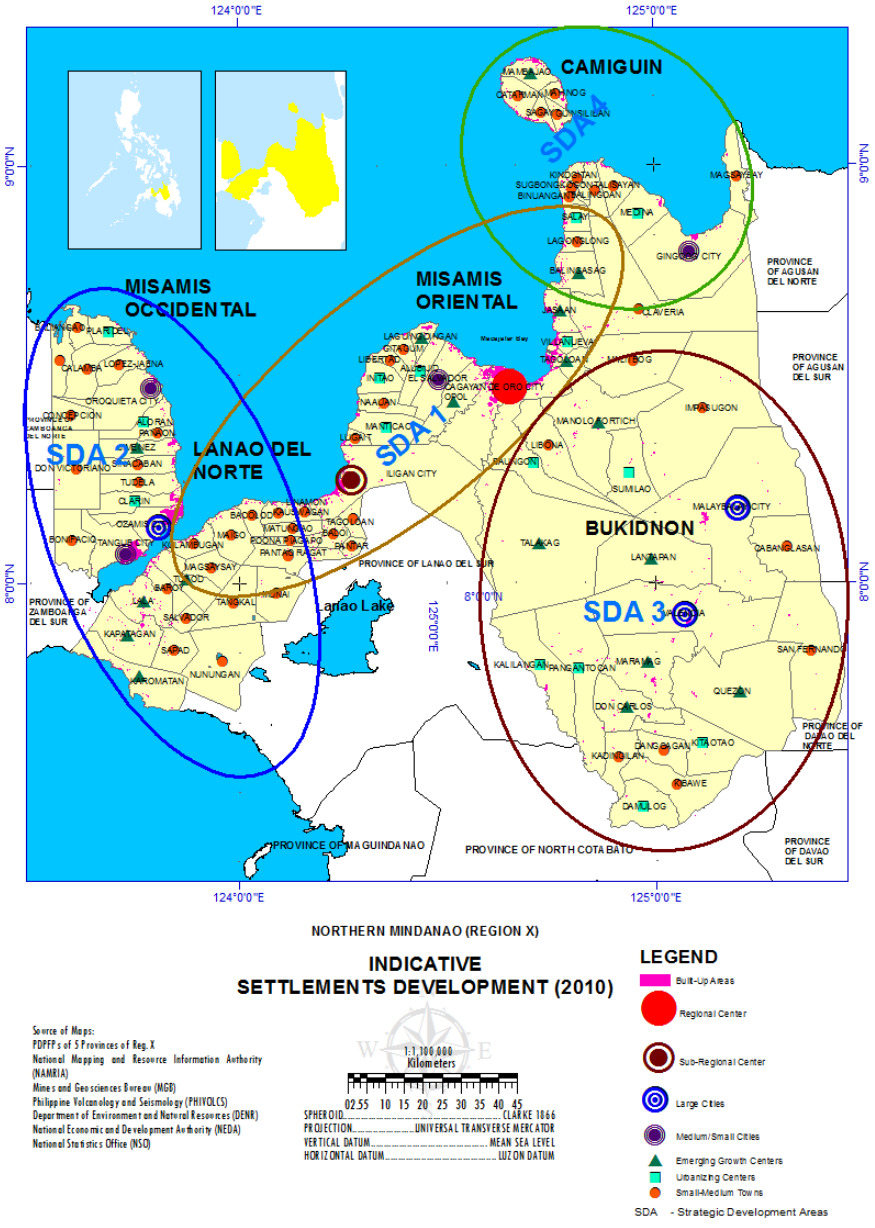
As indicated earlier, the rate and tempo of urbanization in the region is expected to quicken more than it had in the past. Settlements development aims to prevent the phenomenon of urban sprawl, which is associated with fast urbanization without conscious spatial limits and deliberate planning controls. It recognizes the desirability of the rural character, now still obtaining in many of the region's urban areas, and the immeasurable value of conserving the environment, the natural and cultural heritage in the surrounding countryside and open spaces. It envisions an enhanced inter-connectedness of the secondary urbanizing centers and emerging centers to the larger urban centers and finally with the rest of the country and the world, through an efficient transportation system, information and communications technology, and social, economic and administrative cooperative arrangements.

In consonance with the national spatial strategies on concentration, connectivity and vulnerability reduction, strategic development areas (SDAs), and watershed/river basin approach to planning being adopted by the plan for the region's overall spatial development, the following principles and strategies will be observed in the planning and development of settlements:

- **Concentration.** The region will take advantage of urbanization, while avoiding or mitigating the negative impacts. As such, there will be: inner city revitalization and renewal, in-filling, increasing the density of new building (medium rise buildings in the core) and/or settlement; establishing an urban growth boundary that limits the amount of land that can be developed. This strategy also helps abate the conversion of prime lands into urban and industry uses;

  Open space development or cluster design development: grouping new homes unto a part of the development parcel, so that the remainder can be preserved as unbuilt open space. The degree to which this accomplishes a significant saving of land, while providing an attractive and comfortable living environment, depends largely on the quality of the zoning regulations and the expertise of the development designer (preferably someone experienced in landscape architecture);

MAP 42. INITIAL SETTLEMENTS DEVELOPMENT, 2010



NORTHERN MINDANAO (REGION X)

INDICATIVE SETTLEMENTS DEVELOPMENT (2010)

LEGEND

- Built-Up Areas
- Regional Center
- Sub-Regional Center
- Large Cities
- Medium/Small Cities
- Emerging Growth Centers
- Urbanizing Centers
- Small-Medium Towns

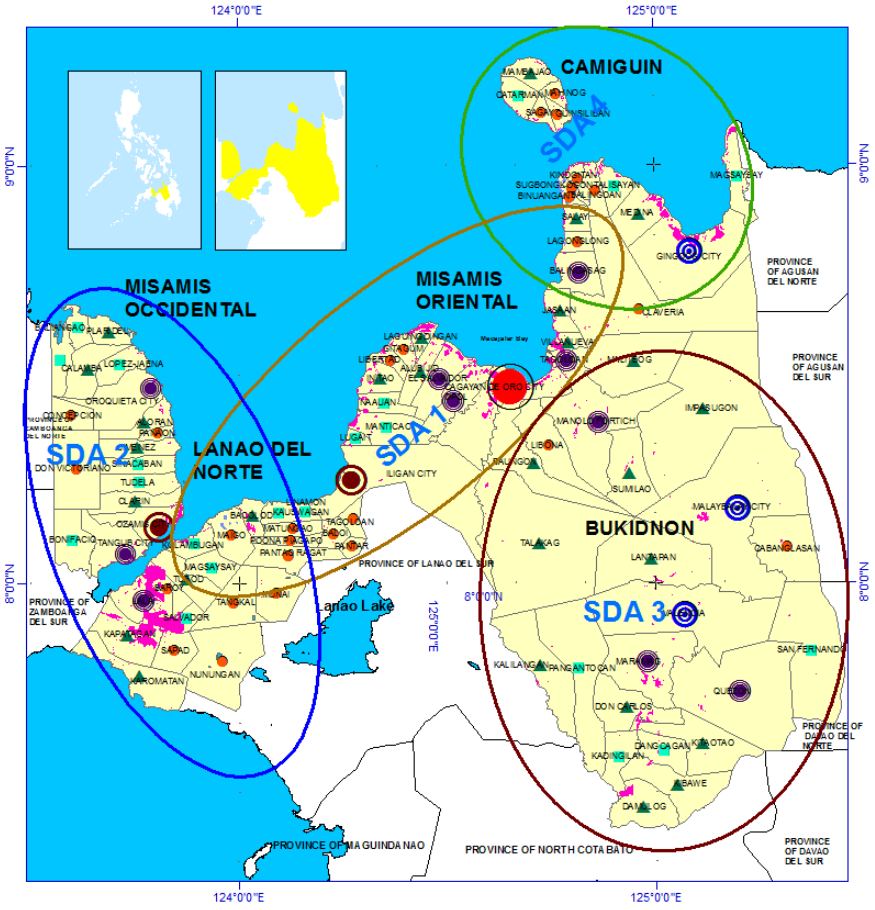
SDA - Strategic Development Areas

Source of Maps:
PDPFPs of 5 Provinces of Reg. X
National Mapping and Resource Information Authority (NAMRIA)
Mines and Geosciences Bureau (MGB)
Philippine Volcanology and Seismology (PHIVOLCS)
Department of Environment and Natural Resources (DENR)
National Economic and Development Authority (NEDA)
National Statistics Office (NSO)

1:1,100,000 Kilometers
0 2.5 5 10 15 20 25 30 35 40 45

SPHEROID..... CLARKE 1866
PROJECTION..... UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM..... MEAN SEA LEVEL
HORIZONTAL DATUM..... LUZON DATUM

MAP 43. INDICATIVE SETTLEMENTS DEVELOPMENT, 2040



NORTHERN MINDANAO (REGION X)

INDICATIVE SETTLEMENTS DEVELOPMENT (2040)

Source of Maps:
PDPFPs of 5 Provinces of Reg. X
National Mapping and Resource Information Authority (NAMRIA)
Mines and Geosciences Bureau (MGB)
Philippine Volcanology and Seismology (PHIVOLCS)
Department of Environment and Natural Resources (DENR)
National Economic and Development Authority (NEDA)
National Statistics Office (NSO)

1:1,100,000 Kilometers
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SPHEROID ..... CLARKE 1866
PROJECTION ..... UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM ..... MEAN SEA LEVEL
HORIZONTAL DATUM ..... LUZON DATUM

NOTE: Iligan City is mostly forest land with most settlement areas found under SAPDZ.

LEGEND

- EXPANSION AREA
- BUILT-UP AREA
- Metropolitan Center
- Sub-Regional Center
- Large Cities
- Medium/Small Cities
- Emerging Growth Centers
- Urbanizing Centers
- Small-Medium Towns

SDA - Strategic Development Areas

increased mobility and accessibility. Efficiency of movement within the urban core: preference for public rather than private transportation, cycling, pedestrianization; and mixed land uses; mass transport is encouraged while road – vehicle density has to be closely monitored to minimize traffic congestion;
Efficiency of transport and communication linkages between urban centers, urban-rural areas, and rural-rural areas through the construction and maintenance of all-weather roads and establishment of communication networks that will connect production areas to the markets;

- **Vulnerability Reduction.** The region will remain purposive in helping communities to reduce risk and negative impacts of disasters. Preservation of the watershed character of the region and green development, and protection of natural resources and the rich cultural heritage of the region through the adoption of sustainable and environment-friendly technologies, as well as in the production of goods and services.

The following institutional-regulatory, as well as sectoral strategies and policies are also relevant for the rational development of settlements in the region:

- Residential use shall be the priority over all other uses in the allocation of hazard-free areas;
- Hazard-exposed settlements, urban and rural, shall be relocated to safe areas; Vulnerable settlements that cannot be relocated shall have an operational community-based disaster risk reduction and management plan and ensure that mitigating measures are in place;
- No existing and expansion of settlements in NIPAS;
- Periodic updating of CLUPs and enforce zoning ordinances;
- Medium to high rise or multi-storey dwellings shall be sited in areas determined to be safe by engineering geological studies;
- Regular monitoring and evaluation of structural quality of dwellings shall be conducted and timely treatment measures provided by local authorities;
- Continuing capacity building on physical/spatial planning for regional and local ~~planners,~~planners, and periodic review and updating of comprehensive land use role of the countryside and planning for the rural settlements must be given equal emphasis as planning for the urban centers;
- Adopt an integrated area approach to infrastructure and service delivery (e.g., garbage/waste treatment and disposal and~~;~~ sewerage~~), etc.)~~ through inter-local government cooperation or national-local partnership whenever appropriate;
- Continuing skills upgrading in urban and rural management; and improving the civil society's capacity and participation (especially the business/industry sector and non-government organizations) in efforts to improve quality of life, such as in the promotion of community health and social services; conservation, rehabilitation and protection of the environment; urban renewal; human resource development; improvement of technology and productivity; and promotion of culture and preservation of heritage. The essential role of local authorities as embodied in RA 7190 or the Local Government Code in providing services and

empowering people to secure economic development, social welfare and environmental protection for their communities must be recognized;

- Appropriate alienable and disposable lands should be released for residential needs and other compatible uses, to meet the needs of the poor for socialized housing;
- Conservation of productive/prime agricultural lands and encourage conversion of unutilized or unproductive/marginal lands for urban use/settlement;
- Enforce Administrative Order No. 20 on Interim Guidelines on Agricultural Land Use Conversion;
- Improve the protection of land rights, eliminate fake or conflicting claims and titles and introduce an equitable system of land valuation;
- Provision of essential urban amenities, e.g., roads, overpass, sewerage, garbage/waste treatment and disposal, drainage and potable water, and classrooms; and promotion of inter-LGU cooperation with regard to major utilities especially in areas within potential conurbation, such as in the Cagayan-Iligan growth corridor;
- Provision of adequate health facilities particularly by the tertiary hospitals in major urban centers and industrial zones to cater to the rising demands of the labor force and the whole populace. The existing 24 tertiary (Levels III & IV) hospitals (18 private and 6 government) located in the regional capital as well as in other cities and strategic provincial sites will continue to provide medical services in the entire region with specialized diagnosis and treatments;
- With the region's bid to become an industrial core and trade center, skilled workers of industries are more likely to demand for specialized type of treatment. Thus, the existing lone government tertiary hospital located in the regional capital, which is currently specializing in heart and kidney-related treatments may also specialize in the treatment of lung-related diseases to cushion the effects of pollution from industrial firms. The envisioned development in the region may also pose a challenge to private tertiary hospitals to offer preventive, diagnostic and rehabilitative treatments to respond to the health demands of the workforce. Likewise, promotion of good nutrition and timely delivery of packaged social services shall be also ensured;
- Provision and access to educational facilities that will respond to the demands of the local and global markets, and encourage key HEIs to offer relevant development courses (i.e., urban and regional planning, disaster risk reduction and management and climate change adaptation, etc.) to respond to the current and future direction of the region in terms of spatial development planning and resiliency.
- Improve competence and employability of TVET graduates, higher-level of productivity, competitiveness, quality and responsiveness of TVET, and strengthen collaboration among stakeholders to provide middle-level skills requirements of the labor market;
- Provision of recreational and sports facilities both urban and rural settlements shall be made accessible to all including those with special needs. However special focus shall be undertaken to sustain and fully utilize the state-of-the-art sports complex located in Tubod, Lanao del Norte, the Mindanao Civic Center (MCC). In the plan period, the establishment of a Sports Academy is seen to optimize the utilization of said sports complex. Strong advocacy along with the

holding of interregional and international sports-related activities shall be undertaken;

- Cooperative industry and social—/—administrative arrangements between to make possible greater returns or impact as well as mutual benefit in sharing and complementation of resources and talents (e.g. industry clustering, common open space management, and metropolitanization);
- Support to off-farm/seasonal employment such as access to credit/capital, skills training and technology to create livelihood and employment opportunities in the rural areas should be of prime concern to absorb surplus labor in the agriculture sector and thus prevent push in urban migration;
- Improving the availability of land for the poor, through measures to control land speculation and hoarding by making available idle public lands for housing, and enforcing taxation on private idle lands in commercial, industrial, and residential zones (PD 1715);
- The facilities, goods and services in the settlement areas shall be highly accessible and sensitive to the needs of special groups of people such as the PWDs, the elderly, the children (0-2yrs old), and the pregnant and lactating women, the vulnerable groups and persons with special needs, and the needs of the Indigenous Peoples;
- Expand and strengthen programs that cater to the lowest income groups, such as the Community Mortgage Program (CMP) and Resettlement Program and more effective financing schemes to ensure that social housing programs serve the target beneficiaries including the Overseas Filipino Workers (OFW) and their dependents; The estimated housing needs of the region for the period 2001-2030 of 563,355 (Table 13) is targeted to be responded by 25-30% with this low-cost housing program;
- Land banking for social housing especially for the low-income groups and resettlement of residents in priority development and hazardous areas, and implementation of RA 7279 or the Urban Development and Housing Act;
- Continuing search and commercialization of low cost and indigenous housing materials, cost-saving, and environment-friendly building technologies, appropriate for clustered housing subdivision or settlements design;
- Adoption and efficient enforcement of more stringent regulatory measures including stiffer penalties for violations of land and water use/environmental laws, ordinances and regulations; and
- Promotion of research and local policy development on spatial planning, land use management, and conservation / preservation of the region's natural, historical and cultural heritage.

4.3.1.9. Desired Outcomes

The overall goal of the spatial development plan of the region is to enhance the region's locational advantage, and develop its considerable land and water resources/potentials to secure a good quality of life for its inhabitants and the future generations. It likewise aims for an inclusive growth where everyone participates and benefits in the development process.

The overall regional spatial strategy of promoting the Strategic Development Areas (SDAs) affirms the diversity in the types of human settlements now obtaining in the region, and the eventual emergence of more urban centers from its array of erstwhile

emerging growth and urbanizing centers. It seeks to have many urban centers and not just one large metropolitan city or growth corridor dominating all the others. The urban will be compact centers, with mixed land uses, density, concentration of settlements, and public spaces suitable for pedestrians. The compact development model aims for economy of space in order to preserve the countryside.

4.3.1.10. Policy Reforms Needed / Interregional Issues

Housing and security of tenure continues to be a challenge especially in the urban areas of Northern Mindanao. Estimates show that the region will need 727,734 houses by 2040 to close the gap in housing needs. Among the five provinces and two key cities in the region, Bukidnon accounts the highest housing need at 28.5 percent of the total need followed by Cagayan de Oro (21.2 %) and Misamis Oriental (18.2 %). This may be attributed to the developments along the Cagayan-Iligan Corridor and the Cagayan-Bukidnon Corridor which continues to draw more people particularly workers along industry, trade and agribusiness ventures from neighboring areas, among others. Meanwhile, housing needs for 9,167 displaced families due to the devastation caused by TS Sendong in December 2011were already addressed.

To achieve inclusive growth, the efforts of the region shall focus on the efficiency of its urban areas prioritizing mixed-use development and the use of existing developed areas to stop sprawling and conserve agricultural land. With this, massive urban renewal shall be made. There is also a need to explore the use of indigenous and recyclable materials as environment-friendly alternatives to reduce cost in building houses in urban centers. This way, more skills development programs shall be pursued to assist those especially affected by disasters such as TS Sendong and TS Pablo. This is to ensure that those affected families will be provided and equipped with the needed and appropriate social and economic interventions, especially along employment and livelihood to make them continually productive.

The issue of inefficient delivery of public higher education and health services has not been sufficiently dealt with. The "rationalization" of SUCs and tertiary health services need to be pursued in order to achieve a more equitable distribution among regions, to improve internal efficiency and quality in individual institutions, as well as to avoid direct competition with the private sector. Thus, the region pursues one of the national policy reforms along the restructuring of the public higher education institutions through amalgamation or complementation, and provision of institutional arrangement for the implementation of a university system. This is to help rationalize governance and financing of higher education in a manner that would unleash institutional creativity and entrepreneurship. In the health sector, the establishment and development of the more highly specialized tertiary hospital services and facilities are now being spread or distributed among the regions, rather than concentrating them in one or two regions. For Region X, specialization along heart and kidney-related diseases are being pursued.

~~*4.3.1.10. Policy Reforms Needed / Interregional Issues*~~

REGION/PROVINCE/ CITY	DISPLACED DUE TO TS SENDONG*	2013-2040 NEED DUE TO POPULATION GROWTH**			TOTAL HOUSING NEED (2013-2040)	TOTAL HOUSING NEED (2013-2040) (% Share to Total)
		2013 - 2020	2021-2030	2031-2040		
Province						
Bukidnon		47,775	71,749	87,917	207,440	28.50
Camiguin		1,823	2,543	2,871	7,236	0.99
Lanao del Norte		27,848	43,667	56,115	127,629	17.54
Misamis Occidental		16,306	23,417	27,311	67,034	9.21
Misamis Oriental		30,500	45,795	56,101	132,395	18.19
Key City						
Cagayan de Oro	5,355	31,913	50,693	66,082	154,043	21.18
Iligan	3,812	7,067	9,883	11,192	31,954	4.39
Region X	**9,167**	**163,232**	**247,746**	**307,588**	**727,734**	**100.0**

**Source: DSWD-X*
***Based on 2010 NSO Census of Population, Source: HUDCC data recomputed by NEDA-X*

~~The issue of inefficient delivery of public higher education and health services, has not been sufficiently dealt with. The "rationalization" of SUCs and tertiary health services need to be pursued in order to achieve a more equitable distribution among regions, to improve internal efficiency and quality in individual institutions, as well as to avoid direct competition with the private sector. Thus, the region pursues one of the national policy reforms along the restructuring of the public higher education institutions through amalgamation or complementation, and provision of institutional arrangement for the implementation of a university system. This is to help rationalize governance and financing of higher education in a manner that would unleash institutional creativity and entrepreneurship. In the health sector, the establishment and development of the more highly specialized tertiary hospital services and facilities are now being spread or distributed among the regions, rather than concentrating them in one or two regions. For Region X, specialization along heart and kidney-related diseases are being pursued.~~

The negative perception regarding peace and order in Mindanao as a whole is detrimental to the island's economy. In provinces where peace and order is a real problem, the development and peace effort must be given special attention. At the same time, aggressive countermeasures to minimize, if not erase the negative perception of Mindanao should be made a continuing activity. In Region X, one such venue for creating a positive image is the international standard sports facility, the Mindanao Civic Center. It is proposed that local sports organizations in all provinces in Mindanao be revitalized and all local sports organizations be unified, which can then avail of the excellent sports facilities of the Mindanao Civic Center in Tubod, Lanao del Norte.

4.3.2. Production Land Use

Production areas are capable of sustaining intensive and multiple uses primarily geared to the production of food and cash crops or the extraction of commodities for their economic value. These areas are not as environmentally constrained or ecologically sensitive as protected areas and are not covered by existing conservation laws or policies. Nevertheless, sustainable cultural practices should be observed in their uses.

The production areas of the region (MAP 44) include those identified in the Strategic Agriculture and Fisheries Development Zone (SAFDZ) under Republic Act (RA) 8435; production forest; mining areas, both metallic and non-metallic minerals; industrial centers and ecozones; and, tourism areas (ecotourism and nature and adventure)**.** These areas are where majority of the economic activities take place and are vital components of the economy of the region. Hence, sustainable development shall be pursued.

In 2013, the estimated agricultural areas totalled 805,174 hectares or about 40 percent of the total land area of the ~~region which~~region, which comprised both the SAFDZ and Through GIS simulation, it was noted that there are some overlaps or conflicts in terms of utilization of the region's identified agricultural areas with other ~~other~~ land uses such as protection and environmentally constrained areas. Specifically, agricultural areas that are within the environmentally-constrained and/or severely eroded areas (Map 43) is approximately 208,000 hectares or about 26 percent of the total existing agricultural areas. In this situation, appropriate interventions and/or mitigating measures are critical to reduce risks to disasters and minimize negative impacts of climate change.

because the sector comprised 30 percent to the gross regional domestic product and employ 43 percent of the total employment in the region. Changes in temperature and changing crop patterns coupled with extreme weather patterns could severely affect agriculture[1]. Hence, climate change adaptation-related technologies and researches along agriculture should be prioritized.

The agriculture sector is considered as the backbone of the regional economy. This is because the sector comprised 30 percent to the gross regional domestic product and employ 43 percent of the total employment in the region. Changes in temperature and changing crop patterns coupled with extreme weather patterns could severely affect agriculture[1]. Hence, climate change adaptation-related technologies and researches along agriculture should be prioritized.

The region shall continue to intensify countryside development, nurture sustainable agriculture, and manage natural resources to enhance productivity and increase agricultural production to attain food security and rural development. The Priority Focus Areas (PFAs) of the sector include high value agricultural/industrial crops specifically banana, coffee, abaca, coconut and rubber, as well as livestock and poultry.

[1] Regional Disaster Risk Assessment Report , p.105

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About three percent of the existing agricultural areas (24,155 hectares) are in conflict or situated within the existing and the proposed NIPAS areas ~~(44)~~**.** Two percent of the agricultural areas encroached the existing NIPAS areas particularly portions of Baliangao Protected Landscape, Initao Landscape and Seascape, Mt. Malindang, Mt. Kalatungan and Mt. Kitangklad. Meanwhile, a minimal one percent encroahed the areas proposed under NIPAS namely, Mt. Gabunan, Cagayan de Oro River Basin, Mt. Lumot, Mt. Tago, Palaopao, and Liangan-Larapan Seascape.

Meanwhile, ~~for~~ production forests, which include ~~ or those areas that are utilized as~~ should only be allowed in suitable areas. Areas s~~S~~uitable ~~areas~~ for production forest are with slope range of 18-30 percent and elevation of not more than 1,000 meters.

In the context of environmental integrity, the policy of the region is to prioritize protection land use over production land use. The agricultural areas encroaching the existing, as well as, the proposed NIPAS areas, shall be reverted to protection areas. Thus, the total proposed agricultural land use at the end of the planning period (2040) shall become 710,000 hectares or 12 percent lower than that of 2013. The proposed agricultural areas shall comprise about 35 percent of the total land area of the region by 2040 (Table 14 ~~and **Error! Reference source not found.**~~5).

TABLE 14. EXISTING AND PROPOSED AGRICULTURAL LAND USE, REGION X: 2013 & 2040

AGRICULTURAL LAND USE (In Hectares)	Existing Area (2013)	% Share to Total Regional Area	Proposed Area (2040)	% Share to Total Regional Area	% Change (Proposed vs Existing)
SAFDZ	805,174	40	532,917	26	-
Production Forest			177,083	9	-
Total	**805,174**	**40**	**710,000**	**35**	**-11.82**

Source of Basic Data: DA-X for SAFDZ shapefile
** Areas are GIS-derived and are approximate only*

~~Moreover, apart from agricultural areas, industrial centers and ecozones, the Tourism Development Areas (TDAs) shall be given equal importance. Preservation of the region's biodiversity shall be strictly observed in the extraction of mineral resources of the region.~~

Moreover, apart from agricultural areas, industrial centers and ecozones, the Tourism Development Areas (TDAs) shall be given equal importance. Preservation of the region's biodiversity shall be strictly observed in the extraction of mineral resources of the region.

Development of new industrial centers and economic zones in the region to support the establishment and operation of agri-based industries including manufacturing and emerging industries shall be put in place. Further, the region will embark on the production of "green" or environment-friendly products/services in doing business.

[1] Regional Disaster Risk Assessment Report , p.105

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The tourism sector strengthens the identified Tourism Development Areas (TDAs) and pursues community based tourism development in identified ecotourism and/or nature and adventure tourism sites. New endeavors along nature and adventure tourism shall be geared towards sports and recreational activities to create diverse tourism-related activities in the region.

Disaster risk reduction and climate change adaptation strategies shall be adopted in the proposed production land use of the region (Map 495). As such, proposed developments (e.ge.g., location of new industrial centers and ecozones) are discouraged in constrained areas, among other factors.

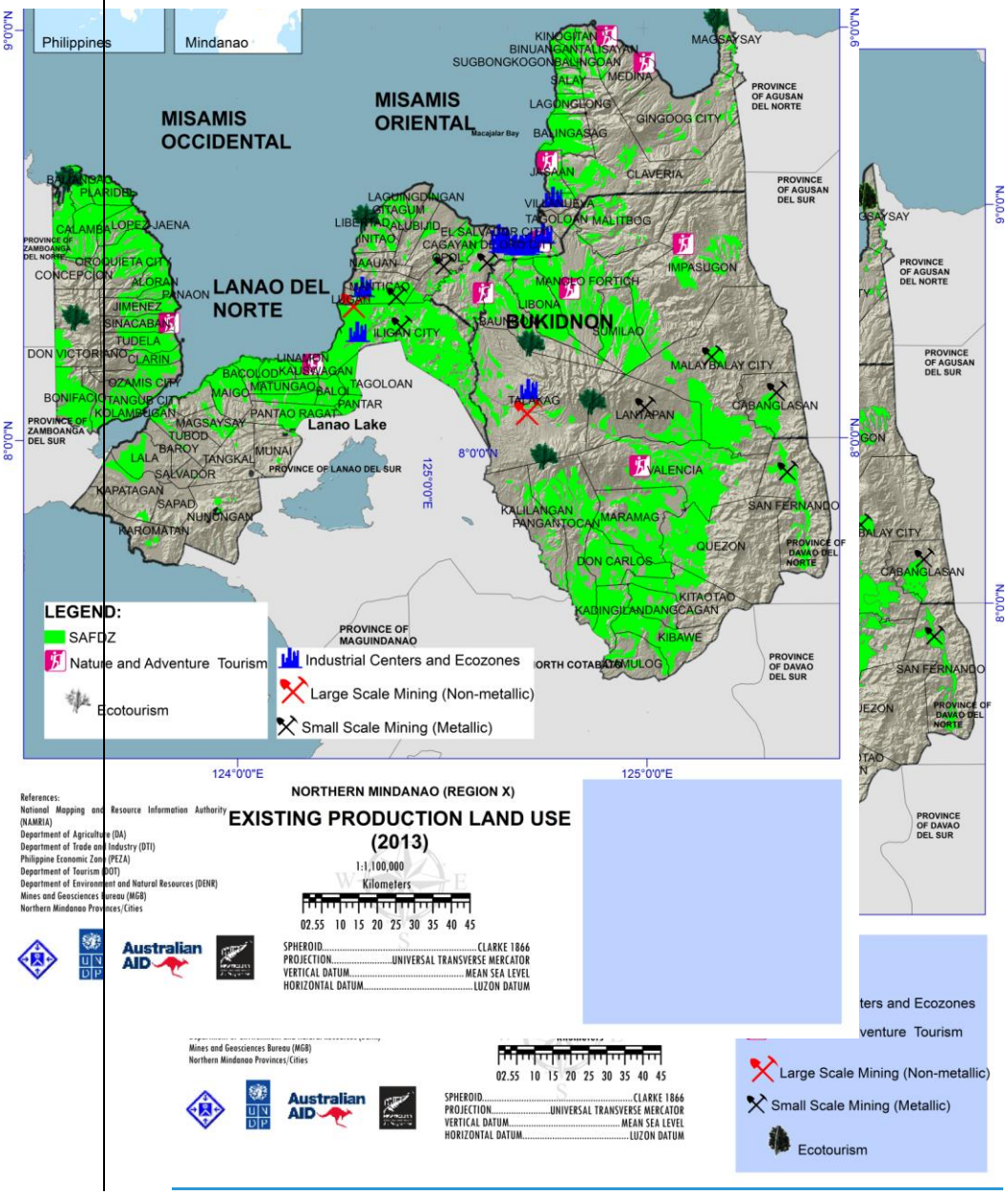
4.3.1.11. Overall Goals and Objectives

a) Food Security and Self-Sufficiency

The fundamental goal is to make the region self-supporting in its requirements for crops and commodities that are currently deficient in supply such as rice, ~~corn,~~ vegetables, fish animal products (beef/chevon, pork, poultry meat and eggs). Self-sufficient levels shall be attained by intensifying and expanding the scope of production of such crops and livestock-poultry, agricultural products crop diversification and intensification, , and fully utilizing the opportunities of coconut-based crops and livestock systems as complemented by improving irrigation, and adopting productive, profitable and appropriate agricultural technologies.

~~Development of new industrial centers and economic zones in the region to support the~~

~~Moreover, apart from agricultural areas, industrial centers and ecozones, and Tourism~~



NORTHERN MINDANAO (REGION X)

EXISTING PRODUCTION LAND USE (2013)

1:1,100,000

Kilometers

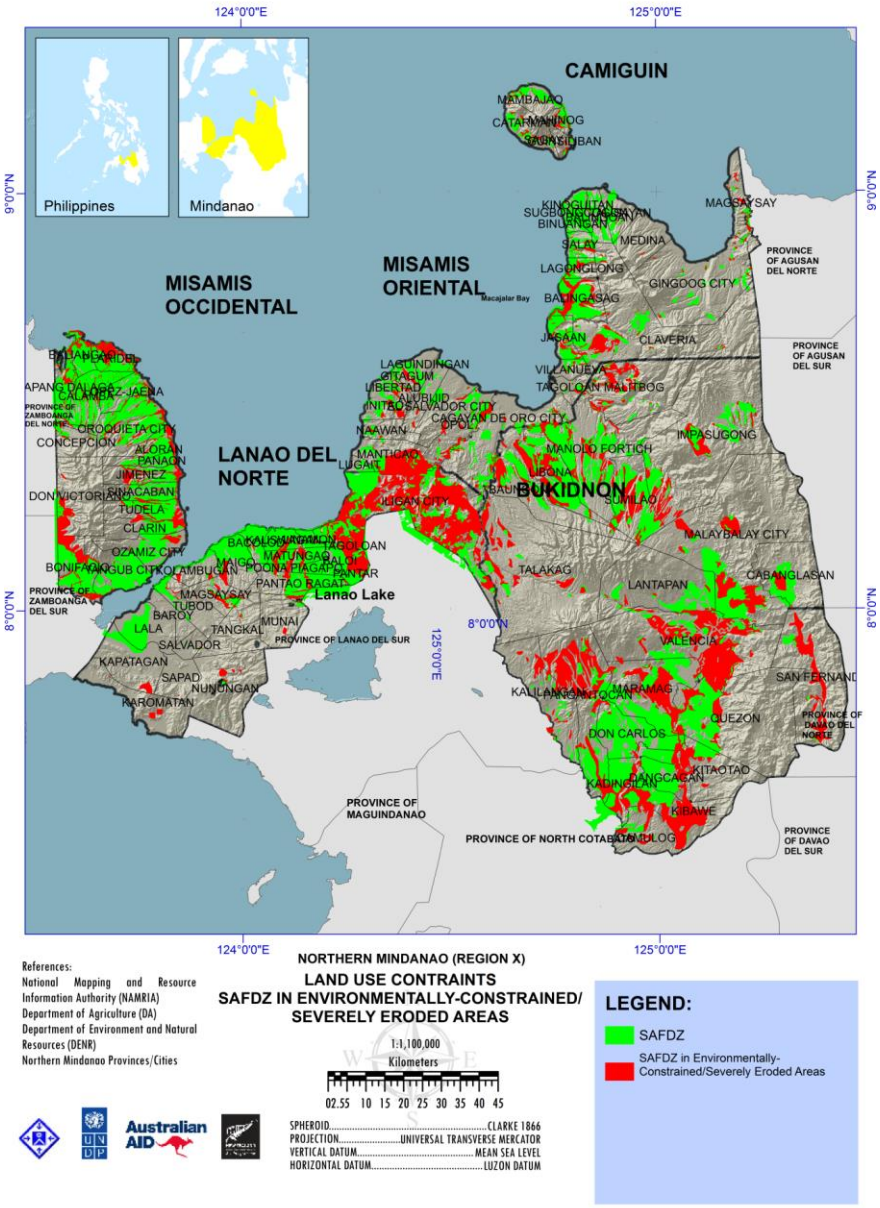
02.55 10 15 20 25 30 35 40 45

SPHEROID.....CLARKE 1866
PROJECTION.....UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....LUZON DATUM

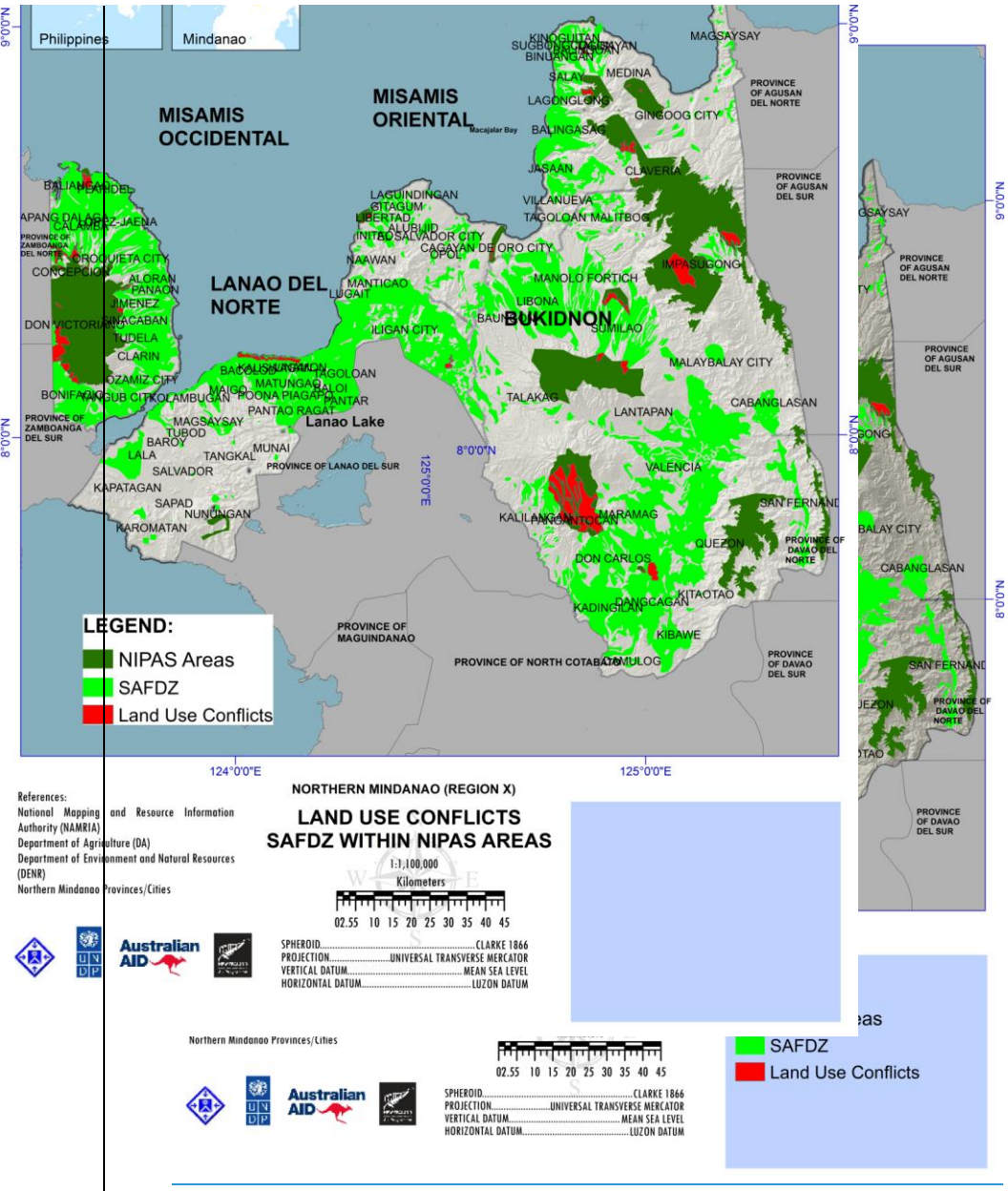
References:
National Mapping and Resource Information Authority (NAMRIA)
Department of Agriculture (DA)
Department of Trade and Industry (DTI)
Philippine Economic Zone (PEZA)
Department of Tourism (DOT)
Department of Environment and Natural Resources (DENR)
Mines and Geosciences Bureau (MGB)
Northern Mindanao Provinces/Cities

Large Scale Mining (Non-metallic)
Small Scale Mining (Metallic)
Ecotourism

MAP 45. SAFDZ WITHIN ENVIRONMENTALLY-CONSTRAINED/SEVERELY ERODED AREAS, REGION X, 2013



MAP 46. SAFDZ IN CONFLICT WITH EXISTING NIPAS AREAS, REGION X, 2013



References:
National Mapping and Resource Information Authority (NAMRIA)
Department of Agriculture (DA)
Department of Environment and Natural Resources (DENR)
Northern Mindanao Provinces/Cities

NORTHERN MINDANAO (REGION X)

LAND USE CONFLICTS SAFDZ WITHIN NIPAS AREAS

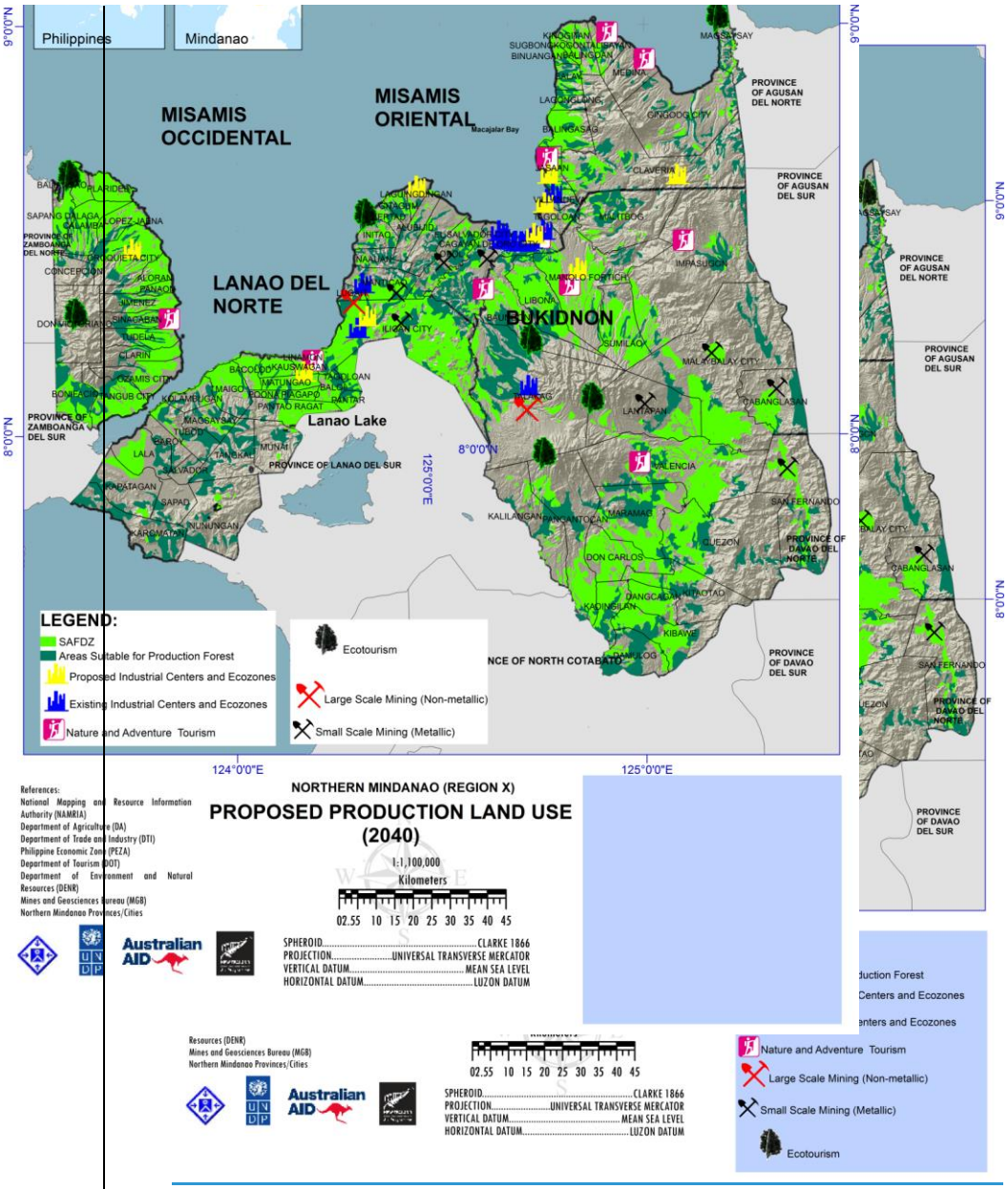
1:1,100,000
Kilometers
0 2.5 5 10 15 20 25 30 35 40 45

SPHEROID.....CLARKE 1866
PROJECTION.....UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....LUZON DATUM

Northern Mindanao Provinces/Cities
0 2.5 5 10 15 20 25 30 35 40 45
SPHEROID.....CLARKE 1866
PROJECTION.....UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....LUZON DATUM

SAFDZ
Land Use Conflicts

MAP 47. PROPOSED PRODUCTION LAND USE, REGION X: 2040



In line with the national policy of food security, areas identified as highly suitable for agricultural production must be protected and developed accordingly with appropriate infrastructure and institutional support.

b) Integrated Agri-food Parks

The agricultural potentials in the region shall be tapped through an integrated rural agribusiness and agri-industrial development program, a system envisioned to build strong linkages among agricultural production, processing, marketing and its allied industries. It is centered on the creation of broad-based commodity production programs fully integrated with processing plants to be ultimately owned and managed by farmers themselves.

~~b)~~c) Balanced Socio-Economic and Physical Growth and Equitable Distribution of Opportunities

In order to achieve simultaneous socio-economic and physical growth, development efforts shall focus on depressed areas and alternate growth centers. The intention is to provide "counter magnets" to the over concentration of population and services in urban settlements, mainly Cagayan de Oro City and Iligan City and to equitably distribute economic and social amenities to areas lagging behind in development.

d) Sustainable Resources Management and Addressing the Impact of Climate Change

The utilization of resources without regulation and proper management results to environmental degradation that will negatively impact livelihood and living standards of the population. Hence, the region shall pursue the development and promotion with farmer's participation of sustainable and environment friendly technologies; further development and promotion of high-value organic agricultural and fisheries system; and programs that improve and/or preserve the carrying capacity of land and water resources.

The impact of climate change continues to affect the agriculture and fishery sector because of weather disturbances, soil erosion, soil fertility depletion, as well as changes in the ecosystem such as increased coral bleaching, increased shift of species, altered distribution, productivity and community composition of marine resources, loss of biodiversity and ecosystem functioning of natural habitats, ocean acidification, and changes in migration patterns of some species (30 percent of species face extinction).

e) Empowered Farmers and other Stakeholders

Empower farmers, processors, traders and entrepreneurs by making information and technology services accessible during critical decision making on production, processing, trading and marketing activities.

4.3.2.1. Croplands

The goal is to augment production and consequently increase the income of farm households to eventually ease them out of poverty. This will be achieved through improving productivity/yield as a means of increasing production. It shall pursue self-sufficiency in agricultural products and commodities with agriculture serving as a reliable

backward linkage to the industry sector through value-adding or processing/ manufacturing activities.

Objectives

- Ensure proper land utilization (e.g., matching land capability and crops suitability);
- Adopt appropriate, productive and sustainable production management systems and profitable technologies (certified seeds, integrated pest management among others) that are resilient and climate change adaptive;
- Establish strong agro-industrial base where industries shall function in consonance with agricultural sector requirements; and
- Enhance linkage of production areas to market areas ~~through value chain analysis~~.

Strategies and Policy Options

Land Use and Organization of Production System - Judicious use of land may facilitate the initial realization of socio-economic benefits and eventual development and progress in the region. Guiding principles followed in choosing the most appropriate use of land shall consider suitability, economic efficiency, and conservation and protection methods adaptable to the land parcel. To attain maximum land productivity, development shall be guided by appropriate crop commodity mixes for various land types through the following:

- Increase productivity levels through the intensification of land use for both ~~under-~~ ~~under-~~irrigated areas and uplands;
- Enhance production of disease-free planting materials and intensify integrated pest management and utilize biological control agents;
- Continue promotion of multi-cropping/integrated farming systems and crop diversification in lowland and upland ecosystems;
- Strictly enforce contour tillage and similar sustainable practices among sloping land~~s cultivators~~;
- Intensify promotion of Good Agricultural Practices (GAP) certification, organic farming and balanced fertilization;
- Intensify research studies to generate and verify technologies concerning production, post-harvest and marketing, climate change tolerance, and resistance to emerging pest and diseases;
- Develop and adopt climate change-sensitive technologies and agricultural infrastructure facilities (e.g. responsive irrigation and support services including farm to market roads, post-harvest facilities);
- Ensure linkage between production areas to market areas;
- Intensify value-adding activities for PFAs and other agri-based products to be commercially and globally competitive;
- Transform farmlands into agribusiness enterprises through collaborative efforts of the government, private investors and crop association;
- Strengthen collaboration among adjoining regions to identify strategic locations of support infrastructure such as post-harvest facilities/storage facilities, farm to market roads, air and seaports network;
- Intensify promotions of Cagayan de Oro-Iligan-Cebu Industrial and Trade Triangle to enhance the three cities' existing trade links;

- Adopt soil conservation measures and technologies;
- Provide security of tenure to farmers to encourage land users to protect and rehabilitate land from soil erosion; and,
- Intensify participation of various stakeholders in the risk reducing mechanism such as crop insurance.

Targets

Attain self-sufficiency, particularly for crops that are deficient in supply such as rice. Table 15 presents the projected area expansion of crops and fruits in the region.

Industrial and other high value commercial crops, such as cacao, coffee sugarcane and cassava, are among the identified PFAs of the region. These require appropriate government interventions in the succeeding years. Staple foods namely camote and adlai shall also be given focus.

Irrigation Systems Development. The success of rice self sufficiency program, relies heavily on the provision of efficient and adequate irrigation infrastructure. Hence, the construction of additional irrigation infrastructure for the 121,432.00 hectares potential areas for irrigation has been programmed by the DA through the NIA.

Farm-to-Market Roads. For production areas where roads are non-existent, the LGUs will be assisted in terms of fund support for the road construction, while in areas where roads are dilapidated, rehabilitation activities will be undertaken.

2020, 2030 AND 2040

Commodity	Existing (2011)	2020	2030	2040
Crops				
Palay	152,410	174,123	202,874	202,874
Corn	364,059	450,685	450,685	450,685
Total Crop	**516,469**	**624,808**	**653,559**	**653,559**
Fruit				
Pineapple	21,979	24,548	29,170	29,170
Mango	8,751	56,887	136,039	136,039
Banana	51,452	134,592	247,709	247,709
Total Fruit	**82,182**	**216,027**	**412,918**	**412,918**

Source for 2011 Data: BAS~X and DA~X
**Estimates by RLUC-TWG*

Programs/Projects

Seeds and Seedstock Production. The ready and continuous source of high quality seeds and seed stock obtained at reasonable cost is crucial in the sustainability of the crops development program. In anticipation of this need, nurseries shall be established to rapidly propagate fruit tree seedling and forest species for reforestation.

Tenurial Reform. Land reform programs for the region shall be vigorously pursued by increasing the scope of: a) Operation Land Transfer under P.D. No. 27, and Direct

Payment Scheme; and b) Leasehold Operation Program, where rice and corn lands within the retention limit of P.D. No. 27 shall be subjected to leasehold operation, together with lands planted with other crops. The acquisition and distribution of all lands covered over a period of 20 years from the date of effectivity of Republic Act No. 6657 has been programmed by the DAR.

4.3.2.2. Livestock and Poultry Development

Goals and Objectives

- Increased livestock and poultry production through agro-livestock farming to augment farm income.
- Readily available draft animals for all farming households as a means to alleviate limited application of mechanized farming caused by inaccessibility to mechanized power equipment and slightly rugged terrain of uplands/croplands.
- Enhanced value of agricultural products. A large volume of livestock and poultry products is promising as raw materials for the livestock-poultry-based industrial sector (e.g. feed milling, meat processing, fast-food services and allied industries). Thus, project designs should veer from the traditional backyard/home-use concept to market-and profit-oriented growth strategies.

- Increase breeding base population of all important livestock and poultry species such as cattle, carabao, pigs, and poultry;
- Increase production of livestock and poultry and related products particularly beef, milk, eggs and poultry meat in order to meet domestic needs and eventually regional/national demand;
- Augment/supplement the income derived from crops and serve as an off-setting mechanism against risks associated with crop production projects;
- Supply raw materials for the eventual establishment of livestock and poultry-based agro-industrial centers;
- Enforce strict zoning and regulation on livestock, poultry and piggery houses;
- Intensify promotion of good agricultural practices (GAP) for livestock;
- Intensify disease surveillance, prevention and control of highly contagious and zoonotic diseases (e.g. brucellosis, anthrax, rabies and H5N1 or bird flu);
- Intensify participation in the risk reducing mechanism such as livestock insurance;
- Promote livestock/poultry enterprise development and value adding activities.

Targets

The region shall be competitive in meat products within the plan period. The production schedule and total output projections for the livestock and poultry sector are shown below.

TABLE 16. PROJECTED LIVESTOCK AND POULTRY PRODUCTION (NUMBER OF HEADS), REGION X: 2020, 2030, 2040

Livestock/Poultry	Existing (2012)	Year		
		2020	2030	2040
Cattle	272,711	399,278	520,156	677,630
Hogs	897,213	2,011,211	4,551,507	10,300,369
Goat	241,776	283,279	381,256	420,938
Chicken	19,296,971	33,906,809	97,562,462	138,765,453

Source for 2012 Data: BAS X and DA X
**Estimates by RLUC-TWG*

Programs/Projects

Central Breeding Stations: Central breeding herds/flocks for cattle, carabao, pigs, poultry and possibly goats shall be maintained to ensure the continuous and reliable supply of high quality/superior breeding stock catering to cooperative farms is particularly important during the initial stage of livestock and poultry production.

Livestock Agribusiness Development and Management Training. The level of expertise of livestock production technicians and cooperative/farmer officers in livestock business organizations and production technology determine organizational and program effectiveness and its rate of expansion. The capacity and effectiveness of technology transfer agents must be strengthened alongside that of livestock project managers and cooperative officers on the areas of agribusiness design, organization and operations management.

4.3.2.3. Fishery Development

Goals and Objectives

- Increase fish production by increasing the productivity of aquaculture, brackish water and freshwater fishponds, swamps/marsh fisheries and sea cages in coastal areas; and
- Assist fisherfolk to adopt modern fishing practices to provide bigger opportunities to earn higher income as follows:
  - Organize and strengthen fisherfolk and involve them in cooperative deep-sea fishing to allow exploration of farther and richer fishing grounds; and
  - Provide modern fishing equipment for longer, safer and faster sea travel the whole-year round through collective ownership, management and risk-taking. The use of fish gathering devices such as "*payaos"* in deep waters outside municipal boundaries is expected to improve the production and efficiency of fishermen.

Strategies and Policy Options

The fishery sector is one of the sectors that is highly vulnerable to sea level rise and temperature increase due to climate change. Hence, there is a need to put in place climate change adaptation strategies particularly to prepare for its negative impact.

Preventive and adaptive planning for coastal areas should be in the LGUs' comprehensive land use plans, and into NGAs' development plans and policies. Therefore, the following are the strategies to be implemented:

a) Aquaculture and Inland Fisheries

- Increase in production and productivity by prioritizing aquaculture development through marine cages, brackish water and freshwater ponds, swamps/marsh fisheries.
- Provision of technical assistance and extension services to the LGUs and private individuals;
- Dissemination of fisheries technologies and rehabilitatation of fish farms;
- Distribution of quality fish broodstock and fingerlings to fisherfolk;
- Establishment of Mariculture Parks in coastal provinces and focus support in strategic areas;
- Improvement of production-marketing system linkage to become more efficient and effective;
- Collaboration with SUCs on research and extension in accessing appropriate technologies, and in assisting them in the evaluation of programs; and
- Promotion of production-intensifying but cost-reducing technologies within ecological limits

b) Municipal Fisheries

- Capacity-building and empowerment of f LGUs to assume their primary responsibility towards food security and resource management;
- Intensification of conservation and protection of the fisheries and aquatic resources especially the development of municipal waters;
- Strengthening the complementation and counterparting scheme with LGUs in providing fishery projects and linking them to private sector in availing credit to boost their livelihood projects; and
- Strengthening fisherfolk organizations and provision of alternative livelihood and provision for credit component;

c) Commercial Fisheries

- Implementation and operationalization of Vessel Monitoring Device (VMS) to registered commercial fishing vessels in the region.;
- Development and implementation of post-harvest facilities and construction of modernized fishing port facilities;
- Establishment of one-stop shop fisheries trading center to market fishery products;
- Promotion of joint-venture among commercial fisheries through provision of fiscal incentives;
- Intensification of fishery inspection and quarantine services;
- Establishment of fishing vessels support fund;
- Promotion of the RORO (Roll on-Roll of) concept of handling fishery products;
- Streamlining the process of export and import of fishery products; and
- Installation of the Philippine Fisheries Information System (PhilFIS).

Targets

The projected fish requirement is 118,354 MT by 2040 (using the 2002-2003 data per capita consumption of 26.8 kilograms per year).

TABLE 17. PROJECTED FISH REQUIREMENT (IN MT)

Year	Bukidnon	Camiguin	Lanao del Norte	Misamis Occidental	Misamis Oriental	TOTAL
2013	27,582	2,329	16,583	8,643	18,590	73,728
2014	28,185	2,358	16,682	8,784	18,987	74,994
2015	28,801	2,386	16,780	8,926	19,392	76,286
2016	29,431	2,416	16,880	9,071	19,805	77,602
2017	30,074	2,445	16,980	9,219	20,228	78,945
2018	30,731	2,475	17,080	9,369	20,659	80,314
2020	32,089	2,536	17,283	9,676	21,550	83,133
2030	39,834	2,863	18,334	11,368	21,550	93,949
2040	49,449	3,232	19,450	13,356	32,867	118,354

**Estimates by RLUC-TWG*

Programs/Projects

In order to increase fish production and ensure its sustainability, the fishery sector shall implement programs, projects and activities on aquaculture and inland fisheries development as follows: Fisheries Enterprise Development to modernize fisheries production and marketing aspect; Fisheries Resource Management to conserve and protect coastal resources for sustainable productivity of municipal and commercial fisheries; Extension, Support Education and Training services to enhance capacity of regional and local implementing units; and Fisheries Research and Development to ensure the sustainability of appropriate fisheries technologies for adoption by the fishing industry and enhance global competitiveness. The following are the interventions and targets of each component from 2013-2040:

a) Aquaculture and Inland Fisheries Development

- To increase aquaculture productivity of Tilapia, Bangus, Seaweeds, and other commercial fish species;
- To produce and disperse quality fish broodstock and fingerlings; and,
- To improve product quality and reduce post-harvest losses through the development of fisheries post-harvest facilities.

b) Fisheries Enterprise Development

- To provide a favorable policy environment conducive to increased investment and global competitiveness;
- To optimize offshore and exploitation of Pacific-side EEZ and adjacent high seas by providing support financing to commercial fisheries operators;
- To improve the marketing system through establishment of trading centers;
- To strengthen the Fisheries Inspection and Quarantine services; and,
- To install and operationalize the Vessel Monitoring Satellite to monitor and track fishing vessels operating both on the high seas and national waters.

c) Fisheries Resource Management

- To develop and install a Regional Fisheries Information System;

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- To formulate and adopt coastal resource management plans in all coastal municipalities of the region;
- To establish a Monitoring, Control, and Surveillance system that will effectively implement conservation and protection of marine resources; and,
- To strengthen and empower the Fisheries and Aquatic Resource Management Council (FARMC).

d) Extension, Support Education and Training Services

- To effectively render technical advisory services to LGUs;
- To facilitate the organization of fisheries stakeholders; and,
- To develop the capacity of LGUs through trainings, fisheries demonstration ~~projects,~~projects and scholarships for field technicians.

e) Fisheries Research and Development

- To conduct on-farm Research and Development on the three banner commodities: tilapia, bangus and seaweeds;
- To conduct on-station Research & Development projects on high value species like pompanio, lapu-lapu, kitong, and ulang; and~~,~~
- To conduct assessment and verification studies of production sites and fisheries species in the region.

4.3.2.4. Production Forest

The existing forest areas are either by virtue of land classification or actual cover. They occur in slopes below 50 percent and are predominantly under second growth dipterocarps with grass and brush undergrowth.

Goal: Optimize land productivity, enhance ecological stability and improve the socio economic condition of forest occupants, and communities in the upland and coastal areas.

Objectives:

- To effectively manage and protect forest;
- To meet the needs of the region for wood and other forest products;
- To establish development projects to support the needs of wood-based industries;
- To improve and develop plantation forest, including bamboo, and tree farm to increase productivity;
- To conserve, develop and manage below 50 percent slope and below 1000m above sea level of forest area; and~~,~~
- To contribute to employment opportunities in the region.

Strategies and Policy Options:

- Gradual replacement of coconut trees on the steeper slopes with forest trees to maintain a forest cover for soil and water conservation purposes;
- Management of regenerated and natural forests for their multiple use values – slope and soil protection; watershed for domestic and agricultural use; wildlife sanctuary; maintenance of a healthful environment; wood supply,etc.;
- Promotion of natural regeneration of forest or fruit trees where suitable;

- Regulate cutting of useful vines, herbs, medicinal plants, palms, pandan, tree ferns and common ferns in demand by flower shops, ensure that harvesting rate does not exceed these species capacity to regenerate;
- Establishment of tree nurseries in each barangay, where tree seedlings of all kinds can be raised to meet tree planting needs of the barangay for soil stability and water supply conservation;
- Encourage residents to establish, backyard tree farms to plant ornamentals and booming plants to meet growing demand of cut-flower markets; and,
- Production/plantation forest in areas within 30-50 percent slope to be reverted as protection areas.

Targets:

TABLE 18. PROJECTED PRODUCTION FORESTS, REGION X (IN HECTARES)

Components	2011-2020	2021-2030	2031-2040
1. Second Growth Forest	87,532.08	87,532.08	87,532.08
2. Mangrove	2,030.00	2,030.00	2,030.00
3. Rangeland for grazing	18,068.00	18,068.00	18,068.00
4. Industrial Forest Plantation	44,664.00	44,664.00	44,664.00
5.Areas for Community Forest	159,527.09	159,527.09	159,527.09
6. Forest Plantation	27,720.00	40,000.00	54,474.00
7. Built-Up area	4,171.68	4,171.68	4,171.68
TOTAL	**355,992.85**	**370,466.85**	**370,466.85**

NOTE: Industrial Forest Plantation under agreements, portion of which is part of areas projected under Community Forest.

4.3.2.5. Mineral Resources

Goal: The region envisions a mineral industry that is prosperous, socially, economically and environmentally sustainable, with broad community participation while significantly contributing to poverty alleviation and improvement in the general economic well-being of the nation.

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Objectives:

- To promote responsible mining as one of the region's major sources of wealth and encourage sustainable utilization of mineral resources;
- To protect the environment and mitigate the negative impact of mining activities;
- To ensure the mining industry's compliance with laws and policies on conservation, protection and rehabilitation; and,
- To rationalize the use and extraction of minerals for regional and national development.

Strategies:

- Environmental impact, as well as potential revenue generation shall be given equal consideration in evaluating proposals for mining and quarrying
- Promotion of Investments in Sustainable Development of Mineral Resources:

- Processing and approval of mining rights of application;
- Continuation of the cleaning process on inactive/dormant mining rights and applications;
- Simplification on mining tenement processing procedures;
- Strengthening the operations of the Regional Panel of Arbitrators to fast-track the resolution of mining cases;
- Generation/production of GIS-based mining tenement maps; and
- Formulation and review of policies on mineral resources development

- Mine Community Development
  - Institutionalization of the Social Development Management Program (SDMP) for all mining/quarrying companies/operations;
  - Operationalization and monitoring of mining company commitments for community development;
  - Monitoring of the implementation of mining company commitments for science and technology development in mining operations;
  - Provision of technical assistance for mine development, environmental protection, and mine safety and health to small scale miners; and
  - Provision of technical assistance to LGU's re: community water well development and sanitary landfill site identification.

- Mine Environmental Protection and Rehabilitation
  - Full operationalization of the Contingent Liability and Rehabilitation Fund (CLRF) / Mine Rehabilitation Fund (MRF)/ Monitoring Trust Fund (MTF) in all mining operations;
  - Intensification of monitoring of environmental protection and rehabilitation programs (EPEP);
  - Full operationalization and active participation of LGU's and NGO's in the multipartite monitoring team;
  - Active promotion of mine safety, health and environmental protection through award conference, reforestation and rehabilitation programs;
  - Continuing expansion of the "Adopt-a-Tree ,Adopt-a-Forest" movement for mine site reforestation and rehabilitation;
  - Conduct of studies and assessment of abandoned mine/quarry sites for future rehabilitation/enhancement program; and
  - Conduct of training programs for LGU and NGO participants in the multi-partite monitoring teams to strengthen partnerships and effectiveness.

- Advocating and Intensifying Information, Education and Communication Campaigns
  - Strengthening the IEC campaigns with religious groups, LGU's, NGO's, POs, and other stakeholders;
  - Strengthening linkages with the local organizations for the creation of mining industry support groups;
  - Active participation in local and/or national tri-media programs/publications to address mining issues and concerns;
  - Establishment of a Mining and Geological Museum;
  - Publication of mining and geosciences information materials, including mineral statistics, Mineral Gazette and policy issuances;

- Publication of geologic maps and reports relative to geology, geologic hazards, groundwater resources, landfill site development, and engineering geology;
- Institutionalization and operationalization of the MGB website and e-mail system in line with the MGB's Strategic Mineral Information System (SMIS); and
- Conduct of regional and national mining summits and other related fora

- Application of Geosciences and Mining/Processing Technologies:
  - National geohazard mapping, quadrangle mapping and hydrogeology;
  - Assessment on the proper valuation of minerals through the Philippine Economic, Environmental & Natural Resources Accounting (PEENRA) system;
  - Conduct of metallurgical researches for claque upgrading and environmental mitigation in mining operations;
  - Geological, geophysical and geo-environmental mapping of the Philippine marine coastal areas;
  - Development and establishment of mine environment/mining tenements monitoring systems;
  - In-depth study on best practices in mining/quarrying technologies;
  - Technical assessment of quarry resources for possible delineation of Quarry Zones; and
  - Assessment of mine blasting practices and associated risks.

- Linkages and International Commitments
  - Provision of technical assistance to the Provincial/City Mining Regulatory Boards (P/CMRB) and the Multi-Partite Monitoring Teams (MMTS);
  - Strengthening of linkages with national and international institutions on minerals supply and trade, mining investment, mine environment protection, corporate and social responsibilities and geosciences development like ASEAN, UNEP, JICA, World Bank, CCOP, WSSD, APEC among others; and
  - Provision of technical assistance to LGU's for development projects and land use planning.

4.3.2.6. Tourism Development

The sustainable development of the tourism industry in Northern Mindanao is ensured through the interactive factors of product availability, affordability, diversity, accessibility, and power to attract different market segments. Appropriate combinations of these factors will enable the region's tourism sector address market demands, which have proved its potential as destination for meetings, conventions, and exhibits, but more so for investments. The region shall be promoted as eco-tourism and agri-tourism destination, while preserving its cultural and historical heritage. Through these stimulating and positive images, the region's tourism sector shall strongly respond to the challenge of putting the country's unique tourism resources in the global competency. Ensuring Northern Mindanao to be in the tourism map of Asia is the first step towards achieving this goal.

Anchored on the above scenario, Northern Mindanao positioned as a culturally diversified eco-tourism destination shall promote its different potential destinations through the

tourism hub positioning strategy. Essentially, it shall provide the necessary support for a more dynamic private-government sector partnership in implementing positive tourism activities, and putting in place globally competitive facilities and services. Thus, it shall continuously work in linking the private sector, government line agencies and non-government organizations together in establishing a heightened, favorable, and focused direction towards developing, promoting and protecting the region's environment; its men, women and children; and their culture.

Policy Framework

Tourism industry in Northern Mindanao is primarily contributory to the overall economic life of communities. It is recognized to contribute significantly in reducing poverty and unemployment, improving the quality of life, and in achieve global competency. The Philippine Tourism Master Plan (PTMP) as translated in the Northern Mindanao Regional Tourism Master Plan (NMRTMP) shall guide the tourism development in the region. It is therefore the objective of the NMRTMP to position varied potential products into a cohesive development theme, thus enhancing socio-cultural and environmental sustainability.

Establishing a wholesome image of the region through a cluster-cohesive approach will allow tourism a gainer for domestic and foreign travelers, visitors, exhibitors, and innovative investors of eco-tourism and agri-tourism activities. Capturing the high-spending segment of travelers will result to economic boost in terms of benefit dispersal to countryside tourism and urban service centers. The industry will likewise open or widen opportunities for employment. Business incentives shall be adopted and policies that entice travel (i.e., transportation, communication, access road, infrastructures, etc.) and environmental protection (easements, carrying capacity, indigenous peoples' participation, etc.) shall be pursued.

Tourism development shall be the joint responsibility of the LGUs, and the community representing the private groups led by practitioners directly involved in the industry. Eco-tourism shall be promoted and continue to serve as an avenue to further appreciate environmental conservation, preserve cultural heritage, and institutionalize community-based tourism.

The promotion of tourism culture shall be instilled to spontaneously draw local folks or community participation principally geared towards achieving and maintaining a clean, beautiful, peaceful, progressive, cordial, and hospitable region. It is hoped that the identity of the region through volunteerism will greatly surface. Advocacy to gender sensitive policies, socio-cultural-environmental enhancement shall be consistently promoted.

As a unifying factor, tourism as a tool towards peace and global understanding shall be upheld.

Strategies and Policy Options

a) Development of diverse destinations and attractions

Based on the cluster/hub development approach in the NMTMP, diverse tourism destinations and attractions will entice a wide range of market. This development is

regarded an appropriate response to the economy of rural areas with potential tourism endowments. The region is enhanced with a variety of attractions and adventure products that would greatly boost the tourism industry.

b) *Restoration, rehabilitation, and maintenance of landmarks*

Historical sites and landmarks are considered priced assets of the industry. The plan aims to institutionalize restoration, rehabilitation, and preservation of these locations that highlight communities' identity and history. In addition, tourism shall be evaluated for their income generation potential, environmental integrity, and welfare of local native residents,among others.

c) Establishment of inter-intra regional routes

Presence of diverse unique, thematic destination and cultural practices/activities in the region are tremendous components to promote viable tour packages which can be transshipped to different regions in Luzon, Visayas through the east and west borders and various Mindanao areas.

d) *Adoption of a national eco-tourism strategy*

The national eco-tourism strategy, which promotes and develops eco-tourism in the country, establishes network of sites and products, encourages community participation, preserves natural and cultural resources, promotes environmental ethics and fosters economic benefits shall be pursued in the region to serve as a means of alternative livelihood.

In line with the development priorities as embodied in the NMTMP and in pursuing community-based tourism development in identified ecotourism and agri-aqua tourism sites in the region, the following are the development strategies for each of the proposed typical developments.

Tourism Feature: Typical Beach Resort Development. The focus will always be the natural asset of the area, the beach. Hence, all developments will be undertaken with the aim of enhancing this asset. Moreover, no hardscape will be constructed that can distract the visitors. Structures will be constructed hugging the terrain and will be dispersed within the area. Parking will be located adjacent to the access and away from cottages or rooms. Access to the main pavillon and the cottages will be through well-maintained pathways.

Typical Cave Site Development. The focus shall be the core or the interior of the caves. This along with the cave's environs, shall be preserved as much as possible. The only structure which shall be allowed in the vicinity of the caves will be a small pavilion that house a restaurant, a rest area and a souvenir shop.

Typical View Park Development. The focus will be the natural asset of the area. Structures will be constructed along the view area which will include a picnic area, a restaurant, a kitchen and service areas. Enough clean and well maintained rest rooms shall also be provided. The building materials of the structure shall be of the make and color which well blend well with the natural environment.

Other Site Development Concepts. The region abounds in waterfalls, but previous developments on such tourism attractions have been haphazard and, most often have caused the destruction of the areas' primary attraction. This is also true of the many caves, springs, lakes, islets and marine parks which have been developed into public swimming areas. In this regard, site development concepts should be done in such a manner that it will not destroy its pristine beauty.

Priority Legislative Agenda

Policy bottlenecks in the area of cultural preservation have to be resolved through enactment of a heritage law that will harmonize all existing legislations on the preservation, restoration and conservation, and management of cultural and historical properties nationwide.

The protection of consumers from unscrupulous travel agents, tour operators and other service providers will be addressed by amending the Local Government Code to require coverage within the Department of Tourism's (DOT) accreditation program of concerned tourist establishments licensed by the LGUs. The adoption by the LGUs of the DOT's standards and guidelines for tourism development needs to be institutionalized.

The National Land Use Act will have to be enacted to provide for the designation of tourism development areas. Executive Order No.125-A, which attached the Civil Aeronautics Board (CAB) to the Department of Transportation and Communications (DOTC), will have to be amended to reorganize the CAB and provide for the DOT's membership in the Board.

The amendment of Executive Order No. 226 or the Omnibus Investments Code of 1987 to make the incentive system responsive to the needs of investors will prioritize tourism-related activities.

Targets

Based on the trend, the tourism sector is projected to bring in 13 percent and 17 percent annual increase in domestic and foreign arrivals, respectively, for the period 2013-2040. This will be achieved through the concerted efforts of the government, private sector and non-government organizations in promoting the tourism industry. This shall be augmented by the operations of more airlines, which would open direct flights to various parts in Mindanao and Visayas, as well as to countries of Brunei, Indonesia, Malaysia as offshoot of the BIMP-EAGA initiatives. The incoming operations of more fast vessel-carriers will likewise increase the volume of travelers from across the country.

Moreover, the development of the region's tourism hubs, which shall cater to the different interests of domestic and foreign tourists, is expected to sustain high utilization rates of local facilities and services.

Likewise, the development of eco-tourism sites through the LGUs' initiatives in improving access roads and strong partnership with the private sector for upgraded facilities is anticipated to attract more travelers to the region's tourism sites.

The industry's improved performance is expected to increase job opportunities, expand or open up new businesses, and raise tourist receipts of local industries.

TABLE 19. TARGETS ON TOURIST ARRIVALS, REGION X: 2013-2040

Year	Domestic	Foreign	Total
2012 (Actual)	1,421,688	61,113	1,482,601
2013	1,961,143	174,667	2,135,810
2014	2,215,567	204,126	2,419,693
2015	2,502,998	238,553	2,741,550
2016	2,827,718	278,785	3,106,503
2017	3,194,565	325,804	3,520,369
2018	3,609,004	380,752	3,989,756
2019	4,077,209	444,967	4,522,176
2020	4,606,155	520,013	5,126,168
2021	5,203,723	607,715	5,811,438
2022	5,878,815	710,209	6,589,024
2023	6,641,488	829,989	7,471,477
2024	7,503,105	969,970	8,473,075
2025	8,476,501	1,133,559	9,610,061
2026	9,576,179	1,324,739	10,900,918
2027	10,818,521	1,548,161	12,366,682
2028	12,222,034	1,809,265	14,031,300
2029	13,807,629	2,114,406	15,922,035
2030	15,598,927	2,471,009	18,069,936
2031	17,622,615	2,887,755	20,510,369
2032	19,908,840	3,374,787	23,283,627
2033	22,491,664	3,943,959	26,435,622
2034	25,409,563	4,609,124	30,018,687
2035	28,706,009	5,386,472	34,092,480
2036	32,430,111	6,294,923	38,725,033
2037	36,637,349	7,356,588	43,993,937
2038	41,390,404	8,597,307	49,987,711
2039	46,760,084	10,047,279	56,807,363
2040	52,826,386	11,741,794	64,568,180

Source: DOT-~~10~~X

4.3.2.7. Agri-Industrial Areas

Agri-industry plays a critical role in regional and national development because of its relationship with agricultural production and urban marketing. It presents the primary methods for transforming raw agricultural products into finished products for consumption. Thus, the importance of processing rises correspondingly with intensified agricultural production. It likewise poses new backward demand to the farm sector for various raw materials and products and consequently opens new opportunities for creating additional farm revenues. This facilitates the entry of subsistence farmers to the commercial market and further induces agricultural diversification. Thus, the multiplier effects of agri-industry on downstream and upstream industries translate to rural development, increase in land and labor productivity and overall economic growth.

Goal and Objectives

The goal is to have a progressive and sustainable economy propelled by agri-industries owned and managed by self-reliant and empowered farmer-entrepreneurs contributing largely to economic growth and develop global competitiveness of the region's small and medium enterprises (SMEs) where the bulk are the micro industries. To meet this goal and to promote rural agri-industrialization adhering to the principles of equitable distribution, ecological balance, optimal resource utilization and sustainable development, the following objectives shall be attained:

- Integration of rural agro-industries with small farming systems to capture economies of scale in plantation agriculture;
- Vesting rural farmer-beneficiaries with the control of agri-industrial enterprises and strategic allied industries through the strengthening of technical, management and leadership capabilities;
- Enhancement of the availability and distribution of food supplies to contribute to national food security over the long-term;
- Creation of rural employment opportunities and improvement of rural dwellers' income and living conditions;
- Expansion of enterprises by increasing number of new SMEs by 60 percent. This would lead to graduation of micro-enterprises into SME plus new entrants; and,
- Accelerating growth of the Priority Industry Clusters, to include the Priority Focus Areas (PFAs) of the region , through increased investments, sales, number of firms and productivity indices.

- Enhancement of agri-industrialization growth in key resource areas in the region through the establishment of additional agri-industrial centers;
- Adoption of Industry Clustering;
- Operationalization of PEZA Board-approved economic zones and industrial centers;
- Industrial and commercial land use should be properly located in consideration of their pollution impact and other environmental concerns;
- Development of new agri-industrial economic zones in the region to support the needs of growing fruit and vegetable-based processing plants and packing industries;
- Enhancement of operation of SMEs to become more competitive both at the local and international markets; and,
- Provision of support to firms embarking on the production of "green" or environment-friendly products that include the concept of climate change adaptation in doing business.

Programs/Projects

a) **Establishment of the Manolo Fortich Agri-Industrial Zone -** This proposed 30-hectare Agri-Industrial Zone is located at Barangay Mantibugao, Manolo Fortich, Bukidnon. This will be developed to serve as a consolidation area for goods from production places in Bukidnon and from Central and Southern Mindanao. It can be a holding/processing area for goods to be shipped out in the Mindanao International Container Terminal (MCT) located at the PHIVIDEC Industrial Estate.

b) **Establishment of the Metro Iligan Agri-Industrial Center (MIRAIC) -** The MIRAIC is located in the municipality of Linamon, Lanao del Norte, 12 kilometers from Iligan City. It admits locators catering to both foreign and domestic markets but the priority are those that serve as downstream industries of the existing industrial plants. Out of the 416 -estate, 29 hectares constitute an Export Processing Zone (EPZ), a manufacturing enclave where locator industries are given duty and tax holidays on condition that their products are exported and that all imported intermediate goods are not outside the zone.

Approximately 588 locators, occupying lots ranging form 2,250 to 9,600 square meters in size, can be accommodated in the MIRAIC. When fully operational, the center can generate employment of 33,000 people.

4.3.2.8. CARP Completion

Access to land and resources is essential to attain food security, poverty reduction, sustainable rural development and industrialization. The Comprehensive Agrarian Reform Program (CARP) plays a significant role to achieve this goal being vested the constitutional mandate to acquire and distribute private agricultural lands, provide support services and deliver agrarian justice in order to promote social justice and equity. It envisions of "A nation where there is equitable land ownership with empowered agrarian reform beneficiaries who are effectively managing their economic and social development for a better quality of life."

Goals and Objectives

- To sustain and monitor land distribution;
- To revitalize the Philippine countryside through socio-economic reforms and agri-industrial development; and,
- To intensify program beneficiaries development to make agrarian reform areas more economically viable and globally competitive.

In tandem with the integrated rural development approach of other partner agencies, the focus of development shall be towards agricultural enhancement cum community empowerment.

Strategies and Policy Options

To expedite the completion of the land redistribution program and ensure success among its beneficiaries, the following shall be implemented:

- Synchronization of acquisition and distribution of land to target beneficiaries;
- Strengthening the Land Tenure Improvement (LTI) Monitoring System;
- Review of all lands that are classified as deductibles and problematic;
- Directing a pool of resources and creation of a Task Force to intensify land distribution activities in Lanao del Norte who has the biggest share of the land distribution balance;
- Review of procedures/ guidelines and intensify information dissemination on penalties and sanctions on premature and illegal conversion of agricultural lands;

- Strengthening database through the Swede survey technology by integrating the land information and the geographic information systems where thematic maps are produced;
- Planning of a precise development intervention for the AR Zones with the use of spatial relationships through overlay of data on terrain, people, crops, existing road networks, facilities, rivers, market and production centers;
- Review of existing computer-based systems and develop new systems that will provide cross-checking and validation of accomplishments to include landowners and beneficiaries identification across regions and partner agencies such as DENR, LBP and LRA-ROD;
- Intensification of agricultural leasehold agreements within retained areas to ensure the security of tenure of farmers especially in coconut areas;
- Strengthening government-support price on major crops, corn and palay and coconut;
- Work closely with the Land Bank to come up with a system to improve and/or shorten the land valuation and compensation process. The DAR and Land Bank should assist landowners affected by CARP by providing investment information and alternative schemes, marketing or exchange of their LBP bonds to government stocks and/or with government assets;
- Pursue swift and just delivery of agrarian justice;
  - Dispense agrarian justice not only to the farmers but also to the landowners;
  - Land Bank to provide just compensation to reduce the volume of land valuation cases filed at the DAR Adjudication Board. It shall consider fair market value and intensify the processing of land transfer claims. The Central Bank clearance as required in Lanao del Norte shall be dispensed.
- Prosecution of CARP violators must be pursued;
- The compensation/salaries of adjudicators, lawyers, para-legal officers shall be upgraded and standardized to prevent them from looking for better opportunities outside of DAR;
- Train Municipal Agrarian Reform Officers in handling alternative agrarian dispute resolution and mediation to prevent issues from becoming full-blown cases;
- Rationalization, integration and institutionalization of the delivery of support services to the farmers through convergence of efforts of DAR, DA, DENR, LGUs and other sectors;
- Integration of ARCs and adjacent barangays with the Agrarian Reform Community Connectivity and Economic Support Services (ARCCESS) with DA's Strategic Agriculture and Fisheries Zones(SAFDZs) into viable economic agrarian reform zones and shall be called ARCCESS Zones to cater the needs of more ARBs not just in ARCs but also those outside ARCs-;
- Operationalization/administration of the ARCCESS Zones;
- Intensifying social marketing of the program to attract more foreign assistance to projects in ARCs and ARCESS Zones; and
- Encourage ARBs to become members of cooperatives.

Targets

The land acquisition and distribution task will be completed by CY 2016.

TABLE 20. PROJECTIONS ON LAND DISTRIBUTION, REGION X, 2012-2016 (IN HECTARES)

Province	Scope	Accomp. as of 2012	PROJECTIONS					
			Balance as of 2012	2013	2014	2015	2016	TOTAL
Bukidnon	168,687	148,041	20,646	6,041	10,946	3,659	-	20,646
Camiguin	2,626	2,490	136	33	53	50	-	136
Misamis Occidental	27,903	24,715	3,188	2,497	681	10	-	3,188
Misamis Oriental	37,580	36,170	1,410	542	844	24	-	1,410
Lanao del Norte	95,867	72,518	23,349	9,210	6,010	8,128	-	23,349
TOTAL	**332,663**	**283,935**	**48,728**	**18,323**	**18,535**	**11,870**	**-**	**48,728**

Source: RDR 2010

TABLE 21. AGRARIAN REFORM COMMUNITIES LAUNCHED/MAINTAINED, REGION X, 2013-2040

Province	As of 2012	2013 Targets	ARCs to be maintained (2016-2040)
Bukidnon	51	2	53
Camiguin	8	-	8
Misamis Occidental	45	-	45
Misamis Oriental	41	1	42
Lanao del Norte	27	1	28
TOTAL	**172**	**4**	**176**

The ARCs will be integrated into the ARCCESS Zones to sustain the gains in the ARC Development Program and optimize the use of resources through convergence of interventions and complementation of efforts with various major government programs: the SAFDZs, ARCCESS, etc.

In 2013, there will be two remaining ARCs to be launched. At the end of the planning period, ~~a total of 176~~176 ARCCESS zones will be maintained. These are envisioned to be the hub of agro-development to pool and maximize DAR's support services for farmer beneficiaries and will become the agency's focus of development interventions until 2040.

4.3.3. Protection Land Use

Protection Land Use refers to the use of areas that need to be protected because of their special values, and the use of hazard prone areas where there are existing settlements and man-made structures. These areas include the following: a) areas declared as belonging to the National Integrated Protected Areas (NIPAS) system per Republic Act (RA) 7586; b) Non-NIPAS areas which are outside the NIPAS areas requiring equivalent amount of protection; and, c) environmentally constrained areas; d) severely-eroded areas; and e) areas with Certificate of Ancestral Land/Domain Title (CALT/CADT).

The region's existing protected areas are shown in Map 4~~8~~6. A total of 1,152,780 hectares or about 57 percent of the the region's total land area are considered for protection. Existing NIPAS areas comprised around six percent of the total land area and about 10 percent of the total protected areas in the region.

The Non-NIPAS areas, on the other hand, are those with elevation higher than 1,000 meters above sea level (masl) and having slope above 50 percent. Approximately, the areas were derived through GIS simulation using Digital Elevation Model as reference in the absence of actual data for analysis. The non-NIPAS areas covered 642,949 hectares, about 56 percent of the total protected areas in the region.

The environmentally constrained areas are also considered as one of the areas that ought to be protected. The region is potentially at risk to both hydrometeorologic and geologic hazards. Specifically, in terms of hydrometeorologic hazards, the region is prone to flooding, rain-induced landslide, and storm surge. For geologic hazards, the region have varying levels of susceptibility to ground shaking, ground rupture, and earthquake-induced landslide, among others. However, considered for the protection land use analysis (using GIS) are those only areas that are highly susceptible to flooding, rain-induced and/or earthquake-induced landslide, and tsunami.

Around 50 percent of the protection areas are prone to flooding, landslide and tsunami. Hence, the region give emphasis on these identified ~~environmentally~~ reduce risks, in terms of loss of lives and damage to properties that may be brought about by natural hazards. Further, the protection land use also ensures the proper management of the region's natural resources, particularly the critical ecosystems, to achieve ecological integrity and sustainable development that will benefit the present and future generation.

Meanwhile, severely eroded areas comprised 48 percent of the total protection areas. Appropriate interventions and ~~rehabilitatation~~rehabilitation measures are urgently needed further damages to properties specifically to the production areas which may have an impact on the food sufficiency of the region.

Areas with CALT/CADT are likewise considered as protection areas to ensure that ancestral land/domain rights of the indigenous people are recognized and honored pursuant to RA 8371 or the Indigenous People's Rights Act of 1997 (IPRA). The approved CALT/CADT currently covered a total of 244,911 hectares or 21 percent of the total protection areas.

By 2040, the protection areas shall be increased to 1,274,668 hectares or an increase of 11 percent from 2013 (Table 21). The increase is due to the additional areas proposed under NIPAS, as well as, those agricultural areas encroaching the existing and proposed NIPAS areas that will be reverted to protection areas (also discussed in production land use section). The proposed NIPAS areas shall increase to 237,541 hectares by 2040 or more than a hundred percent increase from the 2013 level. The total NIPAS areas shall comprise 19 percent to the total protection areas by 2040.

TABLE 22. EXISTING AND PROPOSED PROTECTION LAND USE, REGION X: 2013 & 2040

PROTECTION LAND USE (In Hectares)	Existing Area (2013)	% Share to Total Protection Areas	Proposed Area (2040)	% Share to Total Protection Areas	% Change (Proposed vs. Existing)
Protection Land Use	**1,152,780**		**1,274,668**		**10.57**
NIPAS Areas	115,634	**10**	237,541	**19**	**105.42**
Non-NIPAS Areas	642,949	**56**	642,949	**50**	**-**
Environmentally-constrained areas	578,846	**50**	578,846	**45**	**-**
Severely-eroded Areas	551,895	**48**	351,895	**43**	**_36.24**
Areas with CALT/CADT	244,911	**21**	244,911*	**19**	**-**

Source of Basic Data: DENR-X for Protected Areas/NIPAS shapefile
Notes: 1) Areas may overlap with the other, hence, all areas considered for protection will exceed the total protection area; and 2) Areas were GIS-derived and are approximate only; 3)- NCIP is still in the process of determining the proposed coverage of CALT/CADT areas in coordination with concerned entities*

Moreover, watershed management and rehabilitation should be the top priority. In terms of management of watersheds, there is a need to stop the indiscriminate cutting of trees, encroachment of settlements in protected areas, which together cause land cover change in the watersheds. Moreover, the development and management of the watersheds are undeniably not only the responsibility of government, but of those depending on it for life support. Research shall investigate how the region's watersheds, wetlands, and river basins can be a lifeline to communities. Meanwhile, as the region is likewise vulnerable to climate change, preventive and adaptive planning should find its way into the LGUs' comprehensive land use plans, and into NGAs' development plans and policies.

4.3.2.9. Overall Goal and Objectives

***Goal**:* To achieve and sustain an acceptable level of environmental quality.

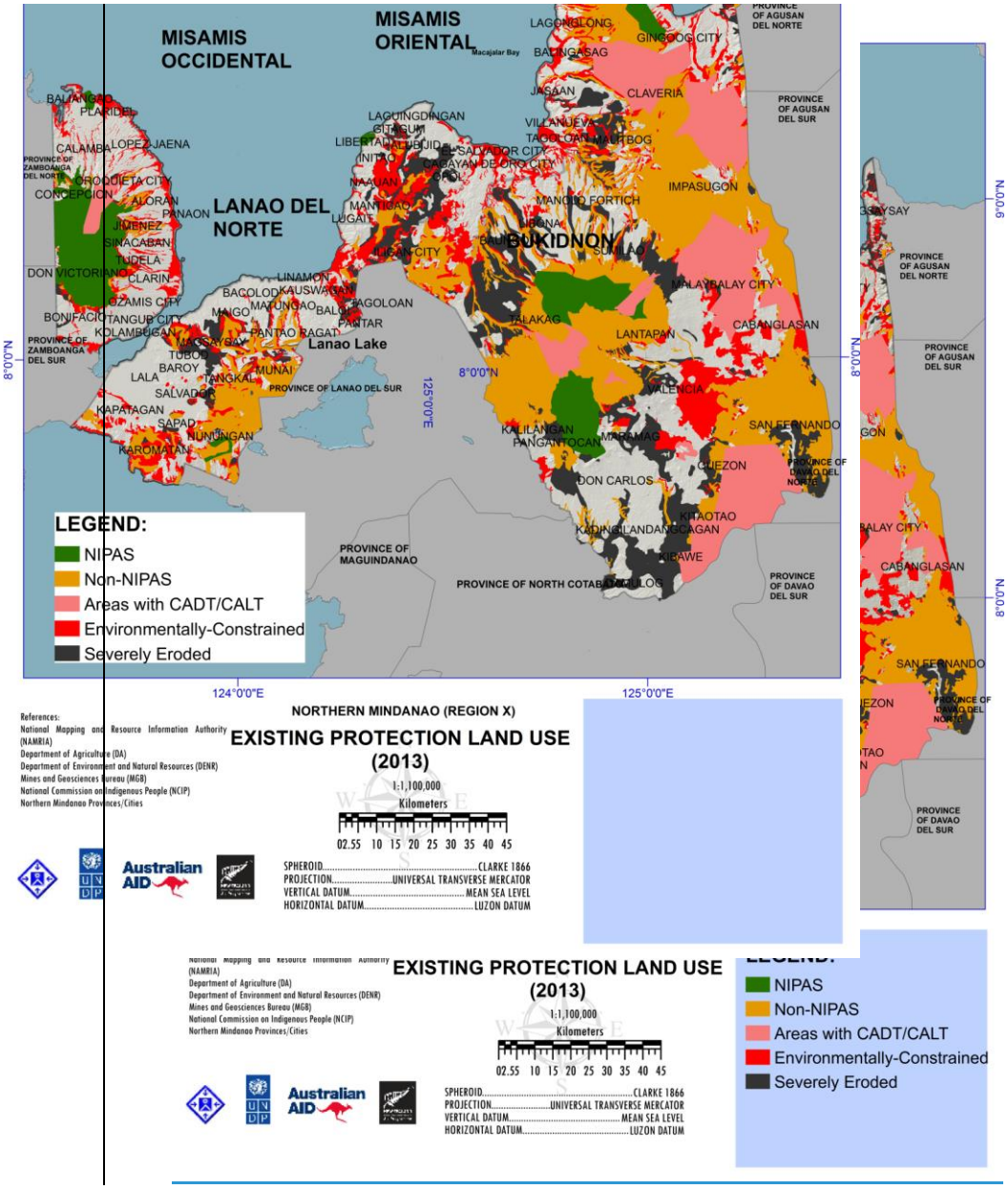
Objectives:

- To protect sensitive and critical ecosystems from human intrusion;
- To conserve and preserve the natural resources;
- To allow degraded resources to regenerate; and,
- To protect the people from environmental hazards.

4.3.2.10. Overall Strategies and Policy Options:

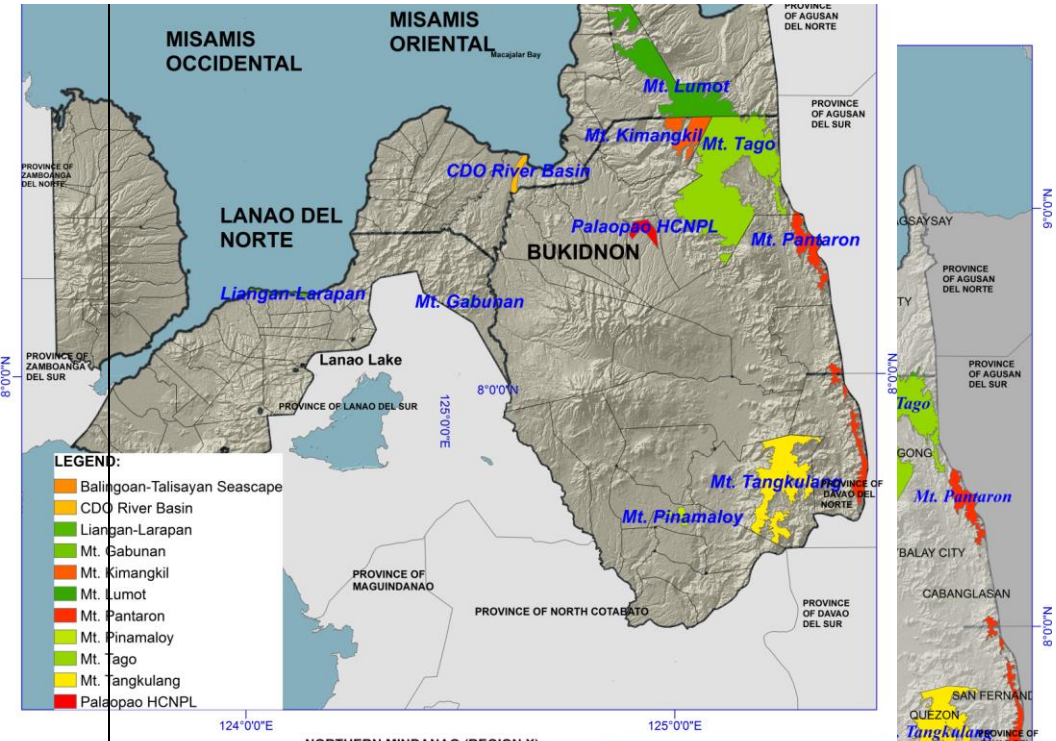
- The ecological function shall be paramount over economic and other considerations when allowing the use of portions of protected areas for production purposes;
- Environmentally-constrained areas shall be properly demarcated and buffered; and
- Implement ecosystem-based approach in implementing hazard mitigation, well as exposure and vulnerability reduction.

MAP 48. EXISTING PROTECTION LAND USE, REGION X: 2013



EXISTING PROTECTION LAND USE (2013)
1:1,100,000
Kilometers
0 2.5 5 10 15 20 25 30 35 40 45
SPHEROID.....CLARKE 1866
PROJECTION.....UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....LUZON DATUM
Australian AID
LEGEND:
NIPAS
Non-NIPAS
Areas with CADT/CALT
Environmentally-Constrained
Severely Eroded

MAP 49. PROPOSED NIPAS AREAS, REGION X: 2040



References:
National Mapping and Resource Information Authority (NAMRIA)
Department of Environment and Natural Resources (DENR)
Northern Mindanao Provinces/Cities

NORTHERN MINDANAO (REGION X)
PROPOSED NIPAS AREAS 2040
1:1,100,000
Kilometers
0 2.5 5 10 15 20 25 30 35 40 45

SPHEROID.....CLARKE 1866
PROJECTION.....UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....LUZON DATUM

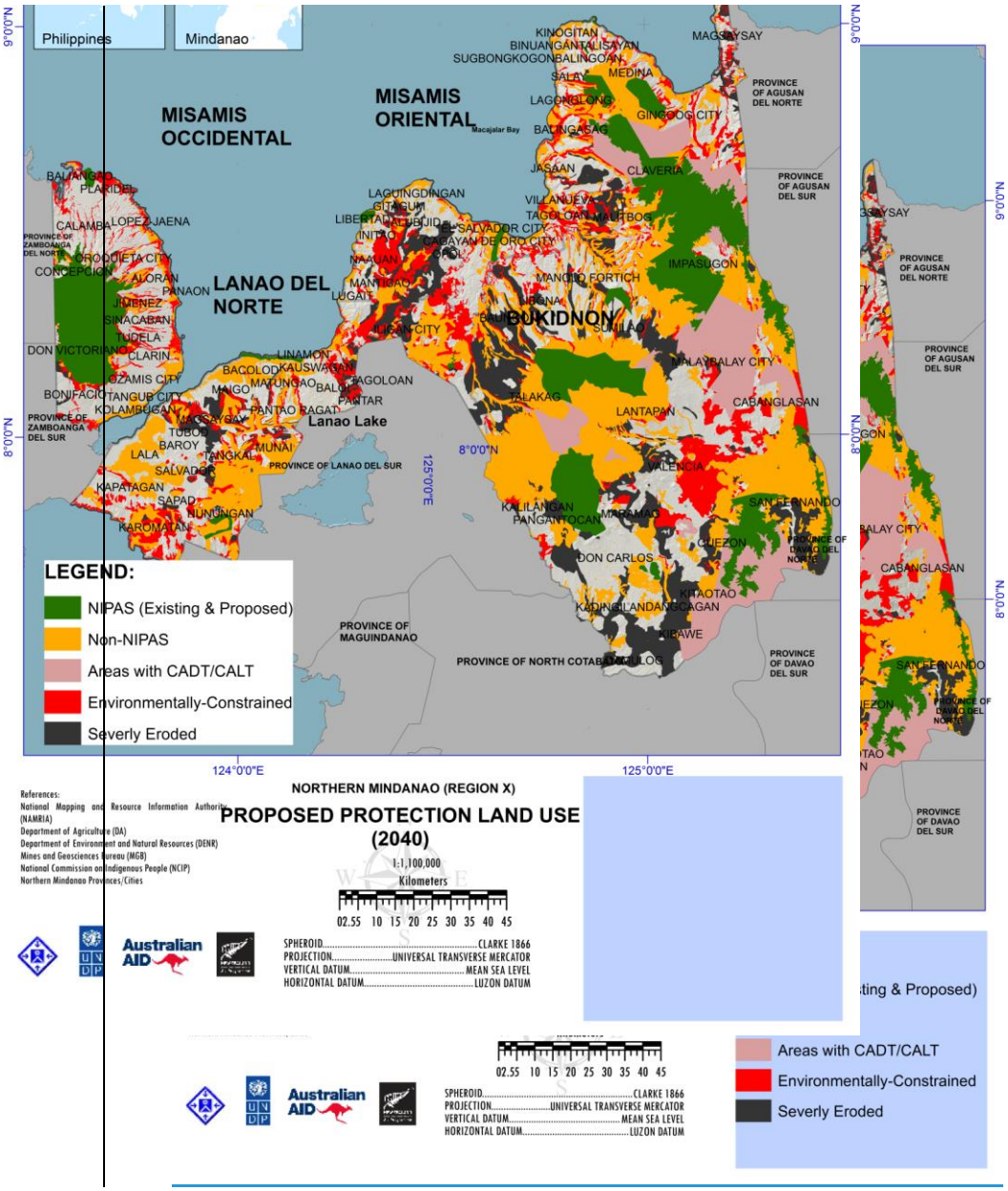
National Mapping and Resource Information Authority (NAMRIA)
Department of Agriculture (DA)
Department of Environment and Natural Resources (DENR)
Northern Mindanao Provinces/Cities

PROPOSED NIPAS AREAS (2040)
1:1,100,000
Kilometers
0 2.5 5 10 15 20 25 30 35 40 45

SPHEROID.....CLARKE 1866
PROJECTION.....UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....LUZON DATUM

LEGEND:
- Balingoan-Talis... Seascape
- CDO River Basin
- Liangan-Larapan Seascape
- Mt. Gabunan
- Mt. Kimangkil
- Mt. Lumot
- Mt. Pantaron
- Mt. Pinamaloy
- Mt. Tago
- Mt. Tangkulang
- Palaopao HCNPL

MAP 50. PROPOSED PROTECTION LAND USE MAP, REGION X: 2040



4.3.3.1. NIPAS Areas

Key Issues and Concerns

a) Unregulated economic activities such as illegal logging and illegal settlements in upland/forest ecosystem threaten the flora and fauna, and the integrity of the protected areas. Deforestation is usually a consequence of human intrusion into the various national parks and other protected areas. Even the buffer zones of protected areas where economic activities are allowed have not been spared from abuse of resource extraction;
b) Small-scale mining activities in some protected areas and watershed areas;
c) Subsistence farming practices of upland dwellers, especially "kaingin", contribute to degradation of forest resources;
d) The implementation of the NIPAS Law is hampered by the absence of accurate and reliable data on the biophysical characteristics and ecosystem dynamics of identified protected areas, which are prerequisites for their classification into NIPAS categories;
e) Land use conflicts among ecological space, agricultural lands and built-up areas have resulted in competing and overlapping land uses; and
f) Absence of a clearly defined boundary of permanent forestlands and other land uses.

Strategies and Policy Options

a) Protection of upland and forest resources shall be pursued under the NIPAS Law (RA 7586). Establishment of additional protected areas to be included in the NIPAS: Mt. Lumot Natural Park, Balingoan-Talisayan Landscape and Seascape, and Cagayan de Oro River in Misamis Oriental; Mt. Kimangkil Range Natural Park, Mt. Tago Range Natural Park, Mt. Tangkulang Range Natural Park and Mt. Pantaron Range Natural Park, Pinamaloy Forest Reserve (FR) and Palaopao Hill Cave Network Protected Landscape (HCNPL) in Bukidnon; and Mt. Gabunan and Liangan-Liarapan Mangrove Forest Reserve (MFR) Protected Landscape and Seascape (PLS) in Lanao del Norte;
b) Wildlife conservation efforts shall pursue the organization and establishment of the following: Regional Wildlife Management Committee (RA 9147); Regional Wildlife Rescue Center; and Regional Biodiversity Center;
c) Development of improved rehabilitation technologies on degraded and marginal areas (e.g. reforestation of denuded areas and engineering conservation measures for heavily eroded areas in critical watersheds, etc.);
d) Promotion of responsible mining;
e) Sustain forest protection through strict enforcement of forest laws with stakeholders' participation to wit:
    - Sustainable utilization of state forestlands shall be pursued under Executive Order No. 318, s. 2004 (Promoting Sustainable Forest Management in the Philippines);
    - Mossy forest pursuant to RA 7586 and Section 1 of AO No. 27 dated July 3, 1993 shall form part of the NIPAS and shall be considered as Strict Nature Reserves and shall not be the subject of exploitation of whatever nature; and
    - Save and protect the remaining virgin forests and other protected areas. Virgin forest and/or old growth forest pursuant to RA 7586 and AO No. 24

dated May 3, 1991, will form part of the permanent national forest estate and cutting of trees within these areas are strictly prohibited.

f) Application of ridge to reef approach through integrated watershed management units as the basis for planning forest development;
g) Establishment of mechanisms that can expand the capacities of stakeholders particularly community stakeholders on good and sound forest management;
h) Adoption of sustainable development approaches for poverty reduction, food security, biodiversity conservation, and climate change mitigation and adaptation with stakeholders' participation;
i) Establishment of protected area management zones to provide the flexibility in the management of each protected area and its attached buffer zones, namely: strict protection zone, sustainable use zone, restoration zone, habitat management zone, multiple use zones, buffer zone, cultural zone, recreational zone, special use zones and other management zone as may be used in the management plan and approved by the Secretary of DENR.
j) Tenured migrants, who have continuously occupied an area for at least five years prior to its designation as part of a protected area and are solely dependent on that area for subsistence, shall be eligible to become stewards of a portion of land within the multiple use management or buffer zone of protected areas;
k) Migrants who do not qualify as tenured migrants shall be resettled outside the protected area;
l) The plans, policies, rules and guidelines governing land and resource use within the territorial domain of indigenous cultural communities shall be done in partnership with the affected groups, in consideration of their rights over livelihood sources: desire to maintain their socio-cultural and spiritual integrity; prevention of degradation of the protected areas; and encroachment by any development activities or outside parties;
m) Proposals for activities which are beyond the scope of management plan for protected areas shall be subject to an environmental impact assessment as required by law before their adoption;
n) Delineation of boundaries will be pursued to define the extent of buffer zones and at the same time identify and regulate activities compatible with the purpose of the protected areas;
o) Identification, demarcation and installation of monument boundaries on protected areas, Non-NIPAS and hazard prone areas. Demarcation of boundaries involving protection areas should be prioritized as follows:
    - First priority should be given to the demarcation of hazard prone areas that pose immediate and/or regular threats to the lives of affected communities. This will help ensure that immediate action is taken towards mitigating or eliminating life threatening disasters;
    - Next priority should be given to demarcating the boundaries between the other protection areas (NIPAS and Non-NIPAS) and non protection areas (settlement, production and infrastructure). This will allow the planning and utilization of non-protection areas to proceed without compromising the integrity of protection areas; and,
    - Subsequent priority should then be given to the demarcation of boundaries among protection areas (NIPAS, Non-NIPAS and other hazard prone areas). This will allow more detailed planning of the different protection areas according to their specific conditions and requirements.

p) Establishment/strengthening of environmental management trust fund for the rehabilitation of degraded environment, monitoring of environmental quality and compliance of users and compensation of affected communities;
q) Identification of critical watershed and intensifying reforestation and forest protection efforts in partnership with LGUs, POs, NGOs and civic organizations;
r) Strengthening/promotion of people's participation in environmental protection;
s) Intensifying information and education campaign on environmental protection through training, symposia, press and radio programs, seminars and the integration of an Environmental Protection subject in all levels of education;
t) Inculcating population and gender concerns and social welfare among upland occupants;
u) Institutionalization of payment for environmental services (PES) scheme; and,
v) Improvement of watershed management particularly those serving key infrastructures (i.e. water supply at Laguindingan Airport).

TABLE 23. LIST OF PROPOSED PROTECTED AREAS, REGION X

Province/Name of Proposed Protected Area	Area (in Hectares)			Location
	Protected Area	Buffer Zone	Total	
Misamis Oriental				
Mt. Lumot Natural Park	16,989	4,922	21,911	Covering Misamis Oriental and Impasugong, Bukidnon
Cagayan de Oro River	136,046		136,046	Mambuaya-Kabula, Cagayan de Oro City
Balingoan-Talisayan Protected Landscape and Seascape	646		646	Balingoan and Talisayan, Misamis Oriental
Bukidnon				
Mt. Kimangkil Range Natural Park	8,079	5,262	13,341	Malitbog and Manolo Fortich
Mt. Tago Range Natural Park	29,063	8,045	37,108	Malaybalay City and Impasugong
Mt. Tangkulang Range Natural Park	11,973	9,951	21,924	Quezon, Valencia, San Fernando
Mt. Pantaron Range Natural Park	17,709	15,319	33,029	San Fernando, Impasugong, Cabanglasan, Malaybalay City
Palaopao HCNPL	110,350	48,490	158,841	Sto. Kilabong, Brgy. Villa Vista, San Roque, Sumilao and Brgy Daling, Manolo Fortich
Mt. Pinamaloy FR	2,268			Don Carlos, Kitaotao, and Dangcagan
Lanao del Norte				
Liangan-Lirapan MFR PLS			1,645	Bacolod, Kauswagan
Mt. Gabunan Range Natural Park			1,858	Rogongon, Iligan City

Source: DENR-X

4.3.3.2. Non-NIPAs Areas

Key Issues and Concerns

a) Discharges of untreated and incompletely treated domestic wastewater, industrial effluents and agricultural runoffs into the region's water bodies (e.g. Macajalar Bay, Iligan Bay, Murceillagos Bay, etc.) threaten the coastal and marine ecosystems because of the possible pathogenic qualities of solid discharges. This situation not only degrades habitats (e.ge.g., mangroves) that leads to reduced fish production and loss of variety of marine species but also jeopardizes human health;
b) Small scale mining activities in Misamis Oriental and Bukidnon have affected the turbidity levels of Iponan River and Macajalar Bay;
c) Conversion of mangrove forests into fishponds, saltbeds, rice paddies and even for housing, commercial and industrial establishments;
d) Increasing instances of illegal conversion of prime agricultural lands to non-agricultural uses resulted to the decrease in lands devoted to agriculture, thereby threatening food security in the region;
e) Conflicting land use between tourism and industry in coastal areas;
f) Illegal construction of permanent structures on easements and squatting on easement areas due to poor enforcement of pertinent zoning regulations; and,
g) Increasing number of threatened endemic species of wildlife.

Strategies and Policy Options

a) Development of aggressive coastal and marine management program along the region's coastal stretch of 600 kilometers. Coastal resource management planning and implementation through the passage of comprehensive ordinance among municipalities and cities;
b) Conservation, restoration, rehabilitation and sustainable management of mangrove areas;
c) Institutionalization of mangrove resources development through the formulation of additional policies and regulations (DAO No. 15. Series of 1990) or amending existing policies and regulations to allow effective and sustainable management highlighting the massive reforestation of degraded mangrove ecosystems through a community-based approach and permanent delineation of the existing mangrove resources;
d) Establishment of the Regional Mangrosetum area in Baliangao, Misamis Occidental. Based on the Resource Ecological Assessment conducted by DENR-CRMO-X, the municipality of Baliangao has the largest mangrove areas that are in good condition estimated at 500 hectares;
e) Implementation of Sustainable Archipelagic Development Framework which seeks to improve coastal/marine monitoring mechanisms, harmonize various resource use especially by local government units and access arrangements among various users of marine resources;
f) Institutionalization of Integrated Coastal Management (ICM) at the provincial local government units level;
g) Strengthening of coastal law enforcement alliance (Regional Law Enforcement Coordinating Council-SubCommittee on Fishing, Coastal and Marine Environment;

h) Strict implementation of RA 9003 and Sanitation Law which penalizes the disposal of garbage that are non-biodegradable and other pollutants on all water bodies;
i) Full implementation of the Clean Water Act of 2004 (RA 9275 Comprehensive Water Quality Management) through the enforcement of its Implementing Rules and Regulations;
j) Establishment of an integrated sewerage system in urban areas;
k) Strict implementation of RA 8345 (Agricultural and Fishery Modernization Act) and MC 54. Close monitoring on the use of irrigated and irrigable lands jointly by DA, DAR and LGUs;
l) Consider the presence of important and sensitive ecosystems in urban land use planning and zoning. Strictly enforce the regulations for sitting of industries and installation of pollution control facilities;
m) On land survey, public easements, right of way and buffer strips shall be treated as separate lots and be excluded from titling or private ownership; ocular inspection shall be required before approval of the survey on all areas adjoining bodies of waters;
n) On land disposition, the restriction on easement and right of way should be incorporated in the patent and lease contract; the CENROs/LGUs should be required to reserve foreshore areas, which are critical areas, for recreation/tourism purposes and other public use, from disposition; and geothermal areas should be nondisposable;
o) Close monitoring and enforcement of regulations on easement zones with the participation of LGUs;
p) Monitoring of wildlife trade and intensifying IEC campaign against trade of wildlife species under prohibited list;
q) Strict enforcement of environmental laws to ensure the compliance by industries and firms and establish pollution control measures;
r) Strengthen monitoring of compliance to Environmental Impact Assessment conditionality and environmental standards;
s) Establishment/strengthening of environmental management trust fund for rehabilitation of degraded environment, monitoring environmental quality and compliance of users and compensation for affected communities;
t) Promotion of clean technologies for manufacturing industries and develop waste recycling technology for industrial wastes;
u) Establishment of urban forests or tree parks in industrial areas and in highly urban and emerging centers;
v) Collaboration/cooperation to Region IX in the management of the Mt. Malindang Natural Park that is located in the provinces of Misamis Occidental, Zamboanga del Norte and Zamboanga del Sur; and,
w) Cooperation with Region XI and Region XII and other concerned regions in the management of the Bukidnon river basin.

4.3.3.3. Environmentally Constrained Areas

The environmentally-constrained areas are those prone to natural (hydrometeorologic and geologic) hazards. These include areas prone to seismic hazards, flooding, tidal waves/tsunamis, subsidence, landslides, erosion and areas threatened by saltwater intrusion. Also included are security risk areas. The development and use of lands should consider the limitations posed by these hazards.

The environmental constraints need detailed study for the enhancement and protection of development projects. As such, detailed geologic, hydrologic, as well, as engineering evaluation subject to established standards must be undertaken and intensified. These can be attained through integrated efforts of concerned government agencies, local government units and the participation of non-government organizations (NGOs). Likewise, policy decision on appropriate land use shall be adopted for a given environmentally -constrained area. Moreover, there must be a concerted effort to put in place appropriate disaster preparedness management and mitigation plans and policies as responses to the risks posed by natural hazards.

Key Issues and Concerns

a) Disaster risk reduction and climate change adaptation planning and management are not yet fully integrated into the overall planning process;
b) Burgeoning settlements, both formal and informal, and commercial establishments located in hazard prone-areas; and,
c) Loss of lives and destruction of properties due to armed conflict in pocket areas of the region.

Strategies and Policy Options

The concerned regional line agencies and the local government units shall identify, develop and implement appropriate disaster risk reduction and climate change adaptation strategies for identified hazard prone areas and key ecosystems to prevent the negative impacts of disaster, as well as increase resiliency.

Appropriate interventions include restricting development in high-risk risk areas such as prohibiting settlements and construction of vital infrastructures; instituting mitigating measures to reduce the severity of impact that may be brought about by the disasters; adopting mechanism where risk-bearing responsibility is transferred to another party such as in the form of insurance; and/or, fully accepting/retaining the risk or "do-nothing" scenario.

The following shall be undertaken for the specific hazard prone areas:

1. **On flooding** – Proper infrastructure and settlement planning to prevent extensive destruction of life and property. Strict enforcement of zoning ordinances especially to restrict settlements in flood-prone areas;
2. **On earthquake-induced hazards** – In the existing building code, the viability of adopting a policy on the provision of easements in areas traversed by active faults with respect to ground rupture shall be considered. Likewise, its implications on the economic aspect should be carefully assessed. There should be strict implementation and adherence to the existing building code especially on provisions for seismic loading during construction, as well as the conduct of evaluation of liquefaction potential of the site. Information from earthquake hazard mapping activities are helpful to engineers and planners in strengthening buildings, infrastructure, and lifelines to withstand future earthquakes. These shall also help increase public awareness on such hazards and how earthquake

losses can be minimized. As much as possible, human activity shall not be encouraged on areas along faultlines;

3. **On tidal waves/tsunamis** – Relocate the inhabitants on coastal areas that are highly at risk to tidal waves/tsunamis to areas of higher elevations. Any further developments must be restricted.
4. **On volcanic hazards** –There shall be strict enforcement of permanent danger zones for active volcanoes. A thorough study shall be conducted to delineate the applicable danger zones of other active volcanoes. In the comprehensive land use planning of LGUs, such areas shall clearly be delineated and to strictly impose these danger zones as non-habitable;
5. **On soil erosion** – Soil conservation measures must be applied. Moreover, the provision of security of tenure to farmers shall be effected to encourage land users to protect and rehabilitate the land from soil erosion;
6. **On coastal and river erosion** – There shall be strict enforcement of mining laws, reforestation of denuded watersheds, compliance to the requirement of geological/hydrological/structural engineering evaluation prior to development, and formulation of guidelines and legislations for the implementation of coastal zone management plan;
7. **On security risk areas** – Peace and Order Councils and Disaster Risk Reduction Management Coordinating Councils should be strengthened and functional; adequate rescue and relief support to affected people should be provided; and relocation sites should be identified and secured.

4.3.3.4. Major Programs and Projects

Comprehensive Natural Resources Inventory Program

a) Project 1 – Appropriate boundaries of major land uses and forest categories shall have been delineated/marked on the ground; and,
b) Project 2 - Research and development particularly in environmental geological studies shall have been undertaken to provide information base for development projects like on the choice of appropriate locations away from hazardous areas.

Environmental Impact Assessment (EIA) System

The EIA system should be strengthened at the regional and provincial/city and down to municipal level. This program aims to determine the environmental effects of development projects by requiring investors/proponents to install mitigating measures to counter the adverse effects of projects on the environment.

Watershed Management Program

Critical watershed shall have been rehabilitated. In recognition of the fact that some watershed areas are already settled and that relocation of settlers is not feasible, a rehabilitation and protection scheme shall be carried out through people-oriented and community-based projects. Intensive environmental education shall be instituted to enable the people to understand and appreciate the value and role of natural resources in economic development, as well as develop the commitment and political will to deal with difficult environment/social issues.

This aims to conserve/protect/preserve and develop the region's historical diversity through the establishment and development of representative samples of biotic communities.

Identification of sites to be conserved or preserved shall be undertaken. Likewise, pertinent development projects shall be implemented to upgrade area management, as well as protect the area from unregulated and exploitative activities.

The IPAS program envisions to make the local people aware that the protected areas are providing substantial benefits. Among the benefits are sustained income and agricultural crop production; assurance of outstanding outdoor recreation areas; reference sites; scientific and educational areas; assurance of food and medicines; assurance of conservation of representative samples of outstanding flora and fauna and biota ecosystem; conservation of protected areas that will attract more tourists causing a multiplier effect on livelihood among the nearby communities; establishment of buffer zones that will create livelihood opportunities and minimize land use pressures in core areas; reduction of risks to pests and diseases due to the diversity and the increasing opportunity for wildlife flora and fauna and other marine life to reproduce.

National Greening Program

The National Greening Program aims to plant 1.5 billion trees covering1.5 million hectares for the period of six years (2011-2016) in the following public domain: forestlands; mangrove and protected areas; ancestral domains; civil and military reservations; urban areas under the greening program of the LGUs, inactive and abandoned mine sites; and other suitable lands.

4.3.4. Infrastructure and Utilities Development

The infrastructure and utilities development sector shall continue to provide the built-up environment that allows production, consumption and service activities to take place . It covers the five subsectors: transportation, communication, energy, water resources, and social infrastructure. The sector encompasses the provision of basic services that will provide economic and other forms of integration, as well as the development of an efficient, responsive, safe, and ecologically friendly built environment. The planning and design of all infrastructure and utilities shall adhere to building standards and related requirements (e.g., compliance to zoning ordinances) to ensure resiliency to disasters and climate change.

4.3.4.1. Regional Transportation Network

The infrastructure sector shall continue to include the provision of an integrated intermodal transportation facilities and services toward sustained economic growth and poverty reduction. During the plan period, the transportation network system of the region shall be expanded to further improve connectivity within the region and linkage with other regions in Mindanao and the country.

Central to the vision of the region to be the major transhipment hub in Mindanao are the completion and commercial operation (including night time flights) of the Laguindingan

Airport (started operations in June 2013) and enhanced capacity of the ~~Mindanao~~ operations in January 2004). The OLA-MCTAP, which stands for "Operation of Laguindingan Airport-Mindanao Container Terminal Allied Projects", is a package of infrastructure projects designed to enhance the viability and efficiency of operation of Laguindingan Airport and MCT, particularly, in terms of their accessibility and utilization. While these core OLA-MCT interventions are located in the Cagayan-Iligan Corridor, the benefits shall also impact to the other provinces in the region. The allied projects: Laguindingan Seaport, seaports improvement, roads construction, widening and improvement, and Panguil Bay Bridge will result to an effective intermodal transportation system for convenient access of the airport and the container terminal. It will also strategically link key growth areas in the region and will generate economic investments and employment.

Road networks shall also be improved to facilitate access and connectivity to potential tourism areas and remote but productive agriculture sites.

In the long-term, key development initiatives identified are the establishment of an expressway and railway transport systems to further support the full development of the expanded Cagayan-Iligan Industrial and Trade Corridor (Map ~~49~~51). The establishment domestic airport in Don Carlos, ~~Bukinon~~Bukidnon is also being pursued, considering the economic activities within the province and since Laguindingan Airport is approximately 140 kilometers away from Malaybalay City, the capital of Bukidnon.

Goal: Efficient satisfaction of economic and social needs through an integrated road, air, sea and rail modes of transportation.

Objective: Adequate and integrated system of roads, airports, seaports and railway.

Strategies and Policy Options

- Establishing and carrying out well-defined complementary roles of the government and private sectors along infrastructure development. This policy/strategy calls for the government to be more involved in policy-making, planning and~~&~~ setting of technical standards, regulations and framework for competitive participation of the private sector. The private sector, in turn, shall be expected to be the leader in actual provision of infrastructure and services;
- Improving the quality of existing infrastructure to prolong useful life;
- Promoting inter-modal transport system for efficient and smooth mobility of people, goods and services;
- Encouraging private sector participation in financing, implementation and operation of infrastructure projects whenever feasible;
- Providing safety facilities;
- Assisting LGUs in developing local infrastructure to complement national infrastructure through integrated area development approach;
- Supporting and promoting strategies related to:
  - Establishment and maintenance of an effective and efficient functional relationship among the different transportation modes;
  - Adoption of international standards for transportation facilities and services; and,

  - Integration of transport planning with urban and regional planning, land use, environment, industry, agriculture, tourism and other sectors of the economy.
- Minimizing cost of infrastructure, without sacrificing quality, in order to generate savings to be used to implement additional projects;
- Giving due consideration to environmental conservation and protection;
- Improving the location and design of infrastructure facilities to minimize and/or mitigate exposure to natural hazards;
- Retrofitting/construction of infrastructures using disaster-resilient designs and materials; and
- Re-locating of critical infrastructures including health and education facilities, and housing away from hazard-prone areas.

4.3.4.2. Road Network

The development of the highway network in the region is one of the major national programs being implemented by the government in order to support the overall socio-economic development of the country. The land-based transportation system will continue to be the dominant mode of transportation in the region and the entire island of Mindanao. The road network carries almost all intra-island traffic.

The region has a good and reliable road network system that links the urban centers within and outside the region except for some intra-provincial and inter-provincial roads, that are ongoing. About 88 percent of the local roads are still unpaved. Majority of the unpaved local roads are located in the provinces of Misamis Oriental and Bukidnon. These local roads require repair/rehabilitation and improvement, particularly, farm-to-market roads to harness the agricultural potentials of rural areas.

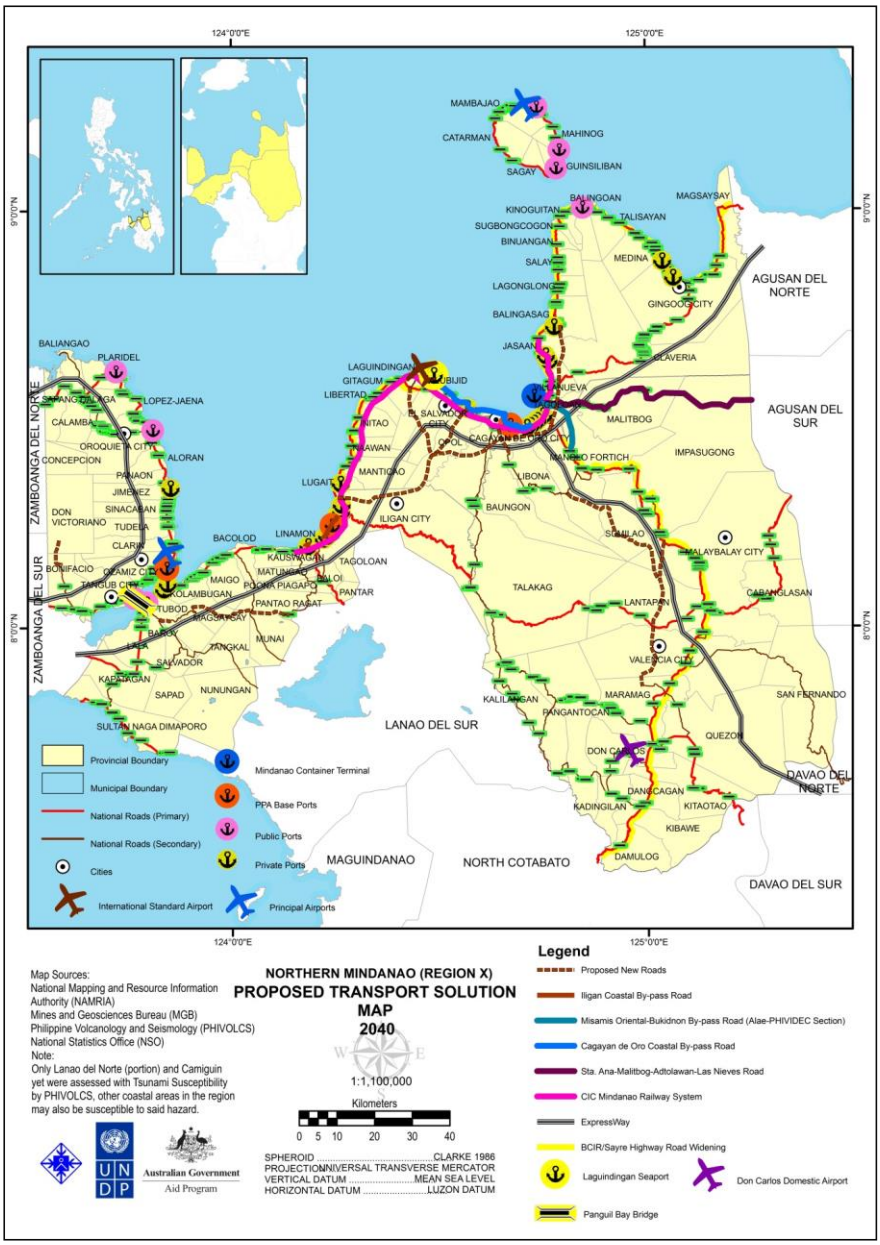
There is a need to increase the capacity of the existing roads and bridges to meet the growing road traffic particularly roads leading to growth and urban areas, as well as to ensure resiliency to disasters and climate change.

Issues and concerns surrounding the road network in the region shall be addressed by pursuing the following policies, strategies, targets and projects:

Goal: Improved land transportation network.

Objectives:
- Ensure efficient traffic flow;
- Complete major road network which connects major urban centers;
- Improve access to production areas;
- Adopt proper preventive measures against road closures due to natural calamities; and
- Attain acceptable service level of all component roads.

MAP 51. PROPOSED TRANSPORT SOLUTION 2040, REGION X



Strategies and Policy Options

- Strengthening urban-regional and inter-regional linkages by developing national arterial road networks (north-south backbone, east-west laterals and roads of strategic importance);
- Promoting inter-modal transport systems for efficient traffic flow;
- Applying the following prioritization scheme with respect to roads & bridges projects:
    - Priority 1 - maintenance;
    - Priority 2 - rehabilitation;
    - Priority 3 - improvement, capacity improvement, by-passes;
    - priority 4 - development roads; and,
    - Priority 5 - missing links.
- Improving the quality of existing infrastructure, through proper maintenance including preventive maintenance to prolong the useful life of the road network;
- Upgrading, improvement and widening of the national arterial and secondary roads will be selectively carried out. Those roads connecting major but under-exploited agricultural areas with main urban-industrial centers and markets will be prioritized. Aside from road improvement, temporary or weak bridges will be replaced with permanent structures capable of carrying the new generation of heavy vehicles;
- Protecting roads' (and other infrastructures) right-of-way (ROW) by designating ROWs as protected areas in local land use plans and zoning ordinances;
- Securing project's ROW prior to implementation;
- Focusing on the development of national roads leading to regional growth centers and less developed areas;
- Providing high-standard means of transportation for growth corridors;
- Improving roads leading to ports and airports;
- Adopting, where feasible, the Build-Operate-Transfer (BOT) and its variants/ options in implementing roads and bridges projects to encourage private sector participation;
- Boosting traffic-carrying capability of the road system by expanding low-cost traffic engineering and management measures;
- Providing safety facilities including posting signs and other safety devices;
- Proper balancing between trucking and infrastructure costs by adjusting truck load limits with respect to road design standards. Load limits will be strictly enforced;
- Providing efficient access to agricultural production areas and to achieve efficient transport linkage between production areas and agri-industrial centers;
- Providing efficient access to industrial growth centers;
- Providing access to socio-economically important but isolated areas;
- Constructing stronger roads against road disaster or to provide alternative route for disaster-prone section of important road;
- Cutting down the costs of infrastructure while safeguarding quality and service standards and to generate at least 30 percent savings in project costs to implement more infrastructure that can benefit a larger number of people by using the appropriate technology;
- Providing safety facilities including the provisions of sign posting and other safety devices;

- Assisting LGUs in developing local roads to complement national roads through the IAD (Integrated Area Development) approach;
- Considering environmental protection and conservation in all of the programs, projects and activities related to road infrastructure development; and,
- Improving drainage systems and facilities especially in flood-prone rural and urban areas to protect the road network system.

Targets

- Paving all the national arterial, secondary and local roads;
- Making adequate bridges along national roads;
- Widening the north-south backbone arterial roads into four-lane roads to accommodate more traffic;
- Rehabilitating/improving some arterial roads to have a minimum width of 6.7 meters both sides; national secondary roads to have a minimum of 6.1 meters pavement and 2.0 meters shouldering on both sides;
- Constructing and improving interregional roads traversing and linking to vast agricultural lands and to support the industrial, trading and tourism activities of the region; and,
- Establishing an expressway system to further support the full development of the expanded Cagayan-Iligan Industrial and Trade Corridor and improve connectivity from the province of Misamis Occidental going to the west to the province of Misamis Oriental, and linking to the south to the province of Bukdinon.

Projects

Shown in the table below are the priority routes going to and within the region that should be improved/developed. The assessment is based on its economic and social impacts considering its major role in the mobility of people, goods and services within and outside the region. The DPWH as the mandated agency to maintain national roads and bridges, has already considered in its annual budget the appropriation for the proposed priority routes inclusive of disaster mitigation/climate change adaptation measures.

TABLE 24. ROAD LINKS WITHIN AND OUTSIDE REGION X TO BE IMPROVED/DEVELOPED, 2013 ONWARDS

Road/Bridge Project	Remarks
BCIR and Sayre Highway road widening into 4-lanes	Enhance the flow of people, goods and services especially with the opening and commercial operation of the Laguindingan Airport
East West Lateral Road (Bukidnon-Iligan Road)	Improve linkages between regions and connect rural areas to urban centers
Tubod-Ganasssi Road	Serves as an alternative route that will link Lanao del Sur to Lanao del Norte
Panguil Bay Bridge Project	Directly connects Tubod in Lanao del Norte to Tangub City in Misamis Occidental. It will also link major growth centers and cities in Region X and other regions in Mindanao
Misamis Oriental-Bukidnon Bypass Road (Alae-PHIVIDEC Section)	Provide direct transport system to the Mindanao Container Terminal (MCT) users especially those coming from Davao, Bukidnon and Cotabato by-passing the Alae, Manolo Fortich, Bukidnon-Puerto, Cagayan de Oro portion of the Sayre Highway.
Cagayan de Oro-Laguindingan	Serves as alternate access to improve transport connectivity

Road/Bridge Project	Remarks
Coastal Bypass Road	of the Laguindingan Airport and decongest traffic along the BCIR.
Iligan City Circumferential Road (C-3)	Improve traffic circulation of the city streets by reducing the volume of vehicles at the city center and enhance accessibility of the traversed barangays including upland far-flung barangays
Sta. Ana-Malitbog-Las Nieves-Butuan Road	Interconnect Region X to the Caraga Region to facilitate linkage of production areas to market centers of agricultural produce
Kapalong-Talaingod-Valencia Road	Interconnect Region X to Davao Region and provide alternate route going to Davao City. It will pass through the municipalities of Talaingod, Davao del Norte and San Fernando, Bukidnon until it ends at the junctions of Sayre Highway in the City of Valencia, Bukidnon
Iligan Coastal Bypass Road and Iligan Bypass Road (Buru-un Causeway)	Divert traffic from the existing national highway and improve traffic circulation of the city streets by reducing the volume of vehicles at the city center
Ozamiz Coastal Bypass Road	Divert traffic and improve mobility within the city
Roads leading to designated strategic tourism destinations	Improve access to tourism areas

The following are the roads and bridges programs and projects targeted to be implemented within the planning period, 2013-2040:

1. Road Upgrading
    - National arterial and secondary roads
    - All local roads including farm-to-market roads

2. Road widening
    - Butuan-Cagayan de Oro-Iligan Road
    - Sayre Highway
    - Carmen-Patag-Bulua Road Section
    - Ozamiz-Oroquieta Road Catadman-Maningcol Section, Ozamiz City
    - Tangub-Polao Road (completion) Polao Section, Tangub City
    - Ozamiz-Pagadian Road, Bañadero-Lam-an Section, Ozamiz City

3. Roads leading to Tourists Destination
    - Upgrading (Gravel to Concrete) - Access Road leading to Rafflesia Yard
    - Road leading to White Water Rafting, Lumbia, Cagayan de Oro City
    - Upgrading (gravel to concrete) of road leading to Jatico Resort, Cagayan de Oro City
    - Upgrading (gravel to concrete) of road leading to DAO Heritage Tree and Mapawa Nature Park, Cugman CDOC
    - Construction of Cross Country Road from Mainit, Catarman to Mambajao
    - Construction of Service Road to Tuasan Falls including Slope Protection
    - Construction of Service Road to Binangawan Falls
    - Upgrading (gravel to concrete) of road leading to Ardent Spring Bug-ong Section, Mambajao, Camiguin
    - Upgrading (gravel to concrete) and drainage system of road leading to Sto. Nino Cold Spring, Catarman, Camiguin
    - Upgrading of road leading to Soda Water Spring, Catarman, Camiguin

- Roads leading to eco-tourism sites
- Upgrading (Gravel to Concrete) - Road from the Highway to Calilangan Falls, Tubod, Lanao del Norte
- Upgrading (Gravel to Concrete) - Road from the Highway to Pagayawan Falls, Bacolod, Lanao del Norte
- Concreting Of Sta Maria - Hoyohoy Road (Leading to Hoyohoy Highland Park) (View Deck) Hoyohoy, Tangub City
- Concreting Of Paiton - Simasay Road (Road Leading To Roma Localita Di Montagna Mountain Resort) Brgy. Simasay, Tangub City
- Upgrading (Gravel to Concrete) of road leading to MOAP in Sinacaban, Misamis Occidental
- Upgrading (Gravel to Concrete) of road leading to Bokagan Hill (location? Province)
- Upgrading of Road leading to Sugpulon Waterfalls, Brgy. San Isidro Jasaan , Misamis Oriental
- Upgrading of Road leading to Sitios of the Sacred Heart National Shrine, El Salvador City

4. Bridges construction
    - Replacement of Sabangahan Bridge along Misamis Oriental - Bukidnon - Agusan Road,
    - Sunggod Bridge along Jct. SH Aglayan-Alanib-Ticalaan Road (Aglayan-Basak)
    - Maluko Bridge along Sayre Highway including access road
    - Completion of New Batangan Bridge along Kapalong-Talaingod-Valencia Road
    - Maluos Bridge II along Bukidnon-Davao City Road, Malous Section
    - Mangalay Bridge (RCDG), Uguiaban By Pass Road
    - Rehabilitation of Umalag Bridge 2
    - Replacement of Maac Bridge, Guinsiliban, Camiguin
    - Replacement of Maubog Bridge, Mambajao, Camiguin
    - Construction of Lumad Bridge, Mambajao, Camiguin
    - Replacement of RCBC, Mambajao, Camiguin
    - Panguil Bay Bridge
    - Tugar Bridge along Linamon-Zamboanga Road, Lanao del Norte
    - Pantar Bridge along Iligan City-Marawi City Road, Lanao del Norte
    - Hinagdong Bridge (pls indicate location
    - Sinonoc Bridge

5. New roads
    - Construction of Dalwangan-San Jose By Pass Road
    - Construction of Mailag-Barobo-Lumbo By Pass Road
    - Construction of Malaybalay-Agusan Road, Mapulo-Agtulawon Section
    - Construction of Cagayan de Oro Coastal Road By-Pass Road including ROW, Cagayan de Oro City
    - Construction of Laguindingan-Cagayan de Oro Coastal Coastal By-Pass Road
    - Construction of Misamis Oriental - Bukidnon Bypass Road, PHIVIDEC-Alae Section

- Ozamiz City Coastal By-pass Road, Misamis Occidental including ROW
- Iligan City Coastal By-pass Road including ROW
- By-Pass Road leading to Laguindingan International Airport (Alubijid-Laguindingan-Gitagum Section)
- Construction of expressway system
    - CDO-Malaybalay-Valencia Davao
    - Dipolog-Ozamiz-Pagadian
    - Pagadian-Tubod-CDO-Gingoog-Butuan

4.3.4.3. Airports

The new international standard Laguindingan Airport is now the gateway to the region further boosting the trade, services and tourism activities and improving linkage of the region to the rest of the country and soon to the rest of the world. The airport is currently operating under visual flight rule (sunrise to sunset operation) because the installation of the Air Navigation System and Support Facilities (ANSSF) is still ongoing. By 2015, the ANSSF should have been accomplished to complete the requirements for the full commercial operation of the airport including night flights or even 24-hour operations.

The development of an aerotropolis is seen to improve the global competitiveness of the region. The Laguindingan Airport is proposed to be the center of an airport city that shall be built. It shall compose of a set of commercial facilities to support the growing number of ~~travelers~~travellers who shall pass through the airport. It is expected to generate thereby creating jobs and economic benefits for the whole region.

There is also a need to improve the secondary airports in Ozamiz City, and the feeder airport in Mambajao, Camiguin to provide better quality transport services and boost economic and tourism activities.

A new domestic airport is also being proposed to be located in Don Carlos, Bukinon. The airport is expected to further improve connectivity and spur economic activities in the province of Bukidnon and for the whole region.

Goal: Improved air transport and enhanced connectivity.

Objective: Safe and reliable airports with facilities of international standards.

Strategy and Policy Option: Constructing and improving airport facilities using disaster-resilient designs and materials.

Targets

- By 2015, night flight operation at Laguindingan Airport will be operational;
- By 2016, Laguindingan Airport shall have expanded its runways to accommodate wide bodied aircrafts (2,100-2.600 meters);
- By 2017, Laguindingan Airport shall have its Passenger Terminal Building for international flights and shall have completed its CIQS requirement;
- By 2018, Laguindingan Airport shall have full operation of international flights;
- By 2020, Laguindingan Airport shall be connected to the CIC Mindanao Railway System; thus, facilitating speedy transit of airport users;

- By 2025, Laguindingan Airport shall be center of an airport city with commercial establishments such as hotels, tourism areas, restaurants, office, logistics and distribution facilities, among others (Aerotropolis);
- In the next 10 years, the facilities at Ozamiz City Airport and Camiguin Airport shall have been improved; and
- By 2020, the new domestic airport in Don Carlos, Bukidnon is completed and shall be in commercial operation.

Projects

- Runway extension of Laguindingan Airport and expansion of its Passenger Terminal Building and Cargo Building;
- Construction of commercial establishments outside the Laguindingan Airport; and
- Construction of the proposed domestic airport in Don Carlos, Bukidnon.

4.3.4.4. Seaports

With many navigable bays and gulfs along the region's shoreline, several ports, including the region's three base ports, have been developed and continuously improved for the effective and efficient functioning of the marine transport system.

Among the recent developments in the region that are expected to contribute to the growth of cargo and passenger traffic through the Cagayan de Oro, Iligan and Ozamiz ports and other ports in the region include: a) commercial operation of the Laguindingan Airport; b) establishment in Cagayan de Oro City of branches of famous chain malls such as Ayala, Shoe Mart (SM) and Robinson, and expansion of Limketkai Mall; and c) continuing improvement/upgrading of major road network system.

Goal/Objective: Highly efficient and sufficiently capable and appropriately equipped ports of international standards to accommodate the ever growing domestic and foreign maritime traffic

Strategies and Policy Options

- Rationalizing and integrating development of port infrastructure in support to domestic and foreign trade, growth areas, and tourism programs;
- Providing/installing additional berthing facilities, modern cargo handling facilities, roll-on-roll-off structures, and other necessary facilities and equipment necessary for highly efficient and productive port operations; and
- Facilitating greater private participation in ports development such as putting in place additional and needed modern facilities.

Targets

- Reduction in ship waiting time;
- Minimized diversion time of ship for loading/unloading cargo and embarking/ disembarking passengers;
- Highly efficient cargo handling services;
- Improved facilities for berthing and cargo handling operations; and,
- Minimize or eliminate port congestion particularly in base ports.

Projects

To efficiently and adequately handle the projected growth in marine traffic of both domestic and foreign trade, the facilities and amenities of the following ports shall be continuously rehabilitated and/or improved:

- Cagayan de Oro Port, Cagayan de Oro City;
- Iligan Port, Iligan City;
- Ozamiz Port, Ozamiz City;
- Balingoan Port, Balingoan, Misamis Oriental;
- Benoni Port, Benoni, Camiguin;
- Tubod Port, Tubod, Lanao del Norte;
- Silanga Port, Tangub City; and,
- Gingoog Port, Gingoog City.

Second and third phases of the development of the Mindanao Container Terminal shall be pursued during the plan period.

4.3.4.5. Railway System

There is no existing rail transport system yet in the region. The 1st phase of the Mindanao Railway System (MRS) is proposed to be implemented along the Cagayan de Oro-Iligan Corridor (CIC). The CIC Rail segment of the MRS would be a 124.65-kilometer rail mainline (single and double track) from the municipality of Jasaan, Misamis Oriental to municipality of Linamon, Lanao del Norte, covering 14 municipalities and the two cities of Cagayan de Oro and Iligan. The DOTC is currently repackaging the project feasibility study for Public-Private-Partnership/Build-Operate-Transfer (PPP/BOT) undertaking.

4.3.4.6. Water Supply

Goal: Improved living and health conditions of the populace of the region

Objective: To enhance access to safe, adequate and sustainable water supply.

Strategies and Policy Options

- Implement priority programs for waterless municipalities/areas;
- Develop sustainable new water sources to meet increasing demand;
- Localize national policies to support sustainable extension of water services;
- Protect the environment through proper watershed management, surface water quality control and proper drainage;
- Conserve and develop water resources in areas where existing supply is constrained and protect against saline water intrusion in aquifers, groundwater contamination and ground subsidence;
- Expand existing water systems for cities and municipalities with water districts or Level III systems;
- Create water districts or Level III systems for municipalities; and
- Establish Level I systems in rural areas where the houses are thinly scattered; Level II systems in rural and urban fringe areas where houses are clustered densely; Level II systems in densely populated urban areas.

Targets

- By 2015, all households in the region shall have access to safe and adequate water supply
- By 2016, all waterless municipalities shall be provided with safe and affordable water systems
- By 2020, additional 15 municipalities shall be granted to operate their own water districts.
- By 2040, all municipalities in the region shall have Level III water supply system

Programs and Projects

1. SALINTUBIG Water Supply Program for Waterless municipalities/areas;
2. Alubijid Watershed as Protected Area under NIPAS to serve as water supply for the AGiLa Cluster (municipalities of Alubijid-Gitagum-Laguindingan);
3. Establishment of water districts in the municipalities of Cabanglasan, Damulog and Malitbog of Bukidnon; in the municipalities of Kapay, Munai, Pantar, Tagoloan, Tangkal and Sapad of Lanao del Norte; in the municipalities of Baliangao and Sapang Dalaga of Misamis Occidental; in the municipalities of Laguindingan, Sugbongcogon, Tagoloan and Talisayan of Misamis Oriental; and
4. Reforestation project in all watershed areas

4.3.4.7. Sanitation

Goal: Improved health outcomes and sustainable environment through improved sanitation, septage and sewerage provision

Objective: To enhance access to sanitation facilities, sewerage and septage management services

Strategies and Policy Options:

- Strict enforcement and implementation of the National Sanitation Code;
- Development of effective regional and local leadership and sanitation governance;
- Provision of incentives and motivation for expansion of services within the LGUs to increase coverage on sanitation, sewerage and septage;
- Rationalization of investments and financing to provide infrastructure in support to private sector increasing services on sanitation, sewerage and septage particularly in strategic areas (alternative PPP packages may be considered);
- Development of septage/sewerage treatment plants giving priority to highly vulnerable areas such as the highly urbanized cities of Cagayan de Oro and Iligan and component cities of Malaybalay, Valencia, Gingoog, El Salvador, Ozamiz, Tangub, Oroquieta and municipalities of Mambajao, Camiguin and Tubod, Lanao del Norte which are population-dense and susceptible to sanitation problems, as well as priority tourism destinations in the region;
- Hygience promotion, coupled with sanitation response measures should be mainstreamed in disaster relief and rehabilitation efforts at all levels; and
- Improve service delivery through vigorous communication

4.3.4.8. Irrigation

To support the agricultural development of the region, the irrigation subsector shall contribute to attain the following goal and objective.

Goal: Rural development and increased agricultural productivity

Objective: To attain food self-sufficiency and surplus production in rice

Strategies and Policy Options:

- Providing irrigation facilities to SAFDZ and ARC areas
  - Rehabilitate existing irrigation systems and construct new small scale systems;
  - Protect irrigated and potential irrigable lands; and
  - Protect infrastructure right-of-way to allow construction of drainage canals and waterways

Target

- The region shall attain an irrigation development of at least 80 percent of potential irrigable areas by 2020, 90 percent by 2030 and 100 percent by 2040

Projects

To help achieve the goal and objective of the irrigation subsector, a number of irrigation facilities construction and repair/rehabilitation projects shall be undertaken. Location of proposed irrigation projects in the region is shown in Map 52.

TABLE 25. IRRIGATION PROJECTS, REGION X: 2013-2020

NAME OF PROJECT	NO. OF PROJECTS	ESTIMATED COST (PHP M)	TOTAL AREA (IN HECTARES)		
			NEW CONSTRUCTION	REHABI-TATION	RESTO-RATION
Small Irrigation Projects (SIP	209	3,399.904	13,365	2,892	1,653
NIS/CIS Extension Projects	61	463.037	1,146	1,058	1,389
Rehab/Resto of Existing Irrigation System (RREIS)	39	202.734	57	1,201	1,314
TOTAL	309	4,065.700	14,568	5,151	4,356

Source: NIA-X

TABLE 26. IRRIGATION PROJECTS, REGION X: 2021-2030

NAME OF PROJECT	NO. OF PROJECTS	ESTIMATED COST (PHP M)	TOTAL AREA (IN HECTARES)		
			NEW CONSTRUCTION	REHABI-TATION	RESTO-RATION
Small Irrigation Projects (SIP	22	441.320	1,765	-	-
NIS/CIS Extension Projects	40	311.405	1,887	-	-
Rehab/Resto of Existing Irrigation System (RREIS)	5	32.800	-	140	258
TOTAL	67	785.525	3,652	140	258

Source: NIA-X

TABLE 27. IRRIGATION PROJECTS, REGION X: 2031-2040

NAME OF PROJECT	NO. OF PROJECTS	ESTIMATED COST (PHP M)	TOTAL AREA (IN HECTARES)		
			NEW CONSTRUCTION	REHABI-TATION	RESTO-RATION
NIS/CIS Extension Projects	22	611.000	-	30	-
Rehab/Resto of Existing Irrigation System (RREIS)	6	480.000	-	3,200	-
TOTAL	28	1,091.000	-	3,230	-

Source: NIA-X

4.3.4.9. Flood Control and Drainage

Goal: Zero Casualty and socio-economic progress in affected areas

Objective: To minimize or prevent damages to life, properties, crops and livestock

Strategies and Policy Options

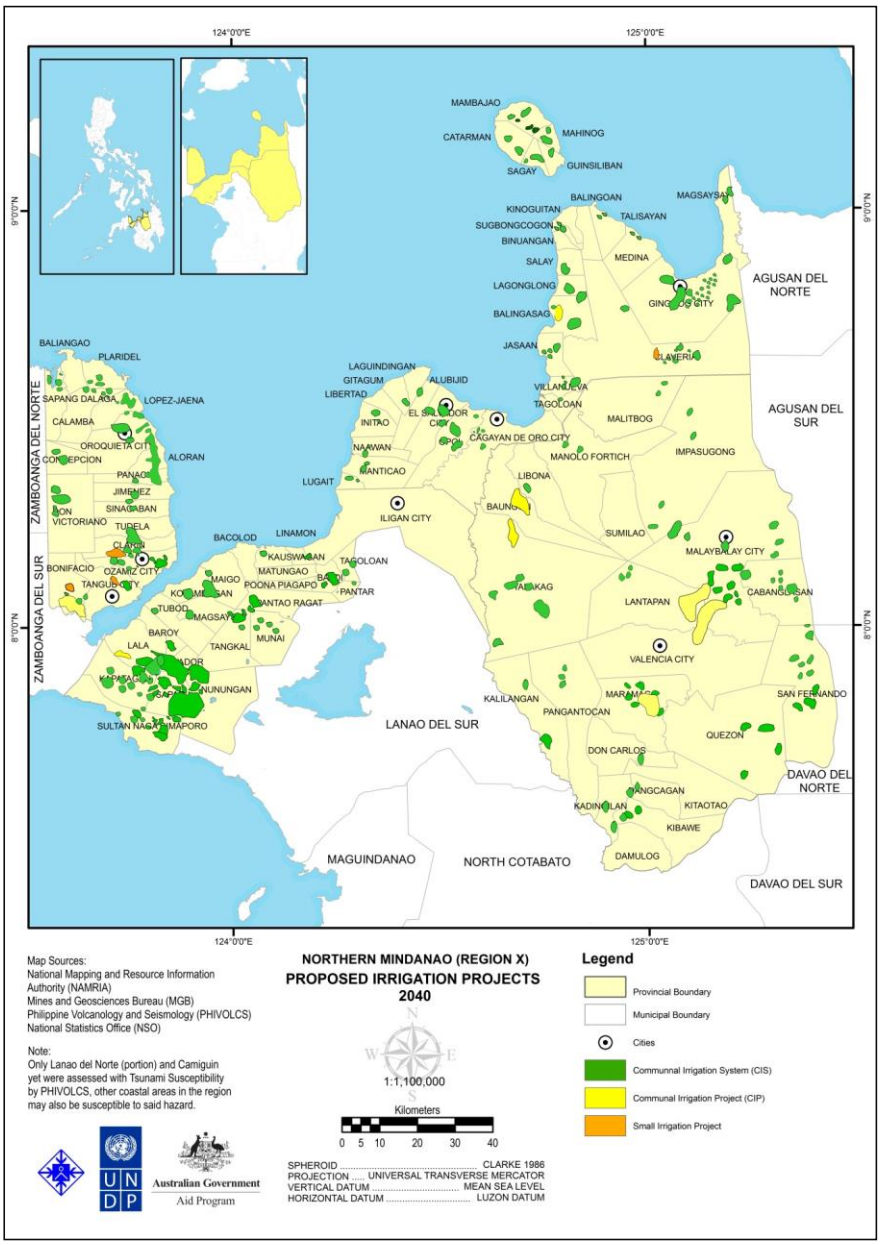
- Prioritize the construction of flood management structures in highly vulnerable areas;
- Apply DRRM and CCA strategies in the planning and design of flood management structures;
- Develop a mechanism to expedite immediate financing for the rehabilitation of flood management structures integrating the concept of building back better; and
- Increase local government and community participation in infrastructure planning and implementation

Projects

The following major flood and control projects listed below should be implemented to minimize or prevent damages from floods in the projects' influence areas:

1. Cagayan de Oro River Basin Flood Control Project
2. Tagoloan River Flood Control Project
3. Iponan River Flood Control Project
4. Mandulog River Flood Control project
5. Critical Slope Protection of Sayre Highway
6. Construction of Slope Protection along Butuan City-Cagayan de Oro City-Iligan City Road
    - Cugman River Section
    - Alae River Section
    - Umalag River Section
    - Agusan River
    - Bigaan River Section
7. Ozamiz City Drainage System Project
8. Construction of line drainage (right side), RCPC with manholes Carmen-Patag Bulua Road
9. Construction of Slope Protectioin and Erosion Control Cabula Section (both sides)

MAP 52. PROPOSED IRRIGATION PROJECTS 2040, REGION X



Projects –Flood Control and Drainage (continuation)

10. Construction of Slope Protection and Erosion Control Lumbia-Uguiaban Road Section (both sides)
11. Construction of Slope Protection and Erosion Control of CDOC-Lumbia Airport Bukidnon Road, Carmen Section
12. Construction of Poblacion Mambajao River Control
13. Construction of Poblacion Sagay River Control
14. Construction of Poblacion Catarman River Control
15. Construction of Guinsiliban River Control
16. Construction of Looc River Control
17. Construction of Liloan River Control
18. Construction of Balbagon River Control
19. Construction of Dinangasan River Control
20. Construction of San Roque River Control
21. Construction of Lumad River Control
22. Construction of Agusan River Control

4.3.4.10. Health Facilities

Goal: Improved access to and provision of quality of health facilities

Objectives

- To improve primary health care services and preventive measures
- To upgrade capacities of health facilities

Strategies and Policy Options

- Formulate and ~~i~~Invest in the Health Facility Enhancement Program (HFEP) that defines a unified and rationalized health facility covering both public and private health facilities;
- Link regional and local development plans to national allocation of investments for health, including acquisition of ROW and lands set aside for the construction of health facilities;
- Improve access to specialized services in regional and provincial health facilities and enhance the quality assurance system for public health facilities such as RHUs and BHSs. Provision of necessary access road to the RHUs and BHSs, especially in the remote areas, must be considered in the planning and development of health facilities;
- Increase the percentage of public and private hospitals for Continuous Quality Improvement (CQI);
- Strengthen the gate-keeping functions of lower level facilities;
- Integrate the provision of proper waste-management system (~~e.g~~e.g., hospital, and solid waste) in the plans of all proposed and existing health facilities;
- Explore the use of indigenous and recyclable materials that are environment-friendly to reduce costs and incorporate DRRM and CCA concepts in building health facilities;

- Employ labor-intensive methods in implementing health infrastructure projects as a means to generate employment in the beneficiary communities;
- Construct/relocate critical health facilities in hazard-prone areas; and
- Explore the possibilities of entering into PPPs in the construction, structural retrofitting, rehabilitation, maintenance and management of health facilities.

Targets

- Formulate ~~Health Facility Enhancement Program (~~HFEP~~)~~ for Region X, including with the necessary access roads in place;
- All development Plans of LGUs have allocated funds/create investments for health including road right of way and purchase of land for construction of BHSs, RHUs and hospitals;
- Health facilities constructed using indigenous and recyclable materials that are environment-friendly and DRRM and CCA incorporated; and
- Construction of new health facilities, structural retrofitting and rehabilitation through public-private partnership venture.

Programs and Projects

- Expand capacities of the Northern Mindanao Medical Center (NMMC) Level 3- Upgrade bed capacity from 300 to 500 beds by 2016
- Upgrade the capacities of other secondary and tertiary government hospitals
    - Bukidnon Provincial Medical Center, Casisang, Malaybalay City, Bukidnon (Level 2)
    - Camiguin General Hospital, Lakas, Mambaajo, Camiguin (Level I)
    - Lanao del Norte Provincial Hospital, Baroy, Lower Sagadan, Baroy, Lanao del Norte
    - Mayor Hilario L. Ramiro, Sr. General and Teaching Hospital, Ozamiz City
    - Misamis Occidental Provincial Hospital in Oroquieta City
    - Tangub City Hospital, Tangub City
    - Calamba District Hospital, Calamba, Misamis Occidental
    - Gingoog City District Hospital
    - Alubijid Hospital, Alubijid, Misamis Oriental
    - Maramag Hospital, Maramag, Bukidnon
    - Manolo Fortich Hospital, Manolo Fortich, Bukidnon
    - Municipal/District Hospital in Balingasag, Initao and Claveria,
- Establishment of municipal and barangay health centers in areas which are not adequately covered by existing health services.

The region, through the cooperation of the government and private sector shall endeavor to adequately meet the projected hospital bed requirements of its population.

TABLE 28. PROJECTED HOSPITAL BED REQUIREMENTS, REGION X: 2015-2040

Province/City	2015		2020		2025	
	Population	Beds	Population	Beds	Population	Beds
Province	2,897,124	5,794	3,210,312	6,421	3,557,556	7,114
Bukidnon	1,066,601	2,133	1,179,398	2,359	1,304,071	2,608
Camiguin	88,987	178	94,445	189	100,194	200
Lanao del Norte	688,666	1,377	779,796	1,560	882,598	1,765
Misamis Occidental	329,669	659	353,619	707	379,237	758
Misamis Oriental	723,201	1,446	803,054	1,606	891,456	1,783
City	1,860,710	3,721	2,057,379	4,115	2,274,629	4,531
Cagayan de Oro	686,954	1,374	783,437	1,567	893,079	1,768
El Salvador	50,856	102	57,544	115	64,973	130
Gingoog	126,120	252	134,616	269	143,374	287
Iligan	343,301	687	364,919	730	387,728	775
Malaybalay	169,905	340	188,272	377	208,294	417
Oroquieta	73,904	148	79,151	158	84,696	169
Ozamis	143,357	287	156,115	312	169,861	340
Tangub	65,663	131	71,926	144	78,719	157
Valencia	200,650	401	221,399	443	243,905	488
Total	4,757,834	9,516	5,267,691	10,535	5,832,185	11,645

Province/City	2030		2035		2040	
	Population	Beds	Population	Beds	Population	Beds
Province	3,942,558	7,888	4,369,399	8,739	4,842,605	9,685
Bukidnon	1,441,868	2,884	1,594,159	3,188	1,762,458	3,525
Camiguin	106,247	212	112,617	225	119,318	239
Lanao del Norte	998,519	1,997	1,129,177	2,258	1,276,385	2,553
Misamis Occidental	406,642	813	435,959	872	467,326	935
Misamis Oriental	989,282	1,982	1,097,487	2,195	1,217,118	2,434
City	2,514,615	5,029	2,779,738	5,559	3,072,647	6,145
Cagayan de Oro	1,017,623	2,035	1,159,035	2,318	1,319,531	2,639
El Salvador	73,201	146	82,293	165	92,313	185
Gingoog	152,371	305	161,582	323	170,978	342
Iligan	411,784	824	437,144	874	463,866	928
Malaybalay	230,079	460	253,742	507	279,398	559
Oroquieta	90,551	181	96,726	193	103,232	206
Ozamis	184,655	369	200,563	401	217,651	435
Tangub	86,078	172	94,043	188	102,655	205
Valencia	268,273	537	294,610	589	323,023	646
Total	6,457,173	12,917	7,149,137	14,298	7,915,252	15,831

Source of Basic Data: NSO-X (Note: Requirements for hospital beds were estimated using the DOH's planning standard of 1 hospital per 500 population.)

4.3.4.11. Education Facilities

Goal: Improved quality, access and efficiency of education

Objectives

- To have adequate classrooms and other educational facilities for quality education; and
- To address the issues on inequitable distribution of elementary school classrooms, and shortage of secondary school classrooms.

Strategies and Policy Options

- Construction of additional school buildings to fully meet the backlog and future needs with consideration of the requirements for differently abled students;
- Improvement in the quality of educational facilities by pursuing the construction of disaster-resilient classrooms especially designed to withstand calamities and provide sufficient water and sanitation facilities to protect the health of children and teachers;
- Repair and rehabilitation of dilapidated classrooms;
- Review and revision, when necessary, existing criteria and procedures in allocating school building projects in the region. If possible, allocation should be based on the school-to-school classroom needs analysis without bias to the school divisions these schools belong; and
- Strengthening of linkages with the local and the private sector in the provision of school facilities.

4.3.4.12. Power, Transmission and Electrification

To address the issues and concerns on power supply shortage in Mindanao, the region shall pursue the stability, security and reliability of power generation capacity, transmission and distribution systems. It shall also expand rural electrification in the context of sustainable energy, poverty alleviation and environmental management towards creating a future with less carbon and ensuring energy efficiency as a way of life and using alternative fuels and renewable energy as intelligent choices.

Goals/Objectives

- Sufficient, stable, secure, accessible and reasonably-priced power supply; and
- Efficient energy utilization and adoption of clean energy technology applications.

Strategies and Policy Options

- Supporting the implementation of power generation projects that use clean energy technology applications and power stability and reliability-enhancing transmission related projects;
- Promoting the use of on-grid and off-grid renewable energy systems as support to rural electrification;
- Rehabilitation, maintenance, and or capacity-enhancement of power generation and transmission facilities; and,

- Supporting the policies that reasonably balance the interests of the private energy industry players and with those of the other stakeholders of the economy.

Proposed Programs/Projects

The following tables contain the lists of energy resource development, transmission and capacity enhancement projects that would help in attaining the subsector's objectives. Map 5~~3~~1 shows the location of proposed power plants and transmission lines in the region by 2040.

TABLE 29. TRANSMISSION DEVELOPMENT PROJECTS, 2012 TO 2016

	PROJECT NAME	DRIVER*	PURPOSE
1	Agus 1 HEPP Switchyard Upgrading Project	R	This project aims to ensure the reliability of the switchyards by upgrading the aged and dilapidated primary and secondary equipment.
2	Agus 2 HEPP Switchyard Upgrading Project	R	
3	Agus 5 HEPP Switchyard Upgrading Project	R	
4	Pulangi IV HEPP Switchyard Upgrading Project	R	
5	Agus 6 HEPP- Aurora 138 kV T/L	R	To provide N-1 contingency at Northwestern Mindanao
6	Jasaan-Butuan Bus-in to Nasipit Project	L	At present, the Nasipit Substation is cut-in along one of the circuits of Jasaan-Butuan 138 kV double circuit transmission line. Any outage of the Nasipit-Butuan 138 kV single circuit, by 2014 at peak load, low voltage will be experienced in the following north eastern substations: Butuan, Placer, San Francisco and Bislig. This is due to expected substantial load growth in Northeastern Mindanao Area (NEMA). To address this voltage problem, the connection of Nasipit Substation will be reconfigured into a ‗bus-in' connection, where both circuits of Jasaan-Butuan 138 kV are cut-in. This will provide reliability and balanced loading of the lines. Also included in this project is the reconfiguration of the existing Nasipit Substation from ring bus to breaker-and-a-half configuration. This will further enhance flexibility and reliability of the substation.
7	Mindanao Capacitor I	R	To maintain the voltage level at Northeastern Mindanao during normal and N-1 conditions
8	Mindanao Substation Reliability II	R	To provide N-1 transformers at various substations
9	Mindanao Substation Reliability III	R	To provide N-1 transformers at various substations
10	Mindanao Substation Reliability IV	R	To provide N-1 transformers at various substations
11	Repair/rehabilitation of Camiguin Submarine Cable	R	To ensure reliability of transmission service to Camiguin
*G=Generation-Associated, L=Load-Growth-Driven, C=Congestion-Related, R=Reliability & Power Quality			

Source: Transmission Development Plan 2012, NGCP

TABLE 30. ENHANCEMENT CAPACITY POWER PROJECTS

Name of Project	Target Date of Completion
Agus 6 Uprating Project	December 2014
Rehabilitation of Agus VI Unit 4	December 2014
Balo-i Plains Flood Control Project	December 2015
Selctive Dredging of Pulangui IV Reservoir	December 2014

Source: NPC/PSALM

TABLE 31. DOE PROSPECTIVE POWER PLANTS

Proposed Generation Facility	Capacity (MW)	Location
Bubunawan Hydro	23	Baungon, Bukidnon
Clarin Run-of-River Mini Hydro	6.9	Clarin, Misamis Oriental
FDC Coal	300	Misamis Oriental
Laguindingan Solar	30-40	Misamis Oriental
Mat-I Mini Hydro	4.85	Claveria, Misamis Oriental
Oriental Energy Run-of-the-River Mini Hydro	10	Manolo Fortich, Bukidnon
Simod Hydro	11.80	Simod, Kitaotao, Bukidnon
Sita Hydro	16.40	Kipilas, Kitaotao, Bukidnon
Larangan Mini Hydropower Plant	8.5	Misamis Occidental
Culaman MHP	10	Bukidnon
Tagoloan HEP	68	Bukidnon
Impasug-ong	68	Bukidnon
Liangan HEP	11.9	Bukidnon
Bulanog-Batang HEP	132	Bukidnon
Agus 3 HEP	225	Lanao del Norte
Odiongan MHP 2 & 3	15	Misamis Oriental
Mapalad Power Corporation (formerly Iligan Diesel Power Plant)	110	Iligan City

Source: Power Development Plan 2009-2030, DOE & NPC/PSALM

4.3.4.13. Communications

In pursuit of and consistent with national development programs, the communications subsector of the region aims at fulfilling the following goals/objectives through the implementation of policies/strategies and projects, as follows:

Goals/Objectives

- Affordable and quality postal and telecommunications services regionwide, linking the rural and urban areas and other parts of the country and across the world;
- Affordable, efficient and effective internet connection; and
- Competent and resilient ICT infrastructure as the backbone of e-Government system.

Strategies and Policy Options

- Establishment of /re-open postal offices in all municipalities of the region;
- Installation of telephone facilities in all municipalities in the region;

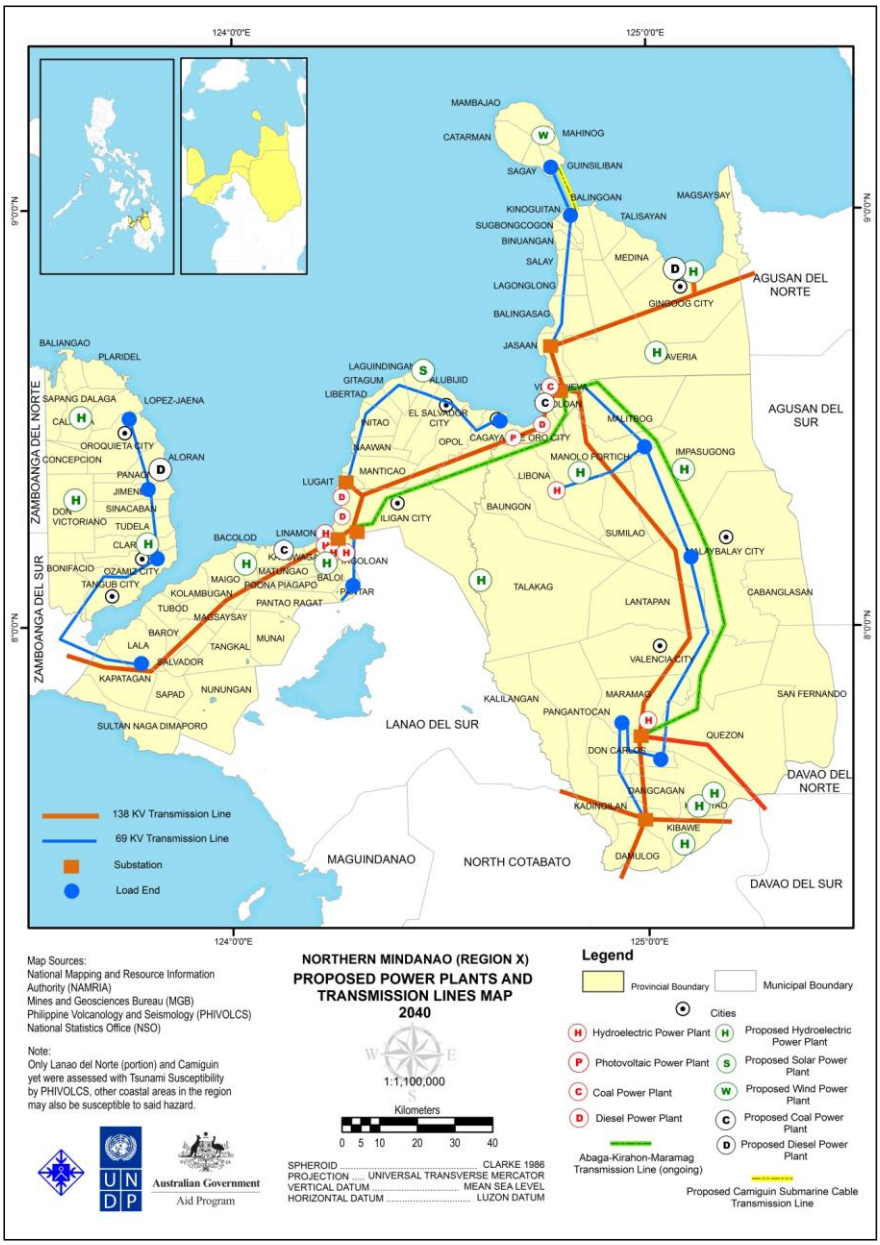
- Full establishment of CMTS coverage regionwide;
- Intensification of private sector participation in providing postal, telecommunication and ICT services; and
- Strengthening of ICT Infrastructure

Targets

- All municipalities shall have at least one postal station
- All municipalities shall be connected by affordable and efficient telecommunication system;
- All municipalities shall have access to internet services;

Programs and Projects

- Establishment/re-opening of post offices at municipalities without or have closed post offices
- In order to strengthen ICT infrastructure to support the e-Government system, the following shall be fully implemented:
  a) PhilCeC towards self-reliant barangays; and
  b) iGovPhil to provide the necessary infrastructure and software needed for e-governance. The infrastructure includes the creation of data centers, layout of fiber-optic networks to interconnect government offices and provide high speed communications. The software includes online tools, services, and applications for the use of government agencies and citizens.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MAMBAJAO
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MAGSAYSAY
KINOGUITAN
TALISAYAN
SUGBONGCOGON
BINUANGAN
SALAY
MEDINA
LAGONGLONG
AGUSAN DEL NORTE
GINGOOG CITY
BALINGASAG
JASAAN
AVERIA
BALIANGAO
PLARIDEL
LAGUINDINGAN
GITAGUM
ALUBIJID
LIBERTAD
SAPANG DALAGA
LOPEZ-JAENA
CALAMBA
ZAMBOANGA DEL NORTE
OROQUIETA CITY
CONCEPCION
ALORAN
PANAON
JIMENEZ
DON VICTORIANO
SINACABAN
TUDELA
CLARIN
BONIFACIO
OZAMIZ CITY
TANGUB CITY
NAITAO
EL SALVADOR CITY
OPOL
CAGAYAN DE ORO CITY
NAAWAN
MANTICAO
LUGAIT
ILIGAN CITY
BACOLOD
LINAMON
MATUNGAO
MAIGO
BALOI
PANTAR
KOLAMBUGAN
TUBOD
MAGSAYSAY
PANTAO RAGAT
BAROY
LALA
TANGKAL
MUNAI
SALVADOR
KAPATAGAN
SAPAD
NUNUNGAN
SULTAN NAGA DIMAPORO
LANAO DEL SUR
MALITBOG
MANOLO FORTICH
IMPASUGONG
LIBONA
BAUNGON
SUMILAO
MALAYBALAY CITY
TALAKAG
LANTAPAN
CABANGLASAN
VALENCIA CITY
KALILANGAN
MARAMAG
SAN FERNANDO
PANGANTUCAN
QUEZON
DON CARLOS
DAVAO DEL NORTE
DANGCAGAN
KADINGILAN
KIBAWE
DAMULOG
MAGUINDANAO
NORTH COTABATO
DAVAO DEL SUR
138 KV Transmission Line
69 KV Transmission Line
Substation
Load End
Map Sources:
National Mapping and Resource Information Authority (NAMRIA)
Mines and Geosciences Bureau (MGB)
Philippine Volcanology and Seismology (PHIVOLCS)
National Statistics Office (NSO)
Note:
Only Lanao del Norte (portion) and Camiguin yet were assessed with Tsunami Susceptibility by PHIVOLCS, other coastal areas in the region may also be susceptible to said hazard.
Australian Government
Aid Program
NORTHERN MINDANAO (REGION X)
PROPOSED POWER PLANTS AND TRANSMISSION LINES MAP
2040
1:1,100,000
Kilometers
0 5 10 20 30 40
SPHEROID ..... CLARKE 1986
PROJECTION ..... UNIVERSAL TRANSVERSE MERCATOR
VERTICAL DATUM ..... MEAN SEA LEVEL
HORIZONTAL DATUM ..... LUZON DATUM
Legend
Provincial Boundary
Municipal Boundary
Cities
Hydroelectric Power Plant
Photovoltaic Power Plant
Coal Power Plant
Diesel Power Plant
Proposed Hydroelectric Power Plant
Proposed Solar Power Plant
Proposed Wind Power Plant
Proposed Coal Power Plant
Proposed Diesel Power Plant
Abaga-Kirahon-Maramag Transmission Line (ongoing)
Proposed Camiguin Submarine Cable Transmission Line

~~*4.3.4.14. Communications*~~

Goal/Objective

- Healthy and clean environment

Strategies and Policy Options

- Full implementation of the Ecological Solid Waste Management Act of 2000 (RA 9003) to build resilient communities;
- Installation of appropriate waste collection and disposal systems to local conditions
- Capacity development and effective information, education and communication; campaign on proper waste segregation and reduction and other aspects of solid waste management for the local communities;
- Assistance to LGUs in formulating their respective 10-year SWM Plans;
- Increasing level of compliance of LGUs in terms of the establishment of sanitary landfills and MRFs/MRSs to address uncollected waste and improper disposal practices;
- Improvement of access to and coordination/partnership with other agencies and the private sector for the establishment of facilities for alternative technologies to address scarcity in land for landfill purposes;
- Full utilization of the Regional Ecology Center to act as hubs for information, networking, and technology showcasing and advocacy;
- Clustering of common disposal facility and private sector participation in solid waste management; and
- Development of a framework for setting-up baseline data/indicators on SWM at the LGU level.

Targets

- All provinces, cities and municipalities in the region shall have their respective 10-year solid waste management plans;
- All cities and municipalities shall have established their respective landfill disposal system

Programs and Projects

- Establishment of sanitary landfill in cities and municipalities in the region

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Chapter 5

PLAN IMPLEMENTATION

This chapter describes the institutional, political and administrative arrangements for implementing the DRR/CCA-Enhanced Regional Physical Framework Plan (RPFP) of Northern Mindanao; how the RPFP is integrated into the existing machinery and processes of the regional and sub-regional policy-making, plan formulation, programming and budgeting under the Synchronized Planning, Programming and Budgeting System (SPPBS).

It discusses the existing monitoring and evaluation system that shall be adopted to monitor the implemented programs/projects; the need to monitor the changes in land uses over time and facilitates the periodic review, evaluation and revision of the RPFP.

The need for institution building is highlighted through: (i) capability building programs for regional, provincial and city planners and implementers to sharpen their skills in physical and land use planning to enable them to translate the DRR/CCA-Enhanced RPFP of Northern Mindanao into implementable Provincial Development and Physical Framework Plans (PDPFPs) at the provincial level, City and Municipal Comprehensive Land Use Plans (CLUPs) at the city and municipal levels, respectively; (ii) massive information campaign and advocacy to make all concerned be aware of their roles in the RPFP implementation; and (iii) identification of areas for further research/investigation and conduct of in-depth study.

5.1. REVIEW, APPROVAL AND ADOPTION PROCESS

The formulation and implementation of the 2013-2040 DRR/CCA-Enhanced Regional Physical Framework Plan (RPFP) of Northern Mindanao shall be considered a part of the entire development planning and implementation machinery and process.

It is therefore essential that the RPFP acquires legitimacy as the result of a formal process of endorsement and adoption so that its significance is acknowledged by government agencies, local government units and private sector and that it can fulfill its function of integrating their various development activities.

The following steps shall be undertaken:

a) Sufficient copies of the draft RPFP shall be reproduced and circulated to all involved agencies and groups to enable them to review the draft document simultaneously. NEDA-X, as chair of the RLUC shall take the lead in orchestrating the review process. Accredited NGOs and POs should be involved in the review process.

b) Multi-sectoral consultations at the regional and provincial/city levels should be conducted to solicit comments and suggestions to enhance the plan and at the same time for the stakeholders to understand the provisions of the RPFP.

c) An Inter-regional consultation/session should be conducted for the purpose of rationalizing and reconciling inter-regional development policies, programs and projects. This session is necessary to prevent or minimize conflicting proposals for policies, as well as optimize complementary policies, especially involving areas along common borders and/or subject of common interests.

d) The RLUC-TWG X should then make the necessary revisions to the draft RPFP by incorporating valid comments and suggestions of the various review agencies, sectors and organizations. The refined draft should then be endorsed by the RLUC-X to the RDC-X for approval and adoption as the Final RPFP.

e) The RDC-X shall then approve and adopt the RPFP through a resolution. If any further refinements are introduced by the RDC-X, the document should be returned to the RLUC-TWG-X. The RDC-X shall set a time frame for incorporating the refinements and schedule a session for presentation, approval and final adoption of the RPFP.

f) RDC-X submits the RPFP to the National Land Use Committee (NLUC) for its endorsement to the Office of the President.

5.2. THE RPFP PROCESS AND THE SYNCHRONIZED PLANNING, PROGRAMMING AND BUDGETING SYSTEM (SPPBS)

5.2.1. RPFP and SPPBS Implementation

The first generation RPFP, which covers the period 1993-2022 was approved by the RDC-X on March 18, 1994 through Resolution No. 2. This plan was updated after ten years considering the various developments such as the reorganization of the administrative regions in Mindanao (Executive Order No. 36), the enactment of new laws and issuances, new data sets generated and changes in land use and physical plans. The RPFP covering the period 2004-2030 was approved by the RDC on December 16, 2004 per Resolution No. 45.

The growing concern on the effects of disasters and climate change on development recognizes the importance of mainstreaming DRR/CCA into the physical plans. The Guidelines in Mainstreaming Disaster Risk Reduction in Subnational Development and Physical Planning in the Philippines is mainly used in the updating and/or formulation of this DRR/CCA-Enhanced RPFP covering the period 2013-2040.

This DRR/CCA-Enhanced RPFP shall serve as the policy framework for the preparation/updating of the Medium-Term Regional Development Plan, the Provincial Development and Physical Framework Plans, as well as the Comprehensive Land Use Plans of cities and municipalities in the region.

The Joint Memorandum Circular No. 1 (s. 2007) of the DILG, NEDA, DOF and DBM provides the Guidelines on the Harmonization of Local Planning, Investment Programming, Revenue Administration, Budgeting and Expenditure Management.

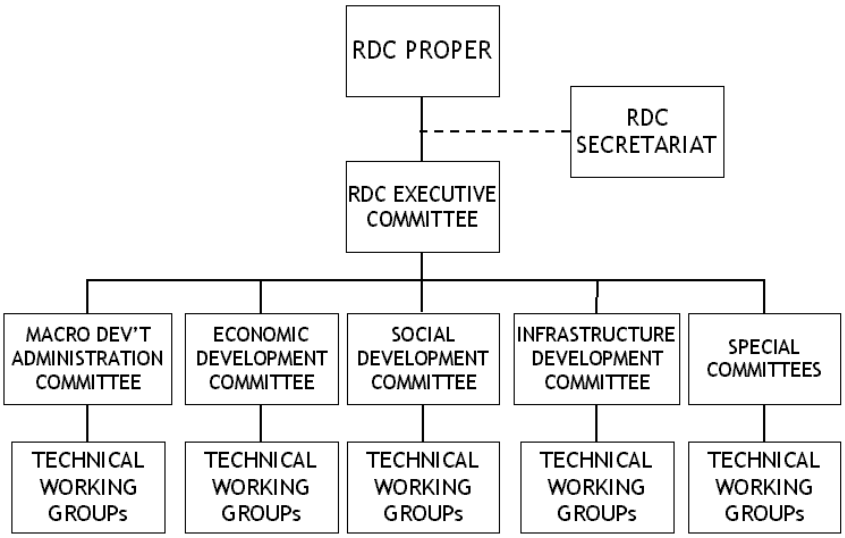
5.3. INTEGRATING THE RPFP MECHANISM INTO THE EXISTING MACHINERY FOR REGIONAL POLICY- MAKING AND PLANNING COORDINATION/INTEGRATION

5.3.1. The Reorganized Regional Development Council (RDC)

Pursuant to Letter Of Instructions (LOI) No. 22, issued on December 31, 1972, a Regional Development Council (RDC) is established in each of the regions in the country primarily to coordinate development planning and policy-making in these regions. To enhance its effectivity in synchronizing the "top-bottom and bottom-up" planning processes, over the years, efforts have been directed towards strengthening the council through, among others, the provision of additional powers to the Council Chairperson under LOI 542 as amended by LOI 542-A. Then on April 12, 1996, Executive Order (EO) No. 325 was passed repealing EO 308 (s. 1987), as amended by EOs 318 (s. 1988), 347 (s. 1989) and 366 (s. 1989) and 455 (s. 1991) and 505 (s. 1992) and providing for the rules and regulations on the RDC's reorganization to make it more responsive to the increased autonomy provided by the 1991 Local Government Code to local government units and pursuant to the mandate of the 1986 Philippine Constitution stated in Art. X, Sec. 14, as follows:

> *"The President shall provide for Regional Development Councils or other similar bodies composed of local government officials, regional heads of departments and other government offices, and representatives from non-government organizations within the region for purposes of administrative decentralization to strengthen the autonomy of the units therein and to accelerate the economic and social growth and development of the units in the region."*

FIGURE 16. REGIONAL DEVELOPMENT COUNCIL STRUCTURE*



*Reorganized pursuant to Executive Order 325

5.3.2. The Regional Land Use Committee (RLUC)

The RLUC is one of the special committees in the RDC. It is created through LOI 1350, otherwise known as "Providing the Institutional Framework for National Physical Planning and created the National Land Use Committee (NLUC) on 02 August 1983. On December 1, 2008, LOI 1350 was amended to strengthen the NLUC by elevating it into a National Economic and Development Authority (NEDA) Board Committee through Executive Order 770.

Section 6 of EO 7770 provides the institutionalization of the Regional Land Use Committee (RLUC). At the regional level, the RLUC, under the Regional Development Council, will be strengthened, with a replicated NB-NLUC composition. The RLUC may call on any department, bureau, office, agency or instrumentality, support and assistance in the performance of its functions.

a) Formulate and periodically update the Regional Physical Framework Plan (RPFP), taking into consideration national, interregional, regional and local plans and policies;
b) Promote the integration of land use and physical planning policies, plans and programs, including disaster risk management into the regional socio-economic plans and programs;
c) Decide and resolve region-specific land use policy conflicts among government agencies;
d) Review and recommend appropriate actions to the NB-NLUC on land use policy conflicts between or among national government agencies;
e) Assess changes in land use and other physical resources in the regional and the implementation of RPFP policies;
f) Evaluate consistency of major programs and projects with the RPFP and their impact on land use and the environment;
g) Undertake the gathering, updating and maintenance of a regional database system; and
h) Perform other related functions as may be directed by the NB-NLUC.

5.3.3. Regional Project Monitoring Committee (RPMC)

Executive Order No. 93 dated June 1, 1993 amended EO No. 376 (s. 1989) and Memorandum Order 175 (s. 1989), provided for the creation of the Regional Project Monitoring Committee (RPMC), which is under the RDC.

The Regional Project Monitoring and Evaluation System (RPMES) is designed to support the decentralization policy of the Government; provides a scheme linking the monitoring and evaluation systems at the national, regional, provincial/city and municipal levels; and promotes greater NGO participation and transparency of government programs.

At the regional level, the RPMC-X was organized with the NEDA-X and DBM-X Regional Directors as the Chairperson and Co-Chairperson, respectively. The other members of the RPMC-X include the DILG, PMS-OP, three (3) NGO/PSO representatives. The NEDA Regional Office X serves as the Secretariat of the RPMC-X.

The RDC Secretariat

As provided for in Section 13 of Executive Order No. 230 dated July 22, 1987 (Reorganizing the National Economic and Development Authority), there shall be a NEDA Regional Office (NRO) in each of the administrative regions which shall serve as the principal technical staff and Secretariat of the RDC, and its Executive Committee and the Advisory Committee (EO 325 (s. 1996), Section 13).

The NEDA Regional Office (NRO) Staff

The NRO is headed by a Regional Director and assisted by an Assistant Regional Director, one Chief of Finance and Administrative Division and four (4) Chief Economic Development Specialists (CEDS) heading the four technical divisions (per approved NEDA Rationalization Plan, June 2013) which provide technical support to the four RDC Sectoral Committees (Figure 17) as follows:

NRO-X Divisions	RDC-X Sectoral Committees
1. Development Research Division (DRD)	Macro and Development Administration Committee (MacroCom)
2. Project Development Investment Programming and Budgeting Division (PDIPBD)	Economic Development Committee (EDC)
3. Policy Formulation and Planning Division (PFPD)	Social Development Committee (SDC)
4. Project Monitoring and Evaluation Division (PMED)	Infrastructure Development Committee (IDC)

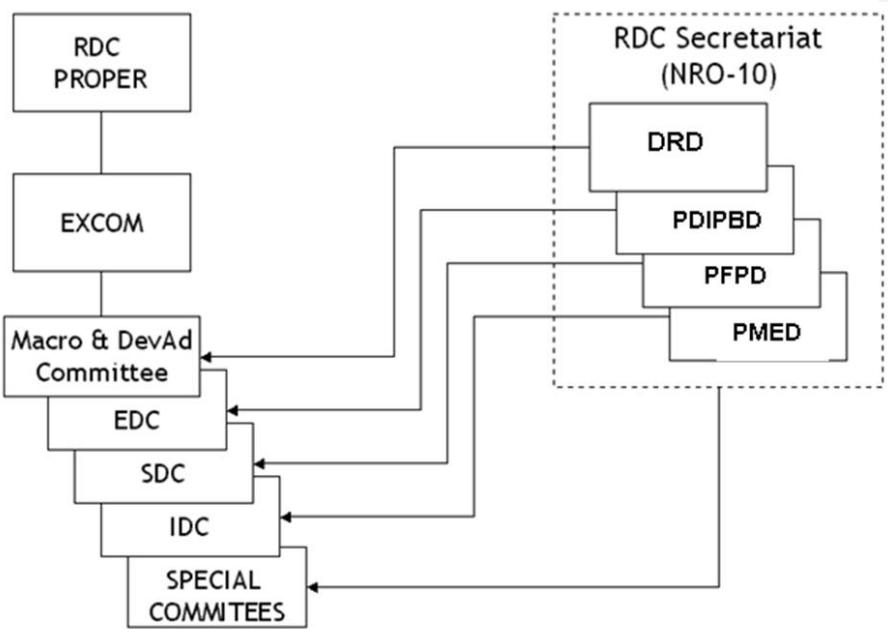
5.4. PHASING THE RPFP IMPLEMENTATION RELATIVE TO THE HORIZONS OF EXISTING REGIONAL/LOCAL PLANS

The underlying reason for phasing the plan derives from the practical difficulty of making accurate projections over long periods of time to implement the RPFP.

Projections of future demand for land and other natural resources by various social and economic activities of the regional population must be made. This will in turn provide a basis for calculating the magnitude of change in the stock and flow of the region's resources.

The RPFP, which is a 30 year plan horizon could be segmented into five-six year phases to synchronize with the tenure of political officials and medium-term and short-term planning cycles.

FIGURE 17. REORGANIZED RDC WITH EXCOM, SECCOM & SECRETARIAT*



* Pursuant to EO 325 and NEDA Rationalization Plan

5.4.1. RDP as the Implementing instrument of RPFP

The Medium-Term Regional Development Plan (MTRDP) (and its national counterpart, the MTPDP) which is largely socio-economic in context serves as the main guide in the formulation and implementation of sectoral programs and projects. With a five to six-year time horizon, the MTRDP, fits into the political term of national elective officials. In essence, both the MTRDP and the MTPDP maybe considered as the vehicle for carrying out the political platform of any incumbent administration, and the country's supposedly independent planning body, the NEDA, seemingly acting as the chief planner and socio-economic architect of the political administration.

In the context of the 2011-2016 MTRDP, both the land use and the spatial/physical dimensions is considered to the socio-economic planning, consisting of the land, environmental and infrastructure requirements of sectoral development. This approach encourages the thinking that land and other resources must be used to achieve sectoral growth targets. This type of planning focuses more on resources and how much of these maybe developed, and at the same time on what resources and areas must be conserved and regenerated to ensure future use by incoming generations.

On the other hand, land and other natural resources in the context of the RPFP, may not merely serve to satisfy sectoral development requirements, but also, to limit and constrain

the present use of some resources to shape future development in order to ensure and sustain the provision of the total economy's long-term development requirements. The RPFP is a 30-year blueprint for development segmented into the implementation periods of the MTRDP. If a major review of the RPFP is undertaken every after two RDP periods taking into consideration slippages in performance against RDP targets as translated from RPFP projections, the RDP in this sense, becomes a short-term implementing instrument of a long-term Framework Plan.

5.4.2. Synchronizing of Planning Horizons

In RPFP and MTRDP Evaluation/Revision

The phasing of RPFP implementation which may cover two MTRDP periods straddle two political terms. This facilitates synchronized evaluation and revision of both plans. Moreover, if a major review/evaluation is done in every two different political cycles, both RPFP and NFPP serve a useful function of lending stability and continuity to the regional/national development efforts despite changing political climates. Such a major evaluation will enable an outgoing administration to make a factual accounting of its accomplishments during its tenure, on one hand, at the same time, provide the incoming officials with benchmark information on which to base their socio-economic growth targets and projections.

Furthermore, the RPFP revision, which follows the evaluation process, as part of the overall planning cycle under the SPPBS, can accommodate major changes in development thrusts and strategies which the incoming set of officials may want to introduce through both the RPFP and the MTRDP.

5.4.3. Implementing the RPFP in Relation to Other Plans

The importance of the RPFP lies not only in the specified role it plays for the effective utilization, development and management of the region's land and other natural resources, but also, in how it links up with other plans for the overall development of the national economy at the various levels.

The RPFP and the NFPP

The RPFP and the National Framework for Physical Planning (NFPP) are mutually supportive and consistent with each other. The NFPP evolved from the National Physical Framework Plan (NPFP), which was prepared by NLUC in 1992, which also evolved from the integration of the various RPFPs. Since then, various public and private sector efforts took place that, while still complementary and relevant to the overall objectives of the NFPP, necessitated the refining and updating of the NFPP to make it more responsive in guiding decisions on the use, allocation, management and development of land resources.

Both the RPFP and NFPP are indicative plans promoting the most appropriate and rational use of the nation's and the region's land and physical resources, respectively. Both provide policy guidelines for the rational use of land and proper management of environmental resources to prevent or mitigate adverse effects of inappropriate utilization on people's welfare and on the ecological balance. Likewise, they both embody policies and strategies necessary to carry out the national/regional goals and objectives.

In the process of updating and refining the NPFP, it is realized that a significant part of the actual use, allocation and development of the land resources is best and more appropriately done at the regional level. Following this direction, the NFPP is more suitably confined to indicating broader policy directions of the various land use planning activities of the country – serving as a framework for planning rather than as a framework plan. The NFPP hopes to achieve national development anchored on sustainable development and growth with social equity. On the other hand, the RPFP prescribes specific policies and strategies for identified geographical sub-regional areas.

The RPFP and the MTPDP/MTRDP

The RPFP provides the spatial framework for integrating land use and spatial components in the MTPDP/MTRDP supportive of the socio-economic components.

The RPFP and the RDIP

The RPFP lays down the basis for proper locations of priority programs/projects lined up in the RDIP as translations of the socio-economic plans. Also, the RPFP itself is a source of projects for inclusion in the investment programs.

The RPFP and the Sectoral Plans

Sectoral programs/projects should be consistent with the goals and strategies of the RPFP, as well as, derive their justifications from the local plans which reflect the basic and development needs of the masses and the environment.

The RPFP and the Local Plans

Existing local plans have been taken into consideration in the iterative processes of RPFP formulation. In turn, the RPFP is being used as basis in the formulation, review and refinement of the provincial development and physical framework plans at the provincial level and the comprehensive land use plans at the city and municipal levels.

5.4.4. Financing the RPFP

The RPFP like any their plans can be funded out of ODA, GAA and locally generated funds. BOT and related schemes which the LGU's can now initiate as empowered under the Local Government Code of 1991.

5.5. RPFP IMPLEMENTATION AND THE EXISTING REGIONAL PROJECT MONITORING AND EVALUATION SYSTEM

The Regional Project Monitoring and Evaluation System (RPMES) was established pursuant to EO No. 93 dated June 1, 1993 which amends EO No. 376 (dated November 2, 1989) in line with the government's policies on decentralization and administrative delegation which among others, task the reorganized Regional Development Councils (EO 325) with the coordination of project implementation, monitoring and evaluation at the regional and sub-regional levels.

The RPMES provides a scheme for monitoring and evaluating projects at the national, regional, provincial/city and municipal levels, with the extensive and active participation

of various government agencies, local government units and non-governmental organizations at all levels. Hence, the monitoring and evaluation system at any level is primarily for the purpose of expediting project implementation at that level and to determine whether the objectives of the projects are accomplished.

5.5.1. Objectives

The RPMES primarily aims to facilitate project implementation, and devolved project facilitation, problem-solving, monitoring and evaluation to the regional, provincial/city and municipal levels.

5.5.2. Scope and Coverage

The RPMES covers all development projects undertaken by Government Agencies (GAs), Local Government Units (LGUs), State Colleges and Universities, and Government-Owned and Controlled Corporations (GOCCs) at the regional, provincial/city, and municipal levels during the fiscal year, inclusive of backlogs from previous fiscal years. Development projects include: a) projects which are capital forming and contributing directly to the country's productive capacity; b) pre-investment studies, research and development, and institutional development activities; and c) "pro-poor" and other similar projects under the direction and special programs of the President thru the Presidential Management Staff (PMS) and other Cabinet Offices. These projects may be funded by the National Government with or without foreign assistance, or financed purely from local revenues of LGUs. Projects to be covered in more specific terms include the following:

a) Those under the General Appropriations Act for the current fiscal year;
b) Those which comprise the approved National Infrastructure Program;
c) Those undertaken by government-owned and controlled corporations with or without subsidy or equity contribution from the national government; and
d) Those implemented by local government units, with or without budgetary assistance from the national government, specifically including those funded from the 20 percent of the internal revenue allotment share appropriated for development projects.

These programs/projects may have been proposed through the regional/local physical framework plans or the socio-economic plans, and ultimately listed in the priority Annual Investment Programs, the annualized RDIP or AIP which serves as the basis of the annual budgeting in accordance with the SPPBS guidelines.

5.5.3. Organizational Framework

The operationalization of the RPMES will be undertaken by a number of units/entities acting as coordinators, monitors and project implementers as shown in Figure 18.

Coordination Activities

The Department of Budget and Management and the National Economic and Development Authority, in coordination with the Department of Interior and Local Government will oversee the implementation of the RPMES at all levels.

The coordination of PMC activities at the sub-regional levels, will be the responsibility of the various development councils at the regional, provincial, city and municipal levels.

Planning, Programming and Scheduling of Monitoring Activities

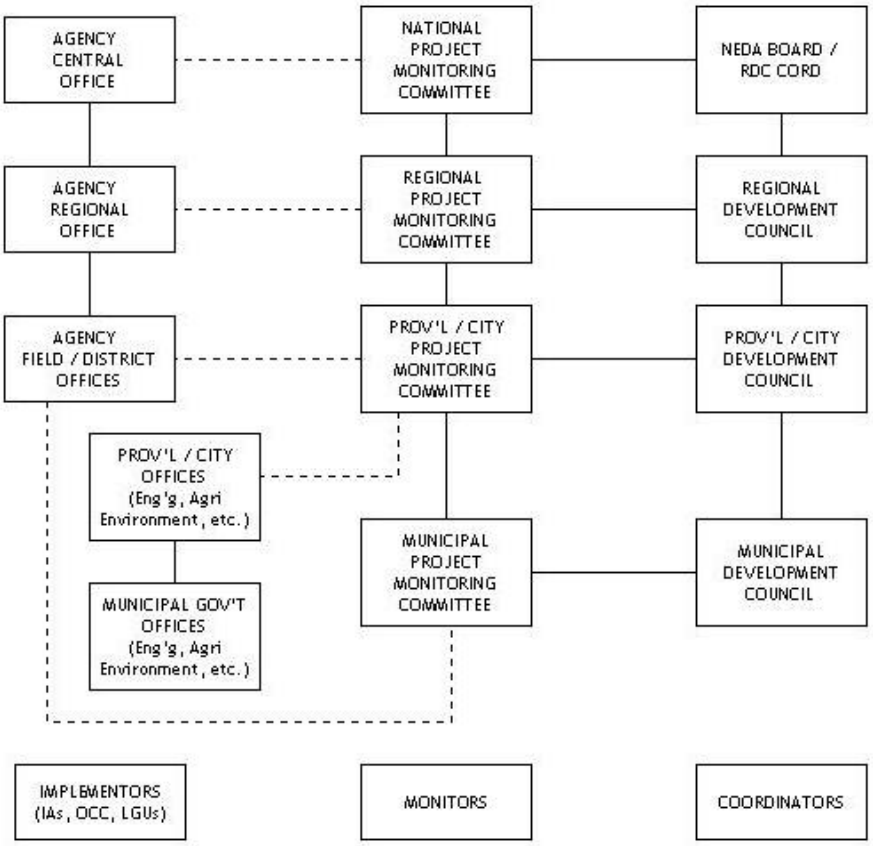
The operationalization of the RPMES will be undertaken through the Project Monitoring Committee (PMC) created in each region through E.O 376 as amended by EO 93, and in each province, city and municipality through M.C. 175 and M.C. 175-A, as amended. These PMCs will be responsible for planning, programming and scheduling of monitoring activities; to facilitate the actual monitoring and evaluation of implemented development projects at their respective levels (Figure 19).

At the regional level, the RLUC will join the PMC and will be responsible for monitoring changes in land use and other physical resources, whereas the NRO will take care of monitoring changes in the socio-economic environment. The provincial counterparts will be the PLUC and the PPDO. At the city and municipal level both responsibilities are devolved to the CPDO and MPDO.

The most effective level at which environmental monitoring can be undertaken is at the provincial level. The PLUC-PPDO can co-opt the PENRO and CENRO to monitor changes that take place in lands of the public domain and the provincial, city and municipal assessors to monitor changes in A & D lands. Accredited NGOs and POs of the LDCs should be called in to participate in this process.

The project monitoring and evaluation will continue to be the joint responsibility of the implementing agency and the planning agency. For proper integration between the RPFP and the MTRDP, any change or revision of the medium-term plan that has spatial or land use implications should be reflected in, or covered by a corresponding revision of the RPFP.

FIGURE 18. RPMES ORGANIZATIONAL STRUCTURE



5.6. IMPLEMENTATION SUPPORT ACTIVITIES

The effective implementation of the RPFP calls for a massive information drive to advocate this plan to all concerned:

a) Members of the House of Congress who can provide the funding thru legislation and congressional funds
b) LGUs which should translate the RPFP into implementable provincial development and physical framework plans and city/municipal comprehensive land use plans;
c) Other line agencies which shall be assisting the NEDA-RLUC in the updating of the RPFP;

d) The private sector, NGOs and the businessmen who will translate the RPFP into income generating private investments;
e) The people who are the ultimate beneficiaries of the fruits of the RPFP in terms of a productive and ecologically balanced Region X.

IEC materials on the RPFP shall be prepared and disseminated through the different media of communication. The cooperation and support of the RDC-X particularly the PIA in the preparation of these promotional materials is essential. These IEC materials shall be written in a non-technical language to enable ordinary citizens to understand what the RPFP is all about and how it affects them.

5.6.1. Capability Building Programs

The RPFP provides for the indicative framework which is in the process of being translated into the provincial physical framework plans, and ultimately, into the comprehensive land use plans of component cities and municipalities which have the mandated power to enact and enforce zoning ordinances. Thus, these cities and municipalities are expected to give teeth to the implementation of RPFP. In operation, the RPFP serves as bases for the formulation of socio-economic and other development plans at the national, regional and local levels all supportive to the attainment of national development anchored on sustainable development and inclusive growth with social equity.

To effect the translation of the region's RPFP into the provincial development and physical framework plans and the comprehensive land use plans of cities and even of municipalities the following activities should be conducted regularly. These will supplement the on-going efforts of the provinces and cities in reformulating and/or updating their land use plans consistent with the goals and objectives spelled out in the RPFP:

a) Training and retraining programs on various aspects of physical and land use planning, as well as DRR/CCA mainstreaming to enable the regional, provincial, city and even the municipal development planners to keep abreast of recent developments in physical, urban and regional planning concepts and techniques;
b) Training on gender analysis and planning to better analyze and plan for gender concerns that influence sectoral policies and plans;
c) Training on the Geographic Information System. GIS shall also be linked up to other important information systems such as project tracking systems and statistical information systems to have a more meaningful data relationship and representation; and
d) Scholarships on physical, urban/regional planning, land use, DRR and CCA and other related programs both local and abroad should be sourced out from time to time.

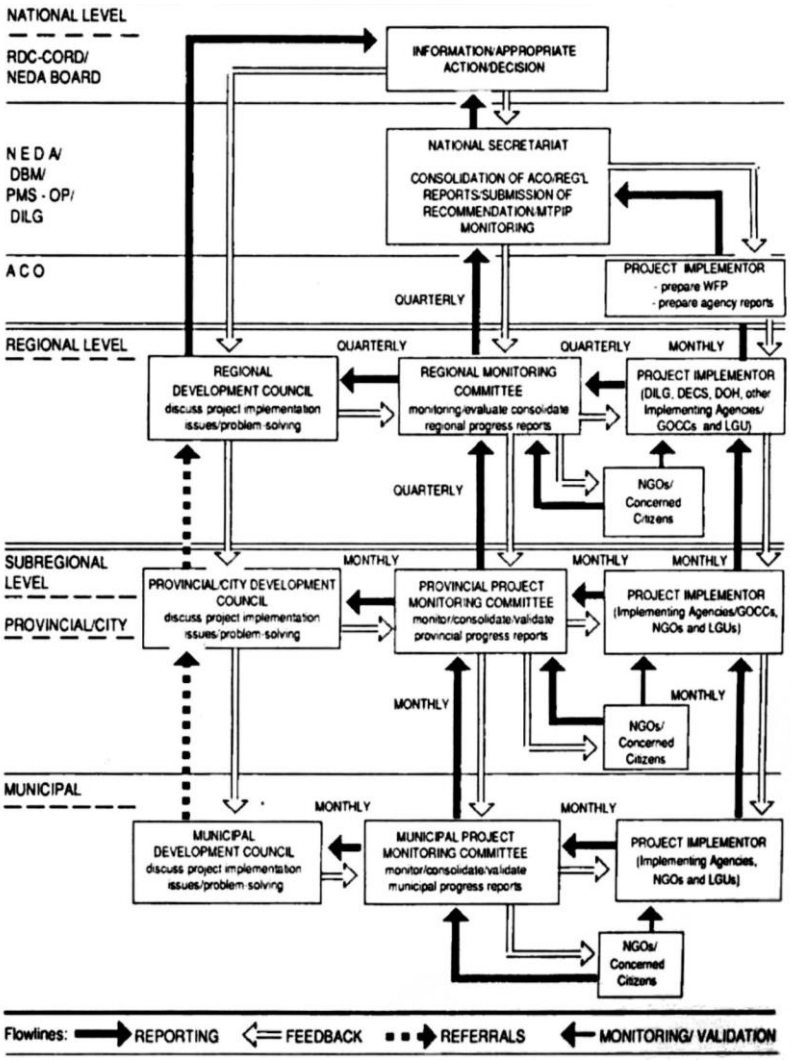



FIGURE 19. OVERALL RPMES FRAMEWORK