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# **CLUP GUIDEBOOK**

**A Guide to Comprehensive  
Land Use Plan Preparation  
2014**

**Volume 2  
Sectoral Analysis and  
Tools for Situational Analysis**

This Guidebook is subject to changes pending field-tested corrections of the Sectoral Studies.





# Foreword

The Comprehensive Land Use Plan (CLUP) Guidebook 2013-2014 is an update of the CLUP Guidebook 2006-2007 on the formulation/updating of Comprehensive Land Use Plans (CLUPs) and Zoning Ordinances (ZOs) for local governments at the city/municipal level, promulgated by the Housing and Land Use Regulatory Board (HLURB).

The CLUP guidelines were updated in compliance with two (2) landmark national laws, the Climate Change Act of 2009 (RA 9729) and the Disaster Risk Reduction and Management Act of 2010 (RA 10121), which require the mainstreaming of climate change adaptation and disaster risk reduction in all national and local development plans including the CLUP. Coupled with these directives is the recognition of the need to have an all-inclusive physical plan through the integration of our coastal and forest lands in city/municipal land use planning.

In response to these needs, the CLUP Guidebook 2013-2014 has adopted the ridge-to-reef or integrated watershed ecosystems management framework to emphasize the interrelationship between the upland, lowland and coastal ecosystems. The guidebooks have also integrated special areas and thematic concerns such as ancestral domain, biodiversity, heritage, urban design and green growth in the land use planning process to ensure the conservation and sustainable management of these critical elements.

We highly appreciate the successful collaboration between the HLURB and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in coming out with the CLUP Guidebook 2013-2014. Everyone is enjoined to utilize the guidebooks in the formulation and development of local land use plans that are not only forward looking but also adaptive and resilient to our constantly changing environment.



**ANTONIO M. BERNARDO**

Chief Executive Officer and Commissioner  
Housing and Land Use Regulatory Board

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National Commission on Culture and the Arts (**NCCA**); National Historical Commission of the Philippines (**NHCP**); National Museum of the Philippines (**NM**)

Climate Change Commission (**CCC**)

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Department of the Interior and Local Government (**DILG**)– Bureau of Local Government and Development (**BLGD**)

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**BOARD OF COMMISSIONERS**

**RESOLUTION NO. 918**

Series of 2014

**APPROVING THE ENHANCED CLUP GUIDEBOOK VOLUME 2,  
SECTORAL STUDIES AND TOOLS FOR ANALYSIS**

**WHEREAS**, Executive Order 648 provides that it is the policy of the state to implement an integrated program of land use development control that aims to foster growth and renewal of urban and rural communities in an integrative manner that promotes optimum land use, adequate shelter, and environmental protection - all these towards the development of man as a total human being;

**WHEREAS**, it is necessary to provide full support to local government units' policies and programs on the development of their communities through effective land use and development control measures;


**WHEREAS**, the Housing and Land Use Regulatory Board (formerly the Human Settlements Regulatory Commission) is empowered under Section 4 (a) of Executive Order 648 to "promulgate zoning and other land use control standards and guidelines which shall govern land use plans and zoning ordinances of local governments;

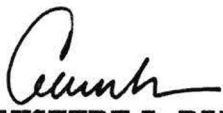
**WHEREAS**, there is a need to plan for the total land area and jurisdiction of local government units to provide a land management framework that will cover the 'ridge-to-reef' landscape, from the upland, lowland and coastal ecosystems to establish the interdependencies and linkages of the biophysical, human and physical resources and development; and,

**WHEREAS**, the enhanced CLUP Guidebook Volume 2 provides for the tools for analysis and detailed processes in the study of ecosystems and the mainstreaming of climate and risks in the socio, economic and infrastructure studies as component of the Comprehensive Land use Plans of cities and municipalities.


**WHEREFORE**, be it **RESOLVED** as it is hereby **RESOLVED** that the CLUP Guidebook Volume 2, Sectoral Studies and Tools for Analysis (2014) be, as the same is hereby **APPROVED**.


**APPROVED**, 24 July 2014 at the Coconut Palace, Pasay City.

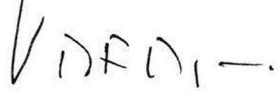
  
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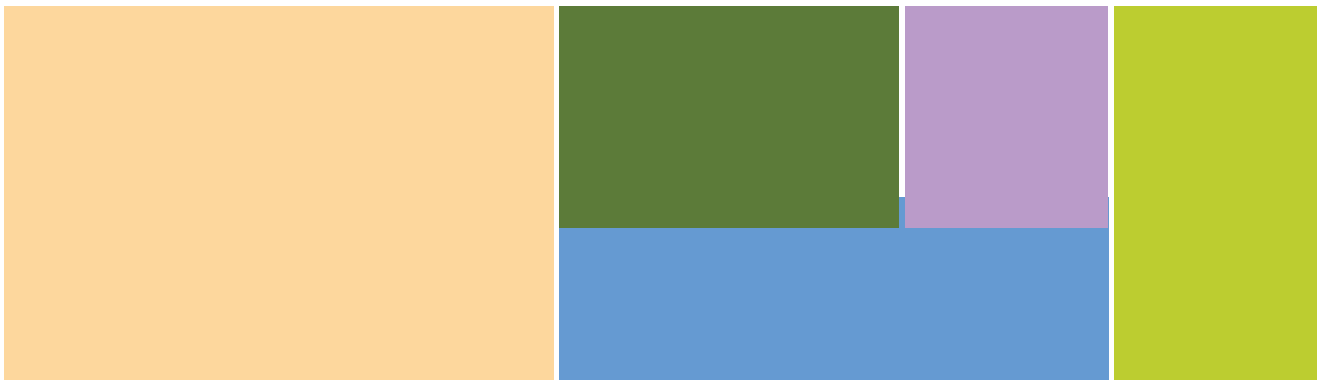
  
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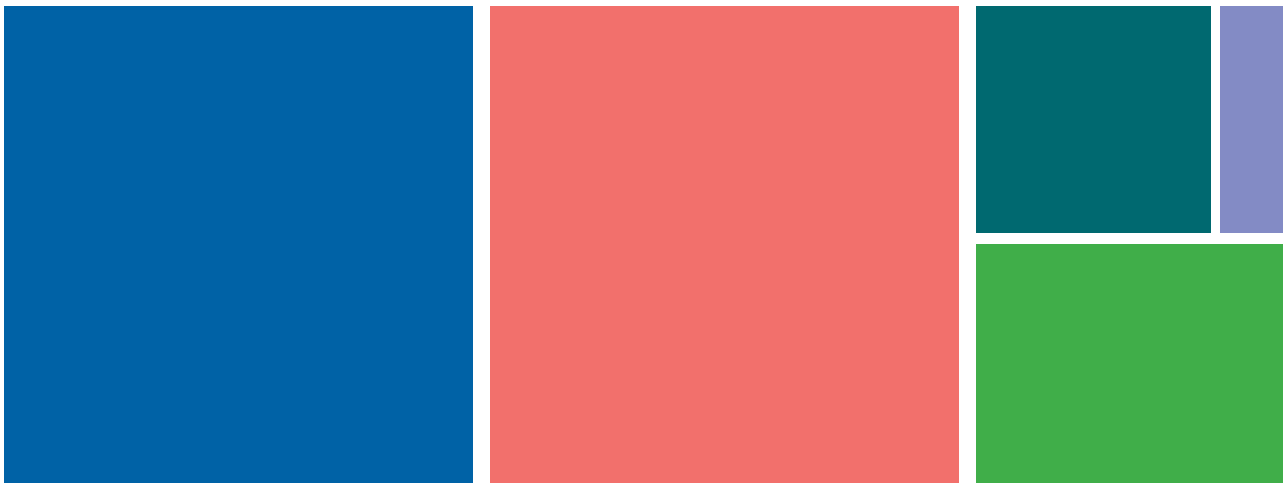




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# Acronyms

ADSDPP	-	Ancestral Domain Sustainable Development Protection Plan
APIS	-	Annual Property Indicators
ASTER GDEM	-	Advanced Spaceborne Thermal Emission and Radiometer Global Digital Elevation Model
AZE	-	Alliance for Zero Extinction
BAS	-	Bureau of Agricultural Statistics
BEIS	-	Basic Education Information System
BFAR	-	Bureau of Fisheries and Aquatic Resources
BITS	-	BLES Integrated Survey
BLES	-	Bureau of Labor and Employment Statistics
BOI	-	Bureau of Investments
BSWM	-	Bureau of Soils and Water Management
CARP	-	Comprehensive Agrarian Reform Program
CBDRRM	-	Community-Based Disaster Risk Reduction and Management
CBFM	-	Community Based Forest Management Program
CCA	-	Climate Change Adaptation
CENRO	-	Community Environment and Natural Resources Office
CFP	-	Community Forestry Program
CH	-	Critical Habitats
CHD	-	Current Housing Demand
C/M CLUP	-	City/Municipal Comprehensive Land Use Plan
CLUP	-	Comprehensive Land Use Plan
CPA	-	Conservation Priority Areas
CPDO	-	City Planning and Development Office
CPH	-	Census of Population and Housing
CRM	-	Coastal Resource Management
DA	-	Department of Agriculture
DAR	-	Department of Agrarian Reform
DILG	-	Department of Interior and Local Government
DEM	-	Digital Elevation Model
DENR	-	Department of Environment and Natural Resources
DOT	-	Department of Tourism
DPWH	-	Department of Public Works and Highways
DRR	-	Disaster Risk Reduction



DRRM	-	Disaster Risk Reduction Management
DRRMO	-	Disaster Risk Reduction Management Office
DTI	-	Department of Trade and Industry
EEZ	-	Exclusive Economic Zone
ENRO	-	Environment and Natural Resources Office
EO	-	Executive Order
EPA	-	Environmental Protection Area
EWS	-	Early Warning System
FAO	-	Food and Agriculture Organization
FARMC	-	Fisheries and Aquatic Resources Management Council
FFL	-	Forests and Forestlands
FGD	-	Focus Group Discussion
FHSIS	-	Field Health Services Information System
FIES	-	Family Income and Expenditure Survey
FLMP	-	Forest Land Management Agreement Program
FLUP	-	Forest Land Use Plan
FMB	-	Forest Management Bureau
FNRI	-	Food and Nutrition Training Institute
FSDZ	-	Fisheries Strategic Development Zones
GHG	-	Greenhouse Gases
GIS	-	Geographic Information System
GPS	-	Global Positioning System
HLURB	-	Housing and Land Use Regulatory Board
HUCs	-	Highly Urbanized Cities
IAN	-	Integration and Application Network
IBA	-	Important Bird Areas
ICCs	-	Independent Component Cities
ICCs	-	Indigenous Cultural Communities
ICP	-	Important Cultural Property
ICOMOS	-	International Committee on Monuments and Sites
IEC	-	Information and Education Campaign
IKSP	-	Indigenous Knowledge Systems and Practices
IPCC	-	Intergovernmental Panel on Climate Change
IPRA	-	Indigenous Peoples Rights Act
IPs	-	Indigenous Peoples
IPO	-	Indigenous Peoples Organization
IPS	-	Indigenous Political Structure
ISFP	-	Integrated Social Forestry Program
JMC	-	Joint Memorandum Circular
LC	-	Land Classification
LFS	-	Labor Force Survey
LGU	-	Local Government Unit

LSA	-	Land Suitability Assessment
MAO	-	Municipal Agricultural Office
MARINA	-	Maritime Industry Authority
MARO	-	Municipal Agrarian Reform Officer
MEO	-	Municipal Engineering Office
MENRO	-	Municipal Environment and Natural Resources Office
MGB	-	Mines and Geoscience Bureau
MPA	-	Marine Protected Areas
MPDO	-	Municipal Planning and Development Office
NAMRIA	-	National Mapping and Resource Information Authority
NCCA	-	National Commission for Culture and the Arts
NCCAP	-	National Climate Change Action Plan
NCIP	-	National Commission on Indigenous Peoples
NCIP-CSC	-	National Commission on Indigenous Peoples - Community Service Center
NDHS	-	National Demographic and Health Survey
NDRRMF	-	National Disaster Risk Reduction and Management Framework
NDRRMP	-	National Disaster Risk Reduction and Management Plan
NEDA	-	National Economic and Development Authority
NGAs	-	National Government Agency/ies
NGOs	-	Non-Government Organizations
NHCP	-	National Historical Commission of the Philippines
NIA	-	National Irrigation Administration
NIPAS	-	National Integrated Protected Areas System
NM	-	National Museum
NPAAAD	-	Network of Protected Agricultural and Agri-Industrial Areas for Development
NSO	-	National Statistics Office
NTFP	-	Non Timber Forest Products
OCD	-	Office of Civil Defense
PAGASA	-	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAMB	-	Protected Area Management Board
PAMP	-	Protected Area Management Plan
PARO	-	Provincial Agrarian Reform Office
PAWB	-	Protected Areas and Wildlife Bureau
PCRA	-	Participatory Coastal Resource Assessment
PCW	-	Philippine Commission on Women
PD	-	Presidential Decree
PDRA	-	Participatory Disaster Risk Assessment
PENRO	-	Provincial Environment and Natural Resources Office
PHIVOLCS	-	Philippine Institute of Volcanology and Seismology
PHS	-	Philippine Health Statistics

PR	-	Participation Rate
PRA	-	Participatory Rural Appraisal
PRECUP	-	Philippine Registry of Cultural Property
PSA	-	Philippine Statistics Authority
PTA	-	Philippine Tourism Authority
RA	-	Republic Act
R2R	-	Ridge-to-Reef
SAFDZ	-	Strategic Agriculture and Fishery Development Zones
SB	-	Sangguniang Bayan
SP	-	Sangguniang Panlalawigan/Panglunsod
SRTM	-	Shuttle Radar Topography Missions
SWDO	-	Social Welfare Development Office
SWOT	-	Strengths, Weaknesses, Opportunities and Threats
TIEZA	-	Tourism Infrastructure and Enterprise Zone Authority
TWG	-	Technical Working Group
UDHA	-	Urban Development and Housing Act
UNFCCC	-	United Nations Framework Convention on Climate Change
UP MSI	-	University of the Philippines – Marine Science Institute



## Glossary

**Adaptation** –the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.(RA 10121)

**Adaptive Re-use** –shall refer to the utilization of buildings, other built structures and sites of value for purposes other than that for which they were intended originally, in order to conserve the site, their engineering integrity and authenticity of design.

**Agricultural Lands (in forestlands)** –areas that are extensively used for the production of agricultural crops. These lands are primarily intended for cultivation, livestock production and agroforestry. (DAO 1995-15)

**Agroforestry** –is a suitable management farm and which increases overall production combines agricultural crops, tree crops and forest plants and/or animals simultaneously or sequentially and applies management practices which are compatible with the cultural patterns of the local populations.

**Alienable and Disposable (A and D) lands** –public domain lands that have been limited, classified and declared as such and available for disposition under Commonwealth Act No. 141, otherwise known as the Public Land Act. (DENR DAO 2000-83)

**Alluvial Flat** –A small alluvial plain having a slope of about 5 to 20 feet per mile (1.5 to 6 meters per 1600 meters) and built of fine sandy clay or adobe deposited during flood.

**Anthropogenic** –Derived from human activities. (Climate Change in the Philippines)

**Anthropological Area** –shall refer to any place where studies of specific ethno-linguistic groups are undertaken, the properties of which are of value to cultural heritage.

**Antique** –shall refer to a cultural property found locally which is one hundred (100) years in age, more or less, the production of which has ceased

**Appropriate Fishing Technology** –adaptable technology, both in fishing and ancillary industries, that is ecologically sound, locally source-based and labor intensive

**Aquaculture** –fishery operations involving all forms of raising and culturing fish and other fishery species in fresh, brackish and marine water areas

**Aquatic Pollution** –the introduction by human or machine, directly or indirectly, of substances or energy to the aquatic environment which result or is likely to result in such deleterious effects as to harm living and non-living aquatic resources, pose potential and/or real hazard to human health, hindrance to the aquatic activities such as fishing and navigation, including dumping/ disposal of waste and other marine litters, discharge of petroleum, or residual products of petroleum or carbonaceous materials/substances, and other radioactive, noxious or harmful liquid, gaseous or solid substances, from any water, land or air transport or other human-made structure. Deforestation, unsound agricultural practices such as the use of artificial fish feed, and wetland conversion, which causes similar hazards and deleterious effects, shall also constitute aquatic pollution.

**Aquatic Resources** –includes fish, all other aquatic flora and fauna and other living resources of the aquatic environment, including, but not limited to, salt and corals.

**Archeological Area** –shall refer to any place whether above or underground, underwater or at sea level, containing fossils, artifacts and other cultural, geological, botanical, zoological materials which depict and document culturally relevant paleontological, prehistoric and/or historic events

**Archive/s** –shall refer to public and private records in any format which have been selected for permanent preservation because of their evidential, historical information value; otherwise known as archival materials collections or archival holdings; the place (building/room/storage area) where archival materials are kept and preserved; and an organization or agency or part thereof whose main responsibility is to appraise, arrange, describe, conserve, promote and make archival materials available for reference and research, also known as archival agency

**Artificial Reefs** –any structure of natural or man-made materials placed on a body of water to serve as shelter and habitat, source of food, breeding area for fishery species and shoreline protection

**Base Map** –shows certain fundamental information such as rivers, roads and political boundaries on which additional, specialized data can be compiled. Base map provides the standard configuration of the planning unit and thus serves as the working map for the preparation of the thematic maps.

**Baseline/Reference** –The baseline (or reference) is any datum against which change is measured. It might be a “current baseline,” in which case it represents observable, present-day conditions. It might also be a “future baseline”, which a projected future is set of conditions excluding the driving factor of interest (e.g. how would a sector evolve without climate warming). (Climate Change in the Philippines)

**Biological hazard** –a process or phenomenon of organic origin or conveyed by biological vectors, including exposure to pathogenic micro-organisms, toxins and bioactive substances that may cause loss of life, injury, illness or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

**Brackish water fishponds (earthponds)** –man-made enclosures of varying size, dependent on tidal fluctuations of water management, located in estuaries (deltas, mudflats and mangrove swamps) and intended for the culture of fishes/aquatic species

**Brackish water swamps** –land areas where most of the time the brackishwater level is at/above the land surface

**Brush Lands** –refer an area characterized by discontinuous cover of shrubby and non-wood vegetation including grasses. (Philippine Forestry Statistics 1992)

**Built heritage** –shall refer to architectural and engineering structures, such as but not limited to bridges, government buildings, ancestral houses, places of worship, traditional dwellings, military installations, train stations, lighthouses, small ports, city and streetscapes, educational technological and industrial complexes, and their settings, and landscapes with notable historical and cultural significance.

**Capacity** –a combination of all strengths and resources available within a community, society or organization that can reduce the level of risk, or effects of a disaster. Capacity may include infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management. Capacity may also be described as capability. (RA 10121)

**Capacity Development** –the process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions.

**Catch Ceilings** –refer to the annual catch limits allowed to be taken, gathered or harvested from any fishing area in consideration of the need to prevent overfishing and harmful depletion of breeding stocks of aquatic organisms.

**Civil Reservations** –forest lands that are proclaimed by the President for a specific purpose such as a town site or a resettlement area.



**Climate Change** –change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. (Climate Change in the Philippines)

**Climate Model** –A quantitative way of representing the interactions of the atmosphere, oceans, land surface, and ice. Models can range from relatively simple to quite comprehensive. (Climate Change in the Philippines)

**Climate Projection** –A description of the response of the climate system to emission or concentration scenarios of greenhouse gases and aerosols, or radiative forcing scenarios, often based upon simulations by climate models. Climate projections are subject to uncertainty, because they are typically based on assumptions concerning future socio-economic and technological developments that may or may not be realized. (Climate Change in the Philippines)

**Climate Risk** –is the possibility of interaction of physically defined hazards with the exposed systems. Risk is commonly considered to be the combination of the likelihood of an event and its consequences –i.e., risk equals the probability of climate hazard occurring multiplied the consequences a given system may experience. (Climate Change in the Philippines)

**Climate Variability** –Climate variability refers to variations in the mean state of the climate and other statistics (such as standard deviations, the occurrence of extremes, etc.) on all temporal and spatial scales beyond that of individual weather events. (Climate Change in the Philippines)

**Climate Change Vulnerability** –is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity. (Climate Change in the Philippines)

**Closed Season** –the period during which the taking of specified fishery species by a specified fishing gear is prohibited in a specified area or areas in Philippine waters

**Coastal Area/Zone** –is a band of dry land and adjacent ocean space (water and submerged land) in which terrestrial processes and uses directly affect oceanic processes and uses, and vice versa; its geographic extent may include areas within a landmark limit of one (1) kilometer from the shoreline at high tide to include mangrove swamps, brackish water ponds, nipa swamps, estuarine rivers, sandy beaches and other areas within a seaward limit of 200 meters isobath to include coral reefs, algal flats, sea grass beds and other soft-bottom areas.

**Coastline** –lines that form the boundary between the land and water, especially of sea or ocean

**Collector** –shall refer to any person who or institution that acquires cultural property for purposes other than sale

**Commercial Fishing** –the taking of fishery species by passive or active gear for trade, business or profit beyond subsistence or sports fishing, to be further classified as:

- a. **Small scale commercial fishing** –fishing with passive or active gear utilizing fishing vessels of 3.1 gross tons (GT) up to twenty (20) GT;
- b. **Medium scale commercial fishing** –fishing utilizing active gears and vessels of 20.1 GT up to one hundred fifty (150) GT; and
- c. **Large scale commercial fishing** –fishing utilizing active gears and vessels of more than one hundred fifty (150) GT.

**Commercial Scale** –a scheme of producing a minimum harvest per hectare per year of milkfish or other species including those raised in pens, cages and tanks to be determined by the Department in consultation with the concerned sectors.

**Commission** –shall refer to the National Commission for Culture and the Arts (NCCA)

**Communal Forest** –refers to a tract of forest land set aside by the Secretary of the DENR upon the recommendation of the concerned LGU for the use of the residents of a municipality/city. Said residents may cut, collect and remove forest products for their personal use in accordance with existing laws and regulations and subject to the provision that utilization of resources therein shall be in accordance with sustainable development. For this purpose, the concerned LGU with the assistance of the DENR shall prepare sustainable operations plan prior to any utilization. (DENR-DILG JMC 98-01)

**Community-Based Disaster Risk Reduction and Management or CBDRRM** –a process of disaster

risk reduction and management in which at risk communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities, and where the people are at the heart of decision-making and implementation of disaster risk reduction and management activities. (RA 10121)

**Community-Based Forest Management (CBFM) Program** –the program involving local communities which integrates and unites the Integrated Social Forestry Program (ISFP), Forestry Sector Program, Forestry Sector Project, Forest Land Management Agreement Program (FLMP), Community Forestry Program (CFP), and other people oriented forestry projects. (DENR-DILG JMC 98-01)

**Community Environment and Natural Resources Office (CENRO)** –the DENR Office, headed by a Community Environment and Natural Resources Officer Appointed by the Secretary of DENR, which is responsible for the implementation of DENR policies, programs, project and activities and the enforcement of ENR laws and regulations in the community level. (DENR-DILG JMC 98-01)

**Community Mapping** –a process that aims to externalize or draw out the community’s interpretation of the landscape, its elements, and the activities within it; their socio-cultural relations with their environment; and their perceptions on how best to implement forest resource management.

**Community Watershed Areas** –forestlands set aside by the Secretary of the DENR upon the recommendation of the concerned LGU as sources of water supply for specific local communities subject to the provision that the utilization thereof shall be in accordance with sustainable development. (DENR-DILG JMC 98-01)

**Conservation** –shall refer to all the processes and measures of maintaining the cultural significance of a cultural property, including but not limited to, preservation, restoration, reconstruction, protection, adaptive re-use or any combination thereof

**Coral** –the hard calcareous substance made up of the skeleton of marine coelenterate polyps which include reefs, shelves and atolls or any of the marine coelenterate animals living in colonies where their skeletons form a stony mass. They include: (a) skeletons of anthozoan coelenterate characterized as having a rigid axis of compact calcareous or horny spicules, belonging to the genus corallium as represented by the red, pink, and white corals which are considered precious corals; (b) skeletons of anthozoan coelenterates characterized by thorny, horny axis such as antipatharians represented by the black corals which are considered semi-precious corals; and (c) ordinary corals which are any kind of corals that are not precious nor semi-precious.

**Coral reefs** –simply defined, these are reefs made chiefly of fragments of corals, coral sands, algae and other organic deposits, and the solid limestone resulting from their consolidation. Technically, they are marine shelves or platforms formed by the consolidation of the skeleton of hermatypic corals through cementation by coralline algae and lithification processes; also defined as a natural aggregation of coral skeleton, with or without living coral polyps, occurring in intertidal and sub tibal marine waters

**Critical facilities** –the primary physical structures, technical facilities and systems which are socially, economically or operationally essential to the functioning of a society or community, both in routine circumstances and in the extreme circumstances of an emergency

**Cultural agencies** –shall refer to any of the following national government agencies with their specific areas of responsibility: National Museum (cultural property), the National library (books); National Historical Commission of the Philippines (Philippine history), the National Archives of the Philippines (documents), the Cultural Center of the Philippines (culture and the arts) and Komisyon ng Wikang Filipino (language)

**Cultural Education** –shall refer to the teaching and learning of cultural concepts and processes

**Cultural Heritage** –shall refer to the totality of cultural property preserved and developed through time and passed on to posterity

**Cultural Heritage worker** –shall refer to an Individual undertaking cultural heritage work

**Cultural Institution** –shall refer to entities primarily engaged in cultural work

**Cultural Property** –shall refer to all products of human creativity by which a people and a nation reveal their identity, including architecture and sites or human activity [churches, mosques and other places of religious worship, schools] and natural history specimens and sites, whether public or privately owned, movable or immovable, and tangible or intangible

**Dealers** –shall refer to natural and juridical persons who acquire cultural property for the purpose of engaging in the acquisition and disposition of the same

**Delimitation** –the determination of boundaries of municipal waters between adjacent or opposite municipalities where the delineation of their respective waters show that their respective waters overlap. (DA Administrative Order No. 1, Series of 2004)

**Delineation** –the determination of the outer limits of the municipal waters of a municipality. (DA Administrative Order No. 1, Series of 2004)

**Demarcation** –the determination of the boundaries where there is a depth of at least seven (7) fathoms. (DA Administrative Order No. 1, Series of 2004)

Note: Demarcation, as defined here, makes reference to Section 18 of the Philippine Fisheries Code of 1998 (RA 8550), where a municipal or city government may, through its local chief executive and acting pursuant to an appropriate ordinance, authorize or permit small and medium-scale commercial fishing vessels to operate within the 10.1-15 km area from the shoreline in municipal waters provided that no commercial fishing be allowed in municipal waters with depth less than seven (7) fathoms as certified by the appropriate agency

**Demarcated Areas** –boundaries defined by markers and assigned exclusively to specific individuals or organizations for certain specified and limited uses such as:

- a. Aquaculture, sea ranching and sea farming;
- b. Fish aggregating devices;
- c. Fixed and passive fishing gears; and
- d. Fry and fingerlings gathering.

**Depression** –a type of tropical cyclone between between 35 KPH and 64 KPH near the center

**Downscaling** –is the general name for a procedure to take information known at large scales to make predictions at local scales. It refers to techniques that take output from the model and add information at scales smaller than the grid spacing. (Climate Change in the Philippines)

**Disaster** –a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources. Disasters are often described as a result of the combination of: the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injury, disease and other negative effects on human, physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, Social and economic disruption and environmental degradation. (RA 10121)

**Disaster Mitigation** –the lessening or limitation of the adverse impacts of hazards and related disasters.

**Disaster Preparedness** –the knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions. Preparedness action is carried out within the context of disaster risk reduction and management and aims to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response to sustained recovery. Preparedness is based on a sound analysis of disaster risk and good linkages with early warning systems, and includes such activities as contingency planning, stockpiling of equipment and supplies, the development of arrangements for coordination, evacuation and public information, and associated training and field exercises. These must be supported by formal institutional, legal and budgetary capacities. (RA 10121)

**Disaster Prevention** –the outright avoidance of adverse impacts of hazards and related disasters. It expresses the concept and intention to completely avoid potential adverse impacts through action taken in advance such as construction of dams or embankments that eliminate flood

risks, land-use regulations that do not permit any settlement in high-risk areas, and seismic engineering designs that ensure the survival and function of a critical building in any likely earthquake. (RA 10121)

**Disaster Response** –the provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. Disaster response is predominantly focused on immediate and short-term needs and is sometimes called “disaster relief”. (RA 10121)

**Disaster Risk** –the potential disaster losses in lives, health status, livelihood, assets and services, which could occur to a particular community or a society over some specified future time period. (RA 10121)

**Disaster Risk Reduction** –the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposures to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. (RA 10121)

**Disaster Risk Reduction and Management** –the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster. Prospective disaster risk reduction and management refers to risk reduction and management activities that address and seek to avoid the development of new or increased disaster risks, especially if risk reduction policies are not put in place. (RA 10121)

**Disaster Risk Reduction and Management Information System** –a specialized database which contains, among others, information on disasters and their human material, economic and environmental impact, risk assessment and mapping and vulnerable groups. (RA 10121)

**Drought** –a situation of limited rainfall substantially below what has been established as a ‘normal’ value for the area concerned, leading to adverse consequences for human welfare

**Dunes** –an accumulation of sand in ridges or mounds landward of the beach formed by natural processes and usually parallel to the shoreline

**Early Warning System** –the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss. A people-centered early warning system necessarily comprises four (4) key elements: knowledge of the risks; monitoring, analysis and forecasting of the hazards; communication or dissemination of alerts and warnings; and local capabilities to respond to the warnings received. The expression “end-to-end warning system” is also used to emphasize that warning systems need to span all steps from hazard detection to community response. (RA 10121)

**Earthquake** –a sudden and violent shaking of the ground, sometimes causing great destruction, as a result of movements within the earth’s crust or volcanic action

**Earthquake-induced Landslide** –a landslide hazard occurred with a delay in time and over a wider area, which triggered by post-seismic factor (earthquake)

**Eco-efficiency** –is achieved by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life while progressively reducing environmental impacts of goods and resource intensity throughout the entire life-cycle to a level at least in line with the Earth’s estimated carrying capacity

**Electrofishing** –the use of electricity generated by batteries, electric generators and other source of electric power to kill, stupefy, disable or render unconscious fishery species, whether or not the same are subsequently recovered

**Emissions Scenario** –Representation of the future development of emissions of greenhouse gases based on a set of assumptions about driving forces and their key relationships. (Climate Change in the Philippines)

**Emission Storylines** –A narrative description of a scenario (or a family of scenarios), highlighting the main scenario characteristics and dynamics, and the relationships between key driving forces.



**Endangered, Rare and/or Threatened Species** –aquatic plants, animals, including some varieties of corals and sea shells in danger of extinction as provided for in existing fishery laws, rules and regulations or in the Protected Areas and Wildlife Bureau of the Department of Environment and Natural Resources (DENR) and in the Convention on the International Trade of Endangered Species of Flora and Fauna (CITES)

**Estuary** –a water body where sea water of oceanic origin is diluted by freshwater from land drainage areas. Areas influenced by this include deltas, tidal marshes, and river mouth, among others

**Exclusive Economic Zone (EEZ)** –an area beyond and adjacent to the territorial sea which shall not extend beyond 200 nautical miles from the baselines as defined under existing laws

**Exposure** –the degree to which the elements at risk are likely to experience hazard events of different magnitudes. (RA 10121)

**Farm-to-Market Roads** –shall include roads linking the fisheries production sites, coastal landing points and other post-harvest facilities to major market and arterial roads and highways

**Fault Rupture** –a break in the ground along the fault line during an earthquake

**Fauna** –All species of animals found in a given area. (DENR FMB Harmonization Project 2005)

**Fine Mesh Net** –net with mesh size of less than three centimeters (3 cm.) measured between two (2) opposite knots of a full mesh when stretched or as otherwise determined by the appropriate government agency

**Fish and Fishery/Aquatic Products** –include not only fin fish but also mollusks, crustaceans, echinoderms, marine mammals, and all other species of aquatic flora and fauna and all other products of aquatic living resources in any form

**Fish Cage** –refers to an enclosure which is either stationary or floating made up of nets or screens sewn or fastened together and installed in the water with opening at the surface or covered and held in a place by wooden/bamboo posts or various types of anchors and floats

**Fish Corral or “Baklad”** –a stationary wire or trap devised to intercept and capture fish consisting of rows of bamboo stakes, plastic nets and other materials fenced with split bamboo mattings or wire mattings with one or more enclosures, usually with easy entrance but difficult exit, and with or without leaders to direct the fish to the catching chambers, purse or bags

**Fish fingerlings** –a stage in the life cycle of the fish measuring to about 6 – 13 cm. depending on the species

**Fish fry** –a stage at which a fish has just been hatched usually with sizes from 1 - 2.5 cm

**Fish pen** –an artificial enclosure constructed within a body of water for culturing fish and fishery/aquatic resources made up of poles closely arranged in an enclosure with wooden materials, screen or nylon netting to prevent escape of fish

**Fish Pond** –a land-based facility enclosed with earthen or stone material to impound water for growing fish

**Fisherfolk** –people directly or personally and physically engaged in taking and/or culturing and processing fishery and/or aquatic resources

**Fisherfolk Cooperative** –a duly registered association of fisherfolk with a common bond of interest, who have voluntarily joined together to achieve a lawful common social or economic end, making equitable contribution to the capital requirement and accepting a fair share of the risks and benefits of the undertakings in accordance with universally accepted cooperative principles

**Fisherfolk Organization** –an organized group, association, federation, alliance or an institution of fisherfolk which has at least fifteen (15) members, a set of officers, a constitution and by-laws, an organizational structure and a program of action

**Fisheries** –refers to all activities relating to the act or business of fishing, culturing, preserving, processing, marketing, developing, conserving and managing aquatic resources and the fishery areas, including the privilege to fish or take aquatic resource thereof

**Fishery Management Areas** –a bay, gulf, lake or any other fishery area which may be delineated for fishery resource management purposes

**Fishery Operator** –one who owns and provides the means including land, labor, capital, fishing gears and vessels, but does not personally engage in fishery

**Fishery Refuge and Sanctuaries** –a designated area where fishing or other forms of activities which may damage the ecosystem of the area is prohibited and human access maybe restricted

**Fishery Reserve** –a designated area where activities are regulated and set aside for educational and research purposes

Note: The term 'Marine Protected Area' or MPA is a general term more commonly used among marine practitioners to encompass both Fishery Refuge and Sanctuaries and Fishery Reserves under RA 8550. MPAs may even refer to Protected Areas as defined in RA 7586 (The NIPAS Act of 1992) For purposes of coastal law enforcement and regulation, LGUs are encouraged to use these legally defined terms.

**Fishery Species** –all aquatic flora and fauna including, but not restricted to, fish, algae, coelenterates, mollusks, crustaceans, echinoderms and cetaceans

**Fishing** –the taking of fishery species from their wild state or habitat, with or without the use of fishing vessels

**Fishing Boat/Gear License** –a permit to operate specific types of fishing boat/gear for specific duration in areas beyond municipal waters for demersal or pelagic fishery resources

**Fishing gear** –any instrument or device and its accessories utilized in taking fish and other fishery species

**a. Active fishing gear** –is a fishing device characterized by gear movements, and/or the pursuit of the target species by towing, lifting and pushing the gears, surrounding, covering, dredging, pumping and scaring the target species to impoundments; such as, but not limited to, trawl, purse seines, Danish seines, bag nets, paaling, drift gill net and tuna longline

**b. Passive fishing gear** –is characterized by the absence of gear movements and/or the pursuit of the target species; such as, but not limited to, hook and line, fishpots, traps and gill nets across the path of the fish

**Fishing vessel** –any boat, ship or other watercraft equipped to be used for taking of fishery species or aiding or assisting one (1) or more vessels in the performance of any activity relating to fishing, including, but not limited to, preservation, supply, storage, refrigeration, transportation and/or processing

**Fishing with Explosives** –the use of the dynamite, other explosives or other chemical compounds that contains combustible elements or ingredients which upon ignition by friction, concussion, percussion or detonation of all or parts of the compound, will kill, stupefy, disable or render unconscious any fishery species. It also refers to the use of any other substance and/or device which causes an explosion that is capable of producing the said harmful effects on any fishery species and aquatic resources and capable of damaging and altering the natural habitat

**Fishing with Noxious or Poisonous Substances** –the use of any substance, plant extracts or juice thereof, sodium cyanide and/or cyanide compounds or other chemicals either in a raw or processes form, harmful or harmless to human beings, which will kill, stupefy, disable or render unconscious any fishery species and aquatic resources and capable of damaging and altering the natural habitat

**Fishworker** –a person regularly or not regularly employed in commercial fishing and related industries, whose income is either in wage, profit-sharing or stratified sharing basis, including those working in fish pens, fish cages, fish corrals/traps, fishponds, prawn farms, sea farms, salt beds, fish ports, fishing boat or trawlers, or fish processing and/or packing plants. Excluded from this category are administrators, security guards and overseers

**Flood** –an abnormal progressive rise in the water level of a stream that may result in the overflowing by the water of the normal confines of the stream with the subsequent inundation of areas which are not normally submerged

**Flora** –All species of plants found in a given area, including ferns, lycopods and mosses. (DENR PAWB 2005)

**Food Security** –refers to any plan, policy or strategy aimed at ensuring adequate supplies of appropriate food at affordable prices. Food security may be achieved through self-sufficiency (i.e. ensuring adequate food supplies from domestic production), through self-reliance (i.e. ensuring adequate food supplies through a combination of domestic production and importation), or through pure importation

**Foreshore area** –as defined, it is a strip of land alternately covered and uncovered by the tidal movements. Its interior limits are that portion of land reached by the water during the highest equinoctial tide. The outer limit is that portion of land reached by the water during the lowest ordinary tide

**Foreshore Land** –a strip of land margining a body of water; the part of a seashore between the low waterline usually at the seaward margin of a low tide terrace and the upper limit of wave wash at high tide usually marked by a beach scarp or berm

**Forest** –land with an area of more than 0.5 hectare and tree crown cover (or equivalent stocking level) of more than 10%. The trees should be able to reach a minimum height of 5 meters at maturity in situ. It consists either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open formations with a continuous vegetation cover in which tree crown cover exceeds 10%. Young natural stands and all plantations established for forestry purposes, which have yet to reach a crown density of more than 10% or tree height of 5 meters are included under forest. (FAO Global Resource Assessment 2000)

**Forestlands** –are either public domain lands that are classified as such by the Public Lands Act or all unclassified lands of the public domain. For the purpose of this manual, forestlands will also include those areas legally classified as mineral lands and national parks. (DENR DAO 1996-29)

**Forests and forestland resources** –This includes the land resources, the natural forests and plantations, water bodies, biodiversity resources and other components of the forest ecosystem that provide products and services to communities and people. These resources are considered assets since if developed they could contribute to the overall development of LGUs.

**Forest Land Use** –refers to the manner of utilization of forestlands, including their allocation, development and management. The primary land uses of forestlands are protection and production. Production forestlands are sub-classified, according to their use, into the following categories: timber production, agriculture, agroforestry, mineral production, grazing, residential, resettlement, and other uses (industrial, commercial, fish farm, fishponds).

**Forest Reservation/ Reserves** –refer to forestlands which have been reserved by the President of the Philippines for any specific purpose or purposes. (PD 705)

**Forest Resources** –include soil and all elements found on it, above and below the ground in an area classified as forestland. (DENR DAO 2000-65)

**Freshwater bodies** –these are water bodies in basins, rivers, lakes, lagoons, channels and aquifers not influenced by sea water

**Freshwater swamps** –these are land areas where the freshwater table is at or above the land surface during most of the year to promote the formation of hydric soil and to support growth of hydrophytes such as grasses and sedges which are also influenced by sea water

**Fully-developed Fishpond Area** –a clean leveled area enclosed by dikes, at least one foot higher than the highest floodwater level in the locality and strong enough to resist pressure at the highest flood tide; consists of at least a nursery pond, a transition pond, a rearing pond or a combination of any or all said classes of ponds, and a functional water control system and producing in a commercial scale

**Geologic hazard or geohazard** –one of several types of adverse geologic conditions capable of causing damage or loss of property and life. Examples of these adverse geologic conditions include volcanoes, fault lines, landslips, unstable/landslides areas which pose risks to lives, crops, property and infrastructure. (DENR DAO 2000-28). A geological process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

**Geographic Information System (GIS)** –a database which contains, among others, geo-hazard assessments, information on climate change, and climate risk reduction and management.

(RA 10121). It is defined as an information system that is used to input, store, retrieve, manipulate, analyze and output geographically referenced data or geospatial data. Descriptive attributes in tabular form are associated with spatial features. Spatial data and associated attributes in the same coordinate system can be layered together for mapping and analysis. This tool is most helpful to support decision making for planning and management of land use, natural resources, environment, transportation, urban facilities, scientific investigations, etc.

**Global Positioning System (GPS)** –a radio navigation system that allows users on land, sea, and air to determine their exact location, velocity, and time 24 hours a day, in different weather conditions, and place in the world.

**Grasslands** –refer to forestlands predominantly vegetated with grasses, devoid of trees or with very few isolated trees. (Interagency Task Force on Geographic Information resolution No. 1 Series of 1995)

**Grazing Lands** –are portion of the public domain which has been set aside, in view of its topography and vegetation, for the raising of livestock. (PD 1559)

**Green growth** –is a sustainable development strategy that focuses on improving the eco-efficiency of production and consumption and promoting a green economy, in which economic prosperity goes hand in hand with ecological sustainability

**Greenhouse Gas** –Any gas that absorbs infra-red radiation in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), halogenated fluorocarbons (HCFCs), ozone (O<sub>3</sub>), per fluorinated carbons (PFCs), and hydro fluorocarbons (HFCs) (EPA). (Climate Change in the Philippines)

**Gross Tonnage** –includes the underdeck tonnage, permanently enclosed spaces above the tonnage deck, except for certain exemptions. In broad terms, all the vessel's "closed-in" spaces expressed in volume terms on the bases of one hundred cubic feet (that equal's one gross ton)

**Groundshaking** –the primary cause of earthquake damage to man-made structures

**Hazard** –a dangerous phenomenon, substance human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihood and services, social and economic disruption, or environmental damage. (RA 10121)

**Heritage Zone** –shall refer to historical, anthropological, archeological, artistic, geographical areas, center district, and settings that are culturally significant to the country, as declared by the National Museum and/or the National Historical Commission of the Philippines

**History** –shall refer to a written record of past events relating to Philippine history

**Historical Landmarks** –shall refer to sites or structures that are associated with events or achievements significant to Philippine history as declared by the National Historical Commission of the Philippines

**Historical Monuments** –shall refer to structures that honor illustrious persons or commemorate events of historical value as declared by the National Historical Commission of the Philippines.

**Historical Shrines** –shall refer to historical sites or structures hallowed and revered for their history or association as declared by the National Historical Commission of the Philippines

**Historical Street Name** –shall refer to a street name which has been in existence for at least fifty (50) years and over time has been considered historic.

**Hydrometeorological hazard** –a process or phenomenon of atmospheric, hydrological or oceanographic nature that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (includes tropical cyclones, thunderstorms, hailstorms, tornados, blizzards, heavy snowfall, avalanches, coastal storm surges, floods including flash floods, drought, heatwaves and cold spells)

**Important Cultural Property (ICP)** –shall refer to a cultural property having exceptional cultural, artistic, and historical significance to the Philippines as shall be determined by the National Museum, the National Historical Commission of the Philippines, the National Library of the Philippines and/or the National Archives of the Philippines

**Incunabula** –printed works produced by the native press when the art of printing in a particular country or locality is still in infancy. In the Philippines, historians and bibliographers often refers to the years 1593 to 1640 our incunabula period.

**Indigenous Cultural Communities/Indigenous Peoples** –refer to a group of people or homogenous societies identified by self-ascription and ascription by others, who have continuously lived as organized community on communally bounded and defined territory, and who have, under claims of ownership since time immemorial occupied, possessed and utilized such territories, sharing common bonds of language, customs, traditions and other distinctive cultural traits, or who have, through resistance to political, social and cultural inroads of colonization, non-indigenous religions and cultures, became historically differentiated from the majority of Filipinos. (RA 8371 IPRA)

**Inland Fishery** –the freshwater fishery and brackishwater fishponds

**Intangible Cultural Heritage** –shall refer to the practices, representations, expressions, knowledge, skills, as well as instruments, objects and artifacts associated therewith, that communities, groups and individuals recognize as part of their cultural heritage, such as: (1) oral traditions, usages, customs, languages and other expressions; (2) performing arts; (3) social practices, religious rites, rituals, culinary traditions and festive events; (4) knowledge and practices concerning nature and the universe, worship and (5) traditional craftsmanship

**Intangible cultural property** –shall refer to the peoples' learned processes along with knowledge, skills and creativity that inform and are developed by them, the products and other manifestations that they create and the resources, spaces and other aspects of social and natural context necessary for their sustainability

**Intensity** –measures the strength of shaking produced by the earthquake at a certain location; determined from effects on people, human structures, and the natural environment

**Intergovernmental Panel on Climate Change (IPCC)** –The IPCC was established jointly by the United Nations Environment Programme and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. (Climate Change in the Philippines)

**IPCC SRES Scenarios** –Special Reports on Emission scenarios by the IPCC, containing information on possible future climate developments and consequences for society and the environment. Emissions scenarios are a central component of any assessment of climate change. (Climate Change in the Philippines)

**Lake** –an inland body of water, an expanded part of a river, a reservoir formed by a dam, or a lakebasin intermittently or formerly covered by water

**Language** –refers to the codes and symbols used by a particular speech community in both written and spoken form to facilitate the conduct of any discourse that contributes to the smooth functioning of society

**Library** –shall refer to an institution where the collection of books, manuscripts, computerized information and other materials are organized to provide physical, bibliographic, and/or intellectual access to the public, with a librarian that is trained to provide services and programs related to the information needs of its clientele

**Limited Access** –a fishery policy by which a system of equitable resource use and allocation is established by law through fishery rights granting and licensing procedure as provided by the Philippine Fisheries Code of 1998 (RA 8550).

**Limited Production Sub-Area** –areas where the following may be allowed consistent with an approved management plan: settlement, traditional and/or sustainable land-use, including agriculture, agro-forestry, and other income generating or livelihood activities. It shall also include, among others, areas of high recreational, tourism, educational or environmental awareness values, areas consisting of existing installations of national significance/ interest such as development of renewable energy sources, telecommunication facilities and electric power lines, hunting grounds and areas for non timber forest products gathering by IPs.

**Liquefaction** –a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading



**Magnitude** –measures the energy released at the source of the earthquake; determined from measurements on seismographs

**Mangroves or mangrove forests** –the communities of trees and associated shrubs that are restricted to tidal flats in coastal waters, extending inland along rivers where the water is tidal, saline or brackish; also defined as a community of intertidal plants including all species of trees, shrubs, vines and herbs found on coasts, swamps, or border of swamp

**Manuscripts** –works prepared by hand including handwritten or typescript drafts of the publication papers or works not otherwise in multiple copies

**Map Overlay** –a method used for analyzing mapped data whereby two or more thematic maps are put on top of another to be able to delineate areas that meet a given set of criteria or conditions; also known as overlay mapping technique.

**Marine waters** –these cover beds, banks, shell fields, zones, areas and regions of Philippine waters totaling some 1,666,300 sq. km

**Maximum Sustainable Yield (MSY)** –is the largest average quantity of fish that can be harvested from a fish stocks/resource within a period of time (e.g. one year) on a sustainable basis under existing environmental conditions

**Migratory species** –refers to any fishery species which in the course of their life could travel from freshwater to marine water or vice versa, or any marine species which travel over great distances in waters of the ocean as part of their behavioral adaptation for survival and speciation:

- a. **Anadromous species** –marine fishes which migrate to freshwater areas to spawn;
- b. **Catadromous species** –freshwater fishes which migrate to marine areas to spawn.

**Military Reservation** –refers to forestlands which have been reserved by the President for military purposes.(DENR DAO 1995-15)

**Mineral Lands** –areas which are presently exploited for mineral production (including land rendered unproductive by deposits of extraction waste material) and those which are positive for ore reserves insufficient quantities and grades to justify their extraction. These include proclaimed mineral reservation

**Mineralized areas** –areas containing deposits of metallic and non-metallic minerals

**Mitigation** –measures encompass engineering techniques and hazard-resistant construction as well as improved environmental policies and public awareness. (RA 10121)

**Municipal fisherfolk** –persons who are directly or indirectly engaged in municipal fishing and other related fishing activities.

**Municipal fishing** –refers to fishing within municipal waters using fishing vessels of three (3) gross tons or less, or fishing not requiring the use of fishing vessels.

**Municipal waters** –“include not only streams, lakes and tidal waters Included within the municipality, not being the subject of private ownership, and not comprised within national parks, public forests, timber lands, forest reserves, but also marine waters included between two lines drawn perpendicularly to the general coastline from points where the boundary lines of the municipality or city touch the sea at low tide and a third line parallel with the general coastline and fifteen (15) kilometers from it. Where two (2) municipalities are so situated on the opposite shores that there is less than 15 kilometers of marine waters between them, the third line shall be equally distant from the opposite shores of the respective municipalities.” (Section 131, Republic Act No. 7160)

**Museum** –shall refer to a permanent institution that researches, acquires, conserves, communicates and exhibits the material evidence of humans and their environment for purposes of education or leisure

**National Cultural Treasure** –shall refer to a unique cultural property found locally, possessing outstanding historical, cultural artistic and/or scientific value which is highly significant and important to the country and officially declared as such by the pertinent cultural agency

**National Disaster Risk Reduction and Management Framework or NDRRMF** –provides for comprehensive, all hazards, multi-sectoral, inter-agency and community-based approach to disaster risk reduction and management. (RA 10121)

**National Disaster Risk Reduction and Management Plan or NDRRMP** –the document to be formulated and implemented by the Office of Civil Defense (OCD) that sets out goals and specific objectives for reducing disaster risks together with related actions to accomplish these objectives. The NDRRMP shall provide for the identification of hazards, vulnerabilities and risks to ‘be managed at the national level; disaster risk reduction and management approaches and strategies to be applied in managing said hazards and risks; agency roles, responsibilities and lines of authority at all government levels; and vertical and horizontal coordination of disaster risk reduction and management in the pre-disaster and post-disaster phases. It shall be in conformity with the NDRRMF. (RA 10121)

**National Integrated Protected Areas System** –the classification and administration of all designated protected areas to maintain essential ecological processes and life support systems, to preserve genetic diversity, to ensure sustainable use of resources found therein, and to maintain their natural conditions to the greatest extent possible. The NIPAS was established by Republic Act 7586, known as the NIPAS Act. (RA 7586 NIPAS Act)

**National Parks** –are forest reservations essentially of natural wilderness character which have been withdrawn from settlement, occupancy, or any form of exploitation except in conformity with an approved management plan and set aside as such exclusively to conserve the area or preserve the scenery, natural and historic objects, and wildlife, and to provide enjoyment of these features in these areas. In DAO 15 s. 1995, all NIPAS areas are to be categorized as national parks.(RA 7586 NIPAS Act)

**Nationally significant** –shall refer to historical, aesthetic, scientific, technical, social and/or spiritual values that unify the nation by a deep sense of pride in their various yet common identities, cultural heritage and national patrimony

**Natural hazard** –a natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage

**Natural Property of Cultural Significance** –shall refer to areas possessing outstanding ecosystems with flora and fauna with national scientific importance under the National Integrated Protected Areas System.

**NCCA Portal Cultural Databank** –refers to the specific domain in the Commission's intranet for cultural information that is accessed only internally with control and confidentiality. It includes the Philippine Registry of Cultural Property (PRECUP).

**Non-governmental organization (NGO)** –an agency, institution, a foundation or a group of persons whose purpose is to assist people's organizations/ associations in various ways including, but not limited to, organizing, education, training, research and/or resource accessing

**Old Growth Forests** –are primary natural forests, sometimes referred to as virgin forest, never been modified of which the composition, structure and function has not been altered. Areas that are identified initial components of the National Protected Areas System of 1992. (DENR FMB Harmonization Project 2004)

**Open Access Area** –are parts of forestlands which are not covered by an existing tenurial instrument.

**Open Areas** –are forestlands devoid of tree cover. These include grasslands, brush lands, denuded forests, croplands and grazing lands that have been abandoned.

**Participatory Disaster Risk Assessment (PDRA)** –PDRA is a process whereby all concerned parties collect and analyze disaster risks information, in order to make appropriate plans and implement concrete actions to reduce and/or eliminate disaster risks that will adversely affect their lives. It is both a dialogue and a negotiated process involving those at risk, authorities and other stakeholders.

**Participatory Disaster Risk Management Planning** –This follows after the analysis of the results of participatory risk assessment. People themselves identify risk reduction measures that will reduce vulnerabilities and enhance capacities. These risk reduction measures are then translated into a community disaster risk management plan.(Abarquez & Murshed, 2004)

**Participatory Rural Appraisal (PRA)**–has been described as a set of approaches, behaviors and methods for enabling people to do their own appraisal, analysis and planning, take their own

actions, and do their own visuals, such as diagrams and maps. Other practitioners describe what they do as Participatory Learning and Action (PLA).

**Payao** –a fish aggregating device consisting of a floating raft anchored by a weighted line with suspended materials such as palm fronds to attract pelagic and schooling species common in deep waters

**Percentage Slope** –is a measurement of the rate of change of elevation over a given horizontal distance, in which the rise is divided by the run and then multiplied by 100. A 45° slope is equivalent to 100% slope.

**Pearl Farm Lease** –public waters leased for the purpose of producing cultured pearls

**People's Organization** –a bonafide association of citizens with demonstrated capacity to promote the public interest and with identifiable leadership, membership and structure. Its members belong to a sector/s who voluntarily band themselves together to work for and by themselves for their own upliftment, development and greater good

**Permit** –short-term privilege or authority granted by the State to a person to utilize any limited forest resources or undertake limited activity within any forestland without any right of occupation and possession therein.

**Person** –natural or juridical entities such as individuals, associations, partnership, cooperatives or corporations

**Philippine waters** –include all bodies of water within the Philippine territory such as lakes, rivers, streams, creeks, brooks, ponds, swamps, lagoons, gulfs, bays and seas and other bodies of water now existing or which may hereafter exist in the provinces, cities, municipalities, and barangays and the waters around, between and connecting the islands of the archipelago regardless of their breadth and dimensions, the territorial sea, the sea beds, the insular shelves, and all other waters over which the Philippines has sovereignty and jurisdiction including the 200-nautical miles Exclusive Economic Zone and the continental shelf

**Post-harvest facilities** –these facilities include, but are not limited to, fish port, fish landing, ice plants and cold storages, fish processing plants

**Post-Disaster Recovery** –the restoration and improvement where appropriate, of facilities, livelihood and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors, in accordance with the principles of “build back better.” (RA 10121)

**PRECIS** –(pronounced as in the French précis – “PRAY-sea”) is based on the Hadley Centre's regional climate modelling system. It has been ported to run on a PC (under Linux) with a simple user interface, so that experiments can easily be set up over any region. PRECIS was developed in order to help generate high-resolution climate change information for as many regions of the world as possible. The intention is to make PRECIS freely available to groups of developing countries in order that they may develop climate change scenarios at national centres of excellence, simultaneously building capacity and drawing on local climatological expertise. These scenarios can be used in impact, vulnerability and adaptation studies, and to aid in the preparation of National Communications, as required under Articles 4.1, 4.8 and 12.1 of the United Nations Framework Convention on Climate Change (UNFCCC). (Climate Change in the Philippines)

**Pre-history** –refers to the period of human existence and activities before the introduction of the forms of writing

**Preparedness** –the knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions

**Presidential Papers/Collections** –contains published and unpublished collection on Philippine presidency from Emilio Aguinaldo to present. It also includes photographs, books collections, manuscripts, personal papers and records as well as digital resources.

**Prevention** –the outright avoidance of adverse impacts of hazards and related disasters

**Production Area** –forestlands tended primarily for the production of timber including areas within ancestral lands devoted to agriculture. These are areas below 50% slope and less than 1,000 meters in elevation.

**Projection** –The term “projection” is used in two senses in the climate change literature. In general usage, a projection can be regarded as any description of the future and the pathway leading to it. However, a more specific interpretation has been attached to the term “climate projection” by the IPCC when referring to model-derived estimates of future climate. (Climate Change in the Philippines)

**Protected Areas** –identified portions of land and water set aside by reason of their unique physical and biological significance and are managed to enhance biological diversity and protected against destructive human exploitation as provided for in RA 7586, otherwise known as the National Integrated Protected Areas Systems (NIPAS) ACT of 1992.

**Purse Seine** –a form of encircling net having a line at the bottom passing through rings attached to the net, which can be drawn or pursed. In general, the net is set from a boat or pair of boats around the school of fish. The bottom of the net is pulled closed with the purse line. The net is then pulled aboard the fishing boat or boats until the fish are concentrated in the bunt or fish bag.

**Rainfall-induced Landslide** –a landslide hazard occurred with a delay in time and over a wider area, which triggered by post-seismic factor (rainfall)

**Rarebooks** –all Filipiniana books printed or published before 1945. It also includes original manuscripts, exceptional collections, and other publications of historical importance

**Records** –recorded information produced or received in the initiation, conduct or completion of an institutional or individual activity and that comprises content, context and structure sufficient to provide evidence of the activity

**Registry** –shall refer to the Philippine Registry of Cultural Property (PRECUP), which is the registry of all cultural property of the country deemed significant to cultural heritage

**Rehabilitation** –measures that ensure the ability of affected communities/areas to restore their normal level of functioning by rebuilding livelihood and damaged infrastructures and increasing the communities' organizational capacity. (RA 10121)

**Residual or Second Growth Forest** –the status or condition of a forest subsequent to commercial logging and which there is more or less sufficient or adequate volume of residuals of the desired species of trees for future harvest. (EO 318)

**Resilience** –the ability of a system, community or society exposed to hazards to resist, absorb, accommodate and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. (RA 10121)

**Resource Rent** –the difference between the values of the products produced from harvesting a publicly owned resource less the cost of producing it, where cost includes the normal return to capital and normal return to labor

**Response** –any concerted effort by two (2) or more agencies, public or private, to provide assistance or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected and in the restoration of essential public activities and facilities. (RA 10121)

**Restoration** –shall refer to the action taken or the technical intervention to correct deterioration and alterations

**Risk** –the combination of the probability of an event and its negative consequences

**Risk Assessment** –a methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihood and the environment on which they depend. Risk assessments with associated risk mapping include: a review of the technical characteristics of hazards such as their location, intensity, frequency and probability; the analysis of exposure and vulnerability including the physical, social, health, economic and environmental dimensions; and the evaluation of the effectiveness of prevailing and alternative coping capacities in respect to likely risk scenarios. (RA 10121)

**Risk management** –the systematic approach and practice of managing uncertainty to minimize potential harm and loss

**Scenario** –A scenario is a coherent, internally consistent and plausible description of a possible future state of the world. It is not a forecast; rather, each scenario is one alternative image of how the future can unfold. (Climate Change in the Philippines)

**Sea farming** –the stocking of natural or hatchery-produced marine plants or animals, under controlled conditions, for purposes of rearing and harvesting, but not limited to commercially important fishes, mollusks (such as pearl and giant clam culture), including seaweeds and seagrasses

**Seagrass beds** –vegetation dominated by flowering grasses which grow best in sandy- muddy portions of the intertidal zone. They are highly productive habitats which serve as the transition zone between coral reefs and mangroves

**Sea ranching** –the release of the young of fishery species reared in hatcheries and nurseries into natural bodies of water for subsequent harvest at maturity or the manipulation of fishery habitat, to encourage the growth of the wild stocks

**Sink** –any process, activity or mechanism which removes a greenhouse gas from the atmosphere

**Spatial Data** –information pertaining to a place linked to coordinates or other positional information.

**Special Collections** –materials, within a library, which are “special” in nature which are typically stored because they are unusually valuable, rare, and unique. It also includes rare books, archives, and collected manuscripts

**Storm Surge** –ocean waves being pushed towards the shore by the force of the winds and the intense low pressure of a tropical cyclone

**Strict protection area** –areas with high biodiversity value, closed to all human activities, except for scientific studies and/or ceremonial or religious use by the ICCs/IPs. It may include habitats of threatened species or degraded areas that have been designated for restoration and subsequent protection.

**Strict protection zone** –a portion of the protected area with high biodiversity value which shall be closed to all human activity except for scientific, ceremonial or religious use by the indigenous communities. (RA 7586 & NIPAS Act of 1992). These are also areas that may include habitats of threatened species or degraded areas that have been designated for restoration and subsequent protection.

**Superlight** –also called magic light, is a type of light using halogen or metal halide bulb which maybe located above the sea surface or submerged in the water. It consists of a ballast, regulator, electric cable and socket. The source of energy comes from a generator, battery or dynamo coupled with the main engine.

**Susceptibility** –open or subject to hazards

**Tangible cultural property** –shall refer to cultural property with historical, archival, anthropological, archeological, artistic, and/or architectural value and with exceptional or traditional production, whether of Philippine origin or not, including antiques and natural history specimens with significant value

**Technical Description** –provides the data on the location of the points that make-up a polygon feature such as political boundary. It describes a point by citing the coordinates of the points; or the bearing and distance of succeeding point from a reference point to trace the shape of the polygon.

**Tenorial Instrument** –is an agreement or contract between DENR and an individual, people's organization or corporate entity which guarantee peaceful possession and use of specific forestland area and the resources found therein within a given time period. Such an agreement or contract cannot be altered or abrogated without due process.

**Thematic map** –a map representing a particular theme or subject, such as vegetation, soils, slope or topography.

**Tic Points** –are Geographic control points for a map representing known locations on the earth's surface. Tics allow all map features to be recorded in a common co-ordinate system. Tics are used to register map sheets when they are mounted on a digitizer. They are also used to transform the coordinates of a coverage, for example, from digitizer units (inches) to the



appropriate values for a particular coordinate system.

**Tidal flats** –these are lands mostly devoid of trees and shrubs that are alternatively exposed and inundated by tides. These may be mud flats or sand flats (see foreshore areas)

**Total Allowable Catch (TAC)** –the maximum harvest allowed to be taken during a given period of time from any fishery area, or from any fishery species or group of fishery species, or a combination of area and species and normally would not exceed the MSY.

**Trawl** –an active fishing gear consisting of a bag shaped net with or without otter boards to open its opening which is dragged or towed along the bottom or through the water column to take fishery species by straining them from the water, including all variations and modifications of trawls (bottom, mid-water, and baby trawls) and tow nets

**Tree Plantations** –refer to man-made forests.

**Tropical Cyclone** –the global generic term for an intense circulating weather system over tropical seas and oceans. It is accompanied with very strong winds, heavy rains & large ocean waves. Its wind circulation rotates Counter-clockwise in the Northern Hemisphere & Clockwise in the Southern Hemisphere.

**Tsunami** –a series of sea waves commonly generated by under-sea earthquakes and whose heights could be greater than 5 meters. It is erroneously called tidal waves and sometimes mistakenly associated with storm surges. Tsunamis can occur when the earthquake is shallow-seated and strong enough to displace parts of the seabed and disturb the mass of water over it.

**Typhoon** –a mature tropical cyclone that develops in the western part of the North Pacific Ocean between 180° and 100°E (119 to 200 KPH near the center)

**UK Met Office Hadley Center** –The Met Office Hadley Centre is the UK's foremost climate change research centre. (Climate Change in the Philippines)

**United Nations Framework Convention on Climate Change (UNFCCC)** –The UNFCCC arose from increasing international concern about the implications of climate change and recognition that no one country can solve this global environmental problem alone. The ultimate objective of the UNFCCC is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human-induced interference with the climate system. (Climate Change in the Philippines)

**Volcano** –a mountain or hill, typically conical, having a crater or vent through which lava, rock fragments, hot vapor, and gas are being or have been erupted from the earth's crust

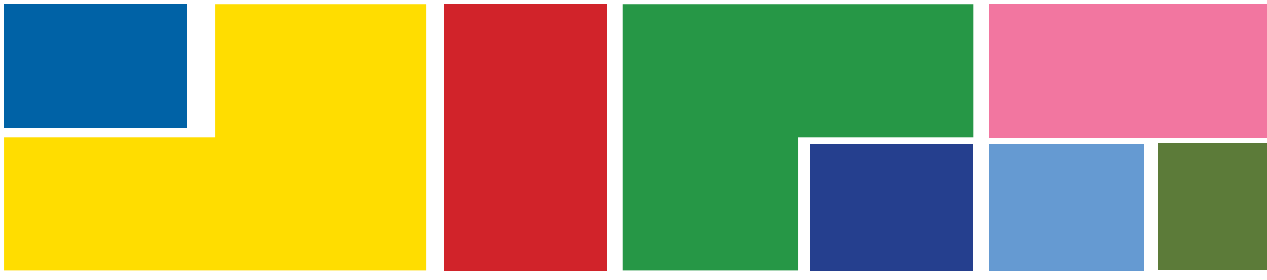
**Vulnerability** –the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. Vulnerability may arise from various physical, social, economic, and environmental factors such as poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of risks and preparedness measures, and disregard for wise environmental management. (RA 10121)

**Vulnerable and Marginalized Groups** –those that face higher exposure to disaster risk and poverty including, but not limited to, women, children, elderly, differently-abled people, and ethnic minorities. (RA 10121)

**Watershed** –is a land area drained by a stream or fixed body of water and its tributaries having a common outlet for surface run-off. It is synonymous with a catchment area or drainage basin. (PD 1559 & PD 705)

**Watershed reservation/ forest reserve/ watershed forest reserve** –refers to a defined area in the forestlands that has been proclaimed by law as such, primarily to establish adequate vegetative cover that would prevent erosion, conserve water and nurture wildlife.

**Woodlands** –these occur behind the beach and dune on the older beach areas. In the coastal zone, these consist essentially of a tangle of low stunted trees or shrubs. Examples are botong, pandan, and the taller agohe and coconut palms



## Overview and Rationale

The Comprehensive Land Use Plan Guidebook 2013 is a response to major legislative and environmental shifts affecting land use and resource allocation and management in the country over the last five years.

It is also in recognition of the need to mainstream climate change adaptation and disaster risk reduction and the growing demand for the integration of planning for critical resources such as upland, coastal, ancestral domain, biodiversity areas, heritage and urban greening, which are not yet appropriately addressed by existing local enabling policies and planning processes. The use and management of these areas affect the LGU's and local communities' economic, social, and cultural productivity.

It has adopted the ridge-to-reef or integrated watershed ecosystems management framework to emphasize the interrelationship between the upland, lowland and coastal ecosystems.

More importantly, this Guidebook is an effort to be more relevant and adaptive to the rapidly changing conditions of land and water resources to ensure their sustainable management and conservation for the benefit of future generations.

## Objectives

This Guidebook is meant to serve as a practical and simplified technical reference for local government units, community members, and general public in the formulation and development of their local land use plans.

It hopes to provide the users a handy tool containing the following:

- Steps on how to prepare the CLUP;
- Basic instruments in the collection and generation of key baseline data and information; and
- Simple analytical and evaluative tools to determine and decide on the strategic long-term physical vision and development goals of their localities.

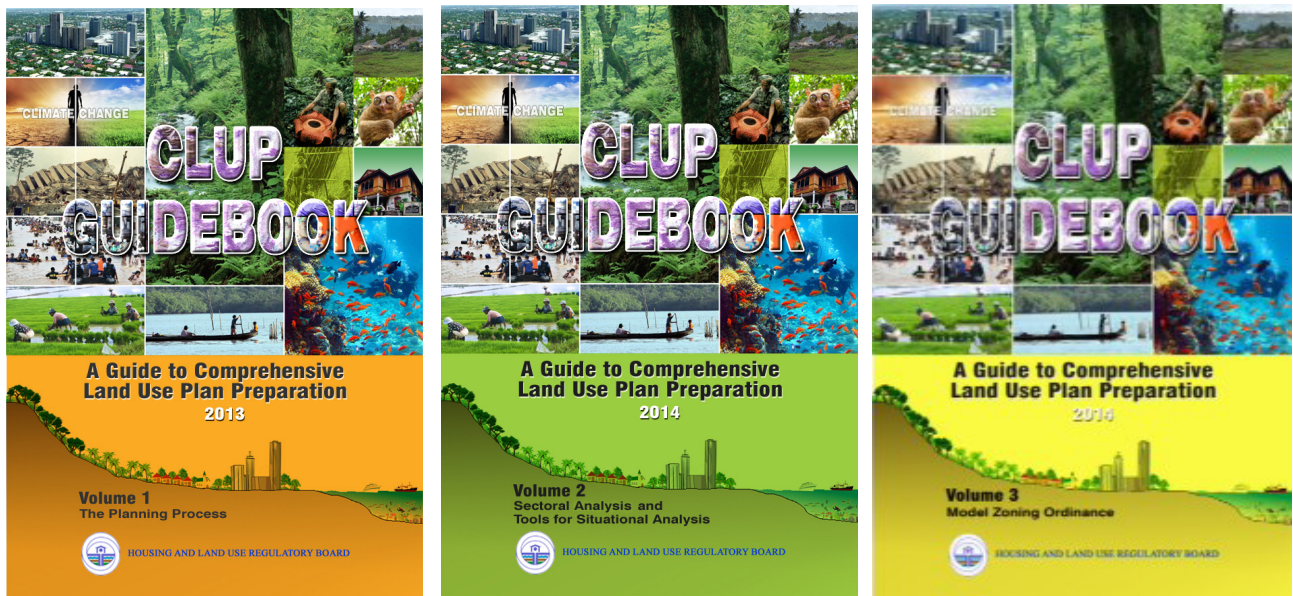
The CLUP Guidebook 2013 is categorized into three (3) volumes as follows (See **Figure 1**):

- Volume 1: The Planning Process
- Volume 2: Sectoral Studies and Tools for Situational Analysis
- Volume 3: Model Zoning Ordinance

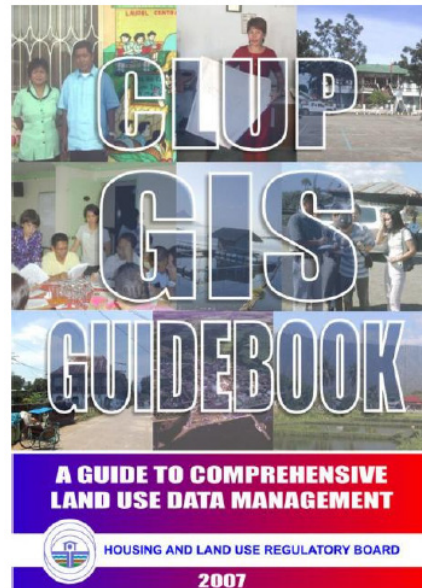
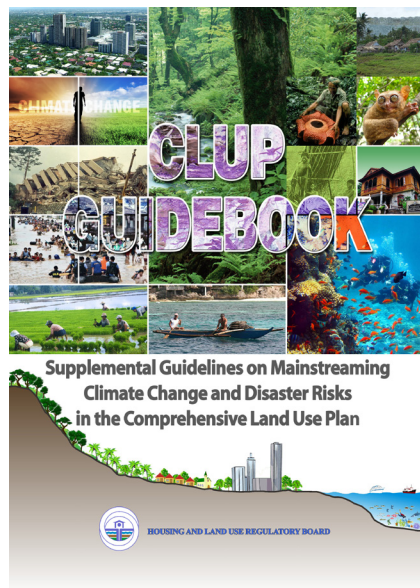
The Guidebook is likewise complemented by the following references:

- Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in Comprehensive Land Use Plan (Project Climate Twin Phoenix: HLURB/Climate Change Commission/UNDP/AusAID) - approved by HLURB in February 2014
- A Guide to Comprehensive Land Use Data Management (HLURB CLUP Guidebook 2007, Vol.3)

Figure 1. The HLURB Guidebook Series.



Other references:



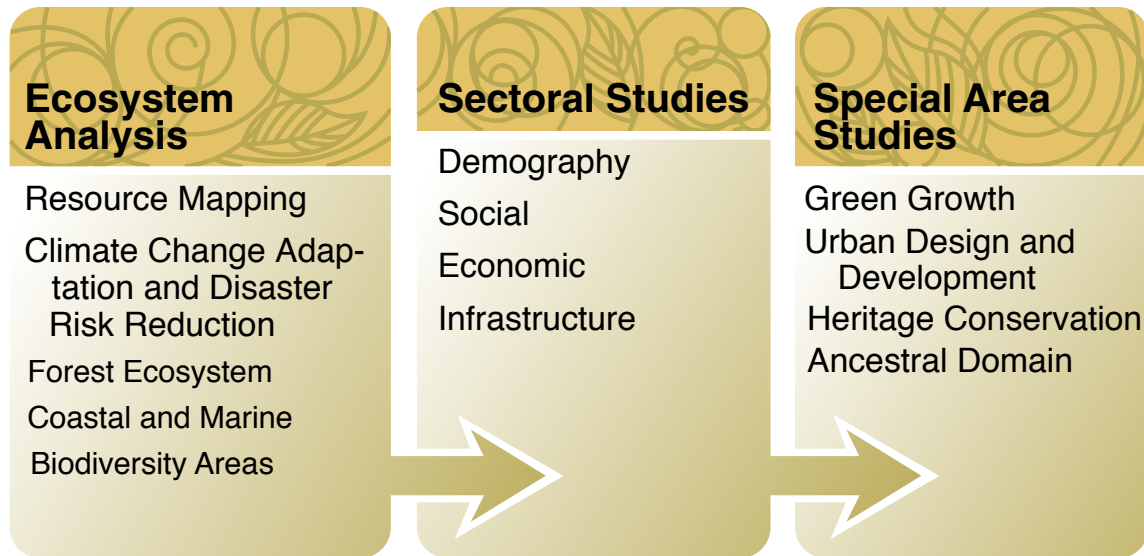
# About the CLUP Guidebook Volume 2

Volume 2 of the Guidebook series retains the sectoral studies in the 2006 version but now includes the different data gathering techniques and tools for thematic areas that were integrated to adopt the R2R framework.

Tables and graphs incorporated in this Guidebook are compiled in a CD containing editable excel copies to help LGUs gather and organize CLUP-relevant data. Corresponding GIS-ready tables are also available in this CD.

Volume 2 is subdivided into the following major sections:

Figure 2. Major sections of Volume 2.





# Ecosystem Analysis

This section presents the studies that can be used to develop a better understanding of the dynamic interrelationships and interconnectedness of ecosystems from the mountains (landscape–ridge) to the seas (seascape–reef). It helps cities and municipalities plan for their entire land and water area, including public land and the 15km extent of city/ municipal waters. The studies include analysis of the resources, the forest and coastal areas, the biodiversity, as well as the potential impact of climate change and various natural hazards. These studies expand on aspects of the environment which were previously embedded in the Sectoral Studies, and looks at the city/municipality within a more integrated ridge-to-reef approach.

Such intensive studies are ideally done during the situation analysis stage of the CLUP preparation (Volume 1: A Guide to Comprehensive Land Use Preparation, Step 4). In case of limited capacity, the LGU has the option to forgo these studies until the the CLUP is updated again but in cases where such studies are deemed urgent or neccessary, the LGU should allot funds or seek assistance to conduct these studies.







# Resource Mapping

## I. City/Municipal-Level Resource Mapping, Target Consultations, Prioritization of Objectives and Resource Mapping

To establish the baseline information for an LGU, we suggest encouraging the local community to create a map of their municipality. Mapping is a very useful tool in resource management as the community can easily visualize where the resources are as well as their condition. Such maps may also be used to identify issues, problems and conflicts and eventually aid in the zoning of various uses. They can also reveal the socio-economic conditions through the eyes of the community. Various information that can be mapped include boundaries, roads, settlements, other infrastructures, natural resources, land use, zonation and other special interests.

To facilitate the community in the resource mapping exercise, symbols from the Integration and Application Network (IAN) may be used. These symbols have been globally accepted to represent processes that may affect the community, taking into consideration of a ridge-to-reef context. The participants should be oriented on the mapping activity in the following mapping sequence (adapted from Deguit et al. 2004):






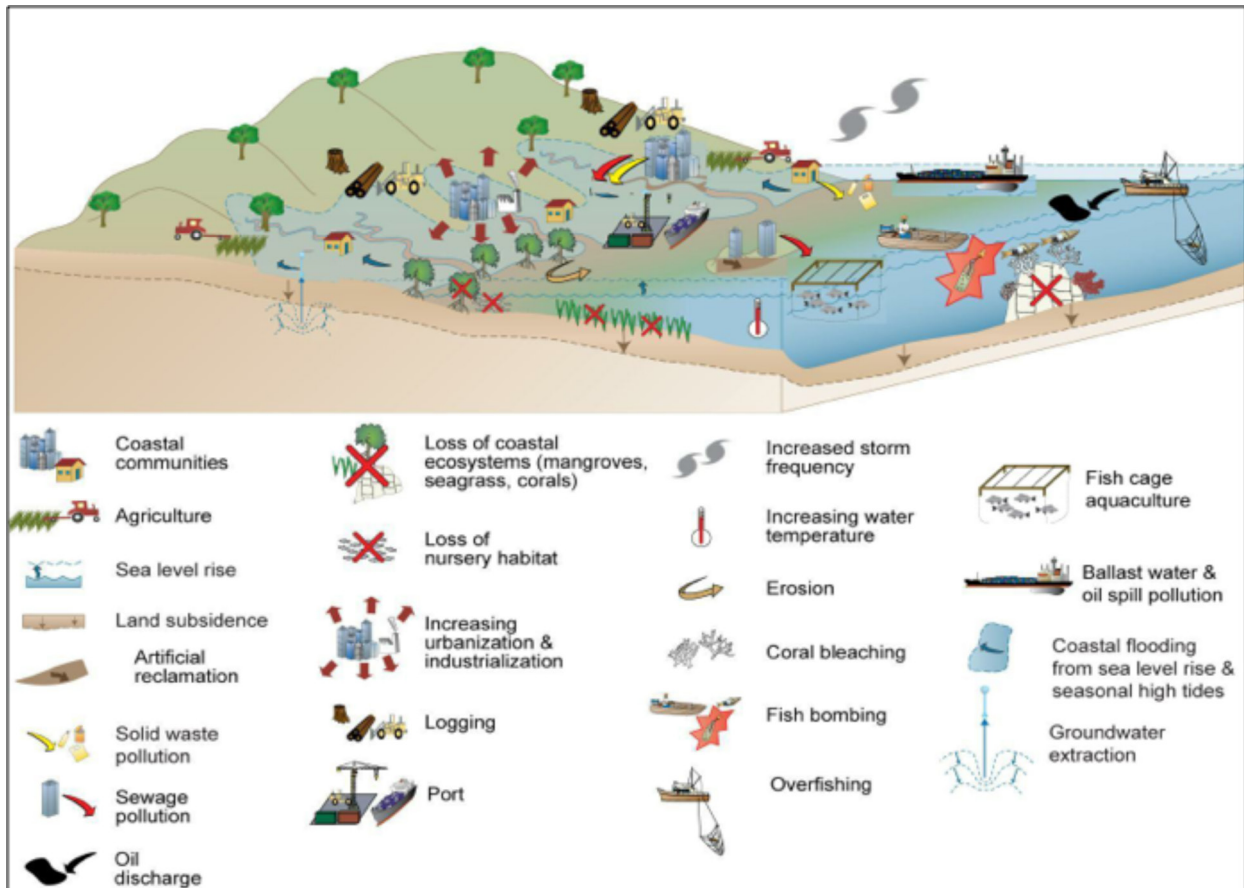
<ul style="list-style-type: none"> <li>• General information/features               <ul style="list-style-type: none"> <li>○ Landmarks in the community, roads, infrastructure, boundaries, etc.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• Habitats               <ul style="list-style-type: none"> <li>○ Habitats, both coastal and terrestrial, are the next features to be mapped.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• Resources               <ul style="list-style-type: none"> <li>○ Elements that provide food and other materials from the coastal ecosystem.</li> <li>○ May also include ecologically important species found in the area such as sea turtles, sea birds, etc.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• Uses, livelihood, opportunities               <ul style="list-style-type: none"> <li>○ Sites or locations where activities are conducted or where opportunities provide existing or potential benefits to the community.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• Problems, issues and conflicts               <ul style="list-style-type: none"> <li>○ This is the last to be mapped as this may be difficult to express by the community due to their sensitive nature.</li> </ul> </li> </ul>	

Figure RM-1. Sample map showing issues affecting coastal resources



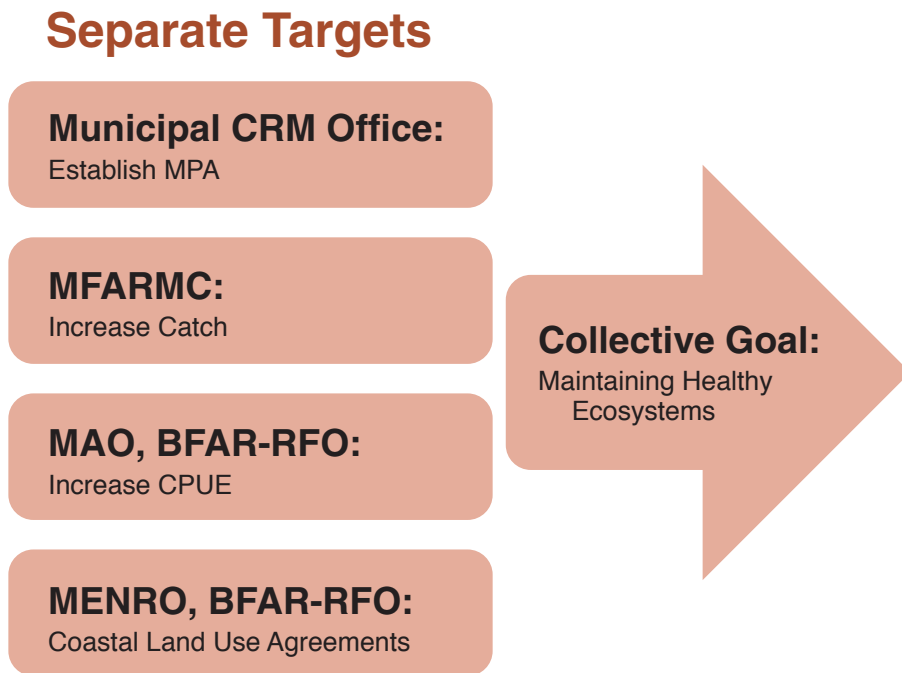
The symbol libraries may be downloaded from [http://ian.umces.edu/symbols/#\\_Download](http://ian.umces.edu/symbols/#_Download). The easiest option is to print the symbols in small sheets of paper and the participants may be asked to paste the symbols on a base map representing the location, following the aforementioned mapping sequence. Maps produced by these exercises may then be digitized by the local planning officer and used in the zonation of the land use plan.

## Target Consultation

Effectual implementation of any policy hinges on engagement of the stakeholders from the beginning of the decision making process. In terms of the existing CLUP assessment, the target stakeholders should also include existing industries at the coast and up the watershed; MFARMC and BFARMC; the MAO and the Municipal CRM Office; PG-ENRO; PENRO, MENRO, CENRO; BFAR-RFO; NAMRIA; PDRRMC; PPA; and SUCs in the Province or LGU-accredited NGOs engage in marine/coastal related work. Results of these consultations will form the backbone of the CLUP.

The goal of the initial consultation is to find out what the locals envision for the future of the city/municipality. Consultation can be in the form of FGDs, interviews, surveys, or part of a regular multi-sectoral meeting. It will then be up to the Planning Officer to summarize the results of the various consultations to formulate the city/municipality's collective goals.

Figure RM–2. Illustrative sample of data gathered from the stakeholder consultations and how the LGU can use these to formulate a collective goal.



### Prioritization of Objectives

The next step is then for the LGU to use the synthesis of the stakeholder consultation to prioritize the collective goals of the city/municipality. For these the LGU will first need to explicitly list the criteria that they typically use to approve or disapprove any proposal. For example, the total number or beneficiaries versus the cost of a project might be typical criteria for the approval or disapproval of proposals. The same can be used for prioritizing the collective goals. In addition other criteria relevant to land use or DRR may be used.

Figure RM–3. Illustrative sample of scoring and prioritizing the collective goals.

Criteria	Collective Goal #1	CG #2	CG #3
No. of Beneficiaries	4	4	2
Supported by Existing Policies	4	4	2
Cost	3	4	3
High Acceptance by Other Stakeholders	2	4	4
...	3	3	2
...	2	2	2
<b>TOTAL</b>	<b>18</b>	<b>21</b>	<b>15</b>

The LGU can then use the total score to objectively rank and prioritize the collective goals of the city/municipality. These are what will be used in both the assessment of the existing CLUP and the development of the enhanced CLUP Guidebook 2013.

## Annex RM-1. Relevant Tables for Resource Mapping

Table RM-1. Soil Type

Barangay	Soil Type	Suitability	Total Area Covered (ha)	% Total

Notes:

- Soil type: clay, clay loam, silty clay loam, silty loam, loam, sandy loam, sand
- Suitability: suitable/unsuitable for agriculture

Table RM-2. Slope

Slope category	Area Covered (ha)	Suitability
0-3 %		
3-8 %		
8-18 %		
18-30 %		
30-50 %		
> 50 %		

Notes:

- Suitability: urban use, forest use; > 18% is suitable for forest use

Table RM-3. Land Classification

Land classification	Area (ha)	% to total area
TOTAL		

Notes:

- Land classification: alienable & disposable land, forest/timber land, mineral land, national park

Table RM-4. Land Cover

Land Cover	Total Area Covered (ha)	% Total

Notes:

- Land cover: mangrove, open canopy, closed canopy, fishpond, built-up area, shrubland, grassland, marsh, quarry, barren land, plantation, cropland, etc.

Table RM-5. Fault

Name of fault	Barangay

Table RM-6. National Integrated Protected Areas System (NIPAS), Year\_\_\_\_\_

Name of particular NIPAS area	(Location) Barangay	Area Covered (ha)	Type of NIPAS	Date proclaimed (mmddyy)	Agency responsible for maintenance	Hazard Susceptibility (H/M/L)						
						Fl	Tc	Eq	Vo	Ln	Ts	Others

Notes:

- Type of old NIPAS: national park, mangrove reservation, watershed reservation, fish sanctuary, virgin forest, game refuge, bird sanctuary
- Type of new NIPAS: Strict Nature Reserve, Natural Park, Natural C. Monument/ landmark, Protected Landscape/ seascape, Resource Reserve, Natural Biotic Area, Wildlife Sanctuary and other categories established by law, conventions or international agreements which the Philippine Government is a signatory
- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards: Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table RM-7. Locally Proclaimed Protected Areas, Year\_\_\_\_\_

Name of particular Non-NIPAS area	Type of Non-NIPAS	Legal basis for establishing the Non-NIPAS area	Date proclaimed (ddmmyy)	Agency responsible for maintenance	Hazard Susceptibility (H/M/L)						
					Fl	Tc	Eq	Vo	Ln	Ts	Others

Notes:

- Type of non-NIPAS: reserved second growth forest, mangrove, buffer strip, freshwater, swamps/marsh, estuary, unproclaimed watershed
- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards: Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)



Table RM-8. Water Quality Monitoring, Year\_\_\_\_\_

Name of observation point	Date of observation	Observations made:	Water Quality Class	Probable Source of Pollution	Date of observation

Notes:

- Water quality class: AA - Public water supply class I (1), A - Public water Supply II (2), Recreational water class I (3), Class C - Fishery water, Recreational water, Industrial water supply (4), Class D - Agriculture, irrigation, livestock (5)

Table RM-9. Air Quality Monitoring, Year\_\_\_\_\_

Name of observation point	Date of observation	Observations made	Probable source of pollution

Table RM-10. Environmentally Critical Areas, Year\_\_\_\_\_

Name of Environmentally Critical Area (if applicable)	Type of Environmental Critical Area	Date when the area is declared critical	Agency that declared the area critical

Notes:

- Type of Environmental Critical Area:
  - A - area declared by law as national park, watershed reserve, wildlife preserve and sanctuary
  - B - area set aside as aesthetic, potential tourist spot
  - C - area which constitutes the habitat for any endangered or threatened species of indigenous Philippine wildlife (flora and fauna)
  - D - area of unique historic, archeological, geological or scientific interest
  - E - area which is traditionally occupied by cultural communities or tribes
  - F - area frequently visited and/or hard-hit by natural calamities (geological hazards, floods, typhoons; volcanic activity, etc.)
  - G - area with critical slope
  - H - area classified as prime agricultural lands
  - I - recharge areas of aquifers
  - J - waterbody
  - K - mangrove areas
  - L - coral reef

Table RM-11. Environmentally Critical Projects\_\_\_\_\_

Name of the Environmentally Critical Project	Brgy.	Area (ha)	Owner/ Developer	Type of Environmentally Critical Project	ECC No.	Development Permit Number	Date when the project was given a permit	Status of Development

Notes:

- Type of Environmentally Critical Project: heavy industry, extractive resource, infrastructure project, golf course

Table RM-12. Land Parcel

Barangay	Other address (road/street name, parcel no.)	Building Owner	Type of Land Parcel	Number of storey	Floor area (sq.m.)	Estimated project cost

Notes:

- Type of land parcel: type 1 (titled), type 2 (untitled), others

Table RM-13. Land Use Change (from the Date the CLUP was Approved)

Zone Classification	Zone Area (ha)	Type of Project	Project Classification	Project Area (ha)	Location	Permit	Date of approval (ddmmyy)	Applicant	Hazard Susceptibility (H/M/L)							
									Fl	Tc	Eq	Vo	Ln	Ts	Others	

Notes:

- Type of project: golf course, socialized housing, resort, etc.
- Project classification: residential, industrial, etc.
- Permit - LC, DP





# Climate Change Adaptation and Disaster Risk Reduction

The Philippines is one of the most disaster-prone countries in the world as well one of the countries which will be most affected by climate change. To enable the safe and sustainable growth of its cities/ municipalities, climate change adaptation and mitigation and disaster risk reduction and management need to become an integral part of the CLUP process of local governments in the Philippines.

In keeping with Climate Change Act of 2009 (RA 9729) and Philippine Disaster Risk Reduction and Management Act of 2010 (RA 10121), this section aims to provide a general overview of the basic principles and concepts, the data collection process, and data analysis for integrating these concerns into the CLUP.



This guideline may be used in tandem with the “Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risks in the Comprehensive Land Use Plan” – Climate Twin Phoenix (HLURB/Climate Change Commission/ UNDP/AusAID).

## I. Basic Principles and Concepts

Understanding the following basic concepts and principles will help adequately integrate climate change and disaster risk considerations into the CLUP.

### Climate Change

**Climate change** means a change of climate which is attributed directly or indirectly to human activity (such as the emission of greenhouse gases) that alters the composition of the global atmosphere in addition to natural climate variability observed over comparable time periods (United Nations Framework Convention on Climate Change).

**Weather** is what we can feel, and is the subject of weather forecasts in radio and television. It is the day-to-day state of the atmosphere, meaning the daily temperature, humidity, rainfall, and wind. It often changes quickly from day to day.

**Climate** in comparison is the force that drives long-term changes in weather. It therefore determines the characteristics of a region (seasons, average temperature etc.). It is described by long-term statistics (e.g. average minimum and maximum temperature). Climate changes include increases or decreases in:

- Average temperature,
- Average rainfall,

- Sea level rise, and
- The frequency and/or severity of extreme weather events such as typhoons.

We can feel the weather especially when it changes from one day to the other, but we can also feel climate, e.g. if we travel from one region to another (to the mountains or to the North). Climate change, however, can only be felt over longer periods. Modern science has shown that temperatures have risen globally during the last century, thus the climate has changed already.

## Climate Change Projections for the Philippines

Climate change scenarios are developed using climate models which use mathematical representations of the climate system, simulating the physical and dynamic processes that determine global/regional climate. For the Philippines, PAGASA used the PRECIS (Providing Regional Climates for Impact Studies) model developed by the UK Met Hadley Centre to facilitate impact, vulnerability and adaptation assessments in developing countries where capacities to do climate modeling are still not fully developed or do not exist. Two time slices centered on 2020 (2006-2035) and 2050 (2036-2065) were used in the climate simulations using three emission scenarios; namely, the A2 (high-range emission scenario), the A1B (medium-range emission scenario) and the B2 (low-range emission scenario). Also, the future climate can be modeled with scientific climate models, but only with uncertainties.

The following is a summary of climate change projections for the Philippines for the mid-range emission scenario according to PAGASA (Climate Change in the Philippines, February 2011):

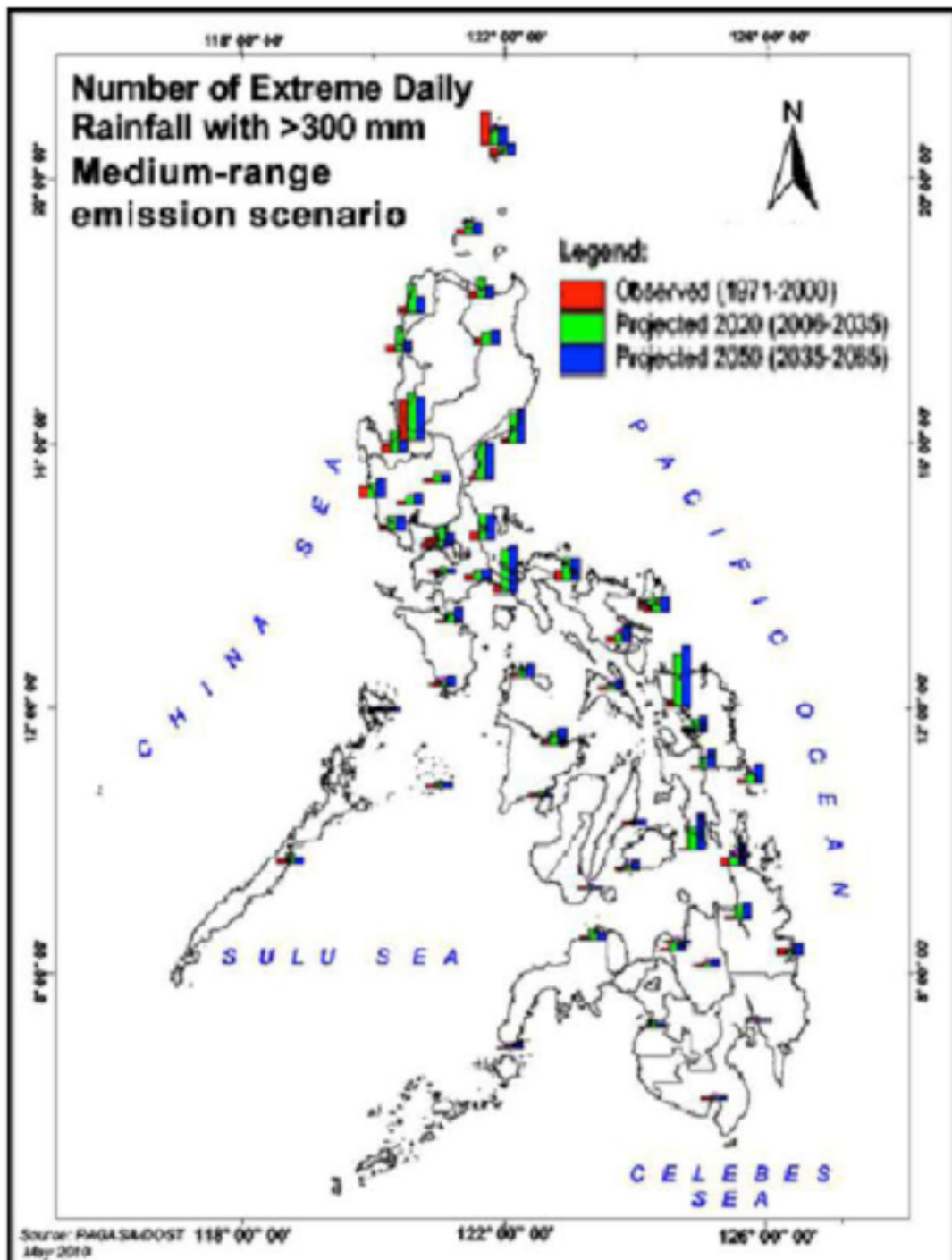
1. **Seasonal Temperature Change:** All areas of the Philippines will get warmer, more so in the relatively warmer summer months. Mean temperatures in all areas in the Philippines are expected to rise by 0.9 °C to 1.1 °C in 2020 and by 1.8 °C to 2.2 °C in 2050. Likewise, all seasonal mean temperatures will also have increases in these time slices; and these increases during the four seasons are quite consistent in all parts of the country. Largest temperature increase is projected during the summer (March-April-May or MAM) season.
2. **Seasonal Rainfall Change:** Generally, there will be reduction in rainfall in most parts of the country during the summer (MAM) season. However, rainfall increase is likely during the southwest monsoon (June-July-August or JJA) season until the transition (September-October-November or SON) season in most areas of Luzon and Visayas, and also, during the northeast monsoon (December-January-February or DJF) season, particularly, in provinces/areas characterized as Type II climate in 2020 and 2050. There is however, generally decreasing trend in rainfall in Mindanao, especially by 2050.

There are varied trends in the magnitude and direction of the rainfall changes, both in 2020 and 2050. What the projections clearly indicate are the likely increase in the performance of the southwest and the northeast monsoons in the provinces exposed to these climate controls when they prevail over the country. Moreover, the usually wet seasons become wetter with the usually dry seasons becoming also drier; and these could lead to more occurrences of floods and dry spells/droughts, respectively.

3. **Extreme Temperature Events:** hot temperatures will continue to become more frequent in the future. The number of days with maximum temperature exceeding 35 °C (following value used by other countries in the Asia Pacific region in extreme events analysis) will be increasing in 2020 and 2050.
4. **Extreme Rainfall Events:** Heavy daily rainfall will continue to become more frequent. Extreme rainfall is projected to increase in Luzon and Visayas only, but number of dry days is expected to increase in all parts of the country in 2020 and 2050. **Figure CL-1** shows the projected increase in number of days with extreme rainfall (defined as daily rainfall exceeding 300 mm) compared with the observed (baseline) values.



Figure CL–1. Current and projected extreme rainfall in the Philippines in 2020 and 2050 under mid-range scenario



- Changes in Annual Mean Temperature.** Significant warming will occur in the Philippines by the middle of the current century. The country's average annual mean temperature is projected to increase by 0.9°C -1.2°C by 2020 and 1.7°C -3.0°C by 2050. Higher temperatures are generally expected for all regions of the country by 2050, the rates doubling compared to 2020 levels. Warming will be worst in Mindanao, supposedly the country's food basket.
- Changes in Annual Mean Rainfall.** The projected change in annual precipitation ranges from -0.5 to 17.4 % in 2020 and -2.4 to 16.4 % in 2050. Increases in rainfall are particularly evident in most areas of Luzon and Visayas, while Mindanao is projected to undergo a drying trend. Average annual rainfall increase over most parts of Luzon and the Visayas is expected to be 2 to 17 % by 2020 and 1 to 16 % by 2050. In contrast, there is a general reduction in regional annual average rainfall in Mindanao (~ 0.5 to 11 % by 2020; 2 to 11% in 2050).

7. **Sea level Rise.** One of the most significant potential impacts of climate change is sea level rise that may cause inundation of coastal areas and islands, shoreline erosion, and destruction of important ecosystems such as wetlands and mangroves. As global temperatures increase, sea level rises due to a thermal expansion of upper layers of the ocean and melting of glaciers and ice sheets. According to the NOAA Laboratory for Satellite Altimetry (which provide estimates of sea level rise based on measurements from satellite radar altimeters), sea level rise for the area around the Philippines has ranged from 6 to 10mm per year since 1993. Given the same rate the expected sea level rise (with 2013 as base year) would be 4 to 7cm for 2020, and 22 to 37 cm for 2050 (NOAA).



#### **For projections per region/province:**

[http://kidlat.pagasa.dost.gov.ph/cab/climate\\_change/Climate%20change%20in%20the%20Philippines%20-%20August%2025%202011.pdf](http://kidlat.pagasa.dost.gov.ph/cab/climate_change/Climate%20change%20in%20the%20Philippines%20-%20August%2025%202011.pdf)

#### **For sea level rise:**

[http://ibis.grdl.noaa.gov/SAT/SeaLevelRise/LSA\\_SLR\\_maps.php](http://ibis.grdl.noaa.gov/SAT/SeaLevelRise/LSA_SLR_maps.php)

## **Possible Impacts of Climate Change on the Philippines**

The Philippines, being archipelagic and composed of small islands, is highly vulnerable to the impacts of climate change. Scientific studies suggest that even if the world makes a significant reduction in greenhouse gas emissions, the lag in the climate system means that the world is faced with decades of climate change due to the emissions already put into the atmosphere. While the Philippines is not a major emitter of greenhouse gases and, in fact, is a carbon sink<sup>1</sup>, the adverse effects of global climate changes will not spare the country. The following impacts in particular affect land use planning:

### **Water**

In areas/regions where rainfall is projected to decrease, there will be water stress (both in quantity and quality), which in turn, will most likely cascade into more adverse impacts, particularly on forestry, agriculture and livelihood, health, and human settlement.

Large decreases in rainfall and longer drier periods will affect the amount of water in watersheds and dams which provide irrigation services to farmers, especially those in rain-fed areas, thereby, limiting agricultural production. Likewise, energy production from dams could also be rendered insufficient in those areas where rainfall is projected to decrease, and thus, could largely affect the energy sufficiency program of the country (PAGASA, 2011).

In areas where rainfall could be intense during wet periods, flooding events would follow and may pose danger to human settlements and infrastructure, in terms of landslides and mudslides, most especially in geologically weak areas. Additionally, these flooding events could impact severely public infrastructure, such as roads and bridges, including classrooms, evacuation centers, and hospitals.

### **Coastal Areas**

The country's coastal resources are highly vulnerable due to its extensive coastlines. Sea level rise is highly likely in a changing climate, and low-lying islands will face permanent inundation in the future. The combined effects of continued temperature increases, changes in rainfall and accelerated sea level rise, and tropical cyclone occurrences including the associated storm surges would expose coastal communities to higher

<sup>1</sup>A carbon sink is anything that absorbs more carbon than it releases, whilst a carbon source is anything that releases more carbon than it absorbs. Forests, soils, oceans and the atmosphere all store carbon and this carbon moves between them in a continuous cycle.

levels of threat to life and property. The livelihood of these communities would also be threatened in terms of further stress to their fishing opportunities, loss of productive agricultural lands and saltwater intrusion, among others. According to estimates of the National Mapping and Resource Information Authority (NAMRIA), a one meter sea level rise can translate to an estimated land loss of 129,114 ha (PAGASA, 2011).

## Climate Change Adaptation and Mitigation

Mitigation and adaptation are two ways to respond to climate change impacts.

**Climate change adaptation** refers to adjustments in ecological, social, or economic systems in response to the effects or impacts of actual or expected climatic stimuli. It refers to changes in processes, practices, and structures to lessen or avoid potential damages, or to benefit from opportunities associated with climate change (United Nations Framework Convention on Climate Change).

**Climate change mitigation** is human intervention aimed at reducing the sources of greenhouse gases or enhancing the sinks of greenhouse gases. "Sink" means any process, activity or mechanism which removes a greenhouse gas from the atmosphere (United Nations Framework Convention on Climate Change).

## Disaster Risk Reduction

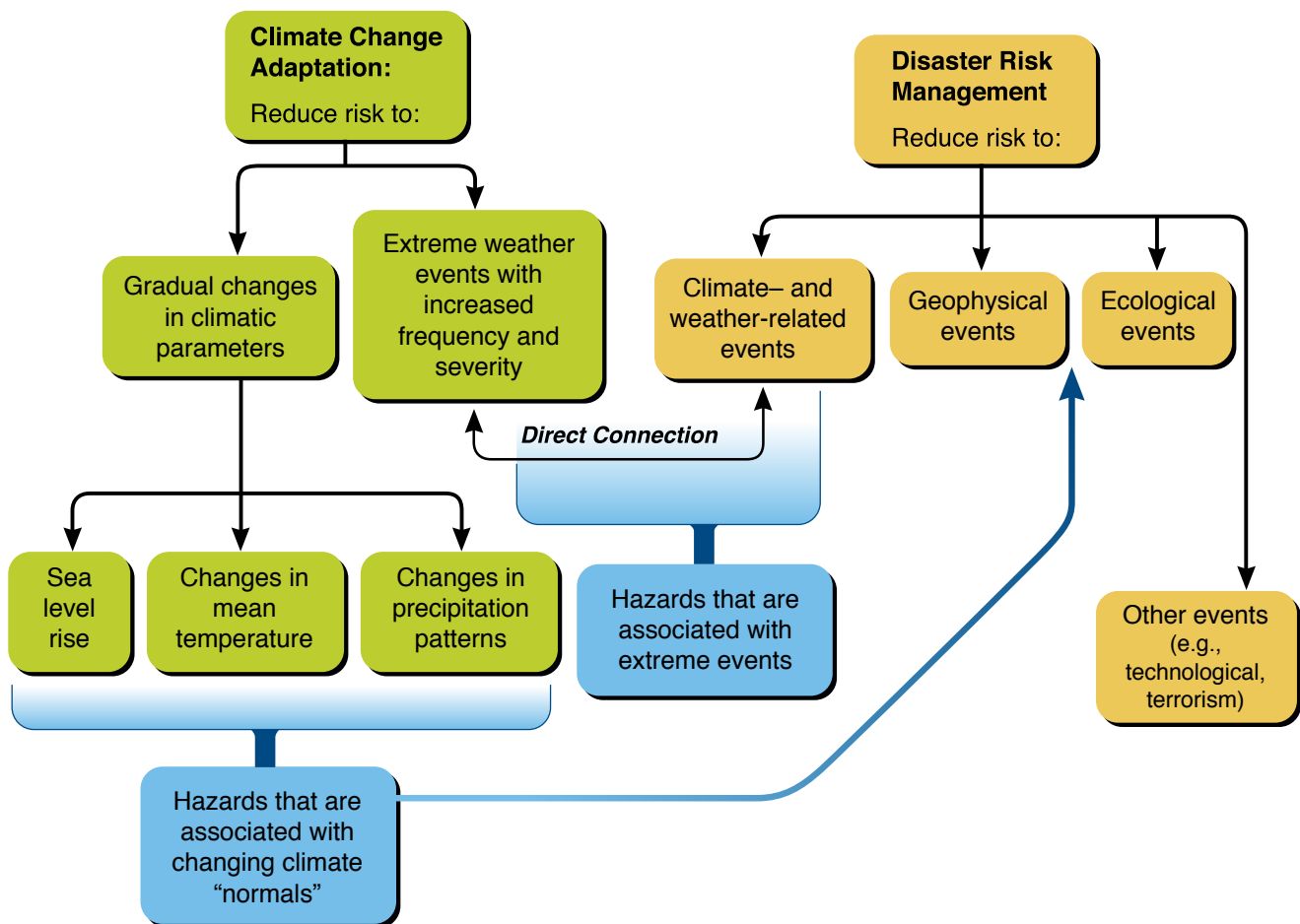
Disaster risk reduction is the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters; reducing exposure to hazards; lessening vulnerability of people and property; managing land and the environment wisely; and improving preparedness for adverse events (Republic Act 10121). It includes structural and non-structural measures such as:

- Hazard-resistant construction and engineering works;
- Formulation and implementation of risk mitigation plans, programs, projects and activities;
- Awareness raising;
- Knowledge management;
- Land use policies;
- Resource management; and
- Enforcement of comprehensive land use planning, building and safety standards and legislation.

## Relationship of Climate Change and Disasters

Climate change can increase the frequency and severity of climate- and weather-related hazard events such as typhoons, extreme rainfall, and drought, leading to worsening disaster impacts. Gradual changes in climate parameters (such as sea level rise, changes in mean temperature, and changes in rainfall pattern) can exacerbate geophysical and ecological hazard events. For example, changes in precipitation patterns can increase potential for landslides; while sea level rise can contribute to coastal erosion (See **Figure CL-2**).

Figure CL–2. Convergence of climate change adaptation and disaster risk management



Source: Gotangco 2012, adapted from Gotangco Castillo 2007 as cited by CLUP Resource Book, 2012

## Goal of Incorporating Climate Change Adaptation and Mitigation and Disaster Risk Reduction and Management in the CLUP

The goal of incorporating climate change adaptation and mitigation and disaster risk reduction into the CLUP is to be able to regulate and control physical development to reduce casualties and damage from discrete hazard events as well as minimize the negative impacts of slow-onset hazard events. Policies and spatial strategies in the CLUP and Zoning Ordinance should be able to achieve the following:

- Prevent future development in areas highly susceptible to hazards where possible;
- Keep land use intensity, buildings value, and occupancy to a minimum in areas where development cannot be prevented;
- Encourage risk mitigation through proper urban design, site planning, and building design in areas where the above strategies are not viable and development occurs;
- Protect life and existing development from losses;
- Conserve protective environmental systems; and
- Prevent future development from creating conditions that contribute to risk.



## For More Information:

### IEC materials:

- Climate Change 101 <http://www.earthhour.org/page/about/what-climate-change>
- Climate Change Commission (Basics of Climate Change) <http://climate.gov.ph/index.php/documents/category/19-brochures>

### Government documents:

- Republic Act 10121: An Act Strengthening the Philippine Disaster Risk Reduction and Management System ([http://www.ndrrmc.gov.ph/attachments/045\\_RA%2010121.pdf](http://www.ndrrmc.gov.ph/attachments/045_RA%2010121.pdf))
- Climate Change Act, as amended (RA 10174): <http://climate.gov.ph/index.php/documents/category/23-republic-act>
- National Climate Change Action Plan Executive Summary (<http://climate.gov.ph/index.php/nccap-executive-summary>)
- National Climate Change Action Plan Technical Document (<http://climate.gov.ph/index.php/nccap-technical-document-nccap>)

## Climate and Disaster Risk Assessment

Risk assessment is a process which involves identifying the nature and behavior of the hazards the city/municipality is exposed to; identifying what elements are at risk to these hazards and why they are at risk; estimation of potential damages and losses as a result of a hazard event; and evaluation of risk levels to determine the possible strategies to manage or reduce the risk. Climate change is considered through its impact (particularly its effect on the frequency and magnitude) on climate hazards such as floods, rain-induced landslide, and droughts.

## Climate Change Vulnerability Assessment

Vulnerability assessment is a process of examining the degree to which a system is susceptible to, and unable to cope with adverse effects of climate change. It involves determining the nature and degree to which a system is exposed to climate variations (exposure), the degree to which it is affected adversely or beneficially (sensitivity), and the ability of the system to adjust to climate change (adaptive capacity).



Existing tools and methods may supplement the steps introduced below. These include exposure database generation tools such as Climex.db (CCC), REDAS - Rapid Earthquake Damage Assessment System (PHIVOLCS), and CBMS - Community-based Monitoring System (DILG).

There are also existing programs/project such as the Climate Change and Disaster Risk Information Project (CRISP) developed by UNDP-Ausaid-NEDA for Region 2 LGUs and Greater Metro Manila Area – Risk Analysis Project (GMMA-RAP) developed by CSCAND Agencies for Metro Manila that may help the LGUs in their assessments.

## II. General Objectives and Outputs

This section details the steps for climate and disaster risk assessment and climate change vulnerability assessment. Section III deals with formulation of spatial strategy and land use policies based on the assessment.



### Objective

- Identify the land use constraints and issues associated with the climate and disaster risks affecting the city/municipality



- Identify safe areas for future urban development
- Determine strategies/ policies and regulations to reduce disaster in highly susceptible areas
- Identify climate adaptation measures for the vulnerable population



## Outputs

- Climate and disaster risk assessment to include the following:
    - ♦ Hazard profile and hazard maps\*
    - ♦ Exposure maps and tables
    - ♦ Risk maps
  - Climate change vulnerability assessment to include the following:
    - ♦ Local climate change scenario\*
    - ♦ Climate change impacts (per sector or area)
    - ♦ Adaptive capacity
  - Assessments of priority areas/ sectors to include the following:
    - ♦ Area assessments (for identified priority areas)
    - ♦ Sectoral assessments (for identified highly sensitive sectors)
  - Summary of land use constraints and issues related to climate and disaster risk\*
- (\*Minimum output required—others may be done where capacity exists)



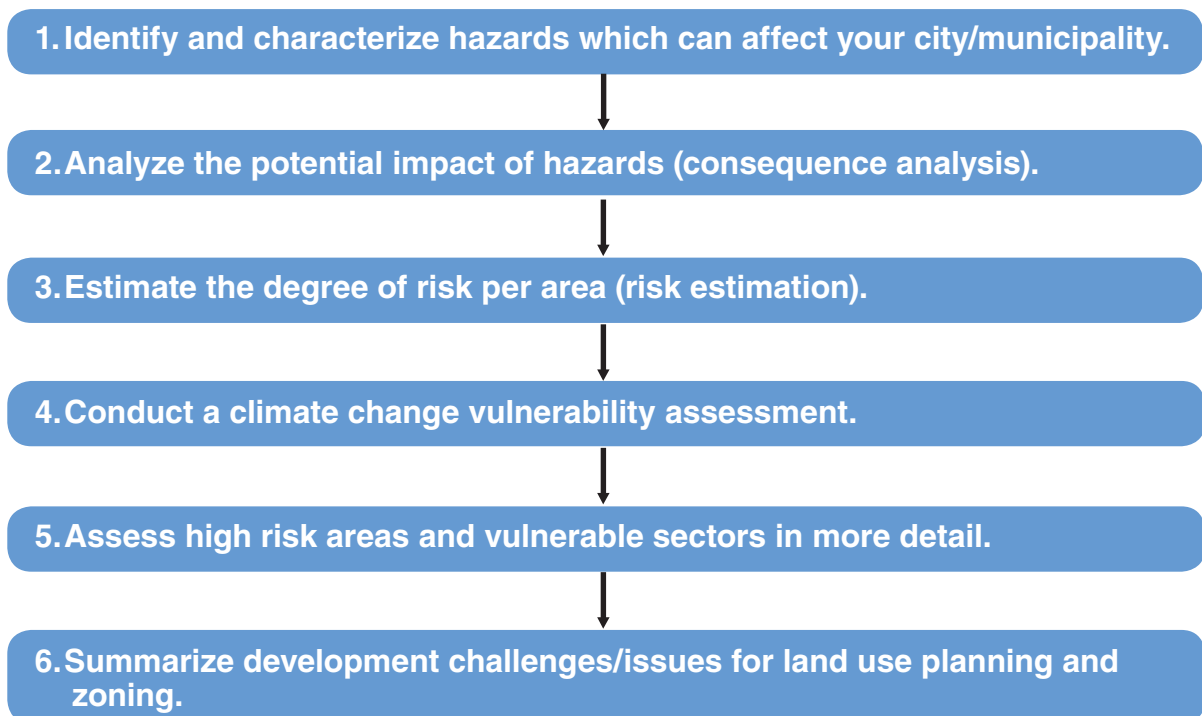
## Participants

- Technical Working Group for Climate Change Adaptation/Disaster Risk Reduction
- Communities at risk

## III. Data Collection and Analysis

This section provides the steps for climate and disaster risk assessment and climate change vulnerability assessment. Section III deals with formulation of spatial strategy and land use policies based on the assessment.

### Overview Of Steps





A more detailed guide for the Climate and Disaster Risk Assessment (CDRA) process is available in the “Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risks in the Comprehensive Land Use Plan” – Climate Twin Phoenix (HLURB/Climate Change Commission/UNDP/AusAID).

## STEP 1. Identify and characterize hazards which can affect your city/municipality.

Determine the possible timing, location, extent, and severity of potential hazard events within and around the territory of the city or municipality including the potential effects of climate change. For land use planning, it is important to obtain hazard maps to determine location and extent of areas susceptible to hazards. This step is important to establish restrictions on future land use and development.

Hazards can be distinct and recurrent events, such as in the case of typhoons and extreme rainfall, droughts, landslides, and earthquakes. But hazards can also be gradual and continuous, such as increases in mean temperature, changes in rainfall average and distribution, sea level rise and coastal erosion.

Many of the hazards of climate change fall into the latter category, and their impact on land use needs to be factored into planning as well. For example, development along coastal areas should be avoided or restricted since these areas are expected to be permanently inundated by projected sea level rise and coastal erosion. Analysis for the purpose of long-term land use planning need to recognize both types of hazard (CLUP Resource Book, Integrating Climate Change Adaptation and Disaster Risk Reduction and Management: A Companion Resource Book to the 5-Volume HLURB Guidebook on Comprehensive Land Use Planning, 2012).

The following are the steps for hazard characterization:

**1.1. Review existing data on hazards and climate change.** This may include a review of the following:

- Existing CLUP
- Hazard Maps and Information from National Agencies (See **Table CL-1.**)
- Previous Studies (any local Hazard, Risk, or Vulnerability Assessments including community-level assessments)
- Post Disaster Assessments
- Historical Records/News Archives

Compile the information available and note down the gaps. It is best to contact national agencies who do hazard mapping such as MGB, PAGASA, and PHIVOLCS to discuss with you the interpretation of existing hazard information and climate change projections. Then determine what needs updating, refinement, validation, and more in-depth assessment.

To determine the resources and technical assistance you may need to further refine hazard information, the Box CL-1 contains guide questions for reviewing existing hazard information.

**Table CL-1. Hazard Maps and Information from National Agencies**

Hazard Information	Source	Format
Climate Information & Climate Change Projections	Climate Change in the Philippines (February 2011), by Adaptayo, MDGF, and DOST <a href="http://kidlat.pagasa.dost.gov.ph/cab/climate_change/main.html">http://kidlat.pagasa.dost.gov.ph/cab/climate_change/main.html</a>	Website version or downloadable PDF
	National Framework Strategy on Climate Change <a href="http://climate.gov.ph/index.php/documents/category/5-national-framework-strategy-on-climate-change-nfsc">http://climate.gov.ph/index.php/documents/category/5-national-framework-strategy-on-climate-change-nfsc</a>	Downloadable PDF

Hazard Information	Source	Format
Philippine Fault Zone Maps	<a href="http://www.phivolcs.dost.gov.ph">http://www.phivolcs.dost.gov.ph</a>	Downloadable PDF/JPEG
Active Faults and Trenches <ul style="list-style-type: none"> <li>• Philippines Map</li> <li>• Regional Maps</li> </ul>	<a href="http://www.phivolcs.dost.gov.ph">http://www.phivolcs.dost.gov.ph</a>	Downloadable PDF
Liquefaction Susceptibility Map <ul style="list-style-type: none"> <li>• Philippines Map</li> <li>• Metro Manila Map</li> </ul>	<a href="http://www.phivolcs.dost.gov.ph">http://www.phivolcs.dost.gov.ph</a>	Downloadable PDF
Earthquake-Induced Landslide Susceptibility Map <ul style="list-style-type: none"> <li>• Philippines Map</li> <li>• Regional Maps</li> </ul>	<a href="http://www.phivolcs.dost.gov.ph">http://www.phivolcs.dost.gov.ph</a>	Downloadable PDF
Tsunami-Prone Areas <ul style="list-style-type: none"> <li>• Philippines Map</li> <li>• Regional Maps</li> </ul>	<a href="http://www.phivolcs.dost.gov.ph">http://www.phivolcs.dost.gov.ph</a>	Downloadable PDF
READY Project Multi-hazard Maps (Earthquake-related hazards –landslide, ground rupture, tsunami, ground shaking, liquefaction; storm surge; rain-induced landslide; flood; and volcanic hazards) <ul style="list-style-type: none"> <li>• Selected provinces only</li> </ul>	<a href="http://www.phivolcs.dost.gov.ph">http://www.phivolcs.dost.gov.ph</a> <a href="http://www.namria.gov.ph/readyMaps/ResultFrame.htm">http://www.namria.gov.ph/readyMaps/ResultFrame.htm</a>	Downloadable PDF Downloadable png file
Landslide Susceptibility Maps	<a href="http://gdis.denr.gov.ph/mgbviewer/">http://gdis.denr.gov.ph/mgbviewer/</a>	Viewable on browser and downloadable as as Excel file (coordinates) or PDFs
Flood Susceptibility Maps	<a href="http://gdis.denr.gov.ph/mgbviewer/">http://gdis.denr.gov.ph/mgbviewer/</a>	Viewable on browser and downloadable as as Excel file (coordinates) or PDFs

Note:

- In cases of unavailability of data and maps, LGUs may use locally-prepared hazard maps or other maps produced by private organizations (e.g. NGOs, CSOs, academe and International Organizations). It is recommended that these maps be verified by the appropriate National Government Agencies.
- In the absence of earthquake hazard maps, LGUs may opt to consider performing earthquake hazard simulation with the assistance of PHIVOLCS to ensure that proper earthquake parameters are adapted.



### Box Cl-1. Guide Questions for Review of Existing Hazard Information

#### Comprehensiveness

- Are all the hazards that occur/ could potentially occur in your territory covered?
- Are climate change projections factored in?

#### Level of Accuracy

- What is the level of analysis of available hazard maps and climate change projections? (national/regional/provincial/city/municipality)
- What is the scale used for the hazard maps? (e.g. 1:250,000, 1:50,000, 1:10,000)
- What is the base topographical map used for analysis? (e.g. 1:250,000, 1:50,000, 1:10,000)
- Are similar maps from various sources consistent with each other? (e.g. scale, projection, data/ information, date of publication, etc.)

### Level of Detail

- Is the location and geographical extent of potential effects documented? (e.g. geographical coordinates, administrative boundaries)
- Is the level of susceptibility (e.g. high, medium, low) indicated and is this consistent with the map?
- Is the frequency/probability of occurrence indicated?
- Is the intensity/severity indicated?
- Is there sufficient information to inform planning decisions and development regulations?

### Map Format

- What is the file format (image/pixel file, GIS shape files/ vector files) of the hazard maps?
- Are the file formats consistent with the information system/ mapping system you are currently using?

**Note:** Maps with smaller scales (e.g. 1:250,000 or smaller than 1:10,000) have lesser level of accuracy due to generalization of features. Refer to <http://www.cookbook.hlurb.gov.ph/4-21-01-example-examining-map-accuracy> for detailed information on examining map accuracy.

1.2. **Refine/update the hazard information for your locality.** The initial review of data will give you an indication of which hazards affect your area and which areas are susceptible. Additional data collection can then focus on further refinement/ updating of hazard information. The extent of detail of hazard characterization should be based on your planning needs. For initial visioning and formulation of general development thrust and strategies, broad-based hazard information may be enough. But detailing of strategies, land uses, and zoning regulations will need more refined hazard information.

It is important to define clearly what information is needed for decision-making, and the level of detail required, before starting data collection. This should be reviewed from time to time as the planning process progresses, and the information needs and availability become clearer. It is also essential to identify explicitly gaps and ambiguities in the evidence and areas where the analysis is contested. In all cases, clear procedures for reaching planning decisions are required, which should be laid down in advance (Benson & Twigg, 2007).

Information on the following key features of natural hazards is needed to identify past, present and potential hazard events and their effects:

- **Location and extent.** Is the city/municipality affected by one or more natural hazards, what types of hazard, and where?
- **Frequency or probability of occurrence.** How often are hazard events likely to occur (in both the short and the long term)?
- **Intensity/severity.** How severe are the events likely to be (e.g., flood levels; speed of winds and volume/rate of rainfall during typhoons; magnitude and intensity of an earthquake)?
- **Duration.** How long will the hazard event last (from a few seconds or minutes in the case of an earthquake to months or even years in the case of drought)?
- **Predictability.** How reliably can we predict when and where events will happen? Information about the speed of onset of a hazard event is principally relevant to disaster preparedness and early warning systems but may also have a bearing on planning decisions (e.g., planning secure evacuation routes).

Planners should also be aware of:

- **Secondary hazards** resulting from a hazard event (e.g., landslides triggered by an earthquake or heavy rainfall; fires in buildings set off by earthquakes; dam failure due to floodwaters);
- **Hazards outside the territory that could affect it** (e.g., by cutting off supplies of power or raw materials, displacing communities); and
- **How hazard events occur**, including not only natural physical processes but also the

impact of human activities that create or exacerbate hazards. (e.g., deforestation causing slope instability and hence landslides)

For a more complete list of hazard information, see **Annex CL-1** for special studies.

Decide on the method for refining/updating the hazard information according to your capacity. A mix of methods may be used to complement each other. These could include the following:

Note: Any significant findings or changes on the hazard maps resulting from the application of the following tools should be discussed and consulted with the concerned NGA/s.

- **Local hazard mapping.** This is ideally done by a specialist or team from the appropriate national agency (e.g. geologists from MGB to check landslide and flood prone areas) or a consultant together with the LGU. The team could start with existing hazard maps as reference but use a more appropriate scale (e.g. 1:10,000 or larger) and more detailed base maps or digital elevation models (e.g. based on 1-meter-interval contour maps) if available.
- **Computer modeling.** Local governments can coordinate with academic institutions or hire specialist consultants who can do computer models of potential hazard events using various scenarios. For example, hydraulic engineers can calculate flood elevations through stream gauge data and information on drainage area, rainfall potential, characteristics of the source of flooding (usually a river or stream), and soil saturation. In some cases modeling for hazard events such as flooding may be more appropriately done at the provincial or regional level especially when watersheds cross boundaries.
- **Ground truthing.** This involves validation of hazard information on the ground through a combination of field observations, documentation, and local interviews. It is useful to do this (e.g. recording flood heights) right after hazard events when the evidence is still visible and the memory is fresh in people's minds. This can be done in conjunction with local hazard mapping and ideally done by a specialist or team from the appropriate national agency or a consultant together with the LGU to ensure that the process is systematic.
- **Post disaster assessments.** Reports from local and national agencies right after a disaster provide a snapshot of the extent, severity, and impact of a hazard event. The following are the possible sources of information:
  - LDRRMO/RDRRMO/NDRRMO: Situation Report (usually includes contributions from other agencies); Post Disaster Needs Assessment (PDNA)
  - MGB, PAGASA, and PHIVOLCS: Field reports/assessments of major disasters.
  - DSWD: Affected barangays, number of affected families/persons, number of casualties (injuries/deaths), number of displaced persons in evacuation centers, and number of partially/totally damaged houses.
  - City/Municipal/Provincial Agriculture Office or Department of Agriculture: area and cost of damaged agriculture
  - City/Municipal Engineering Office or Department of Public Works and Highways (DPWH): number and cost of damaged infrastructure.
  - Department of Education: number and cost of damaged school buildings
  - Department of Health: number and cost of damaged health facilities
- **Participatory community mapping/assessment.** This also involves validation of hazard information on the ground but through a more participatory method involving selected communities (usually the ones with high susceptibility to hazards). This gives people a chance to get involved in the process as well as elaborate further on their vulnerabilities and capacities and recommend possible actions. Community assessment is also essential to provide a more detailed context to the situation. See methods in **Annex CL-2**. Tools for Community-Based Hazard Assessment. An example for using participatory community hazard mapping is shown on the next page.



### CASE EXAMPLE: Participatory Community Hazard Mapping

The German international cooperation enterprise GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit, GmbH) has supported the production of 52 community flood hazard maps, employing a participatory approach. With local residents, commonly flooded areas have been identified and mapped with GPS (global positioning system) and the resulting maps validated by the local community. These maps are in general more detailed than those available from MGB, typically indicating three different water heights (Mainstreaming Risk Reduction in Subnational Development and Land Use/ Physical Planning in the Philippines, 2008)

**1.3. Integrate hazard maps into a GIS system to facilitate analysis.** Maps from various sources will have to be integrated into a Geographic Information System (GIS). Paper maps as well as community-based information will have to be scanned, geo-referenced, and digitized. The HLURB has provided a guide for integrating hazard maps into a GIS System through the HLURB GIS Cookbook (<http://www.cookbook.hlurb.gov.ph>) for LGUs. The website contains the following guides for incorporating hazard information:

#### Spatial Data Preparation

- <http://www.cookbook.hlurb.gov.ph/4-21-spatial-data-preparation>

#### Sea Level Rise

- <http://www.cookbook.hlurb.gov.ph/4-08-01-environmental-management-climate>

#### Flooding

- <http://www.cookbook.hlurb.gov.ph/4-08-04-environmental-management-flood>

#### Geologic Hazards (earthquake, volcano, tsunami, landslide, subsidence)

- <http://www.cookbook.hlurb.gov.ph/4-08-06-environmental-management-fault-lines-earthquakes>

If an LGU does not have a GIS system, alternative methods may be used for indicative analysis that can be further refined by the LGU as capacity increases and a GIS system is put in place. Hazard maps can be scanned as image files and overlain with other maps using location indicators (such as roadways). Google Earth (<http://www.google.com/earth/index.html>) is a free downloadable program where image overlays and polygons (shapes) can be added as layers on top of the satellite map. There are also open source GIS systems such as Quantum GIS (<http://www.qgis.org/>) which entail no cost to local government units. Training of personnel by GIS specialists will still be necessary for the use of the program.



### Tip on Presenting Maps

Maps are a good medium for communicating hazards information to decision makers but often need interpreting—to both non-specialists, who may not be used to seeing information in this form, and educated users, who may be unfamiliar with formats and symbols being used. In all cases the meaning of the data presented should be thoroughly discussed and understood (Benson & Twigg, 2007).

## STEP 2. Analyze the potential impact of hazards (consequence analysis)

This involves determining the possible outcome or impact of a hazard event. It usually involves a) identifying, locating, and quantifying elements (such as population or buildings) potentially at risk; b) describing the characteristics of these elements at risk; and c) estimating the possible losses or severity of impact. The steps here detail a) and b), which can already provide planners an idea of the areas that need to be given attention (Further



details on how to estimate the possible losses or severity of impact are contained in the Supplemental Guidelines.) In particular the data generated from these steps can be used for the following:

- Estimating housing (relocation, upgrading), evacuation, relief and response needs
- Determining areas where land use needs to be restricted, changed, or maintained
- Determining areas for redevelopment/ priority action
- Identifying protection and mitigation actions
- Selecting areas for further study

The steps below aim to identify population, land uses, and government/ critical facilities and infrastructure potentially affected by hazards.

**2.1. Prepare an inventory of hazard maps and identify levels of susceptibility.** Levels of susceptibility as indicated in hazard maps from national agencies depend on the level of assessment/study that has been done, which varies across different areas. In some areas maps can indicate areas of high, moderate, or low susceptibility; in some they may just indicate susceptible/not susceptible or prone/not prone. **Table CL-2** indicates the levels currently used. It is best to consult the agency source of the map to clarify what the level of susceptibility means and if there are available or ongoing studies to further refine the level of susceptibility. It is up to the LGU to decide whether the available maps are sufficient for the risk assessment or if they need to conduct further studies or refinement (as explained in the previous section). What is important is for the criteria and method of determining susceptibility to be clear.

**Table CL-2. Hazard Description/Susceptibility or Proneness Levels for National Agency Maps**

(Note: Susceptibility/proneness levels may vary per area so it is best to check the map notes or the source agency for the criteria and methods as well as scale of base maps used)

Hazards	Hazard Description/ Susceptibility or Proneness Level	Criteria/ Explanation	Method of Study
Rain-induced landslide	High susceptibility	Areas with active/recent landslides and tension cracks that would directly affect the community. Those with steep slopes and drainage and prone to landslide damming.	
	Moderate susceptibility	Have inactive/ old landslides and tension cracks which are located away from the community. These areas usually have moderate slopes.	
	Low susceptibility	Areas with low to gentle slopes and lacking tension cracks.	
	Possible areas prone to landslide accumulation	Areas where landslide debris could accumulate.	
Flooding	High susceptibility	Areas with greater than 1m flood height. These areas are immediately flooded during heavy rains of several hours; includes landforms of topographic lows such as river channels, abandoned river channels and areas along river banks. Also prone to flash floods.	Based on geomorphological analysis of the area by photo interpretation techniques using aerial photographs and satellite imageries together with the latest topographic maps leading to the production of a preliminary flood hazard map. Geomorphological mapping was then conducted in the field together with interviews from residents as a means of verification.
	Moderate susceptibility	Areas with 0.5m to 1.0m flood height which is subjected to widespread inundation during prolonged and extensive heavy rainfall or extreme weather condition. Includes fluvial terraces, alluvial fans, and infilled valleys.	
	Low susceptibility	Areas with 0 to 0.5 meter flood height such as low hills and gentle slopes, with sparse to moderate drainage density.	
Storm Surge	Inundations of >4m to 12m	Area to be inundated with >4m to 12m	Based on geomorphological analysis and observation in the areas during interviews/ surveys. The surge heights are computed using the data gathered during surveys in reference to the significant tropical cyclone occurrences and from storm surge model results.
	Inundations of >1m to 4m	Area to be inundated with >1m to 4m	
	Inundations of 1m	Area to be inundated with 1m	

Hazards	Hazard Description/ Susceptibility or Proneness Level	Criteria/ Explanation	Method of Study
Tsunami	Inundation area	Area to be inundated by tsunami (wave height is usually indicated)	Generated using available tsunami programs, earthquake and tectonic data, and bathymetric maps.
Ground Rupture	Active fault. Solid line-trace certain.	Recommended minimum buffer zone from the fault is at least 5 meters as reckoned from both sides of the mapped fault trace or from the edge of the deformation zone.	
	Active fault. Dashed line-trace approximate.		
Earthquake-Induced Landslide	High susceptibility		Based on simulation of largest possible earthquake magnitude occurring in the area. The result shows the possible landslide initiation zones at varying degrees
	Moderate susceptibility		
	Low susceptibility		
	Possible areas prone to landslide accumulation	Possible depositional extent of landslide materials and considered part of the areas that may be affected by landslides.	
Liquefaction	High susceptibility		Based on the geology, earthquake source zone, historical accounts of liquefaction, geomorphology and hydrology of the area, and preliminary microtremor utilized to validate type of underlying materials.
	Moderate susceptibility		
	Low susceptibility		
Ground Shaking	PEIS Intensity X	Completely Devastating-Practically all man-made structures are destroyed. Massive landslides and liquefaction, large scale subsidence and uplifting of land forms and many ground fissures are observed. Changes in river courses and destructive seiches in large lakes occur. Many trees are toppled, broken and uprooted.	
	PEIS Intensity IX	Devastating-People are forcibly thrown to ground. Many cry and shake with fear. Most building are totally damaged. Bridges and elevated concrete structures are toppled or destroyed. Numerous utility posts, towers and monument are tilted, toppled or broken. Water sewer pipes are bent, twisted or broken. Landslides and liquefaction with lateral spreading and sandboils are widespread. The ground is distorted into undulations. Trees are shaken very violently with some toppled or broken. Boulders are commonly thrown out. River water splashes violently on slopes over dikes and banks.	
	PEIS Intensity VIII	Very Destructive-People panicky. People find it difficult to stand even outdoors. Many well-built buildings are considerably damaged. Concrete dikes and foundation of bridges are destroyed by ground settling or toppling. Railway tracks are bent or broken. Tombstones may be displaced, twisted or overturned. Utility posts, towers and monuments mat tilt or topple. Water and sewer pipes may be bent, twisted or broken. Liquefaction and lateral spreading cause man-made structure to sink, tilt or topple. Numerous landslides and rockfalls occur in mountainous and hilly areas. Boulders are thrown out from their positions particularly near the epicenter. Fissures and faults rapture may be observed. Trees are violently shaken. Water splash or stop over dikes or banks of rivers	
	PEIS Intensity VII	Destructive-Most people are frightened and run outdoors. People find it difficult to stand in upper floors. Heavy objects and furniture overturn or topple. Big church bells may ring. Old or poorly-built structures suffer considerably damage. Some well-built structures are slightly damaged. Some cracks may appear on dikes, fish ponds, road surface,	

Hazards	Hazard Description/ Susceptibility or Proneness Level	Criteria/ Explanation	Method of Study
Ground Shaking (cont'd)		or concrete hollow block walls. Limited liquefaction, lateral spreading and landslides are observed. Trees are shaken strongly. (Liquefaction is a process by which loose saturated sand lose strength during an earthquake and behave like liquid)	
	PEIS Intensity VI	Very Strong—Many people are frightened; many run outdoors. Some people lose their balance. motorists feel like driving in flat tires. Heavy objects or furniture move or may be shifted. Small church bells may ring. Wall plaster may crack. Very old or poorly built houses and man-made structures are slightly damaged though well-built structures are not affected. Limited rockfalls and rolling boulders occur in hilly to mountainous areas and escarpments. Trees are noticeably shaken.	
	Lower than PEIS Intensity VI		
Volcano Hazards	Lahar	Lahar (an Indonesian term), sometimes called mudflows or volcanic debris flows, are flowing mixtures of volcanic debris and water. Lahars are classified into: Primary or hot lahar - associated directly with volcanic eruption and Secondary or cold lahar - caused by heavy rainfall. Lahar distribute and redistribute volcanic ash and debris deposited around the volcano after the materials has cooled and has become water logged. Lahar in tropical areas can be produced by: <ul style="list-style-type: none"> <li>* sudden draining of a crater lake, caused by either an explosive eruption or collapse of a crater fall (e.g. Agua, Kelut, Ruapehu)</li> <li>* movement of a pyroclastic flow into a river or lake, displacing and mixing with water</li> <li>* avalanche of water-sustained rock debris, where water can be from heavy rain, hydrothermal activity or other sources</li> <li>* torrential rainfall on unconsolidated deposits on slope of a volcano (e.g. Pinatubo)</li> <li>* collapse of a temporary dam, where recent volcanic deposits have blocked a steam channel (e.g. Asama, Pinatubo)</li> </ul>	

2.2. **Overlay maps of population, land use, government and critical facilities with hazard maps.** See **Table CL-3** below for the list of maps. The results can be shown in map as well as table form. The results of this exercise are indicative and can be later validated by actual surveys.

**Table CL–3. List of Overlay Maps to Determine Exposure**

Category	Existing Conditions Map	Outputs (per hazard and level of susceptibility)
Population	Population Density Map (per barangay)	Potentially Affected Population (sex disaggregated data)
	Map of Informal Settlements	Potentially Affected Population (Informal Settlements: sex disaggregated data)
	Coastal/River Easements	Potentially Affected Population and Informal Settlements (sex disaggregated data) within easements from water bodies or faults
Land Uses	Existing Land Use	Potentially Affected Areas (Existing Land Use)
	Built Up Areas	Potentially Affected Areas (Built-Up Area)
Government/Critical Facilities (Point Locations)	Transport Infrastructure (Roads, Bridges, Rails, Ports, Airports) Water Facilities Power Facilities Evacuation Centers Hospitals	Potentially Affected Facilities

Category	Existing Conditions Map	Outputs (per hazard and level of susceptibility)
Government/Critical Facilities (Point Locations)	Government Facilities Government Offices Schools Health Centers Police and Fire Stations Military Installations	Potentially Affected Facilities

Detailed instructions for the overlay are shown below:

### For population:

- Compute for the population density per barangay.
- Prepare the population density map.
- Overlay the population density map on the hazard map.
- Calculate the size of the area that fall under various susceptibility levels.
- Calculate the potentially affected population for each hazard by multiplying the population density of the barangay and the size of the area affected. Results should be shown in table form (see **Table CL-4**) and translated into a map.

Working Table:

Barangay	Total Area (in hectares)	Total Population	Population Density (persons per hectare)	Affected Area (per level of susceptibility)	Affected Population (Density x Affected Area)

Table CL- 4. Potentially Affected Population in Hazard Areas

Barangay	Type of Hazard [Flooding, etc.]							
	High Susceptibility				Moderate Susceptibility		Low Susceptibility	
	No. of Persons		No. of HH		No. of Persons	No. of HH	No. of Persons	No. of HH
	Male	Female	Male Headed HH	Female Headed HH				

Notes:

- This table should be accomplished for all types of hazards. See **Annex CL-1** and **Table CL-21** for list of hazards.
- The LGU may opt to sex disaggregate data to include moderate and low susceptibility. See **Table CL-16** (Sample Criteria to Define Level of Acceptable Risk) and **Box CL-2** (Parameters for Manageable Risk).

### For informal settlements:

- Overlay the Map of Informal Settlements on a hazard map.
- Calculate the size of the area that fall under various susceptibility levels.
- Calculate the potentially affected population for informal settlements for each hazard event by multiplying the population density of the barangay, and the size of the informal settlement affected. Some LGUs may also have survey information on the actual number of people/households in informal settlements; this may be used in place of the population density by barangay. Results should be shown in table form (see **Table CL-5**) and translated into a map.

Table CL- 5. Potentially Affected Informal Settlements in Hazard Areas

Type of Hazard [Flooding, etc.]								
Barangay	High Susceptibility				Moderate Susceptibility		Low Susceptibility	
	No. of Persons		No. of HH		No. of Persons	No. of HH	No. of Persons	No. of HH
	Male	Female	Male Headed HH	Female Headed HH				

Notes:

- This table should be accomplished for all types of hazards. See **Annex CL-1** and **Table CL-21** for list of hazards.
- The LGU may opt to sex disaggregate data to include moderate and low susceptibility. See **Table CL-16** (Sample Criteria to Define Level of Acceptable Risk and **Box CL-2** (Parameters for Manageable Risk).

**For population and informal settlements within easements:**

(Note: Some LGUs may already have survey information on the actual number of people/ households within easements; this may be used in place of the process below.)

- Determine the easements from water bodies or faults required by law or set by the LGU.
- Determine the Potentially Affected Population
  - Overlay the population density map on the easements.
  - Calculate the size of the area that fall under the easements
  - Calculate the potentially affected population by multiplying the population density of the barangay, and the size of the area within the easement.
- Determine the Potentially Affected Informal Settlements
  - Overlay the Map of Informal Settlements on the easements.
  - Calculate the size of the area that fall under the easements
  - Calculate the potentially affected population by multiplying the population density of the barangay, and the size of the informal settlement within the easement.
- Results should be shown in table form (see **Table CL-6** and **Table CL-7**) and translated into a map.

Table CL- 6. Potentially Affected Population in Easement

Easement (Fault/ River / Coast)					
Barangay	Name of Waterway/Fault/Coastal Area	No. of Persons		No. of Households	
		Male	Female	Male Headed HH	Female Headed HH

Table CL- 7. Potentially Affected Informal Settlements in Easements

Easement (Fault/ River / Coast)					
Barangay	Name of Waterway/Fault/Coastal Area	No. of Persons		No. of Households	
		Male	Female	Male Headed HH	Female Headed HH

### For existing land uses:

- Overlay the Map of Existing Land Uses on a hazard map.
- Calculate the size of the area that fall under various susceptibility levels for the following:
  - Residential Areas
  - Commercial Areas
  - Industrial Areas
  - Agricultural Areas
- Results should be shown in table form (see **Table CL-8**) and translated into a map.

Table CL- 8. Potentially Affected Existing Land Uses in Hazard Areas

Hazard:			
Land Use	High Susceptibility Area (ha)	Moderate Susceptibility Area (ha)	Low Susceptibility Area (ha)
Residential			
Commercial			
Institutional			
Infrastructure/Utilities			
Industrial			
Agricultural			
Tourism Areas			
Others			

Notes:

- This table should be accomplished for all types of hazards. See **Annex CL-1** and **Table CL-21** for list of hazards.

### For built-up areas:

- Overlay the Map of Built-Up Areas on a hazard map. The built up areas may be roughly determined from satellite photos.
- Calculate the size of the Built-Up Area that fall under various susceptibility levels.
- Results should be shown in table form (see **Table CL-9**) and translated into a map.

Table CL- 9. Potentially Affected Built-Up Areas in Hazard Areas

Hazard:			
Barangay	High Susceptibility Area (Built-Up in Ha.)	Moderate Susceptibility Area (Built-Up in Ha.)	Low Susceptibility Area (Built-Up in Ha.)

Notes:

- This table should be accomplished for all types of hazards. See **Annex CL-1** and **Table CL-21** for list of hazards.

### For facilities:

- Overlay the hazard map on the following:
  - Critical Facilities Maps
  - Government Facilities Maps
  - Commerce and Industries Maps
  - Agriculture Maps



- List the facilities falling under various susceptibility levels.
- Results can be shown in table form (see **Table CL-10** and **Table CL-14**) and translated into a map.

**Table CL-10. Potentially Affected Facilities in Hazard Areas: Social Sector**

Hazard (prepare same table for every hazard):						
	High Susceptibility Area		Moderate Susceptibility Area		Low Susceptibility Area	
	Barangay	(List Names)	Barangay	(List Names)	Barangay	(List Names)
Schools						
Day Care Centers						
Hospitals						
Health Centers						
Social Welfare Facility						
Police, Fire and Jail						
Evacuation Centers						
Government Offices						
Waste Facility (Landfill, Dumpsite)						

**Guide Questions for Discussion and Analysis:**

1. What are the hazards that can affect housing and social service facilities?
2. What are the housing and social service facilities that have been affected or could potentially be affected by hazard events?
3. In past hazard events, what was the nature and extent of damage? How long were services disrupted?
4. What conditions contribute to the vulnerability of housing and social service facilities to damage?
5. Due to this damage to the social sector, how were the other sectors affected (economic, infrastructure, etc.)?
6. How can housing and social service facilities be improved to reduce potential negative impacts of hazard events?
7. What are the new housing and social service facilities needed to support adaptation and mitigation strategies?

Table CL-11. Potentially Affected Facilities in Hazard Areas: Economic Sector - Commerce and Industries

Hazard (prepare same table for every hazard):						
	High Susceptibility Area		Moderate Susceptibility Area		Low Susceptibility Area	
	Barangay	(List Names)	Barangay	(List Names)	Barangay	(List Names)
Industries						
Manufacturing						
Retail/ General Merchandise						
Hotels/ Lodging						
Resorts						
Banks						
Gas Stations						

**Guide Questions for Discussion and Analysis:**

1. What are the hazards that can affect commerce and trade, industry, tourism, and agriculture facilities?
2. What are the commerce and trade, industry, tourism, and agriculture facilities that have been affected or could potentially be affected by hazard events?
3. In past hazard events, what was the nature and extent of damage? How long were operations and services disrupted?
4. What conditions contribute to the vulnerability of commerce and trade, industry, tourism, and agriculture to damage?
5. Due to this damage to the economic sector, how were the other sectors affected (social, infrastructure, etc.)?
6. How can commerce and trade, industry, tourism, and agriculture facilities be improved to reduce potential negative impacts of hazard events?
7. What are the new commerce and trade, industry, tourism, and agriculture facilities needed to support adaptation and mitigation strategies?

Table CL-12. Potentially Affected Facilities in Hazard Areas: Economic Sector - Agriculture

Hazard (prepare same table for every hazard):						
	High Susceptibility Area		Moderate Susceptibility Area		Low Susceptibility Area	
	Barangay	Area (ha)	Barangay	Area (ha)	Barangay	Area (ha)
Agriculture						
- Location of Major Crops						
- Location of Aquaculture						
- Location of Mariculture						

**Guide Questions for Discussion and Analysis:**

1. What are the hazards that can affect agriculture facilities?
2. What are the agriculture facilities that have been affected or could potentially be affected by hazard events?
3. In past hazard events, what was the nature and extent of damage? How long were operations and services disrupted?

4. What conditions contribute to the vulnerability of agriculture to damage?
5. Due to this damage to the economic sector, how were the other sectors affected? (social, infrastructure, etc.)
6. How can agriculture facilities be improved to reduce potential negative impacts of hazard events?
7. What are the new agriculture facilities needed to support adaptation and mitigation strategies?

**Table CL-13. Potentially Affected Facilities in Hazard Areas: Infrastructure Sector**

Hazard (prepare same table for every hazard):						
	High Susceptibility Area		Moderate Susceptibility Area		Low Susceptibility Area	
	Location (include affected distance in km, if applicable)	Name of facility	Location (include affected distance in km, if applicable)	Name of facility	Location (include affected distance in km, if applicable)	Name of facility
Roads						
Bridges						
Ancillary Road Facilities						
Land transportation terminals						
Airport						
Seaport						
Water Lines						
Power Lines						
Rail						

**Guide Questions for Discussion and Analysis:**

1. What are the hazards that can affect infrastructure facilities?
2. What are the infrastructure facilities that have been affected or could potentially be affected by hazard events?
3. In past hazard events, what was the nature and extent of damage? How long were operations and services disrupted?
4. What conditions contribute to the vulnerability of infrastructure to damage?
5. Due to this damage to the infrastructure sector, how were the other sectors affected (social, economic, etc.)?
6. How can infrastructure facilities be improved to reduce potential negative impacts of hazard events?
7. What new infrastructure facilities are needed to support adaptation and mitigation strategies?

**Table CL-14. Sample of Sectoral Analytical Matrix**

Infrastructure/Facilities	Level of Susceptibility	Mitigation/ Adaptation Options
Transport Terminal (2)	High susceptibility to typhoon winds	Retrofitting of roof structure
Roads (20 km.)	High susceptibility to flooding	Provision of alternate routes
Bridges (4)	High susceptibility to flooding	Retrofitting of bridge (raising and widening area for waterway; erosion protection)

Infrastructure/Facilities	Level of Susceptibility	Mitigation/ Adaptation Options
Ports	High susceptibility to storm surge	Surge protection
Airport	High susceptibility to typhoon winds and flooding	Flood protection
Water System	High susceptibility to flooding	Provision of emergency water supply system
Power System	High susceptibility to typhoon winds	Underground cabling
Evacuation Centers	High susceptibility to typhoon winds and flooding	Building of new evacuation centers in lower risk areas
Hospitals (3)	High susceptibility to typhoon winds and flooding	Retrofitting
Government Offices (15)	High susceptibility to typhoon winds and flooding	Retrofitting; building of new buildings in lower risk areas
Schools (20)	High susceptibility to typhoon winds and flooding	Retrofitting; building of new schools in lower risk areas
Health & Day Care Centers (10)	High susceptibility to typhoon winds and flooding	Retrofitting
Police Station (1)	High susceptibility to typhoon winds and flooding	Retrofitting
Fire Station (1)	High susceptibility to typhoon winds and flooding	Retrofitting
City Jail (1)	High susceptibility to typhoon winds and flooding	Retrofitting

**2.3. Examine the characteristics of the exposed elements to determine the possible impact.** One way to do this is to look at vulnerability and capacity. Vulnerability is defined as the characteristics of a community, system, or asset that make it susceptible to the damaging effects of a hazard, while capacity is the combination of strengths, attributes and resources that can be used to reduce adverse impacts, moderate harm, or exploit beneficial opportunities. In general higher vulnerability can lead to a higher degree of damage while higher adaptive capacity can lead to a lower degree of damage.

Look at the areas with moderate to high susceptibility to hazards, and ask the following questions:

- How have these areas been affected by past disasters? How many people were affected and displaced and what was the cost of damage? (past impacts can indicate the level of vulnerability)
- What is the socio-economic condition of the potentially affected population? Are there informal settlements?
- What are the physical characteristics of development? How dense are the settlements? What is the quality of the building stock and infrastructure?
- What are the urban growth patterns? How did these areas develop and how might they develop in the future?

- Have mechanisms for early warning and evacuation been established? Are there areas or facilities where people can safely evacuate?
- What is the emergency response capacity of the community?
- Do people have the capacity to relocate or retrofit their properties to reduce damage?

Based on the answers to the above questions, identify the areas which may suffer the most damage for particular hazard events. In the Philippine context these are usually settlements along river and coastal settlements, (for flooding and liquefaction), settlements in moderate to steeply sloping areas (for landslides), and settlements with dense, low quality concrete building stock (for earthquakes).

### STEP 3. Estimate the degree of risk per area (risk estimation)

The level of risk is based on the exposure (level of susceptibility/proneness), vulnerability/capacity, and likelihood of the hazard occurring.

For the purpose of land use planning and zoning regulation, it is important to define the **level of acceptable risk**. This is the level of potential losses that a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions. In engineering terms, acceptable risk is also used to assess and define the structural and non-structural measures that are needed in order to reduce possible harm to people, property, services and systems to a chosen tolerated level, according to codes or "accepted practice" which are based on known probabilities of hazards and other factors (UNISDR). To define the level of acceptable risk, the LGU may need to consult technical specialists and hold discussions with communities to be affected. The following shows sample general criteria for risk level:

Table CL-15. Sample Criteria to Define Level of Acceptable Risk

Risk Level	Criteria
High Risk	<b>Unacceptable risk</b> –high severity of impact; may result in loss of life and total property damage; mitigation measures may be beyond capacity to implement
Moderate Risk	<b>Manageable risk</b> –low to high severity of impact; may result in injury, displacement and partial property damage; mitigation measures are within capacity to implement
Low Risk	<b>Low to moderate severity of impact</b> ; may result in minor inconvenience and property damage; mitigation measures are within capacity to implement

Note:

- Refer to Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risks in the Comprehensive Land Use Plan for a more detailed Risk Estimation process. (Step 6, Task 5).
- Detailed criteria for the appropriate zones and regulations for various risk levels are in Volume 1: Step 8 (Annex 8-3) and Volume 5: Annex 3.

Based on the levels of risk, prepare risk maps per hazard indicating the extent and levels of risk (e.g. high, moderate, low). Overlay risk maps of various hazards to create a composite risk map.



#### Box Cl-2. Parameters for Manageable Risk

Level of acceptable/ manageable risk - generally defined as the level of "tolerable" risk - meaning the risk that the community or local government is able and willing to accept. This is a policy decision to be made based on the hazard/ risk assessment as well as social, economic and political factors.

The following can be used as criteria for determining the level of acceptable risk:

Based on the hazard/ risk assessment:

1. Level of susceptibility (as defined in hazard maps)
2. Hazard characteristics (extent, magnitude, frequency, etc.)
3. Vulnerability of exposed areas/ population (socio economic conditions)
4. Expected level of damage (can be expressed as % average annual damage or worst-case scenario)

Other factors:

1. Capacity of government to fund protection/ mitigation measures
2. Capacity of community to adapt
3. Evacuation and warning systems
4. Community views and preferences

## STEP 4. Conduct a climate change vulnerability assessment

Vulnerability assessment involves examining the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change. It looks at how the people, built environment, and natural environment are affected (sensitivity) and how these are able to adjust to the impacts (adaptive capacity). The climate change vulnerability assessment should ideally be done in parallel with the hazard characterization and risk analysis since climate change also affects the frequency and intensity of meteorological hazard events. The method used here is adapted from UN-Habitat's Participatory Vulnerability and Adaptation Assessment (2010). The steps below detail the initial steps of vulnerability assessment which is obtaining climate change projections, validating them, and determining the biophysical effects and potential urban-planning related consequences.

**4.1. Obtain climate change projections for your area.** The objective of this step is to obtain climate change projections applicable to the local setting, and to assess how these projected climate changes can contribute to or exacerbate potential hazard events identified in Step 1.

Climate change projections for the Philippines can be sourced from PAGASA and is available in the published report, "Climate Change in the Philippines" ([http://kidlat.pagasa.dost.gov.ph/cab/climate\\_change/Climate%20change%20in%20the%20Philippines%20-%20August%2025%202011.pdf](http://kidlat.pagasa.dost.gov.ph/cab/climate_change/Climate%20change%20in%20the%20Philippines%20-%20August%2025%202011.pdf)). The report provides projections at the regional and provincial level under the low-, mid-, and high-range emission scenarios<sup>2</sup> for the following: seasonal temperature increase; seasonal rainfall change; and frequency of extreme events by 2020 and 2050.

For sea level rise, the NOAA Laboratory for Satellite Altimetry provides estimates of sea level rise trends based on measurements from satellite radar altimeters at [http://ibis.grdl.noaa.gov/SAT/SeaLevelRise/LSA\\_SLR\\_maps.php](http://ibis.grdl.noaa.gov/SAT/SeaLevelRise/LSA_SLR_maps.php). For more detailed assessments of the vulnerability of coastal areas, refer to the section on Coastal Planning.

Regional or provincial climate projections may be used as reference for the local climate scenario. It is, however, critical to validate the regional/provincial assumptions/projections with city data (such as local meteorological data, observations, and previous events) to assess whether the larger projections hold true in the local setting.

**4.2 Facilitate validation of the available projections to establish its relation to actual local observations (recorded or not).** The validation could be done by conducting focus group discussions (FGDs) with communities, key informant interviews with local technical experts, or general stakeholder workshops. These FGDs/ interviews/ workshops should be designed

<sup>2</sup>Emission scenarios are assumptions made about future greenhouse gas emissions based on future technological and economic development.



to collect information on people's actual experiences and the possible indigenous methods of observing and recording changes in temperature, rainfall, sea level, typhoon intensity/frequency. An initial orientation of "what is climate change" may be needed to provide respondents with enough background to engage in the discussion. See **Annex CL-3** Community Focus Group Discussion Guide for Climate Change Validation.

**4.3. Assess how climate change can change or exacerbate potential hazard events.** Based on the climate change projections, community validation activity/consultations, and the results of the hazard characterization study, assess the potential biophysical effects<sup>3</sup> of climate change on the city/municipality. A template is provided in **Table CL-16**. Climate Indicators and Relative Risks/Effects.

The findings on the climate change scenario and potential biophysical effects can be summarized according to the following:

- Describe the current climate hazards (events and conditions) affecting the target area. These could be floods, droughts, changing rainfall patterns, cyclones, etc.
- Describe any evidence of climate change that is already being observed based on scientific data and/or community observations (note that wherever possible community observations should be validated by scientific information).
- Describe how climate conditions may change in the future based on climate change scenarios. This could include changing temperatures, changes to the rainy season, etc.
- Describe how the frequency and intensity of climate events may change in future based on climate change scenarios. For example, are droughts likely to occur more frequently? Will floods become more extensive?



#### Case Example: Climate Change Impact on Flooding

The effect of climate change can be captured by factoring in climate change projections when modeling the impact of hazard events. One example is the flood models done for the project, Master Plan for Flood Management in Metro Manila and Surrounding Areas (CTI Engineering International Co. in association with Woodfields Consultants, Inc., 2012). The simulated results indicate the impacts of climate change in 2050 as the following:

- Maximum water level under the 2009 precipitation pattern expected to increase with an increment of 12-18 cm (15 cm in the most likely scenario of climate change)
- Peak runoff discharge expected to increase with an increment of 10-15% (12% in the most likely scenario of climate change)
- Flooding area would increase 6-25% depending on areas (7-21% in the most likely scenario of climate change)
- Sediment yield would increase with 10-19% in the study area (14% in the most likely scenario of climate change)

<sup>3</sup>Biophysical effects are the climatic-induced conditions that may trigger disaster events or alterations in local activities i.e. drought, flooding, landslides, strong cyclones, etc.

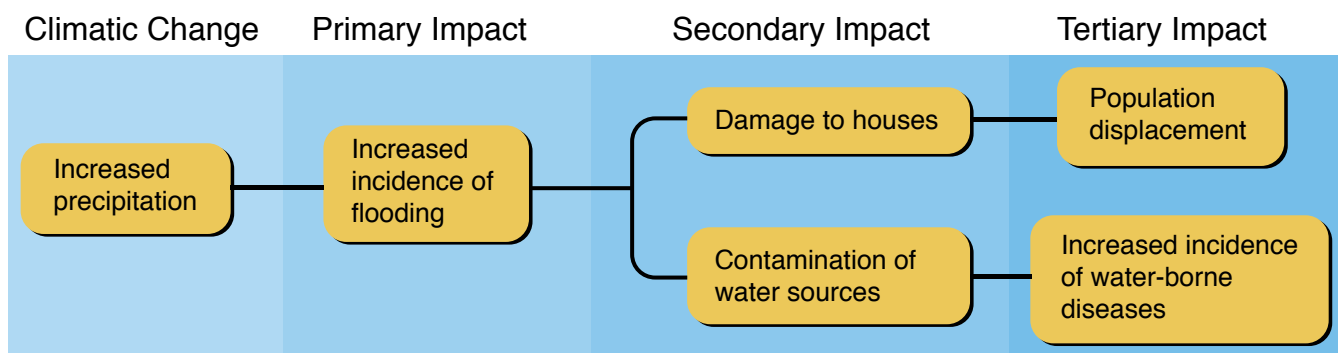
Table CL-16. Climate Indicators and Relative Risks/Effects

1	2	3
Climate Indicator (Current and future exposure scenario)	Relative Risks/Effects (List in this column biophysical effects relative to the climate change exposure indicator in Column 1. The biophysical effects are mainly the climatic-induced conditions that may trigger disaster events or alterations in local events i.e. drought, flooding, landslide, strong cyclones, etc.)	References or Sources (List down here and in each cell below the sources/reference of the answers listed in Column 1 and 2 of every row)
<b>Temperature</b>		
a. Establish the long-term trend (observations of 30 years – ideally indicating seasonal variations and extremes) from the secondary data and FGDs/ key interviews. b. What is the present average temperature?	(List/characterize here effects of historic temperature variations as well as the positive and negative effects of the present temperature levels)	
c. What is the projected change in mean temperature and extremes? –2020: –2050:	(Given the projected change in the left cell, what risks could it further bring relative to the past and current accounts (refer to above cell))	
<b>Rainfall</b>		
Long term trends (observations of 30 years – ideally indicating seasonal variations and extremes) Present average annual rainfall Present seasonal variations and extremes	(List/characterize here effects of historical rainfall variations as well as the positive and negative effects of the present rainfall volume)	
Projected change in rainfall –2020: –2050:	(Given the projected change in the left cell, what risks could it further bring relative to the past and current accounts (refer to above cell))	
<b>Tropical cyclone</b>		
Present historical data (no. of tropical cyclones per year/ averages per decade). Present trends in strength of cyclones.	(List the risks/hazards which were triggered by previous typhoons/cyclone)	

(Source: UN-Habitat, Participatory Vulnerability and Adaptation Assessment, 2010)

4.4. **Assess the impact of climatic changes.** This can be done per area or per sector. Primary, secondary, and tertiary impacts may be identified per climatic change. The figure below illustrates a sample impact chain. This can be summarized in a table.

Figure CL-3. Sample Simplified Impact Chain Analysis for Urban Areas



**Table CL-17** shows a list of possible urban-planning related impacts per climatic change. Check if any of these apply to your area or if there are other impacts not shown. A review of past disaster records and community-level mapping and consultation is important to obtain evidence of impacts.

The assessment of impacts can be done together with the validation workshop cited in Step 4.2. People can be asked to draw/mark on their community base maps areas affected by hazard events such as flooding and storm surge. This activity can be done in conjunction with the Community Mapping/Assessment of Hazards in **Annex CL-2**.

4.5. **Assess adaptive capacity.** Determine how well the city/municipality is able to respond to the identified climate change drivers and their impacts. This may be done per area or per sector and may be done in tandem with the capacity assessment in response to disaster risks. During community workshops people can be asked about their adaptation/ coping strategies, such as how they have responded to weather phenomena and sea level rise, providing an initial assessment on autonomous coping strategies.

4.6. **Based on the previous steps, identify the climate change “hotspots” and vulnerable sectors.** These are areas and sectors which face multiple risks and severe impacts and have low adaptive capacity. Further studies may be done for these identified highly sensitive areas and sectors.



#### Further References:

- Supplemental Guidelines for Mainstreaming Climate Change and Disaster Risks in the Comprehensive Land Use Plan (Vulnerability Assessment is incorporated in the Climate Change Risk Assessment Process)
- Participatory Climate Change Assessments: A Toolkit Based on the Experience of Sorsogon City, Philippines [http://www.unhabitat.org/downloads/docs/11465\\_1\\_594562.pdf](http://www.unhabitat.org/downloads/docs/11465_1_594562.pdf)
- Sorsogon City Climate Change Vulnerability Assessment (sample study) [http://www.unhabitat.org/downloads/docs/10377\\_1\\_594134.pdf](http://www.unhabitat.org/downloads/docs/10377_1_594134.pdf)

Table CL-17. Climatic Changes and Potential Impacts on Cities

Climatic Change	Impacts	Potential Urban-Planning Related Consequences
Increased temperatures	<ul style="list-style-type: none"> <li>• Groundwater depletion</li> <li>• Water shortages</li> <li>• Drought</li> </ul>	<ul style="list-style-type: none"> <li>• Water shortages</li> <li>• Distress migration to cities/towns due to droughts in rural areas</li> <li>• Interruption of food supply networks and higher food prices</li> <li>• Potential energy price increases (e.g. from reduced hydro-electricity generation in places where it exists)</li> <li>• Exaggerated urban heat island effects</li> <li>• Increased energy demands for cooling</li> <li>• Population health impacts (e.g. increased mortality during heat waves, decreased access to food/nutrition)</li> </ul>
Increased Precipitation	<ul style="list-style-type: none"> <li>• Increased flooding</li> <li>• Increased risk of landslides or mudslides on hazard slopes</li> </ul>	<ul style="list-style-type: none"> <li>• Interruption of food supply networks</li> <li>• Property damage (homes and businesses)</li> <li>• Disruption of livelihoods and city/town economies</li> <li>• Damage to infrastructure not designed to standards of occurrences being experienced</li> <li>• Distress migration to cities due to floods in rural areas</li> <li>• Displacement and population movement from informal settlements built on steep slope hazard lands, etc.</li> <li>• More favorable breeding grounds for pathogens (e.g. mosquitoes and malaria)</li> <li>• Population health impacts (increased incidences of water-borne diseases like cholera)</li> </ul>
Sea-level rise	<ul style="list-style-type: none"> <li>• Coastal flooding</li> </ul>	<ul style="list-style-type: none"> <li>• Displacement and population movement from coastal flood areas</li> <li>• Property damage (homes and businesses)</li> <li>• Damage to infrastructure not designed to standards of occurrences being experienced</li> </ul>

Climatic Change	Impacts	Potential Urban-Planning Related Consequences
Sea-level rise (cont'd)	<ul style="list-style-type: none"> <li>Coastal flooding</li> </ul>	Disruption of livelihoods and city/town economies
Increased extreme weather episodes (storms, cyclones, hurricanes)	<ul style="list-style-type: none"> <li>More intense flooding</li> <li>Higher risk of landslides/mudslides on hazard slopes</li> </ul>	<ul style="list-style-type: none"> <li>Property damage (homes and businesses)</li> <li>Damage to infrastructure not designed to standards of occurrences being experienced</li> <li>Population health impacts (injuries, increased mortality, distress)</li> <li>Disruption of livelihoods and city/town economies</li> <li>Interruption of food supply networks</li> </ul>

(Source: UN Habitat, Participatory Vulnerability and Adaptation Assessment, 2010)

## STEP 5. Assess high risk areas and vulnerable sectors

A deeper assessment of sectors/areas which are most at risk or most vulnerable (also termed as climate change “hotspots”) can inform the detailing of the land use plan and zoning regulations and identification of strategic projects.

This is particularly important for areas with conflicting uses (e.g. existing settlements in flood-prone areas) where relocation or mitigation strategies may be necessary. Community- or barangay-level assessments can provide a deeper level of analysis and sufficient context for detailed planning. Activities at this stage can involve further validation of the effects of climate change and hazard events; characterization of local socio-economic and physical conditions that contribute to vulnerability; determination of local capacity for response and adaptation; and identification of possible actions for reducing risk. Aside from focusing on specific areas, vulnerable sectors that directly connect to land use (e.g. water management) can also be assessed in more detail.

**Annex CL-2.** Tools for Community-Based Hazard Assessment provides some tools for community-level studies.



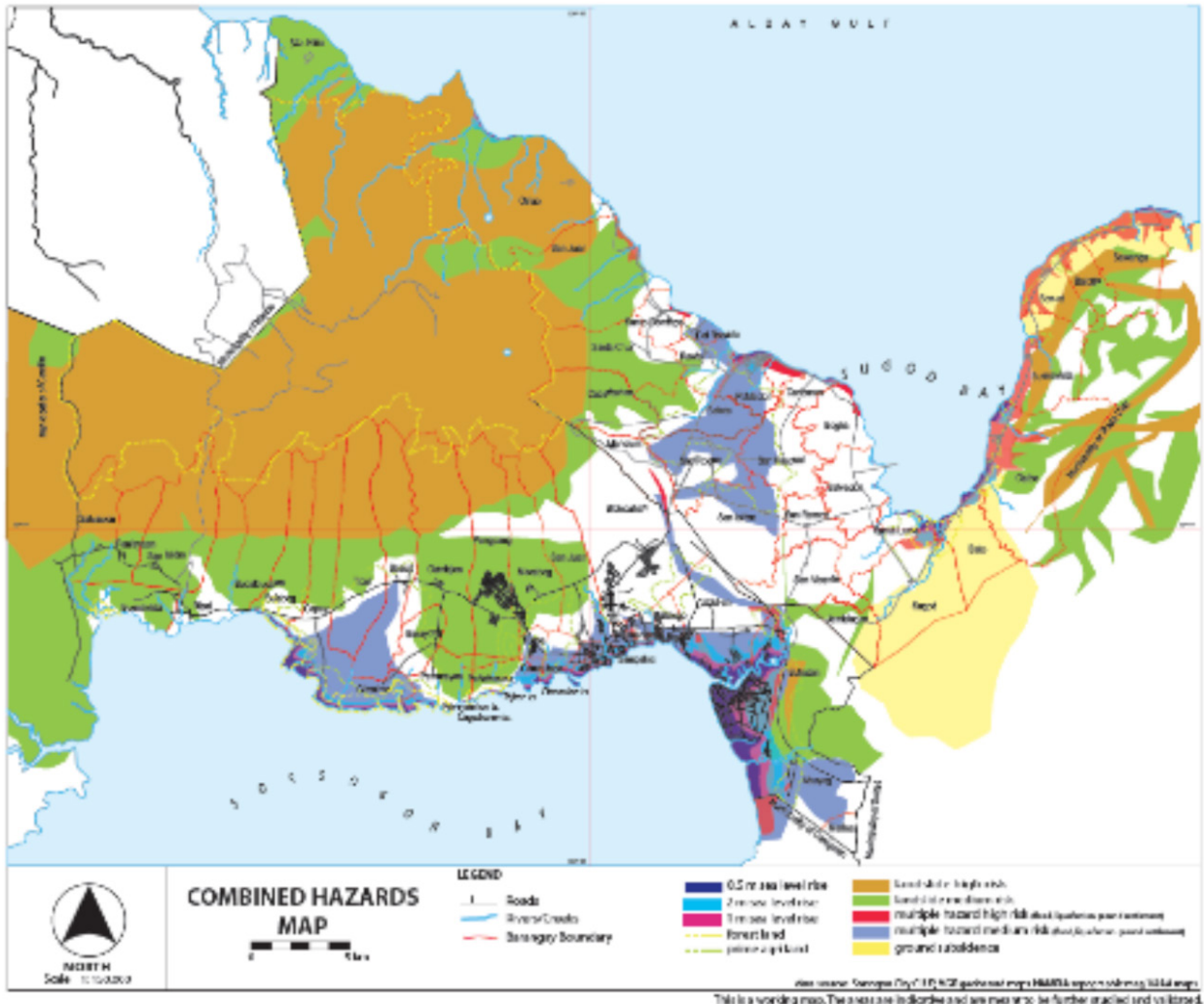
Refer to “Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the Comprehensive Land Use Plan 2014”. This guideline provides a thorough procedure on the conduct of Climate Change Vulnerability Assessment and Climate and Disaster Risk Assessment, as well as, the process of evaluating the risks and vulnerabilities of a locality. A template table for the assessment is also included in this volume.

## STEP 6. Summarize the development challenges/issues for land use planning and zoning

Based on the results of the previous steps identify the possible development issues and concerns.

**6.1. Create composite risk maps of various hazards (or composite hazard maps where risk maps have not been done).** Hazards with widespread coverage (such as groundshaking) may be omitted. Outline the areas where risk or susceptibility levels are similar. See **Annex CL-4** for the Multi-hazards Mapping.

Figure CL–4. Sample Composite Hazards Map (Flooding, Liquefaction, Landslide, Sea Level Rise) (Sorsogon)



6.2. **Summarize findings in Step 5.** Table CL-18 shows an example. This matrix may be refined depending on the level of detail of the hazard profiling, risk assessment, and climate change vulnerability assessment. The Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risks in the Comprehensive Land Use Plan provides more detailed process and analysis for conducting this step.

Table CL–18. Ecosystem and Inter-sectoral Analytical Matrix

Areas	Characteristics	Problems/ Hazards	Cross sectoral Impacts and Population Affected (Sex Disaggregated)	Policy Options
Upland – Forest and Forestland	Forestland constitutes 20,000 ha or 20% of the total land area of the city. Terrain steep to moderately rolling. Predominantly forest with scattered agricultural and settlement areas. Potential for promotion of eco-tourism activities such as hiking, mountain biking.	About 10,000 ha susceptible to rain - induced landslides; 30% susceptible to soil erosion due to deforestation from illegal logging and timber poaching; encroachment of settlements on forestland; conversion of 400 ha into pineapple plantations;  Population affected (sex disaggregated)	<ul style="list-style-type: none"> <li>• Social: 10 killed, 100 families displaced due to landslides</li> <li>• Economic: Decline of soil productivity due to soil erosion</li> <li>• Infrastructure: Clogging of drainage system downstream due to erosion</li> <li>• Environment: Severely eroded upland soils; more surface water runoff; siltation; increased incidence of flooding downstream</li> <li>• Land Management: Need to prevent/ manage further encroachment of settlements and agriculture into forestland</li> </ul>	Conservation with limited recreation; co-management of forestland



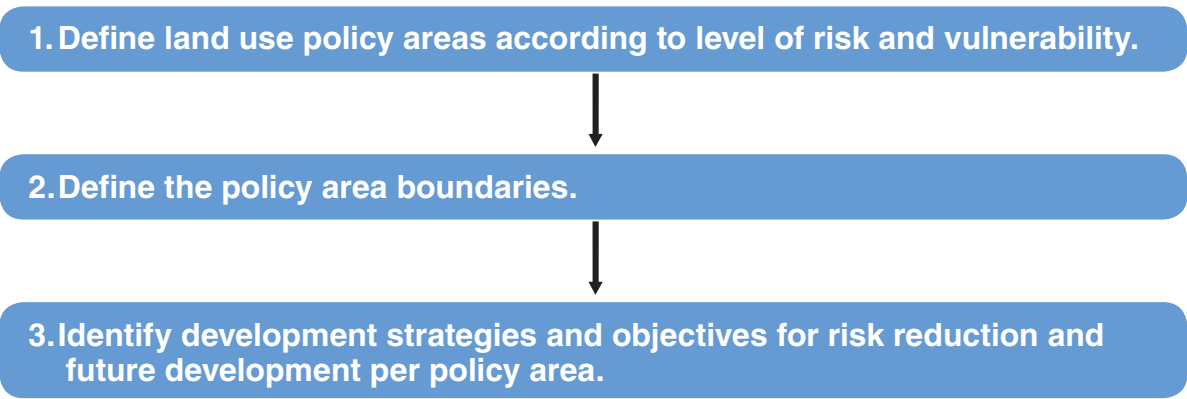
Areas	Characteristics	Problems/ Hazards	Cross sectoral Impacts and Population Affected (Sex Disaggregated)	Policy Options
Lowland – Rural	Lowland rural barangays constitute 40,000 ha or 40% of total land area of the city. Terrain moderately rolling to flat. Predominantly agricultural with scattered settlements. Potential for improvement of agricultural production; some areas may be suitable for urban expansion.	About 20,000 ha moderately susceptible to floods; conversion of agricultural land into residential subdivisions and golf courses; susceptibility of coconuts and fruit trees to strong winds from typhoons; susceptibility to drought (high expected level of decrease in rainfall due to El Nino);  Population affected (sex disaggregated)	<ul style="list-style-type: none"> <li>• Social: 500 farming families affected by flooding and strong winds; 300 families affected by dry spells</li> <li>• Economic: 5,000 ha of cropland affected by flooding; 3,000 hectares of coconuts affected by strong winds; 1,000 hectares of rice and corn affected by dry spells ; transport of produce affected</li> <li>• Infrastructure: Irrigation damaged by flooding; damaged roads and bridges cut off routes connecting to downtown</li> <li>• Environment: River siltation due to increasing agriculture use and settlements</li> <li>• Land Management: Need to balance need for agricultural productivity and land for urban expansion</li> </ul>	Agricultural diversification; controlled urban expansion
Lowland Urban	Lowland urban barangays constitute 10,000 ha or 10% of the total land area of the city. Terrain gently sloping to flat. Densely populated; location of major commercial establishments, schools, and government buildings.	About 5,000 ha highly susceptible to floods; inadequate drainage system (only 20 percent covered); residential subdivisions' drainage system not connected to public drainage system; natural waterways filled by new developments; dumping of garbage into rivers;  Population affected (sex disaggregated)	<ul style="list-style-type: none"> <li>• Social: 3,000 households living on riverbanks and riverbeds affected by flash floods</li> <li>• Economic: P100M damage to flooded properties</li> <li>• Infrastructure: Two bridges damaged by flash floods</li> <li>• Environment: Waterways constricted by settlements and solid waste</li> <li>• Land Management: Need to manage flood risk to settlements along riverbanks and floodplains; encourage densification and investments in lower risk areas</li> </ul>	Densification in areas with lower risk to floods; controlled growth in floodplain
Coastal – Rural	Rural barangays with coastal areas constitute 15,000 ha or 15% of the city area. Terrain gently sloping to flat; mainly agricultural areas with scattered settlements, fishponds, and	About 15,000 ha highly susceptible to storm surge and tsunami; receding coastline due to coastal erosion and sea level rise in some areas; conversion of forest to fishponds;	<ul style="list-style-type: none"> <li>• Social: 50 fishing families affected by storm surge</li> <li>• Economic: P100M damage to flooded fishponds</li> <li>• Infrastructure: Erosion along coastal road</li> </ul>	Protection of mangrove forests; controlled agriculture expansion
Coastal – Urban	Urban barangays with coastal areas constitute 15,000 ha or 15% of the city area. Terrain gently sloping to flat; low-lying areas along bay; peninsula surrounded by water. Mostly built -up with low to medium rise buildings; contains residential, commercial, and institutional areas.	Flooding, typhoon (storm surge, strong winds and heavy rain), earthquake (ground shaking, liquefaction), landslides, ground settlement, tsunami, sea level rise (flooding, salt water intrusion), red tide;  Population affected (sex disaggregated)	<ul style="list-style-type: none"> <li>• Social: 3,000 informal settlements living on coastal areas affected by storm surge</li> <li>• Economic: P100M damage to flooded properties and commercial areas; 10% reduction in jobs generated by local businesses</li> <li>• Infrastructure: 36 government buildings, 18 schools, public market, port and airport damaged by</li> </ul>	Redevelopment/ revitalization



Areas	Characteristics	Problems/ Hazards	Cross sectoral Impacts and Population Affected (Sex Disaggregated)	Policy Options
Coastal – Urban (cont'd)			<p>strong winds and storm surge; airport and port operations halted temporarily due to damage</p> <ul style="list-style-type: none"> <li>• Environment: Bay pollution due to coastal settlements and debris from flooding and storm surge</li> <li>• Land Management: Need to manage risk to the downtown, coastal residential areas, port and airport area; need to maximize potential while regulating growth</li> </ul>	

## IV. Defining Policy Options for Climate Change Adaptation and Disaster Risk Reduction in the CLUP/Zoning Ordinance

### Overview Of Steps



### STEP 1. Define land use policy areas according to level of risk and vulnerability

This step is a key input to the formulation of the structure plan and general land use plan. A policy area is defined for the purpose of this exercise as a contiguous area with a similar level of risk (or hazard susceptibility if risk analysis is not available), topography, and dominant land use. It considers not only the hazards affecting the area but also the physical and socio-economic characteristics of that area.

Prior to the definition of policy areas, prepare the following as reference:

- Composite Hazard Map or Composite Risk Map (overlay of all hazard maps or all risk maps)
- Development Constraints Map (this can include other areas not suitable for development aside from hazard-prone areas)
- Slope Map
- Existing Land Use Map
- Barangay Socio-Economic Profiles (including Climate Change Vulnerability Assessments if available)

## STEP 2. Define the policy area boundaries

The policy area boundaries is defined according to the similarities in the risk or hazard profile as well as topography, existing land use, physical and socio-economic conditions. Policy area boundaries could also be based on barangay boundaries, with each barangay's designation based on its dominant risk/hazard profile and physical/socio-economic conditions. Policy area boundaries are meant to be indicative and should not be construed to mean the boundaries for the subsequent zoning to follow.

Figure CL–5. Sample Policy Areas Map (Sorsogon)

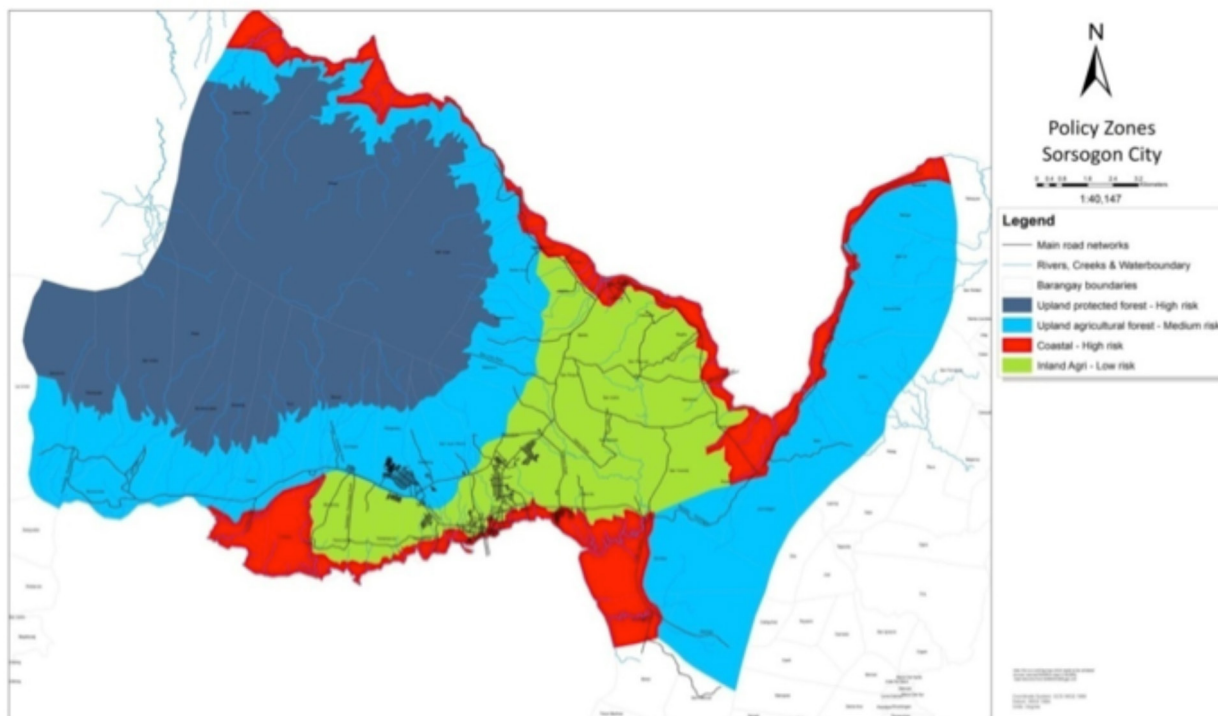


Figure CL-5 shows the general policy areas for Sorsogon City (based on the hazard and risk assessment and situational analysis) to serve as a guide for the revision of the land use plan. The four policy areas are described as: 1) Upland protected forest - high risk, 2) Upland agricultural forest - medium risk, 3) Coastal - high risk, 4) Inland agri - low risk.

## STEP 3. Identify development strategies and objectives for risk reduction and future development per policy area

Table CL-20 provides examples of developments strategies and objectives for the policy areas. Consider the interactions between upstream and downstream activities. Classify policy areas under general categories such as Protection, Buffer, or Multiple Use/Production/Settlement areas (See Volume 1–Step 7 for definitions).

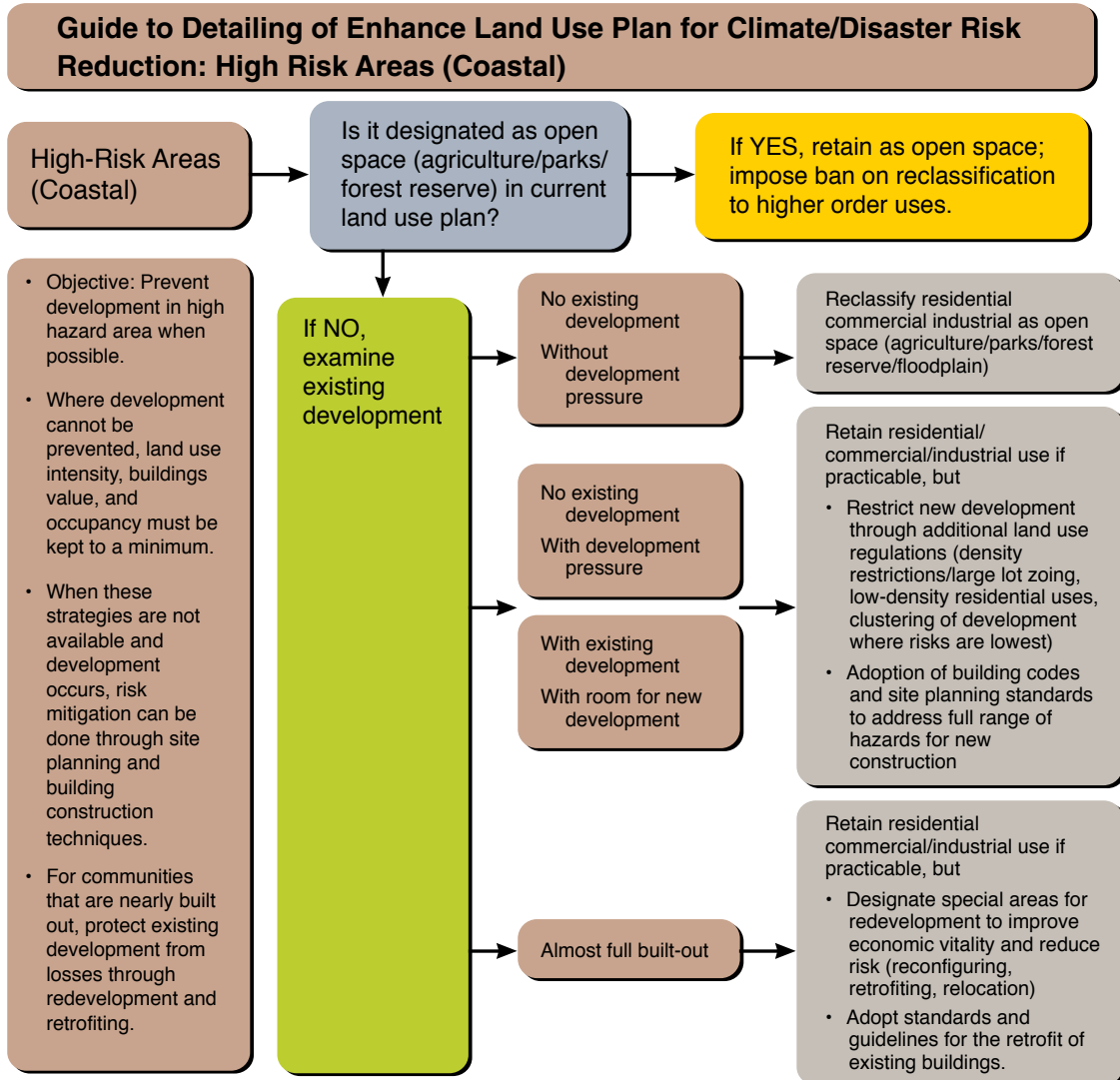
Construct a guide for designating land uses in high risk areas within policy areas. A sample for coastal areas is shown in Figure CL-6.

Table CL–19. Examples of Policy Areas with Development Strategy and Risk Reduction/Development Objectives

Policy Area	Characteristics	Development Strategy	Risk Reduction/Development Objectives
<b>Protection</b>			
River Floodway – Agricultural	High water level and velocity of floods; currently open space	Open Space/ Recreation	Prevent future development/develop into open space/recreational area
River Floodway – Urban	High water level and velocity of floods; currently occupied by informal settlers and private property owners	Disaster Risk Mitigation	Ensure safety of existing settlements by mitigation, warning and evacuation systems and relocation programs. No future development to be allowed.

Policy Area	Characteristics	Development Strategy	Risk Reduction/Development Objectives
Beach	Prone to permanent inundation from projected coastal erosion and sea level rise; currently open space	Open Space/ Recreation	Prevent future development/develop into recreational/ tourist area.
Upland-Protected Forest	High susceptibility to landslides, currently protected forest	Conservation	Prevent future development/limit access
<b>Buffer</b>			
Upland –Agri-Forest	Mountain foothills, low-moderate susceptibility to landslides, currently a mix of agricultural and forest use with scattered settlements	Limited Agricultural Development	Ensure safety of existing and future settlements as well as protection of adjacent forests through limiting density and use.
<b>Production/Settlement (Limited Use)</b>			
River Floodplain	Susceptible to 100-year floods; currently built up with informal settlements, residential subdivisions, commercial areas	Low-Density Urban Development and Disaster Risk Adaptation	Ensure safety of existing and future settlements through limiting density and use and establishing site and building construction requirements.
<b>Production/Settlement (Multiple Use)</b>			
Lowland –Agricultural	Low susceptibility to hazards; currently agriculture areas with some settlements	Agricultural Optimization and Planned Urban Expansion	Optimize agriculture by preserving prime agricultural land; controlled settlement expansion may be allowed under certain conditions
Lowland –Urban	Low susceptibility to hazards; currently built up urban area	Infill development	Increase density through infill development

Figure CL–6. Sample Guide to Detailing of Land Use in High Risk Coastal Areas



# Annex CL-1. Detailed Hazard Information

Type of Hazard	Information Needed	Data Types/ Assessment Methods	Sources
<b>Hydrometeorological Hazards</b>			
<b>Floods</b> <ul style="list-style-type: none"> <li>River, lakes, swamps and marshes</li> <li>Overflow or breach from man-made impoundments (e.g., Small Water Impoundment Projects; dams and reservoirs)</li> <li>Coastal (tidal)</li> <li>Inundation of low-lying areas (ponding)</li> <li>Urban floods (major cities)</li> <li>Flashflood</li> <li>Debris Flow</li> </ul>	<b>Minimum Information</b> <ul style="list-style-type: none"> <li>Extent and location of flooded or flood-prone area</li> <li>Velocity and depth of flood</li> <li>Rainfall volume and intensities</li> <li>Warning period</li> <li>High-tide and low-tide height and schedule</li> <li>In coastal areas: tidal ranges, height, schedule</li> <li>Patterns of on-shore winds</li> <li>Flashflood exit points</li> <li>Potential debris flow impact/ deposition area</li> </ul>	<ul style="list-style-type: none"> <li>Susceptibility maps: susceptibility classification (low, moderate, high and very high) based on flood height and duration</li> <li>Historical records of frequency, location, characteristics, and impact of past flooding events</li> <li>Meteorological data: rainfall records and monitoring (e.g. rain gauges)</li> <li>Long-term and seasonal weather forecasts; climate change models</li> <li>Topographic mapping and height contouring around coastlines, river systems, and catchment areas; geomorphological mapping;</li> <li>Natural resources and land use mapping</li> <li>River morphology</li> <li>Flood frequency analysis (historical)</li> <li>In coastal areas: tidal and sea-level records, meteorological data on windspeeds and directions</li> </ul>	<ul style="list-style-type: none"> <li>MGB (1:50,000 digitized maps; 1:10,000 maps raw files partly available)</li> <li>MGB, PAGASA, OCD/ NDRRMC, Media Reports, Community assessments</li> <li>PAGASA</li> <li>NAMRIA, DENR-RBCO, MGB</li> <li>LGU</li> <li>MGB, PAGASA, NIA, NAPOCOR, Academe/Research Institutions</li> <li>LGU, PAGASA, PPA, Academe</li> </ul>
	<b>Special Studies</b> <ul style="list-style-type: none"> <li>Duration of flood</li> <li>Direction and velocity of water flow</li> <li>Rate of rise in water level and discharge</li> <li>Amount of mud deposited or held in suspension</li> <li>Frequency and timing of flood occurrence (including seasonality)</li> <li>Natural or man-made obstructions to flows and flood control structures</li> <li>Biological and chemical content</li> </ul>	<ul style="list-style-type: none"> <li>Flood flow and velocity</li> <li>Sequential flooding / inundation stages mapping</li> <li>Estimates of capacity of hydrology system and catchment area</li> <li>Rainfall infiltration and properties of soil</li> <li>Flood frequency analysis / return period (model)</li> <li>Flood risk modeling</li> <li>Hydrological data on flows, magnitude (including flood peak discharges) and frequency of floods: Historical</li> <li>Hydrological estimates of future flood discharges, flows: Projected</li> </ul>	<ul style="list-style-type: none"> <li>Academe/research institutions, PAGASA, MGB-DENR, NIA, NAPOCOR, BSWM-DA</li> </ul>
<b>Tropical Cyclone</b> <ul style="list-style-type: none"> <li>Depression</li> <li>Storm</li> <li>Typhoons</li> </ul>	<ul style="list-style-type: none"> <li>Tropical Cyclone name; period, begin and end date; and duration</li> <li>Frequency of occurrence (including seasonality) and directional patterns</li> <li>Location and extent of areas (50 and 100 kilometers from boundaries per province)</li> <li>Rainfall amount and duration</li> <li>Wind direction and speed</li> <li>Velocity and tracks of tropical cyclone</li> <li>Mean sea level pressure conditions</li> <li>Warning period</li> <li>Return period of rainfall</li> </ul>	<ul style="list-style-type: none"> <li>Historical data from PAGASA Synoptic Stations</li> <li>Impact of past events on the project area and neighboring areas (or countries) facing similar conditions</li> <li>Long-term and seasonal weather forecasts</li> <li>Climate change projections</li> <li>Topography and geomorphology of affected land areas (where there is risk of flooding from heavy rainfall or sea surges; see also flood data)</li> </ul>	<ul style="list-style-type: none"> <li>PAGASA, International research and development institutions</li> <li>OCD/NDRRMC</li> <li>PAGASA</li> <li>NAMRIA, MGB, Academe</li> </ul>
	<b>Special Studies</b> <ul style="list-style-type: none"> <li>Extreme wind speed and direction</li> </ul>	<ul style="list-style-type: none"> <li>Extreme wind flow hazard map</li> </ul>	<ul style="list-style-type: none"> <li>PAGASA</li> </ul>
<b>Storm-Surge</b>	<ul style="list-style-type: none"> <li>Tropical Cyclone wind direction and speed</li> <li>Tropical cyclone sea level pressure conditions (during event)</li> <li>Coastal topography and geomorphology</li> <li>In coastal areas: tidal ranges and patterns of on-shore winds; height of sea surges induced by cyclones</li> <li>Return period of rainfall</li> </ul>	<ul style="list-style-type: none"> <li>Data from PAGASA Synoptic Stations</li> <li>Topographic map</li> <li>Susceptibility maps: susceptibility classification (low, moderate, high and very high) based on flood height and duration</li> <li>Settlements map</li> <li>Satellite images (e.g. google earth)</li> <li>Satellite images (e.g., aerial photos)</li> </ul>	<ul style="list-style-type: none"> <li>PAGASA</li> <li>NAMRIA</li> <li>MGB</li> <li>LGU</li> <li>Internet</li> <li>NAMRIA</li> </ul>
	<ul style="list-style-type: none"> <li>Storm surge Modelling</li> </ul>	<ul style="list-style-type: none"> <li>Storm Surge Map: time series, bathymetry, inundation model; date, time and peak height;</li> </ul>	<ul style="list-style-type: none"> <li>DOST</li> <li>Academe</li> </ul>

Type of Hazard	Information Needed	Data Types/ Assessment Methods	Sources
<b>Rainfall-Induced Landslide</b>	<ul style="list-style-type: none"> <li>Rainfall volume and intensities</li> <li>Field information: type of landslide; dimension; inactive / old landslide; active / tension cracks; deposition area</li> <li>Geomorphology: Slope, Drainage</li> <li>Soil and vegetative cover</li> <li>Existing infrastructure and settlements</li> <li>Return period of rainfall</li> </ul>	<ul style="list-style-type: none"> <li>Meteorological data</li> <li>Landslide susceptibility maps: (low, moderate, high and very high; Available detailed 1:10,000 maps and regional 1:50,000 maps)</li> <li>Topographic Map</li> <li>Geologic Map</li> <li>Land Use Map</li> <li>Infrastructure and Settlement Maps</li> </ul>	<ul style="list-style-type: none"> <li>PAGASA</li> <li>MGB</li> <li>NAMRIA</li> <li>MGB</li> <li>MGB, BSWM, LGU, FMB</li> <li>LGU</li> </ul>
	<ul style="list-style-type: none"> <li>Special Studies (planned)</li> <li>Prediction of landslide occurrence and frequency</li> </ul>	<ul style="list-style-type: none"> <li>Landslide Hazard Risk Modeling (selected LGUs)</li> </ul>	<ul style="list-style-type: none"> <li>MGB (with CCC support)</li> </ul>
<b>Drought</b>	<ul style="list-style-type: none"> <li>Temperature (max, min, mean)</li> <li>Daily and seasonal rainfall amount</li> <li>No. of rain days</li> <li>Drought occurrence (including seasonality); length of drought periods</li> <li>Soil type and moisture content surveys/ analysis; water retention qualities of soils</li> <li>Soil and vegetative cover</li> <li>Water resources inventory (surface and groundwater)</li> <li>Water levels (groundwater, rivers, lakes, etc.)</li> <li>Warning period</li> <li>Drought projections</li> </ul>	<ul style="list-style-type: none"> <li>Historical rainfall data from synoptic stations, automatic weather station (AWS)</li> <li>Soil Map and Soil Suitability Map</li> <li>Vegetation surveys (including mapping, aerial photographs) and crop production monitoring</li> <li>Hydrogeological Map</li> <li>Regional water resources map</li> <li>Surface water maps</li> <li>Groundwater assessment maps/reports</li> <li>Long-term and seasonal weather forecasts;</li> <li>ENSO predictions</li> <li>Climate change projections</li> </ul>	<ul style="list-style-type: none"> <li>PAGASA, DA-BSWM, LGU, Climate Field School</li> <li>DA-BSWM</li> <li>NAMRIA, DENR-FMB, DA</li> <li>MGB, NWRB, NIA, NAPOCOR, LWUA, DPWH</li> <li>DA, PAGASA</li> <li>PAGASA</li> </ul>
	<ul style="list-style-type: none"> <li>Special Studies</li> <li>Water demand and deficit (per crop variety)</li> <li>Associated biological features (e.g. pest infestation, invasive plants)</li> </ul>	<ul style="list-style-type: none"> <li>Water budget</li> <li>Historical records of frequency, location, characteristics and impact of past events (including long-term records of rainfall fluctuations)</li> </ul>	<ul style="list-style-type: none"> <li>NIA</li> <li>DA-BSWM</li> </ul>
<b>Geologic Hazards</b>			
<b>Earthquakes</b> <ul style="list-style-type: none"> <li>Ground shaking</li> <li>Fault rupture</li> <li>Liquefaction</li> </ul>	<ul style="list-style-type: none"> <li>Active fault, inactive fault, inferred fault</li> <li>Areas prone to liquefaction</li> <li>Location and extent of known seismic hazard zones, epicenters, faults, fault systems, etc.</li> <li>Magnitude (energy release at epicenter) and intensity (severity of ground shaking) of earthquakes in the area</li> <li>Other geological, geomorphological, hydrological features that influence ground shaking and deformation</li> <li>Potential secondary effects: landslides, mudslides, avalanches, floods resulting from dam failures or tsunamis; fires; pollution from damage to industrial plants</li> <li>Historical frequency of events</li> <li>Calculations of maximum ground accelerations</li> </ul>	<ul style="list-style-type: none"> <li>Active Faults and Susceptibility Map (Regional, Provincial)</li> <li>Zoning and micro-zoning (mapping/ recording all seismological, geological, hydrogeological parameters needed for project planning in a given area, based on sources below)</li> <li>Maps of seismic sources (faults, fault systems)</li> <li>Geological, geomorphological maps and surveys (see also landslides)</li> <li>Data on past occurrences of earthquakes, their location, characteristics (magnitude, intensity, etc.) and effects</li> <li>Groundshaking hazard map (g- factor)</li> </ul>	<ul style="list-style-type: none"> <li>PHIVOLCS</li> </ul>
Tsunami	<ul style="list-style-type: none"> <li>Tsunami inundation area</li> <li>Tsunami wave height at coastline</li> <li>Tidal information</li> <li>Infrastructure and settlements in coastal areas</li> <li>Coastal topography and geomorphology</li> <li>Submarine slope, seafloor relief and terrain</li> </ul>	<ul style="list-style-type: none"> <li>Tsunami hazard map (provincial 1:50000)</li> <li>Topographic map</li> <li>Tide and Current Table</li> <li>Settlements and Infrastructure map</li> <li>Satellite images (e.g. google earth)</li> <li>Satellite images (e.g., aerial photos)</li> <li>Bathymetry map</li> </ul>	<ul style="list-style-type: none"> <li>PHIVOLCS</li> <li>NAMRIA, MGB</li> <li>NAMRIA</li> <li>LGU</li> <li>Internet</li> <li>NAMRIA</li> <li>NAMRIA</li> </ul>
Volcanoes	<ul style="list-style-type: none"> <li>Location of volcanoes and current state of volcanic activity (active, dormant, extinct)</li> </ul>	<ul style="list-style-type: none"> <li>Map of active and inactive volcanoes</li> <li>Geological studies and maps, based on geological survey evidence of frequency, extent, nature of previous eruptions</li> </ul>	<ul style="list-style-type: none"> <li>PHIVOLCS</li> </ul>

Type of Hazard	Information Needed	Data Types/ Assessment Methods	Sources
Volcanoes (cont'd)	<ul style="list-style-type: none"> <li>History, frequency and character of each volcano's eruptions and the processes that produce them</li> <li>Areas at risk from eruptions; radius of fall out or direction of flow of eruptive materials</li> <li>Infrastructure and settlements in volcano proximity</li> <li>Volume and type of material ejected (e.g. ash falls, pyroclastic flows, lava flows, lahars, gas emissions)</li> <li>Explosiveness and duration of eruption</li> <li>Warning period/ alert levels</li> </ul>	<ul style="list-style-type: none"> <li>Historical records of frequency, location, characteristics and impact of past events</li> <li>Monitoring and observation/ recording of precursory phenomena (including seismicity, ground deformation, hydrothermal phenomena, gas emissions)</li> <li>Settlements and Infrastructure map</li> <li>Land use map</li> <li>Lahar hazard map</li> <li>Ashfall hazard map</li> <li>Pyroclastic flow hazard map</li> </ul>	<ul style="list-style-type: none"> <li>PHIVOLCS</li> </ul>
Earthquake-induced Landslides	<ul style="list-style-type: none"> <li>Historical records of frequency, location, characteristics and impact of past events</li> <li>Volume and type of material dislodged, area buried or affected, velocity</li> <li>Natural conditions affecting slope stability (composition and structure of rock and soil, inclination of slopes, groundwater levels)</li> <li>Vegetation and other land use (including building activities, landfill, man-made mounds, garbage pits, slag heaps, etc.)</li> <li>Infrastructure and settlements in the affected area</li> </ul>	<ul style="list-style-type: none"> <li>Identification of location and extent of previous landslides or ground failures by surveys, mapping, aerial photography</li> <li>Mapping/ surveys of rock formations and characteristics, surface geology (soil types), geomorphology (slope steepness and aspect), hydrology (esp. groundwater and drainage)</li> <li>Identification and probability of triggering events such as earthquakes, cyclones, volcanic eruptions</li> <li>Vegetation and land use mapping and surveys</li> </ul>	<ul style="list-style-type: none"> <li>PHIVOLCS, LGUs</li> <li>MGB, BSWM</li> <li>PHIVOLCS</li> <li>LGUs</li> </ul>

## Annex CL–2. Tools for Community-Based Hazard Assessment

The main purpose for community-based hazard assessment is to get more detailed hazard information and validate city-level hazard maps. Community observations may also be used to validate the trends of slow-onset hazards related to climate change (such as sea level rise). It should be noted, however that a community-based assessment will mostly be limited to past and current hazard events and may not reflect future potential events. Observations will be based on events that occur more frequently or have occurred within their lifetime. Thus the community assessment should be placed within the context of a scientific assessment which can include the possibility of future events.

Aside from obtaining necessary information, the main principle for doing community-based assessment is to involve the people in the situation analysis and make them more active participants in the planning process. The activities proposed below have the added benefit of making people more aware of the hazards facing their area and may lead them to take initial actions themselves.

Community-based assessment may be done after the city has prioritized areas for assessment after the city-wide hazard characterization and risk assessment activity. Alternately, it may be initiated at the barangay or community-level and fed into the city-level assessment.

The activities presented here are the following:

- Hazard Identification and Assessment
- Historical Profiling/Timeline or Trend Analysis
- Seasonal Calendar
- Transect Walk
- Hazard and Resource Mapping and Vulnerability Assessment

Depending on the time available, the activities can be combined or done in conjunction with other community-based assessment activities for other sectors.



# Activity and Tools: Hazard Identification and Assessment



## Objectives

- To identify each of the hazards occurring in the community as well as those that are likely to occur
- To understand the nature and behavior of the hazards or threats



## Outputs

- List of hazards and their corresponding properties



## Participants

- Key members of the community



## Materials

- Prepared handout/poster listing different types of hazards and their classification
- Manila paper
- Marker pens
- Metacards
- Masking taps
- Available maps and data



## Steps

1. Using the list of hazards and classification as a guide, ask the participants the following questionings:
  - Which among these hazards were experienced in our community (historical)?
  - Which among the hazards were not experienced but have the risk of being encountered (projected)?
2. List all their answers in a manila paper

Table CL–20. Hazard Categories and Types

CATEGORY	TYPE	HAZARD	EXPERI- ENCED	NOT EXPERI- ENCED	LIKELY TO EXPERI- ENCE
Natural - naturally occurring physical phenomena caused either by rapid or slow onset events	Geological/ Geophysical - events originating from solid earth	Earthquake Volcanic activity Mass wasting or Landslide Liquefaction Ground rupture Ground subsidence Tsunami			
	Hydro- meteorological - atmospheric, hydrological or oceanographic in nature	Typhoon, tropical cyclone Floods (rain-induced flood, storm surge/coastal flood) Rain-induced landslide Flash flood Mud flow Tornado Thunder and lightning Drought			

3. From this list, ask the participants to choose the major hazards that shall be detailed later in the Focus Group Discussion (FGD).
4. Break the participants into groups. The number of groups depends on the number of participants. If there are 40 participants, there may be 3 groups. Each group may detail 1 or 2 hazards.
5. Distribute the materials and ask each group to assign a facilitator, documenter and reporter.
6. Show and explain how to fill out the Hazard Assessment Form. To understand the nature and behavior of hazards we need to identify the following: Force, Warning signs and signals, Forewarning, Speed of onset, Frequency, Period of occurrence, and Duration.

Table CL–21. Hazard Assessment Form (BDRCL Learning Circle)

		Hazard 1:	Hazard 2:
<b>Force</b> ( <i>Lakas o pwersa na maaring magdulot ng sakuna</i> )	What will hit me? <u>wind</u> , <u>water</u> (rain, flood, overflow, run-off, flashflood, tidal wave, storm surge, epidemic), <u>land</u> (slides, deposits by river, lahar, mudflow), <u>fire</u> (forest fire, settlement fire), <u>seismic</u> (earthquake, tsunami, liquefaction), <u>conflicts</u> (civil war, insurgency, other actions leading to displacement and refugees), <u>industrial/technological</u> (pollution, radio-activity, explosions), <u>other human-related</u> (famine, drought, pests, etc.), <u>others</u> (debris, rocks, mud, branches, trunks)		
<b>Warning Signs and Signals</b> ( <i>Babala/Senyales</i> )	Scientific and indigenous indicators that hazard is likely to happen		
<b>Forewarning</b> ( <i>Paunang babala, oras sa pagitan ng babala at pagdating ng kalamidad</i> )	Time between warning and impact		
<b>Speed of Onset</b> ( <i>Bilis ng pagdating</i> )	Rapidity of arrival and impact –we can distinguish between hazards that occur without almost any warning (earthquake), and a hazard that can be predicted three to four days in advance (typhoon) to very slow-onset hazards like drought and famine		
<b>Frequency</b> ( <i>Kadalasan ng pagdating</i> )	Does hazard occur seasonally, yearly, once every 10 years, once in a lifetime, etc?		
<b>When/Period of Occurrence</b> ( <i>Yugto ng pangyayari; tuwing kelan dumarating</i> )	Does hazard occur at a particular time of the year (wet or dry season; in November to December?)		
<b>Duration</b> ( <i>Katagalan</i> )	How long is a hazard felt? –earthquake and aftershocks; days/weeks/months that an area is flooded, length of military operations?		

7. Point out the following considerations in assessing hazards:
  - Some hazards may cause secondary hazards (for instance, one should consider the main force of the primary hazard). Example: earthquake may cause landslides, tsunamis
  - Although hazard assessment is based on past experiences, we should not forget to look at possible potential hazards that may occur in the community. This can be determined by looking at scientifically produced hazard maps and climate change projections.
  - Be aware of local threats: the number of small scale, localized hazards that do not hit the headlines or appear in disaster statistics, is increasing. Collectively, these can present a more serious problem than any catastrophic event. Example: in densely populated shanty towns, fires, floods, landslides, and epidemics are increasingly common events.
  - Various intensities of each hazard must also be considered.
  - Other sources should be consulted to provide more reliable information about their prediction and possible behavior especially those hazards that are rarely occurring in the area.

8. Allot 20 minutes for discussion and report preparation, and allow 10 minutes for each group to report.
9. After each report, ask the participants if they have comments or anything they would like to add to the report of the group.
10. Summarize the report of each group.

## Activity and Tools: Historical Profiling/Timeline or Trend Analysis

In determining the timeline and trend analysis, there will be two options. Option 1 is the use of the flip chart and option 2 Pre-drawn timeline.



### Objectives

- To narrate the disaster history and significant events that happened in the community, where one column gives the year and the other column lists down the events that took place
- To understand how hazards have change over time, which hazards have happened in the past, or the start of particular hazard occurrence
- To understand how communities are affected by specific hazards
- To understand how communities have responded to the impacts of the hazards over time



### Outputs

- Historical disaster hazard profile and related significant events (land use, land tenure, waterways, national/local officials, population, livelihood, etc.) that happened in the community
- List of communities response to hazards over time



### Participants

- Representative of all members of the community (ensure representation of community elders)



### Materials

- Flip chart
- Manila paper
- Metacards
- Marker Pens
- Information and data on hazards and disasters (e.g. news clippings)



### Steps

1. Begin by asking the community members about what disasters happened in their community and what year did they occur. Use the following sample key questions:
  - What are the disaster events that happened or are happening in the community? When did they happen? (Ask the specific state if the stakeholders will be able to

recall)

- What significant events affected the community? When did they happen? These events may be changes in terms of land use, land tenure, waterways, national/local officials, population (male, female, children, person with special needs, LGBT), livelihood, rainfall pattern and volume etc.

1.1. Write the answers on a flip chart as Option 1. See **Table CL-22**.

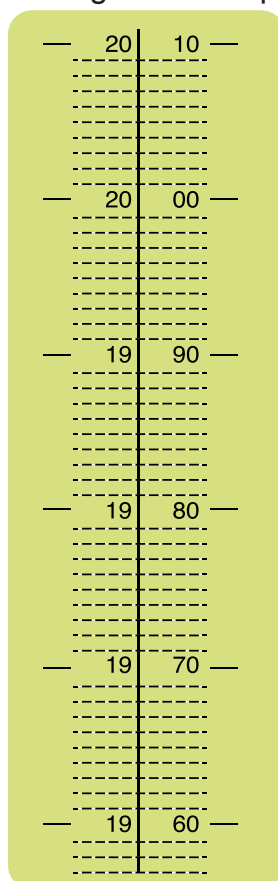
**Table CL-22. Timeline Example using a Flip-Chart**

Date	Event
1994	Normal annual flood and road project
1995	Normal annual flood
1996	Big flood and occurrence of leptospirosis
1998	Normal annual flood, dengue, then followed by long drought
1999	Normal annual flood
2000	Normal annual flood
2001	Normal annual flood, availability of telephone and water utilities
2002	Big flood, occurrence of leptospirosis, then followed by long drought
2003	Normal annual flood, dengue, road project
2004	Normal annual flood, dengue

While discussing, the facilitator can also pass on to a community member the writing of their answers on the flip chart.

1.2. Another option (Option 2) is by using a pre-drawn timeline (see **Figure CL-7**). Ask the participants to write their answers on metacards. These metacards shall be placed on a manila paper with a pre-drawn timeline. The disaster events shall be placed on the right side while other significant events shall be placed on the left side of the timeline.

**Figure CL-7. Timeline Example using Manila Paper & Metacards**



2. After completing the timeline, ask the participants their realization about the history of disasters in their city/municipality.
  - What is the impact of the hazard (for example: flood, drought, forest fire) to you (income, health, properties, etc.)? In the environment?
  - Has the impact always been like this? If no, explain.
  - Which disaster is now occurring more/less serious or more often than before? Why?
  - When did you begin to notice that the impact of these disasters have started to become more/less serious than before?
  - What do you think have caused these disasters? Why are these disasters more serious than before?
  - What is the relationship between the past events and the current situation of the city/ municipality?

If applicable, also include the following guide questions in the discussion:

- What is the community's observation on local temperature? How has temperature change manifested in their community?
- What is the community's observation on rainfall pattern and volume? What evidences of this change are seen/experienced by the community?
- What is the community's experience of drought/El Nino?
- What are the community's experiences on previous tropical cyclones/typhoons?
- What have the local people observed in the coast? What changes have you seen over the years?
- How have storm surges affected the community over the years?

3. Note each hazard discussed by the participants and mark on the timeline.

## Activity and Tools: Preparation of Seasonal Calendar



### Objectives

- To visualize the time, frequency and duration of common hazards
- To highlight problems or concerns taking place throughout the year



### Outputs

- Information about seasonal changes and related hazards, diseases, community events and other information related to specific months of the year



### Participants

- Representative of all members of the community



### Materials

- Manila paper
- Marker Pens or other interesting materials to mark the chart (e.g. dry leaves, twigs, flowers, stones, etc.)



## Steps:

1. After completing the Timeline, use the Seasonal Calendar to visualize the hazards/ threats experienced by the community within a year.
2. Prepare a calendar template on a manila paper before the activity. See **Figure CL-8**.

Figure CL–8. Seasonal Calendar example

Hazard (derived from step 1)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Note: Indicate the level of severity of hazard

3. Review the results of the hazard identification and assessment activity. Mark the months of the year these hazard events occur in the community. Indicate degree, severity or extent of the change by using markers (ten being the highest score)
4. Apart from the identified hazards, also ask the participants the following:
  - What are the people's sources of income? List all answers.
  - For each income, when is the busiest period? Mark these answers on the calendar.
  - Which months do community members get sick?
  - When is food availability most difficult?
  - When is water supply most difficult?
  - Which months are usually low in economic activity? List all answers and mark on the calendar.
5. Summary: After completing the calendar, ask the participants what they have discovered between the relationship of hazards and their livelihoods. The following guide questions may also be answered in the course of the discussion.
  - What do community members do during those times that they experience difficulties? How do they cope?
  - What differences are there in the condition and roles of men and women in times of disaster?

## Activity and Tools: Transect Walk for Risk/ Vulnerability Assessment



### Objectives

- To identify and describe 'elements at risk' with respect to a particular hazard through walking in the community following a certain path or direction



### Outputs

- Data and information on past events
- Transect Map





## Participants

- Representatives of all members of the community (ensure representation of community elders; key informant)



## Materials

- Base map
- Hazard maps
- Writing or sketch pad
- Pens and pencils



## Steps

1. Discuss with the participants the kind of information needed from this activity i.e. areas at risk to flooding, vulnerable population, resources (e.g. natural resources, livelihood, institutions, etc.) which may also be at risk, critical facilities and others.
2. Get advice from community members what direction to take and the best path to follow.
3. Walk with community members who can give information while transect walk is being made.
4. Write down your observations and input from community representatives/members.
5. Draw the map after the transect walk and validate with key informants from among community representatives/members.

Figure CL–9. Sample Landslide and Flood Susceptibility Map

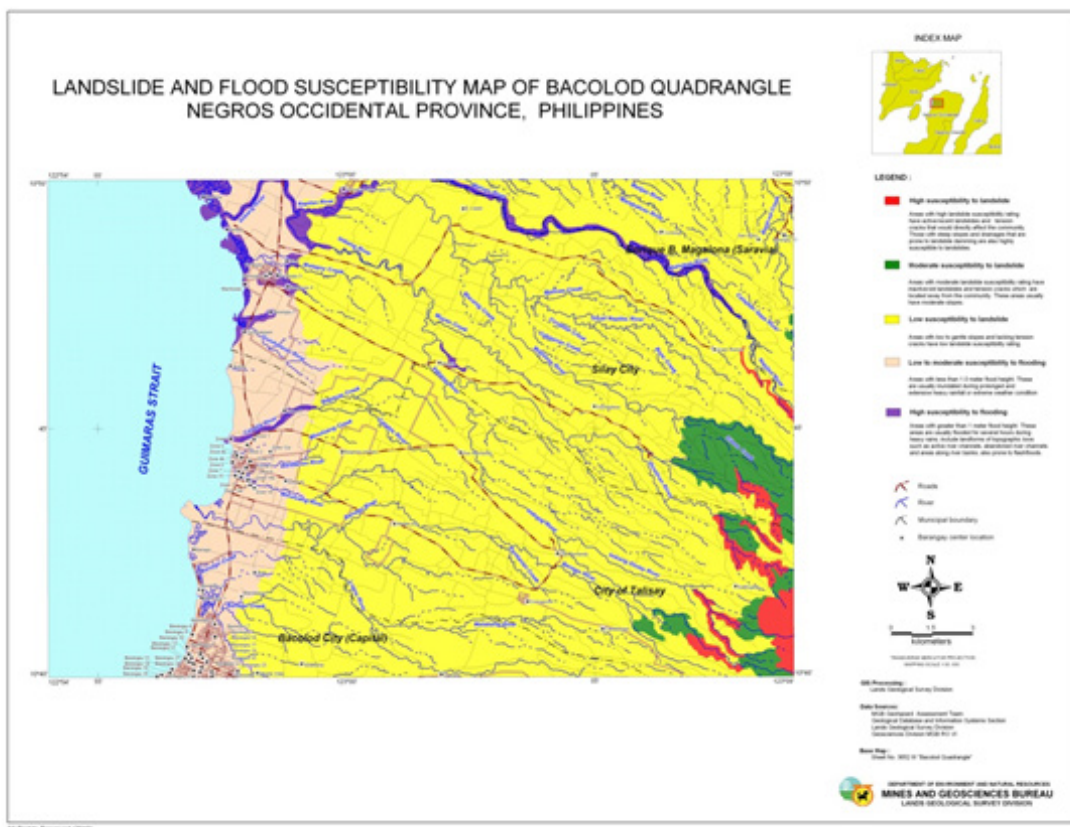



Figure CL-10. Sample Output of Transect Walk



upland	lowland	creek	lowland	canal	village	upland	creek	upland
<b>water source</b>								
rain	rain irrigation	rain runoff/ seepage	rain irrigation		rain well	rain	rain	rain
<b>soil</b>								
Sandy loam		rocky	clay	rocky	sandy clay loam	sandy clay loam		clay
<b>crops</b>								
rice sugarcane eggplant beans corn	rice sesbania pepper beans tomato	bamboo	rice sesbania pepper beans tomato	bamboo	okra horseradish grapes beans	peanuts cassava rice corn beans	bamboo	rice bean sugarcane
forages								
grassland for grazing	gliricidia	grass	azolla	grass		weeds in plots	guines grass	grassland
<b>trees</b>								
mango leucaena guava banana tamarind	gliricidia	banana gliricidia leucaena	gliricidia bananan leucaena acacia neem	gliricidia leucaena	acacia mango guava coconut leucaenia jackfruit	mango		mango tamarind starapple

## Activity and Tools: Hazard and Resource Mapping and Vulnerability Assessment



### Objectives

- To identify graphically the vulnerable members of the community especially the children, pregnant women, elderly and differently abled who are put at risk by hazards like floods
- To enable participants to look at their resource base and make an inventory of their resources and capacities



### Outputs

- Vulnerability Map
- Inventory of resources and capacities



### Participants

- Representatives of all members of the community



## Materials

- Base map
- Hazard map
- Resource map
- Data and information of vulnerable population/ physical/ materials/ resources
- Google earth map of the community (printed in tarpaulin)
- Writing or sketch pad
- Pencils with eraser
- Tracing paper 20" x 30"
- Transparent sheet or Plastic cover 20" x 30"
- Marker pens (Black, Red, Blue)



## Steps

1. Show an enlarged image of the community printed in tarpaulin (taken from Google earth, aerial photograph or satellite image). Explain how the image was captured. Allow a few minutes for the participants to take a closer look at the image and see if they can identify particular locations (e.g. their homes, barangay hall, city/municipal hall, etc.)
2. Divide the participants into groups. The number of groups depends on the number of participants. Ideally there should not be more than 10 members per group. The participants may be divided according to sector. Groups to represent the women, youth, elderly and differently abled should also be considered.
3. Show an example of a completed hazard and resource map overlaid on the base map.
4. For LGUs without Base map: Overlay the tracing paper on the enlarged image of the community. Using **BLACK** marker, trace/draw the following features:
  - Administrative boundary
  - Location/Spatial arrangement of houses and other structures
  - Rivers, creeks, canals and other waterways
  - Roads and bridges (including names)
  - Open spaces
  - Important landmarks
5. Overlay a transparent/plastic sheet on the base map. Identify and locate the areas prone to hazards. Use **RED** marker pen.

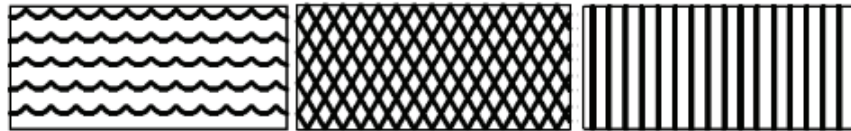
Ask the participants to discuss within their group the answers to the following guide questions:

- What are the hazards that put the community at risk?
- What places/areas in the community are at risk?
- What community infrastructures or critical facilities are in danger?
- Are there high risk areas whose residents must be relocated?
- Who are the people that are most exposed to risk and will likely need assistance?
- Which areas are not prone to hazards/danger?
- Are these areas accessible to all residents?

Areas to identify on the hazard map may include:

- Areas prone to hazards (e.g. hydro-meteorological and geologic hazards)
- Danger zones
- Garbage dumpsites
- Areas with informal settlements
- Others

It is advised that the facilitator establish uniform symbols/legend for each hazard. Symbols/Legends for Hazard Mapping may be as simple as the following:



**RESOURCE & CAPACITY ASSESSMENT**

Resource and capacity assessment is the process to determine how people cope in times of crisis to reduce the damaging effects of hazards. Through capacity assessment, the LGU's coping strategies and resources, which are available, for disaster preparedness, mitigation and prevention are identified. It involves a) understanding people's previous experiences with hazards and the coping strategies they have developed; and b) analyzing resources that are available and used by the LGU to reduce disaster risk. (Kafle and Murshed)

6. Overlay a transparent/plastic sheet on the base map. Identify and locate the areas prone to hazards. Use BLUE marker pen.

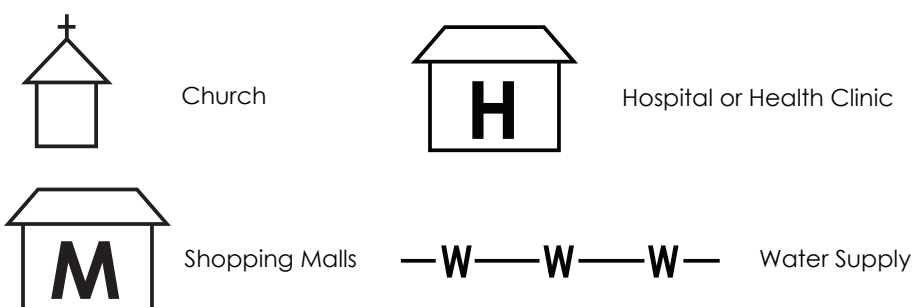
Ask the participants to discuss within their group the answers to the following guide questions:

- What resources can be found in the community?
- Who have the least resources in the community?
- Who have access and control over the available resources?
- What resources are at risk?
- Why are they at risk?

Areas to identify on the resource map may include:

- Natural: mangroves, trees, plantations and other natural features that serve as source of livelihood
- Physical/Material/Constructed: water supply, electrical posts, wells, transport terminals, playgrounds, community facilities, construction supplies and equipment, etc.
- Economic: public markets, banks, malls/shopping centers, factories, other offices
- Social: barangay and city/municipal halls, evacuation centers, schools, police stations, churches, health clinics, evacuation routes

It is advised that the facilitator establish uniform symbols/legend for each resource. Symbols/Legends for Resource Mapping may be as simple as the following:







7. Allot 10 minutes for each group to report on the result of the mapping activity.
8. Summarize what has been discussed and share how this would input into the CLUP.  
The participants should prepare the following tables to do a more detailed vulnerability and capacity assessment.

**Table CL–23. Vulnerability Assessment Form**

	Elements at Risk	Vulnerable Condition	Pressure	Underlying Causes
	What are the elements at risk?	Why are the elements identified vulnerable?	What are the factors contributing to the vulnerability of the elements at risk?	How the identified factors make the elements more vulnerable?
<b>Economic Assets</b>	<ul style="list-style-type: none"> <li>• Which economic activities or assets are most affected by the CDR?</li> <li>• Are people forced to sell assets?</li> <li>• What do people sell first? Second? Third?</li> <li>• Would basic needs (such as food and water) be affected, and how long does it last?</li> <li>• Is it harder to borrow money in times of CDR?</li> </ul>	<ul style="list-style-type: none"> <li>• How does the CDR disrupt activities?</li> <li>• Why does this happen?</li> <li>• Does anybody benefit from this? Why are people unable to meet basic needs during the CDR?</li> <li>• Why can people not get a loan?</li> </ul>	<p>Topics to consider:</p> <ul style="list-style-type: none"> <li>• Work opportunities and wages</li> <li>• Credit and savings opportunities</li> </ul>	<ul style="list-style-type: none"> <li>• Are people denied access to work opportunities? Why?</li> <li>• Are people paid a fair wage? Why not?</li> <li>• Do people have access to financial schemes? Why not?</li> <li>• Is money lent under fair terms?</li> </ul>
<b>Natural Assets</b>	<ul style="list-style-type: none"> <li>• Which natural assets are affected by the CDR? How are they affected?</li> </ul>	<ul style="list-style-type: none"> <li>• Why are these natural assets affected by the CDR?</li> <li>• How long does it take damaged natural assets to recover after the CDR?</li> <li>• Is there a lack of any natural assets? How does this affect people?</li> </ul>	<p>Topics to consider:</p> <ul style="list-style-type: none"> <li>• Local authorities</li> <li>• Land ownership</li> <li>• Logging/ deforestation</li> <li>• Industry/ pollution</li> <li>• Agriculture (large scale)</li> <li>• Population growth</li> </ul>	<ul style="list-style-type: none"> <li>• Why is there a lack of natural assets?</li> <li>• Why do people have limited/ denied access to natural assets?</li> </ul>
<b>Constructed Assets</b>	<ul style="list-style-type: none"> <li>• What are government or community buildings made of? (such as concrete, wood )</li> <li>• How are these buildings affected by the CDR?</li> <li>• How are critical infrastructures and utilities (e.g. roads, bridges, water supply, power, and communication) affected by the CDR? How are construction tools and equipment affected by the CDR? (i.e. for reconstruction, rescue)</li> </ul>	<ul style="list-style-type: none"> <li>• Why are these affected by the CDR?</li> </ul>	<p>Topics to consider:</p> <ul style="list-style-type: none"> <li>• Land ownership</li> <li>• Local authorities</li> <li>• Religious groups</li> <li>• Building regulations</li> <li>• Access to community buildings</li> </ul>	<ul style="list-style-type: none"> <li>• Why are people unable to prevent damage to constructed assets?</li> <li>• Why do owners of constructed assets not able to help and how could they help?</li> </ul>
<b>Individual Assets</b>	<ul style="list-style-type: none"> <li>• Who is most likely to be affected? <ul style="list-style-type: none"> <li>– During the CDR</li> <li>– After the CDR</li> </ul> </li> <li>• What happens to these people? (For example, are they killed, injured, affected by illness,</li> </ul>	<ul style="list-style-type: none"> <li>• Why are these people most likely to be affected? Consider: <ul style="list-style-type: none"> <li>– Mobility</li> <li>– Health</li> <li>– Skills</li> <li>– Education and literacy</li> </ul> </li> </ul>	<p>Topics to consider:</p> <ul style="list-style-type: none"> <li>• Health services</li> <li>• Social services</li> <li>• Education and training</li> </ul>	<ul style="list-style-type: none"> <li>• Topics to consider:</li> <li>• Access to health care</li> <li>• Access to social welfare schemes</li> <li>• Education policies and curriculum</li> </ul>



	Elements at Risk	Vulnerable Condition	Pressure	Underlying Causes
	What are the elements at risk?	Why are the elements identified vulnerable?	What are the factors contributing to the vulnerability of the elements at risk?	How the identified factors make the elements more vulnerable?
<b>Individual Assets</b> (cont'd)	<ul style="list-style-type: none"> <li>displaced, traumatized)</li> <li>Which diseases affect local people as result of the CDR?</li> <li>Who is most likely affected by these?</li> </ul>	<ul style="list-style-type: none"> <li>Is there any knowledge on what to do when a CDR hits?</li> </ul>		
<b>Social Assets</b>	<ul style="list-style-type: none"> <li>How do relationships with different groups change in difficult times?</li> <li>What is the consequence of these changes?</li> <li>How do relationships, gender roles and decision making in the households change?</li> <li>How do relationships between men and women change?</li> </ul>	<ul style="list-style-type: none"> <li>Why do some of these relationships gets affected?</li> <li>What more should be done to help?</li> <li>What conflicts may arise/ manifest during CDR times?</li> <li>Is there any lack of leadership during crisis?</li> </ul>	Topics to consider: <ul style="list-style-type: none"> <li>Local authorities</li> <li>Traditional leadership</li> <li>Social groups</li> </ul>	<ul style="list-style-type: none"> <li>Do people have access to social assets?</li> <li>How much influence do leaders have in times of disaster?</li> <li>Are there any informal leaders who emerge during CDR?</li> </ul>

(BDRC Learning Circle)

Table CL–24. Capacity Assessment Form

	Protected Elements	Safe Conditions	Pressure Releases	Positive Underlying Causes
	Which elements are not badly affected by the disaster?	What capacities exist that help protect the elements at risk from the impact of the disaster?	What are the factors that contribute to reduce vulnerability?	How the identified factors contribute in the reduction of vulnerability?
<b>Economic Assets</b>	<ul style="list-style-type: none"> <li>Which economic activities or assets are least affected by the CDR?</li> <li>Which assets are never sold, even during difficult times?</li> <li>Is it possible to borrow money using the unsold assets as collateral?</li> </ul>	<ul style="list-style-type: none"> <li>Why are certain economic activities and assets not affected by the CDR?</li> <li>Why are people not forced to sell certain assets?</li> <li>How are people able to meet their basic needs (such as food and shelter) when a CDR happens?</li> <li>Are there reserves of food or money for use during difficult times?</li> <li>Remember some economic capacities may be illegal (such as cattle stealing) or damaging to health (such as selling sex)</li> </ul>	<ul style="list-style-type: none"> <li>What organizations or institutions are present? (such as government, private, NGOs, POs, CSOs)</li> <li>What economic principles/ policies are implemented?</li> <li>What cultural activities and beliefs are practiced?</li> </ul>	<ul style="list-style-type: none"> <li>How do these help local people economically in times of crisis? (such as loans, providing work, gifts/ donations)</li> <li>Are people provided with good work opportunities and paid a fair wage?</li> <li>Do people have access to finance schemes under fair terms?</li> </ul>
<b>Natural Assets</b>	<ul style="list-style-type: none"> <li>Which natural assets are not affected by the CDR? (such as trees, water, pasture, high land)</li> <li>What natural assets benefit from the CDR?</li> </ul>	<ul style="list-style-type: none"> <li>Why are the identified natural assets not affected by the CDR?</li> <li>Why do some natural assets benefit from the CDR?</li> </ul>	<ul style="list-style-type: none"> <li>Who owns or controls the use of natural assets in the local area?</li> <li>Is greater access given to natural assets in times of crisis?</li> </ul>	<ul style="list-style-type: none"> <li>How do the natural assets help local people in times of crisis? (such as floating bamboo platforms or banana tree rafts during floods)</li> </ul>

	Protected Elements	Safe Conditions	Pressure Releases	Positive Underlying Causes
	Which elements are not badly affected by the disaster?	What capacities exist that help protect the elements at risk from the impact of the disaster?	What are the factors that contribute to reduce vulnerability?	How the identified factors contribute in the reduction of vulnerability?
<b>Natural Assets</b> (cont'd)	<ul style="list-style-type: none"> <li>Which natural assets recover quickly after the CDR? Why?</li> </ul>	<ul style="list-style-type: none"> <li>Why natural assets recover quickly after the CDR?</li> <li>Are natural assets used in special ways to protect people?</li> </ul>	<ul style="list-style-type: none"> <li>What policies are implemented?</li> <li>What cultural activities and beliefs are practiced?</li> </ul>	<ul style="list-style-type: none"> <li>Do people have access to natural assets?</li> </ul>
<b>Constructed Assets</b>	<ul style="list-style-type: none"> <li>What government or community buildings are protected from the CDR?</li> <li>What buildings are not affected by the CDR?</li> <li>Are critical infrastructures and utilities (e.g. roads, bridges, water supply, power, and communication) protected from the CDR?</li> </ul>	<ul style="list-style-type: none"> <li>Why are government or community buildings protected from the CDR?</li> <li>Why are critical infrastructures and utilities (e.g. roads, bridges, water supply, power, and communication) protected from the CDR?</li> <li>Are buildings used in special ways (such as for storage, shelter):               <ul style="list-style-type: none"> <li>before the CDR</li> <li>during the hazard</li> <li>after the CDR</li> </ul> </li> <li>Do people have alternative means of transport if roads are damaged?</li> <li>Do people have alternative forms of power, communication and water if supply is cut off?</li> </ul>	<ul style="list-style-type: none"> <li>Who owns or controls the use of safe buildings during times of crisis?</li> <li>Who owns or controls the use of vehicles or boats?</li> <li>Who has access to a phone or radio?</li> <li>Do affected people have access to safe buildings during times of crisis?</li> <li>Do affected people have access to transport and communication during times of crisis?</li> <li>What cultural activities and beliefs are practiced?</li> </ul>	<ul style="list-style-type: none"> <li>How do affected people get access to protected buildings and alternative sources of power, water, etc. ?</li> </ul>
<b>Individual Assets</b>	<ul style="list-style-type: none"> <li>Who is least affected:               <ul style="list-style-type: none"> <li>during the CDR</li> <li>after the CDR</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Why are these people least affected? Consider:               <ul style="list-style-type: none"> <li>mobility</li> <li>health</li> <li>skills</li> <li>education and literacy</li> <li>traditional knowledge</li> <li>others</li> </ul> </li> <li>Do affected people have particular knowledge of what to do when a CDR hits?</li> <li>Who assist the affected people during CDR?</li> <li>Who has the knowledge/skills to cope with CDR?</li> </ul>	<ul style="list-style-type: none"> <li>What knowledge and skills are passed on to others?</li> </ul>	<ul style="list-style-type: none"> <li>How are knowledge and skills passed on to others?</li> </ul>
<b>Social Assets</b>	<ul style="list-style-type: none"> <li>Which groups are least affected by the CDR?</li> <li>Are any relationships strengthened by the CDR?</li> </ul>	<ul style="list-style-type: none"> <li>Why are some groups able to cope with the CDR?</li> <li>Why do some relationships grow stronger during difficult times?</li> <li>What role does extended family play?</li> </ul>	<ul style="list-style-type: none"> <li>Who takes control or shows leadership during times of crisis?</li> <li>Who gives most help to those affected?</li> <li>Is help fairly given to all affected people?</li> </ul>	<ul style="list-style-type: none"> <li>How do these cultural activities and beliefs help/contribute in the reduction of vulnerability ?</li> </ul>

	Protected Elements	Safe Conditions	Pressure Releases	Positive Underlying Causes
	Which elements are not badly affected by the disaster?	What capacities exist that help protect the elements at risk from the impact of the disaster?	What are the factors that contribute to reduce vulnerability?	How the identified factors contribute in the reduction of vulnerability?
<b>Social Assets</b> (cont'd)			<ul style="list-style-type: none"> <li>• Do the most vulnerable get any special assistance?</li> <li>• Do concerned leaders give clear direction in a crisis?</li> <li>• Is there a system for passing on warning messages?</li> </ul>	

(BDR Learning Circle)

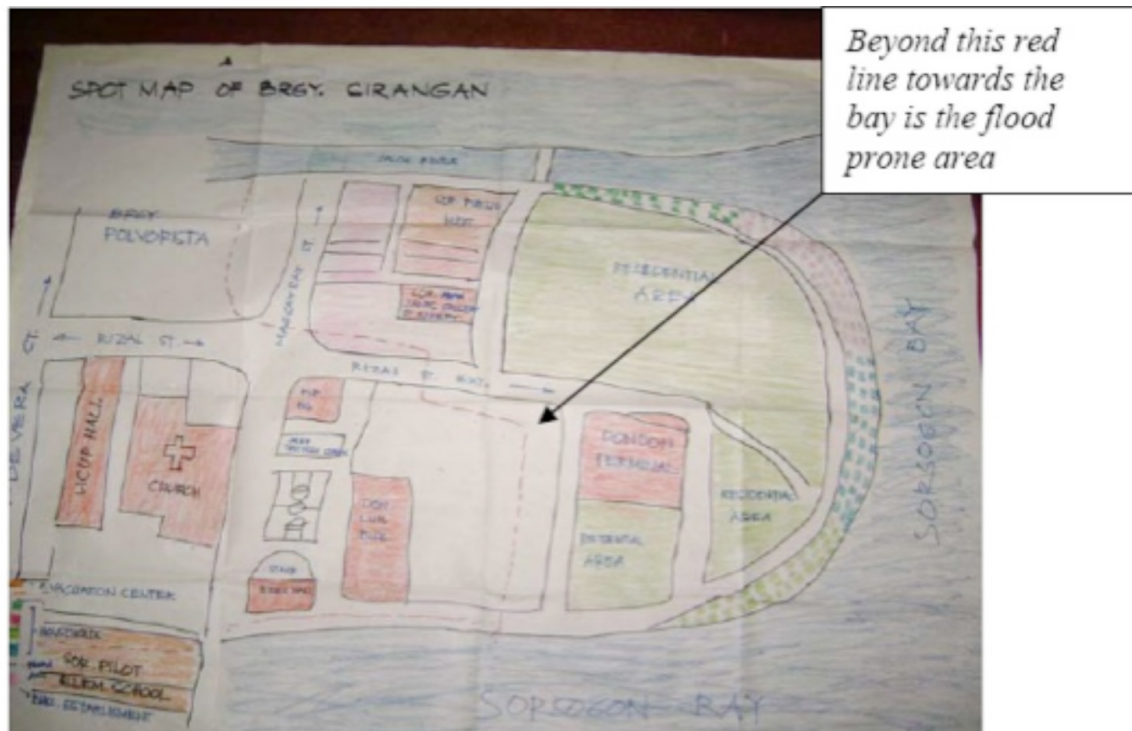
## Annex CL–3. Community FGD Guide for Climate Change Validation

(Source: UN-Habitat, Participatory Vulnerability and Adaptation Assessment, 2010)

### Suggested Focus Group Discussion Activity

- 5 minutes Introduction of FGD Participants and Assessment Team
- 5-10 minutes Presentation of FGD Objectives and Overview of Climate Change
- 1-2 hours Guided Discussions
- (Each discussion topic should be asked in an open ended manner so that the participants could answer as they see fit and in their own terms. Probing will be done during the FGD to gather more information)
- What is the community’s observation on local temperature? How has temperature change manifested in their community?
  - What is the community’s observation on rainfall pattern and volume? What evidences of this change are seen/ experienced by the community?
  - What is the community’s experience of drought/ El Nino?
  - What are the community’s experiences on previous tropical cyclones/ typhoons?
  - What have the local people observed in the coast? What changes have you see over the years?
  - How have storm surges affected the community over the years?
- 1 to 1.5 hours Using the community base map, ask the participants to mark areas/ households which were previously affected by the climate related hazards noted during the discussion. Let them share/ explain their outputs and probe if needed.
- 15 minutes Recap and Closing
- Summarize what has been discussed and share how this would input into the CLUP planning process.

Figure CL-15. Sample Community Map



## Annex CL-4. Multi-Hazard Mapping

When an area is exposed to more than one hazard, a multiple hazard map is a tool that will facilitate the planning team to analyze the risks and vulnerabilities from all the hazards.

A multi-hazard map is referred to as a “composite” and “overlay” hazard map. The main purpose of a multi-hazard map is to put together in one map the various hazard-related information for a certain physical area to convey a composite picture of the natural hazards of varying magnitude, frequency and area affected.

A multiple hazard mitigation strategy will provide an equitable basis for allocating disaster planning funds; and promotes participation of relevant agencies and interested groups in disaster preparedness.

### Preparing a Multi-hazard Map

1. A prerequisite in compiling individual hazard information into one map is a base map to place the information. The most detailed individual hazard map may be selected as the base if it provides adequate geographic orientation.

A base map usually shows hypsography (elevation of land above sea level). This map is sometimes called “topographic” or “contour line” maps. The elevation and contour information will help the planner in visualizing the location and severity of flood, landslide, fault rupture, hurricane, and other potential hazards. Cadastral (property ownership boundary) maps can be used as base maps. Controlled aerial photographs, photo maps, radar images, and satellite photography can also be used for base maps.

2. Evaluate the uniformity, accuracy, and completeness of hazard information-areal coverage, detail, content, elements (likelihood, location, and severity), format, and symbols.
3. Select the most appropriate scale to be used.

Map scale is the measure of reduction in size from the actual environment to that portrayed on the map. The scale can be expressed as a ratio between the map distance and the actual distance. There are no best scales, only more appropriate

ones to coincide with planning requirements.

The scale used for a multi-hazard map is dependent not only on the hazard information to be shown but also upon the scale of the base map. If a choice of scales is available, then the following factors become important in making the selection: number of hazards to be shown; hazard elements to be shown; range of relative severity of hazards to be shown; and area covered.

Normally, the individual hazard maps to be used are at different scales. This may require an enlargement or reduction to the scale of the base map selected. Use of controlled photographic or computer mapping methods makes this process easy and accurate.

4. Combine the selected individual hazard information onto the multi-hazard map in an accurate, clear, and convenient way.

Note: The effects of a single event, as in the case of storm surge, can include various hazards such as flooding and inundation, each having different severities and each affecting different locations. The consideration of one event, then, should result in the assessment and mapping of several hazards.

## Annex CL–5. Types of Volcanic Hazards

Volcanic Hazards	Description
Lava Flow	<p>Lava flow is a highly elongated mass of molten rock materials cascading downslope from an erupting vent. The lava flow being extruded has low silica and low water contents.</p> <p>Rate of flow: 3 km/day (slightly high viscosity) or 45 km/hour (low viscosity). Speed and geometry of lava flows depend on local topography. Steep slopes encourage faster and longer flows than gentle slopes or terrain</p>
Dome Growth	<p>Lava dome is a pile or mound of lava that grew on the floor of an active crater, on the side slopes via a feeder vent that breached through the surface of the edifice, or inside the volcanic edifice.</p> <p>Types: Exodomes - lava domes that were formed on the surface of the volcanic edifice)</p> <p>Cryptodomes - lava domes that grew anywhere inside the edifice</p>
Pyroclastic Flow	<p>Pyroclastic flow refers to hot dry masses of fragmented volcanic materials that move along the slope and in contact with ground surface. This includes: pumice flow, ash flow, block-and-ash flow, nuee ardente and glowing avalanche.</p> <p><u>Mechanism</u> Pyroclastic flow mechanism: Nuee ardente is a glowing eruption cloud characterized by: extreme heat (about 500 °C or higher) 1. high gas content rapid flow down the slope of an erupting volcano enormous amounts of ash and other fragmental volcanic materials A nuee ardente may originate directly from an active crater or from a collapse of a growing lava dome.</p>
Pyroclastic Surge	<p>Pyroclastic surges are turbulent low-concentration density currents of gases, rock debris and in some cases, water, that move above the ground surface at high velocities.</p> <p>Types: Ground surge, Ash-cloud surge, Base surge</p>
Hot Blasts	<p>* Hot blasts arise when pent-up gases facilitate their way out through the impermeable overlying materials and cause a very rapid escape into the atmosphere. Blasts that are directed obliquely often do much damage and could exact a high toll in human lives.</p> <p>* Lateral blasts are combination of pyroclastic flows and pyroclastic surges with an especially strong initial laterally-directed thrust. They have an initial velocity of 600 kph and slow down to about 100 kph near its margin 25 km from the volcano.</p>

Volcanic Hazards	Description
Tephra Falls	Tephra falls may consist of pumice, scoria, dense lithic materials or crystals or combination of the four.  Particle size: less than 2 mm diameter (ash) , 2-64 mm diameter (lapilli) , more than 64 mm diameter (blocks and bombs)
Volcanic Gas	Volcanic gas is one of the basic components of a magma or lava. Active and inactive volcanoes may release to the atmosphere gases in the form of: water vapor, hydrogen sulfide, sulfur dioxide , carbon monoxide, hydrogen chloride and hydrogen fluoridfluoride.  Aside from the major constituents, minor amounts of nitrogen, methane, argon and helium may be also present in volcanic gases. The proportion of these components changes with changing temperature.
Lahar	Lahar (an Indonesian term), sometimes called mudflows or volcanic debris flows, are flowing mixtures of volcanic debris and water. Lahars are classified into: Primary or hot lahar - associated directly with volcanic eruption and Secondary or cold lahar - caused by heavy rainfall.  Lahar distribute and redistribute volcanic ash and debris deposited around the volcano after the materials has cooled and has become water logged.  Lahar in tropical areas can be produced by: * sudden draining of a crater lake, caused by either an explosive eruption or collapse of a crater fall (e.g. Agua, Kelut, Ruapehu) * movement of a pyroclastic flow into a river or lake, displacing and mixing with water * avalanche of water-sustained rock debris, where water can be from heavy rain, hydrothermal activity or other sources * torrential rainfall on unconsolidated deposits on slope of a volcano (e.g. Pinatubo) * collapse of a temporary dam, where recent volcanic deposits have blocked a steam channel (e.g. Asama, Pinatubo)
Tsunami	Tsunamis are long-period sea waves or wave trains that are generated by the under-the-sea earthquake. Most tsunamis are caused by fault displacements on the sea floor and of volcanic sudden displacement of water. They travel at high speed water as low broad waves and build to great heights as they approach shores. Origin including volcanic or volcano-tectonic earthquakes, explosions collapse or subsidence, landslides, lahars, pyroclastic flows or debris avalanches entering bodies of water, and atmospheric waves that couple with the sea.
Debris Avalanche	Debris avalanche is the fast downhill movement of soil and rock, speed: 70 km/h (due to high water content and steep slopes) caused by slope failure on the cones of stratovolcanoes.
Hydrothermal Explosions	Hydrothermal explosions are explosions from instantaneous flashing of steam upon contact with hot rocks.
Secondary Explosions	Secondary explosions are caused by the contact of water with hot pyroclastic flow deposits.
Subsidence	Subsidence is a ground deformation resulting from the downward adjustment of surface materials to the voids caused by volcanic activity.

## Annex CL–6. Maximum Allowable Noise Quality Standards

Adapted from Implementing Rules and Regulations of Chapter XIX – Nuisances and Offensive Trades and Occupations of the Code on Sanitation of the Philippines (PD-856)

The maximum allowable noise quality standards shall be as follows:

### Maximum Allowable Noise Levels in General Areas

Category of Area	Daytime	Morning and Evening	Night time
AA	50 dB	45 dB	40 dB
AA	55 dB	50 dB	45 dB
B	65 dB	60 dB	55 dB
C	70 dB	65 dB	60 dB
D	75 dB	70 dB	65 dB



a. Classification of General Areas:

- i. Class AA — a section or contiguous area which requires quietness such as area within 100 meters from school sites, nursery schools, hospitals, and special homes for the aged.
- ii. Class A — a section or contiguous area that is primarily used for residential purposes.
- iii. Class B — a section or contiguous area that is primarily a commercial area.
- iv. Class C — a section primarily reserved as a light industrial area.
- v. Class D — a section that is primarily reserved as a heavy industrial area.

b. The division of the 24-hour period are as follows:

- i. Morning — 5:00 a.m. to 9:00 a.m.
- ii. Daytime — 9:00 a.m. to 6:00 p.m.
- iii. Evening — 6:00 p.m. to 10:00 p.m.
- iv. Nighttime — 10:00 p.m. to 5:00 a.m.

The noise level shall be measured by a standard sound level meter that meets the American National Standards Institute (ANSI) S1.4-1974 or other specification accepted by the Department of Environment and Natural Resources (DENR).

When an area is exposed to more than one hazard, a multiple hazard map is a tool that will facilitate the planning team to analyze the risks and vulnerabilities from all the hazards

## Annex CL–7. Relevant Tables for CCA-DRR

Table CL–25. Volcanic Hazard

Type of volcanic hazard	Barangay	Area affected (ha)

Notes:

- Type of volcanic hazard - ground shaking, lava flow, dome growth, pyroclastic flow, pyroclastic surge, hot blasts, tephra falls, volcanic gas, lahar, tsunami, debris avalanche, hydrothermal explosions, subsidence (see Annex CL-5)

Table CL–26. Historical Data on Tsunami

Earthquake Magnitude	Date	Wave Height	Inundation Area

Notes:

- Types of tsunami - local, regional, pacific wide
- Effects - human, environment, property, critical facility, socio-economic
- Area affected includes tsunami-affected and inundated area

Table CL–27. Landslide

Barangay	Slope	Type of Landslide		Area Affected (ha)	Susceptibility (H/M/L)
		Rain induced (amount of rainfall)	Earthquake induced (magnitude)		

Notes:

- Susceptibility - High (H), Moderate (M), Low (L)

Table CL–28. Noise Pollution Source, Year\_\_\_\_\_

Type of noise producer	Affected area (radius in meter)	Noise level at source (dB)

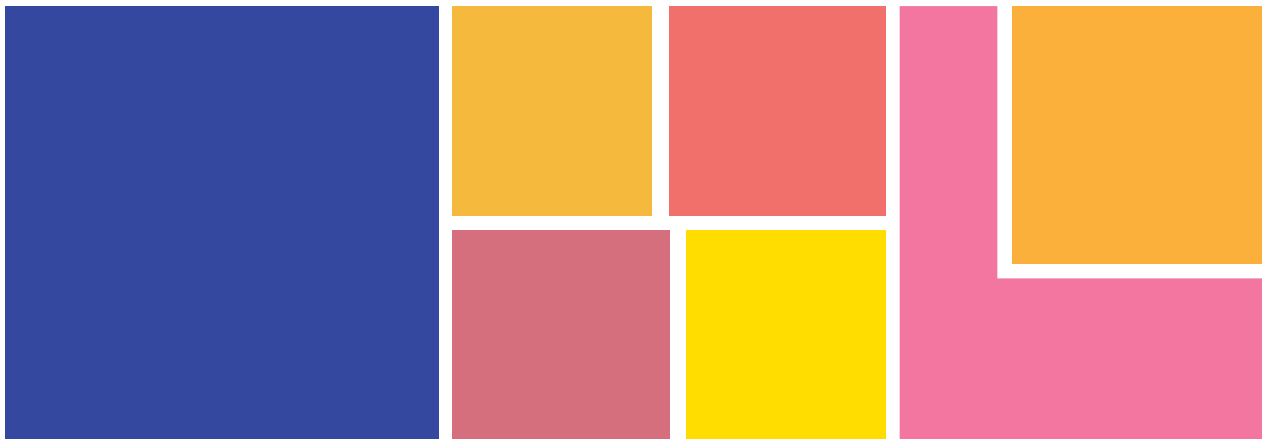
Notes:

- Type of noise producer - vehicular, industrial, commercial, others
- Refer to Annex CL-6 for maximum allowable noise levels to identify noise pollution source

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# Forest Ecosystem

## I. Basic Principles and Concepts

### A. Forest Ecosystem Management: An Essential Component of Comprehensive Land Use Plan

The Philippine constitution provides that the State shall protect and advance the right of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature (Article II, Section 16). Forest ecosystems are vital in climate and water regulation and likewise provides protective function for disaster risk reduction and management. Forest is key to maintaining ecological balance as they provide environmental services essential to human survival. It is likewise a major source for economic development for it provides multiple products such as food, fiber and raw materials for pharmaceutical and other industries, water for irrigation, domestic and industrial use. It contributes to preventing soil erosion and downstream sedimentation, and controlling pests and diseases. Because of the significant roles of forest ecosystems in the overall development of LGUs, it is necessary to integrate their proper management and use in the Comprehensive Land Use Plan (CLUP).

A forest ecosystem study as a component of the CLUP is therefore important to promote effective on-site management of forests and forestlands in harmony with downstream land uses. This is explicitly recognized under Section 1.3 of DENR-DILG Joint Memorandum Circular 98-01 (JMC 98-01) which provides that "Comprehensive Land Use and Forest Land Use Plans are important tools in the holistic and efficient management of forest resources. Toward this end, the DENR and the LGUs together with other government agencies shall undertake forest land use planning (FLUP) as an integral activity of comprehensive land use planning to determine the optimum and balanced use of natural resources to support local, regional and national growth and development."

### B. Integrating Forest Land Use Plans into the Comprehensive Land Use Plan

The formulation of Forest Land Use Plan (FLUP) is aimed to provide a framework for the effective governance and sustainable management of forests and forestlands under the sphere of shared responsibilities between the LGUs, DENR, and other stakeholders. For LGUs, FLUP is important in putting the forestlands in the best use that can boost their economic and ecological advancement. This partnership in FLUP and forestland management is elaborated in the DENR-DILG Joint Memorandum Circular 98-01 and 2003-01. Though the process promoted the use of watershed as spatial framework in planning, FLUP was originally prepared stand alone with no clear cut connection with other spatial plans covering other types of ecosystems (e.g., coastal and marine) within a municipality or a City.

A more ecologically and environmentally responsive, holistic, and ecosystem-based ridge-to-reef framework was adopted by HLURB as a spatial framework of CLUP. The new CLUP demands the integration of various sectoral Environmental and Natural Resources management (ENRM) plans such as Forest Land Use Plan, Integrated Coastal Management Plan, Disaster Risk Reduction and Management, Watershed management, among others. Moreover, it aims to uphold synergy among sectors in ENRM in line with the goal of promoting disaster and climate change-resilient ecosystems and communities.

As contained in the DENR – Forest Management Bureau (FMB) Technical Bulletin No. 2, “the FLUP provides direction to the LGUs, DENR and other stakeholders in managing FFL within their area of responsibility within the context of Sustainable Forest Management (SFM), biodiversity management, vulnerability assessment/ climate change adaptation, disaster risk reduction and management and the reduction of emissions from deforestation and forest degradation.”The FLUP shall be conducted by the planning team/TWG under the guidance of the DENR Regional Office. Refer to CLUP Guidebook Volume 1 Annex 1.2.

## II. General Objectives and Outputs



### Objectives

- Assess the current situation of the LGU's forests and forestlands (FFL) and protected areas to determine existing and potential opportunities, hazards and threats to development
- Determine the availability and conditions of FFL assets/ resources of the LGU including biodiversity
- Establish suitable and specific forest land uses
- Indicate boundaries of Certificate of Ancestral Domain Title (CADT) areas where applicable (AD of CLUP 2014 Volume 2)
- Indicate mining tenement areas where applicable
- Identify the managers, stakeholders and users of forestry assets/ resources
- Identify the institutions involved in the management of forestry assets/ resources and assess their capabilities, including LGUs, NGAs, etc.
- Identify zoning of the production and protection forests within the forest ecosystem.



### Outputs

- Stakeholders Analysis
  - List of institutions involved in the management of forestry assets/ resources and their capabilities
  - List of stakeholders and users of forestry assets/ resources
- Existing forest land uses, location and area
- Thematic maps indicating the available forest assets/ resources (See **Table FO-1** and **FO-2**)
- Existing Land Use Allocation map showing protection and production forests including CADT, mining tenement and tenure instruments/ management arrangements
- Summary table of the forestry assets/ resources of the LGU with corresponding area/ quantity
- Existing forest policies, programs and project

- Proposed forest land uses, policies, programs and projects
- Proposed forest land use allocation map

### III. Thematic Area Assessment Guide



#### Data Requirements

The data on FFL should be gathered and prepared along with other CLUP data. The planner must be aware that data requirements overlap between and among sectors, especially in the use of demographic profiles, and other biophysical data presented in maps. For a clearer presentation of data, it is important to reflect or include the spatial context of the data, whether by type of ecosystem (coastal, mangroves, and marine) or by land classification (e.g., forestlands, A& D lands) for easy spatial integration and analysis.

Some profiles required for forestlands are enhancement to the sectoral studies and form part of the Special Studies area based on the current HLURB CLUP guidelines. Most of the recommended additions covering FFL caters to knowing the issues, threats, and opportunities in the FFL and watersheds, how it influenced changes in land uses and overall situation of forest and forestlands. At the minimum, the following socio-profiles must be included;

- Demographic Profile (including ethnicity, Indigenous Knowledge Systems and Practices of IPs)
- Issues/conflicts and Threats in Forests and Forestlands (and watersheds) and biodiversity.
- Status of Population and Settlements (including basic services)
- Economic standing, economic activities/ dependence on forest resources, and land and resources use practices (in relation to threats)
- Onsite and offsite stakeholders, their interest and mandates, and capability, as well as conflict dynamics (if any)
- Institutional capability/capacity of LGU in ENRM.



#### Steps

The following steps shall be conducted by the LGU planning team/TWG with the assistance of the DENR Regional Office. The forest land use planning includes four major steps: 1) data gathering, mapping, and validation; 2) situational analysis; 3) forests and forestlands zoning and; 4) strategic direction setting and investment planning.

The first activity is about the profiling of forestlands which include socio-institutional data and maps preparation that can readily be integrated in the demographic and sectoral studies part of the CLUP, as well as the preparation of all CLUP maps. Second is the Situational Analysis, which requires separate set of workshops that specifically centers on understanding the situation of the forest and watersheds, the dynamics of stakeholders, and the status of tenurial arrangements or ownership rights within the forestlands. Part of the analysis is the conduct of sieve mapping or map overlaying, which entails spatial analysis that will set the criteria and determine the proposed zones and land uses.

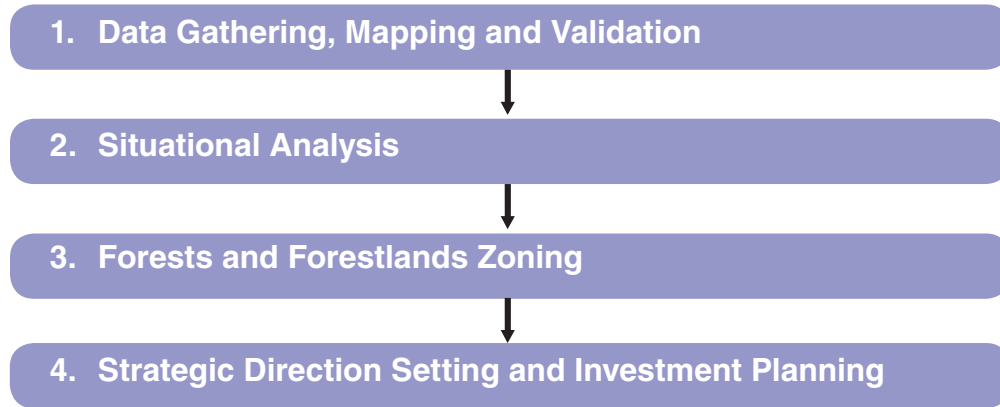
After all data are available and analysis had been completed, the next step is the strategic development direction setting under the Step 5 of the CLUP Guidelines. Consistent with the methods and steps in the CLUP Guidelines Volume 1, the strategic plan shall mainstream forest and forestlands management in the LGU Vision, with at least one definitive goal. The enforcement of the spatial strategies, including the recommendations addressing the issues



and threats in the forestlands, improving the value of forest and watershed assets through various forest rehabilitation means, shall also be prioritized among the investible measures which will then form part of Comprehensive Development Investment Plan (CDIP).

Strong stakeholders' involvement is conveyed to be the basic good governance principle applied in data gathering, analysis, in the determination of zones and land uses, and in defining strategies and recommendations for the management of the forestlands.

## Overview Of Steps



### 1. Data Gathering, Mapping and Validation

This step prepares the CLUP team in gathering, collating, consolidating, and updating/validating all socio-economic data, as well as preparing and validating thematic maps. The validation is done with the participation of the community. Participatory validation is important to update socio-economic profiles and maps, and an opportunity for knowledge sharing and awareness on FFL planning, integrated planning, and sustainable forest management in general.

#### Data on Forest and Forestlands

There are two context of presenting the forestland profiles; 1) in the confines of forestlands based on land classification, and 2) in the context of watershed. The former presents the situation of the forest and forestlands as one of the major ecosystems across the watershed spectrum. However, it is also important to establish the important role played by forest and forestlands across the watershed or subwatershed continuum for integrated ecosystems spatial analysis. The analysis using watershed continuum best approximated the vertical (upland-lowland) and horizontal (across political or administrative boundaries) spatial relationship or interconnectedness, and best applied in hazard, climate change vulnerabilities, water production importance, and integrated zoning.

To make an integrated presentation of the profiles, it is suggested that data be organized/collated properly indicating the type of ecosystem and/or land classification.

- a. Land Classification. It situates the administrative territory and types of land classification and ecosystems in an LGU. (Refer to **Table FO-11**)
- b. Distribution of Area By Barangay Administrative Coverage. Situate further the Barangay by type of land classification and/or ecosystem. (Refer to **Table FO-12**)
- c. Socio-economic Data. Specific socio-economic data needed for FFL planning, in addition to other socio economic data (in the sectoral studies) required in CLUP. (Refer to **Tables FO-13 to FO-23**)
  - o Population by Barangay
  - o Population of IPs (if any)
  - o Migration into the forestlands
  - o Population Change
  - o Profile Specific to Forestlands

- o Tenure in Forestland
- o Mining Rights
- o Issues and Threats and Opportunities

d. Other Biophysical Data/Information. As much as practicable, all biophysical data should be presented in maps. For better statistical manipulation (using Excel or spreadsheets software), tabulate or present results in matrices. Attribute data tables can be derived from all thematic maps using GIS. (Refer to **Tables FO-24 to FO-31**)

- o Elevation Map
- o Slope
- o Geologic Hazards
- o Existing/Current Vegetative Cover/Land Uses
- o Biodiversity
- o Watersheds

In addition to the minimum data requirements discussed above, other information can be collected, depending on available LGU resources and local expertise, to improve plan formulation.

- Undertake a complete census or inventory of forestland protected area occupants and claimants, including location of their claims. This will help a lot in determining appropriate land uses and in crafting implementation strategies.
- Secure recent Key Biodiversity Area (KBA) map from DENR – Biodiversity Management Bureau (BMB) and other habitat maps of rare, endemic and endangered wildlife species which may be available from existing studies in academic institutions or special projects. Community mapping can also be undertaken to locate habitat areas of endangered and threatened wildlife species.
- Secure data on timber and non – timber forest products including wild life species from DENR. If funding is available, conduct inventory in partnership with DENR.

### **Inventory available maps**

Inventory existing maps from the DENR (NAMRIA, BMB, FMB, MGB), LGU, DAR, DPWH, NIA, NPC, DA–BSWM, NCIP, and other sources. These are usually in digital files although the scale may vary and their boundaries may cover regional or provincial boundaries. A list of existing maps available in different offices is provided in **Table FO-10**. This portrays the spatial association or location of variety of physical and cultural features and should be reflected in the base map.

For consistency, process maps according to the scale of the base map (1:10,000, 1:25,000 or 1:50,000).

### **Derive thematic maps (as listed in Table FO-2) preferably using Geographic Information System (GIS)**

Utilize official city/ municipal boundaries in the preparation of the base map. This will be used for the preparation of the thematic maps. Each thematic map depicts a single feature of the earth surface or represents a single subject or theme which will be used to analyze and synthesize variable factors according to the desired output.

Refer to **Annex FO – 1** for sample of overlay maps.

### **Validate and update thematic maps, if necessary**

Present the derived thematic maps in a general meeting attended by barangay officials or representatives, DENR, people's organizations (POs), NGOs and other stakeholders. Let the stakeholders review the maps and indicate their comments or update the information on the map which may be relevant in forest ecosystem planning. If necessary, the comments or additional information indicated on the thematic maps may be verified further on the ground using GPS receivers.

The cheapest way to either get first-hand or validate spatial information is through participatory/ community mapping done in combination with ground validation (walk through). Community mapping has become widely acceptable tool not only in validating secondary spatial information but also in planning. For forestlands, vegetative cover and land uses provide a link to human activity or population pressure, therefore, this information should be gathered with community participation. The information gathered through community mapping should be integrated into the thematic maps and then subject to ground validation.

### Conduct an inventory of forestry assets/ resources

- a. Overlay sub-watershed boundary map with the recent forest cover map and land resource use map of the LGU.
- b. Generate for each sub watershed the total area of each forest / forest land assets/ resources such as forestlands, protected areas, A & D lands, mineral lands, close canopy forest, open canopy forest, mangrove forests, plantations, and other resources as indicated in the thematic maps.
- c. Summarize data using **Table FO-33**

### Determine the changes and condition of FFL assets/ resources

- If DENR or the LGU have other forest cover or land resource use maps of previous years, summarize the results in **Tables FO-27 to FO-29**.
- Conduct a resource assessment workshop among barangay key informants to determine changes in the condition of other FFL Assets/ resources.
- Identify the barangays that have forestry assets or which are directly benefitting from the forest resources.
- Invite key informants from these barangays who are knowledgeable about the conditions of the forestry assets/ resources
- Facilitate qualitative resource assessment. Summarize results in **Table FO-34**.

### Assess the primary users and beneficiaries of the LGU's forestry resources

- Identify the primary users and beneficiaries of forestry assets/ resources
- Invite key informants from these users and FFL beneficiaries
- Assess their interests, current uses, strengths and weaknesses, and whether they have conflicts with other stakeholders
- Summarize results in **Table FO- 36**.



The primary users and/or beneficiaries of the LGUs forestry resources are those forest-dependent communities/ individuals such as IPs/ ICCs, tenure holders, kaingineros, etc.

### Assess the institutions involved in the management of forest ecosystems

- List down the primary institutions/ agencies involved in the management of the LGU's forestry resources by virtue of their mandates and activities. This would include DENR, LGUs, NCIP, NGOs and other relevant agencies operating in the LGU's forestlands and protected areas.
- Interview key informants from these agencies to determine their capabilities in managing the forest resources in terms of manpower, funding, manpower skills, forest ecosystem related policies/ plans, past and existing projects being implemented including institutional constraints and limitations.
- Summarize results in **Table FO- 37**.

## 2. Situational Analysis

Situational analysis in FFL is meant to understand the relationships, pattern, and trends across forestlands and within the watershed as the integrated land use spatial framework. The bottom line aside from coming up with the proposal for land use, is to recommend measures to achieve sustainable forest management under the sphere of shared responsibility between the Local Government Units and National Government (DENR). The analysis focuses on the following premise:

- How are forestlands being managed? Or is Sustainable Forest Management being achieved?
- Are land uses within forestlands compatible or in harmony with its desired functions? Does it ensure the sustainability of goods and services including its support for watershed ecosystems functions?
- In the context of watershed, is the current state of the forests and forestlands supportive of watershed integrity in order to perform its ecological functions to provide and sustain goods and services?

### Conceptual and Technical Discussion on Situational Analysis

Forest cover (especially natural forest) serves as the main indicator for assessing forestlands, although the presence of other resources also serves as an opportunity for potential optimization of use. It also serves as the proxy indicator for biodiversity as most habitat is associated with forest pristineness, as well as the integrity of watershed, for the role it plays in water regulation, climate regulation, and many other ecological functions (e.g., nutrient cycling, etc.).The analysis therefore works on this premise. The forest may also be utilized for tangible benefits (e.g., lumber and other wood products) but should be done in a sustainable manner. Accordingly, a balance of Protection and Production use must be observed and contextualized in a spatial perspective that follows the technical (or ecological requirements) for forest land uses.

The factors of forest and watershed degradation in the Philippines have long been established as caused by intertwined issues of poverty, indiscriminate uses, weak institutions, political priorities, and other socio-cultural factors. Therefore, it should also be understood in the local setting of the Local Government Units.

### Coverage and Methods of Analysis in Forest and Forestlands

Focal Area of Analysis	Key Findings	Methods
1. Forest Assessment (understanding the forest resource)	<ul style="list-style-type: none"> <li>• Situation of the remaining forest in terms of extent relative to the total forestlands</li> <li>• Trend of forest decline/increase</li> <li>• Vegetative Cover types (in vegetative cover maps)</li> <li>• Other land uses/Pattern of forestland uses</li> </ul>	Field Observation Inventory Results if Available Use of thematic map Map Overlaying and Analysis
2. Assessing existing forestland management regime	<ul style="list-style-type: none"> <li>• Who manages the forestlands? What are their contribution in forest development and management? Their capability?</li> <li>• Is the large part of forestlands under open access situation? Or are there no legitimate entity tasked for its protection and development?</li> <li>• Are there IPs inside?</li> <li>• Other ownership rights (mining, CADT, other claimants)</li> </ul>	Tenure Holder Assessment

Focal Area of Analysis	Key Findings	Methods
3. Population Pressure	<ul style="list-style-type: none"> <li>• Population within Forestlands</li> <li>• Economic activities of people</li> <li>• Economic standing of settlers (within or below poverty thresholds?)</li> <li>• Practices (kaingin, illegal cutting, unregulated resources extraction)</li> </ul>	Socio-economic Profiling Review of sectoral studies PRA/Participatory mapping
4. Other Economic Activities in forestlands	<ul style="list-style-type: none"> <li>• Are there forest related industries? What are their contributions to local income? To LGU revenue?</li> </ul>	PRA/Socio-Profiling
5. Conflicts	<ul style="list-style-type: none"> <li>• Are there conflicts involving forest land uses? What is the status of conflicts?</li> </ul>	Conflict Analysis/Socio-Profiling
6. Biodiversity Status in Forestlands	<ul style="list-style-type: none"> <li>• Important species of plants and animals and their habitat</li> <li>• Critical habitat for highly threatened species of flora and fauna</li> </ul>	Biodiversity Inventory/ Studies Participatory mapping
7. Climate Change Vulnerability	<ul style="list-style-type: none"> <li>• Vulnerability level of forest ecosystem based on combined findings on exposure, sensitivity, and adaptive capacity. Key variables recommended: erosion, forest fire, landslide, drought</li> </ul>	Vulnerability Assessment Map Overlaying and Analysis Socio-profiling

What is important is to develop the story line utilizing all information from the findings to determine the situation of the forests and forestlands and the associated biodiversity. Findings can be summarized into issues, threats and opportunities. Opportunities may be in the form of resources or natural assets that may be tapped by the LGU to boost its comparative advantage.

In the analysis of land use, incompatible land uses will be determined by comparing the existing land uses to the recommended/envisioned forest management zone and land uses established base on set of criteria.

## Map Overlaying

Map overlaying serves as the most important tool in land use analysis and planning. Also called sieve mapping, this is basically a GIS operation which combines or merges two or more map layers or themes to produce derived maps or maps of desired analysis. Given the enormity of possible overlay scenario, it is best to focus on the objective of the analysis and/or desired results. Most of the analysis on FFL, including the watershed analysis will make use of this tool.

## Integrated Watershed Analysis

The focus of analysis in the watershed is the establishment of the relation between the FFL and its overall ecosystem functions such as sustainability of water production or water production value, reducing scenario of flooding (or disaster mitigation), biodiversity, etc. The analysis of watershed is regardless of types of ecosystems or Land Classification. However, FFL is important in this context because the forest is an important element in maintaining or improving watershed integrity. Based on some studies, each watershed must at least have 40% of forest or perennials (UNDP-FAO) to approximate integrity.

Recommended focus of analysis of watershed for land use integration in CLUP are the following:

- Vegetative Cover in Watershed (approximates watershed health/integrity)

- Geologic Hazards (and or Climate Change Vulnerability) and Population and/or investments that may be affected, including in the coastal areas.
- Water Production Value of the Watersheds (Water Uses within Watershed)
- Environmentally constrained or critical areas within watersheds that must be protected and/or developed

### Sample Data Tables of Analysis

This section presents sample data tables that the planning team may use for the analysis of FFL. Refer to **Annex FO-1** for the sample thematic maps needed for forest ecosystems planning.



Analysis from sample tables should be translated into maps to better see the spatial relationships (vertical and horizontal).

A rapid watershed analysis/characterization may be undertaken through map overlaying analysis having the Watershed/Drainage Map as base map. The following are the topics for analysis:

- a. Land Uses in Watersheds/Sub-watersheds. The sample table below gives a picture of various land uses across the watershed landscapes.

Map Overlay: Vegetative Cover + Land Uses (both forestlands and A & D)

**Table FO-1. Major Usage and Land Uses of Watersheds/Sub-watershed (Sample)**

	Watershed	Area	Existing Use/Upland-Lowland Link
1	Ilog Hilabangan and Bacuyangan	7,047.90	Drains to Tabla River and headwaters of the critical watershed of proclaimed Ilog-Hilabangan Watershed Reserve mainly used for large scale irrigation
2	Pagatban	6,807.27	Drains to Basay and Bayawan. Contributor to large irrigation and domestic uses in those towns.
3	Sangke-Culipapa	970.14	In the Southeastern tip of Hinoba-an. Drained to its coastal area; Large population of coastal communities. Land uses include irrigation and perennial crops; MPA in coastal and marine areas. Coastal area is assessed flood prone.
4	Culipapa-Daug	1,597.19	Drains to coastal area of Hinoba-an. With small area of irrigated rice lands. Coastal communities downstream. MPA in coastal and marine areas. Coastal area is assessed flood prone.
5	Bulwangan-Daug	1,773.93	Drains to coastal area of Hinoba-an. Large irrigated ricelands and huge number of households in coastal area. Coastal area was assessed flood prone.
6	Asia-Alim-Bulwangan	2,621.07	Drains to Sulu Sea. Coastal area is assessed flood prone. Large number of settlements and vast area of irrigated rice lands.
7	Alim-Pook-San Rafael-Asia	1,823.86	Large settlements, infrastructures, and large irrigated rice lands are also present. Flood prone.
8	Bacuyanán,-San Rafael-Brgy 1 & 2	3,305.36	Drains through the Poblacion proper. Key uses include commercial establishments, large area of irrigation, and coastal settlements are numerous. Downstream is assessed as flood prone.
9	Talacagay-San Rafael-Brgy 1	1,932.89	Drains through the Poblacion proper. Key uses include commercial establishments, large area of irrigation, and coastal settlements are numerous. Downstream is assessed as flood prone.

Note: For a more detailed analysis and better understanding of how land use is distributed across ecosystems, also reflect land use by land classification type.



b. Approximating Watershed Health. The presence of forest or forest vegetation plays an important role in maintaining the ecological function of the watersheds. Vegetation is important to protect soil surfaces during intense rainfall, and absorbs large proportions of rainfall for underground water recharge and reduction of runoff and flooding. More forests indicate a healthier watershed.

Map Overlay: Watershed + Vegetative Cover

Table FO-2. Forest-Watershed Area of the Municipality of Hinoba-an (Sample)

Watershed	Area	Forest and Other Perennial	Open Area	% Vegetative Cover
Ilog Hilabangan and Bacuyangan	7,047.90	1,848.24	4,959.98	26.22
Pagatban	6,807.27	2,365.12	4,317.90	34.74
Tiabanan	10,306.23	4,368.04	5,640.97	42.38
Sangke-Culipapa	970.14	616.67	310.1	63.57
Culipapa-Daug	1,597.19	973.93	448.02	60.98
Talacagay-San Rafael - Brgy 1	1,932.89	498.76	496.15	25.8
Talacagay	270.09	125.26	11.81	46.38
<b>TOTAL</b>	<b>38,455.93</b>	<b>15,145.06</b>	<b>19,415.36</b>	<b>39.38</b>

c. Geologic Hazard Area by Watershed. This shows the extent of areas that are prone to hazards such as landslide, flooding, and liquefaction. The analysis will help approximate the coverage of areas, population, public, and private investments that may be affected by these hazards in the light of DRRM and/or climate change adaptation. Moreover, it also includes types of hazards in coastal areas.

Map Overlay: Hazard Map + Watershed Map

Table FO-3. Danger Areas per Watershed (Sample)

Watershed	Area			
	High Landslide Susceptibility	Flood Prone	Liquefaction Area	Storm Surges
Ilog Hilabangan and Bacuyangan	7,047.90	1,848.24	4,959.98	26.22
Pagatban	6,807.27	2,365.12	4,317.90	34.74
Tiabanan	10,306.23	4,368.04	5,640.97	42.38
Sangke-Culipapa	970.14	616.67	310.1	63.57
Culipapa-Daug	1,597.19	973.93	448.02	60.98
Talacagay-San Rafael-Brgy 1	1,932.89	498.76	496.15	25.8
Talacagay	270.09	125.26	11.81	46.38
<b>TOTAL</b>	<b>38,455.93</b>	<b>15,145.06</b>	<b>19,415.36</b>	<b>39.38</b>

d. Settlements (and/or Land Uses) within Identified (or assessed) Hazard Prone Area (or in areas of high risk due to climate change). This data approximates the risk that may happen in the event of disaster, a necessary input in disaster risk reduction and management.

Map Overlay: Watershed + Hazard + Settlement Maps

Table FO-4. Settlement in Hazard Prone Areas per Watershed

Watershed	Area			
	High Landslide Susceptibility	Flood Prone	Liquefaction Area	Storm Surges
Ilog Hilabangan and Bacuyangan				
Pagatban				
Tiabanan				
Sangke-Culipapa				
Culipapa-Daug				
Talacagay-San Rafael-Brgy 1				
Talacagay				
<b>TOTAL</b>				

Note: This may be applied also to other types of land use (institutional, agriculture, industrial) and/or to specific private or public investments (roads, bridges, schools, that may be affected).

e. Other Ecological Service Functions of Watersheds. Consideration on ecological service functions of watershed is paramount, and must be basic in land use planning. Ideally, there should be a linkage between the land use decisions, the demand, and its spatial appropriateness (vertical and horizontal analysis). However, it must avoid irrational land uses that undermine the overall integrity of the watersheds and all ecosystems within it.

**Importance of Watersheds for Water Production.** Water is a major life support system that needs to be sustained. The importance of forest and perennial cover are properly contextualized in the hydrologic cycle, mainly in regulating water and climate regime. It is thus also important to manage the forest and forestlands for these reasons.

In this analysis, the basic proxy indicators in determining water production importance of watersheds include:

- Presence of large irrigations that are dependent on water resources (area in hectares)
- No. of settlements or households that demand water for domestic/ household use
- No. of industries utilizing water resources (resorts, hydro-electric facilities)

This analysis can be supported by estimating water demand for each type of uses. Its relation to land use has bearing on the water sources. Watershed catchments or sub-catchment identified as primary sources of water should be allocated/ delineated as water production area, and should be included in the PROTECTION ZONE.

What is important is to identify and map the source (especially for surface water) and input that in the land use decisions. For water sources that are in A & D lands, certain mechanism must be established with the owner or claimant of the land to be able to include that area in the protection zone, and enforce necessary regulations.



Refer to **Infrastructure Sub-sector: Water** of this guidebook (CLUP Guidebook Volume 2) for estimating water demand for the city/municipality according to the type of consumers. For irrigation, water requirement is projected at 1 liter per second per hectare at 60 days at 2 croppings.

**Biodiversity Conservation Areas.** Ranges of habitat of biodiversity (flora and fauna) transcend boundaries across ecosystems. All areas of critical habitat (if available) or corridors must be mapped and included in the land use decision.

Table FO-5. Distribution of Biodiversity Conservation Area by Watershed (Sample)

Watershed	Critical Habitat/Other Biodiversity Conservation Areas			
	Alienable and Disposable Lands (ha)	Forestlands (ha)	Coastal	Threats (for each ecosystem)
<b>Ilog Hilabangan and Bacuyangan</b>				
<b>Pagatban</b>				
<b>Tiabanan</b>				
<b>Sangke-Culipapa</b>				
<b>Culipapa-Daug</b>				
<b>Talacagay-San Rafael-Brgy 1</b>				
<b>Talacagay</b>				
<b>TOTAL</b>				

Note: Network of local conservation areas may be organized into biodiversity corridors as part of the proposed land uses and regulations.

**Assess the impact of climate change and disaster risk on FFL resources.** Refer to CCA-DRR tools and methodologies as detailed in the CLUP Guidebook Volume 2, Supplemental Guidelines on Mainstreaming Climate and Disaster Risk in the CLUP and DENR Climate Resilient Philippine Master Plan for Forestry Development.

### 3. Forests and Forestlands Zoning

Preparing land use for forestlands is entirely different from the land use planning in Alienable and Disposable Lands or urban areas. Land use planning in forestlands works in the premise of sustainable forest management, where it promotes the balance between production and protection with the overall intention of contributing to the integrity of ecosystem and maintaining ecological balance. There are two major categories considered: PRODUCTION and PROTECTION zones or uses.

PROTECTION FOREST is a forest set aside for protection to maintain essential ecological processes and life-support systems, preserve genetic diversity, ensure sustainable use of resources found therein, and maintain their natural conditions to the greatest extent possible (PD 705). It thus primarily serves for biodiversity conservation, and other forest non-altering specific uses such as for community watersheds, tourism, sanctuaries, and critical habitats, among others.

PRODUCTION FOREST is where various economic uses of forestlands are allowed but are also contributive to biodiversity and soil and watershed conservation;

- agro-forestry development (including high value crops production)
- industrial tree plantation
- settlements (upon approval or declaration)
- other special land uses

Protected Areas declared under the NIPAS Law are also divided into two (2) management zones: STRICT PROTECTION ZONE and the MULTIPLE USE ZONE. Protected areas have the same or similar regulatory requirements as forestlands, only that it is set aside by law for such purpose.

Example of areas that can be included in Protection Zone/Conservation Areas in forestlands:

A. Based on Laws and Regulation
<ul style="list-style-type: none"> <li>• Above 1000 masl in elev. and 50% in slope</li> <li>• Natural Forest (EO 23)</li> <li>• Geologic Hazard Areas (flooding and landslides)</li> <li>• Mangrove Forest</li> <li>• Riverbanks and Water Bodies, including estuaries</li> <li>• Habitat of endangered or threatened species of indigenous wildlife (biodiversity conservation sites)</li> <li>• Areas of unique interest</li> <li>• Historical, cultural and archaeological sites</li> <li>• Foreshore</li> </ul>

**B. Existing, designated or to be designated**

- Tourist Spot
- Community Watersheds/Water Production Areas
- Assessed CC-Vulnerable Areas
- Marine Protected Areas
- Coastal Vulnerable Areas (Coastal Zones)
- Other areas that may be designated by Local Government Unit in agreement with DENR (e.g., 800 and above in elevation)
- IPs heritage sites

Note: Indigenous Cultural communities may have different categorization of area based on their traditional and customary practices which must be paramount in land use decision for areas covered by CADT.

In the context of holistic watershed planning, the upland-lowland (vertical) and horizontal (across ecosystems) link of zoning and land uses must be carefully studied in terms of balance and harmony. As much as possible, there should be a holistic balance between production and protection use across land classification and ecosystem giving paramount consideration to the environment and ecological impacts of these land uses.



For detailed zoning in FFL, refer to Volume 3 of CLUP Guidebook 2014: Model Zoning Ordinance.

### Regulations for Inclusion in the Zoning Ordinance

Regulations on land uses are available in various laws and policies for forestlands and may serve as the primary basis for inclusion in the zoning ordinance. However, LGUs may also recommend a more stringent measure of regulations, only to ensure that the objectives of land use planning are met.

Table FO-6. Example of Policy Option for Consideration in the Zoning Ordinance

Land Use Plan	Policy Option/Management Prescription
<b>Protection Zone</b>	
Environmentally Critical and Constrained Area	No cutting of trees; Rehabilitation to make dominant use of endemic species; Non-buildable- building of any kind of structures not allowed.
Water Bodies/River Easements	No cutting of trees. Maintain easement of at least 40 meters on both side of rivers. In identified flood prone area, put additional buffer easement as necessary after assessment of level of vulnerability. Non-buildable- no structure of any kind may be allowed. Serves as part of the BIODIVERSITY CORRIDOR. Rehabilitation in areas currently denuded and/or cultivated must be in multi-storey (agro-forestry) type
Community Watershed/Primary Water Sources	No cutting of trees; Rehabilitation to make dominant use of endemic species; Non-buildable-building of any kind of structures not allowed.
Coastal and Mangroves	No cutting of mangroves; Planting of more mangroves in suitable areas and identified prone to storm surges. Recommended relocation of existing structures, and/or imposition of adaptation mechanism on building standards.
<b>Production Zone</b>	
Settlement Area (Existing)	Inventory of legitimate claimant. Maintain easements of 40 meters from riverbanks. Follow building standards. In support of biodiversity, maintain Barangay Tree Parks.
Sustainable Forest Production	Based on site suitability assessment, allowed investment and activities include: agroforestry, high value crops, and industrial tree plantation. There should be balance of use for timber/lumber purposes between and other non-timber uses. Maintain blocks of tree buffer strips in between non-timber uses in complement of biodiversity use.

Land Use Plan	Policy Option/Management Prescription
<b>Overlay Zone</b>	
Biodiversity Conservation	As KBA, biodiversity conservation must be mainstreamed in all types of uses within forestlands and A & D Lands be it protection and production.
Certificate of Ancestral Domain	Management should be based on ADSDPP. The future zoning, which must be based on their traditional practices, must be added or harmonized with these recommended zones and land uses.
Eco-Tourism Zone	Use of semi to non-permanent structures. Apply for Special Use Permit. Further define use regulation prior to issuance of special use permit that incorporate biodiversity, and other protective uses of the forestlands.

#### 4. Strategic Direction Setting and Investment Planning

Ideally for Local Government Units, the use of forestlands is envisaged to boost or contribute to their economic development and the sustainability of the provisions of goods and services. For forestlands and watershed that are in the alarming state of degradation, an added challenge to LGUs and the national government is to address the cause of degradation and harmonize incompatible uses (vis-a-vis the envisioned or recommended forest zones and land uses) along with Sustainable Forest Management, disaster risk reduction, and climate change mitigation. These are areas that must be included in environmental investments for integration in the Comprehensive Development Plan investment portfolio.

There are at least five main goal categories that may be defined for determining priorities for investment planning:

- Goals that address threats to forest resources and revert the pattern of degradation (as the case may be)
- Goals that help improve the value of the forest assets and biodiversity, including its overall integrity and productive value (e.g., forest rehabilitation, agroforestry, industrial tree plantation, high value crop production, etc.)
- Goals that improve the economic standing of the local population;
- Goals that grab opportunities that will boost the comparative advantage of Local Government Unit for the use of forest and forestlands (or protected areas assets)
- Goals that address threats to population and investments (DRRM and Climate Change Adaptation and Mitigation)

Define and prioritize strategies and recommendations under each goal for more strategic use of limited resources. All spatial strategies must be directed towards the attainment of the proposed land use.

Table FO-7. Strategic Objective

STRATEGIC OBJECTIVE	To establish enforcement mechanism in addressing conflicts on land uses, issues and threats in forestlands and watersheds
Objective	Strategies
Objective 1. Creation of Enforcement Mechanism for Zoning and Land Uses	<ul style="list-style-type: none"> <li>• Demarcation by Barangay through appropriate methods i.e., participatory mapping</li> <li>• Disaggregation or Zone to Barangay Development Zone/Integration to the Barangay Development Plan</li> <li>• Integration of enforcement responsibilities to the responsibility of Bantay Gubat/Bantay Dagat</li> <li>• IEC</li> </ul>
Objective 2. To close the Open Access Situation of the Forestlands	<ul style="list-style-type: none"> <li>• Facilitate the Issuance of Tenure in untenured forestlands (CBFM, or Private Investor)</li> <li>• Provision of extension services/community organizing/IEC</li> </ul>

STRATEGIC OBJECTIVE	To establish enforcement mechanism in addressing conflicts on land uses, issues and threats in forestlands and watersheds
Objective	Strategies
Objective 2. To close the Open Access Situation of the Forestlands (cont'd)	<ul style="list-style-type: none"> <li>Facilitate formulation of Management Plan for tenure Holders and adoption of zoning map and regulation in the management plan.</li> </ul>
Objective 3. To regulate expansion of claims and land uses within forestlands	<ul style="list-style-type: none"> <li>Inventory of forest occupants</li> <li>Formation of registry of occupants, land claims, and productive development activities;</li> <li>Creation of data base management information system as basis of control and regulation.</li> </ul>
Objective 4. Create and Strengthen Enforcement Teams	<ul style="list-style-type: none"> <li>Organize/Train Bantay Kalikasan and establish collaborative means to enjoin settlers/CADT holders, and tenure holder in forest protection and enforcement</li> <li>Conduct of paralegal training and deputation of members;</li> <li>Formulation of incentive systems for members of the enforcements units;</li> <li>Inventory and mapping of hotspot areas and prepare an enforcement plan;</li> <li>IEC</li> </ul>

## IV. Sector Analysis Matrix

Table FO-8. Sample Forest Sector Analysis Matrix

Technical findings/observations/ Issues and concerns	Effects, impacts, implication	Policy options/Interventions
Declining forests	<ul style="list-style-type: none"> <li>Availability of forest products (timber and non-timber) to communities is expected to decline</li> <li>Ability of forests to provide environmental services, such as watershed protection and reduction of flooding risks will decline</li> </ul>	<ul style="list-style-type: none"> <li>Strict protection of existing natural forests</li> <li>Creation of multi sectoral forest protection committees</li> <li>Develop additional forest plantations</li> <li>Zoning to identify areas for private sector investment in plantation development</li> </ul>
Settlements in landslide prone areas	<ul style="list-style-type: none"> <li>This could potentially lead to loss of lives and properties</li> </ul>	<ul style="list-style-type: none"> <li>Zoning of landslide prone areas within forestlands as protection zone and strict enforcement of zoning ordinance</li> <li>Encourage communities to relocate to safer areas</li> </ul>
Denuded watersheds draining to flood prone areas	<ul style="list-style-type: none"> <li>High exposure of communities and agricultural lands to flooding risks that could lead to loss of lives and properties and damage to crops</li> </ul>	<ul style="list-style-type: none"> <li>Zoning of catchments/ watersheds draining to flood prone areas as protection zones where timber cutting will be prohibited</li> <li>enforcement of zoning ordinance</li> <li>Rehabilitation of denuded watersheds</li> </ul>
Destruction of critical habitats	<ul style="list-style-type: none"> <li>Loss of biological diversity resources and extinction of endangered species</li> </ul>	<ul style="list-style-type: none"> <li>Zoning of critical habitats as protection zone and strict enforcement of zoning ordinance</li> <li>Information dissemination on the importance of biodiversity</li> </ul>
Lack or inadequate source of wood raw materials	<ul style="list-style-type: none"> <li>This could lead to more illegal cutting of timber in existing natural forests because of available market demand</li> </ul>	<ul style="list-style-type: none"> <li>Identify production zones within forestlands for plantation development or as communal forests of LGUs</li> <li>Encourage development of forest plantations in alienable and disposable lands</li> </ul>
Denuded condition of watersheds which are sources of water for irrigation and domestic use	<ul style="list-style-type: none"> <li>Leads to water shortages for irrigation and domestic use especially during the dry season</li> </ul>	<ul style="list-style-type: none"> <li>Zoning of water sources as protection zones and strict enforcement of zoning ordinance</li> <li>Apply with DENR for co-management or declaration of water sources as community watersheds</li> <li>Rehabilitation of denuded watersheds</li> </ul>



Technical findings/observations/ Issues and concerns	Effects, impacts, implication	Policy options/interventions
Declining or Destruction of mangrove forests	<ul style="list-style-type: none"> <li>- Increased risks to tsunami and storm surges</li> <li>- Destruction of spawning grounds and adversely affect fisheries resources which could impact on livelihood of communities</li> </ul>	<ul style="list-style-type: none"> <li>- Zoning of mangrove forests as protection zone and strict enforcement of zoning ordinance</li> <li>- More information and education campaigns on values of mangroves</li> <li>- Development of mangrove plantations</li> </ul>
Open access condition of forestlands	<ul style="list-style-type: none"> <li>- Leads to more destruction of forest resources since there is no accountable on site manager</li> </ul>	<ul style="list-style-type: none"> <li>- Allocate open access forestlands to responsible tenure holders through transparent processes</li> </ul>
Lack or inadequate mechanisms for stakeholders and	<ul style="list-style-type: none"> <li>- Use of manpower and financial resources is not maximized</li> </ul>	<ul style="list-style-type: none"> <li>- Enter into co-management agreement of forest ecosystems with DENR, PAMB, and other stakeholders</li> </ul>

## V. Data Requirements for Forest Ecosystem Assessment

Table FO-9. Checklist of Existing Maps for Inventory and their Corresponding Sources

NO.	MAP TYPES	SOURCES
1	Political boundaries map	City/ Municipality
2	Slope map	DENR, Province/ City/ Municipality
3	Topographic map indicating drainage/ river systems	DENR, NAMRIA
4	Land Classification Map	BMB, NAMRIA, DENR, MGB
5	Forest cover map	DENR, NAMRIA
6	Elevation map	DENR
7	Tenure map	DENR, DAR, DA-BFAR, MGB, BMB, NCIP
8	Infrastructure map	Province/ City/ Municipality, DPWH, NIA, NPC, Water District, DA
9	Hazard map	MGB, PAGASA, Province/ City/ Municipal DRRMO,
10	Forestry projects map	DENR, NGOs, BMB, City/ Municipality
11	Tourism areas map	DOT, Province/ City/ Municipal Tourism office
12	Mineral Map	MGB
13	Land cover map	NAMRIA
14	PA Management Zone Map	PAMB, DENR
15	Watershed Map	DENR, FMB

Table FO-10. Checklist of Thematic Maps Needed for Forest Ecosystem Planning

NO.	THEMATIC MAPS	DESCRIPTION	SOURCE
1	Land Classification Map	Locates timberland, protected areas, alienable and disposable areas and mineral lands	City/ Municipal boundary + LC + Mineral map + tenure map of protected areas)
2	Watershed & Drainage Map	Indicates watershed divide, rivers and creeks	City/ Municipal boundary + Drainage + watershed divide traced from Topographic Map
3	Administrative Map	Shows the boundaries of the LGU and its barangays	LGU, DENR
4	Forest Cover Map (for 2 periods)	Indicates old-growth forest (closed canopy forest); Second-growth forest (open canopy forests), plantation, mangrove forests, grasslands, brush lands, ricelands, etc.	City/ Municipal boundary + NAMRIA forest cover map updated by community mapping; DA-BSWM
5	Slope Map	Shows different slope categories (<18%, 18-30%, 30-50%, >50%)	City/ Municipal boundary + slope map; DA-BSWM
6	Elevation Map	Shows different elevation categories (<500 masl; 500-1,000; >1,000 masl)	City/ Municipal boundary + elevation map
7	Tenure & Allocation Map	Areas with CSCs, CBFMA, land grant, protected area, special agreements, CADTs, and other tenure instruments	City/ Municipal boundary + tenure map from DENR, NCIP (for CADTs), DAR, MGB, BMB (for protected areas)

NO.	THEMATIC MAPS	DESCRIPTION	SOURCE
8	Existing Land Use/ resource use map	Shows agroforestry, built up, cultivated areas, hunting areas, sacred areas, NTFP gathering, etc.	City/ Municipal boundary + land cover map + community maps indicating existing land uses of communities
9	Infrastructure Map	Shows the bridges, roads, communal irrigation system, water sources for domestic use, power distribution systems, schools, hospital, ports, dams and other infrastructures	City/ Municipal boundary + location map of key infrastructures provided by NIA, DPWH, Water District, DA, NPC, and the Mun. Engineering Office + community map
10	Population Density Map	Show population by barangay, and areas of settlements; location of sitios	Barangay administrative map indicating density of population and location of settlements
11	Geologic Hazard & Risk Map	Location of geologic hazards, e.g. volcanoes, faults, land slips, highly erodible areas, flood prone areas	City/ Municipal boundary + geologic hazard and risk map from MGB/ PAGASA
12	Conflicts/Issues Map	Location of existing and emerging conflicts in land use allocation plus other concerns in forest management (e.g. overlapping tenures/claim, presence of upland communities, identified boundary conflicts, location of new and old kaingin, location of illegal cutting areas), impact areas of CC hazards and risks	<ul style="list-style-type: none"> <li>- City/ Municipal boundary + existing land use + hazard map;</li> <li>- City/ Municipal boundary + overlay of different tenure maps</li> <li>- City/ Municipal boundary + boundary map of adjacent LGUs</li> <li>- City/ Municipal boundary + PA mgm't zones + existing land use map</li> <li>- Community mapping of illegal activities in forestlands</li> </ul>
13	Forestry Projects Map	Show forestry operation by various agencies, e.g. reforestation projects	City/ Municipal boundary map + location map of existing forestry projects
14	Mineral Map, if any	Shows location of Mineral Production Sharing Agreement, exploration permits, Financial or Technical Assistance Agreements, mining claims	City/ Municipal boundary + Mineral map from MGB and PLGU
15	Tourism areas map	Existing and potential tourism sites (caves, waterfalls, lakes, etc)	City/ Municipal boundary map + tourism areas map from Tourism Office + community map of potential tourism sites
16	Biodiversity map	Shows Key Biodiversity Areas	City/ Municipal boundary map + Key Biodiversity Areas

Note: LC - Land Classification map

Table FO-11. Land Classification in the Municipality of \_\_\_\_\_, Year \_\_\_\_

Land Classification	Area	%
A & D		
Forestlands		
<b>Total</b>		

Source: Administrative Map, DENR Land Classification Year \_\_\_\_

Table FO-12. Distribution of Area by Barangay Administrative Coverage

Barangay	Area			%
	A & D	Forestlands	Total	

Source: Land Classification Map, Administrative Map Year \_\_\_\_

Table FO-13. Population by Barangay in the Municipality of \_\_\_\_\_

Barangay	Area	# of HH	Population			Density
			IPs	Non-IPs	Total	
<b>Forestland or Protected Area</b>						
1						
2.						
<b>A &amp; D</b>						
1.						
2.						
<b>TOTAL</b>						

Source:

Note for Table FO-13: Indicate if possible the exact number of population within the forestlands and coastal area, the ethnicity and the gender as required in the CLUP. Location of households can also be reflected in the Settlement Map with proper georeferencing (tracking using GPS device) which can help spatially approximate distribution across land classification or ecosystem by map overlaying analysis.

**Table FO-14. Population of Indigenous Cultural Communities of ICC/IP in communities, by barangay, CY xxxx (if IP are present)**

Barangays	Indigenous Cultural Communities	Estimated Population	Status of CADC/CADT	Remarks (indicate conflicts with other claimants)

Source:

**Table FO-15. Migration Pattern in Forestlands**

Barangay	Migration Rate			Causes of Migration
	2005	2010	CYxx	
Forestlands (upland)				
Barangay 1				
Barangay 2				
Coastal/Mangroves				
Barangay 1				
Barangay 2				

Source:

**Table FO-16. Average Annual Population Change and Population Projection per Barangay**

Barangays	Total Population			Ave. Annual Population Change	Growth Rate	CY xxxx Projected Population
	2000	2007	2010			
Forestlands						
Non-forestlands						
TOTAL						

Source:

**Table FO-17. Forest Land Use Practices of Household in Forestlands**

Barangay	Farming Practices/No. of Household Involved						
	Slash and Burn	Shifting Cultivation	Open Cultivation	SALT	Commercial Fertilizer or Chemical	Organic Method	Others
Barangay 1							
Barangay 2							
Barangay 3							

Note: This data establishes appropriate and inappropriate forest land use practices. This can augment findings on issues and threats, and the status of remaining forest cover (and land uses) in forestlands.

**Table FO-18. Forest Based Livelihood Activities and the Number of Households Involved**

Barangays	No. of Household Involved					Total
	Farming	Agroforestry	Charcoal Making	Rattan Gathering	Etc	
Barangay 1						
Barangay 2						
TOTAL						

Note: If possible, ask for an approximate income or establish how the livelihood activities contribute to their overall economic standing (above or below poverty thresh hold). Also do for non-forest based economic activities.

Table FO-19. Past and Ongoing Projects or Investments in Forest Rehabilitation

Barangay	Past & Ongoing Project/s	Period covered/ Started	Type of Project Interventions	Species	Area (has.)	Implementing Unit	Status	Source of Funds	Cost (Php)

Table FO-20. Types of Tenure or Ownership Rights in Forestlands

Tenure/Ownership Rights	Area Covered	Tenure Holder/ Name of Organization	No. of Members
CBFM/CSC			
CADT			
Reservation			
Etc.			

Table FO-21. Mining Rights in the Municipality of \_\_\_\_\_

Mining Application/Rights	Area Covered		Type of Minerals	Duration (coverage of Rights)
	A & D Lands	Forestlands		
FTAA				
EXPA				
Etc.				

Note: Mining data is available with MGB, and map can be accessed in the internet through their geo-portal. Mining rights usually extends to A & D lands and must appropriately be reflected in the map and data table.

Table FO-22. Summary of Problems/Issues/Threats in Forestlands

Barangays	Problems/Issues/threats	Scope of the Problem
	Illegal Cutting	Rampant?
	Forest Fire	Frequent During Summer; Large area of forest destroyed?
	Kaingin	Rampant?

Note: It is better to have this mapped to provide spatial reference during the discussion of strategies in resolving these issues.

Table FO-23. Summary of Conflicts in Forestlands

Barangays	Type of Conflict	Entities responsible for resolving the conflicts	Status of Conflicts

Table FO-24. Elevation Distribution in Municipality of \_\_\_\_\_

Elevation	A and D (ha)	Forestland (ha)	Total (ha)	%
0-300				
300-500				
500-800				
800-1000				
1000 and up				
TOTAL				

Source: Elevation Map, 2012; NAMRIA Topo Map

Table FO-25. Slope Distribution in Municipality of \_\_\_\_\_

Slope (%)	A and D (ha)	Forestland (ha)	Total (ha)	%
0-18				
18-30				
30-50				
50 & Above				
TOTAL				

Source: Elevation Map, 2012; NAMRIA Topo Map

Table FO-26. Degree of Susceptibility of Municipality of \_\_\_\_\_ to Hydrometeorological Hazards (MGB)

Hazard	A and D (ha)	Forestland (ha)	Coastal (ha)	Total (ha)	%
High Susceptibility to Flooding					
Low to Moderate Susceptibility to Flooding					
High Susceptibility to Landslide					
Moderate Susceptibility to Landslide					
Low Susceptibility to Landslide					
TOTAL					

Source: Mines and GeoSciences Bureau, 2012

Table FO-27. Existing/Current Vegetative Cover by Land Classification/Ecosystem

Vegetative Cover	A and D (ha)	Forestland (ha)	Island (ha)	Mangrove/Coastal (ha)	Total (ha)
Natural Forest					
Mixed Perennial					
Tree Plantation					
Mangrove Plantation					
Total					
Total Land Area					

Note: It is recommended that forest/vegetative cover be prepared for the entire territory of LGU for use in the integrated analysis, especially in relation to knowing the situation of the watershed (vis-à-vis geologic hazard mitigation, water production value, and overall value in relation to water regulation functions of vegetative cover, and for biodiversity).

Table FO-28. Forest-related Uses in Forestlands

Land Uses	Forestland (ha)	Mangrove/Coastal (ha)	Total (ha)	% of Total Area of Forestlands
Community Watershed (declared or informal)				
Critical Habitat/Biodiversity Conservation Area				
Industrial Tree Plantation				
Agro-forestry				
Etc.				
Total				

Table FO-29. Forest-related Uses in Forestlands

Vegetative Cover	Forestland (ha)	Mangrove/ Coastal (ha)	Total (ha)	% of Total Area of Forestlands
Brush land/Grassland				
Coconut Plantation				
Rice Paddies				
Sugarcane				
Settlement				
ETC.				
Total				

Note: These are basically forestland conversion issues. Typical situation in the Philippines is the massive encroachment of forestland for agricultural uses and settlements. In the analysis, land use practices may also be discussed and analyzed how they contributed to loss of vegetative or forest cover. All information on vegetative cover and land uses can be combined in one map, except when some areas covered with vegetation has been allocated (by law or proclamation) and managed for specific purpose, e.g., natural forest declared as critical habitat or sanctuary; grasslands utilized for pasture based on approved lease agreement, etc.

Table FO-30. Biodiversity Inventory

Species	Where Located? Sighted?	Cite Status	Threats	Degree of Threats
		Endangered or highly threatened: rare, etc.		

Source: Biodiversity Inventory, \_\_\_\_\_, 20xx

Table FO-31. Results of Participatory Mapping on Biodiversity in the Municipality of \_\_\_\_\_

Barangay	Name of Wildlife	Location	Frequency of sighting		
			Only once	Seldom	Often
a. Barangay 1	<b>Fauna</b> wild duck	Purok 1, 3 & 6		√	
b. Bacuyangan	<b>Flora</b> Waling-waling	Zone 16 & 18			√
	<b>Fauna</b> Deer, wild pig, monkey	Zone 16, 18 & 19			√
c. Damutan	<b>Flora</b> Kalbo negro	BugtongLubi		√	
	<b>Fauna</b> Deer, wild pig, monkey	Entire Barangay		√	
d. Pook	<b>Fauna</b> Marine turtle	Had Paz			√
e. Sangke	None				
f. San Rafael	<b>Fauna</b> Wild pig, wild chicken	Ga-as			√

Source: Socio-economic survey/Community Mapping, 2013.

Table FO-32. Extent of Watershed/Sub-watershed in the Municipality of \_\_\_\_\_ (by Land Classification)

Name of Watershed		A and D	Forestland	Total	% of Total
1	Ilog Hilabangan				
2	Pagatban				
3	Tiabanan				
<b>Total</b>					<b>100.00</b>

Source: Watershed/Subwatershed Map, 2013

Note: The watershed map will also provide the analytical base in map overlaying for integrated ecosystems analysis.



Table FO-33. Inventory of FFL Assets by Sub-watershed and Barangay

FFL Assets/ Resources	Number or Area per subwatershed (Indicate barangay locations of the FFL assets/ resources			Total area	Maps for overlying
	SW 1	SW 2	SW n		
Total Land Area					
- Forestlands					LC + SW map
- A & D lands					LC + SW map
- Protected areas (PAs)					Tenure map of PAs + SW map
- Mineral lands					Mineral map + SW map
Water bodies and sub-watersheds					
- Rivers and creeks (km)					Drainage + SW map
Natural Forests (2 periods)					
- Closed canopy					Forest cover + SW map
- Open canopy					Do
- Mangroves					Do
Plantations					Do
Water infrastructures					
- Irrigation (no.)					Water infra map + SW map
- Domestic water reservoirs (no.)					Water infra map + SW map
- Hydro power (no.)					Water infra map + SW map
Biodiversity assets/ resources					Tenure + Forest cover+ habitat map+ SW map
- Proclaimed protected areas (ha)					Tenure map of PAs + SW map
- Known habitats of endangered species (ha. or no.)					Habitat map if available or community map + SW map
- Closed canopy forests (ha)					Forest cover + SW map
- Mangrove forests (ha)					Forest cover + SW map
- Identified endangered species (no. & names)					Local accounts/ scientific studies/ FGD
Nature-based tourism assets/ resources					
- Caves (no.)					Nature based tourism map + SW map
- Water falls (no.)					do
- Lakes (no.)					do
- Other assets/ resources					
Grasslands & brushlands					Forest cover + SW map
Cultivated forest lands					Forest cover + SW map + LC map
Other FFL assets/ resources					

Note: \*LC - Land Classification Map, SW - Sub-watershed

Table FO-34. Forest Cover Change

FFL Assets/ Resources	Forest cover change per sub-watershed (ha)								
	SW 1/ Brgy 1			SW 2/ Brgy 2			SW n/ Brgy n		
	2003	2010	loss/ gain (2010- 2003)	2003	2010	loss/ gain (2010- 2003)	2003	2010	loss/ gain (2010- 2003)
Natural Forests									
- Closed canopy									
- Open canopy									
- Mangroves									
Plantations									
Grasslands & brush lands									
Cultivated lands									

Table FO-35. Perceived Changes in the Condition of FFL Assets/Resources (Sample)

Name of Barangay: Burgos, Sablayan, Occ. Mindoro

Resources(Likas Yaman)	Situation the last 20 years( Kalagayan sa nakalipas na 20 taon)	Estimated changes (Gaano kadami nabawas/ nadagdag)	Factors contributing to the situation (Mga kadahilanan)
Forest	Nabawasan	60%	Kaingin; Pag uuling; Pambahay; kalamidad; illegal cutting
Mangrove Forest	Nabawasan	90%	Materials ng Bahay; pangatong
Cultivated Lands	Nadagdagan	90%	Pagbukas ng grassland ginawang sakahan; kaingin
Grassland / Brush lands	Nabawasan	50%	Ginawang Sakahan
Habitats of Endangered species - Usa	Nabawasan	50%	Pagkuha ng gamit sa bahay; kaingin; illegal cutting
Wildlife species; Usa, Baboy damo, Unggoy, Musang, Bayawak, sawa, tarictic, lawin, paniki, loro, atbp.	Nabawasan	20%	Pangangaso ng katutubo at hindi katutubo
Nature based tourism			
Malatungtung falls	Nabawasan ang tubig	90% nabawas pag tag-araw	Haba ng tag-init
Kweba	Nabawasan ang puno sa paligid	90%	Pagpuputol ng puno
Water resources (Ilog)	Nabawasan ang tubig	90%	Pagkasira ng watershed; landslide; pagkawala ng kakahuyan
Dagat	Lumawak ang tabing dagat	45%	Siltation (banlik)
Fishery resources			
Tabang	Nabawasan ang huli	90%	Paggamit ng pesticides/lason; kuryente; paghina ng tubig sa ilog
Dagat	Nabawasan ang huli	40%	Overfishing; Illegal fishing
Non Timber (uway, nito, buri, baging, bagto)	Nabawasan	95%	Over collection for livelihood activities Ginagawang karitan ang buri

Table FO-36. Stakeholders' Assessment (Sample from Sablayan, Occ. Mindoro)

Stakeholders	Interests	Current uses of FFL	Budget on FFM/ manpower	Past/ current FFM activities	Estimated number of members	FFM Skills	Remarks (any conflict in resource use?)
CBFM POs	Tree Planting and Reforestation, forest protection, and management. Land tenure	Continuous rainforestation	Budget depends projects provided by funding agencies	Maintenance of Plant nursery	Palbong = 200 members Burgos = 81 members Yapang = 150 members	Livelihood, forest law enforcement and forest management	Palbong/ Yapang = Boundary dispute of private land owners and CADT Intrusion of illegal loggers and hunters
IPs	Tao Buid/ Alangan = mapadami at Mapanatili ang kalkasan at mapakinabangan. Protect the ancestral domains	Pagkain, Gamot, Pagawa ng bahay, produktong handicrafts yari sa non timber materials. Hanapbuhay.	Own labor	Proteksyon sa mga sagradong lugar, mga pinagkukunan ng tubig o bukal at pagkain	Tao Buid= 77 sitios 1 sitio = 80 pamilya 1 pamilya = humigit kumulang 5 tao Alangan 100 sitios	Proteksyon sa nasasakupang ancestral domain. Training on protection and management of forest from, NGO and LGU.	Hanganan ng mga lupa sa tribo. Hindi pagkikilala sa kaugalian, kultura at paniniwalang katutubo ng mga taga patag.
Upland farmers	Taniman para may pagkukunan ng makakain at kita	Tirahan at Sakahan, pinagkukunan ng gamit sa pagtatanim at hanapbuhay.	Own labor	Assist in the formulation of ADSPD Plan	60 pamilya may sariling tubigan 20 pamilya sa sakahan mais, mungo.	Training mula sa NGO at LGU sa pagawa ng sariling handicrafts at kabuhayan mula sa gubat.	Hatian sa Lupa na pag ma may ari ng tribo.
Water district	Sustainable supply of potable water.	Source of potable water supply	Voluntary planting; no annual budget allocated	Planting of trees in identified/ established water sources.	11 members (concerned on tree planting) 2,500 concessioners.	Tree planting in selected sites.	People tend to see the institution as a private company.
Irrigators' Assoc.	Pangalagaan ang gubat na pinagmumulan ng tubig	Maging tuloy-tuloy ang daloy ng tubig upang makarating sa mga taniman	Association member should contribute 1 cavan per cropping	Tree planting in selected sites	57 members	Training on compost-making and IPM (Integrated Pest Management)	Insufficient government subsidies
Individual producers of native products	Continuous source of raw materials for native products	Source of non timber raw materials for native products	Individual labor only	Selective harvesting of non timber products	About 431 individuals	Livelihood training provided by NGOs, LGU	Rampant harvesting by non-IP members ; Lack of knowledge on protection and management of non timber resources
Sablayan Prison and Penal Faem (SPPF )	Source of raw materials for livelihood of inmates; Houses the inmates and related facilities	*Reforestation *Planting of Coconut Seedlings at the Penal Colony	Uses existing budget of the penal colony	None	NA	Seedlings Production Tree planting handicraft making	*Has no mandate on forest Protection Reservation overlaps with CADT

Table FO-37. Institutional Assessment (Sample from Amlan, Negros Oriental)

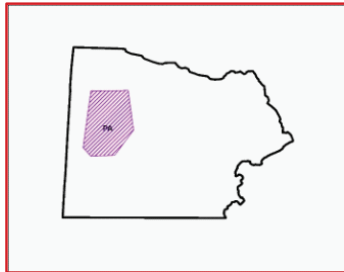
Institutions/ Stakeholders	FFM Units/Staff/ Manpower	Annual Budget	FFM Skills	Past/ Current Projects that can support forest ecosystem plan implementation	Policies/ Plans on FFM	Remarks (Issues, constraints/ Limitations)
<b>DENR</b>	CENRO w/ forestry unit with focal person for AMLAN	Has NGP budget for Silab	GIS, nursery and plantation establishments, surveying, FLUP,	NGP, Carabao dispersal; assist PO in policy formulation	DAOs ON CBFM, harvesting, tenure issuance, land allocation	Limited coordination with MLGU in projects
<b>PLGU</b>	ENRD resp. for forestry concerns(60 staff w/ 2 focal persons in Amlan	Php 2 M on watershed managemt. FLUP budget for Amlan Php 40 K	GIS, Community mapping RMP, CO, FLUP	FLUP capacity building; Seedling inputs; PO trainings;	Prov'l Emt Code;	Close collaboration with MLGU, DENR, EDC, POs
<b>MLGU</b>	MENRO organized in 2008; 20 staff	Php 1,780,000 from EDF (500,000 for tree park);Php 1,257,000 from gen fund (394,000 for refo & FFM)	Nursery establishment; community organizing, GIS,	FLUP formulation; tree park; nursery estab.	Tree park ordinance; Tree planting activities (3 times a year)	Strengthen coordination among different agencies (DENR deals directly with POs) ; Policies on harvesting of planted trees discourages plantation devt. There should be a mechanism for updating the LGU on DENR Activities
<b>Amlan LGU waterworks system (AWAS)</b>	None	Collects Environment fee from water users which can be used for watershed rehabilitation	NA	Eco park (50 ha) maintenance MENRO prepares a program of work to use the environmental fee fund	An environmental fee is paid out of the water used (25 cents/ cubic for 11-20 cubic and 50 cents for 21 cubic up	AWAS is mainly concerned with water distribution. MENRO implements watershed management projects by preparing a work program using the environmental fee

Institutions/ Stakeholders	FFM Units/Staff/ Manpower	Annual Budget	FFM Skills	Past/ Current Projects that can support forest ecosystem plan implementation	Policies/ Plans on FFM	Remarks (Issues, constraints/ Limitations
<b>BLGU Janti-anon</b>	Environment committee	Php 10000 for green brigade; 20,000 ON SWM; 18,000 clean & Green	NURSERY ESTABLISHMENT	clean and green ; nursery	Tree planting policy before issuing brgy clearance	
<b>BLGU Silab</b>	Environment committee (3 members)	25-30,000 pesos	NURSERY ESTABLISHMENT	Nursery; tree planting;	none	none
<b>ICS Renewable energy group Amlan hydro electric plant</b>	With hired forest guards	For verification	Forest protection, seedling production and tree planting	Refo, with forest guards; hydro power generation	Protection of the watershed	Sells power to NGCP which sells the power to NORECO2
<b>EDC</b>	geothermal power reservation	Has annual funds for protection of the reservation	Forest protection, agroforestry and reforestation technology	Reforestation; livelihood support	Protection of the geothermal power reservation	LGU not consulted on projects
<b>DA</b>	Technicians	Has funds for fruit trees production	Nursery operations	BADC, FFS, Coconut plantation development	No plans in forestlands	DA generally focuses their activities in A&D lands
<b>FIDA</b>	Technician assigned to assist in abaca production	None	NA	TA in abaca plantation development	none	There is a risk that people will cut the forest and replace them w/ abaca
1. NO FORMAL COLLABORATIVE MECHANISM AMONG STAKEHOLDERS AND DIFFERENT INSTITUTIONS IN AMLAN. THERE HAS TO BE A REGULAR UPDATING of the LGU BY DIFFERENT AGENCIES ABOUT THE STATUS OF THEIR PROGRAMS AND PROJECTS IN AMLAN. All projects to be implemented in Amlan should pass through the MDC/ BDC						
2. Other organizations could potentially assist the LGU in implementing its FLUP. These agencies have existing programs and budgets which could complement LGU finances while LGU could also assist them in implementing their projects						
3. The environmental fee being collected now in Amlan has great potential as a source of sustainable financing. This can be expanded to cover other uses such as ecotourism services.						
4. The Department of Agriculture seems to have limited presence in the forestland barangays. The DA could help in FLUP implementation by supporting appropriate upland development projects.						

# Annex FO-1. Sample Thematic Maps Needed for Ecosystem Planning

Source: DENR-FMB

## 1. Land Classification Map



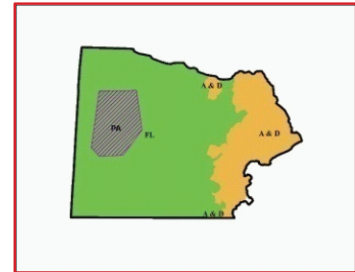
Municipal Boundary

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Land Classification

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Land Classification Map

## 2. Drainage Map



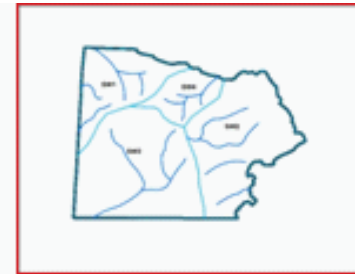
Municipal Boundary  
River Network

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Sub-watershed Areas

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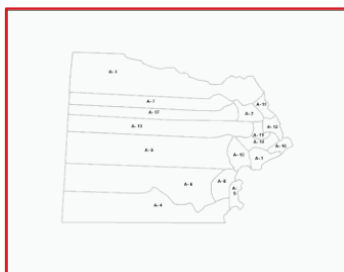
Drainage Map

## 3. Administrative Map



Municipal Boundary

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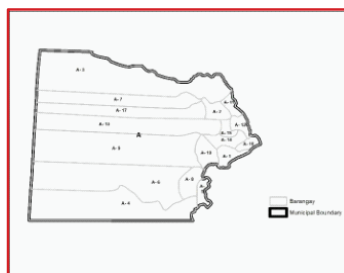
Barangay Boundary

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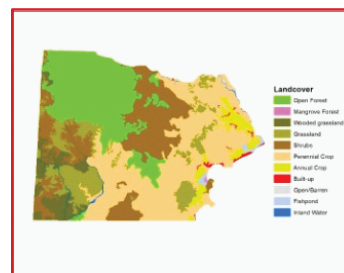
Administrative Map

## 4. Land Cover Map



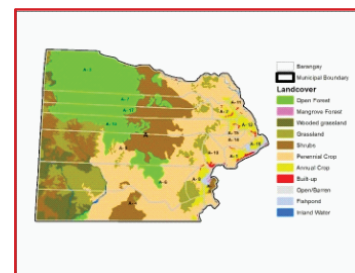
Administrative Boundary

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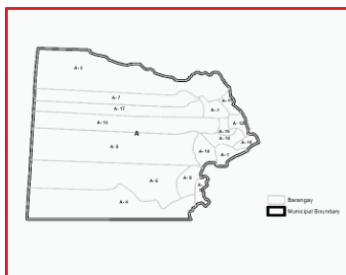
Land Cover Classification

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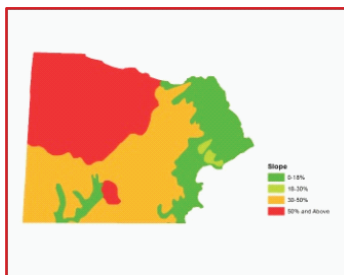
Land Cover Map

## 5. Slope Map



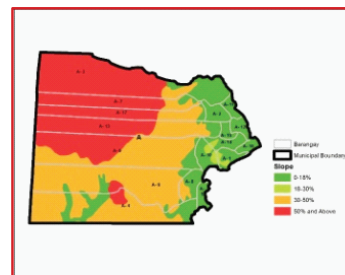
Administrative Boundary

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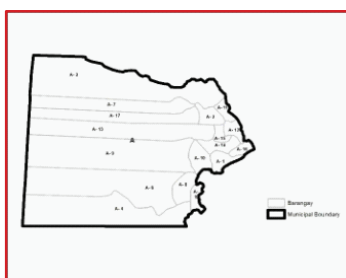
Slope Class

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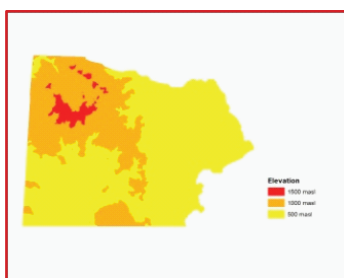
Slope Map

## 6. Elevation Map



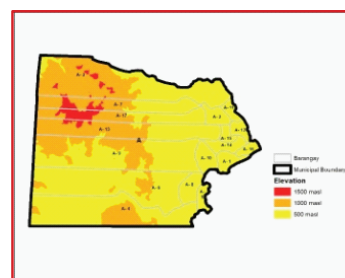
Administrative Boundary

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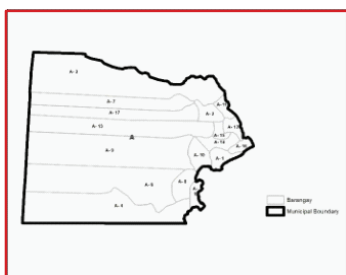
Elevation Class

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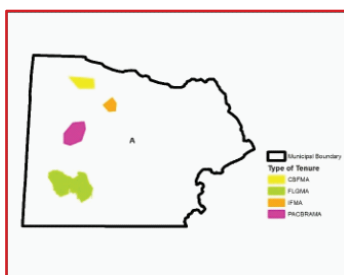
Elevation Map

## 7. Tenorial Map



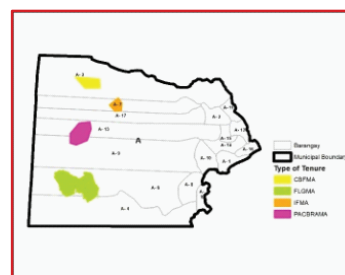
Administrative Boundary

+



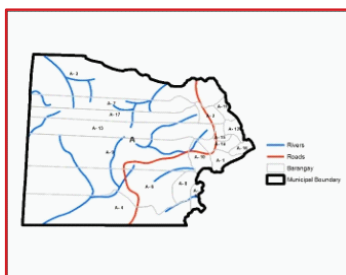
Tenurials

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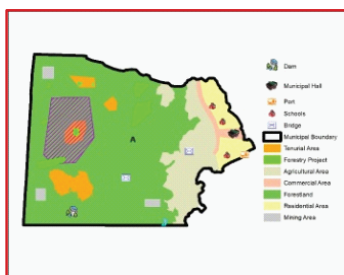
Tenorial Map

## 8. Existing Land Use Map



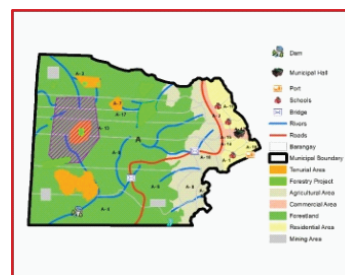
Administrative Boundary

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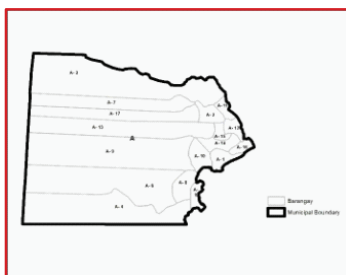
Land Uses

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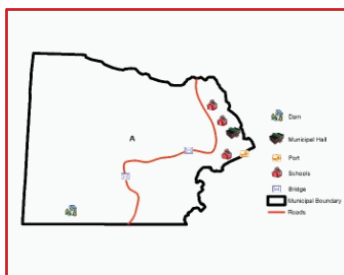
Existing Land Use Map

## 9. Infrastructure Map



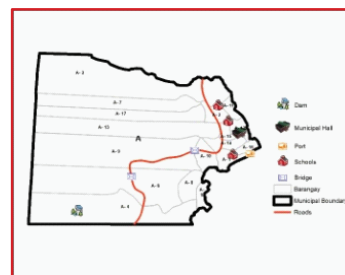
Administrative Boundary

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Infrastructures

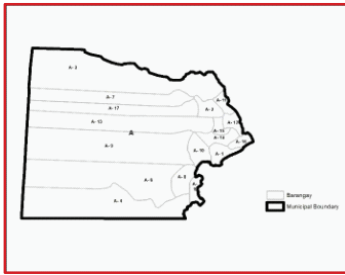
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Infrastructure Map

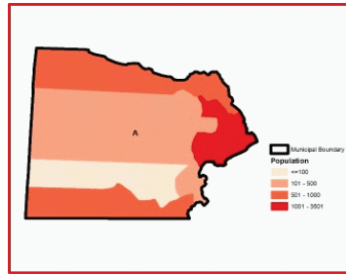


### 10. Population Map



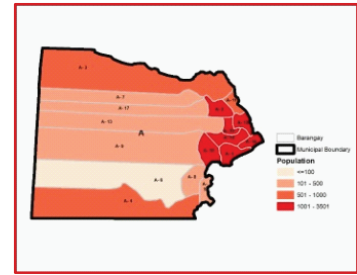
Administrative Boundary

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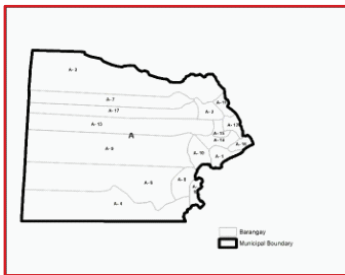
Population Class

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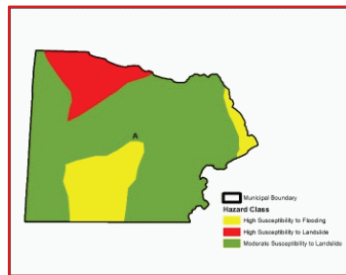
Population Map

### 11. Hazard Map



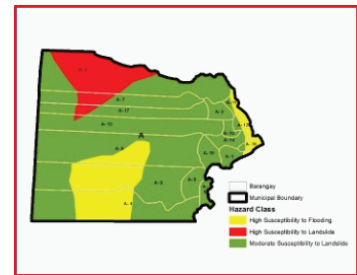
Administrative Boundary

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Hazard Class

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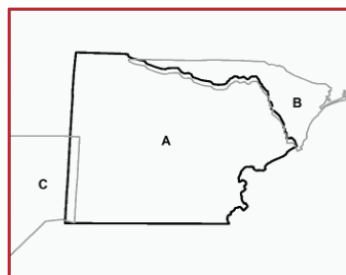
Hazard Map

### 12. Conflict/Issues Map



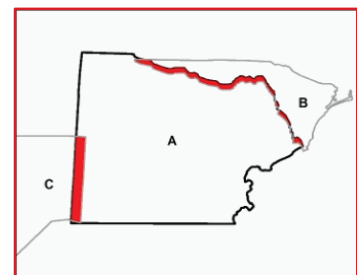
Municipal Boundary

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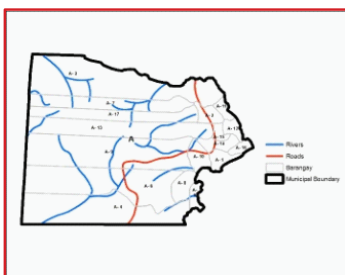
Adjacent Municipalities

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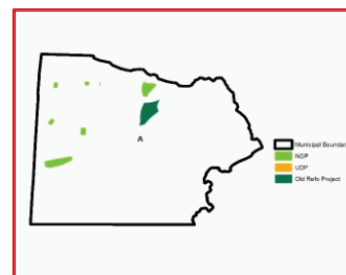
Location of Boundary Issues

### 13. Forestry Projects Map



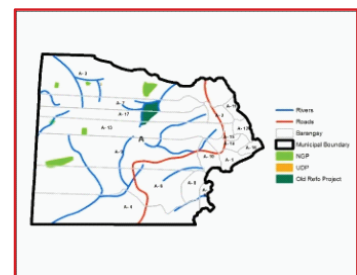
Administrative Boundary

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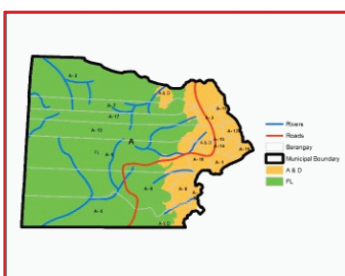
Reforestation Projects

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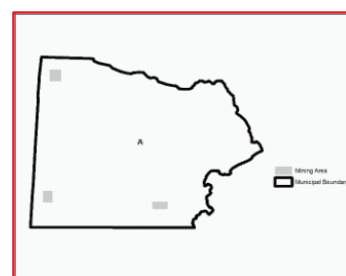
Forestry Projects Map

### 14. Mineral Map



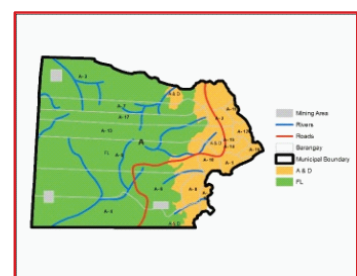
Administrative Boundary and Classification

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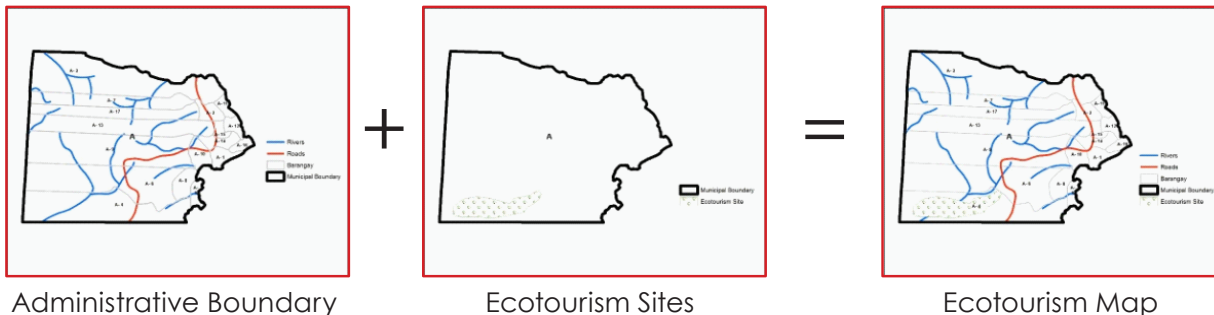
Mineral Exploration Areas

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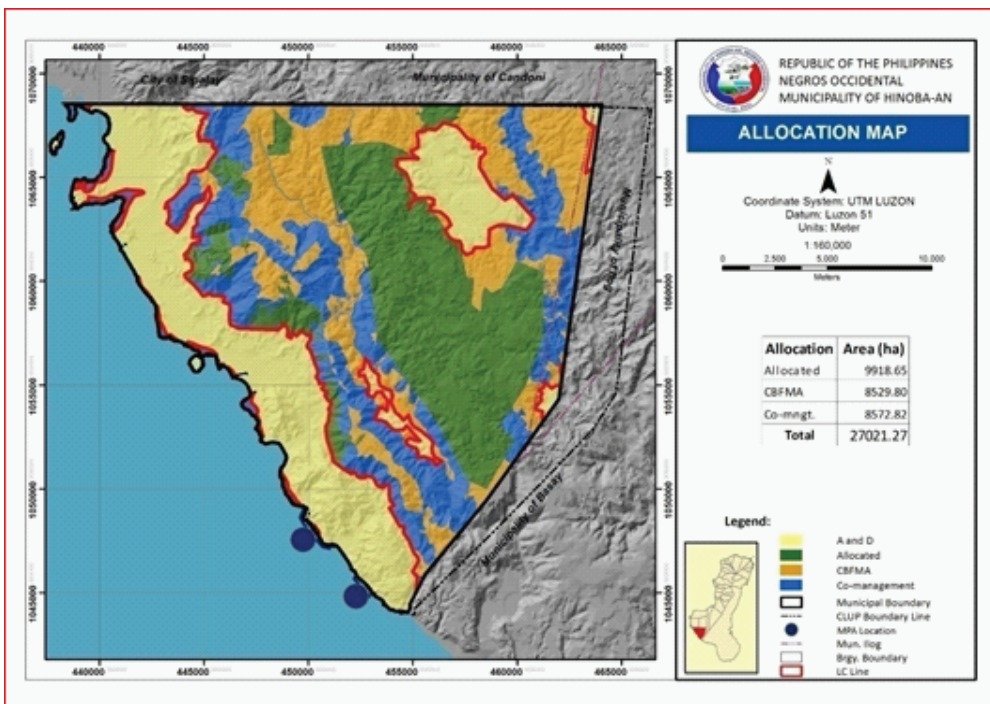


Mineral Map

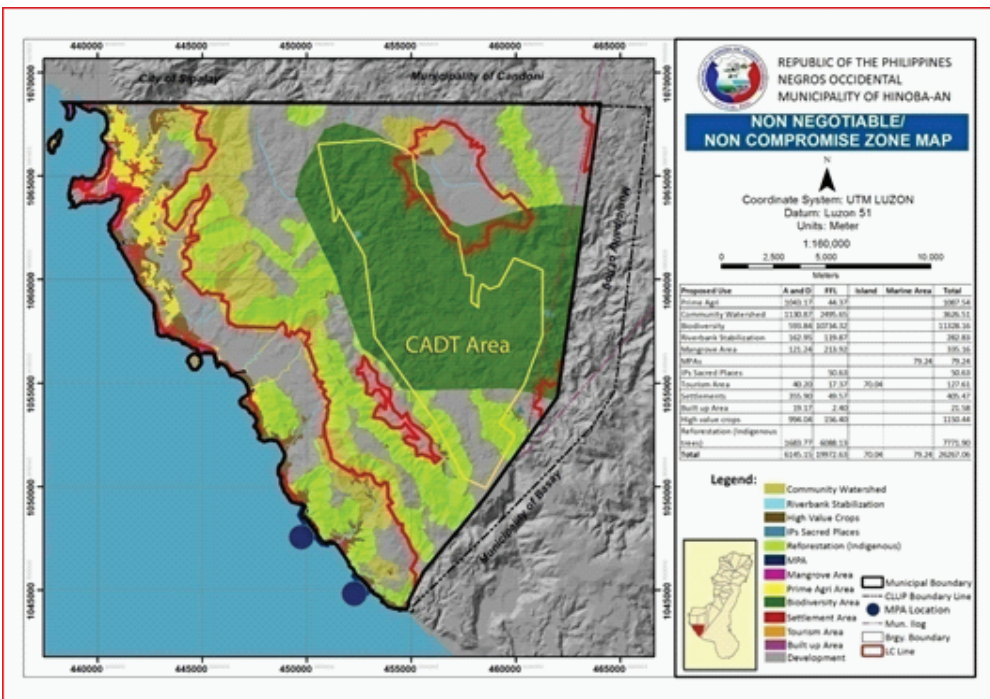
### 15. Ecotourism Map



### Annex FO-2. Proposed Allocation Map



### Annex FO-3. Sample Non Negotiable/ Non Compromise Zone Map



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- Republic of the Philippines. 1991. Republic Act No. 7160, The Local Government Code of the Philippines.
- Republic of the Philippines. 1997. Republic Act No. 8371, An Act to Recognize, Protect and Promote the Rights of Indigenous Cultural Communities/ Indigenous Peoples, Creating a National Commission on Indigenous Peoples, Establishing Implementing Mechanisms, Appropriating funds therefore and for Other Purposes.
- Republic of the Philippines. 1997. Republic Act No. 8435, Agriculture and Fisheries Modernization Act of 1997.

# Coastal Planning

*Although this section speaks of the coastal zone, planning shall focus only on the coastal waters, **excluding** the 1 kilometer inland section of the coastal zone.*

## I. Basic principles and concepts

### Integrated Coastal Management (ICM) in the CLUP

The Integrated Coastal Management (ICM) is an internationally accepted planning and coordinating process, which promotes the proper sustainable development and management of coastal zones. In the long term, ICM aims to balance the environmental, economic, social, cultural, and recreational sectors within the natural sustainable limits. ICM acknowledges that the management of coastal resources requires a holistic and comprehensive approach, addressing the land and sea interactions.

In light of the ridge-to-reef concept and the fact that the Philippines is an archipelagic country, it is necessary that the concept of ICM be integrated in the CLUP. Henceforth therefore, the boundary of the CLUP should extend until the fifteen kilometers boundary of the municipal waters (see **Figure CO-1**). Since this inclusion of the coastal/marine sector into the CLUP is a new concept, an IEC section explaining the reasons and logic for this must be included in the public consultation process (step D). The slides and lecture notes are found in **Annex CO-1**.

Figure CO–1. Illustration of the Extent of CLUP





## Relationship between Upland Watershed Activities and the Coastal Waters

An important concept that has to be relayed to the city/municipality is how upland watershed activities greatly affect the coastal areas, even if these activities may be kilometers away from the coast. Activities, such as mining and lumbering, may cause high sedimentation downstream, which will eventually perturb coastal waters. This has detrimental effects to coastal habitats like coral reefs and seagrass meadows, with dire consequences to fisheries. **Figure CO-2** shows an example of the consequences of upland erosion to coastal habitats.

The need to highlight the importance of inter-LGU alliances is crucial as the watershed boundary generally extends over several or many municipalities. Proper watershed management requires that LGUs discuss and agree that the protection of their environment must not be based solely on the benefits for their cities/municipalities but for all cities/municipalities involved.

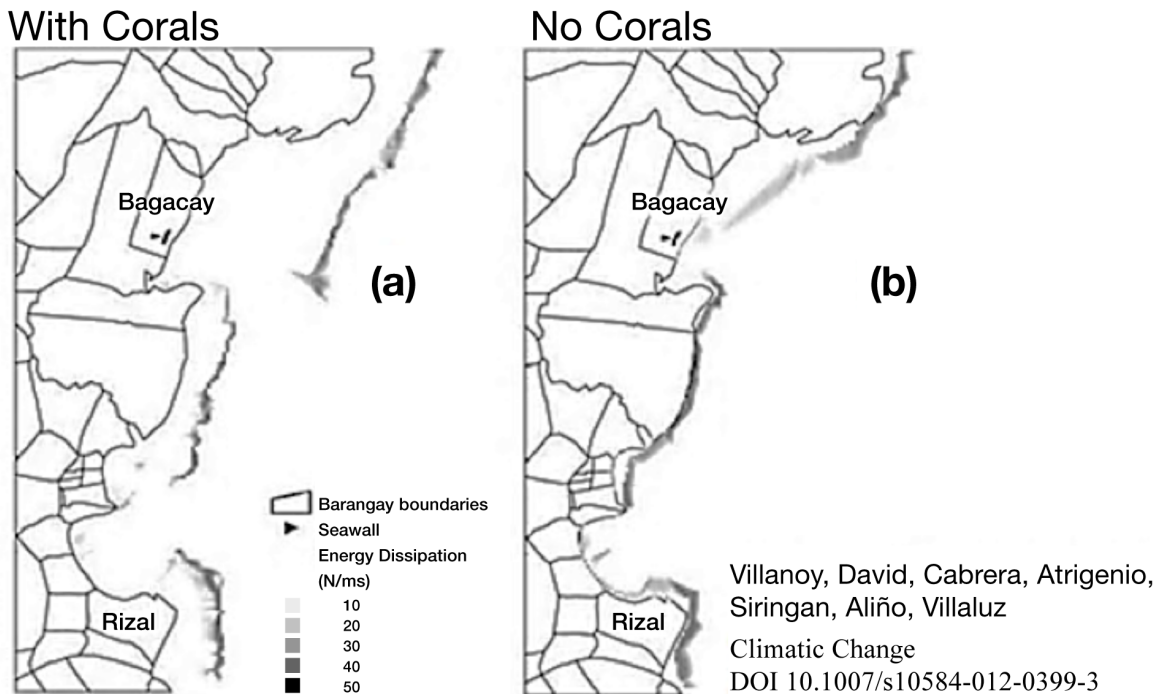
**Figure CO-2.** Illustrative examples of consequences of upland erosion to coastal habitats (a) Aerial view of sediment run-off in eroded watershed (b) sedimentation on seagrass beds (c) Sedimentation on coral reef



## Preservation of Coastal Habitats

Studies have proven that coral reefs, seagrasses, and mangroves protect the coast from strong waves by buffering the high energy from oncoming waves (see **Figure CO-3**). As living seawalls, these habitats may also provide added protection against sea level rise and high-energy storm events. Similar to inter-LGU alliances within one watershed, the co-management of neighboring coastal municipalities contribute to the protection not only of the coastal resources but also the coastal integrity of the shoreline. In fact, 30% of the inter-LGU alliances in the Philippines have been formed on the basis of management of either watersheds (6%) or coastal resources (24%) (DILG-BLGD and GIZ data, 2014).

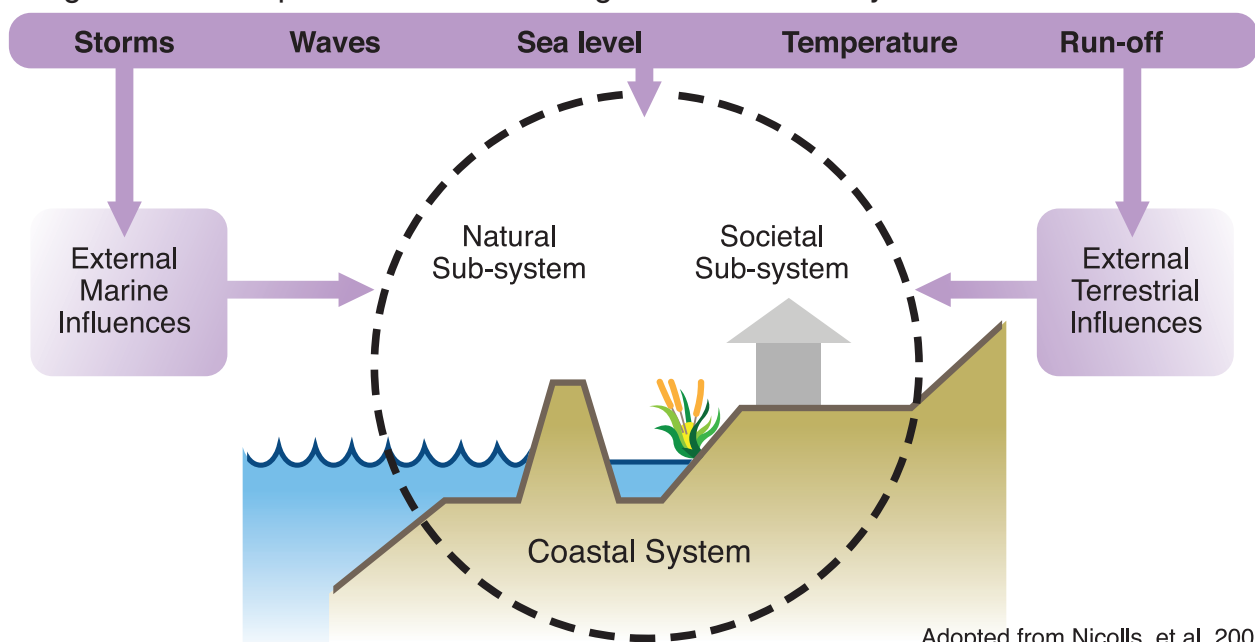
Figure CO–3. Illustrative example of role of coastal habitats in shoreline protection. Villanoy et al (2012) showed in a numerical model how (a) coral reefs decrease wave energy (here depicted as “Energy Dissipation”) approaching a coastal community in Bagacay, Sorsogon by dissipating the waves away from the coast. When corals are removed in the model (b), higher wave energy reaches the coast, putting the community at higher risk.



## Climate Change and the Coastal Areas

The impacts of climate change are not only felt in terms of storms and increase in temperature, but also increase in wave strength, sea level rise, and disturbed rainfall patterns. What is more important to us is how these impacts affect human activities, e.g. how increased rain may cause flooding events, as well as how sea level rise may submerge our coastal cities and municipalities. It is therefore imperative that we consider climate change adaptation and disaster risk reduction and management in the CLUP. **Figure CO-4** and **Figure CO-5** shows how climate change impacts the coastal system and the climate change stressors affecting the country.

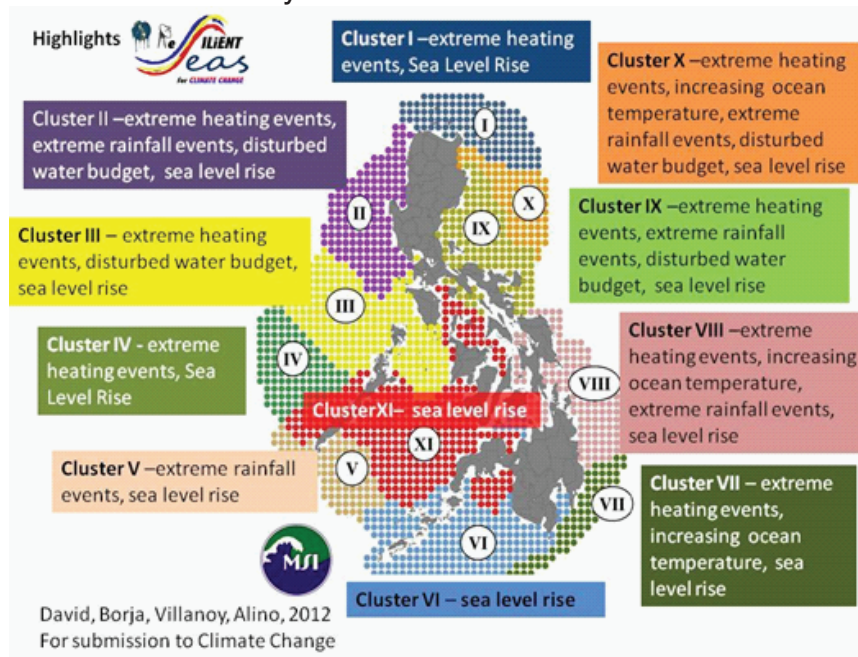
Figure CO–4. Impacts of Climate Change to the Coastal System



Adopted from Nicolls, et al. 2007



Figure CO–5. 11 Types of Climate Change Stressors Currently Experienced in the Philippines Based on Remotely Sensed Data for the Last 30 Years



## II. General Objectives and Outputs



### Objective/s

- Identify the institutions involved in the management of coastal and marine assets/ resources and assess their capabilities, including LGUs, NGAs, etc.;
- Identify the managers, stakeholders and users of coastal and marine assets/ resources;
- Identify and demarcate suitable areas for specific municipal water uses;
- Assess the current situation of the LGU's coastal and marine areas to determine the conditions of coastal and marine assets/ resources including biodiversity;
- Determine climate change and disaster risks to coastal and marine assets/ resources for adaptation and mitigation purposes; and
- Zone the identified areas and establish policies and regulations for the protection and management of coastal and marine resources.



### Output

- Coastal ecosystem assessment integrated into the CLUP/ZO

## III. Thematic Area Assessment Guide



### Data Requirements

The data on the coast and other water bodies should be gathered, prepared and processed alongside with the other CLUP data. Similarly, the planner should be aware that data requirements overlap between and among sectors such as demography and other bio-physical data. Zeroing in on the spatial data requirements of the coastal and other water bodies will facilitate its analysis and integration into the CLUP.

The coastal data requirements come in three different delineation processes namely, watershed boundaries, municipal water boundaries and coastal boundaries/layers. In addition, data is also gathered for the coastal and marine assessments These are expounded in the steps.

### 1. Watershed Boundaries

Data Set:

- DENR-FMB watershed maps
- Topographic map or DEM
- Delineated river networks
- Administrative maps of LGUs

### 2. Municipal Water Boundaries

Data Set:

- Official NAMRIA nautical charts
- DENR Municipal Boundary Monument (MBM) Index
- List of islands as certified by local assessor
- Reference cadastral maps
- Technical description validation form

### 3. Coastal Boundaries/Layers

Data needs and possible data sources for the delineation of coastal boundaries/layers:

Coastal Boundaries/Layers	Data Requirements	Data Type	Source(s)
<b>Hazard Areas</b>	Elevation	Topographic map/DEM	NAMRIA maps/SRTM or ASTER GDEM
	Tide Data	Tide Table	NAMRIA Tide Table
	Storm Surge	Scenario-based model, Historical values	PAGASA, Historical reports
	Tsunami projection	Model or expert's projection values	PHIVOLCS, Experts
<b>Foreshore</b>	Elevation	Topographic map/DEM	NAMRIA maps/SRTM or ASTER GDEM
	Tide Data	Tide Table	NAMRIA Tide Table
<b>Easement/ Buffer</b>	Foreshore	Delineated from Foreshore delineation (Topographic map/DEM and Tide Table)	
	Land Use-Land Cover map	NAMRIA, Remote Sensing outputs	NAMRIA Land cover maps, Orthophoto*/Satellite image delineated Land cover maps
<b>River Network and Riparian Area</b>	Delineated river networks	River networks, flood plain	Historical maps with river networks, NAMRIA Topographic maps, Orthophoto/Satellite Image
	Flood maps	Flood-prone areas nearby the river	N/PDRRMC, MGB, historical maps
<b>Accreted Land</b>	Shoreline	Topographic map/DEM/google earth-delineated	NAMRIA maps, SRTM or ASTER GDEM, Historical images (Orthophoto/satellite image)
	Historical maps	Changes in shoreline position	NAMRIA maps, SRTM or ASTER GDEM, Historical images (Orthophoto/satellite image)
<b>Existing Structures</b>	Existing public utilities and facilities	Location of public utilities and facilities	Orthoimage/satellite image, Land use maps, existing CLUPs
	Existing land use	Land use zoning	Orthoimage/satellite image, Land use maps, existing CLUPs
	Industrial and commercial permits	Locations and area covered by industries and commercial structures	LGUs, DENR, BFAR, MGB

Coastal Boundaries/ Layers	Data Requirements	Data Type	Source(s)
<b>Critical Habitats</b>	Habitat cover maps	Delineated habitat cover area and status	NAMRIA, delineated using remote sensing techniques, PCRA
	Status of habitat cover (e.g. seagrass, mangroves, etc.)	Delineated habitat cover area and status	NAMRIA, delineated using remote sensing techniques, PCRA
<b>MPAs/ Fishery Refuge and Sanctuary / Fishery Reserve</b>	Delineated municipal water	Total area and delineated boundaries	NAMRIA
	Habitat cover maps	Delineated habitat cover area and status	PCRA, stakeholder's consultation meetings, FGD
	Fisheries production data	Catch rate, no. of fishers, no. of fisheries dependent, location of traditional fisheries and aquacultures	PCRA, stakeholder's consultation meetings, FGD
<b>Production Areas</b>	Fisheries production data	Catch rate, no. of fishers, no. of fisheries dependent, location of traditional fisheries and aquacultures	PCRA, stakeholder's consultation meetings, FGD
	MPA maps	Delineated from previous data	
<b>Biodiversity Conservation Areas</b>	KBAs map with associated species	Protected areas boundaries	BMB, DENR KBA maps
<b>Ecotourism</b>	Critical Habitat Maps	Delineated from previous data	
	PAMP and KBAs map with associated species	Protected areas boundaries, Delineated from previous data	BMB, DENR KBA maps
<b>Navigational Lanes</b>	Existing navigational routes	Designated routes for municipal vessels and commercial vessels	MARINA, PPA, fisherfolks
	Maps of existing and proposed port areas	Location and area coverage of existing and proposed ports, and jetties	MARINA, PPA, fisher folks
	Critical Habitat and MPA Maps	Delineated from previous data	
	Bathymetry	Tidal corrected Depth data	Field data, NAMRIA

\*Note: An orthohoto is a rectified copy of an aerial photograph showing image features corrected for variations in scale and height displacements (e.g Google Earth images).

#### 4. Coastal and Marine Assessments

Data needs and possible data sources for coastal and marine assessment (adapted from Aliño et al. 2012):

##### a. Disaster Risk Reduction and Climate Change Adaptation Assessment

	Criteria	Data Needs	Source
1	Is the coast steep (landward slope; rise over run)?	Slope values	Topographic map (NAMRIA) Orthophotos/ satellite images Field observations Slope map
2	How much of the coastline is lined by coral reefs/ communities?	Coral reefs extent	Topographic map (NAMRIA) PCRA, Remote sensing
3	What is the highest hard coral cover (%)?	Life forms, species composition	PCRA
4	How much of the shallow areas are covered by seagrass?	Sea grass extent	Topographic map (NAMRIA) PCRA, Orthophoto/ satellite images
5	How much of the coastline is lined by mangroves?	Mangrove extent	PCRA, Orthophoto/ satellite images
6	What kind of mangrove forest is left?	Species composition	PCRA

## b. Coastal Integrity Vulnerability Assessment

	Criteria	Data Needs	Source
1	Is the coastline prone to erosion?	Lithology/rock or sediment types	Topographic map (NAMRIA) Orthophoto/satellite image Geologic map (MGB) Field observations
2	Has the beach changed much in the last 12 months?	Shoreline trends	Field observations Anecdotal accounts
3	Width of reef flat or shore platform (m)	Width of reef flat	Topographic map (NAMRIA) Orthophoto/satellite image
4	Are there any coastal and offshore mining activities? (including removal of fossilized corals on the fringing reef and beach)	Coastal activities	Field observations Anecdotal accounts
5	Are there structures on the foreshore present?	Foreshore structures	Field observations Anecdotal accounts
6	Is there any beach forest or vegetation?	Beach vegetation	Field observations Anecdotal accounts
7	Is the coastline highly exposed to strong wave action?	Wave exposure	Field observations Anecdotal accounts

## c. Water Quality

	Criteria	Data Needs	Source
1	Is the water murky/silty in most of the year?	Water clarity	Personal observation; water quality monitoring
2	Are there sources of effluents near the coast or nearby bodies of water?	Maps of establishments, sewage systems and industries	Business permits; Office of the Mayor; Personal Observation
3	Does solid waste accumulate in this coastal area?	Garbage/solid waste mapping	Solid waste monitoring
4	Does the area experience warm still water?	Sea surface temperature	Personal observation; water quality monitoring
5	Are there any adjacent coral and/or sea grass habitats?	Presence of habitats	PCRA
6	Does water flow freely at intended culture site?	Water flow	Personal observation

## d. Fishes and Gears

	Criteria	Data Needs	Source
1	What is the dominant catch composition?	Fish catch composition	Focus Group Discussion (FGD)
2	What is the average catch rate?	CPUE	Focus Group Discussion (FGD)
3	Has there been a change in catch composition?	Fish catch composition	Focus Group Discussion (FGD)
4	What are the size and amount of fish caught?	Fish catch composition	Focus Group Discussion (FGD)
5	Population density	Population census	NSO, Municipal socio-economic profile
6	Fisheries ecosystem dependency	Number of fishers per barangay	Focus Group Discussion (FGD)
7	What is the contribution of fisheries to the per capita consumption of the area?	Municipal/provincial poverty thresholds	LGU, NSCB
8	Is fishing the only source of livelihood?	Sources of income	PCRA, LGU
9	Are fishery resource management plans effective?	Evaluation of fishery management efforts	LGU

## e. Seagrass, Corals, Wetlands, and Mangroves

	Criteria	Data Needs	Source
1	Are there more massive corals compared to branching ones?	Life forms	PCRA
2	Is the coral diversity much reduced?	Species composition	PCRA
3	What type of seagrass dominate the meadows	Species composition	PCRA
4	Are there more barren areas within the seagrass meadow?	Sea grass extent	Topographical maps from NAMRIA and satellite images (i.e. Google Earth); mapping exercises
5	Are the slow growing, slow colonizing species most common in the area?	Species composition	PCRA
6	Are there more large trees than small propagules (in terms of density)?	Community structure	PCRA
7	How much is the need to expand the MPA?	Description of restoration, rehabilitation efforts	LGU
8	Was the MPA design and management focused on fishery enhancement alone?	Description of restoration, rehabilitation efforts	LGU
9	To what extent do protected areas focus on single habitats (mangrove, seagrass, and coral) alone?	Description of restoration, rehabilitation efforts	LGU
10	Are there any endangered, endemic, or key biodiversity species present?	Marine key biodiversity species	PCRA

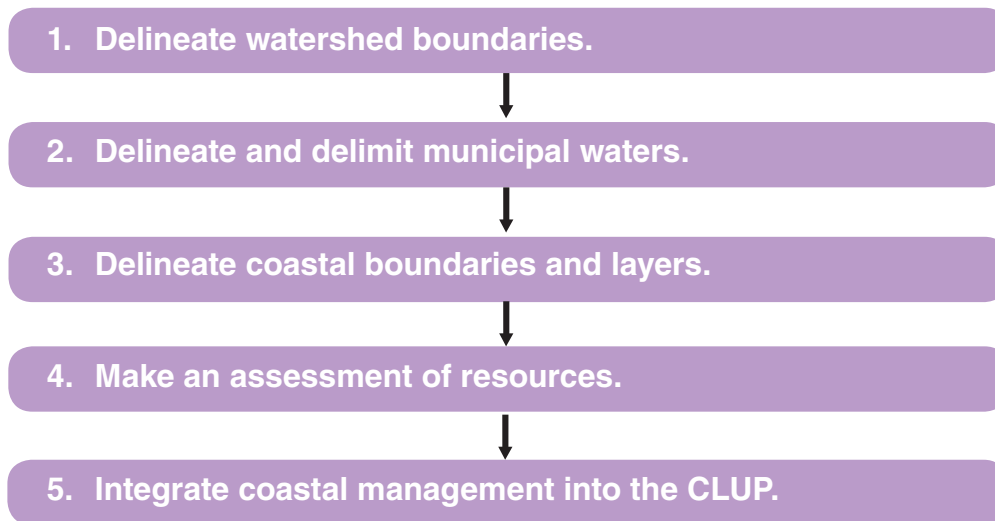


## Steps

The steps shall be conducted by the planning team/TWG with the assistance of the DENR and DA-BFAR Regional and/or Provincial Offices (refer to CLUP Guidebook Volume 1, Step 2 for the composition). For coastal planning activities, the following is a more specific list of those who should be involved:

- City/Municipal Planning and Development Coordinator (Lead)
- Municipal environment and natural resources officer
- Municipal agricultural officer
- SB Chair or committee member(s) for agriculture and fisheries or environment
- Representatives of the *Bantay Dagat*/ Fishery Law Enforcement Team
- Representatives of the Municipal Fisheries and Aquatic Resources Management Council
- Representatives of the Association of Barangay Captains
- Fisherfolk organizations
- NGOs
- Business sector
- Academic institutions
- Philippine National Police
- Philippine Navy
- Philippine Coast Guard
- Philippine Ports Authority

## Overview Of Steps



### 1. Delineate watershed boundaries as a priority step to integrated management.

Prior to delineation of the various coastal boundaries/layers/zones and conduct of coastal and marine assessment, it is deemed necessary to delineate first the watershed boundaries. Delineation of watershed boundaries will provide information on the possibilities of forming LGU management alliances to ensure an integrated management of the watershed and the coastal areas. It should also be noted that all activities in the watershed could partly or greatly affect the coastal areas of an LGU. Thus, delineation of the watershed boundary will aid in determining the stakeholders for the planning process.

Watershed boundary is sometimes referred to as the ridgeline or watershed divide. This ridgeline separates one watershed from another. Watershed boundary delineation can be done manually using a topographic or elevation map and determining the ridgeline surrounding each river system or It can be done digitally in GIS with the use of DEM and delineated river system. The boundaries can also be obtained from DENR-FMB, which conducts watershed delineation. The administrative maps of LGUs can be overlain to the watershed boundaries to know which LGUs is covered by each watershed.

Upon delineation of the watershed boundaries, the delineation of coastal boundaries/layers as well as coastal and marine assessment can be done. Other layers from other sectors can be overlain in the same watershed boundaries. These will ensure that policy formulation in all the sectors are in harmony to each other.

### 2. Delineate and delimit municipal waters.

The delineation and delimitation of municipal waters define the boundaries and geographic extent of an LGU's jurisdiction, function and responsibilities regarding their coastal resources. These include taxation and revenue generation through licenses, fees, rentals or charges; enforcement of fisheries ordinances and policies; the general management of the territorial waters and lastly, resource allocation to small-scale fishers within the municipal waters. Delineation is important politically and economically for a municipality as it prevents boundary disputes among neighboring LGUs. With delineation, there is certainty regarding the source of local income as well as coverage of local policies. Defined territorial waters facilitate coastal law enforcement and further strengthen the autonomy of the LGU while laying the basis for potential alliance building and for coastal zoning.

The process includes consultation and agreements with neighboring LGUs on the water boundaries based on DA-AO No. 01, Series of 2004. The NAMRIA is authorized to carry out municipal water delineation and delimitation, promoting the archipelagic principle in delineating coastal local government units with offshore islands.



The following steps set out the process in detail:

- Conduct field survey and validate technical coordinates
- Consult and validate with affected coastal barangays in adjacent government units
- Request technical description from the DENR NAMRIA\*
- Sangguniang Bayan/SangguniangPanlungsod to pass a resolution with FARMC endorsement
- Prepare municipal water boundary ordinance
- Establish boundary/markers

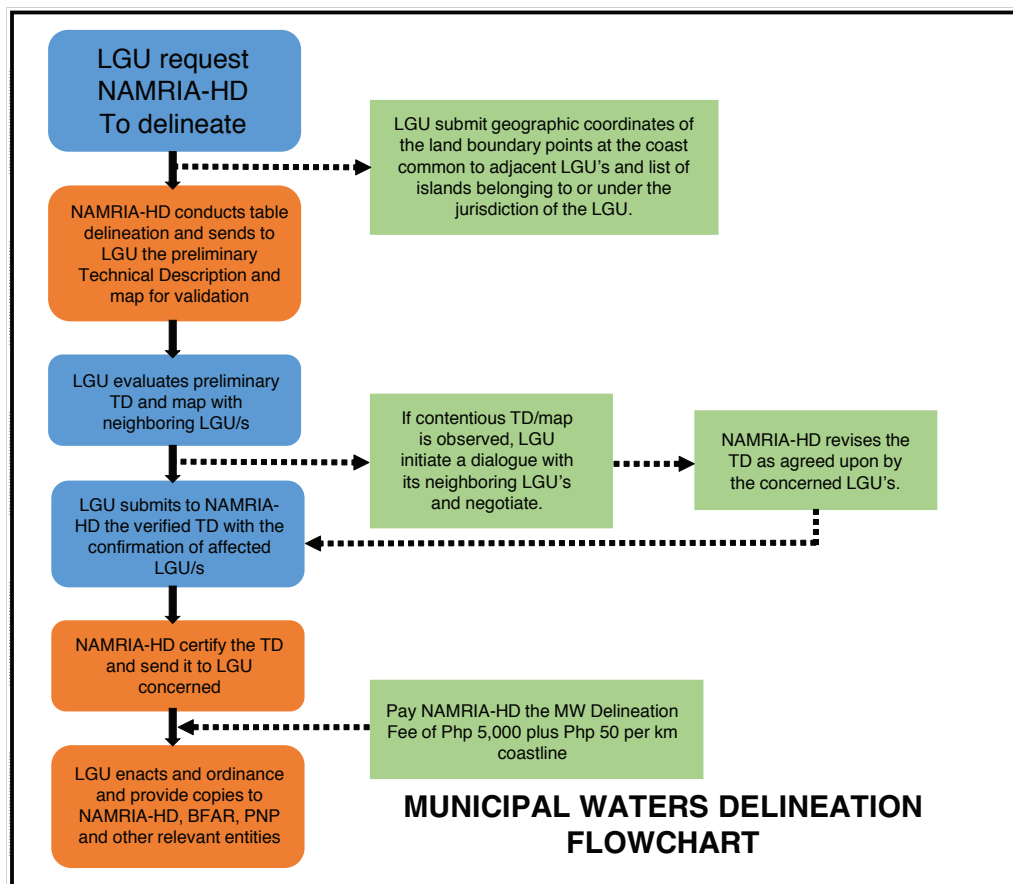


Note:

Secure map and technical description of the municipal waters from NAMRIA.

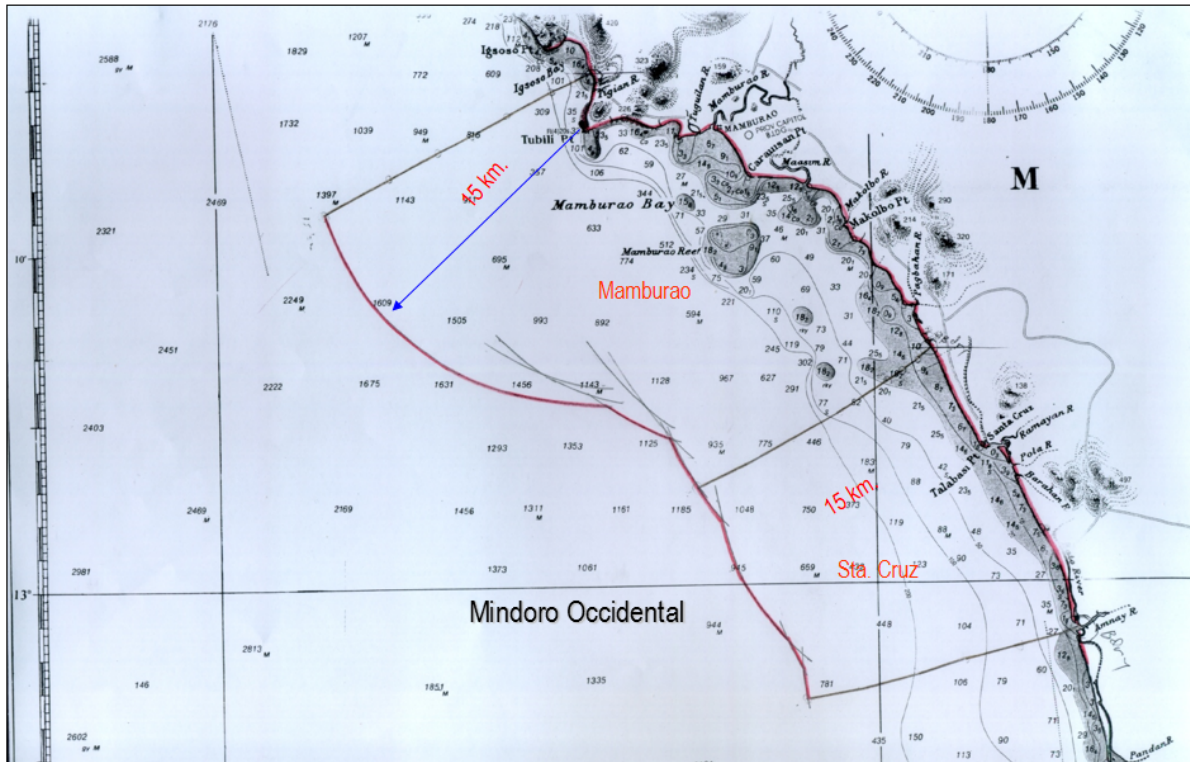
As of September 28, 2010, about 919 coastal municipalities are already mapped, of which 796 are validated, 295 municipalities have updated maps, 263 are certified, and 54 municipalities have their respective ordinances.

Figure CO–6. Municipal Waters Delineation Flowchart



Note: In the absence of NAMRIA-certified technical descriptions, LGU may proceed with planning and zoning provided they take the necessary measures to properly delineate their municipal waters. LGUs may refer to DENR Administrative Order No. 17 S-2001 for the Guidelines for Delineating/Delimiting Municipal Waters.

Figure CO-7. Delineating Municipal Waters using Normal Baselines



Source: NAMRIA

### 3. Delineate Coastal Boundaries and Layers.

Demarcation of coastal boundaries/layers is important before conducting a stakeholder's consultation. These layers will serve as a visualization that will aid the stakeholders as well as the planning team in assessment, prioritization, and on the development of spatial strategies and zoning.

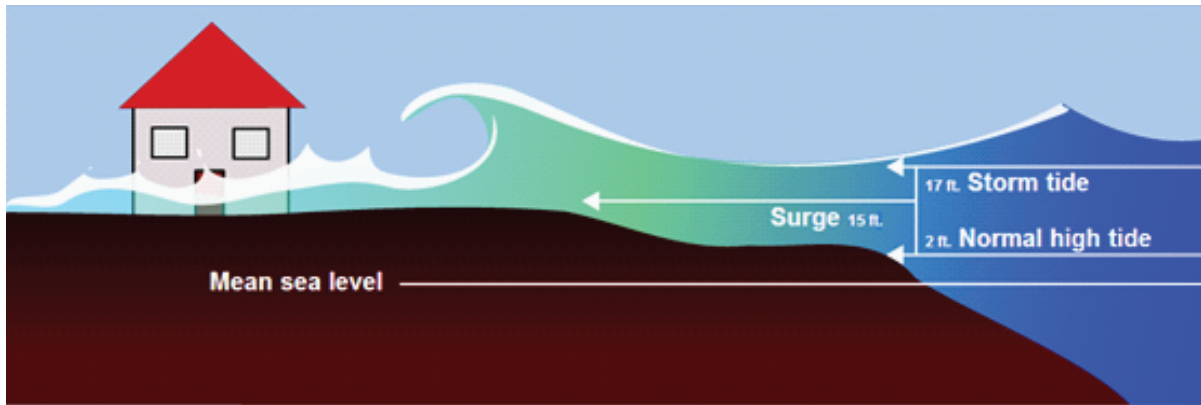
#### Hazard Areas

These areas should be of priority due to its potential impact to human safety, properties, and economic growth of the LGU. In consideration on the impact of climate change to disaster risk reduction, areas that can be affected by storm surges and tsunami should be delineated. A storm surge occurs when water is pushed inland because of high winds. Typically, high winds occur during a storm or a typhoon. Coastal zones are particularly at risk for storm surges. While typically associated with tropical cyclones (hurricanes, typhoons, and cyclones) a storm surge can also occur when abnormally high winds combine with a high tide. A tsunami, on the other hand, is a series of sea waves commonly generated by under-the-sea earthquakes and whose heights could be greater than 5 meters. Tsunamis can occur when the earthquake is shallow-seated and strong enough to displace parts of the seabed and disturb the mass of water over it

These areas can be delineated by obtaining historical highest high tide, historical records or model outputs of storm surges, projected heights of tsunami (for areas that are tsunami prone). Susceptibility maps and models on storm surge and tsunami can be obtained from PAGASA and PHIVOLCS, respectively. In addition, a topographic or elevation map or DEM is required.

First, determine the potential areas that can be affected by storm surge, by adding up the historical highest high tide level with the potential storm surge height. The computed value would be the storm surge's elevation threshold, which means that areas that have elevation equal or below the elevation threshold is at risk to storm surge. For example, if the historical highest high tide is 2m and the highest historical storm surge records or modelled potential storm surge height is 5m, then the storm surge's elevation threshold is 7m. This means that land areas that are 7m elevation and below are at risk to storm surge.

Figure CO–8. Illustration of a storm surge (adapted from Wikipedia)



Same with storm surges, tsunami prone areas can also be determined by adding up historical highest tide with the highest historical tsunami record level or modelled tsunami level.

The overlapping areas of storm surge risk areas and tsunami risk areas are the most critical areas. These areas should have suitable and properly planned evacuation procedures/options as well as evacuation routes that should be executed upon announcement of an arriving typhoon or storm and/or tsunami warning.

### Foreshore

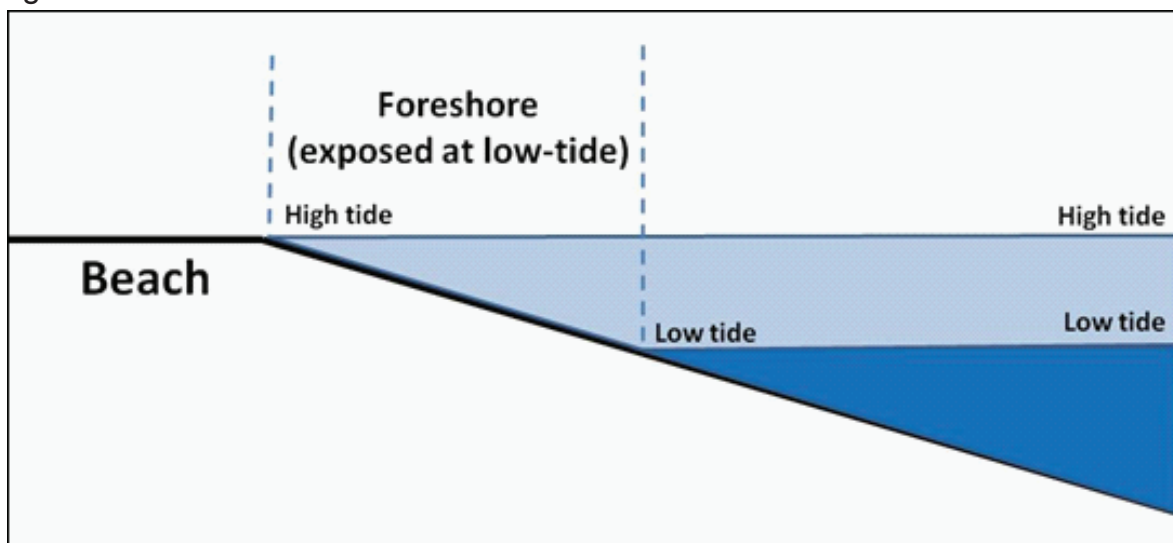
The Foreshore land is defined in the Water Code as the land area that is covered by water at high tide and exposed at low tide.

The reference line for determining the boundary of the foreshore zone should be done during the lowest low tide of the year and the highest high tide of the year. This occurs near the spring equinox (March during full moon and new moon) and near the autumn equinox (September during full moon and new moon). With these data, the foreshore zone can be delineated from an elevation map using the following conditional statement:

**Foreshore = Highest High Tide Level value < Elevation > Lowest Low Tide Level value**

For example, if records show that the highest high tide level is at 2m and the lowest low tide is -0.5m, then land area in a topographic or elevation map/DEM that has -0.5m to 2m elevation is classified as foreshore area.

Figure CO–9. Illustrative Definition of a foreshore area



The delineation can be done either manually on a printed map or digitally in a GIS platform on a digital elevation model.

## Easement/Buffer or Salvage Area

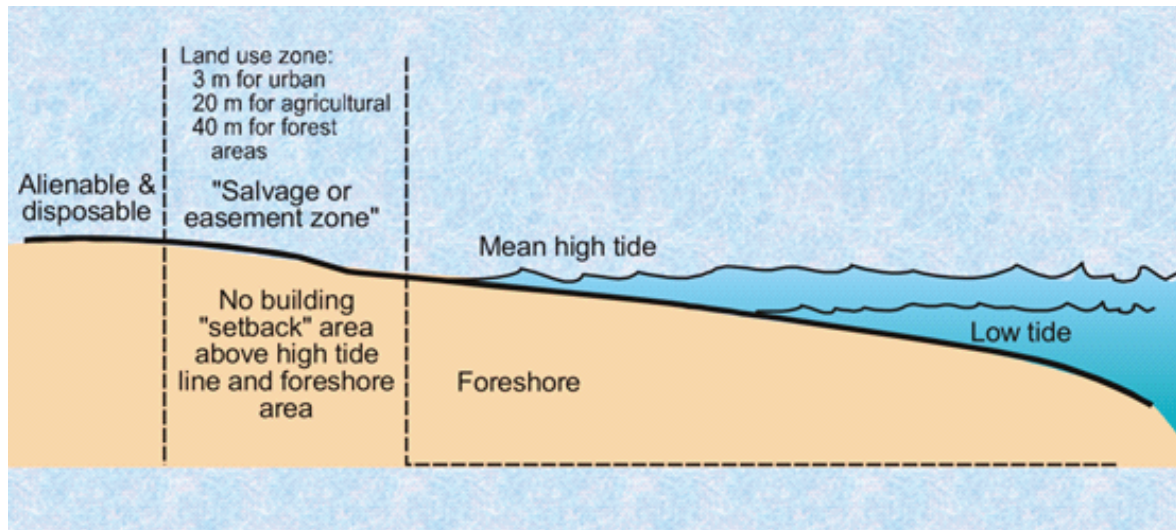
According to the Water Code of the Philippines, the easement/buffer or salvage area applies to both coastal shores as well as riverbanks. As this area is intended primarily for accessibility to the sea or river, no permanent structures are allowed to be built in the easement area and this should be ideally void of large, thick vegetation such as mangroves in the foreshore land that would reduce access.



### Water Code (PD 1067) Article 51

“The banks or rivers and streams and the shores of the seas and lakes throughout their entire length and within a zone of three (3) meters in urban areas, twenty (20) meters in agricultural areas and forty (40) meters in forest areas, along their margins, are subject to the easement of public use in the interest of recreation, navigation, floatage, fishing and salvage. No person shall be allowed to stay in this zone longer than what is necessary for recreation, navigation, floatage, fishing, or salvage or to build structures of any kind.”

Figure CO–10. Existing provision on salvage and easement zone on coastal area in the Water Code



A 3-meter, 20-meter, and 40-meter no-building buffer shall be maintained at the fringe of the Foreshore land if the adjacent land use is residential land, agricultural land, and forest, respectively. The reference line for the determination of easement should be done during the highest high tide of the year, which occurs near spring equinox (March during full moon and new moon) and near autumn equinox (September during full moon and new moon). Delineation can be done manually or digitally using the delineated foreshore area and existing land use map.

It is suggested to develop natural biofilters in these areas. Natural biofilter is a patch of vegetation, such as green belts and riparian forests, that helps in filtering surface run-off to the river and it ensures soil stability to prevent soil erosions/landslides.

## River Network and Riparian Area

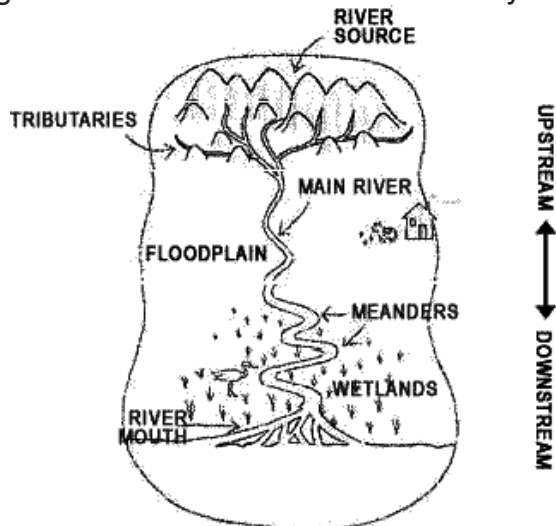
A river system is defined as a group of rivers discharging water by way of a common flow or system of channels into a sea or lake. It usually consists of the main river (the trunk of the system) and primary, secondary, and later-order tributaries. Whereas, a riparian area is the area of interface between the surrounding land and a river system.

A floodplain or flood plain is an area of land adjacent to a stream or river that stretches from the banks of its channel to the base of the enclosing valley walls and experiences flooding during periods of high discharge. It includes the floodway, which consists of the



stream channel and adjacent areas that actively carry flood flows downstream, and the flood fringe, which are areas inundated by the flood, but which do not experience a strong current. In other words, a floodplain is an area near a river or a stream, which floods when the water level reaches flood stage. An alluvial plain is a largely flat landform created by the deposition of sediment over a long period by one or more rivers coming from highland regions, from which alluvial soil forms. A floodplain is part of the process, being the smaller area over which the rivers flood at a particular period, whereas the alluvial plain is the larger area representing the region over which the floodplains have shifted over geological time.

Figure CO–11. Illustration of a River System



Source: [http://www.cgeducation.ca/resources/learning\\_centre/classroom\\_activities/river\\_system.asp](http://www.cgeducation.ca/resources/learning_centre/classroom_activities/river_system.asp)

Though these areas are technically not part of the coastal zone, the rivers and streams are the major means of transport of materials from the land to the sea. Strips of vegetation along riparian zones help control soil erosion, can buffer pollutant loadings from landward sources, and help recycle nutrients from sediments. The development along the freshwater bodies within the territorial jurisdiction of the municipal/city LGU has very significant impact on the quality of coastal resources. Portions of the riparian area up to the extent defined in Article 51 of the Water Code are also subject to the easement of public use.



It is necessary to delineate river network boundaries and identify the changes before, during, and after major flood events. A local technical or study group created for this purpose should conduct the data requirements, gathering and analysis in consultation with a geologist and a hydrologist, if available, or with the concerned/relevant agencies such as the Mines and Geosciences Bureau (MGB), and the Department of Environment and Natural Resources (DENR).

### Accreted Land

Accreted land are land area form by accretion; the growth of land by the offshore deposition of sediment. Accretion is most active in estuaries and deltas. These land mass could be unstable or wash away during a strong typhoon. Accreted land that had stabilized for at least 15 to 30 years could be an area for minimal development such as for mangrove afforestation; otherwise, no permanent structures or developments should be built on it.

### Existing Infrastructure and Industrial Complex in the Watershed

Any infrastructure developments (whether small- or in large-scale) in the watershed must undergo proper clearance that requires environment impact assessment in relation to soil integrity, sedimentation, flooding, water quality, sediment transport and pollution to ensure minimal impact to the coastal areas.

### Critical Coastal Habitats

Critical Coastal habitats are habitats that are vital for the functioning of a coastal ecosystem to provide fisheries security and coastal protection as well.

The spatial extent of all of these habitats except for the biodiversity conservation sites can be delineated from PCRA or by doing an image analysis/remote sensing or ground/sea survey.

The community structure of these habitats can be determined from coastal resource profile from the municipal agriculturist office, or through the conduct of primary survey/PCRA.

Procedure for biodiversity conservation sites may be found in the Biodiversity section of HLURB CLUP Guidebook Volume 2.

## **Seagrass Beds**

Seagrasses are marine flowering plants that commonly form meadows in the foreshore and subtidal areas. Seagrass beds serve as shelter and breeding area for a variety of fishes and invertebrate species, and as a nursery for their young. They also stabilize bottom sediments and protect the shoreline from erosion. Sea grasses are also important food to grazing animals like sea turtles. Another popular inhabitant of these areas is the dugong, an endangered species in the Philippines. (Juinio-Meñez, Butardo-Toribio, Perez and Pollisco, 2007)

The leaves of seagrasses are also used as compost fertilizer and fodder for livestock. Their leaves can also be woven into baskets or used as stuffing for mattresses, thatching for roofing, upholstery, and packing material.

## **Seaweed Beds**

These are areas with large extent/cover of either green, brown, and red algae or a complex of them. They may include some of the economically important algae (such as agar, carrageenan, and fucoidan-rich species). They also serve as habitat as well as source of nutrition to some fisheries (herbivores).

## **Corals Reef Systems**

Corals form one of the dominant framework builders of the coral reef. They consist of soft-bodied animals called coral polyps. Hundreds of thousands of polyps often aggregate and form a colony. Communities of coral colonies form massive deposits of calcium carbonate that form coral reefs. These reefs provide habitat, breeding and spawning areas for a wide variety of marine organisms including many commercially important fishery species and sources of marine natural products. Together with seagrass beds and mangrove forests, coral reefs buffer strong wave action and prevent coastal erosion.

Because of the stony calcareous deposits, corals have been traditionally harvested for filling and construction materials or for commercial trade in the marine curio industry together with other marine organisms (e.g., shells).

## **Estuaries**

The estuaries are areas where rivers meet the sea and where fresh water mixes with salt water. They provide habitat for birds, mammals, fish, and other wildlife. They serve as feeding areas, spawning grounds and nurseries to many marine organisms. Most commercially valuable fish species also depend on estuaries at some point during their life history. Estuaries are highly productive ecosystems that perform other important functions such as water filtration and flood control through the absorption of floodwaters and dissipation of storm surges. (Juinio-Meñez, Butardo-Toribio, Perez and Pollisco, 2007)

## **Wetlands and Mangrove Forests**

Wetlands are areas of marsh or land saturated with water that are natural or artificial, permanent or temporary, static or flowing, fresh, brackish or salt. They include areas of marine water with a depth not exceeding 6 meters at low tide (DENR et al., 2001). Wetlands have vital ecological functions. They store carbon, mitigate flooding and sedimentation, and help in nutrient retention, water purification, biodiversity conservation, replenishment of groundwater and energy generation. They are also sites for ecotourism, recreation and



transport, and sources of fresh drinking water, fish, shellfish, and other economic goods. Examples of wetlands are swamps, marshes, and shallow coral reefs.

There are significant wetlands in the country that included in the the Ramsar List of Wetlands of International Importance (or Ramsar Sites). Ramsar sites are representative, rare, or unique wetland types that are internationally important for conserving biodiversity. They are protected under the Convention of Wetlands of International Importance or the Ramsar Convention of 1971. The six (6) wetlands included in the Ramsar sites are Olango Island Wildlife Sanctuary in Cebu, Naujan Lake National Park in Oriental Mindoro, Agusan Marsh Wildlife Santuary in Mindandao, Tubbataha Reefs National Park, and Puerto Princesa Subterranean River National Park, both in Palawan and the Las Piñas – Parañaque Critical Habitat and Ecotourism Area in Metro Manila.

Mangrove forests are classified as Marine/Coastal Wetlands I (Intertidal Forested Wetlands) in the Ramsar classification system for wetland types. As defined by the Fisheries Code (Section 4, No. 52), a mangrove is a community of intertidal plants that includes all species of trees, shrubs, vines and herbs found on coasts, swamps or borders of swamps.

### **Beach Forest**

Beach forest is a narrow strip of woodland along the sandy and gravelly beaches of the sea coast dominated by *Terminalia catappa*, *Casuarina equisetifolia*, *Barringtonia asiatica*, *Sonneratia caseolaris*, *Acacia farnesiana*, and *Erythrina orientalis*. Beach forest aids in soil stability, coastal integrity, and minimizes sedimentation. It may also serve as buffer or coastal protection against storm surge/tsunami depending on the extent of the forest cover.

### **Biodiversity Conservation Sites**

Some LGUs are blessed with the presence of plants and animals that are uniquely found or endemic in their areas of jurisdiction. To protect wildlife, LGUs are mandated to implement and enforce the provisions of the Fisheries Code and the Wildlife Act. According to Section 35 of the Wildlife Act, "local government units shall initiate conservation measures for endemic species in their areas. For this purpose, they may adopt flagship species...which shall serve as emblems of conservation for the local government concerned."

LGUs may also coordinate with the DENR in establishing and protecting critical habitats in their localities. Section 25 of the Wildlife Act provides that "all designated critical habitats shall be protected, in coordination with the local government unit, from any form of exploitation or destruction which may be detrimental to the survival of the species dependent therein."

Procedures in delineation and development of conservation strategies are found in the Biodiversity section of HLURB CLUP Guidebook Volume 2.

### **Marine Protected Areas**

Marine protected areas, like any protected area, are regions in which human activity has been placed under some restrictions in the interest of protecting the natural environment, its surrounding waters and the occupant ecosystems, and any cultural or historical resources that may require preservation or management.

The sites for existing MPAs also need to be taken into consideration. The boundaries of the existing MPAs can be typically found in the office of the MAO or CRM officer. It is recommended to have at least 15% of the municipal water areas to be designated as MPA. These areas should have at least a good condition of benthic critical habitats.



“In municipal waters, the concerned LGU in consultation with the FARMCs may establish fishery refuge and sanctuaries: Provided further, that at least fifteen percent (15%), where applicable, of total coastal areas in each municipality shall be identified based on the best available scientific data and in consultation with

the Department, and automatically designated as fish sanctuaries by the LGUs in consultation with the concerned FARMCs.” (Section 81, RA 8550)

Establishment of MPAs may require a study to be conducted by a Technical Working Group typically composed of a marine resource ecologist, the MAO, the CRM planning officer, MFARMC, and a RS-GIS specialist. The TWG could also assess the carrying capacity that can be supported by each MPA.

Otherwise, if the coastal resource assessment report and coastal resource map are available, identify areas of critical benthic habitats (especially seagrasses, coral reefs). Then, determine on what is 15% of your municipal waters and designated these areas as MPAs or network of MPAs. Consult experts/BFAR on what should be the minimum size for an MPA suitable for your area.



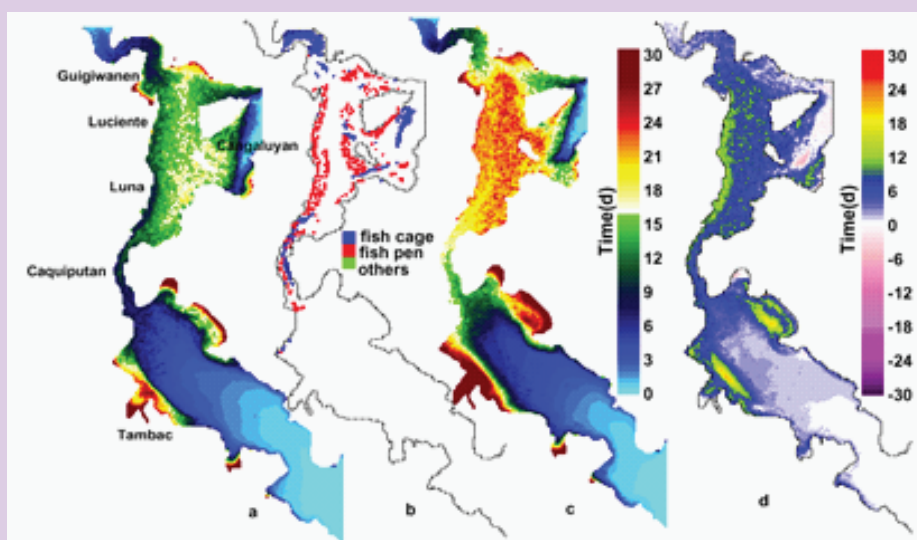
Migration pathways, where present, shall be protected. These are applicable to migratory species which are any fishery species which in the course of their life could travel from freshwater to marine water or vice versa, or any marine species which travel great distances in waters of the ocean as part of their behavioral adaptation for survival and speciation.

## Production Areas

### a. Mariculture

Mariculture is a specialized branch of aquaculture involving the cultivation of marine organisms for food and other products in the open ocean, an enclosed section of the ocean, or in tanks, ponds or raceways which are filled with seawater.

Monitoring existing activities in terms of extent, expansion, the legal and environmental implications can be done either by a survey or through remote sensing/image analysis. For the proposed establishment of a mariculture zone or expansion activities please refer to BFAR guidelines, policies, implementing rules and regulations. This process can be achieved with the help of a TWG headed by a physical oceanographer, an ecologist, and



Prior to the establishment of mariculture parks, a study by a technical working group to ascertain the carrying capacity of the proposed mariculture zone should be conducted. The study should focus on the residence time, the water quality, particularly dissolved oxygen, in the planned area. It should also be determined if there are any nearby coastal habitats (coral reefs, seagrass beds, etc.) that may be affected by the proposed park. The TWG should estimate the ideal size of mariculture structures (cages, pens, etc.) as well as their total allowable structures for the park. To avoid deterioration of coastal habitats, the proposed park should be situated downstream from the habitats.

a fishery expert. It should be noted that carrying capacity, in terms of number and spatial distribution of mariculture activities in the area, could be inferred from the water quality and residence time/renewal of water.

### **b. Inland Aquaculture**

Inland aquaculture refers to the farming of aquatic animals and plants under controlled or selected aquatic environments (fresh, sea or brackish waters) for any commercial, small-scale, recreational, or other public purpose.

Monitoring existing activities in terms of extent, expansion, and in terms of legal and environmental implications can be done either by a survey or through remote sensing/image analysis. For the proposed establishment of an inland aquaculture zone or expansion activities please refer to FAO and BFAR guidelines, policies, implementing rules and regulations.

This process can be achieved with the help of a technical working group headed by a hydrologist, an ecologist, and a fishery expert.

### **c. Catch Fisheries**

The boundaries of the catch fisheries can be determined during the stakeholder's meeting and a buffer of the pointed areas will represent these zones. It is also important to note potential regulatory policies like close and open seasons per designated area or species in order to manage the supply or source of each fishery species. Identification and assessment of traditional fisheries area is also important.

### **d. Ecotourism**

Potential ecotourism areas may include critical habitats, MPAs, nurseries/ fishery culture areas, heritage sites/ structures, and Indigenous People-related areas. However, regulated access and practices/ procedures must be employed on these areas. The process of establishment of these zones is under the supervision of the Tourism Infrastructure and Economic Zone Authority, which is mandated by the Philippine Tourism Act. The authority has the role of providing the implementing rules and regulations for the establishment of these zones. The process also includes participation of the community and/or stakeholders. A technical working group can conduct the study on the establishment of these zones. However, it should be noted that during the stakeholder's consultation, the plans that will be decided on these zones should be in accordance with other CLUP guidelines and regulations and uphold sustainable development.

## **Navigation**

LGUs can designate navigational passageways within municipal waters but only for small vessels. The Marine Industry Authority (MARINA) and the Philippine Ports Authority (PPA) designate sea-lanes, ports, and berthing areas for large marine vessels. These agencies are governed by agreements and rules of the International Maritime Organization (IMO). The LGU should coordinate with these national agencies for appropriate action in areas where passage of large vessels poses serious danger to the marine environment. (Junio-Meñez, Butardo-Toribio, Perez and Pollisco, 2007)

A technical working group headed by the MARINA, PPA and with a physical and geological oceanographer could do a study to identify areas where jetties, ports, and navigation lanes can be established. The studies should have special considerations to the critical habitats, ports location, coastal integrity, water circulation and water quality, tide/sea level (bathymetry) dynamics and sediment transport. Ports and jetties are recommended to have a stilt-type construction design to allow proper sediment transport and ensure coastal integrity.

## **Mining/Quarrying Areas**

Extraction of resources such as minerals, sand, and gravel should be done in a responsible way. Large-scale mining should be regulated and in accordance with the guidelines of Mines and Geosciences Bureau. Necessary permits and consultation with stakeholders

within LGUs must be observed. For small-scale mining projects, whether small or large, proponents must be required to conduct environmental impact assessment in relation to erosion/ landslides, sedimentation in rivers and coastal areas and proper waste disposal and management. This must be included in the LGU's ordinance or requirement before issuing permits.



No extraction, removal, and/or disposition of one (1) kilometer from the boundaries of reservoirs established for public water supply, archaeological and historical sites or of any public or private works or structures, unless the prior clearance of the concerned Government agency(ies) or owner is obtained. No extraction, removal, and/or disposition of materials shall likewise be allowed in offshore areas within five hundred (500) meters distance from the coast and two hundred (200) meters from the mean low tide level along the beach. (DAO 96-40)

## 4. Assess resources

The goal of this step is to know and make an evaluation of the status of the municipal coastal and marine resources. The information gathered from a resource assessment is essential to successful land and water use planning. Data will be needed to delineate areas that are essential for the protection of lives and property and/or to ensure sustainable resource management for the protection of biodiversity and food security.

An assessment can provide baseline information as a reference to changes brought about by management intervention and/or external events. The data needs detailed in the coastal and marine assessment tool adapted from Aliño et al. (2012) should be provided by stakeholders to the best of their ability. The involvement of stakeholders at this point has been proven to be a key success factor and one widely accepted method to undertake this activity is through a Participatory Coastal Resource Assessment (PCRA). Details of the PCRA focusing specifically on coral, seagrass, and mangrove habitats are found in **Annex CO-2**. Information on the status of the coastal population including income, livelihood and health, can be found in **Annex CO-3**.

For more specific coastal resources such as the physical coastline or fisheries, more detailed scientific studies are required, usually through the assistance of capable academic institutions. The steps in assessing the coastal and marine resources are enumerated below:

- a. Gather secondary data (e.g. maps, reports, studies, relevant laws, regulations, etc.). Update and verify validity of the information and issues gathered from secondary sources.
- b. Conduct PCRA mapping and data collection (refer to **Annex CO-2**).
- c. Conduct a workshop session on coastal and marine assessment using the following tools:

### Coastal and Marine Assessment Tools














The crucial input of stakeholders at this step involves directly assessing the coastal habitats following the procedural tools that are introduced here (adapted from Aliño et al. (2012). The stakeholders should respond to these questions to the best of their ability. The data derived from the Participatory Community Resource Assessment (PCRA) tools (adapted from Deguit et al. 2004), focusing specifically on coral, seagrass, and mangrove habitats will assist the stakeholders in determining the state of the habitats.



Other vulnerability assessment tools cited from MERF (2012) can also be used such as Integrated Coastal Sensitivity, Exposure, and Adaptive Capacity to Climate Change (ICSEA CChange), Coastal Integrity Vulnerability Assessment Tool (CIVAT), and Tool for Understanding Resilience of Fisheries (TURF).

**Disaster Risk Reduction and Climate Change Adaptation Assessment (modified from Licuanan, Rollon, and Samson)**

Results of this assessment may aid in prioritization of CCA and DRR-related strategies and policies.

	Criteria	Score		
		Low	Medium	High
1	Is the coast steep (landward slope; rise over run)	>1:50 or 2% slope  Effects of sea level rise (SLR) are less prominent on steep coasts	1:200-1:50 or 0.5%-2%  	<1:200 or 0.5%    A coastline with gentle slopes are more prone to inundation due to rising sea levels
2	How much of the coastline is lined by coral reefs/communities?	More than 50% is lined by coral reefs/communities    Coral reefs help in minimizing wave energy on the coast	Between 25 to 50% is lined by coral reefs/communities	Less than 25% is lined by coral reefs/communities    Lack of coral reefs expose the coast to higher wave action
3	What is the highest hard coral cover (%)?	over 50%  51-75%   76-100% 	between 25 to 50%  11-30%   35-50% 	Less than 25%  0%   1-10%   11-30% 
4	How much of the shallow areas are covered by seagrass?	seagrasses cover more than half of the reef flat	seagrasses cover more than 1/8 to 1/2 of the reef flat	seagrasses cover less 1/8 of the reef flat
5	How much of the coastline is lined by mangroves?	More than 50% is lined by mangroves	Between 25 to 50% is lined by mangroves	Less than 25% is lined by mangroves
6	What kind of mangrove forest is left?	More than 3 mangrove species with <i>Avicenna</i> and <i>Sonneratia</i>	Mostly <i>Avicenna</i> and <i>Sonneratia</i>    These species can easily adapt to rising sea level.	Predominantly <i>Rhizophora</i>    These species may drown as they cannot keep with the increase in sea level

If mostly

**Implications**

**Low**

Municipality may be able to face coastal changes due to climate change and should protect coastal habitats.

**Medium**

A TWG\* should be consulted on adaptation options to better mitigate coastal changes due to climate change.

**High**




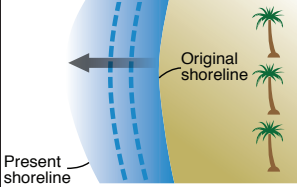
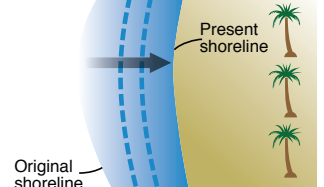

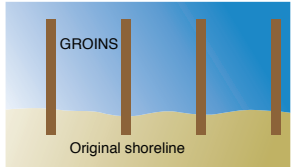

A TWG\* should be consulted on adaptation options to better mitigate coastal changes due to climate change.

\*TWG should be led by a coastal habitat specialist.




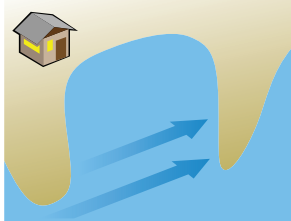
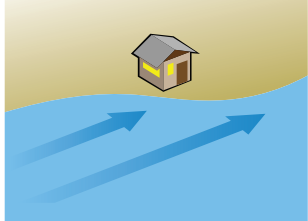
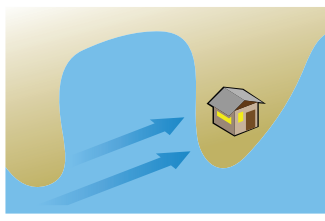


### Coastal Integrity Assessment

Results of this assessment could be a basis for regulation and/or restrictions of coastal developments.

	Criteria	Score		
		Low	Medium	High
1	Is the coastline prone to erosion?	Rocky, cliffed coast; beach rock 	Low cliff (<5m high); Cobble/gravel beaches; alluvial plains; fringed by mangroves 	Sandy beaches; deltas; mud/sandflat 
2	Has the beach changed much in the last several years?	Land Gain/accreting 	Stable/no change 	Eroding 
3	Average width of reef flat or shore platform (m) 	>100m	[50, 100]	<50m
4	Are there any coastal and offshore mining activities? (includes removal of fossilized corals on the fringing reef and beach)	None to negligible amount of sediments being removed (i.e., sand and pebbles as souvenir items)	Consumption for household use	Commercial scale
5	Are there structures on the foreshore present?	None; one or two short groins (i.e., <5m long) and/or few properties on the easement with no apparent shoreline modification 	Short groins & short solid-based pier (5 to 10m long); seawalls and properties with aggregate length of less than 10% of the shoreline length of the barangay 	Groins and solid-based pier > 10m long; seawalls and other properties with aggregate length of more than 10% of the shoreline length of the barangay 



	Criteria	Score		
		Low	Medium	High
6	Is there any beach forest or vegetation?	Continuous and thick with many creeping variety 	Continuous and thin with few creeping variety 	Very patchy to none 
7	Is the coastline highly exposed to strong wave action?	No 	Slightly  Longshore drift will eventually cause coastal erosion	Yes  Sandy headlands are prone to high wave energy

If mostly

**Low**

**Medium**

**High**

**Implications**

Minimal restrictions on coastal development.


A technical working group (TWG)\* should be consulted before coastal development is allowed.

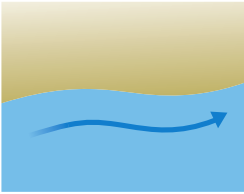
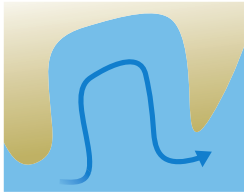
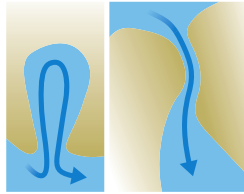
No coastal development should be allowed.

\*TWG should be led by a geologist and/or hydrologist

**Water Quality Assessment**

Result of this assessment is necessary for the continued protection of the culture fisheries productions.

	Criteria	Scoring		
		Low	Medium	High
1	Is the water murky/ silty in most of the year?	Water is clear all year round	Water is observed to be murky for 1 to 2 quarters a year	Water is observed to be murky/ silty for three quarters a year 
2	Are the effluents discharged to water bodies according to standards (DAO 35 Effluent Standards)?	Yes		No
3	Does solid waste accumulate in this coastal area?	No	Solid waste are observed in this coastal area between 1 to 4 months every year	Solid waste are observed in this coastal area between 4 to 8 months every year
4	Does the area experience warm still water?	No	Short periods of warm still water prevails and is related to tides	Periods of warm still water prevails for several days or weeks at a time

	Criteria	Scoring		
		Low	Medium	High
5	Are there any adjacent coral reef and/or seagrass habitats?	No	Either coral reefs or seagrasses are present nearby	Both coral reef and seagrass habitats are present nearby
6	Does water flow freely at intended culture site?	Yes 		No 

If mostly

**Low**

**Medium**

**High**

### Implications

No restrictions for culture production apply



Semi-intensive and seasonal culture production is allowed. A TWG\* should be consulted to find carrying capacity and ideal area to put up culture structures. Monitoring of dissolved oxygen should be regular

Sources of siltation should be identified and mitigated. Culture production should be kept at the minimal allowable by law with stringent monitoring

\* TWG should be headed by a physical and a chemical oceanographer.

### Fishes and Gears Assessment

Results of this assessment are necessary input for the protection of catch fisheries production.

	Criteria	Score		
		Low	Medium	High
1	What is the dominant catch composition?	Predominantly of pelagic types (e.g. tuna, mackerel, roundscad).  These fish taxa are highly mobile and migratory in the pelagic realm that it would be less likely that they will be affected by land use impacts.	A mixture of pelagic and demersal fishes.	Demersal fishes that are mostly associated with nearshore habitats (e.g. coral reefs, seagrass beds, and mangrove areas).  Demersal species are highly vulnerable to land use impacts.
2	What is the average catch rate?	Average catch rate is greater than 8 kg/fisher/day	Average catch rate is greater than 3 but less than 8 kg/fisher/day	Average catch rate is less than 3 kg/fisher/day
3	Has there been a change in catch composition?	Very minimal change in the last two decades	Few changes in the last two decades (e.g. still catching same types of fish but now also additionally catching demersal fish or non-fish like squid and octopus)	Considerable change in the last two decades (e.g., dominant catch replaced; loss of previously common fishes; etc.)
4	What are the size and amount of fish caught?	Most catches are large, mature fishes	Mix of small and large fishes	Small, immature fishes are abundant; few large spawners caught
5	Population density	Population of less than 200 per square kilometer in a fishing village/town; not crowded	200-400 persons per square kilometer	Greater than 500 persons per square kilometer; very crowded

	Criteria	Score		
		Low	Medium	High
6	Fisheries ecosystem dependency	Around one-fourth (25%) or less of the adult population are full-time fishers	Greater than 25% up to 50% of the adult population are full-time fishers	Majority in the adult population (> 50%) are full-time fishers
7	What is the contribution of fisheries to the per capita consumption of the area?	less than 20%	between 20 to 60%	More than 60%
8	Is fishing the only source of livelihood?	More than 3 other sources of livelihood	Fishing plus another source of livelihood	Yes
9	Are fishery resource management plans effective?	Yes		No





**If mostly Implications**

- Low** Fisheries supply is sufficient. No restrictions necessary
- Medium** Fishery resource management plans should be reviewed. A TWG\* should be consulted on how catch fisheries can be made more sustainable
- High** A Marine Protected Area (MPA) is required to protect and enable recovery of coastal habitats. Fishery resource management plans are necessary to enable recovery of fisheries and secure sustainability

\*TWG should be headed by a fisheries specialist.

**Seagrass, Corals, Wetlands and Mangroves Assessment**

Result of this analysis is necessary for the protection of the site's biodiversity.

	Criteria	Scoring		
		Low	Medium	High
<b>Health of coral communities</b>				
1	Are there more massive corals compared to branching ones?	more branching than massive corals 	as many branching as massive corals	more massive than branching 
2	Is the coral diversity much reduced?	more than 100 species remaining	between 50 to 100 species remaining	less than 50 species remaining
<b>Health of seagrass meadows</b>				
3	What type of seagrass dominate the meadows	Multi-species with at least 5 species present	Thalassia OR Cymodocea-, Halodule-, Halophila -dominated meadow 	<i>Enhalus acoroides</i> -dominated meadow 
4	Are there more barren areas within the sea-grass meadow?	Meadow is continuous and barren area is less than 20%	Barren area is between 20 to 60% of the meadow	Barren area is more than 60% of the meadow

	Criteria	Scoring		
		Low	Medium	High
<b>Health of mangrove forest</b>				
5	Are the slow growing, slow colonizing species most common in the area?	presence of more than 5 mangrove species capable of colonizing newly available habitat at a rate that keeps pace with the rate of relative sea-level rise	presence of 1 to 4 mangrove species capable of colonizing newly available habitat at a rate that keeps pace with the rate of relative sea-level rise	Yes, all species are slow growing, slow colonizing
6	Are there more large trees than small propagules (in terms of density)?	seedlings and propagules observed between 6 to 12 months every year	seedlings and propagules observed between 1 to 6 months every year	Yes, all trees are large, seedlings and propagules are absent
<b>Marine Protected Areas</b>				
7	How much is the need to expand the MPA?	Almost none; MPAs are 15% or more of municipal waters	Total MPA areas is between 1 to 15% of the municipal waters	Total MPA areas is less than 1% of the municipal waters
8	Was the MPA design and management focussed on fishery enhancement alone?	No, biodiversity and tourism aims also considered	Fisheries and tourism were considerations	Yes
9	To what extent do protected areas focus on single habitats (mangrove, seagrass, and coral) alone?	No; all habitats represented in the MPA	Only one or two habitat was included in the MPA	No habitats were included in the MPA
<b>Biodiversity species</b>				
10	Are there any endangered, endemic, or key biodiversity species present? (Refer to Marine Key Biodiversity Areas listing in <b>Annex BD-1</b> )	No	A few	Yes, many

If mostly

**Low**

**Medium**

**High for  
Seagrass**

**High for  
Mangroves**

**High (All)**

#### Implications

MPA enforcement is sufficient to protect biodiversity

More protection is required on the coastal habitats. A TWG\* should be consulted to expand MPA

Sources of high sedimentation need to be identified and mitigated.

Back forest should be vacated and reforestation of fast-growing species should be introduced.

A TWG\* should be consulted for establishment of MPA.

\*TWG should be led by a fisheries and ecology specialist.

d. Conduct technical/scientific survey studies, i.e., underwater assessments, CIVAT, TURF (This step is optional; may be conducted depending on available resources and special needs).

e. Evaluate and consolidate data and information from the resource assessments.

f. Package updated coastal environmental and fishery profile and maps.

g. Conduct FGD with key stakeholders and informants to generate issues/concerns and recommendations based on the findings of the situational analysis (see **Table CO-1** for Coastal and Marine Analysis Matrix).

## Defining Policy Options for CLUP/ZO

A matrix of the various implications and corresponding policy options for each coastal and marine assessment are found at the end of each assessment tools. Other policy options for the following findings/issues and concerns in the area are indicated in the table below.

Table CO–1. Coastal and Marine Analysis Matrix

Technical findings/observations/ Issues and concerns	Effects, impacts, implications	Policy options/interventions
Unregulated maritime transportation and port operations	Habitat damage and degradation	The LGU may impose fees and charges indirectly connected with maritime transport, port operations, and not otherwise specifically prohibited by law. An LGU may impose fees and charges through an ordinance for the use of its municipal waters in port operations pursuant to Section 129 in relation to Section 16 (General Welfare Clause) and Section 18 and Section 447 (1) (vi) of RA 7160, which devolves the power to protect the environment to the LGU and penalizes acts that endanger the environment. The fees will serve as compensation for the negative impact of ports and ships on the coastal resources and fishing grounds in municipal waters. All fees that will be collected shall accrue exclusively to the LGU fund.
Used of MPAs for ecotourism Mariculture and Aquaculture developments Illegal Dumping of wastes and wastewaters Unregulated small scale mining/quarrying	Habitat damage and degradation Water quality degradation Unstable coastal integrity and sedimentation	The fees that can be charged from the users of municipal waters include access fees, license fees and registration fees for fishers and vessels, harbor fees, safety inspection fees, marketing fees, fishery management fees, dock-side monitoring fees, accommodation fees, entrance fees, concession fees and permits for establishments in the coastal zone and Marine Protected Areas (MPAs) used as tourism sites, and pollution charges.
Declining fisheries production	Threatens food security	Open and closed season, property rights (either territorial use rights or access rights regulations)
Conflicting municipal water boundaries	Conflicting management thrusts	Inter-LGU collaboration is encouraged by the law. Section 16 of the Fisheries Code states: The management of contiguous fishery such as bays which straddle several municipalities, Cities, or provinces, shall be done in an integrated manner, and shall not be based on political subdivisions of municipal waters in order to facilitate their management as single resource systems. The LGUs, which share or border such resources may group themselves and coordinate with each other to achieve the objectives of integrated fishery resource management. The Integrated Fisheries and Aquatic Resources Management Councils (FARMCs) established under Sec. 76 of this Code shall serve as the venues for close collaboration among LGUs in the management of contiguous resources.
Need for an inter-LGU Alliance in implementations	Division of resources and revenues	Revenue and cost sharing involves an agreement between parties on percentage of sharing and the use of the funds. Revenue and cost sharing can be done between the municipal and barangay LGUs, among municipal LGUs (e.g., alliances) or between the LGU and law enforcers.
Large extent of coastal areas of LGU (covering several barangays)	Difficulty in implementation of ordinances and collection of revenues due to demand for more manpower and wide area of policing coverage	LGU-barangay revenue and cost sharing. An agreement can be made between the LGU and barangays to divide the revenue from user fees and/or fines and penalties. The two parties must agree upon the percentage of shares Coastal barangays can also set up a CRM Barangay Fund where CRM revenues shall accrue fines and penalties. The two parties must agree upon the percentage of shares Coastal barangays can also set up a CRM Barangay Fund where CRM revenues shall accrue.
Titled mangrove areas	Mangrove deforestation or degradation	Section 16 (8) of Presidential Decree (PD) 705 (Revised Forestry Code) "mangrove or swamplands at least twenty (20) meters wide, along shorelines facing oceans, lakes, and other bodies of water, and strips of land at least twenty (20) meters wide facing lakes" are needed for forest purposes and may not be classified as alienable and disposable land.



Technical findings/observations/ Issues and concerns	Effects, impacts, implications	Policy options/interventions
Existence of private fishponds	Unregulated aquaculture	According to Section 57 of RA 8550, private fishponds like fish hatcheries and fish breeding facilities must be registered with LGUs. The LGU in consultation with the Department of Agriculture shall prescribe minimum standards for such facilities.
Seagrass bed degradation due to harvesting/extraction Used of destructive fishing gears	Habitat degradation	The municipal/city government can regulate or prohibit the harvesting of sea grasses within its territorial jurisdiction through the issuance of appropriate ordinances. Though there is no provision in the Fisheries Code that prohibits the harvesting of sea grasses, Section 92 of RA 8550 penalizes any person who fish using gear methods that destroy coral reefs, sea grass beds, and other fishery marine life habitat.
Coral extraction and trade	Habitat degradation	The law bans the exploitation and exportation of corals and prohibits any person or corporation from gathering, possessing, selling or exporting ordinary, precious and semi-precious corals, whether raw or in processed form, except for scientific or research purposes (Section 91 of the Philippine Fisheries Code). The implementing rules are provided in FAO 202 series of 2000.
Structures or settlements in high or critical risk areas	Damage to properties and life	Relocation in safer location with provision of access to their workplace or maybe provision of alternative livelihood.

## 5. Integrate Coastal Management into the CLUP

The integration of coastal management into the CLUP aims to enrich the understanding and appreciation for coastal and marine resources in land use planning so that a city/municipality's land and water use become coherent. As such, the development and regulatory measures become consistent with the proposed coastal management and land use zones. Municipal waters are undoubtedly subject to several uses and are affected by different activities from the upland and urban areas. Thus, zones are not only limited to fisheries activities but also to tourism activities, commerce and industries e.g. navigational zones, mining, etc.

Municipal waters are zoned one kilometer inland from the highest high tide, to up to 15 kilometers seaward. Zoning utilizes the output generated in the delineation and delimitation of municipal waters by further subdividing the area into different uses with the appropriate management. The aim here is to resolve resource use conflicts and create the more widely accepted and suitable water use/zones that will be legitimized by integrating these into the local zoning ordinance.

a. Integrate data from coastal environmental and fishery studies into sections of the CLUP, where applicable. For example, data from the coastal integrity assessments, habitat assessments and socio-demographic surveys can be used in the Physical Features and Environmental Conditions sections of the CLUP.

The results of the study will comprise the coastal ecosystem section under the Sectoral and Special Area Studies of the CLUP.

b. Review past ICM activities/plans, if any.

c. Review national laws and local fisheries ordinances.

d. Revisit/review the city or municipal CLUP vision relative to the ICM assessment

i. Incorporate appropriate ICM vision elements to the CLUP vision

ii. Integrate ICM outcome areas, such as conservation and regulation, into the CLUP goals and objectives.

e. Incorporate ICM assessment relevant to the spatial strategy and development thrusts in the CLUP.

f. Identify water uses in relation to the land use plan (ex. Protection and production



areas)\*

g. Demarcate water use zones and integrate these in the land and water use plan and zoning.

h. Deriving from the VA-CCA analysis, integrate results to the hazard overlay zones.



Local fisheries ordinances can support the ZO by formalizing other provisions and details of ICM, such as the granting of fishing licenses, privileges and concessions, imposition of fees, rentals and levies of fishing activities and products, establishment of fishery reserves and other fisheries regulation strategies. The provisions may also include the creation and provision of funding for a fishery management office, fisherfolk organizations and fishery law enforcement teams (*Bantay Dagat*).

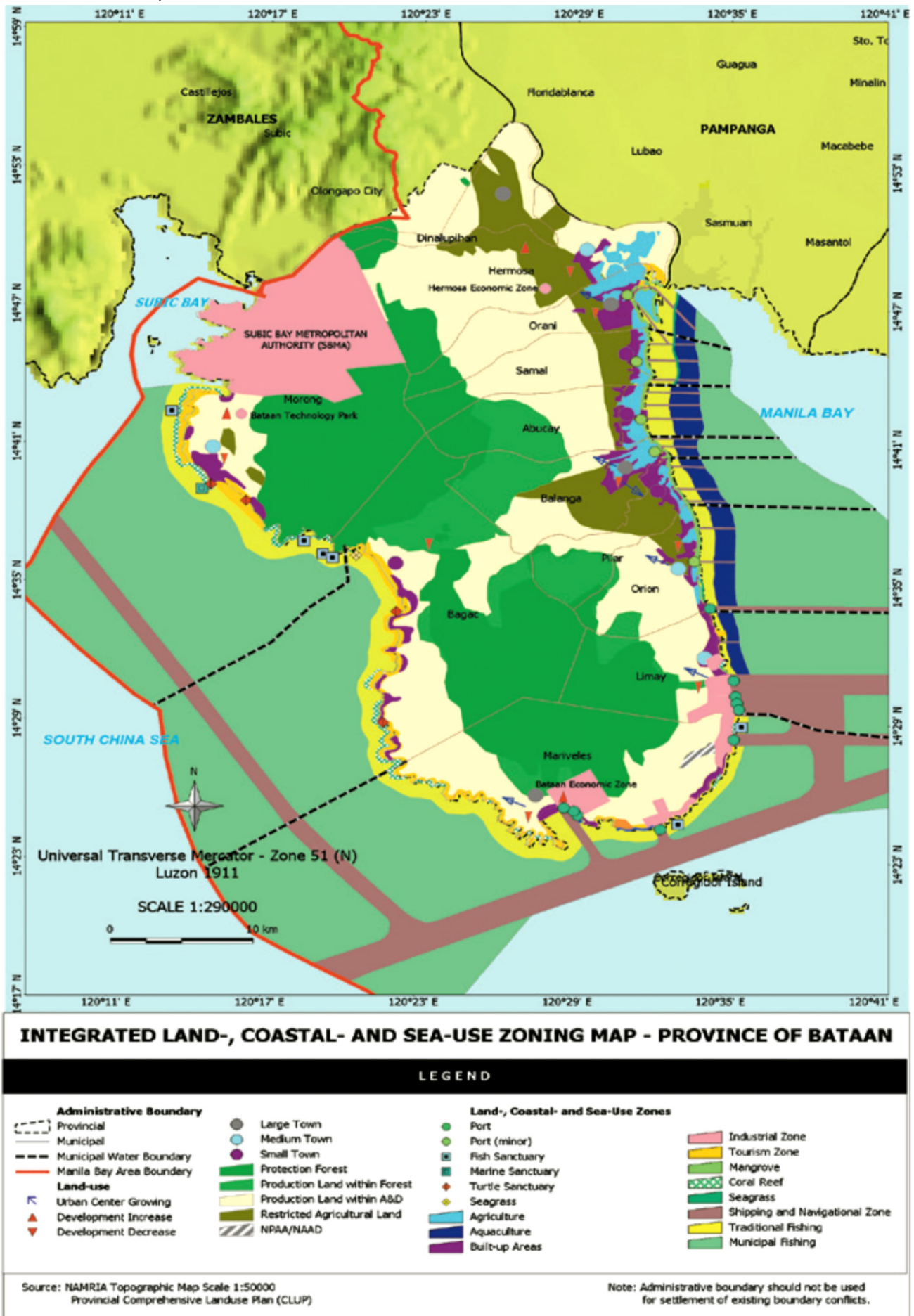
The zones and development regulations for coastal areas are largely determined based on the provisions of the Philippine Fisheries Code of 1998 (RA 8550), the Water Code of the Philippines (RA 9275), the Philippine Clean Water Act of 2004 (RA 9275) and related issuances.

The definition of zones and allowed uses are elaborated in Volume 3 of CLUP Guidebook 2013-2014, Model Zoning Ordinance. Volume 3 also shows the development restrictions and regulations that could be used as guide in policy-making. The LGU may come up with their own water use zones depending on the actual situation of their coastal area and on their priority uses of water.

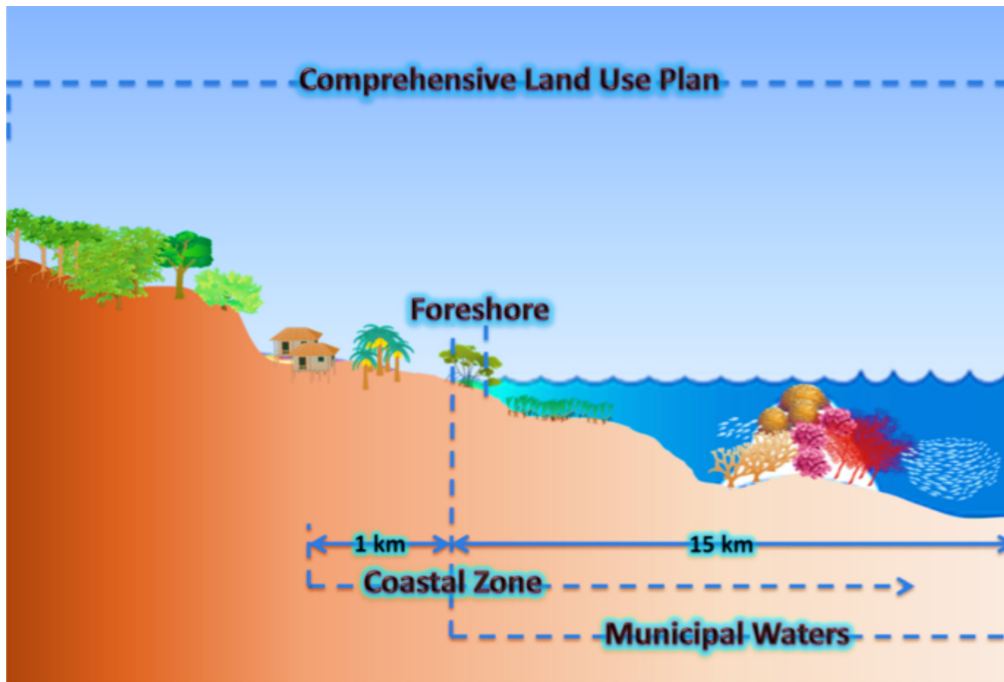
The proposed water use zones and allowable uses are as follows:

Proposed zones	Sub-zone	Allowable uses
Protection zone	Fishery refuge and sanctuary	Regeneration of marine life; cultivation of mangroves.
	Foreshore land	Legal easement
	Mangrove	Mangrove plantations
	Fishery Reserve	Regeneration of marine life; regulated educational and research activities.
	Delta/Estuary	Regulated fishing; shell gathering
Production zone	Lake	Regulated fishing; aquaculture
	Aquaculture	Raising and culturing fish and other fishery species.
	Commercial fishing	Small, medium, and large scale commercial fishing, as defined in the Fisheries Code.
	Municipal fishing	Fishing not requiring the use of fishing vessels; Fishing with the use of three (3) gross tons or less.
	Sealane	Navigation of water vessels.

Figure CO-12. Example of an integrated water and land use map showing some of the delineated coastal boundaries/layers (Bataan ICMP—Project Management Office, 2013)



## Annex CO-1. IEC Materials on Ridge-to-Reef Management Approach



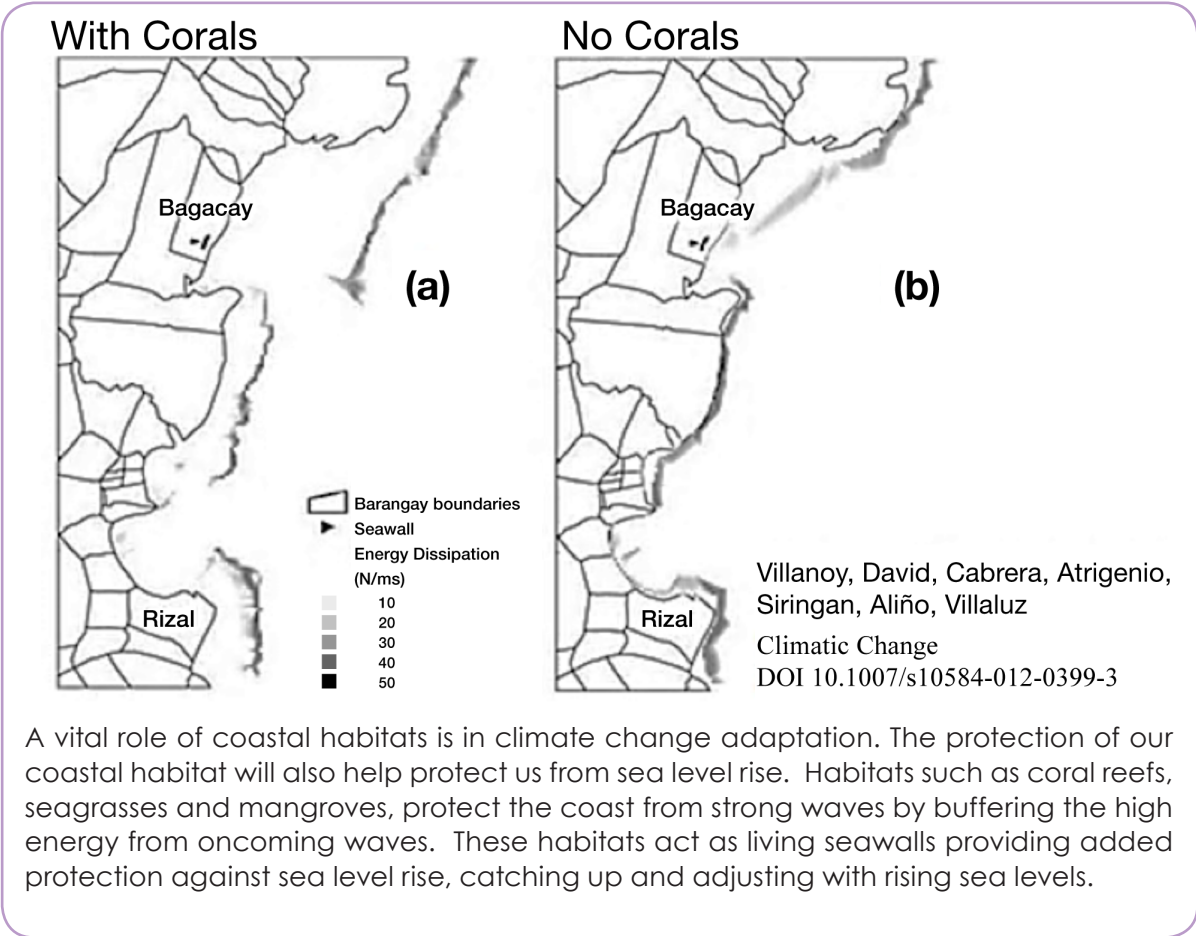
The boundary of the current CLUP extends only to the first kilometer of the coastal zone while the municipal coastal resource management (CRM) plan extends from this first kilometer of the coast until the fifteen-kilometer boundary of the municipal waters. In the light of a ridge-to-reef concept and the fact that the Philippines is an archipelagic country, it is compulsory that new enhanced CLUP should integrate the municipal CRM plan to the current CLUP.

*What we do up here,  
affect what happens down there.*

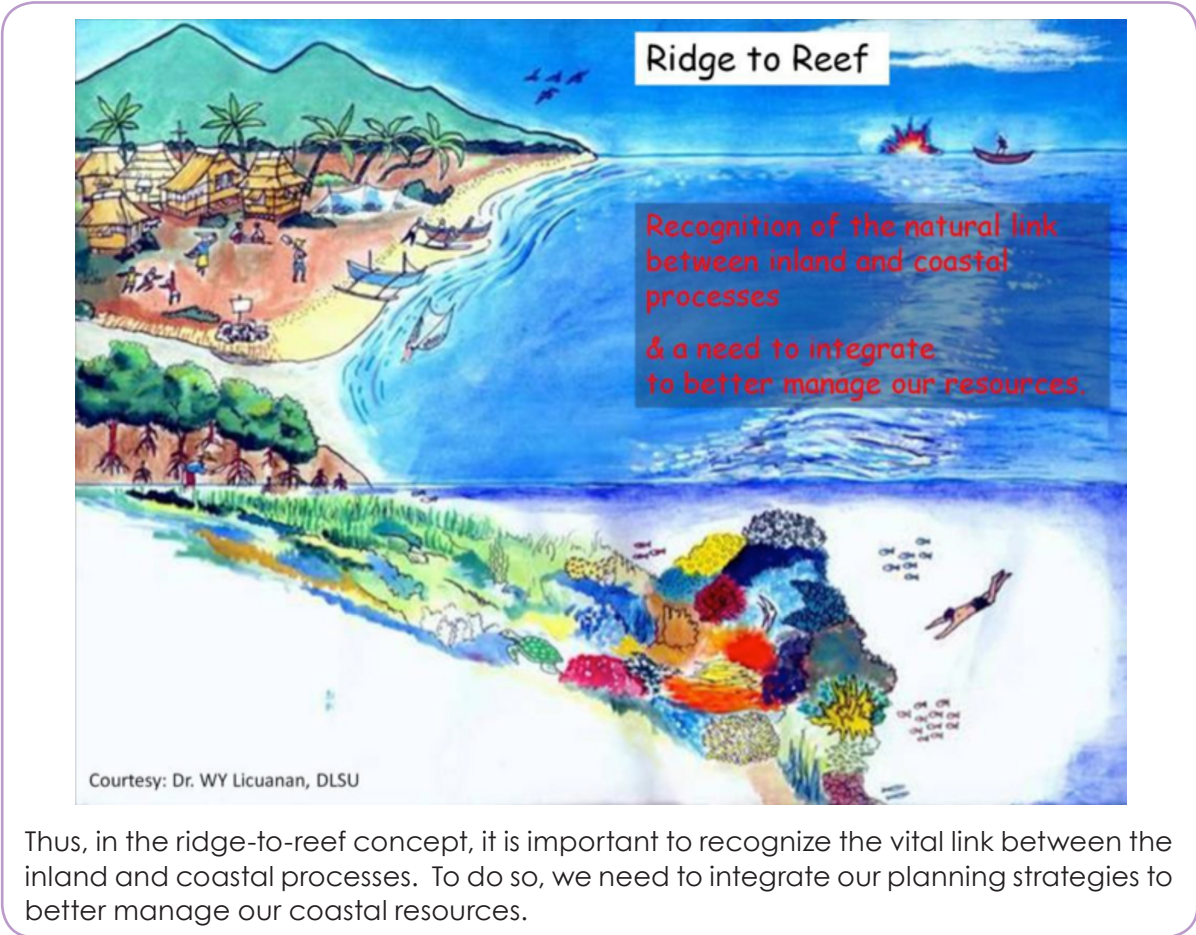


A key concept that has to be relayed to the municipality is how upland watershed activities greatly affect the coastal areas, even if these activities may be kilometers away from the coast. Negative effects of activities such as mining and lumbering are evident in tragedies that have occurred in areas such as Leyte and the Compostela Valley. What should be realized by upland municipalities is that these activities also cause high sedimentation downstream, which will eventually perturb the coastal waters. This proves to be detrimental to coastal habitats like coral reefs and seagrass meadows.



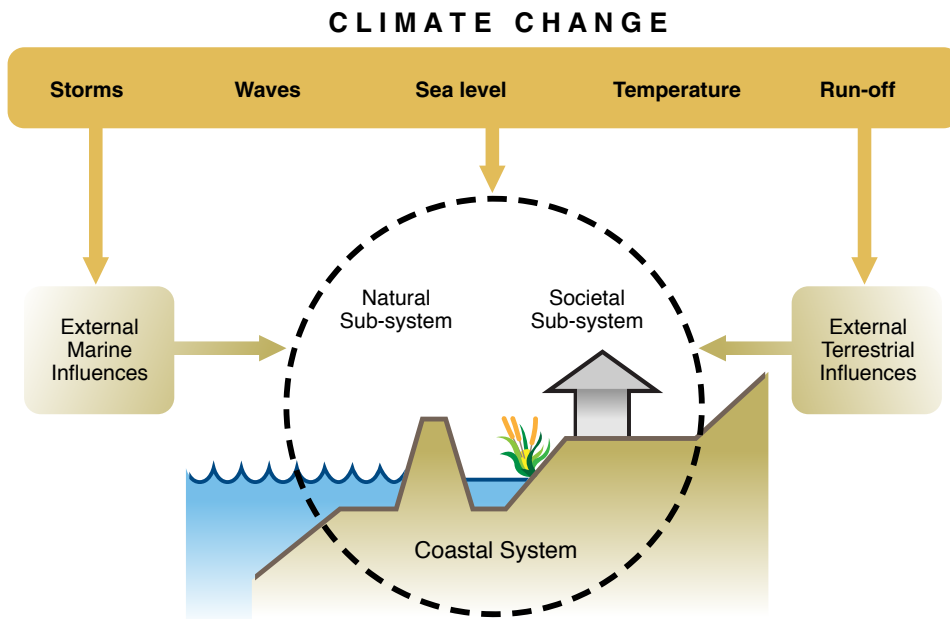


A vital role of coastal habitats is in climate change adaptation. The protection of our coastal habitat will also help protect us from sea level rise. Habitats such as coral reefs, seagrasses and mangroves, protect the coast from strong waves by buffering the high energy from oncoming waves. These habitats act as living seawalls providing added protection against sea level rise, catching up and adjusting with rising sea levels.



Thus, in the ridge-to-reef concept, it is important to recognize the vital link between the inland and coastal processes. To do so, we need to integrate our planning strategies to better manage our coastal resources.

When we talk about Climate Change effects to the coasts we are also talking about Impacts to system function that have consequence to human activities:

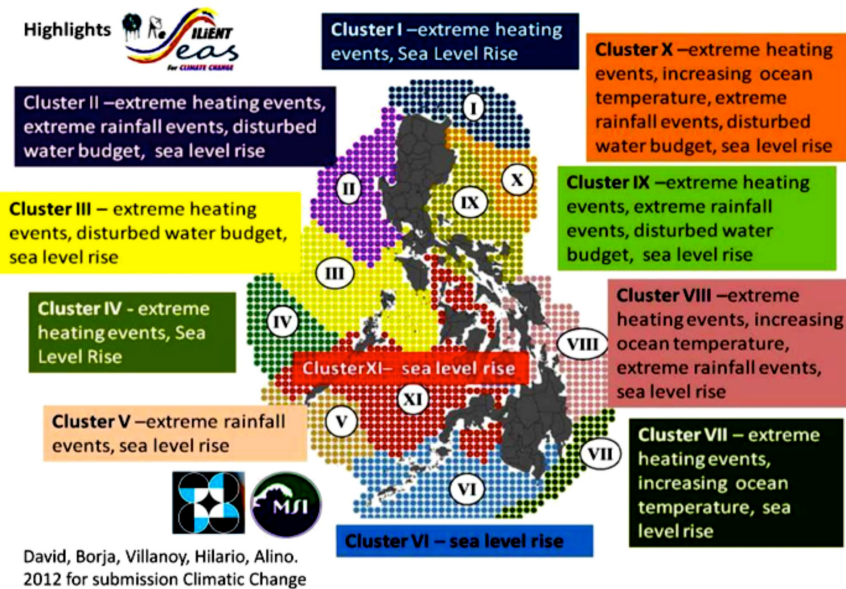


UPMSI: CVillanoy, LDavid, FSiringan, MMartin, OCabrera, ESalamante, RBorja, EPeñaflor

Adopted from Nicolls, et al. 2007

The impacts of climate change are not only felt in terms of storms and increase in temperature, but also increase wave strength, sea level, and rain. What is more important to us is how these impacts affect human activities, e.g. how increased rain may cause flooding events, and how sea level rise may submerge our coastal towns and cities. It is therefore imperative that we consider disaster risk reduction and management in the CLUP.

In the Philippines, all these stressors are already being felt.



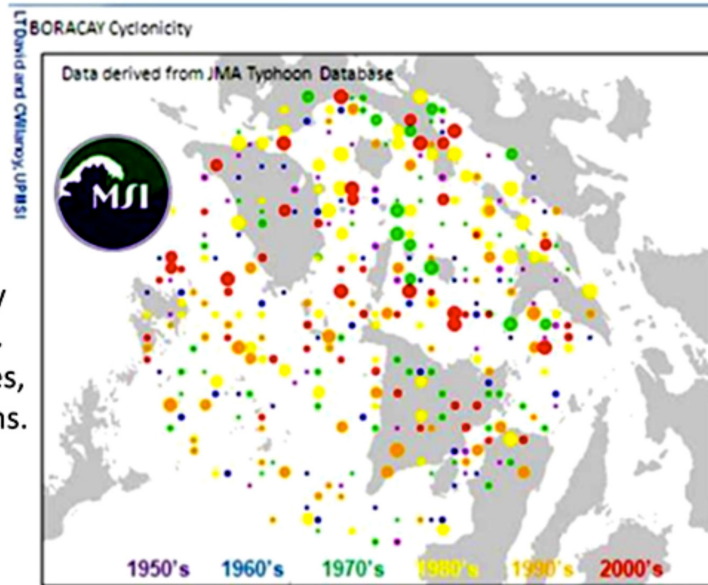
David, Borja, Villanoy, Hilario, Alino. 2012 for submission Climatic Change

Using remotely sensed data for the last 30 years, we see that the Philippines naturally divide into 11 types.

In the last 30 years, only the interior part has been spared from extreme heating events. The eastern coast experiences higher than global average continuous increase in mean temperature. Similarly, the east coast along with the Zambales, Ilocos, and southern Palawan regions has also experienced higher extreme rainfall events. In addition, the rainfall of the north no longer follows the typical afore established patterns. Finally, the entire country has been experiencing higher than global average sea level rise.

## Warm waters provide energy that lead to more severe storm events

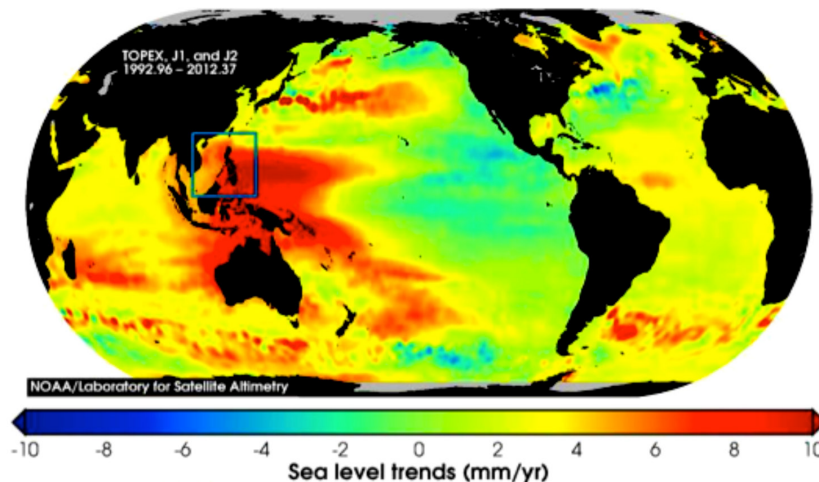
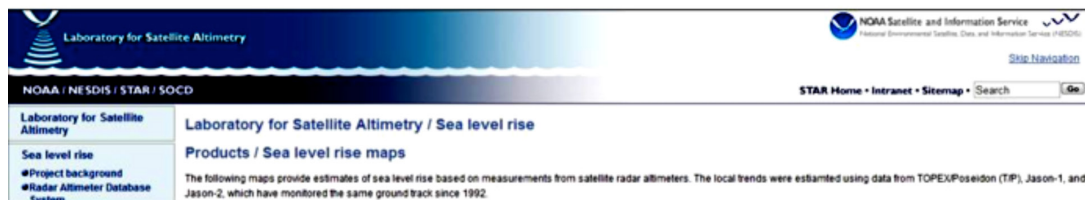
Shown here as an example are storms that have passed near Boracay for the last 50 years. The bigger the circles, the bigger the storms.



### • More intense storms due to increase SST

Warm waters contribute to stronger storm events. Looking at storms that have passed by Boracay in the last 50 years, more intense storms (shown as bigger circles) have occurred with corresponding increase in sea surface temperatures.

## Warm waters also lead to sea level rise

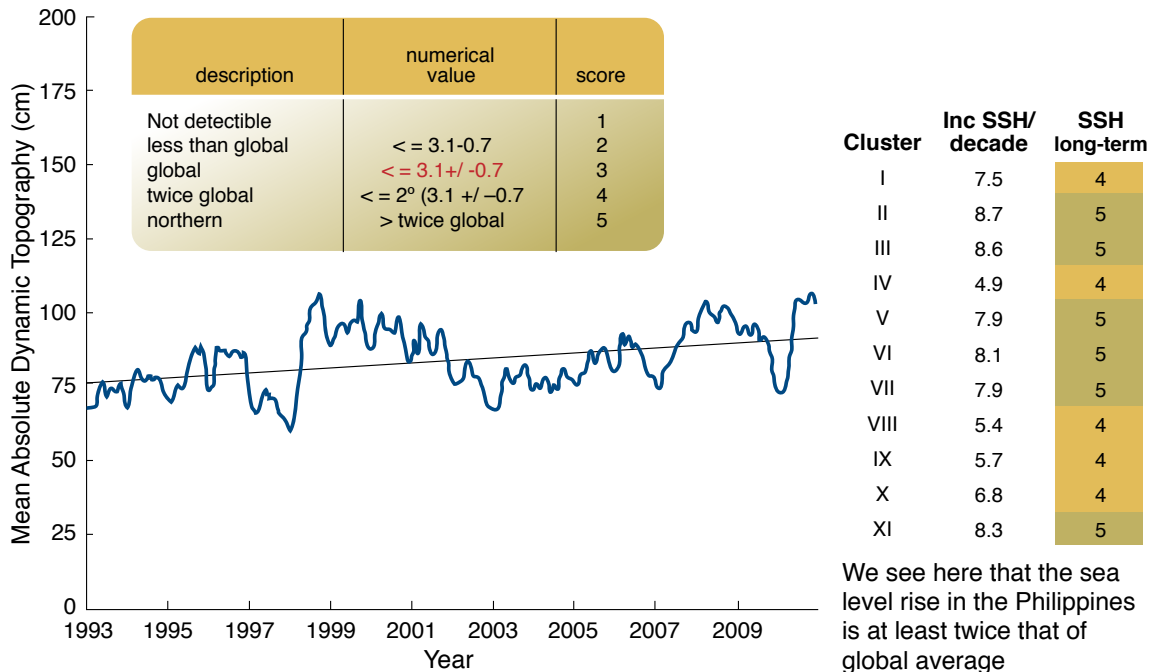


[http://ibis.grdl.noaa.gov/SAT/SeaLevelRise/LSA\\_SLR\\_maps.php](http://ibis.grdl.noaa.gov/SAT/SeaLevelRise/LSA_SLR_maps.php)

Warmer waters generally lead to sea level rise. On a global scale, the warm waters of the western Pacific have the highest sea level trends reaching up to 10mm/year.



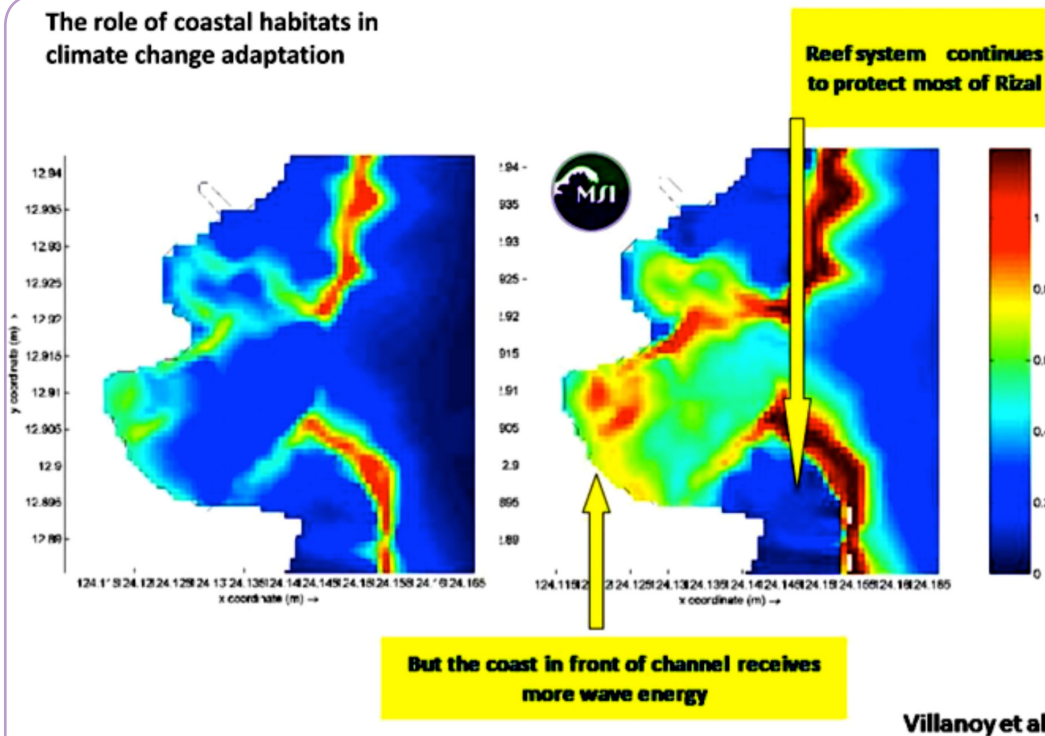
**The sea level rise was compared to the global average**



David, Borja, Villanoy, Hilario, Alino. 2012 for submission Climatic Change

In a study by David et al., the rate of sea level rise (here shown as the increase in sea surface height, SST, per decade) was compared to the global average rate. In the Philippines, the sea level is rising at least twice that of the global average.

**The role of coastal habitats in climate change adaptation**



Shown here on the left is the amount of energy (yellow to red) reaching the coast (white outline) versus that dissipating over the reefs (away from coast) at present. With more intense storms and sea level rise the overall amount of energy is expected to increase. The coastal areas with no coral reefs in front are expected to feel the brunt of the energy but those with healthy reefs in front will continue to be protected.

**SUSTAINABLE COASTAL DEVELOPMENT**  
**Ridge-to-Reef Approach**

protection, avoidance, accommodation, relocation, hard eng'g, soft engineering

- **PROTECTION**
  - of the watershed for freshwater source
- **AVOIDANCE**
  - future structures should not be built where the coast is highly varying (intermittent erosion/accretion)
- **RELOCATION**
  - there should be provisions for relocating existing structures in highly hazardous areas
- **ACCOMMODATION**
  - disaster resistant structures are recommended for essential facilities & habitation
- **SOFT & HARD ENGINEERING APPROACHES**
  - management of coastal integrity necessitates ensuring existence of healthy coastal habitat that attenuate the incoming wave energy
  - as necessary, hard engineering structures may also be employed

For a sustainable coastal development, the ridge-to-reef approach should take into consideration different criteria, i.e. Protection, Avoidance, Relocation, Accommodation, and Soft and hard engineering approaches.

**Seagrasses are home to the Danggits**

**Fish availability**

each sq. km of good reef can provide 1-19 tons of fish/ yr, sustainably

**seagrass meadows and mangroves also provide a nursery ground for other benthic and pelagic fish**

Demersal *Siganus fuscescens* ("Danggit")  
 • Frequently seen in seagrass areas

Demersal *Plectropomus leopardus* ("Lapu-lapu")  
 • Inhabit coral-rich areas of lagoon reefs and mid-shell reefs

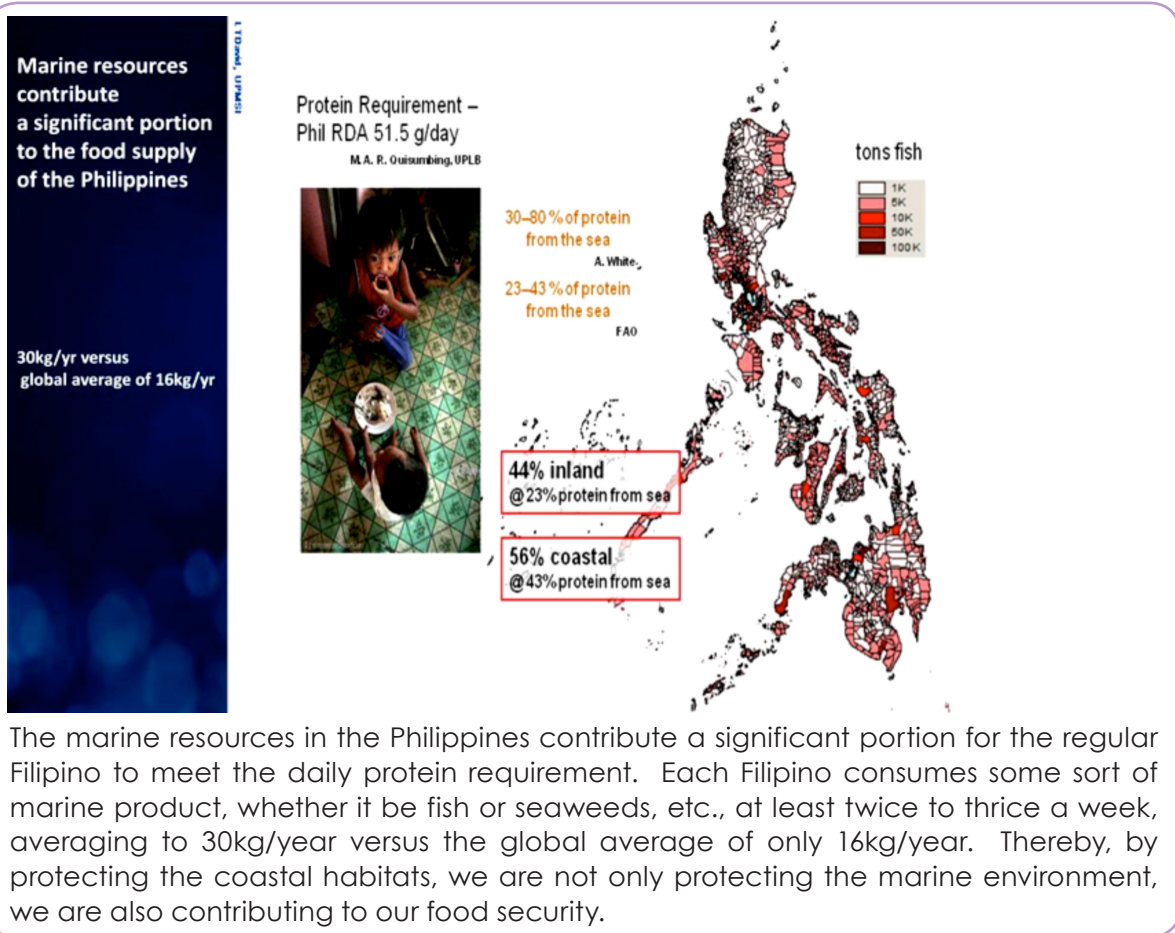
Pelagic *Sphyraena barracuda* ("Lingko", "Lusod", "Bikuda")  
 • Juveniles occur among shallow inner reef areas, mangroves and estuaries

Demersal *Scatophagus argus* ("Kitang")  
 • Very sedentary, frequently occurring in mangroves

Pelagic *Carangoides bajad* ("Pampano", "Lambiyán")  
 • Juveniles occur among mangroves, estuaries and shallow inner reef areas

Fisheries that target species that need different habitats through the course of their life stages are more vulnerable.

Another essential reason why coastal habitats should be protected is for our fish supply. Each square kilometer of good coral reef can sustainably supply 1-19 tons of fish per year. The seagrass meadows and mangroves are important nursery grounds for many types of fishes. There are fishes, which move from one type of habitat to another at different life stages; hence, fisheries that target such species are more vulnerable.



The marine resources in the Philippines contribute a significant portion for the regular Filipino to meet the daily protein requirement. Each Filipino consumes some sort of marine product, whether it be fish or seaweeds, etc., at least twice to thrice a week, averaging to 30kg/year versus the global average of only 16kg/year. Thereby, by protecting the coastal habitats, we are not only protecting the marine environment, we are also contributing to our food security.

## Annex CO-2. Participatory Coastal Resource Assessment (PCRA) of Coastal Habitats

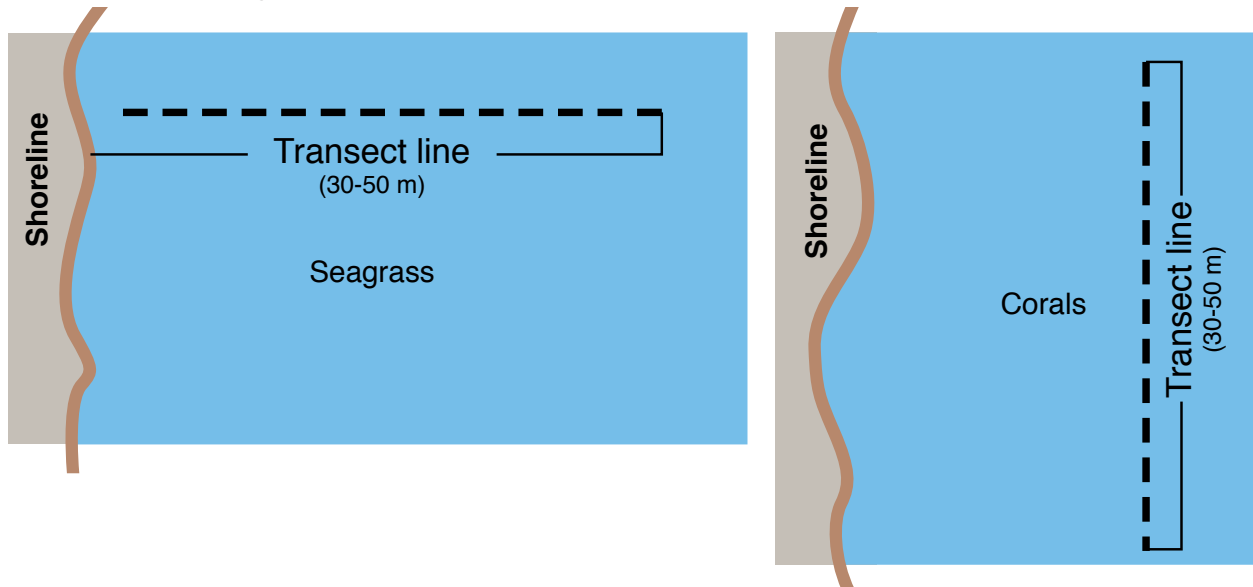
(Adapted from Deguit et al. 2004)

Habitat data can be acquired through Participatory Coastal Resource Assessment. In PCRA, the community is taught to determine the condition and relative abundance of the resources in a simplified scientific method using transect lines and/or quadrats. Actual observations of the habitats give the percentage cover based on the habitat rating criteria. In the assessments of the different resources, data sheets should be prepared in advance and copied onto waterproof slates for documentation.

### Using Transect Lines and Quadrats

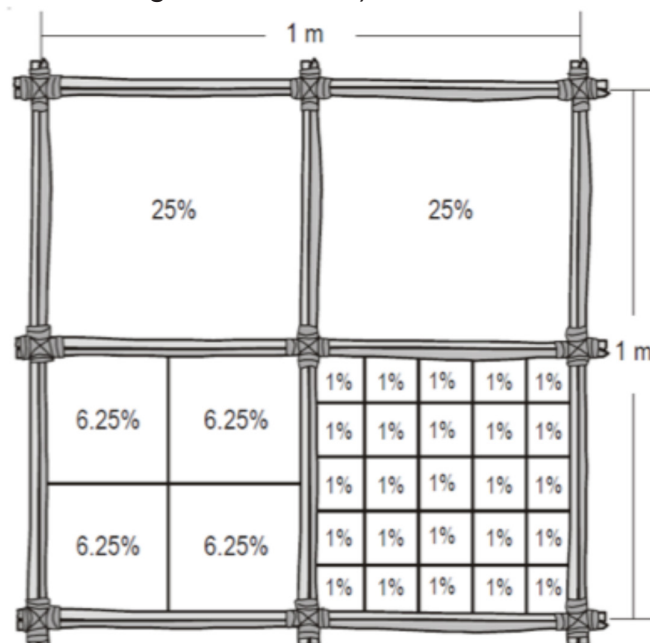
The transect line is a calibrated rope, made from either abaca or nylon, or a fibreglass transect. Calibration, preferably at 1m interval, is essential to allow proper recording. Transect should start where the habitat begins and ideally end where the habitat ends. In assessing seagrasses, the transect line should be set perpendicular to the shoreline while it is laid parallel to the shoreline in coral assessment (**Figure CO-13**). In the case of the latter, the distance to the shoreline to where the habitat begins should be noted. For seagrass and coral assessments, a 50m transect line is sufficient. For mangrove assessments, transect lines measuring up to 100m are normally used, starting at the seaward edge to the landward margin.

Figure CO–13. Proper alignment of transect for seagrass and coral assessment (Taken from Deguit et al. 2004)



Quadrats are very useful in PCRA as participants may be inexperienced in conducting habitat assessments. 1m x 1m quadrats are placed at 10m along transect as representative samples of the assessed habitats. These quadrats may be acquired commercially or improvised with local materials using bamboo poles connected with wires or ropes to form a 1x1m square. For easier assessment, the quadrat is divided into four subsquadrats (**Figure CO-14**). Quadrats used in mangrove assessment may be larger, covering 10 x 10m.

Figure CO–14. Percentage estimation using quadrats. Ideal for coral and seagrass assessments. (Taken from Deguit et al. 2004)

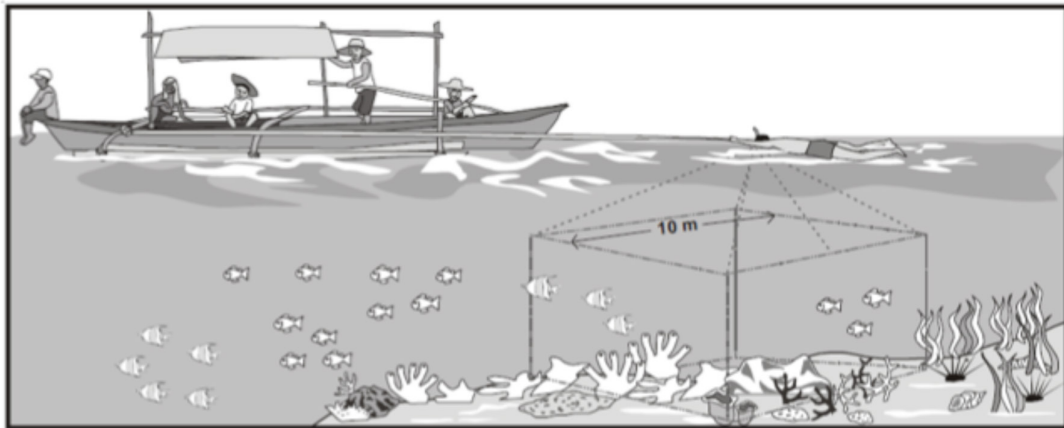


### Assessment Method: Manta Tow

The manta tow technique can broadly assess benthic communities in a fairly short amount of time. With this method, the entire coral reef or seagrass meadow can be visually assessed. The method involves towing an observer, using a rope and a manta board, behind a small motor-powered boat (**Figure CO-15**). The manta tow should be done before detailed surveys such as the quadrat/ transect method. The tows are carried out at a constant speed at two-minute intervals while the observer takes note of the condition and percentage cover of the habitat.



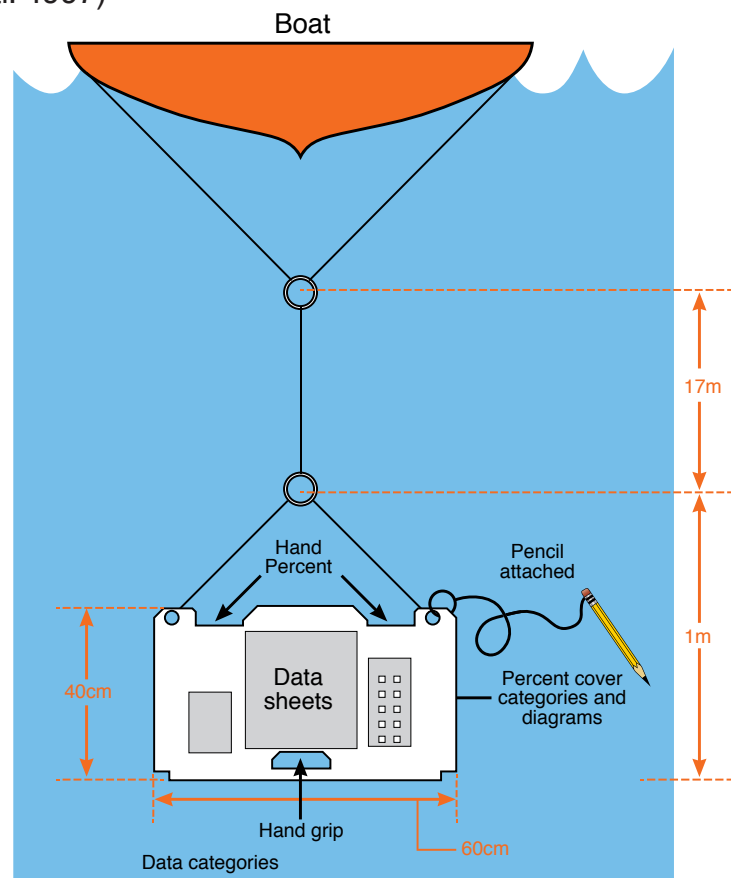
Figure CO–15. Illustration of Manta Tow Method (Taken from Deguit et al. 2004)



Equipment:

- Boat and fuel
- Snorkelling gear or swim goggles
- Manta board attached to the boat by 17m rope
- Stopwatch
- Waterproof slate with pencil
- Manta tow data form
- Lifejackets

Figure CO–16. Details of a manta board and associated equipment - top view (Taken from English et al. 1997)



General procedure:

- Participants are encouraged to work in pairs. Life jackets are required.
- Assign a team leader to provide directions and serve as a lookout for the observers. It may be ideal if the team leader has a megaphone or whistle to signal the observers on the start and end of each tow.
- Once the participants are in position, the survey is broken into manta tows of 2 minutes

duration. The participants should scan at an estimated width distance of 10m of the towpath. After two minutes, the observers are allowed to record the percentage cover of the benthic habitats on the slate attached to the manta board. The observer may then signal to the team leader to start another 2-minute tow.

- This procedure is repeated until the entire reef or seagrass meadow has been assessed.

**Table CO–2. Sample Manta Tow Data Form (Taken from Deguit et al. 2004)**  
**Manta Tow Data Form**

Site Name: \_\_\_\_\_ Date: \_\_\_\_\_

Tow No.	Location (start–end)	LHC (live hard coral)	SC (soft coral)	DC (dead coral)	DCA (dead coral with algae)	Sand/silt/rubble	Total	Notes, observations

**Assessment Method: Snorkel Survey**

This method can be employed for a detailed assessment of the benthic community. With the use of snorkelling gear, the transect line and quadrats are laid out to determine the status of seagrass beds and coral reefs. Quadrats are normally laid at five to ten meter intervals, depending on the total length of transect.

**Figure CO–17. Illustration of Snorkel Survey Method (Taken from Deguit et al. 2004)**



Equipment:

- Transect line (30-50m), calibrated every 5m
- Snorkelling gear
- Waterproof slates with pencil
- Transect data sheet
- Life jackets

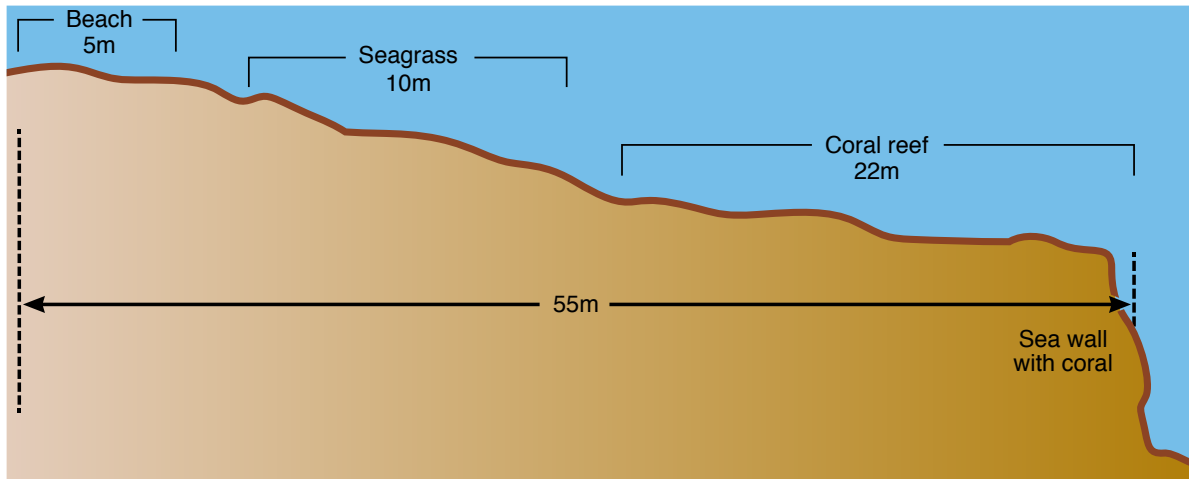
General procedure:

- A buddy system should be established during the survey. One observer may take note of estimation on percentage cover while the other notes these estimations and other notable observations.
- For an initial profile of the habitat, a transect perpendicular to the shoreline is laid.



Walk/swim along the transect line to the end of the coral habitat. This is to classify the reef type of the area (e.g. slope, wall, pinnacle, etc.). If the assessed coral/seagrass area is large, the participants may be broken into teams to cover various parts of transect. Care should be taken not to step on the reef flat.

Figure CO–18. Sample coral reef profile using a perpendicular transect to the shoreline (Taken from Deguit et al. 2004)



- Using the buddy system, transect lines may be laid down parallel to the shoreline at the same depth. Participants should follow the transect where the habitat (coral/seagrass) begins. The participants may estimate the percent cover of the substrate using the quadrat as a guide. Estimations are undertaken at 5-10m intervals and recorded on the slate.

## Coral Habitat Assessment

Possible components of coral reef habitats:

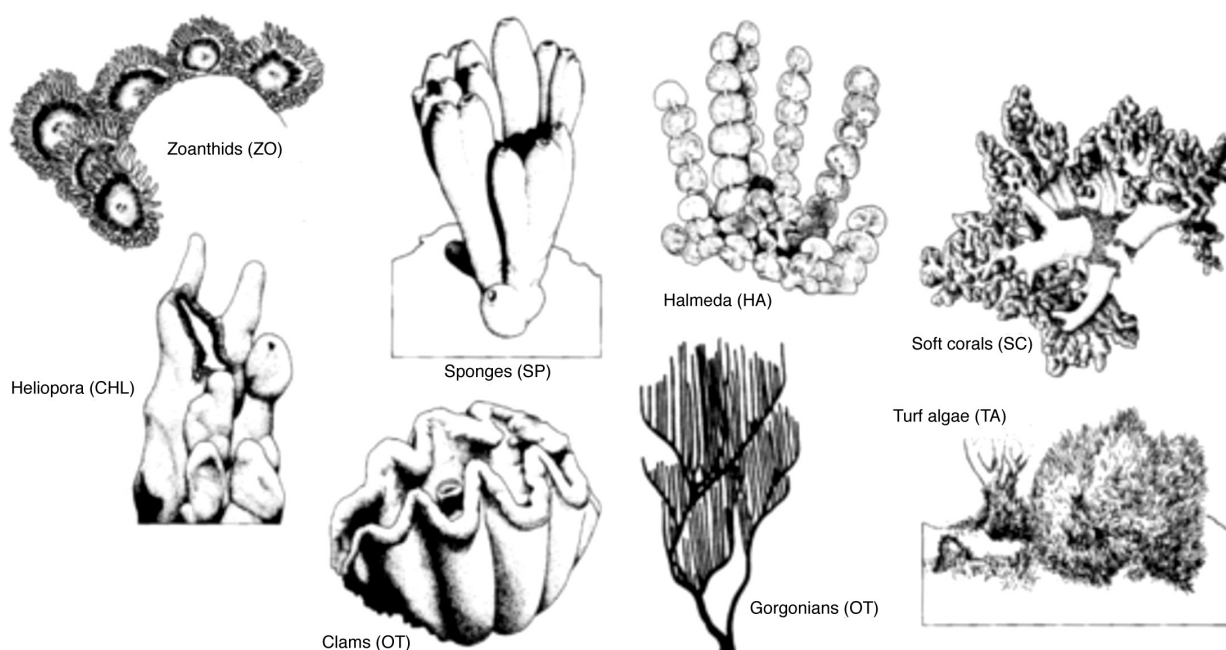
- Live Hard Coral (See Coral Categories below)
- Live Soft Coral (See Coral Categories below)
- Dead Coral
- Dead Coral with Algae
- Plants
- Other animals
- Coral rubble/rock (CR)
- Sand/silt (S)

Table CO–3. Life form categories and codes. (Taken from English et al. 1997)

Categories		Code	Notes/Remarks
Hard Coral:			
Dead Coral		DC	recently dead, white to dirty white
Dead Coral with Algae		DCA	this coral is standing, skeletal structure can still be seen
Acropora	Branching	ACB	at least 2° branching, e.g. <i>Acropora palmate</i> , <i>A. formosa</i>
	Encrusting	ACE	usually the base-plate of immature <i>Acropora</i> forms, e.g. <i>A. palifera</i> and <i>A. cuneata</i>
	Submassive	ACS	robust with knot or wedge-like form, e.g. <i>A. palifera</i>
	Digitate	ACD	no 2° branching typically includes <i>A. humilis</i> , <i>A. digitifera</i> and <i>A. gemmifera</i>
	Tubular	ACT	horizontal flattened plates e.g. <i>A. hyacinthus</i>
Non-Acropora	Branching	CB	at least 2° branching e.g. <i>Seriatopora hystrix</i>
	Encrusting	CE	major portion attached to substratum as a laminar plate e.g. <i>Porites vaughani</i> , <i>Montipora undata</i>
	Foliose	CF	coral attached at one or more points, leaf-like, or plate-like appearance e.g. <i>Merulina ampliata</i> , <i>Montipora aequituberculata</i>

Categories		Code	Notes/Remarks
	Massive	CM	solid boulder or mound e.g. <i>Platygyra daedalea</i>
	Submassive	CS	tends to form small columns, knobs or wedges e.g. <i>Porites lichen</i> , <i>Psammocora digilata</i>
	Mushroom	CMR	solitary, free-living corals of the <i>Fungia</i>
	<i>Heliopora</i>	CHL	blue coral
	<i>Milepora</i>	CME	fire coral
	<i>Tubipora</i>	CTU	organ-pipe coral, <i>Tubipora musica</i>
Other Fauna:			
Soft Coral		SC	soft bodied corals
Sponges		SP	
Zoanthids		ZO	examples are <i>Platythoa</i> , <i>Protopalythoa</i>
Others		OT	Ascidians, anemones, gorgonians, giant clams, etc.
Algae	Algal Assemblage	AA	consist of more than one species
	Coraline Algae	CA	
	<i>Halimeda</i>	HA	
	Macroalgae	MA	weedy/fleshy browns, reds, etc
	Turf Algae	TA	lush filamentous algae, often found inside damselfish territories
Abiotic	Sand	S	
	Rubble	R	unconsolidated coral fragments
	Silt	SI	
	Water	WA	fissures deeper than 50 cm
	Rock	RCK	
Other		DDD	missing data

Figure CO-19. Examples of coral life form categories (Taken from English et al. 1997)



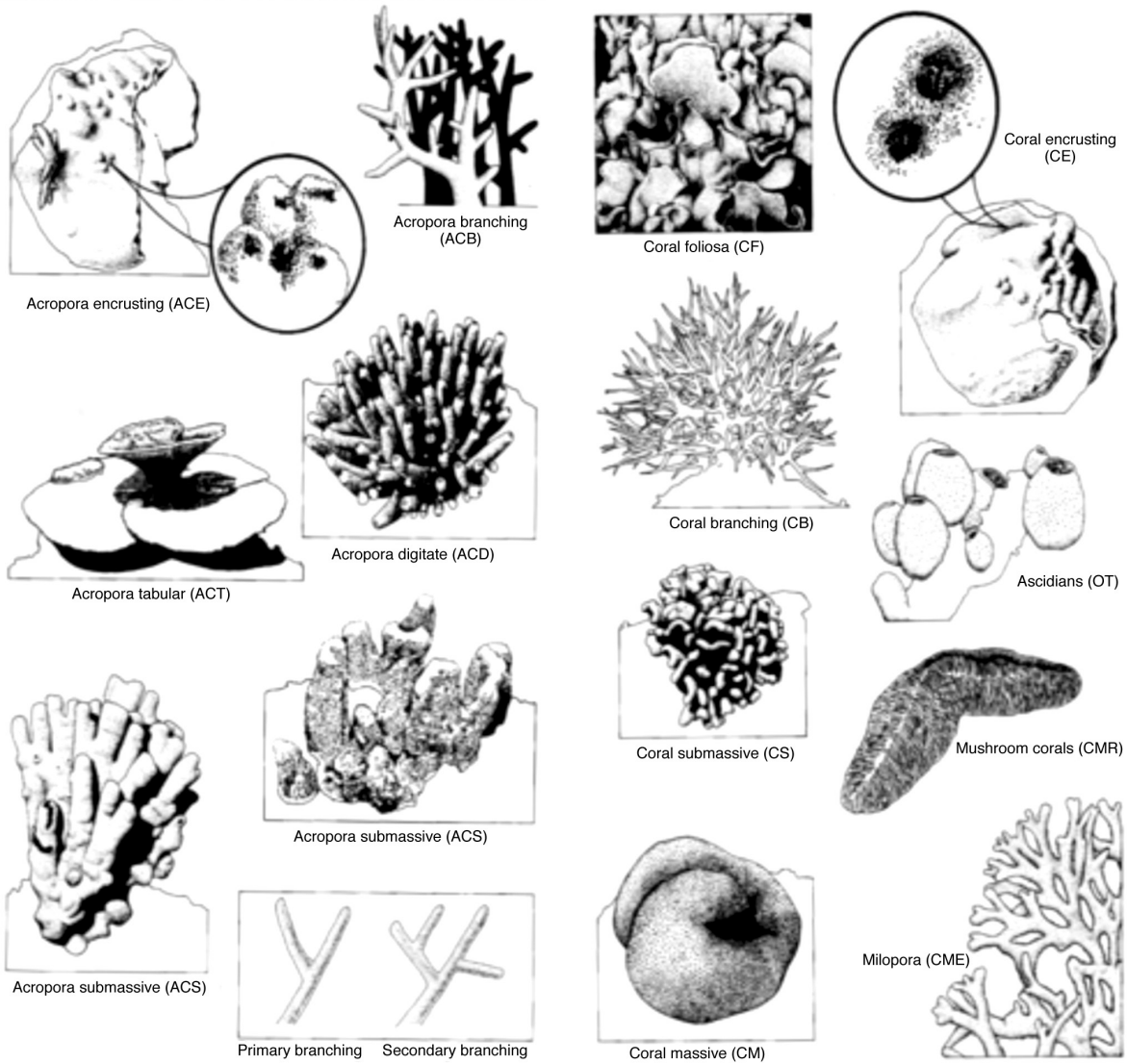


Table CO-4. Sample coral reef assessment transect form

**Coral Reef Habitat Assessment  
Transect Data Form**

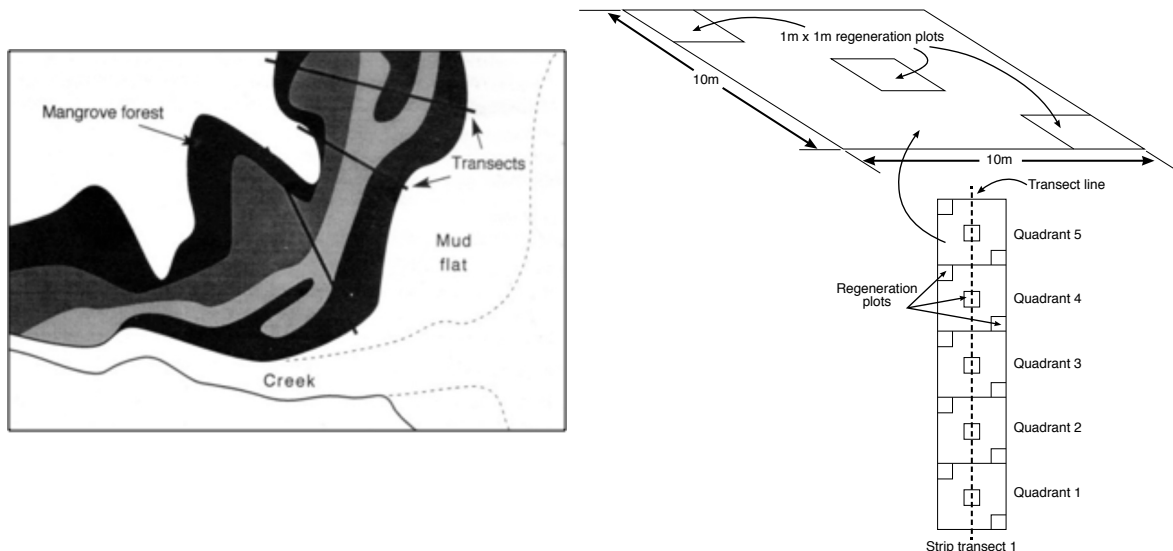
Date

Locations/areas covered

Transect no.	Quadrant no.	LHC (live hard coral)	SC (soft coral)	DC (dead coral)	DCA (dead coral with algae)	Plants (algae, seagrass)	Other animals (sponges, clams, etc.)	Sand/silt	Total	Other observations (causes of coral damage, other invertebrates, water visibility, etc.)



Figure CO–21. Transect and quadrat deployment for mangrove assessment



- The participants may count the number, estimate the height and crown diameter of mature species in the 10 x 10 m quadrat. Then count the seedling and saplings per species in the 1 x 1m regeneration plots within the larger quadrat.
- Each mangrove will be counted according to its age:
  - Seedling – up to 1 m height and trunk size less than 4cm diameter
  - Sapling – greater than 1m height and a trunk size of 4cm in diameter
  - Mature tree – greater than 1m height and trunk size greater than 4cm diameter
- All data should be recorded on a waterproof slate and transcribed later onto a data sheet.

Table CO–6. List of local and scientific names of Philippine mangroves

(Taken from Melana et al. 2000)

Local Name	Scientific Name
Api-api	<i>Avicennia officinalis</i>
Bakauan babae	<i>Rhizophora mucronata</i>
Bakauan bato	<i>Rhizophora stylosa</i>
Bakauan lalaki	<i>Rhizophora apiaculata</i>
Bakauan	<i>Rhizophora</i> spp.
Bungalon puti	<i>Avicennia alba</i>
Bungalon	<i>Avicennia marina</i>
Busain	<i>Bruguiera gymmorrhiza</i>
Buta-buta	<i>Excoecaria agallocha</i>
Diluario	<i>Acanthus ebracteatus</i>
Dungon-lati	<i>Heritiera littoralis</i>
Kulasi	<i>Lumnitzera racemosa</i>
Lagolo	<i>Acrostichum aureum</i>
Langari	<i>Bruguiera parviflora</i>
Nilad	<i>Scyphiphora hydrophyllacea</i>
Nipa	<i>Nypa fruticans</i>
Pagatpat	<i>Sonneratia alba</i> (Gedabu)
Pagatpat baye	<i>Sonneratia onata</i>

Pedada	<i>Sonneratia caseolaris</i>
Piapi	<i>Avicennia lanata</i>
Pototan lalaki	<i>Bruguiera cylindrical</i>
Saging-saging	<i>Aegiceras corniculatum</i>
Tahau	<i>Lumnitzera littoria</i>
Tabigi	<i>Xylocarpus granatum</i>
Tangal	<i>Ceriops tagal</i>
Tingloy	<i>Acanthus ilicifolius</i>

Table CO-7. Sample mangrove assessment data sheet

### Data Sheet for Mangrove Assessment

Transect no.: \_\_\_\_\_ Location \_\_\_\_\_  
 Recorder: \_\_\_\_\_ Site \_\_\_\_\_ Barangay \_\_\_\_\_  
 Date: \_\_\_\_\_ Municipality \_\_\_\_\_ Province \_\_\_\_\_

Quadrant no.	Line no.	Substrate	Species	Total ht. (m)	Crown diameter (2 readings)	Observations (disturbance, threats, uses, cuttings, garbage, fauna)

### Data Sheet for Mangrove Renegeration

Transect no. \_\_\_\_\_ Location \_\_\_\_\_  
 Recorder: \_\_\_\_\_ Site \_\_\_\_\_ Barangay \_\_\_\_\_  
 Date: \_\_\_\_\_ Municipality \_\_\_\_\_ Province \_\_\_\_\_

Quadrant no.	Plot no.	Species	Count	Remarks (average height, status, etc.)
1	1			
	2			
	3			
1	1			
	2			
	3			



# Annex CO-3. Participatory Coastal Resource Assessment (PCRA) of Coastal Habitats of Demography, Livelihood and Community Organizations

(Adapted from Walters et al. 1998)

## Socio-demographic Profile Questionnaire

Name of Barangay: \_\_\_\_\_

1. Name of Respondent: \_\_\_\_\_

2. Household Members:

2.1. Tell me about the people who are now living in your household. (Include respondent)

Name	Position in the family	Sex	Age	Civil Status	Educational level	Occupation	Estimated monthly income contributed to the family

2.2. Tell me about your family members who live outside the household but still consider your house their home.

Name	Position in the family	Sex	Age	Civil Status	Educational level	Occupation	Estimated monthly income contributed to the family

3. Housing.

3.1. Ownership. Is your house \_\_\_\_\_ owned? \_\_\_\_\_ rented? \_\_\_\_\_ how much?  
\_\_\_\_\_ not owned? (specify) \_\_\_\_\_

3.2. If owned, how did you acquire it? \_\_\_\_\_ inherited \_\_\_\_\_ bought \_\_\_\_\_ built

3.3. Type of dwelling: \_\_\_\_\_ nipa/cogon hut \_\_\_\_\_ wood/bamboo with GI roof  
\_\_\_\_\_ concrete (cement) \_\_\_\_\_ others (specify) \_\_\_\_\_

3.4. Furniture/appliance ownership: \_\_\_\_\_ radio \_\_\_\_\_ sala set \_\_\_\_\_ gas stove \_\_\_\_\_ bed  
\_\_\_\_\_ sewing machine \_\_\_\_\_ T.V. \_\_\_\_\_ refrigerator \_\_\_\_\_ others (specify) \_\_\_\_\_

3.5. Lighting facility: \_\_\_\_\_ kerosene lamp \_\_\_\_\_ petromax/gas-operated  
\_\_\_\_\_ generator-operated \_\_\_\_\_ others (specify) \_\_\_\_\_

3.6. Toilet facility: \_\_\_\_\_ Antipolo type \_\_\_\_\_ water sealed \_\_\_\_\_ flush type  
\_\_\_\_\_ no toilet (specify where waste is disposed)

#### 4. Economic Data.

##### 4.1. What is your main source of income?

- fishing  
 farming  
 business (specify \_\_\_\_\_)  
 animal husbandry  
 if no source of income, what is your source of living?  
 \_\_\_\_\_  
 others, specify \_\_\_\_\_

##### 4.2. What are your other sources of income?

##### 4.3. Property ownership

###### 4.3.1. Land

- owned, how big? \_\_\_\_\_  
 not owned, but leased \_\_\_\_\_, how much a year \_\_\_\_\_  
 tenant, what is the sharing system? \_\_\_\_\_

###### 4.3.2. Fishing gear

- motorized boat (specify number \_\_\_\_\_)  
 banca (specify number \_\_\_\_\_)  
 nets (specify types of nets \_\_\_\_\_)  
 other fishing gears (specify \_\_\_\_\_)

###### 4.3.3. Animals owned

- carabao, how many \_\_\_\_\_  
 cattle, how many \_\_\_\_\_  
 chickens, how many \_\_\_\_\_  
 horses, how many \_\_\_\_\_  
 ducks, how many \_\_\_\_\_  
 pigs, how many \_\_\_\_\_  
 goats, how many \_\_\_\_\_

##### 4.4. Credit facility

###### 4.4.1. If you need to borrow money, where do you usually go?

- relatives     *suki*     neighbors/friends     pawnshop  
 credit coop     loan sharks ("5/6")     banks  
 others (specify \_\_\_\_\_)

###### 4.4.2. How is repayment done?

- specified period of time, with interest rate (specify rate \_\_\_\_\_)  
 no specific period of time, without interest rate  
 other arrangements (specify \_\_\_\_\_)

##### 4.5. Income-generating projects

###### 4.5.1. Is your family or a member of your family engaged in income-generating projects?    yes    no

###### 4.5.2. If yes, what projects? \_\_\_\_\_

###### 4.5.3. Who in your family is/are mostly engaged in this? \_\_\_\_\_

4.6. What economic activities are primarily done by specific member(s) of your family?  
Please check.

Nature of Activities	Mother/Wife	Father/Husband	Daughter(s)	Son(s)
<b>Fishing</b>				
• fish capture				
• processing/drying of fish				
• mending nets & other gears				
• preparing gears for fishing				
• gleaning				
• mariculture				
• others, specify				
<b>Farming</b>				
• feeding				
• marketing/selling				
• others, specify				
<b>Other income-generating activities</b>				
• small-scale business				
• handicrafts				
• marine-based IGP				
• others, specify				

5. What percentage of your income is derived from fishing?

76% - 100%      50% - 75%  
 25% - 50%      less than 25%

6. Health data.

6.1. Source of drinking water

piped water      stream/spring  
 dug open well      water pump      river

6.2. Existing health facilities used

local *hilot/albularyo*      health clinic      private physician  
 hospital (specify whether private or government \_\_\_\_\_)

6.3 During the past year, what illnesses/diseases were experienced by the family?

Types of illnesses/diseases	Who in the family?
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

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# Biodiversity

## I. Basic Principles and Concepts

Biodiversity or biological diversity is the variability of life. It is composed of (a) the variety of ecosystem types, (b) the variety of species, and (c) the variety of gene types in each species.

Biodiversity provides options/choices and resilience to natural ecosystems. Thus, it helps sustain the clean air, water, food, safety of and materials for shelter, clothes, materials, medicines, regulated climate, recreation, and other things that people use. Biodiversity helps protect people from hazards such as landslides and storms and is especially important in this era of rapid climate change. We need biodiversity for our survival but we must be cautioned not to use it beyond its natural ability to regenerate its living-giving functions both for the present and future generations.

### Biodiversity in the Philippines

The geographic location and diverse habitats of the Philippines make it one of the 18 countries in the world with the most biodiversity or mega-diversity countries. Many of the Philippines' species are endemic meaning they are found nowhere else in the world.

- The Philippines ranks fifth among all countries in terms of diversity in plant species and fourth in terms of bird endemism.
- About 25 genera of plants and 49 percent of the Philippines' wildlife are endemic to the country.
- The Philippines, Malaysia and Indonesia have the highest coral, seagrass and reef fish diversity in the world
- Inland waters host at least 121 endemic freshwater species (BMB, 2009).

### Benefits of Biodiversity

Biodiversity resources provide the human population with ecological life support services and economic benefits. Biodiversity has both direct and indirect use values:

- **Direct use values** of biodiversity refer to harvestable products that include raw materials and extracts with medicinal uses and/or manufactured into pharmaceutical products; agricultural uses that include crops, biological pest control and pollinators; and consumptive uses that include wood, fish, and meat, among other material goods for consumption.
- **Indirect values** are ecological services that provide life support systems benefitting the human population such as biogeochemical cycles, waste disposal, provision of fresh water, prevention of soil erosion, regulation of climate and provision of ecotourism amenities, among others. The diversity of the biological composition of forest ecosystem



and coastal habitats sustains the stability and productivity of their ecological functions, which provide vital life support services and material products that benefit the human population.

## Threats to Biodiversity

Although the Philippines is one of the 18 mega-diversity countries, biodiversity is being degraded the fastest due to:

- Destruction and conversion of natural areas to other uses such as logging, blast fishing, trawling, agriculture, housing, fishponds, unregulated mining, unregulated tourism, poorly planned development infrastructure projects, etc.,
- Overexploitation (e.g. overfishing, hunting/collection of species faster than they can reproduce),
- Pollution (e.g. from domestic, agricultural, mining and other industrial sources),
- Rapid climate change, and
- Invasive alien species such as tilapia, golden snail, and 'buyo-buyo' (*Piper aduncum*).

Nevertheless, the most serious concern is the illegal occupation and clearing up of biodiversity rich areas by informal settlers for housing and agriculture; and the cutting down of forest and hunting of wildlife for their daily household needs and livelihood. Because of these activities, critical habitats become fragmented and human settlements eventually take over in the use of biodiversity areas.

**About two-thirds of national and natural parks in the country are occupied by human settlements with one-quarter of these parks in degraded conditions due to cultivation of agricultural crops and conversion to other non-forest land uses.** Fragmentation of Protected Areas (PAs) is also common. Luzon, for example, has a total of 341,000 hectares under PA but this is non-contiguous and is comprised of 34 PAs that are separated by large pockets of agriculture and other land uses (PAWB, 2009, Cabrido, 2010).

Diverse forest, inland wetland and marine habitats are also exposed to increasing levels of landslides and storms due to human impacts on the global climate. Over the long-term, climate change poses a big threat to the survival of vulnerable species including those which have low tolerance for temperature and rainfall changes.

The DENR-BMB reports that there are 207 animal and 526 plant species in the Philippines threatened with extinction (DENR-BMB 2013). These species have developed over millions of years and cannot be replaced if lost. The rate at which the country's endemic species of plants and animals are threatened with extinction is a cause for alarm that calls for immediate concerted efforts among various institutions and organizations. The protection and conservation of critical habitats require close coordination among the different national government agencies, LGUs, NGOs, the private sectors, and local community organizations.

## Protected Areas

To arrest biodiversity decline and to protect and manage significantly important ecosystems, the government enacted in 1991 the **National Integrated Protected Areas System (NIPAS) Act under Republic Act 7586**. As of June 2012, the government has identified 240 **Protected Areas (PAs)** including the Initial Components of NIPAS (PAWB, 2012). Of this total, the President formally proclaimed 113 PAs covering a total area of 3.57 million hectares (ha). Of the 113 proclaimed protected areas, **29 are marine protected areas** with a total area of 1.37 million hectares while **84 are terrestrial protected areas** covering an area of 2.20 million hectares. Thirteen (13) PAs have specific laws designating them as part of the NIPAS as follows:

- 1) Batanes Island Protected Landscape and Seascape;
- 2) Northern Sierra Madre Natural Park;
- 3) Bangan Hills;

- 4) Mts. Banahaw-San Cristobal Protected Landscape;
- 5) Tubbataha Reefs Natural Park;
- 6) Mt. Kanlaon Natural Park;
- 7) Sagay Marine Reserve;
- 8) Central Cebu Protected Landscape;
- 9) Mimbilisan Protected Landscape;
- 10) Mt. Kitanglad Natural Park;
- 11) Mt. Malindang Natural Park;
- 12) Mt. Apo Natural Park; and
- 13) Mt Hamiguitan Range Wildlife Sanctuary.

Other relevant laws include the **Fisheries Code** (Republic Act 8550) which provides for the establishment and protection of the habitats of fisheries species, the **Wildlife Act** (Republic Act 9147) which provides for the protection of habitats critical for the survival of wildlife species and the **Cave Act** (Republic Act 9072) which provides directions for cave management. There is also a **National Wetlands Strategy and Action Plan 2011-2016** for managing wetlands.

## Key Biodiversity Areas

Key Biodiversity Areas (KBAs) are sites that contribute significantly to the global persistence of biodiversity. They either include globally-threatened biodiversity (ecosystems, species or genes), restricted-range biodiversity, and/or outstanding ecological processes (e.g. where a species comes together to reproduce). Here, a “site” means an area of any size that can be delimited, and actually or potentially managed for conservation. In the Philippines, 228 KBAs have been identified by scientists (see **Annex BD- 1**.The Marine and Terrestrial Key Biodiversity Areas of the Philippines).

Among these sites, there are 13 (see list below) which are the last remaining strongholds for one or more threatened species. Loss of these species in these areas would result in the global extinction of one or more species, making these sites extremely urgent priorities for conservation.

**Table BD–1. KBAs which are the only known locations of threatened species (from Ambal et al. 2012)**

KBA	Species	IUCN Red List Category
Mt. Halcon	<i>Anonymomys mindorensis</i>	VU
	<i>Apomys gracillirostris</i>	VU
Mts. Banahaw-San Cristobal Protected Landscape	<i>Platymantis indeprensus</i>	VU
	<i>Platymantis montana</i>	VU
	<i>Platymantis naominae</i>	VU
	<i>Platymantis banahao</i>	VU
Lake Manguao	<i>Puntius manguaoensis</i>	VU
Mt. Mantalingahan	<i>Palawanomys furvus</i>	DD
	<i>Sundascuirus rabori</i>	VU
South and North Gigante Island*	<i>Platymantis insulatus</i>	CR
Mt. Canlaon Natural Park*	<i>Ptilinopus arcanus</i>	CR
Southwestern Negros*	<i>Platymantis spelaeus</i>	EN
Central Panay Mountains*	<i>Crateromys heanyi</i>	EN
Cuernos de Negros*	<i>Stachyris nigrorum</i>	EN
	<i>Crocidura negrina</i>	EN

KBA	Species	IUCN Red List Category
Mt. Kambinliw and Mt. Redondo*	<i>Crateromys australis</i>	CR
Mt. Kitanglad Range	<i>Alionycteris paucidentata</i>	VU
Lake Lanao*	<i>Cephalakompsus pachycheilus</i>	CR
	<i>Mandibularca resinus</i>	CR
	<i>Ospatulus truncatulus</i>	CR
	<i>Puntius amarus</i>	CR
	<i>Puntius baoulan</i>	CR
	<i>Puntius clemensi</i>	CR
	<i>Puntius disa</i>	CR
	<i>Puntius flavifuscus</i>	CR
	<i>Puntius herrei</i>	CR
	<i>Puntius katolo</i>	CR
	<i>Puntius lanaoensis</i>	CR
	<i>Puntius manalak</i>	CR
	<i>Puntius tras</i>	CR
	<i>Spratellicypris palata</i>	CR
	<i>Ospatulus palaemophagus</i>	EN
	<i>Puntius lindog</i>	VU
	<i>Puntius sirang</i>	VU
<i>Puntius tumba</i>	VU	
Tawi-tawi Island*	<i>Anthracosceros montani</i>	CR
	<i>Gallicolumba menagei</i>	CR

\*Refer to sites where the species' threat category is either critical or endangered. Other important plant areas, caves and wetlands in the Philippines not considered in the previous KBA identification are being assessed for possible inclusion as KBAs or their equivalents

## Need for Co-Management

The compliance with laws and regulations to protect biodiversity-rich areas and the implementation of their management plans and programs are inadequate in large part due to the small amount of government resources available. Recent estimates indicate available human and financial resources at 1 staff or volunteer per 2,314 hectares and PHP38.82/hectare (excluding personnel costs) respectively (DENR/GIZ PAME 2014). In many areas, conservation and protection efforts are minimal and fragmented due to lack of coordination among key players such as the national government agencies, LGUs, NGOs, the private sector, and local peoples' organizations.

Local government, national government agencies and various stakeholders must work together and organize the various efforts for optimal effectiveness.

Various land use management options to conserve biodiversity include:

- Assessment of the long-term implications of existing land uses on protected areas (PAs), key biodiversity areas (KBAs) and critical habitats (CHs)
- Integration of PA zoning with CLUP zoning
- Zoning of KBAs and CHs as part of CLUP zoning
- Monitoring of KBAs and CHs and limiting agriculture and settlements to multiple-use zones
- Relocation of incompatible land uses within and in the periphery of CH, KBA protection areas and PA core or strict protection zone.

## LGU's Role

It is incumbent upon local governments to understand and appreciate the importance of biodiversity themselves and take the lead in educating their constituents and stakeholders on the need to understand, appreciate and conserve biodiversity.

Integrating biodiversity conservation into local decision-making on land use and zoning, development planning and program implementation of LGUs is one important way to mainstream and institutionalize the cooperative management of biodiversity-rich areas.

## II. General Objectives and Output



### Objectives

- Delineate nationally proclaimed Protected Areas (PAs) and Key Biodiversity Areas (KBAs) within the LGU territory.
- Identify other protected areas, biodiversity areas and critical habitats within LGU territory which are intended for local protection and conservation. • Ensure that the protection and management of PAs and KBAs are supported and enhanced in the proposed land use and zoning
- Ascertain the suitability of multiple use and buffer zones to further support the protection/conservation of PAs, KBAs and CHs.



### Outputs

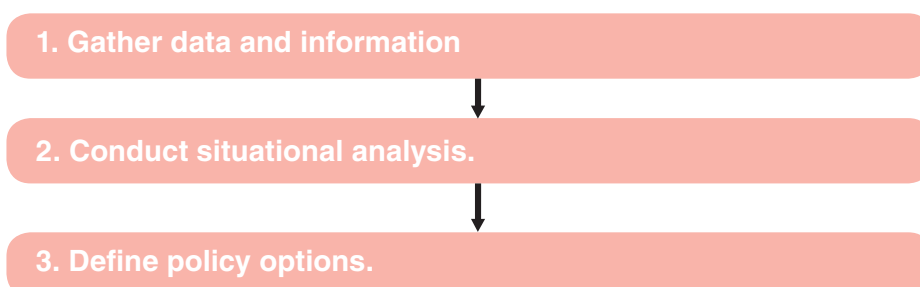
- Inventory and map of delineated PAs, KBAs, CHs, locally identified/declared protected and conservation areas including endangered species, if any
- Biodiversity Conservation and/or Management Strategies for PAs and KBAs integrated in the CLUP



### Steps

It is important for LGUs to be provided with sufficient information and technical guidance, especially on the difference between PAs, KBAs and CHs. It is therefore necessary for the steps to be conducted by the LGU planning team/TWG with strong coordination and assistance from the DENR-BMB and DENR Regional Office since the procedures involved requires processing of scientific information and conducting technical analysis. Also, stakeholders from various environmental national and local government agencies/organization, NGOs and POs should be identified and consulted for additional information.

#### Overview Of Steps



## 1. Gather data and information.

Gather the following secondary data for situational analysis:

- Map of Protected Areas (<http://www.geoportal.gov.ph/viewer/>)
- Map of terrestrial and marine Key Biodiversity Areas (<http://www.geoportal.gov.ph/viewer/> and **Annex BD-1**)
- Natural resource maps (refer to Forest and Coastal Special Study maps)
- Zoning Plans and Management Plans of protected areas within the local government area
- List of endangered plants and endangered animals (see [http://bmb.gov.ph/index.php?option=com\\_content&view=article&id=85:wildlife-conservation-facts-and-figures&catid=63:featured-conservation-area&Itemid=195](http://bmb.gov.ph/index.php?option=com_content&view=article&id=85:wildlife-conservation-facts-and-figures&catid=63:featured-conservation-area&Itemid=195) for DENR Administrative Order No. 2007-01, "The National List of Threatened Philippine Plants and their Categories" and DENR Administrative Order No. 2004-15, "The National List of Threatened Philippine Fauna and their Categories")
- Biodiversity studies of the area. These may contain lists and quantities of flora and fauna species (commonly known as "wild animal and and plants"), their condition and characteristics, including their habitat.

## 2. Conduct situational analysis.

The guide for situational analysis is summarized in **Figure BD-1**. Please consult Framework and Methods for Mainstreaming Biodiversity in the CLUP of LGUs (GEF/UNDP/DENR-BPP 2013) for further details.

a. Check if your LGU is part of a Protected Area (PA). If an area in the LGU territory is within or part of a PA, the Protected Area Management Plan and Zoning Plan should be consulted. Identify appropriate land use on the managed areas where applicable. Co-management agreements can be forged between the LGU and concerned government agencies or management authorities as well as the community leaders/area managers.

b. If the LGU is not a part of a protected area, check if the LGU is a part of a Key Biodiversity Area or KBA (**Annex BD-1**. The Marine and Terrestrial Key Biodiversity Areas of the Philippines).

c. If LGU is part of a KBA, the following should be done:

- List the important ecosystems, species or ecological processes within the area.
- List the goods and services provided by each of these important ecosystems, species or ecological processes and if possible, estimate the level of importance (e.g. high, medium, low value) of these goods and services. For example, they may indicate the presence of higher biodiversity in general and thus higher resilience of the ecosystem of which it is a part. This may mean that land and water sources here may be more stable than elsewhere.
- Prioritize areas where these ecosystems, species and/or ecological processes are abundant for classification as part of protection zones.
  - o Check the vulnerability status of these natural resources (i.e. endangered/highly vulnerable, moderately vulnerable).
  - o Make a list of the endangered/highly vulnerable species with their identified habitat/niche or home range (if applicable).
- Create a map of the important ecosystems, species (and their habitats) and ecological processes.
- Prioritize areas where these ecosystems, species and/or ecological processes are abundant for classification habitat/niche boundaries of the endangered/highly vulnerable species with appropriate buffer area. On these areas, strict protection must be implemented, thus this will be identified as part of protection land use zones.

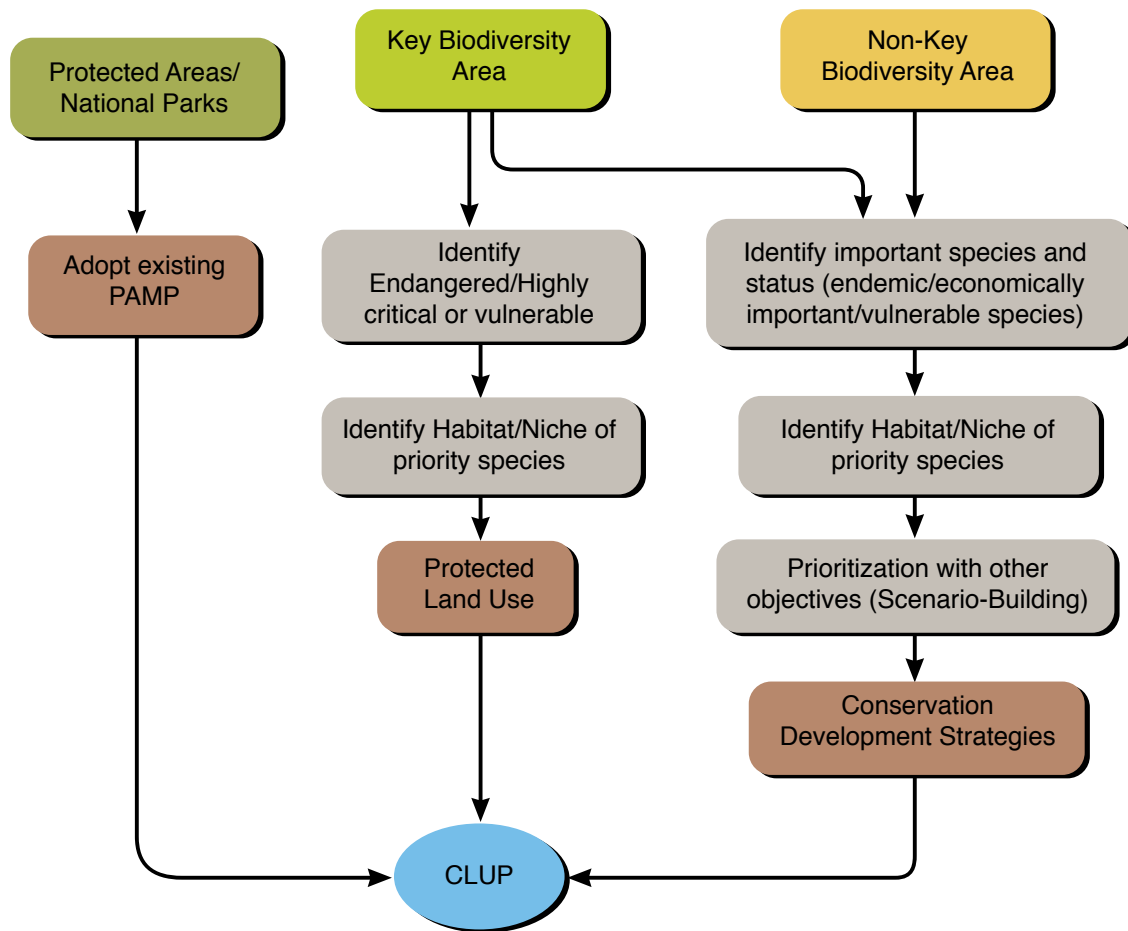
- Determine where and how ecosystem goods and services may benefit adjacent areas "downstream" of these "priority" areas (e.g. areas for housing that are protected from storm surge by coral reefs and mangroves) and consider these as potential use or production zones.
- Conduct scenario building that involve projection of changes in land use (i.e. expansion of urban, agriculture/aquaculture and industrial or built up areas) and its implication to the habitat/niche of the above-identified priority protection and use areas. Consider the possible impact of socio-economic pressures (Population increase; Migration; Level of economic structure (e.g. areas of high poverty); Increasing level of social and infrastructure development) to biodiversity
- Review current enforcement of and compliance with existing national and local policies and identify situations what works and what doesn't work.
- Prepare spatial strategies for the conservation or protection of the prioritized areas to be incorporated into the CLUP.

d. If an LGU is not part of a Protected Area (PA) or a KBA, the following can be done for conserving biological diversity through zoning:

- Identify the different types of ecosystems in the LGU (see **Annex BD-3**). If sub-types can be distinguished, for example, lowland forest (below 750 meters above sea-level) vs. upland forest (above 750 meters above sea-level), then it would be good to map these separately.
- Do resource assessment (in conjunction with forest and coastal land use processes)
- Map where these different natural ecosystems types are
- List the ecosystem goods and services provided by each of these natural ecosystems.
- Aim to protect at least 20% of each natural ecosystem type (and sub-type if possible). Essentially, the greater the % of area protected, the higher the reproduction and survival rates of the organisms therein and therefore the chance that the population will not decrease or become extinct. The greater the % of area protected, the higher will be the sustainability of ecosystem goods and services it provides.
- Identify which areas of each natural ecosystem type might be important for sustaining (e.g. headwaters or breeding grounds) and which areas might be important for providing (e.g. downstream irrigation areas or adult feeding grounds) the value of the above ecosystem goods and services.
- Prioritize areas that may be important for sustaining ecosystem goods and services for the 20% to be protected.
- Consider also how ecosystem goods and services may be provided or gained in areas adjacent "downstream" of these potential protection areas (e.g. areas for housing that are protected from storm surge by coral reefs and mangroves) and consider these as potential use or production zones.
- Conduct scenario building that involve projection of changes in land use (i.e. expansion of urban, agriculture/aquaculture and industrial areas) and its implication to the above-identified priority protection and use areas. Consider the possible impact of socio-economic pressures (Population increase; Migration; Level of economic structure (e.g. areas of high poverty); Increasing level of social and infrastructure development) to biodiversity
- Select which areas to protect approximately 20% (see **Tips for selecting areas for protection**)
- Identify appropriate buffer zones around these protection areas.
- Review current enforcement of and compliance with existing national and local policies and identify situations that work and do not work.
- Prepare spatial strategies for the conservation or protection of the prioritized areas to be incorporated into the CLUP.



Figure BD–1. Summary of biodiversity conservation priority setting process



Source: Framework and Methods for Mainstreaming Biodiversity in the CLUPs of LGUs



### Tips in selecting areas for protection

- a. Represent the range of biotypes, habitats and processes. Aim to protect areas necessary for sustaining ecosystem goods and services that are essential to human society.
- b. Replicate to spread risk among areas; select 3 or more areas to protect per ecosystem type if possible. This allows for resilience to variability.
- c. Protect an ecologically-adequate amount of each habitat type. Protect entire biological units; or larger rather than smaller units.
- d. Long-term protection. Plan to keep area protected for decades rather than moving protection zones every planning period.
- e. Ecological linkages/connectivity with other areas (especially 10-20 km scale); Contribution to network. Try to have protected zones not too far from each other so organisms can travel from one patch of natural habitat to nearby habitats.
- f. Combine with various approaches (e.g. embed MPAs within an ICM framework) and/or incorporate conservation measures in areas/zones outside the strict protection zones.

It is also important during the situational analysis to identify the existing threats/causes of biodiversity as well as socio-economic pressures. Presence and enforcement of existing national and local policies can also be reviewed during this process. This could aid later in the formulation of a conservation development strategies that is harmonized and included in the CLUP.



### **Socio-Economic Assessment for Biodiversity Conservation Priority-setting**

The Socio-Economic Working Group (SEWG) of the Philippine Biodiversity Conservation Priority-Setting Program (Boquiren, 2002) has identified basic requirements and criteria for the biodiversity conservation priority-setting exercise. The consideration of social feasibility and sustainability was the basis for the identification of these basic requirements and criteria. Social feasibility hinges on the preparedness of all stakeholders to take part in the undertaking, their capacity to appreciate conservation issues as well as the need to take an active role in the process, and a political environment conducive to conservation. Meanwhile, the generation of resources, information dissemination and awareness raising, capability building in organizational and technical skills, as well as networking and advocacy are necessary ingredients in sustaining conservation initiatives (Highlights of the Planning Meeting, Eugenio Lopez Center, 25-26 January 2000, p. 20).

#### **Criteria for Socio-Economic Assessment for Biodiversity Conservation Priority-setting**

- Assessment of Human Pressure
  - o Socio-Demographic Data (Pressure)
    - Density and settlement pattern (relative to municipalities around the site)
    - Migration pattern (direction)
  - o Tenurial status of population
  - o Local Economy
    - Average annual per capita Year
  - o Poverty incidence
  - o Resource Utilization Issues (for forest, agriculture, mining, marine/freshwater resources)
    - Impact of resource utilization practices and economic trends on habitats and the resources:
      - extractive industries (mining, logging)
      - deforestation and land conversion (kaingin, forest fires, expansion of human settlements/agricultural encroachment)
      - unsustainable agriculture
      - over-hunting/over-extraction
      - industrial and domestic pollution
      - destructive, over- or illegal fishing
      - coastal water use conversion
      - biopiracy
      - unregulated collection
      - infrastructure projects (major roads, ports, industrial estate)
- Conservation Efforts/Opportunities
  - o Sustainability of Efforts
    - Presence of resource management plan
    - LGU initiatives

- Conservation and NRM-related programs/projects (line agencies, NGOs, POs, etc.)
- Degree of institutionalization of conservation effort (sustained, supported by LGU and community)
- o Community Management
- o Cultural Diversity (uniqueness and degree of acculturation/integration)
  - Reference Data: Presence of indigenous cultural communities (name of group, population)
  - Persistence of Resource Control Mechanisms
    - in land rights and use arrangements
    - degree of non-acculturation and non-integration (of resource management practices vis-a-vis the national state system of property regimes)
  - Persistence of Sound IKS: sustainable
    - NRM practices and beliefs in the indigenous knowledge system (IKS)
  - Presence of Political Stability
    - Sources of instability

Conservation strategies for identified priority areas may vary from place to place and the current condition of the ecosystem. These can range from habitat enhancement, lessening of threats and management of pressures, alternative livelihood, protection enforcement, ecotourism, conservation projects, and other conservation development strategies. These strategies will depend on the objectives and priorities set during the stakeholders' consultation or targeted consultation.

### 3. Define policy options.

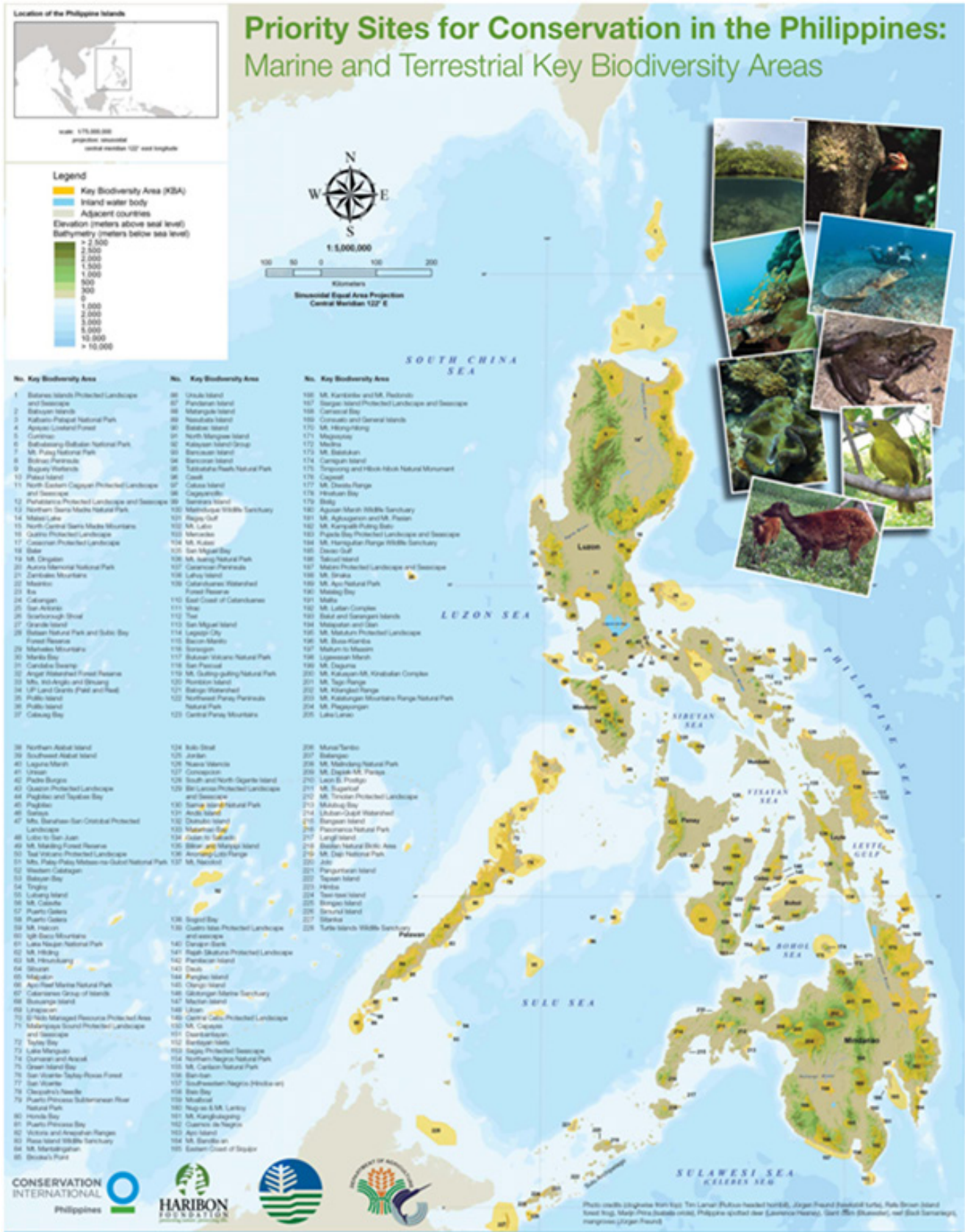
A matrix of the various implications and corresponding policy options for the findings/ observations/ issues and concerns in the area should be in table format as presented below.

Table BD–2. Biodiversity Analysis Matrix

Technical findings/observations/ Issues and concerns	Effects, impacts, implications	Policy options/interventions
Low compliance with environmental regulations in important biodiversity areas or proposed protection zones	Degradation of biodiversity resources  Decrease in ecosystem goods and services	Conduct information campaigns about the ecosystem goods and services provided by biodiversity and the need to protect in order to protect their sustainability  Establish and secure local allies and informants. Intensify preventive monitoring/ patrolling until compliance improves.
Conversion to other uses	Degradation of natural ecosystems, decrease in natural species' population and decrease in ecosystem goods and services  Increased disaster risks/hazards	Prohibit activities (infrastructure build-up, agriculture/ aquaculture, blast fishing, trawling) that convert or degrade natural habitats activities in areas of high biodiversity importance
Overexploitation	Decrease in population and yield of exploited species (e.g. fish)	Estimate maximum sustainable yields and determine desired levels of exploited species and establish regulations to keep

Overexploitation (cont'd)	Loss of associated (e.g. fisheries)	exploitation within these levels (e.g. prohibit hunting of IUCN Red List threatened NDspecies, strictly regulate and slowly reduce number of fishing licenses issued)
Pollution	Degradation of natural ecosystems, decrease in natural species populations and decrease in ecosystem goods and services  Health hazards to those using water sources	Based upon desired water uses, estimate maximum allowable pollution loads and establish regulations to keep pollution within these levels (e.g. no new development permits issued until pollution is brought within allowed levels)
Climate change hazards	Degradation of natural ecosystems, decrease in natural species populations and decrease in ecosystem goods and services  Increased disaster risks/hazards	Relocation of communities living and/or working in danger/hazard areas  Protection of "upstream" natural habitats (e.g. forests upstream of landslide-prone communities, mangroves and coral reefs adjacent to coastal communities)
Invasive alien species	Degradation of natural ecosystems, decrease in natural species populations and decrease in ecosystem goods and services  Decrease in food security and increased disaster risks/hazards  Possible health hazards	Coordinate with DENR to identify appropriate measures

# Annex BD-1. The Marine and Terrestrial Key Biodiversity Areas of the Philippines



Source: [http://www.conservation.org/global/philippines/publications/Documents/Philippines\\_KBAs\\_integrated.pdf](http://www.conservation.org/global/philippines/publications/Documents/Philippines_KBAs_integrated.pdf)

## Annex BD - 2. International Categories of Conservation Areas

IUCN CATEGORY	CONSERVATION	USE
I. Strict Nature Reserve, Wilderness Area	Protect Wilderness	Science
II. National Park	Ecosystem protection	Recreation
III. National monument	Conservation of specific natural/ cultural features	
IV. Habitat/Species management area	Conservation through active management intervention	
V. Protected landscape/ seascape	Conservation of landscape/ seascape	Recreation
VI. Managed resource protected area	Sustainable use	



## Annex BD – 3. Types of Ecosystems

**1. Forest:** lands dominated by trees and other woody vegetation; where we hike, gather wood, gather non-timber forest products, and hunt.



**2. Grassland:** lands dominated by grasses rather than large shrubs or trees; where we graze our cattle and other livestock.



**3. Inland Wetland:** the inland lakes, streams, and rivers; we fish in, boat on, transport our goods over, and rely on for drinking water.



**4. Caves:** hollow place in the ground, especially natural underground space including those underwater; where we hide and explore, and sometimes bury our dead.



**5. Coast Land:** lands near and above the shoreline; the beaches where we play.



**6. Marine Shallow:** salt-water areas below the shoreline less than 140 meters deep; the marine waters where we fish and glean (groupers/lapulapu, shellfish, and the like), the seagrass beds, coral reefs and atolls that line coasts in tropical waters and buffer our coastlines.



**7. Marine Deep:** salt-water areas below the shoreline more than 140 meters deep; where we fish round scad (galunggong), tuna, etc. and transport our goods over.



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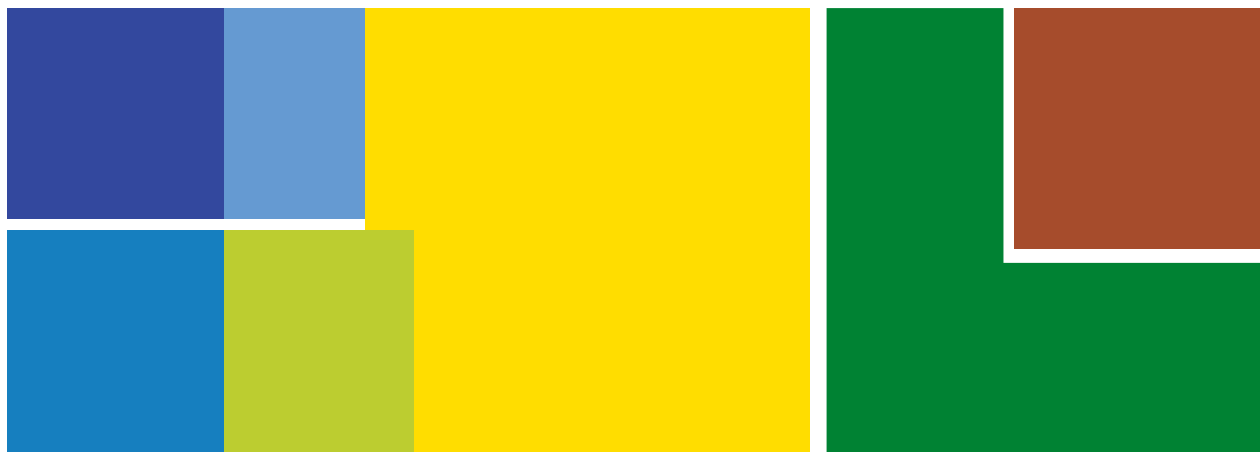
# Sectoral Studies

This section presents the sectoral studies which is an essential part of the preparation of the CLUP. It is done simultaneously with the assessment and situation analysis phase of the CLUP planning process which is outlined in Volume 1: A Guide to Comprehensive Land Use Plan Preparation (Step 4: Analyze the Situation). Sectoral studies are important in land use planning because although the latter is closely associated with physical development planning, it is actually a manifestation of the social, economic, cultural, environmental, political, and other values of the locality/community.

Sectoral studies are basically diagnostic in approach. They are geared towards the following: a) Identifying the issues prevailing in the sector, and analyzing their causes and effects and/or implications; b) Establishing the potentials and development needs of the sector; and c) Determining the spatial requirements of the sector. The spatial requirements refer to the qualitative and quantitative location and area requirements of the identified facilities and infrastructure needed by the sector under study in order to meet the current and projected demands for increased accessibility, and levels of efficiency and equity.

The sectoral studies entail documentation and clear understanding of the current conditions prevailing in the planning area, and in some cases, in the adjoining areas that may have implications on the situation in the area.





## Demographic Study

Literally translated from the Greek language, the term *demography* means *description of the people*. The Multi-Lingual Demographic dictionary of the United Nations defines demography as the scientific study of the human population primarily with respect to size, structure and development. It is therefore concerned with the current size and characteristics of human population, how they were attained and how they are changing.

Population, as defined in the Glossary of Definition of the National Statistical Coordination Board (NSCB) is the total number of individuals in a territory at a specified time. It covers both nationals and aliens; native- and foreign-born persons, internees, refugees and other groups physically present within the borders of a country at a specified time. Thus, the total population of the planning area, i.e. the city or municipality, is the number of individuals physically present at a specified time; that is, the census period.

The demographic profile provides planners and users of the Comprehensive Land Use Plan (CLUP) a backgrounder and general information on the population composition and distribution of the city/municipality. The changes in population brought about by its components such as birth, death, and migration relate to the historical and projected growth of the population.

Population composition includes the characteristics of the population in terms of age groupings and sex ratios. It provides the basis for social and economic planning considerations. Economic dependency ratios and participation measures as in labor force participation ratios are derived from population composition data. School age population and the enrollment participation ratios are also derived from population composition characteristics.

Population distribution, which is the geographic pattern of the location of people, is important in determining centers of population, hierarchy of settlements, and growth points in the city/municipality. Urbanization trends and density levels are also derived from population distribution patterns.

It is essential to take into account population projections, its size and characteristics, at city and municipal levels, which would serve as basis for estimating future needs and potentials in short and long-range planning.

Other population data include marital status, ethnic origin and dialect spoken; religious affiliation; literacy rate and number of disabled persons. Such information does not affect the total size of the population but are also determinants of the structure and composition of the population.



# I. Population and Development Interrelationships

## A. Relevance to Sectoral Planning

The essential needs of the Filipinos such as food, education, health, housing, recreation, safety and other social and cultural amenities, which the development programs aim to provide cannot be realized without taking into account the size, composition and distribution of the population.

It should be understood that population is the most important set of information for planning. It is the basis for determining the level of needs for public services like schools, health centers, recreational facilities, power, water, protective services, etc. Population creates local demand for goods and services affecting the level of economic activities in sustaining their viable existence in an area.

The present and projected size of the population is an equally important input in assessing housing and other basic needs adequacy as well as calculating future demand. It also serves as a guide for allocating land for various uses.

The following topics illustrate the usage of population data by different sectors.

### 1. Social Sectors (Education, Health, Housing, Sports and Recreation, Social Welfare and Protective Services)

#### a. Education

The age structure and population age groups determine the number of school-going age population, and their impact on educational facilities and manpower requirements. The geographical distribution and density of population should be considered in the distribution/location of educational services and facilities.

#### b. Health, Nutrition and Family Planning

Population size would be a parameter in the analysis of health facility and health manpower requirements. Birth and death rates are important indicators in planning maternal and child health services as well as in family planning other health-related development services/ programs.

#### c. Housing and Community Development

An increasing population connotes an increasing demand for housing with necessary amenities and livelihood opportunities. Squatter settlement sizes and rates of expansion of the informal sectors have to be estimated in order to help shape relocation and housing targets in order to provide them with decent housing.

#### d. Social Services and Welfare Services

Data about age cohorts by age and economic circumstances are necessary in quantifying potential social welfare services demand. Similarly, a census of the physically handicapped and survey results showing the magnitude of those below the poverty line are necessary inputs in planning for welfare and livelihood programs related to these needs of those vulnerable groups of the population.

#### e. Peace and Order/Protective Services

Population size, its growth would determine the number of peace keeping personnel that the city/ municipality would require.

## 2. Economic Services (Agriculture, Commerce and Trade, Industry and Tourism)

Population size, its growth, its spatial and age distribution affect the demand for economic good and services (food, clothing, and other manufactured products), the mix of industrial output and the need to generate employment opportunities.

Population density and rural population would exert impact on finite/limited cultivable land resources, thus raising concerns for intensive cultivation to increase productivity or encroachment on forest areas.

### a. Labor and Employment

Analysis of the labor force determines the predominant development sectors in terms of employment of the population in an area, that is, the possible labor market.

Areas with considerable unemployment may be determined and the data can guide the planners in redirecting development towards the area to create job opportunities for existing and projected population.

## 3. Infrastructure

Population size and its growth determine the demand for power and water supply, drainage and sewerage and solid waste disposal systems among households. Population density is considered in planning water supply, drainage sewerage and energy systems since the concentration of potential consumers is ideal for the construction of physical facilities such as pipelines and transmission lines.

Population size, its growth and geographical distribution would bear on the planning of transportation facilities inasmuch as the flow of commodities from production to consumption areas is induced by the demand of population for such commodities. Daytime population should be considered in highly urbanized centers of the metropolis.

## B. Population and Sustainable Development Framework

(Culled from the Gender Responsive Population & Development Planning Guide of POPCOM)

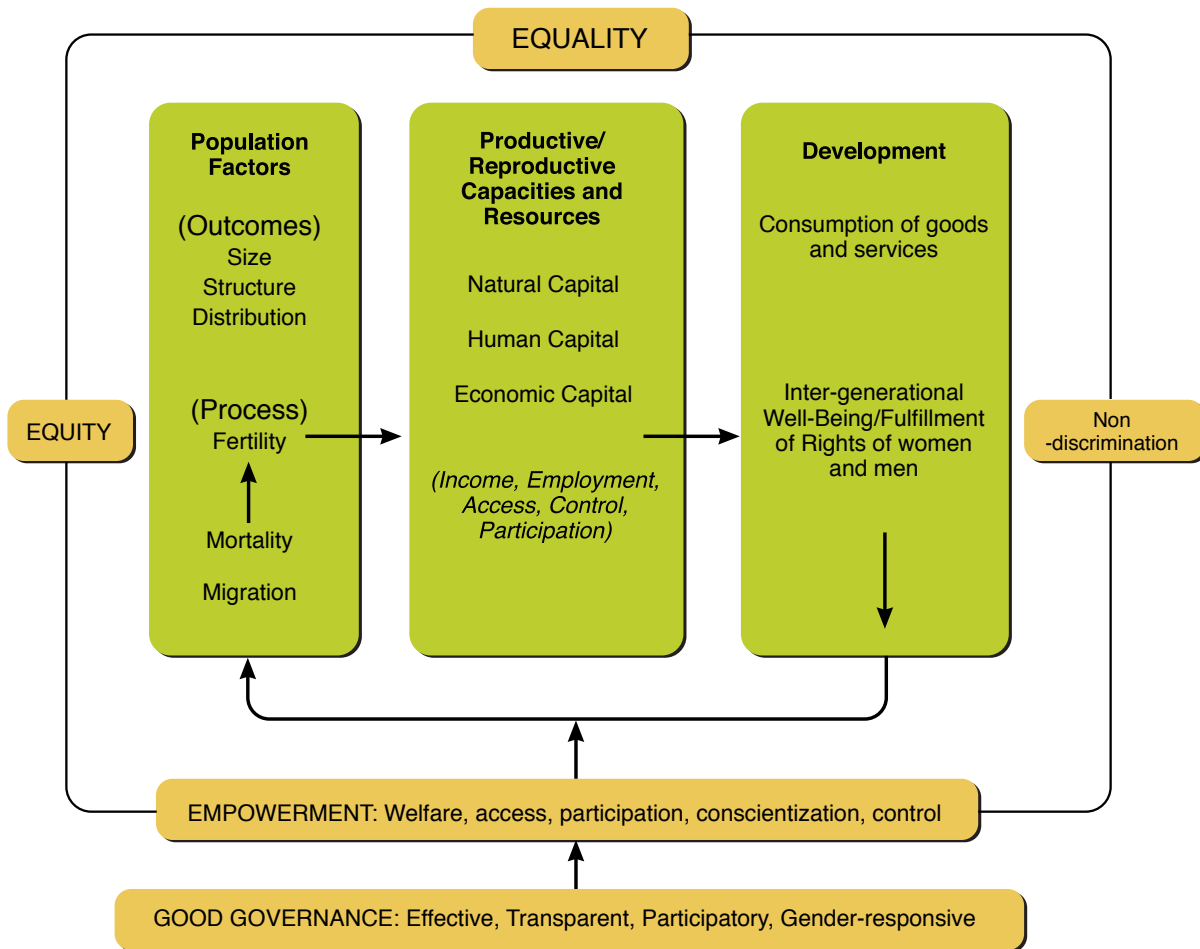
### Sustainable Development (SD) and Population

The attainment of SD is based on the fundamental human rights of people—women and men—in the development process<sup>4</sup>. SD involves the interrelationships of human development, environment/natural resources and the economy. These interrelationships are summarized through the Gender Responsive Population and Sustainable Development Framework (**Figure DE-1**).

<sup>4</sup>These are articulated in various international instruments like the International Conference on Population and development (ICPD-POA), Agenda 21, World Summit of Social Development (WSSD), HABITAT, and Beijing Platform of Action (BPA) and Millennium Declaration.

The Millennium Declaration, which is a global consensus comprehensively map out key provisions of international instruments and reiterates the need for all governments to address poverty at the same time ensure environmental integrity. The Millennium Development Goals (MDGs) containing 16 global targets and 48 global indicators provide concrete measures to assess development on a regular basis at country level.

Figure DE-1. Gender-Responsive Population and Sustainable Development Framework



**Population Factors**

The demographic processes of fertility, mortality and migration affect the population outcomes (size, age-sex structure and spatial distribution of the population). For example, if the average number of children born to a woman of reproductive age (15-49) increased from 3 to 4, this would mean a larger number of children aged 0 to 14.

**Productive/Reproductive Capacities and Resources**

The impact of population outcomes on productive and reproductive capacities and resources is basically based on the perspectives that:

- men and women are the most valuable resources and constitute the pool of human resources
- they are the actors and agents of development through the goods and services they produce

However, existing inequalities and discrimination against women in social, economic, cultural and political spheres need to be eliminated to ensure that women are also mobilized as key actors in development. Moreover, their contributions and capacities along the reproductive spheres need to be recognized as an important component of development.

When equality and equity for men and women is attained, they are free to make informed choice about their sexual and reproductive rights; and when couples and individuals have full access to services including education, reproduction health/family planning, their families will be: (1) healthier resulting in greater productivity; and, (2) smaller which may result to the moderation of population growth and improvement in economic growth.

Changes in population outcomes also affect the formation and use of productive resources—natural, economic and human capital. For example, population pressure on natural resources can contribute to deforestation, erosion and degradation of the environment, which affect productive capacities, hence, the availability of goods and services. The environment and natural resources are the support system and sources of raw materials needed in the production of goods and services. Men and women to improve their lives and attain well being which is indicated by long, healthy and productive life enhanced by the fulfillment of their fundamental human rights need these goods and services.

## Consumption of Goods and Services

The consumption of goods and services, in turn, is partly determined by the availability of such goods and services. Thus, poor households with low purchasing power<sup>5</sup> in the market due to low income can still increase their consumption of goods and services if they can access subsidized goods and services made available by the public sector or private donors. Otherwise, acquisition of goods and services may decrease which will eventually affect the well-being of the members of the poor households.

## Development

The indicators of better life or well-being (that is, the capacity “to do and to be”) are partly determined by the consumption of goods and services. Thus, better health can be partly attributed to the degree of consumption of preventive and curative health services; educational attainment, by the consumption of education services; and fertility, by the use of contraceptive services, etc.

The attainment of better life or well-being, in turn, impacts on women’s and men’s fertility behaviors, mortality patterns and migration practices, which could result in more manageable population levels that may, in the long run, contribute to the achievement of sustainable development. When people consider the social, economic and environmental consequences of their actions, the intergenerational well-being goal of sustainable development is not compromised.

## Gender-Responsive Governance in Population and Sustainable Development

A new world order evolved resulting from the shift of development focus from GNP to human development and well-being. Governance has to be reinvented based on the following principles: effectiveness and efficiency, transparency and accountability, participatory and gender responsiveness. These principles, which characterize good governance, basically create an enabling environment which ensures the following:

- Establishment of effective policies and mechanisms designed to address population and gender issues appropriately by all agencies and sectors;
- Elimination of barriers that impede the mainstreaming of vulnerable and marginalized groups in the development process;
- Identification and removal of legal, economic and political barriers through comprehensive policy reforms and strong affirmative action;
- Promotion and respect of people’s fundamental rights and elimination of threats to women’s lives and well being as a result of lack of power and influence.

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<sup>5</sup>Purchasing power refers to the amount of goods and services a given amount of money—or, more generally, liquid assets—can buy. As Adam Smith noted, having money gives one the ability to “command” others’ labor, so purchasing power to some extent is power over other people.

The importance of participatory governance, which includes the civil society, particularly the women’s groups, cannot be over emphasized. This is considered vital in making development interventions that are legitimate and acceptable.

## II. Strategic Approach to Demographic Study

Demography is concerned with the collection and analysis of data relating to population indicators and the interpretation of these data against social, biological, economic, political, geographical, ecological, and historical background.

### A. Demographic Profiling

To provide a comprehensive demographic profile of the planning area, it is imperative that both population processes and population outcomes be taken into explicit considerations. Thus, the data requirements listed below were derived from NSO population data and POPDEV Core Indicators as defined in **Annex DE-1**. (Refer to **Annex DE-1a**. Core Indicators for Popdev Planning at the Local Level for the list of core indicators and **Annex DE-3**. Relevant Demographic Concepts to PopDev Planning for the discussion on Relevant Demographic Concepts to POPDEV Planning).

The basic data on population can be derived from NSO census publications. However, the local government has the option to use locally generated data/information especially in cases where there are permanent population movements, e.g. presence of resettlement projects, population dislocation due to natural calamities/force majeure, and such other events that may have triggered in or out migration.

For a more gender-responsive analysis, it is suggested that data/indicators be sex-disaggregated, as much as possible.

#### 1. Data Gathering/Collection

##### Basic Data Requirements

Listed below are the basic data needed for demographic profiling of a planning area.

Basic Data Requirements	Where Data is Relevant
<b>1. Population Composition (use latest census data)</b>	
<ul style="list-style-type: none"> <li>a. Total Population by Age Group, Sex, Urban-Rural</li> <li>b. Total Population 15 Yrs. Old and Over by Sex and Employment Status</li> <li>c. Population 15 Years Old and Over by Sex and type of Activity</li> <li>d. Total Population by Sex and Employment Status</li> <li>e. Gainful Workers 15 Yrs. by Occupation Group and Industry Group</li> <li>f. Employed Persons 15 Yrs. Old and Over by Occupation Group</li> <li>g. Unemployed Persons 15 yrs. Old and Over by Age Group, Sex and Highest Educational Attainment</li> </ul>	<ul style="list-style-type: none"> <li>• Topic on Population Composition</li> <li>• Sub-topics on total no. of males and females; sex ratio; age group composition; age dependency ratios; labor force and employment; school-age population</li> <li>• Data relevant to economic sectors; social sector such as social welfare and development; health services; education services.</li> </ul>
<b>2. Population Distribution</b>	
<ul style="list-style-type: none"> <li>a. Total population and No. of Households by Barangay</li> <li>b. Population Density by Barangay*</li> <li>c. Gross Population Density* (Historical at least for the past 10 years)</li> <li>d. Built-up Density*</li> </ul>	<p>Topic on Population Distribution;</p> <p>Sub-topics on Urban/Rural distribution both population and households; urbanization trends and urbanizing barangays; average household members; centers of population/concentration; density and levels of density (refer to land area under natural and physical characteristics); hierarchy of settlements/barangays; nodal growth barangays/growth centers. Data is relevant to social, infrastructure and economic sectors.</p>

Basic Data Requirements	Where Data is Relevant
* To be computed or derived from other sources. Other indicators may be found in <a href="http://www.nscb.gov.ph">http://www.nscb.gov.ph</a> .	
<b>3. Population Change</b>	
a. Migration, if any/applicable <ul style="list-style-type: none"> <li>• Residence of the population for the last 5 years</li> <li>• Population by Mother Tongue/Ethnicity</li> </ul> b. Historical Growth of Population (1903-latest census year) c. Total Population per Census Year from 1903–2000, if applicable, or any year from when the LGU is covered by population census d. Projected Annual Total Population within the planning period using population projection methods/NSO Estimates e. Population by Age Group (yearly projection covering the entire planning period) f. Projected Population by Barangay g. Projected Labor Force	Demography Sector Topic on Population Change Sub-topic on Historical Growth of Population Data is relevant in projecting future land use requirements and needs for services and facilities; also relevant in making policy proposals.
<b>4. Other Population Descriptions (use latest census data)</b>	
a. Total Population 10 Yrs. Old and Over by Age Group, Sex and Marital Status b. Total Population by Mother Tongue c. Total Population by Religious Affiliation d. Total Population 7 Yrs. Over by Educational Attainment e. Literacy of the Total Population 10 Years Old and Over by Age Group, Sex f. Disabled persons by Age Group, Sex, Type of Disability	Sub-topic on Other Population Description such as marital status, mother tongue, religious affiliation, disability; literacy rate and highest educational attainment Data relevant to education and social implications
<b>5. Core Indicators</b>	
a. Fertility Rate b. Crude Birth Rate (CBR) c. Crude Death Rate (CDR) d. Annual Population Growth Rate e. Labor Force Participation Rate by Sex f. Unemployment Rate, Total and Sex g. Average Family Income h. Literacy Rate By Sex	Data is relevant to all sectors, population changes and population distribution

While data from NSO cover significant details, the demographic characteristics may be validated and expounded using documents/reports published by other agencies/institutions and by conducting interview/primary survey.

Data on Core Indicators are important analytical tools in assessing the performance of the sector concerned as well as in analyzing impact/effects of development efforts on population and vice-versa as discussed earlier in part II, Population and Development Interrelationships.

The core indicators listed above are derived from the NSCB Resolutions #14 S.2002 and NSCB Resolution #2 S.2002. For more information, please visit <http://www.nscb.gov.ph>.

Additional information that may further characterize the local population may be generated from consultations and workshops during the conduct of the sectoral studies

## 2. Data Processing

Using the basic data listed above, perform the necessary mathematical operations to transform data to desired information and to present the same in a more meaningful/understandable format such as tables, charts, and graphs.



Processing and presentation of data will be facilitated with the use of tools such as EXCEL program and/or GIS technology. These are found in tool boxes as presented in HLURB's **GIS Guidebook: A Guide to Comprehensive Land Use Data Management**.

The following output/analytical tables shall be generated out of the basic data gathered.

Table No.	Population Information*
DE-1	Population Composition by School-Age, Working-Age, Dependent-Age Group and Sex, Year ____
DE-2	Population Distribution by Age Group and Sex, Year ____ and ____
DE-3	Household Population by Urban and Rural Barangay and Average Household Size, Year ____
DE-4	Urbanization Levels for the Past 20 Years
DE-5	Population Density by Barangay, Year ____
DE-6	Historical Growth of Population
DE-7	Crude Birth Rate (CBR) and Crude Death Rate (CDR) for the Past 5 Years/Planning Period
DE-8	Literacy of Population 10 Years Old and Over, by Sex, Year ____
DE-9	Population by Mother Tongue, Year ____
DE-10	Population by Religious Affiliation, Year ____
DE-11	Inventory of Religious Establishments, Year ____
DE-12	Labor Force Population by Sex and Employment Status, Year ____
DE-13	Overseas Workers for the Past 5 Years
DE-14	Household Population 5 Years Old and Over by Highest Educational Attainment, Year ____
DE-15	Projected Population and Households
DE-16	Population Projection by Barangay, Year ____
DE-17	Projected School-Age Population, Labor Force and Dependent Population

Note: A graphical presentation of this data/information is suggested for ease in interpretation and better appreciation.

### 3. Data Analysis

#### Population Composition

Describe the locality's population composition and compare with provincial, regional or national data as may be available.

Compare the current composition of population with the past census data noting any change in composition that may be vital to the planning process. Discussion shall focus on the following: (refer to data from **Table DE-1** and **DE-2**).

- Total Population by Age Group and Sex
- Age Dependency Ratio
- Labor Force and Employment
- School-Age Population



The **Age-Sex Structure/Composition** of an LGU population is one of the basic inputs in development planning. Population composition determines a number of planning concerns, particularly those dealing with the population in the school going-ages; dependent ages; work participation and occupational structure; fertility, migration and mortality which tend to occur at particular ages.

**Age-Sex Structure** plotted as population pyramid will show at a glance the distribution of population in the locality. The form of population pyramid, generally reflects the pattern of fertility, mortality and migration in the past. A broad-based pyramid is brought about by very high fertility while narrow-based pyramid indicates low fertility/population growth rate for some time. Refer to **Annex DE-3**. Relevant Demographic Concepts to PopDev Planning for a more detailed discussion.

**Sex distribution** is best expressed as sex ratio, i.e, a ratio higher than 100 indicates that there is a predominance of male population in the area while less than 100 indicates a predominance of female population. The sex ratio is lower in areas where massive female in-migration is prevalent. Conversely, the sex ratio increases in areas where out-migration is dominated by females.

$$\text{Sex Ratio} = \frac{\text{No. of Males}}{\text{No. of Females}} \times 100$$

**Age** provides the basis for estimating population services/opportunities for different segments of population: school going-age, the dependent population, the employable group and the elderly, as follows:

- 0-14 years old - child and youth, dependent population
- 15-64 years old - productive population or working age group
- below 15 and over 64 years old - dependent population

**Age dependency ratio** indicates the extent to which those who are too young or too old to earn a living depend for support on those who work, computed as follows:



$$\text{Total Dependency Ratio} = \frac{\text{Pop'n. below 15 yrs.} + \text{Pop'n. 65 yrs. and above}}{\text{Pop'n. 15-64 years}} \times 100$$



$$\text{Young Dependency Ratio} = \frac{\text{Pop'n below 15 yrs.}}{\text{Pop'n. 15-64 years}} \times 100$$



$$\text{Old Dependency Ratio} = \frac{\text{Pop'n. 65 yrs. and above}}{\text{Pop'n. 15-64 years}} \times 100$$

### Population Distribution

Describe the distribution of population in the locality focusing on:

#### 1. Urban and Rural Household Population (refer to **Table DE-3**)



Urban population refers to the population residing in the urban barangays as classified by the NSO. Rural population refers to population residing in rural barangays as classified by the NSO. Refer to **Annex DE-4**. NSCB Resolution No. 9 for definition of urban areas/barangays

- a. Compare the urban and rural household population distribution in the study area.

- b. Discuss which are the most populated barangays and explain the situation by tracing to such factors as proximity to town center or central business district (CBD), accessibility to transportation lines, presence of population catalyzers line industries, major institutions, and the like.

## 2. Urbanization Level



Urbanization is defined as growth in the in the proportion living in urban areas which takes place when there is development. Therefore, where there are economic activities/opportunities in an area, in-migration occurs resulting in increasing population.

Extent of urbanization of a locality at a certain point in time is indicative of the progress or development taking place.

- a. Discuss the **urbanity or urbanization level** of a locality. This shall be determined using the formula: (refer to **Table DE-4**).



$$\% \text{ urbanity/urbanization level} = \frac{\text{Pop'n of urban barangays}}{\text{Total pop'n of city/municipality}}$$

- b. Compare urbanization levels of the locality during the past census years and with that of the urbanization level of the province/region. The latter comparison may be attributed to the role of the locality in the province/region among others

## 3. Population Density, Gross Population Density, Urban Density and Built-Up Density (refer to **Table DE-5**)



**Gross Density** is the ratio of the total population of an area (say barangay, city or municipality) to the total land area. Barangay densities differ greatly depending on the urban-rural character of the locality. In particular differences in densities among these areas may be attributed to the presence/absence of services/facilities/utilities and economic activities, among others.

**Urban Density** indicates the concentration of the total urban population over the total urban barangays, thus resultant density is higher than the **Gross Density**

A more realistic gauge/indicator of population concentration is the **Built-up Density**. Built-up area is defined as an area with contiguous grouping of ten (10) or more structures on it. Hence, built-up area is not a defined political administrative area but is a delineated built-up area usually derived from aerial photo and/or land use survey.

- a. Determine and discuss the levels of population concentration in the locality, barangays or built-up areas using working **Table DE-3**.
- b. Compare and account for the differences in population concentration or densities of the different barangays in the locality. Current data maybe compared with those of the province or neighboring local government units citing factors/reasons that may have led to such population concentration levels

## 4. Hierarchy of Settlements/Barangays

- a. Discuss the hierarchy of settlements/barangays based on the total population per barangay, population density, and urbanization level of the locality
- b. Identify the barangays with potentials of becoming nodal growth centers, centers of population, and satellite barangays based on population and built-up density

## Population Changes

Discuss population changes in terms of the following:

### 1. Historical Growth of Population

Discuss the increase or decrease in population per census year and the corresponding growth rates. Include a discussion on the trend of increase or decrease and cite events that may have influenced said trends. Refer to **Table DE-6** and **Annex DE-3**. Relevant Demographic Concepts to PopDev Planning for relevant concepts on population growth pattern.

### 2. Fertility and Mortality: Crude Birth Rate (CBR) and Crude Death Rate (CDR)

**Fertility** refers to the live births that occur within a population. The production of live birth is connected with many factors like the start of cohabitation, use of contraception, infant and child mortality and cessation of pregnancy. Fertility varies with the characteristics of the mother like educational or occupational status and the like.



**Crude Birth Rate (CBR)** refers to the number of births divided by the midyear population, usually expressed in terms of thousands. It is the simplest and most commonly used index of fertility.

The formula for CBR is as follows:

$$\text{CBR} = \frac{\text{B (No. of Births in a Given Year)}}{\text{P (Total Mid-year Population of the same Year)}} (1,000)$$

**Mortality** refers to the occurrence of deaths in a population. The incidence of death is related to many actors like age, sex, occupation, economic and social class. While fertility represents additions to the population and results in the restoration of the population, mortality represents an attrition or reduction in numbers.

**Crude Death Rate (CDR)** similar to CBR, CDR is a rough measure of mortality. It refers to the number of deaths per 1,000 population.

$$\text{CDR} = \frac{\text{D (No. of Deaths in a Given Year)}}{\text{P (Total Mid-year Population of the same Year)}} (1,000)$$

CDR is computed by dividing the number of deaths in a given year by the mid-year population of the same year multiplied by 1,000.

Refer to **Annex DE-3**. Relevant Demographic Concepts to PopDev Planning for more detailed discussion of the concepts.

### 3. Present and compare the CBR and CDR of the locality for the last five years or between two planning periods (refer to Table DE-7)

Any observed trend (increase/decrease) will be useful in the subsequent analysis of the health situation and in proposing for the needed intervention.

#### Other Population Characteristics

Analyze and discuss information and knowledge on other population descriptions using basic data gathered from NSO/PSA.

#### Marital Status

Both the marital status and age-sex distribution when analyzed can indicate the fertility pattern in a locality. Discuss which among the age group recorded the highest number of married female and relate it to the number of children ever born.

#### Mother Tongue/Ethnicity

Data on mother tongue are used in the analysis of ethnic origin of a person. Present

the percentage distribution of the various dialects/languages spoken by the population. Discuss why majority of the population speak a certain dialect by relating it to the municipality's location and immigration trend (refer to **Table DE-9**).

### **Religious Affiliation**

Mention the various religions in the locality and give percentage distribution of each. This information shall be useful input for the LGUs in determining required places of worship per religious affiliation (refer to **Table DE-10** and **Table DE-11**).

### **Literacy Rate**

Literacy rate is the percentage of the population who have at least completed a year in elementary education to the population seven years old and over. Determine the proportion of the populace who are able to read and write. Compare the literate urban population with the rural population (refer to **Table DE-8**).

### **Labor Force (refer to Table DE-12)**

Labor force or the economically active population refers to population 15 years old and above who are either employed or unemployed. Of the labor force population, compute for the percentage of those employed and unemployed, by sex. Employed persons refer to those engaged in any of the major occupation.

Determine which among the major occupation has the highest number of employed persons and examine the distribution to major industry group.

### **Other relevant information**

Discuss other characteristics of the population that may have significance to the planning process such as disabled persons, migration pattern, overseas workers, etc. (refer to **Table DE-13** to **Table DE-17**).

## **B. Population Projections and Estimates**

Population Projections are a basic requirement in planning a city/municipality. These projections are primarily used as basis for estimating future needs for basic services (e.g. education and health services), determining level of demand for facilities and utilities, economic-related needs and corresponding spatial requirements, among others.

There are three basic methods in projecting the future level of population, namely:

- **Mathematical method** – estimates the future population using mathematical formulas such as the geometric rate, exponential growth rate and in some cases the participation rate or the ratio and proportion method.
- **Economic method** – considering that population growth is closely related to changing economic circumstances, the future population can also be projected in terms of future economic conditions. This method depends on a projection of the future employment opportunities or job-population ratios in the future.
- **Component or cohort-survival method** – projects the future population by various demographic components such as age and sex using information on births, deaths, and migration.

For simplification purposes, this manual presents only the mathematical method particularly the geometric and participation rate methods.

As mentioned earlier, the official population projections published by NSO/NSCB shall be used for planning purposes. The planner is therefore suggested to coordinate/consult with the Provincial or Regional Census Officer before making projections, **as city/municipal estimates may have already been done**. The LGU may decide to use locally generated population base data as warranted by local developments/situation.

The following steps shall apply if a city/municipal population projection is not available:

## Population Projections

There are different methods of projecting future population. However, this guide suggests the combined use of **Geometric** and **Participation Rate** methods as discussed below:



### Geometric Method

Where:  $P_n = P_o (1 + r)^t$   
 $P_o$  = the base population of an area  
 $P_n$  = the population of the area t years later  
 $t$  = time interval in calendar years, between  $P_o$  and  $P_n$   
 $r$  = growth rate of population per unit time, assumed to be constant over the time interval, t

To compute the growth rate (r), rewrite the above formula using the formula:

$$r = \text{antilog} \left[ \frac{\log \frac{P_n}{P_o}}{t} \right] - 1 \quad \text{or} \quad \ln \left[ \frac{P_n}{P_o} \right] \frac{1}{t}$$

### Participation Rate (PR) Method

This method simply uses ratio or percent share of a particular segment of population to total population using actual/latest census data. The PR or ratio when applied to projected population will provide disaggregated projections such as population per barangay, dependent population, labor force population, population per age group, and others as may be needed for planning purposes.

An application of this method is shown in the following example:



$$\text{Participation Rate (PR) Working Age} = \frac{\text{Pop'n 15-64 years old}}{\text{Total Population}}$$

For purposes of CLUP preparation, the following demographic projections will have to be undertaken:

#### 1. City/Municipal Population Projection

Projection required is yearly for the first 5 years and every 5 years thereafter.

For 5-year interval population projection

- Obtain the latest NSO Census on Population for both the city/municipality and the province. Use these as base data. As mentioned earlier, LGU may use locally generated base data.
- Obtain the population projection for the province covering the specified planning period: say, 2008-2020. Available projection published by NSO/NSCB is by 5-year interval. (If projection by single year is available, use the same to facilitate computation).
- Determine the Participation Rate (PR) or ratio of the population of the city/municipality to the province using the base data.



$$\text{Participation Rate (PR)} = \frac{P_o \text{ (base pop'n. of City/Municipality)}}{P_o \text{ (base pop'n. of province)}}$$



- d. Estimate the projected population of the City/Municipality by multiplying the participation rate (PR) of the city/municipality (computed above) with the projected population of the province.



Sample Working Table 1: Planning Period 2008-2020

Province City/Municipality	Base Pop'n. (Po <sup>1</sup> ) (2000)	PR <sup>2</sup>	Projected Population						
			2008	2009	2010	2011	2012	2015	2020
Province	215,356	1	<u>257418</u>	<u>261897</u>	266404 <sup>3</sup>	<u>270666</u>	<u>274997</u>	288128 <sup>3</sup>	308595 <sup>3</sup>
City/Municipality	57,067	0.265	(68216)	(69403)	70597 *	(71726)	(7287)	76354 **	81778 **

<sup>1</sup> use latest census data

<sup>2</sup> Participation Rate, PR =  $\frac{P_o \text{ (City/Municipality)}}{P_o \text{ (Province)}}$

$$PR = \frac{57,067}{215,356} = 0.265$$

<sup>3</sup> given data, obtained from NSO

\*Projected population of City/Municipality, 2010 = PR x Projected Pop'n. of province, 2010  
 = 0.265 (266,404)  
 = 70,597

\*\*Apply same formula using data corresponding to the projection year, 2015 and 2020

(xxxxx) - All figures in parenthesis were derived using participation rate method (see computation below)

xxxxxxx - All figures underlined were computed based on growth rate ( r ), assumed to be constant between the 5-year interval projection for the province (see computation below)

For yearly projection during the first 5-year of the planning period, i.e., from 2008-2012 (refer to **Sample Working Table 1**)

- a. Where yearly provincial population projection is not available, apply the participation rate (PR) to get the projected population of the city/municipality.



**Example:**

P<sub>2008</sub> of city/municipality = PR (Projected provincial population in 2008)  
 Do the same for year 2009, 2011 and 2012

Follow these steps using the same data in Sample Working Table 1 above:

- b. Where yearly provincial population projection is not available, project provincial population using growth rates between 5-year interval projections covering the years where projected population is to be determined and supply participation rate to get the yearly projection for the city/ municipality.

Follow these steps using the same data in Sample Working Table 1 above:

- b.1. Compute for the population **growth rate (r)** of the province between 2005-2010 and between 2010-2015, using the Geometric Formula



$$r_{(2005-2010)} = \text{antilog} \left[ \frac{\log \frac{P_{2010}}{P_{2005}}}{T} \right]^{-1}$$

$$r_{(2005-2010)} = \text{antilog} \left[ \frac{\log \frac{266,404}{244,435}}{5} \right]^{-1}$$

$$r_{(2005-2010)} = 0.0174$$

$$r_{(2010-2015)} = \text{antilog} \left[ \frac{\log \frac{P_{2015}}{P_{2010}}}{T} \right]^{-1}$$

$$r_{(2010-2015)} = \text{antilog} \left[ \frac{\log \frac{288,128}{266,404}}{5} \right]^{-1}$$

$$r_{(2010-2015)} = 0.016$$

- b.2. Compute for the projected population of the province in 2008, 2009, 2011 and 2012 using the growth rates computed above and the Geometric Formula.



$$P = P_0 (1+r)^t$$

$$\text{Pop'n 2005 of Province} = 244,435 \text{ (derived from NSO projections)}$$

$$\text{Pop'n 2008 of Province} = P_{2005} (1+r_{2005-2010})^t$$

$$\begin{aligned} \text{Pop'n 2009 of Province} &= P_{2005} (1+r_{2005-2010})^4 \\ &= P_{2005} (1+0.01774)^4 \\ &= 244,435 (1+0.01774)^4 \\ &= 261,897 \end{aligned}$$

$$\begin{aligned} \text{Pop'n 2011 of Province} &= P_{2010} (1+r_{2010-2015})^1 \\ &= 266,404 (1+0.016)^1 \\ &= 270,666 \end{aligned}$$

$$\begin{aligned} \text{Pop'n 2012 of Province} &= 266,404 (1+0.016)^2 \\ &= 274,997 \end{aligned}$$

- b.3. Compute for the projected population for the city/municipality in 2008, 2009, 2011 and 2012 using the PR computed above, refer to sample working table 1.



$$\begin{aligned} \text{Pop'n. 2008 of City/Municipality} &= PR \times P_{2008} \text{ of Province} \\ &= 0.265 (257,418) \\ &= 68.216 \end{aligned}$$

Repeat the same procedures to obtain city/municipal population in years 2009, 2011 and 2012.



Another method of projecting yearly population of the city/municipality is by using the actual growth rate of population during the last two (2) census years and assuming the same to be constant within the planning period, as follows:

- Obtain the actual population of the city/municipality for the last two census years;
- Compute for the growth rate;
- Project the population within the planning period using the derived growth rate and the geometric formula.

The locality may opt to adjust projections or use methods other than the above especially in cases where the actual population is observed to experience high growth rates triggered by subdivision development, calamities or such other factors that result to in and out-migration, among others. In such case, assumptions and justifications shall be presented accordingly.

**2. Yearly Population by Barangay**

- Get the breakdown on population by barangay of the base year (see column 2 of **Sample Working Table 2**)
- Determine the participation rate (PR) or percent (%) share of each barangay to the city's/ municipality's total population using the base/latest census data (see column 3 of sample working table 2)
- Multiply the PR or percent (%) share of each barangay to each of the projected population of the municipality obtained in the preceding section.



**Sample Working Table 2**

City/ Municipality/ Barangay	Pop'n. (Po) (2000)	Participation Rate (PR)	Projected Population						
			2008	2009	2010	2011	2012	2015	2020
Total	57,067	1.00	68,216	69,403	70,597	71,726	72,874	76,354	81,778
Barangay A	2,879	0.050	3,411	3,470	3,530	3,586	3,644	3,818	4,089
Barangay B	2,806	0.049	3,343	3,401	3,459	3,515	3,571	3,741	4,007
Barangay C	2,554	0.044	(3,001)	3,054	3,106	3,156	3,206	3,360	3,598
etc.									

**Sample Computation:**

xxxx - projected population of the city/municipality previously computed.

$$PR = \frac{\text{Bgy. Pop'n}}{\text{Pop'n. of city/municipality}}$$

$$PR, \text{ Bgy. A} = \frac{2,879}{57,067} = 0.05$$

Projected Pop'n Bgy = PR of Brgy x Projected Pop'n of city/municipality

Projected Pop'n for Brgy 4:

$$\begin{aligned} \text{Pop'n. 2008} &= 0.05 \times 68,216 = 3,411 \\ \text{Pop'n. 2009} &= 0.05 \times 69,403 = 3,470 \\ \text{Pop'n. 2010} &= 0.05 \times 70,597 = 3,530 \end{aligned}$$

Repeat the process for the succeeding years and for the rest of the barangays.

### 3. Population Projection by Age-Group

The participation rate method used in projecting barangay population above applies:

- Get the breakdown on the population by age-group of the base year (see column 2 of **Sample Working Table 3**)
- Determine the participation rate (PR) or percent (%) share of each age-group to municipality's total population (see column 3 of **Sample Working Table 3**)
- Multiply the PR or percent (%) share of each age group to the projected population of the municipality obtained in the preceding section



**Sample Working Table 3**

Age-Group	Pop'n. (Po) (2000)	Participation Rate (PR <sup>1</sup> )	Projected Population						
			2008	2009	2010	2011	2012	2015	2020
<b>Total</b>	<b>57,067</b>	1.00	<u>68,216</u>	<u>69,403</u>	<u>70,597</u>	<u>71,726</u>	<u>72,874</u>	<u>76,354</u>	<u>81,778</u>
Under 1	1,666	0.0292	1,992	2,027	2,061	2,094	2,128	2,230	2,388
1-4	6,196	0.1086	7,408	7,537	7,667	7,789	7,914	8,292	8,881
5-9	7,384	0.1294	8,827	8,981	9,135	9,281	9,430	9,880	10,582
≥ 80									

**Sample computation using Participation Rate Method:**

xxxxx – all underlined figures/data are results of previous computations in above steps.

$$\begin{aligned}
 1) \text{ Participation Rate (PR)} &= \frac{\text{Pop'n (under 1)}}{\text{Pop'n of city/municipality}} = \frac{1,666}{5,7067} \\
 (\text{under 1 age-group})^1 &= \frac{1,666}{5,7067} \\
 &= 0.0292
 \end{aligned}$$

Apply the same formula for all other age-groups to get PR for each age-group.

$$\begin{aligned}
 2) \text{ Projected Population of age under 1} &= \text{PR} \times \text{P (city/municipality)} \\
 &= 0.0292 (68,216) \\
 &= 1992
 \end{aligned}$$

The population projection by age group above can be used to project other segments of the population such as working age, child and youth, old population, etc.



∑ in the example below means summation or sum total of projected population by age-group. Refer to sample working Table 3.

- Projected Working Age, 2010 = ∑ projected population of ages 15-64 in 2010
- Projected child and youth, 2010 = ∑ projected population of ages 0-14 in 2010
- Projected Old Age Population, 2010 = ∑ projected population of ages 64 and over
- Projected Dependent Population, 2010 = ∑ projected population of ages 0-14 and 65 & over

Apply the same procedures to get projections for years beyond 2010.

### 4. Projected Labor Force

The Participation Rate Method shall be used to generate this projection. Steps are as follows:

- Obtain the latest household population 15 years and over by sex and employment status. Use this as base data.

b. Compute for PR of population in the labor force



$$PR = \frac{\text{Pop'n in the Labor Force (or Economically Active Pop'n)}}{\text{Pop'n 15 years and over}}$$

c. Obtain the projected population 15-years old and over from the projected population by age group earlier computed.



**Example:**

Projected Pop'n 15 years =  $\Sigma$  of Projected pop'n of ages 15 years and over and over, 2000

Do the same to get the projected population 15 years and over for the entire planning period.

d. Apply the PR computed above (in step 2) to the projected population 15 years and over (in step 3) to get the projected labor force.



Projected Labor Force = PR x Projected Pop'n 15 yrs. and over  
(refer to the following **Sample Working Table 4**)



**Sample Working Table 4**

	Pop'n. (Po) (2000)	Participation Rate (PR)	Projected Population						
			2008 <sup>1</sup>	2009	2010	2011	2012	2015	2020
Household Pop'n 15 yrs & Over	34,601	1.00	<u>41,359</u>	<u>42,079</u>	<u>42,803</u>	<u>43,487</u>	<u>44,184</u>	<u>46,293</u>	<u>49,582</u>
In the Labor Force	33,563	0.970	40,118	40,816	41,519	42,182	42,858	44,904	48,095
Male	16,647	(0.496)	19,899	20,245	20,593	20,476	21,258	22,272	23,855
Female	16,916	(0.504)	20,219						

xxxx - projected population of the city/municipality previously computed.

$$\text{Labor Force PR} = \frac{33,563}{34,601} = 0.97$$

$$\text{Male PR in the Labor Force} = \frac{11,647}{33,563} = 0.496$$

$$\begin{aligned} \text{Projected Labor Force, 2008} &= \text{PR} \times \text{Projected Pop'n 15 years and over} \\ &= 0.97 \times 41,359 \\ &= 40,118 \end{aligned}$$

$$\begin{aligned} \text{Projected Male Labor Force, 2008} &= \text{PR} \times \text{Projected Labor Force 2008} \\ &= 0.496 \times 40,118 \\ &= 19,898 \end{aligned}$$

$$\begin{aligned} \text{Projected Female Labor Force, 2008} &= 0.504 \times 40,118 \\ &= 20,219 \end{aligned}$$

Repeat procedure to obtain projection for the rest of the planning period.

## IV. Tables

Table DE-1. Population Composition by School-Age, Working-Age, Dependent-Age Group and Sex, Year \_\_\_\_\_

Age Group	Both Sexes	Male		Female		Sex Ratio
		No.	%	No.	%	
<b>School going population</b>	<b>16,761</b>	<b>7,741</b>	<b>46%</b>	<b>9,020</b>	<b>54%</b>	<b>86</b>
Pre-school (3-6)	3,487	1,687	48%	1,800	52%	94
Elementary (7-12)	6,144	2,544	41%	3,600	59%	71
Secondary (13-18)	4,657	2,237	48%	2,420	52%	92
Tertiary (19-22)	2,473	1,273	51%	1,200	49%	106
<b>Working Age (15-64)</b>	<b>27,437</b>	<b>13,444</b>	<b>49%</b>	<b>13,993</b>	<b>51%</b>	<b>96</b>
<b>Labor Force (15 and over)</b>	<b>31,229</b>	<b>16,450</b>	<b>53%</b>	<b>14,779</b>	<b>47%</b>	<b>111</b>
<b>Dependent Population</b>	<b>22,448</b>	<b>6,735</b>	<b>30%</b>	<b>15,713</b>	<b>70%</b>	<b>43</b>
Young (0-14)	13,469	4,041	30%	9,428	70%	43
Old (65-over)	8,979	2,694	30%	6,285	70%	43

Source: Computed based on the latest NSO/PSA data on household population by age-group



Note:

$$\text{Sex Ratio (SR)} = \frac{\text{No. of Male}}{\text{No. of Female}} \times 100$$

Graph DE-1. Population Composition by School-Age, Working-Age, Dependent-Age Group and Sex, Year \_\_\_\_\_

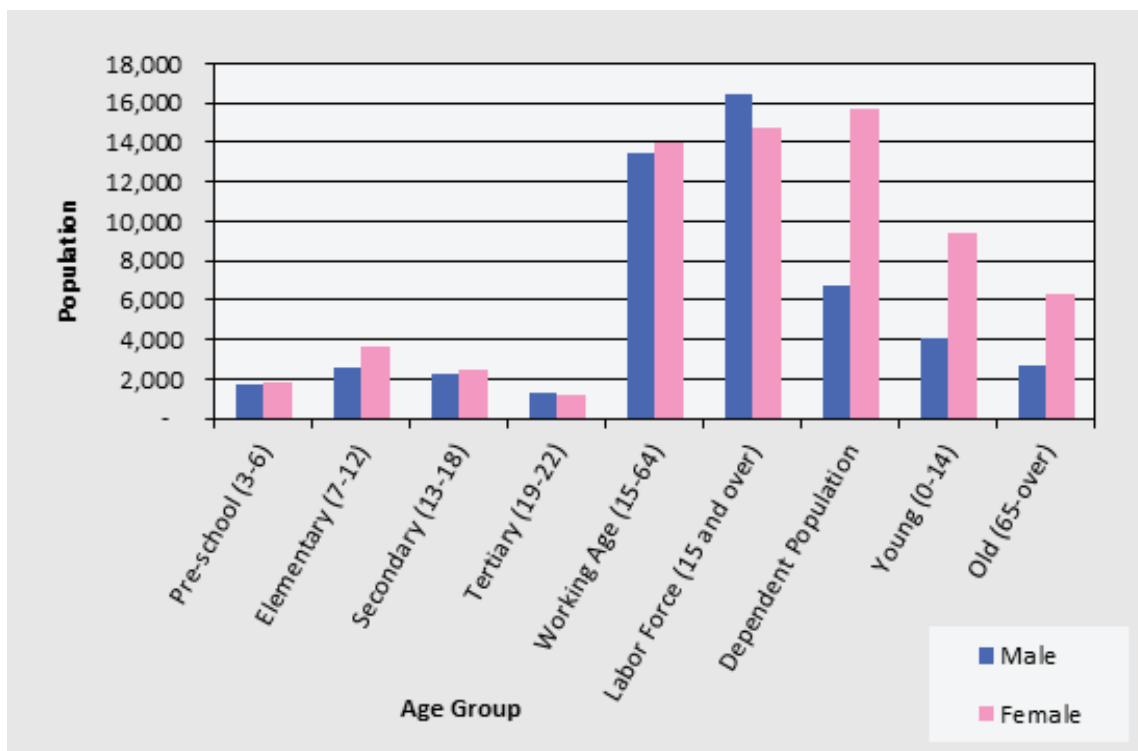




Table DE-2. Population Distribution by Age Group and Sex, Year \_\_\_\_ and \_\_\_\_

Age Group	Censal Year 2 (latest)			Censal Year 1		
	Male	Female	Total	Male	Female	Total
Under 1	2,290	2,215	4,505	2,057	1,992	4,049
1 - 4	8,781	8,302	17,083	7,893	7,466	15,359
5 - 9	9,650	9,449	19,099	8,676	8,495	17,171
10 - 14	9,101	8,739	17,840	8,181	7,856	16,037
15 - 19	7,947	7,472	15,419	7,146	6,718	13,864
20 - 24	6,044	5,845	11,889	5,435	5,254	10,689
25 - 29	5,430	5,156	10,586	4,881	4,635	9,516
30 - 34	4,766	4,667	9,433	4,285	4,149	8,434
35 - 39	4,565	4,391	8,956	4,104	3,947	8,051
40 - 44	3,989	3,672	7,661	3,586	3,301	6,887
45 - 49	2,995	2,737	5,732	2,692	2,460	5,152
50 - 54	2,104	1,945	4,049	1,891	1,749	3,640
55 - 59	1,802	1,859	3,661	1,620	1,671	3,291
60 - 64	1,430	1,496	2,926	1,289	1,341	2,630
65 - 69	1,050	1,151	2,201	945	1,033	1,978
70 - 74	618	753	1,371	560	673	1,233
75 - 79	414	488	902	375	436	811
80 - 84	229	255	484	204	230	434
85 and over	87	119	206	80	105	185
Total	73,292	70,711	144,003	65,900	63,511	129,411

Source: National Statistics Office/Philippine Statistics Authority/Municipal Records

Graph DE-2. Population Distribution by Age Group and Sex, Year \_\_ to Year \_\_

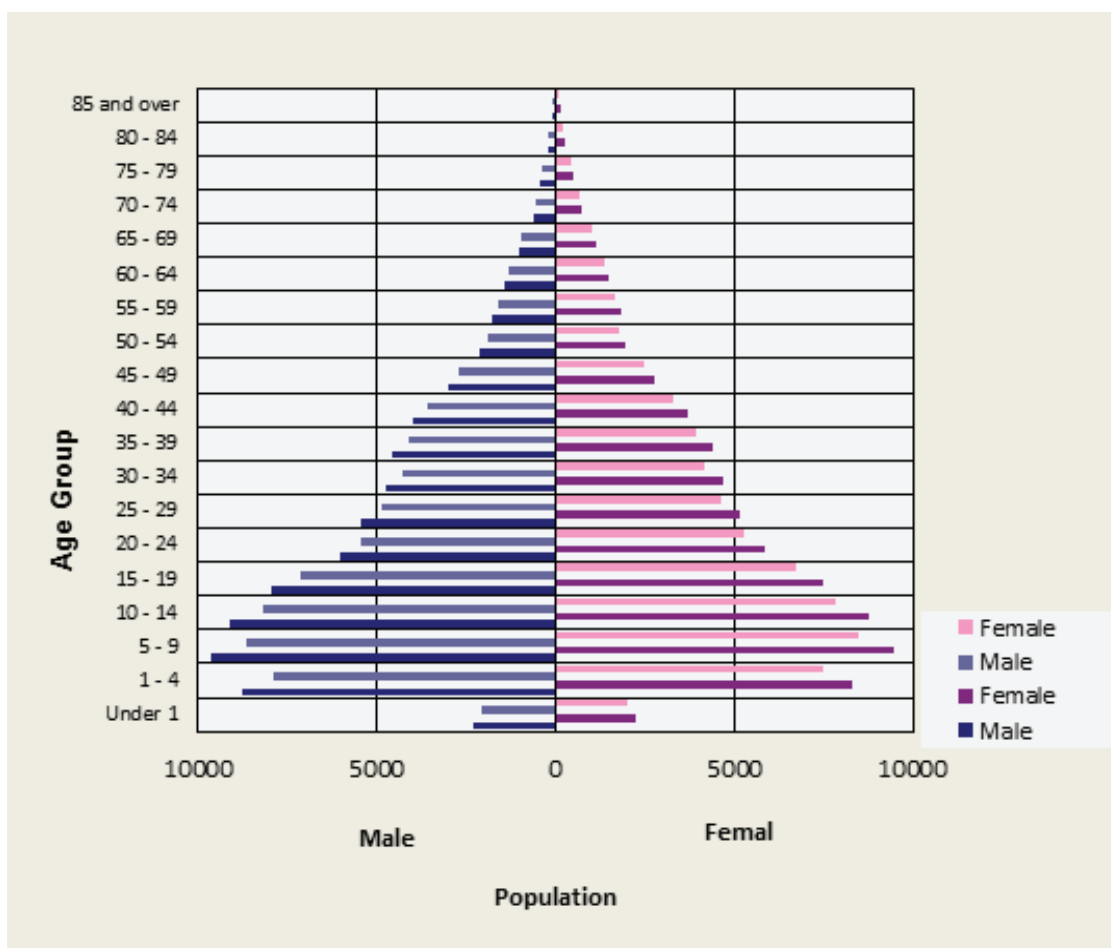


Table DE-3. Urbanization Levels for the Past 20 Years

Barangay	Population	Number of Household	Average Household Size
<b>Urban</b>			
Poblacion 1	497	86	5.78
Poblacion 2	1,168	171	6.83
Poblacion 3	767	100	7.67
Poblacion 4	559	96	5.82
Poblacion 5	674	94	7.17
<b>Sub-Total</b>	<b>3,665</b>	<b>547</b>	<b>6.70</b>
<b>Rural</b>			
As-is	2,113	339	6.23
Balakilong	3,767	624	6.04
Berinayan	1,730	245	7.06
Bugaan East	1,660	245	6.78
Bugaan West	2,375	350	6.79
Buso-buso	2,387	293	8.15
Dayap Itaas	440	57	7.72
Gulod	2,456	283	8.68
Leviste	1,661	263	6.32
Molinete	1,402	211	6.64
Niyugan	1,203	206	5.84
Paliparan	874	143	6.11
Sab Gabriel	2,176	302	7.21
San Gregorio	3,116	417	7.47
Sta. Maria	1,938	311	6.23
Ticub	1,990	317	6.28
<b>Sub-Total</b>	<b>31,288</b>	<b>4,606</b>	<b>6.79</b>
<b>TOTAL</b>	<b>34,953</b>	<b>5,153</b>	<b>6.78</b>

Source: National Statistical Coordination Board

Graph DE-3. Household Population by Urban and Rural Barangay and Average Household Size, Year \_\_\_\_\_

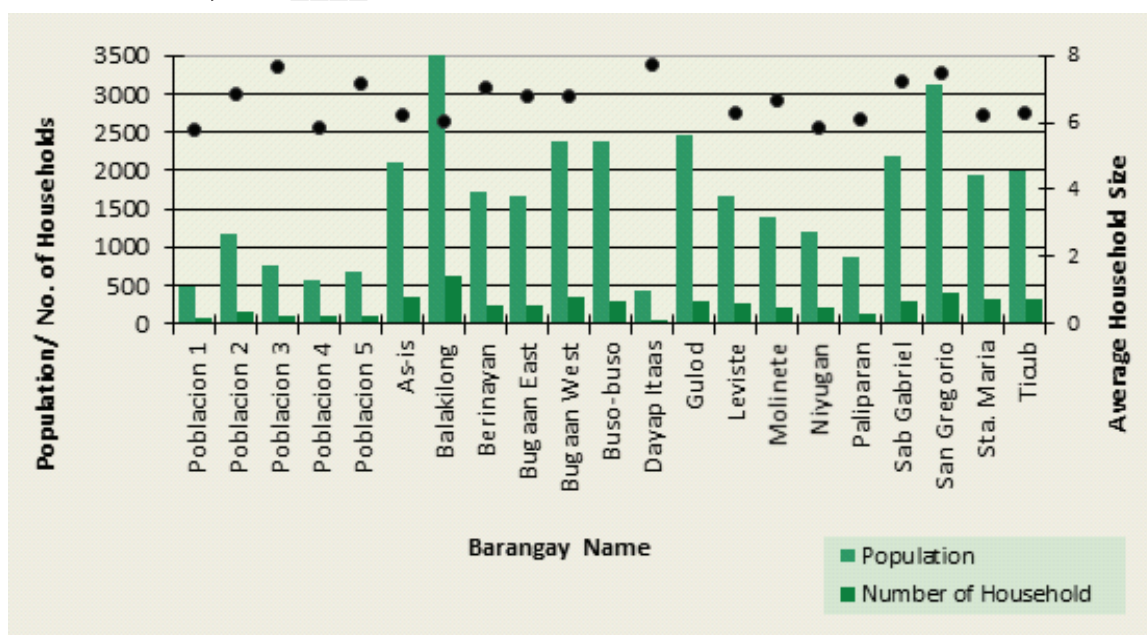


Table DE-4. Population Density, Gross Density and Built-Up Density, Year \_\_\_\_\_

Year	City/Municipal Population			Average Yearly Population Growth Rate (%)		Average 5-Year Tempo of Urbanization (%)	Level of Urbanization (%)	
	Urban	Rural	Total	Urban	Rural		City/Municipal	Provincial
1980	14,598	1,950	16,548				88.2	45.5
1985	16,879	2,298	19,177	3.13	3.57	-0.05	88.0	44.8
1990	18,923	2,515	21,438	2.42	1.89	0.06	88.3	44.0
1995	23,549	2,750	26,299	4.89	1.87	0.29	89.5	45.2
2000	26,895	2,928	29,823	2.84	1.29	0.14	90.2	47.0
Latest censal year								



Notes:

- Y1 to Y5 are based on NSO/PSA conducted censal years. If the LGU has carried out its own survey, this may also be used.
- Average 5-Year Tempo of Urbanization (%) = (Ave. Urban Pop'n Growth Rate – Ave. Rural Pop'n Growth Rate)
- Level of Urbanization = Urban Population/Total Population) x100

Graph DE-4. Urbanization Level for the Past 20 Years

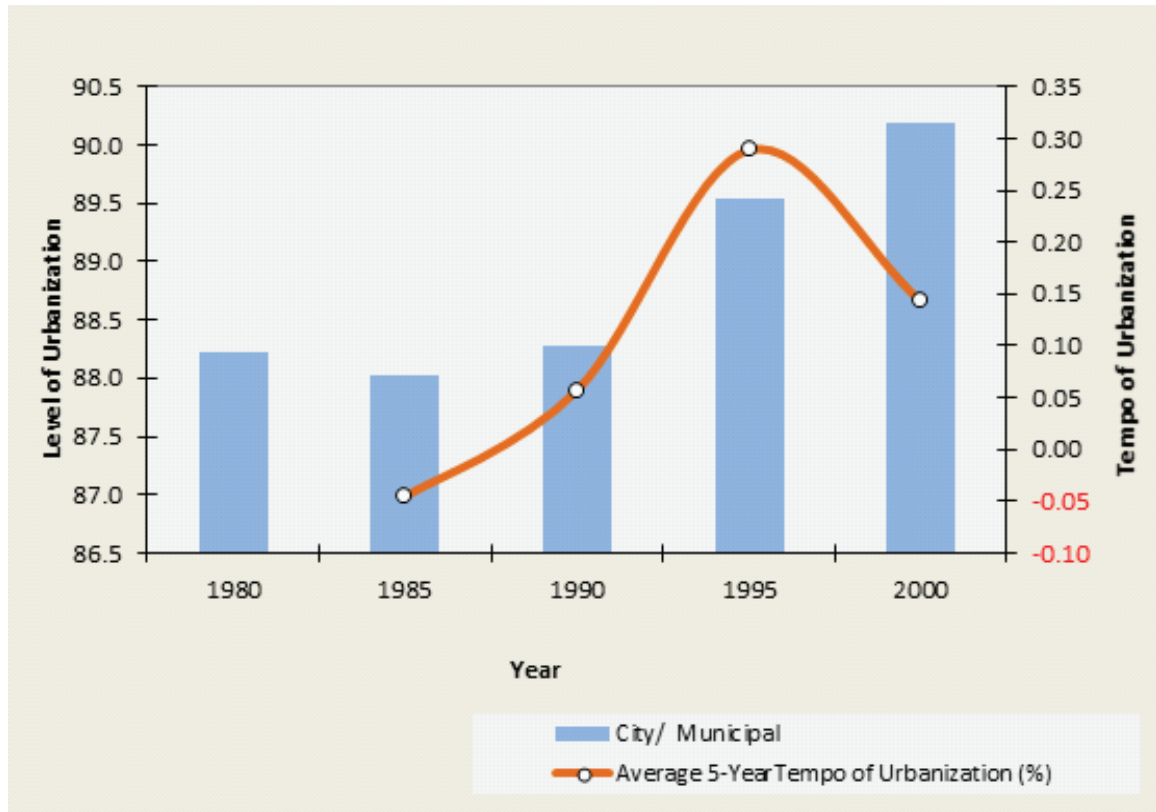


Table DE–5. Population Density by Barangay, Year \_\_\_\_\_

Barangay	Population	Gross Area (ha)	Population Density (Gross Barangay Area)
<b>Urban</b>			
Poblacion 1	480	0.4929	974
Poblacion 2	906	0.6513	1391
Poblacion 3	582	0.5509	1056
Poblacion 4	470	0.6087	772
Poblacion 5	490	0.3390	1445
<b>Subtotal</b>	<b>2,928</b>	<b>2.6428</b>	<b>5639</b>
<b>Rural</b>			
As-is	1813	4.9442	367
Balakilong	3161	2.9985	1054
Berinayan	1229	3.2271	381
Bugaan East	1384	1.3482	1027
Bugaan West	1964	5.0027	393
Buso-buso	1675	4.2066	398
Dayap Itaas	294	7.4838	39
Gulod	1630	2.0306	803
Leviste	1431	2.2637	632
Molinete	1112	2.9114	382
Niyugan	1031	4.3102	239
Paliparan	702	4.2073	167
Sab Gabriel	1628	2.8461	572
San Gregorio	2239	8.1534	275
Sta. Maria	1705	5.2851	323
Ticub	1678	7.4311	226
<b>Subtotal</b>	<b>24676</b>	<b>69</b>	<b>7276</b>
<b>TOTAL</b>	<b>27,604.00</b>	<b>71.29</b>	<b>12,915.09</b>

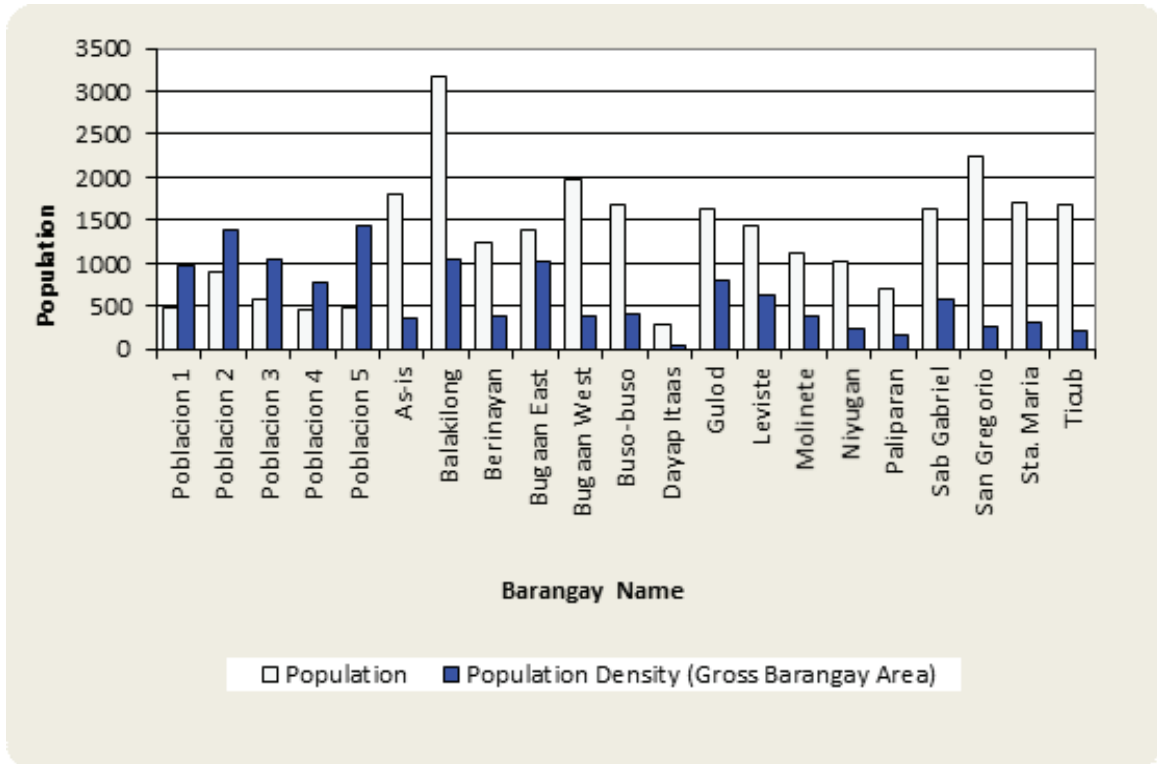
Source: City/Municipal Planning Development Office



Note:

$$\text{Gross Pop'n. Density} = \frac{\text{Population}}{\text{Gross Area}}$$

Graph DE-5. Population Density by Barangay, Year \_\_\_\_\_



Source: City/Municipal Planning Development Office

Figure DE-2. Sample Population Density Map

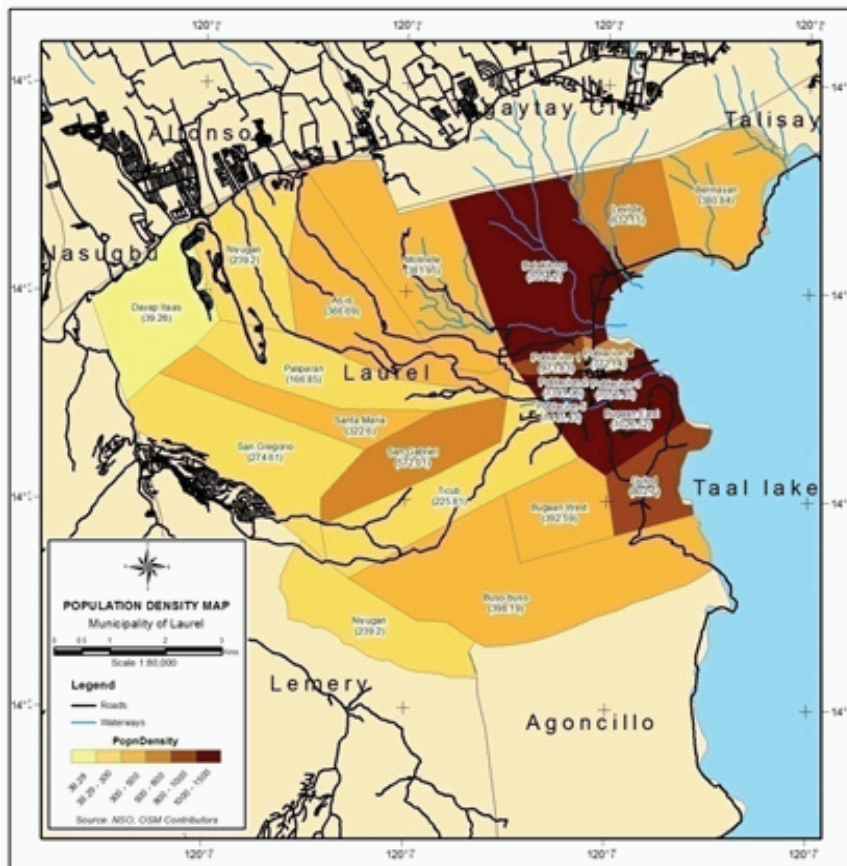


Table DE–6. Historical Growth of Population

Year	City/Municipal						Annual Growth Rate (%)			
	Population <sup>1</sup>			Increase/Decrease <sup>2</sup>			Municipal <sup>3</sup>	Provincial <sup>1</sup>	Regional <sup>1</sup>	National <sup>1</sup>
	Male	Female	Total	Male	Female	Total				
1903	1,921	1,820	3,741							
1918	4,601	4,641	9,242	2,680	2,821	5,501	6.21			0.09
1939	6,998	7,049	14,047	2,397	2,408	4,805	2.01			0.07
1948	6,787	6,789	13,376	-211	-260	-671	-0.54			0.14
1960	8,105	8,073	16,178	1,318	1,284	2,802	1.60			0.12
1970	9,759	9,723	19,482	1,654	1,650	3,304	1.88			0.13
1975	10,756	10,833	21,589	997	1,110	2,107	2.08			0.23
1980	12,098	12,031	24,129	1,342	1,198	2,540	2.25			0.23
1990	13,922	14,020	27,942	1,824	1,989	3,813	1.48			0.13
1995	13,902	13,907	27,809	-20	-113	-133	-0.10	0.13	0.23	0.22
2000	14,576	14,509	29,085	674	602	1,276	0.90	0.12	0.22	0.23
2007	16,467	16,418	32,885	1,891	1,909	3,800	1.77	0.13	0.23	0.22
2010	17,894	17,780	35,674	1,427	1,362	2,789	<b>2.75</b>	0.12	0.22	0.23
Latest censal year										

Source: NSO/PSA



Notes:

- Use latest annual growth rate from Table DE-15
- Y1 to Y5 are based on NSO/PSA conducted censal years. If the LGU has carried out its own survey, this may also be used.
- <sup>1</sup> Given (NSO/PSA data)
  - The latest annual growth rate for the city/municipality will be an input for projecting the population
- Formula/ computations:
  - <sup>2</sup> Increase/Decrease
    - To fill- up, get the difference between two points in time, e.g. 1918 population minus 1903 population, continue process up to year 2000. Determine the percentage increase or decrease of the population from each census year (1903-2000) and plot these on a graph to show trend.
  - <sup>3</sup> Municipal Annual Growth Rate
    - To get data for column 4, use geometric method formula in Volume 2 Guidebook or follow the steps below using scientific calculator:

Where: P<sub>n</sub> = population in the later period (211,879)  
 P<sub>o</sub> = population in the earlier period (184,970)  
 t = time interval between the two period (5 years)  
 r = rate of growth  
 k = 100

Steps (Geometric Method):

1. Enter P<sub>n</sub> (211,879)
2. Press / (division sign)
3. Enter P<sub>o</sub> (184,970)
4. Press = (equal/s sign)
5. Press log (natural logarithm) key
6. Press / (division sign)
7. Press t (no. of years which is 5)
8. Press = (equal/s sign)
9. Press “INV” (inverse sign key)
10. Press log (natural logarithm) key
11. Press – (minus sign)
12. Enter constant integer 1
13. Press = (equal/s sign)
14. Press x (multiplication sign)
15. Enter 100
16. Press = (equal/s sign)
17. Read answer in percent (r=2.75)



Graph DE-6. Historical Growth of Population

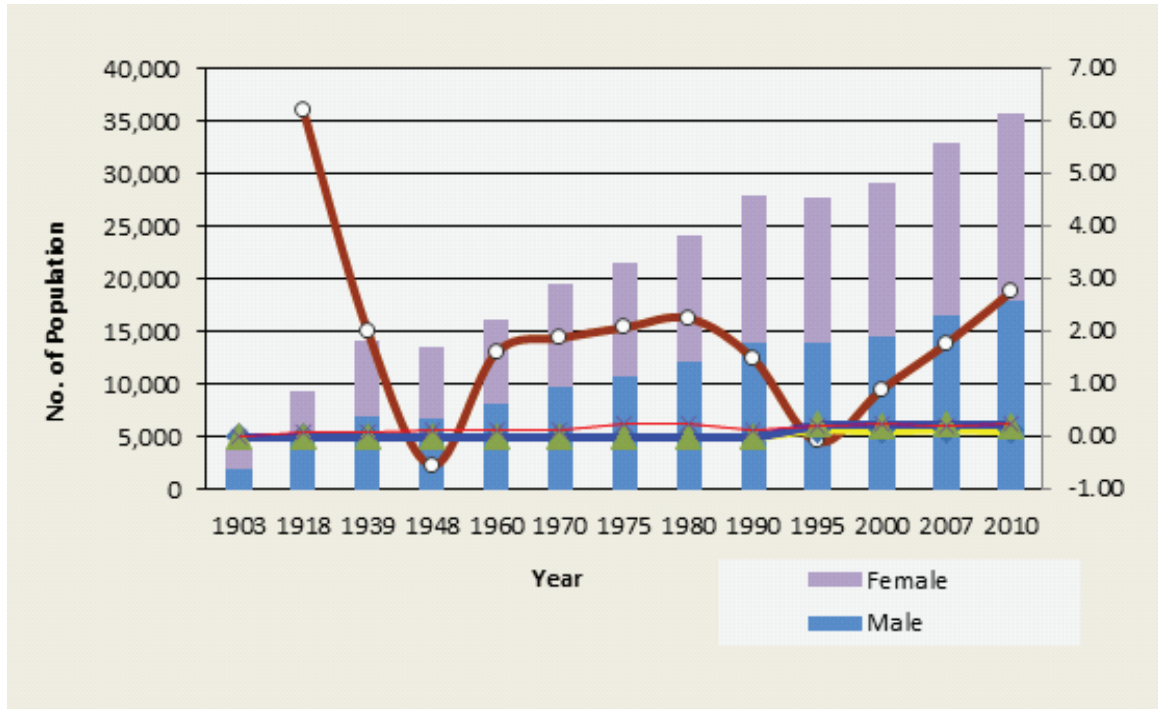


Table DE-7. Crude Birth Rate (CBR) and Crude Death Rate (CDR) for the Past Five Years/Planning Period (2006-2010)

Period	CBR	% Increase/Decrease from Previous Year	CDR	% Increase/ Decrease from Previous Year
Y <sub>1</sub>	17.91		10.2	
Y <sub>2</sub>	18.53	1.03	7.38	0.72
Y <sub>3</sub>	20.38	1.10	9.23	1.25
Y <sub>4</sub>	19.71	0.97	5.82	0.63
Y <sub>5</sub>	24.16	1.23	8.12	1.40



Notes:

- Crude Birth Rate (CBR) refers to the number of live births per 1,000 mid-year population
- Crude Death Rate (CDR) refers to the number of deaths per 1,000 mid-year population

Graph DE–7. Crude Birth Rate (CBR) and Crude Death Rate (CDR) for the Past Five Years

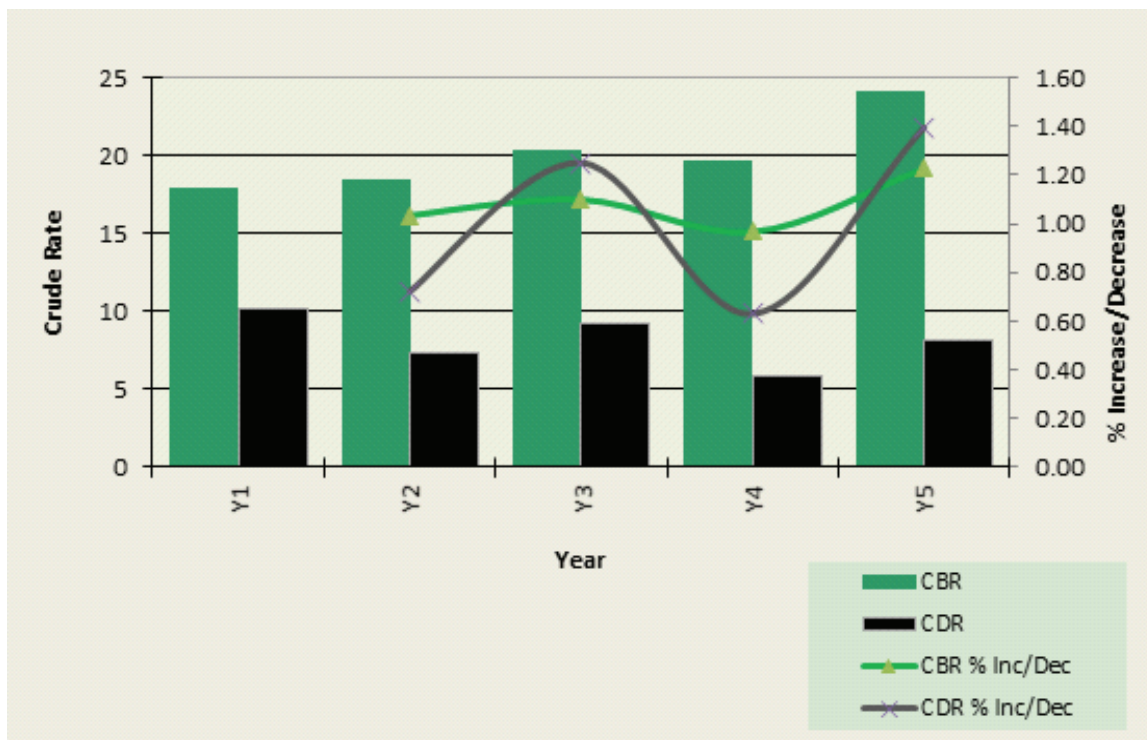


Table DE–8. Literacy Rate of Population 10 Years Old and Over, by Sex, Year \_\_\_\_\_

Indicator	City/Municipal						Regional					
	Male		Female		Both Sex		Male		Female		Both Sex	
	No.	Rate %	No.	Rate %	No.	Rate %	No.	Rate %	No.	Rate %	No.	Rate %
Literate	4,574	87	4,678	83	9,252	85	123,004	83	118,342	77	241,346	80
Illiterate	654	13	958	17	1,612	15	25,493	17	35,403	23	60,896	20
Total (Population >10yr)	5,228		5,636		10,864		148,497		153,745		302,242	



Notes:

- Rate (%) = (No. per indicator/Total population > 10 yr) x 100

Graph DE-8. Literacy Rate of Population 10 Years Old and Over by Sex, Year \_\_\_\_\_

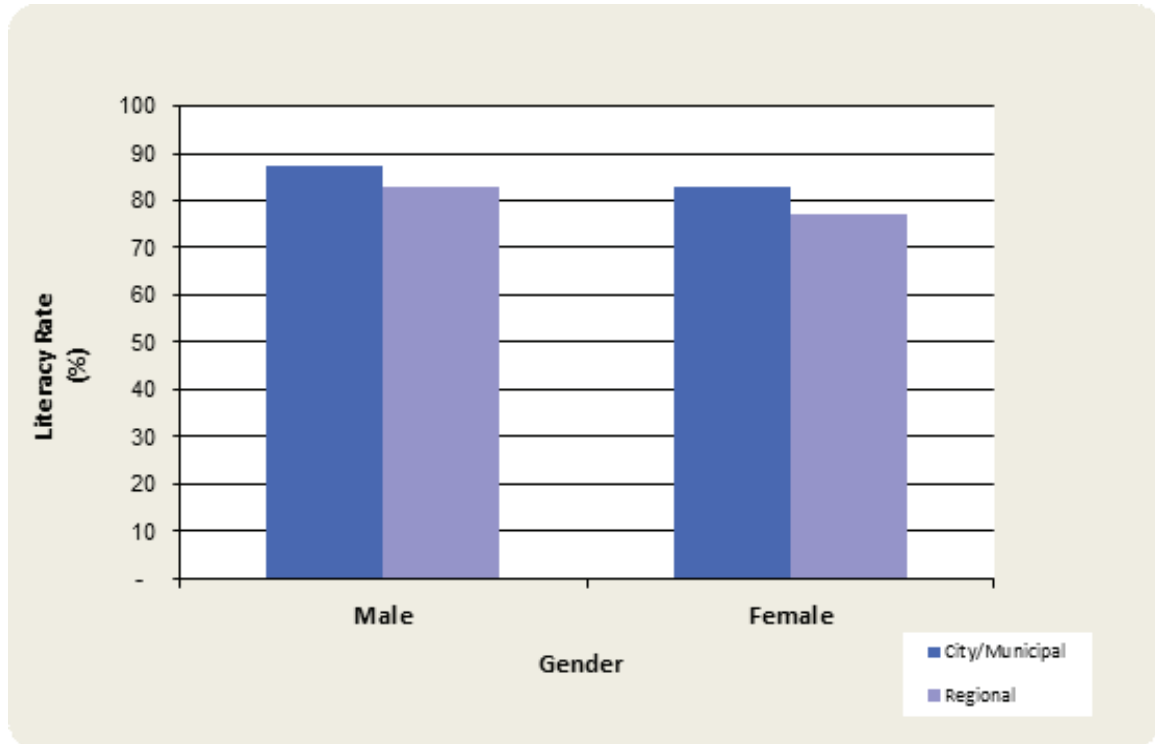


Table DE-9. Population by Mother Tongue, Year \_\_\_\_\_

Mother Tongue	Household No.	% of Total Households
Bicolano	10	16
Cebuano	7	11
Ilocano	9	14
Tagalog	30	47
Waray	8	13
Others	0	0
Total	64	100

Source: Census of Population, NSO/PSA

Graph DE-9. Mother Tongue Distribution among Households.

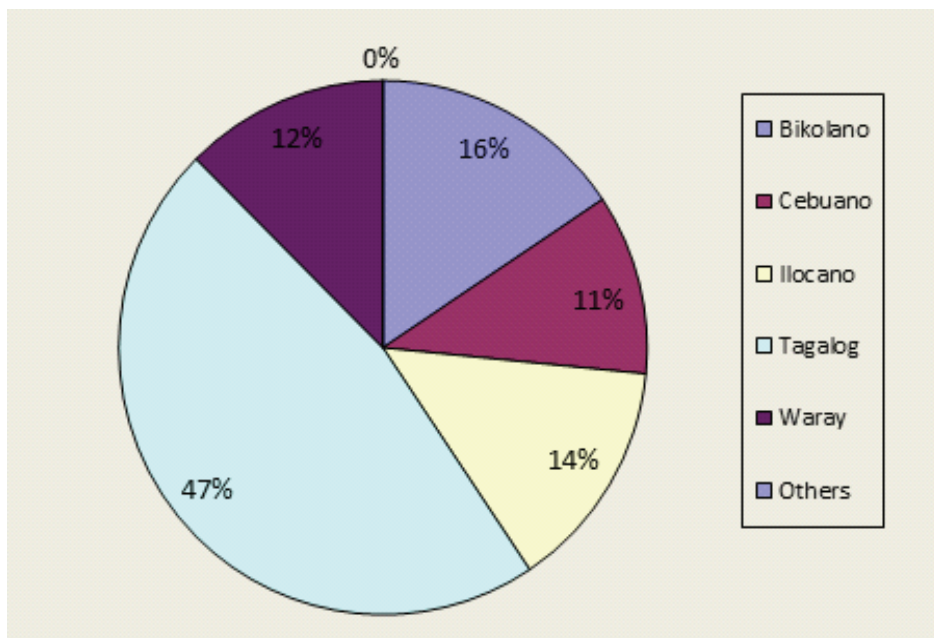


Table DE–10. Population by Religious Affiliation, Year \_\_\_\_\_

Religious Affiliation	No. of People	% of Total Population
Catholics	50	68%
Iglesia ni Cristo	7	9%
Muslims	9	12%
Other	8	11%
Total	74	100%

Graph DE–10. Population by Religious Affiliation, Year \_\_\_\_\_

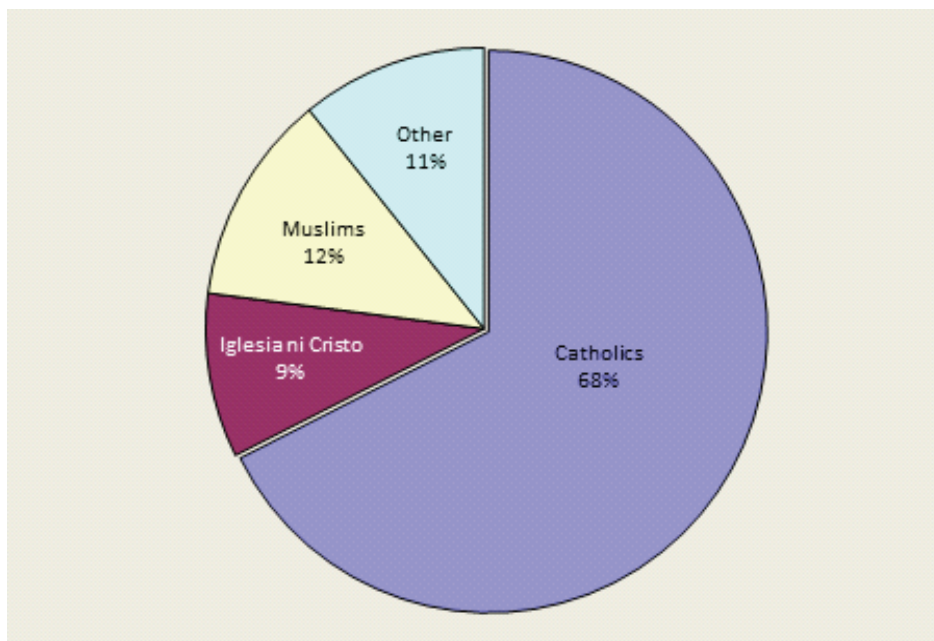


Table DE–11. Inventory of Religious Establishments, Year \_\_\_\_\_

Barangay	Name of Religious Establishment	Type of Religion	Area	Hazard Susceptibility(H/M/L)								Used Evacuation Center (Y/N)
				Fl	Tc	Eq	Vo	Ln	Ts	Su	Others	



Notes:

- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)
- Evacuation center - indicate if used as evacuation center; Yes (Y), No (N)

Table DE–12. Labor Force Population by Sex and Employment Status, Year \_\_\_\_\_

Sex	City/Municipal					Provincial					*Not in Labor Force
	Population 15 Yrs and Over	Employed	%	Unemployed	%	Population 15 Yrs and Over	Employed	%	Unemployed	%	
Male	12,516	9,177	73.3	3,339	26.7	330,778	248,083	75.0	82,695	25.0	
Female	13,618	6,118	44.9	7,500	55.1	323,378	161,689	50.0	161,689	50.0	
Both Sexes	26,134	15,295	58.5	10,839	41.5	654,156	409,772	62.6	244,384	37.4	



Notes:

- Refer to Table DE-1 to fill-up column 2 for the city/municipality. For data on province, use NSO data.
- % Employed =  $\frac{\text{Employed population}}{\text{Population 15 yrs and over}} \times 100$
- % Unemployed =  $\frac{\text{Unemployed population}}{\text{Population 15 yrs and over}} \times 100$
- “Not in Labor Force” means persons 15 years old and over who are neither employed nor unemployed e.g., full-time students, stay-home housewives, retirees, ([http://www.bles.dole.gov.ph/PUBLICATIONS/primers/LFS\\_April2011.pdf](http://www.bles.dole.gov.ph/PUBLICATIONS/primers/LFS_April2011.pdf))

Graph DE–12. Labor Force Population by Sex and Employment Status, Year \_\_\_\_\_

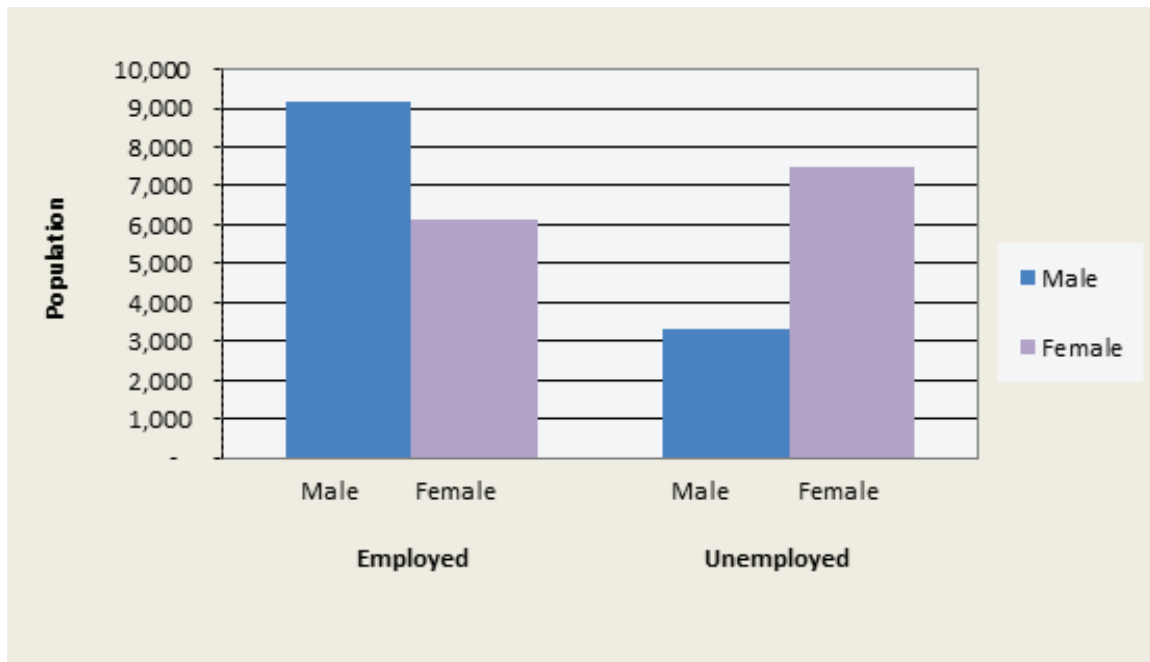


Table DE–13. Overseas Workers for the Past Five Years

Year	No. of Overseas Workers (OW)			Increase / Decrease in No.			Increase / Decrease in Percent (%)		
	Total	M	F	Total	M	F	Total	M	F
Y <sub>1</sub>	50	26	24						
Y <sub>2</sub>	125	60	65	75.00	34.00	41.00	150	131	171
Y <sub>3</sub>	250	150	100	125.00	90.00	35.00	100	150	54
Y <sub>4</sub>	240	150	90	-10.00	0.00	-10.00	-4	0	-10
Y <sub>5</sub>	325	150	175	85.00	0.00	85.00	35	0	94

Source: Primary data/Barangay census



Notes:

- Increase/Decrease in No. = Base year – preceding year
- Increase/Decrease in % =  $\frac{[(\text{No. of OW for Base Year} - \text{No. of OW for Preceding Year}) / (\text{No. of OW for Preceding Year})] \times 100}{}$

Graph DE–13. Overseas Workers for the Past Five Years

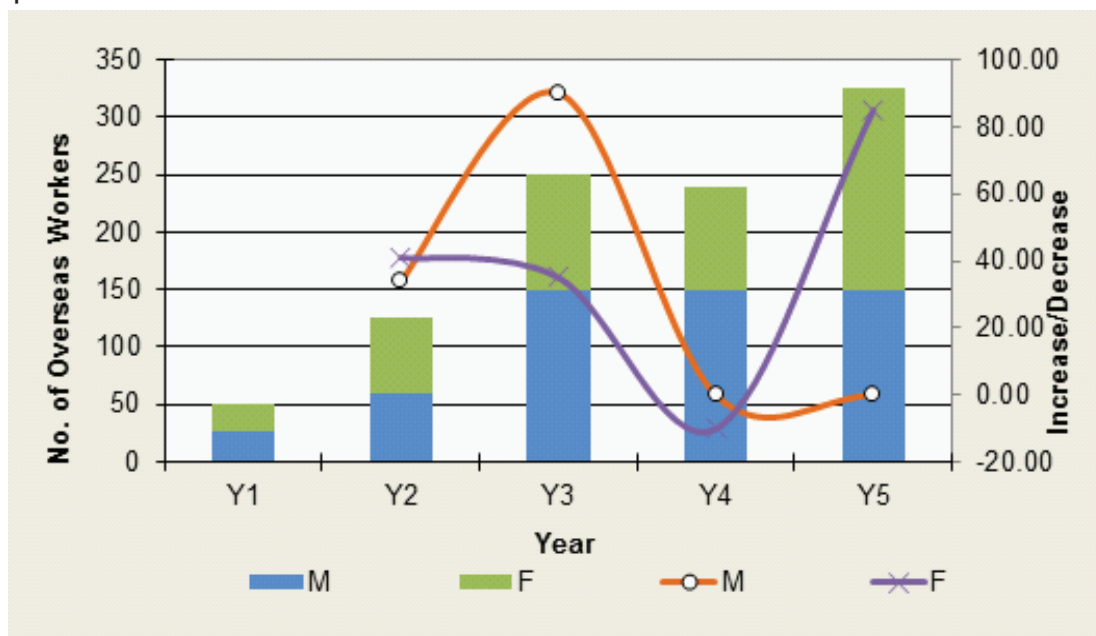




Table DE–14. Household Population 5 Years Old and Over by Highest Educational Attainment, Year

Highest Educational Attainment	City/Municipal						Provincial	
	Male		Female		Both Sexes		Both Sexes	
	No.	%	No.	%	No.	%	No.	%
<b>Pre-School</b>	300	8	400	11	700	9	120	0
<b>Elementary</b>	1000	25	950	25	1950	25	123870	8
Primary (Grade 1-3)	500	13	500	13	1000	13	870	0
Intermediate (Grade 4-6)	500	13	450	12	950	12	123000	8
<b>Secondary</b>	1000	25	900	24	1900	25	550300	35
Junior High School (Grade 7-10)	250	6	300	8	550	7	4300	0
Senior High School (Grade 11-12)	750	19	600	16	1350	18	546000	34
<b>Technical/Vocational Course</b>	700	18	500	13	1200	16	443000	28
Voc-Undergraduate	300	8	250	7	550	7	145000	9
Voc-Graduate	400	10	250	7	650	8	298000	19
<b>College</b>	550	14	550	15	1100	14	467000	29
College Undergraduate	250	6	200	5	450	6	124000	8
College Graduate	300	8	350	9	650	8	343000	22
<b>Academic Degree</b>	400	10	450	12	850	11	5000	0
<b>TOTAL</b>	3950		3750		7700		1589290	



Note:

• % = (Total No./No. per level) x 100

Graph DE–14. Household Population 5 Years Old and Over by Highest Educational Attainment, Year

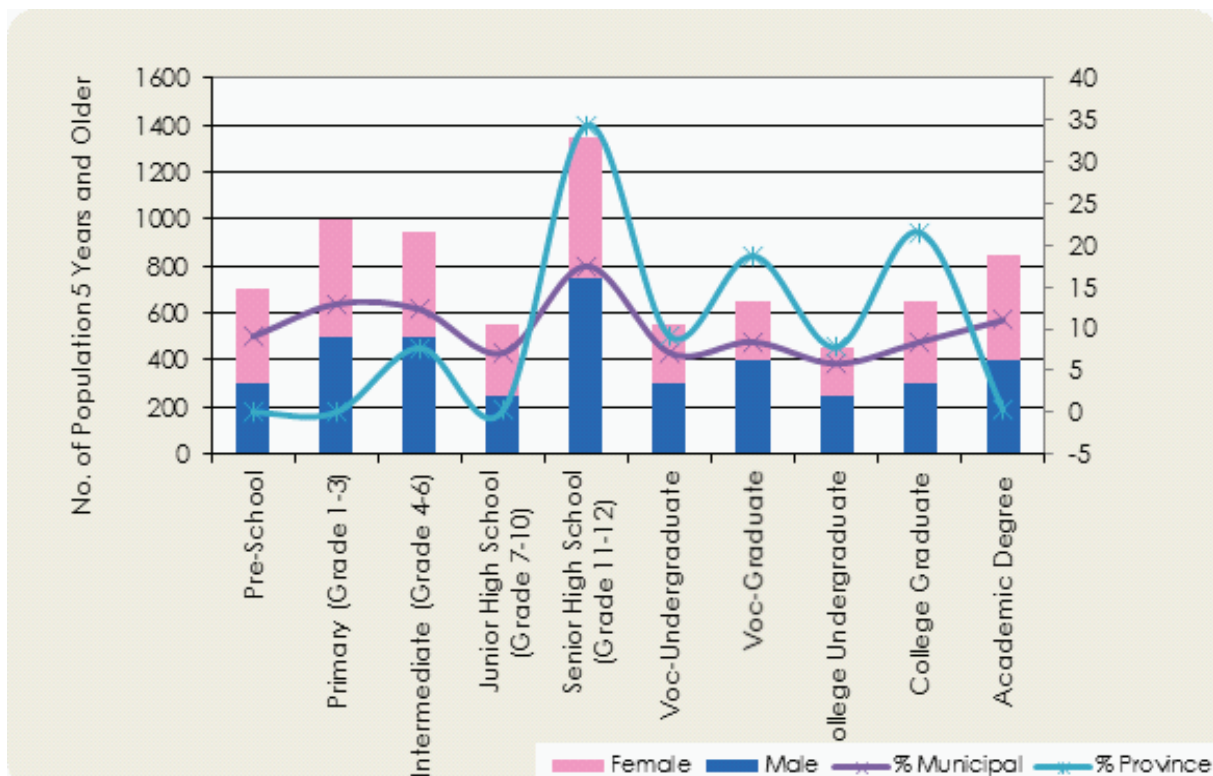


Table DE–15. Projected Population and Households

Year	Population	Household*
Y <sub>0</sub>	49,885	9,977
Y <sub>1</sub>	51,257	10,250
Y <sub>2</sub>	52,666	10,520
Y <sub>3</sub>	54,115	10,830
Y <sub>4</sub>	55,603	11,120
Y <sub>5</sub>	57,132	11,430
Y <sub>10</sub>	65,432	13,090

Source: NSO/PSA



Notes:

- Use latest annual population growth rate derived from **Table DE-6**
- \*Using the average household size derived from **Table DE-3**

Graph DE–15. Projected Population and Households

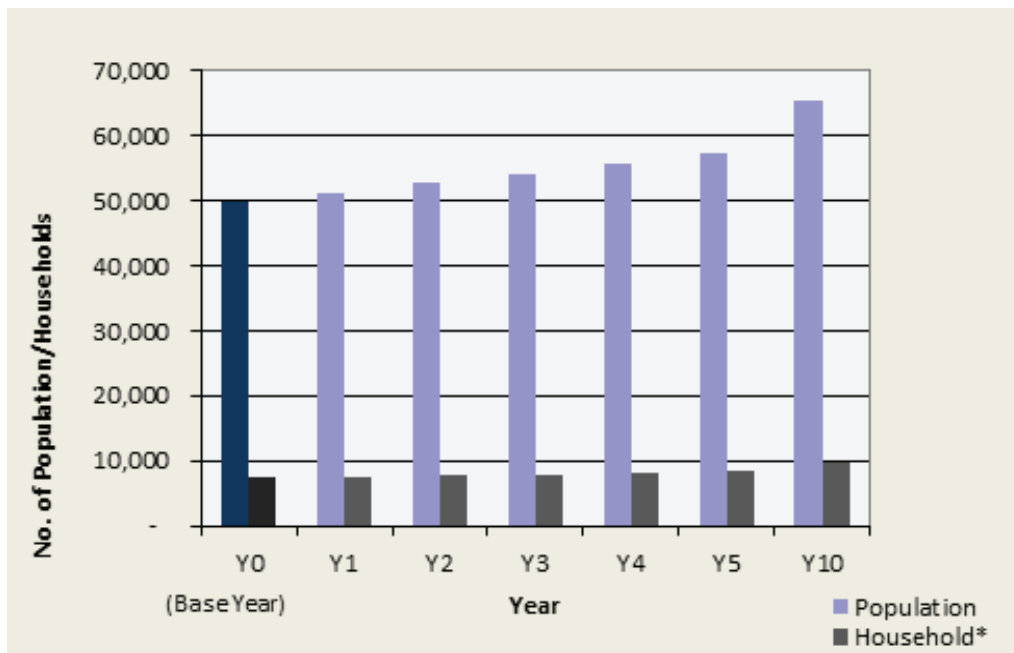


Table DE-16. Population Projection by Barangay, Year \_\_\_\_\_

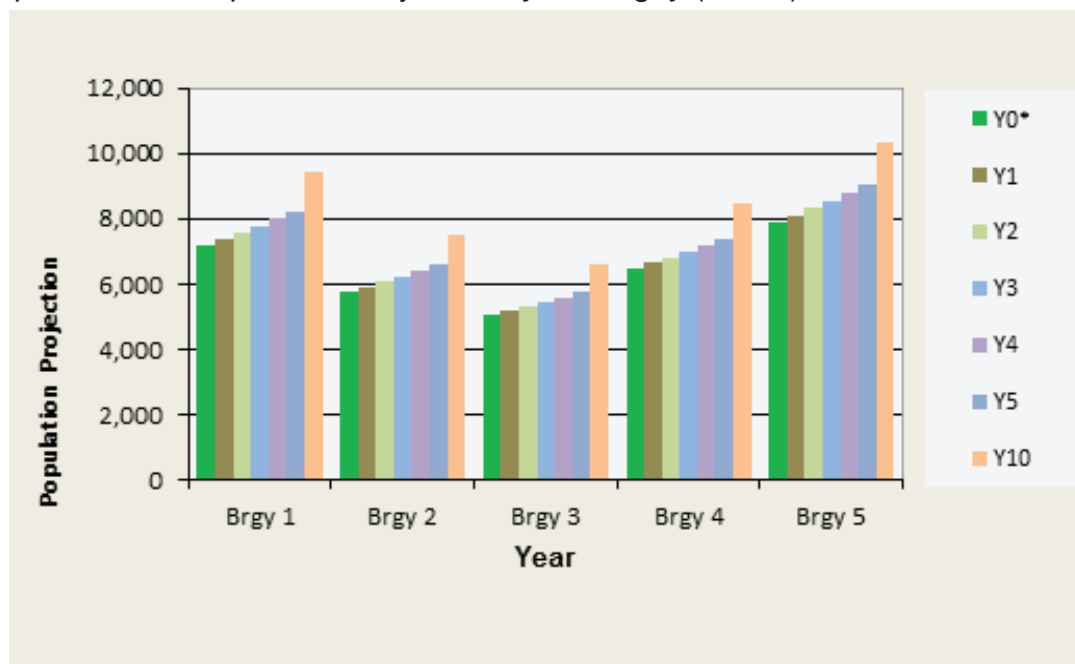
BARANGAY	Y <sub>0</sub> *	Participation Rate (PR)	Population					
			Y <sub>1</sub>	Y <sub>2</sub>	Y <sub>3</sub>	Y <sub>4</sub>	Y <sub>5</sub>	Y <sub>10</sub>
<b>TOTAL</b>	<b>49,885</b>	<b>1</b>	<b>51,257</b>	<b>52,666</b>	<b>54,115</b>	<b>55,603</b>	<b>57,132</b>	<b>65,432</b>
<b>Urban</b>								
Brgy 1	7,178	0.14	7,375	7,578	7,786	8,000	8,220	9,415
Brgy 2	5,742	0.12	5,900	6,062	6,229	6,400	6,576	7,532
Brgy 3	5,024	0.10	5,163	5,305	5,450	5,600	5,754	6,590
Brgy 4	6,460	0.13	6,638	6,820	7,008	7,200	7,398	8,473
Brgy 5	7,895	0.16	8,113	8,336	8,565	8,800	9,042	10,356
<b>Sub-Total</b>	<b>32,300</b>	<b>0.65</b>	<b>33,188</b>	<b>34,101</b>	<b>35,038</b>	<b>36,002</b>	<b>36,992</b>	<b>42,366</b>
<b>Rural</b>								
Brgy 6	718	0.01	738	758	779	800	822	941
Brgy 7	1,077	0.02	1,106	1,137	1,168	1,200	1,233	1,412
Brgy 8	1,436	0.03	1,475	1,516	1,557	1,600	1,644	1,883
Brgy 9	2,153	0.04	2,213	2,273	2,336	2,400	2,466	2,824
Brgy 10	1,077	0.02	1,106	1,137	1,168	1,200	1,233	1,412
Brgy 11	861	0.02	885	909	934	960	986	1,130
Brgy 12	718	0.01	738	758	779	800	822	941
Brgy 13	1,436	0.03	1,475	1,516	1,557	1,600	1,644	1,883
Brgy 14	1,077	0.02	1,106	1,137	1,168	1,200	1,233	1,412
Brgy 15	1,436	0.03	1,475	1,516	1,557	1,600	1,644	1,883
Brgy 16	574	0.01	590	606	623	640	658	753
Brgy 17	646	0.01	664	682	701	720	740	847
Brgy 18	1,436	0.03	1,475	1,516	1,557	1,600	1,644	1,883
Brgy 19	1,077	0.02	1,106	1,137	1,168	1,200	1,233	1,412
Brgy 20	1,148	0.02	1,180	1,212	1,246	1,280	1,315	1,506
Brgy 21	718	0.01	738	758	779	800	822	941
<b>Sub-Total</b>	<b>17,585</b>	<b>0.35</b>	<b>18,069</b>	<b>18,566</b>	<b>19,076</b>	<b>19,601</b>	<b>20,140</b>	<b>23,066</b>



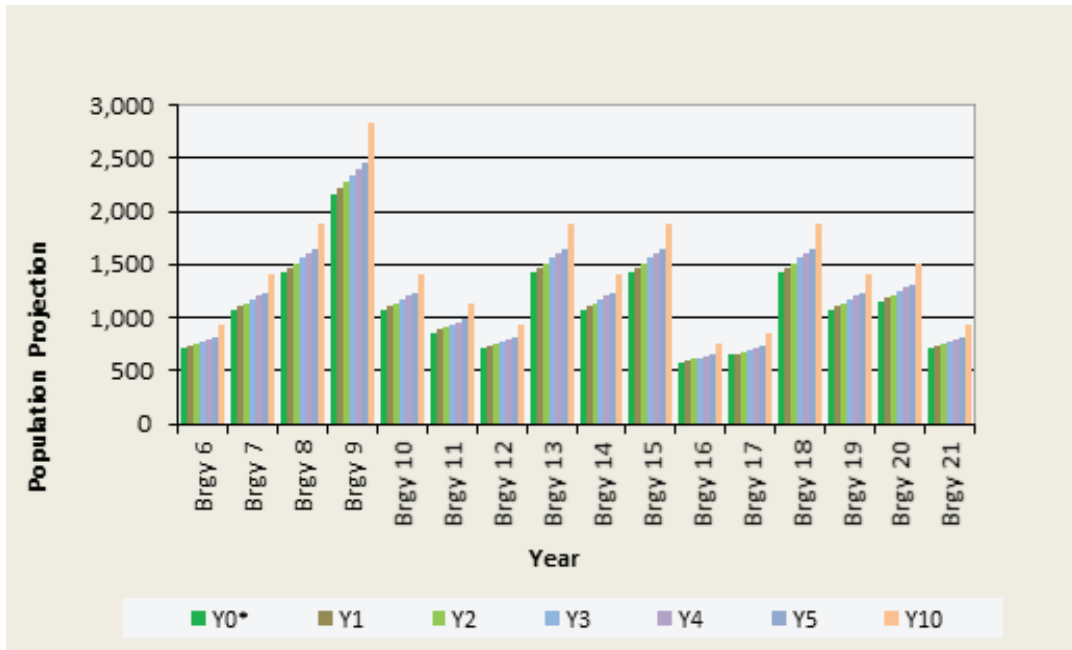
Notes:

- \* Use latest census data
- $PR = \frac{\text{Brgy. Population}}{\text{Pop'n of city/municipality}}$
- $\text{Pop'n projection per brgy.} = PR \text{ of brgy.} \times \text{Projected Pop'n of city/municipality}$
- See **Table DE-15** for projected population of city/municipality

Graph DE-16a. Population Projection by Barangay (Urban)



Graph DE-16b. Population Projection by Barangay (Rural)



Graph DE-16c. Population Projection, Year

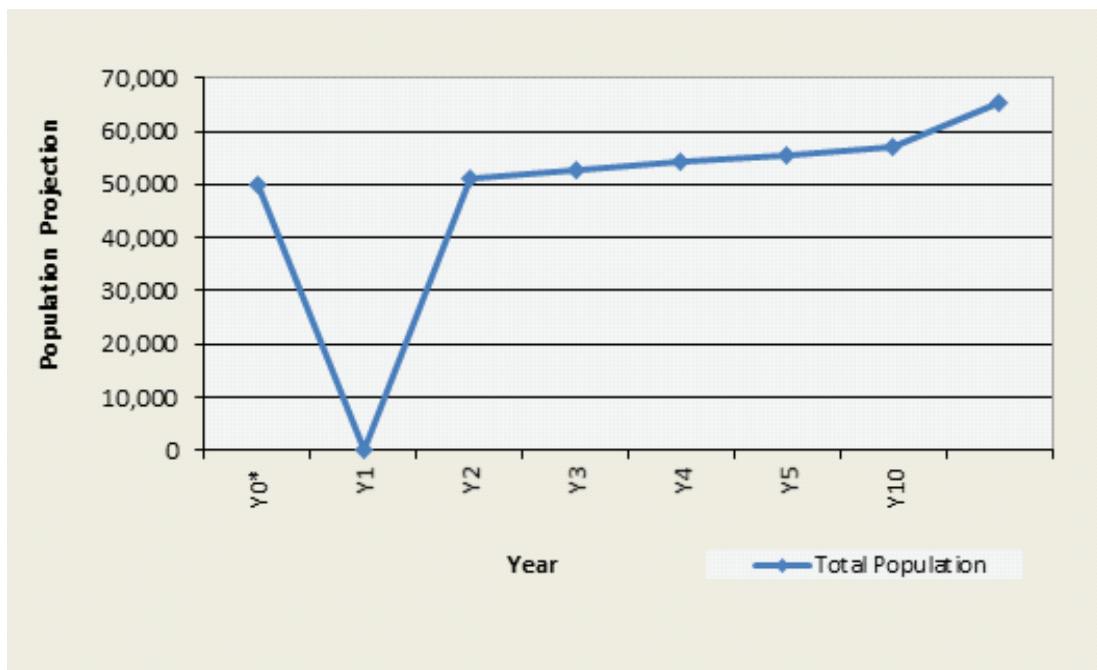


Table DE–17. Projected School-Age Population, Labor Force, and Dependent Population

Grouping	Y <sub>0</sub> (Base year)	Participation Rate (PR)	Projected Population					
			Y <sub>1</sub>	Y <sub>2</sub>	Y <sub>3</sub>	Y <sub>4</sub>	Y <sub>5</sub>	Y <sub>10</sub>
<b>Population</b>	49,885		51,257	52,666	54,115	55,603	57,132	65,432
<b>School going population</b>	16,761	0.34	17,222	17,696	18,182	18,682	19,196	21,985
Pre-school	3,487	0.07	3,583	3,681	3,783	3,887	3,994	4,574
Elementary	6,144	0.12	6,313	6,487	6,665	6,848	7,037	8,059
Secondary	4,657	0.09	4,785	4,917	5,052	5,191	5,334	6,108
Tertiary	2,473	0.05	2,541	2,611	2,683	2,756	2,832	3,244
<b>Labor Force</b>	31,229	0.63	32,088	32,970	33,877	34,809	35,766	40,962
<b>Dependent</b>	22,448	0.45	23,065	23,700	24,351	25,021	25,709	29,444
Young (0-14)	13,469	0.27	13,839	14,220	14,611	15,013	15,426	17,667
Old (65 and over)	8,979	0.18	9,226	9,480	9,740	10,008	10,283	11,777

Source: Computed based on the NSO/PSA data



Notes:

- PR = Population of grouping / Total population
- Projection per year = PR x projected total population

## Annex DE-1. NSCB Resolution No.14

### Adoption of the Core Indicators for Population and Development (PopDev) Planning at the Local Level

**Whereas**, population and development (POPDEV) integration is the explicit consideration of the socioeconomic and demographic interrelationships in the formulation of development plans, policies and programs;

**Whereas**, the formulation and implementation of a good local development plan depend greatly on the availability of reliable, relevant and timely data/information;

**Whereas**, with devolution mandating planning at the local level, the availability of local level data needs to be addressed;

**Whereas**, government initiatives in developing indicators/information systems that could be used in POPDEV planning at the local level should be rationalized and integrated in a single framework to avoid confusion among local planners and enable them to use these indicators more effectively in developing their plans;

**Whereas**, the Technical Committee on Population and Housing Statistics (TCPHS) thru its Technical Working Group on the Core POPDEV Indicators identified/selected the core POPDEV indicators from the list of indicators currently adopted in different government initiatives using the criteria of measurability, appropriateness, comprehensiveness and relevance;

**Whereas**, the core POPDEV indicators can be viewed as basic indicators reflecting those that are common to most of the initiatives and that are highly relevant to local development goals and to sectoral concerns;

**Whereas**, the core POPDEV indicators can serve as a basic list to which local government units (LGUs) can add more indicators as the need arises;

**Whereas**, the NSCB TCPHS, in its meeting held on 10 December 2001 decided to recommend the adoption of the core POPDEV indicators for planning at the local level;

**Now, therefore, be it resolved as it is hereby resolved**, that the Board approve for adoption by all concerned the core POPDEV indicators to be utilized for planning and policy-making purposes at the local level.

**Be it resolved further** that:

The National Statistical Coordination Board (NSCB) enjoin all data producing agencies to regularly provide adequate statistics for these basic indicators of development;

The Commission on Population (POPCOM) monitor the adoption and use of the core POPDEV indicators in the formulation of local development plans, policies and programs;

The LGUs, through the Department of Interior and Local Government (DILG), endeavor to compile these statistics and establish mechanisms to operationalize the core POPDEV indicators; and

The LGUs appropriate some amount from their annual Internal Revenue Allotment (IRA) for inclusion of the data requirements of the core POPDEV indicators in the system of designated statistics

Approved this 5th day of June 2002, in Pasig City.



## Annex DE–1a. Core Indicators for Popdev Planning at the Local Level

INDICATOR	DEFINITION	LEVEL OF DESEGREGATION	FREQUENCY	LATEST AVAILABLE DATA	SOURCE OF BASIC DATA
<b>I. Population Processes</b>					
1. Crude Birth Rate	The number of live births per 1,000 population during a given period	National, regional, provincial, municipal, city,	Annual	1997	1) Vital Statistics Report, National Statistics Office (NSO)
		National, regional, provincial	After every census year	1995-2005	2) Population Projections, NSO
2. Crude Death Rate	The number of deaths per 1,000 population during a given period	National, regional, provincial, municipal, city	Annual	1997	1) Vital Statistics Report, NSO
		National, regional, provincial	After every census year	1995-2005	2) Population Projections, NSO
3. Total Fertility Rate	The average number of children that would be born alive to a woman during her lifetime if she were to pass through her child-bearing years conforming to the age-specific fertility rates of a given year	National, regional, provincial	Annual	1997	1) Vital Statistics Report, NSO
		National, regional, provincial	After every census year	1995-2020	2) Population Projections, NSO
4. Maternal Mortality Rate	The number of deaths among women 15-49 years old from pregnancy-related causes per 100,000 live births in a given period	National, regional, provincial	Every 5 years	1997	1) Vital Statistics Report, NSO
				1990-1995	2) Technical Working Group-Maternal and Child Mortality, NSO
<b>II. Population Outcomes</b>					
5. Annual Population Growth Rate	The pace at which the population is increasing (or decreasing) during a given period on a yearly basis expressed as a percentage of the basic population	National, regional, provincial, city, municipality	Every 10 years		Census of Population and Housing (CPH), NSO

6. Percentage of Population by Five-Year Age Group and by Sex	Percentage distribution of the population classified by 5-year age group and by sex	National, regional  provincial, city, municipality	Every 10 years	2000	CPH, NSO
<b>III. Development Processes</b>					
7. Percentage Distribution of Local Government Expenditures by Specific Activities	Percentage Distribution of Local Government Expenditures by Specific Activities such as: 1) social improvement; 2) adjudication; 3) protective services; 4) general administration; 5) government finance; 6) equipment; 7) economic development; 8) real property; 9) inter government aids, loans/ advance/ transfers; and 10) others	Regional, provincial, city, municipality	Annual	2001	Bureau of Local Government Finance
8. Labor Force Participation Rate by Sex	Percent of population 15 years old and over who are either employed or unemployed but looking for work in relation to the total population	National, regional provincial, key cities	Quarterly	October-00	Integrated Survey of Households Bulletin, Labor Force Survey, NSO
9. Length of Local Government Roads by surface Type	The length of local government roads (in kilometers) by surface type such as: earth, gravel, asphalt and concrete	National, regional, provincial, city - municipality	Annual	2001	DPWH
10. Elementary and Secondary Cohort Survival Rates	The number of total enrollees in the beginning grade/ year who reached the final grade/year at the end of the required number of years of study expressed as a percentage of enrollees in the beginning grade/ year	National, regional provincial, city - municipality	Annual	SY 2000 - 2001	DECS Statistical Bulletin and/or Basic Education Statistics

11. Doctor-Population Ratio	The number of population per doctor in a population	National, regional, provincial, city – municipality	Annual	1996	Philippine Health Statistics, (PHS), DOH
12. Hospital Bed-Population Ratio	The number of population per hospital bed	National, regional, provincial, city	Annual	1996	PHS, DOH
13. Percent of births attended by Health Personnel	The number of births attended by health personnel expressed as a percentage of the total number of births in a given period	National, regional, provincial, city	Annual	1997	1) Vital Statistics Report 2) PHS, DOH
14. Contraceptive Prevalence Rate	The percentage of women currently using a family planning method among currently married women in the reproductive ages (15-49)	National, regional	Every 5 years	1998	National Demographic and Health Survey, (NDHS), NSO
15. Percentage Distribution of Households by Type of Housing Unit Occupied	The number of households by type of unit occupied which include: 1) single house; 2) duplex; 3) apartment/ accessoria/ condominium; 4) improvised barang-barang; 5) commercial/ industrial/ agricultural/etc.; and 6) other housing units, expressed as a percentage of the total number of households	National, regional, provincial, city, municipality	Annual	2000	CPH, NSO
16. Percentage Distribution of Households by Main Source of Water Supply	The number of households by main source of water supply which include: 1) tap (inside house); 2) public well; and 3) private deep well, expressed as a percentage of the total number of households	National, provincial, city, municipality	Every 10 years	2000	CPH, NSO

<p>17. Percentage Distribution of Households by Type of Toilet Facilities Being Used</p>	<p>The number of households by type of toilet facilities used which include:            1) water-sealed, sewer/ septic tank, used exclusively by the household;            2) water-sealed, sewer/septic tank, shared with other households;            3) water-sealed, other depository, used exclusively by the households;            4) water-sealed, other depository, shared with other households;            5) close pit;            6) open pit; and            7) others, expressed as a percentage of the total number of households</p>	<p>National, regional, provincial, city, municipality</p>	<p>Every 10 years</p>	<p>2000</p>	<p>CPH, NSO</p>
<p>18. Percentage Distribution of Households by Type of Garbage Disposal</p>	<p>The number of households by type of garbage disposal which include:            1) pick by garbage truck;            2) burning;            3) composting; and            4) burying, expressed as a percentage of the total number of households</p>	<p>National, provincial, city, municipality</p>	<p>Every 10 years</p>	<p>2000</p>	<p>CPH, NSO</p>
<p>19. Crime Rate by Type</p>	<p>Number of crimes reported per 100,000 population by type</p>	<p>National, regional, provincial, city, municipality</p>	<p>Annual</p>	<p>2001</p>	<p>Philippine National Police</p>
<p>20. Percentage Distribution of DSWD Clienteles Served by Type and by Sex</p>	<p>The number of DSWD clienteles served by type which include:            1) household heads and other needy adults;            2) socially-disadvantaged women;            3) children in difficult situations;            4) victims of calamities and social disorganization; and            5) disabled persons, expressed as a percentage of the total number of clienteles and classified by sex</p>	<p>National, regional, provincial</p>	<p>Annual</p>	<p>2001</p>	<p>Department of Social Welfare and Development</p>

<b>IV. Development Outcomes</b>					
21. Unemployment Rate, Total and by Sex	Total number of unemployed persons expressed as a percent of the total number of persons in the labor force, total or by sex	National, regional, provincial, key cities	Quarterly	October-00	Integrated Survey of Households Bulletin, Labor Force Survey, NSO
22. Average Family Income	Refers to the total family income received in cash or in kind realized by all families in the area divided by the total number of families in the same area	National, regional, provincial, key cities	Every 3 years	2000	Family Income and Expenditure Survey, NSO
23. Literacy Rate by Sex	The percentage of the population who can read and write a simple message in any language or dialect classified by sex	National, regional, provincial	Every 10 years Every 5 years	2000 1994	1) CPH, NSO 2) Functional Literacy, Education and Mass Media Survey, NSO
24. Percentage of Malnourished 7-10 Years Old Children	The number of 7-10 year old children who are moderately and severely underweight expressed as a percentage of total population of children 7-10 years old	National, regional, provincial, key cities	Every 5 years	1996	Updating of the Nutritional Status of Filipino Children at the Provincial Level, FNRI
25. Percentage of Infants with Low Birth Weight	The number of Infants with birth weight of less than 2.5 kilograms expressed as a percentage of the total number of infants	National, regional, provincial, city	Annual	1997	Vital Statistics Report, NSO
26. Morbidity Rates by Leading Causes	The number of reported illnesses from a specific leading cause expressed as a percentage of the total number of illnesses from all causes	National, regional, provincial, city	Annual	1996	PHS, DOH

27. Elementary and Secondary Completion Rates by Sex	Completion rate refers to the percentage of first year (female/male) entrants in the cycle of education surviving to the end of the cycle. The term is used interchangeably with survival rate and retention rate	National, regional, private and public	Annual	2003	BEIS, DepEd
28. Employment rate by sex, age group and highest grade completed	Ratio (in percent) of the total number of women/men in labor force	National, regional	Quarterly	2004	LFS, NSO
29. Nutritional status of pregnant women/ incidence of Malnutrition	The condition of the body resulting from the intake, absorption and utilization of food and from factors of pathological significance	National, regional	Every 5 years	2003	FNRI
30. Mortality by leading causes, age and sex	Death ratios. Shows the numerical relationship between deaths from a cause and from the total number of deaths from all causes in all ages taken together	National, regional, provincial	Annual	2004	Vital Statistics Report, NSO
31. Morbidity by leading causes, age and sex	Morbidity is any departure, subjective or objective from a stage of physiological well-being	National, regional	Annual	2001	FHSIS, DOH
32. Percent of women candidates and share in local elective positions	The number of women candidates over the total number of candidates	National, regional, provincial, municipality	Every election year	2004	COMELEC
33. Percent of women in managerial, supervisory and technical positions	Number of women in managerial, supervisory and technical positions over the total number of women in managerial, supervisory and technical positions	National, regional, provincial, municipality	Quarterly	2004	CPH, LFS, NSO



34. Percent of male/female headed households by civil status	Number of male/female headed households by civil status over the total number of households	National, regional	Annual	2003	CPH, NSO, FIES, APIS
35. Leadership/ membership in labor unions, cooperatives and peasant organizations by sex	Distribution of leadership/ membership in labor unions, cooperatives and peasant organizations in labor unions by sex	National	Annual	2003	BITS-BLES

## Annex DE-2. NSCB Resolution No. 2

### Adoption of the Decennial Census-Based Population Growth Rates

**Whereas**, population growth is a key indicator for measuring the rate of change in population size and an input for generating population estimates and formulating development plans and programs;

**Whereas**, population growth rates are vital for monitoring the impact of the country's population management program;

**Whereas**, the Philippine census data are decennial figures from 1960 up to 2000 and mid-decade censuses were undertaken only in 1975 and 1995;

**Whereas**, decennial population census figures can be used to arrive at average decadal population growth rates which will serve as basis for the derivation of comparable and stable estimates of annual population growth rates;

**Whereas**, there is a need to estimate annual population growth rates at the national, regional, provincial, city, municipality and barangay levels;

**Whereas**, the Technical Committee on Population and Housing Statistics in its meeting held on 19 July 2001 recommended the estimation of average population growth rates for the decade using decennial population census data from which the needed annual population growth rates can be derived;

**Now, therefore, be it resolved as it is hereby resolved** that the Board approve for adoption by all concerned the decennial population census-based annual growth rates as the official population growth rate figures to be utilized for planning and policy-making purposes.

Approved this 7th day of January 2002, in Pasig City.

## Annex DE-3. Relevant Demographic Concepts to PopDev Planning

### Population Growth

The most important concept in demography from the development planning perspective is population growth.

**Rate of Natural Increase (RNI)** is the speed at which a population is increasing in a given period as a result of the interaction of the natural demographic processes of births and deaths. This is the difference between the crude birth rate (CBR) and crude death rate (CDR). The RNI is actually population increase per 1,000 persons in a population.



RNI is calculated as follows:

$$\text{RNI} = \text{CBR} - \text{CDR}$$

Where:

RNI = Rate of Natural Increase  
 CBR = Crude Birth Rate  
 CDR = Crude Death Rate

For example:

CBR for the Philippines in 2003 = 25.6 per 1,000 pop<sup>a</sup>  
 CDR for the Philippines in 2003 = 5.7 per 1,000 pop<sup>b</sup>

$$\begin{aligned} \text{RNI} &= \text{CBR} - \text{CDR} \\ &= 25.6 - 5.7 \\ &= 19.9 \text{ or } 20 \end{aligned}$$

The RNI can also be expressed in terms of percent or per 100 population. This can be accomplished by dividing 20 by 1,000 and multiplying it by 100 (a short cut of which is dividing 20 by 10). Based on the said example, the population was growing at the rate of 2.0% percent through natural increase

- a. 2003 NDHS Preliminary Report
- b. NSO, 1995 Census-Based National and Regional Projections

**Population Growth Rate (PGR)** indicates how fast a population increases or decreases resulting from the interplay of births, deaths and migration in a given period of time. Where the population is closed, meaning no migration, the rate of natural increase is the same as the population growth rate. There are three methods for computing the rate of growth based on the assumption with respect to the change: arithmetic change, geometric change and exponential change. However, to avoid confusion, we will only show the commonly used method, which is the geometric change.



Geometric Change:

$$r = \text{antilog} \frac{\text{Log} \frac{P_t}{P_o}}{t} - 1 \times k$$

$$r = \text{antilog} \frac{\text{Log} \frac{68,616,536}{60,703,206}}{5.3397} - 1 \times k$$

$$\begin{aligned}
 r &= \text{antilog } 0.000997 - 1 \times 100 \\
 &= 1.023213639 - 1 \times 100 \\
 &= 0.02322 \times 100 \\
 &= 2.32 \text{ percent}
 \end{aligned}$$

Where: Pt = population in the later period  
 Po = population in the earlier period  
 t = time in interval between the two periods  
 r = rate of growth  
 k = 100

For example:

$$\begin{aligned}
 P_t &= \text{Sept. 1, 1995 popn} = 68,616,536 \\
 P_o &= \text{May 1, 1990 popn} = 60,703,206 \\
 t &= 5.3397 \\
 r &= ? \\
 k &= 100
 \end{aligned}$$

This means that the population grew at the rate of 2.32 percent per year between 1990 and 1995. **Table DE-14** shows average annual growth from 1948-2000.

Table DE-18. Population of the Philippines

Censal Period	Population (in millions)	Growth rate (geometric)
1948	19.2	
1960	27.1	2.87
1970	36.7	3.03
1975	42.1	2.75
1980	48.1	2.66
1990	60.7	2.33
1995	68.6	2.32
2000	76.5	2.36

## Population Doubling Time

The rate of growth that we calculate, say 3% or 2% by itself does not say much. It does not acquire dynamism in it unless one ask: Suppose that rate of growth remains the same or continues to grow, what would be the implied population size over a given number of years? The simplest way of looking at it is to look at doubling time of population.

Doubling time refers to the length of time a particular population would double its size under a given growth rate. It has been found out that a population growing at the rate of one (1) percent annually doubles its size in 69.3 years. A quick way to estimate doubling time is to divide 69.3 by the growth rate expressed in percent.



$$\begin{aligned}
 \text{Doubling Time} &= \frac{69.3}{\text{Growth Rate (\%)}} \\
 &= \frac{69.3}{2.36} \\
 &= 29.5 \text{ years}
 \end{aligned}$$

Between the period 1995-2000, the growth rate of the Philippine population was 2.36 percent. If this prevails over time, the Philippine population would double in less than 30 years.

The doubling time in years of various rates of growth is shown in **Table DE–19**. If population grows at 0.5% per year, it will double in 138 years; if the rate of growth is 1%, the doubling time will be 69 years and if the rate of growth is 2%, the doubling time is 35 years, and so on.

**Table DE–19. Doubling Time of Various Rates of Growth**

Rates of Growth (%)	Doubling Time (years)
0.5	138
1	69
2	35
3	23
4	17

**Table DE–1** shows that, as the rate of growth increases, the doubling time declines rapidly. With a 3% rate of growth, the doubling time is only 23 years. If we look at sub-national populations, some cities like Metro Manila are growing at say, 4% to 5%. The doubling time of a 4% growth rate is only 17 years, which is very, very short. If Metro Manila already has 10 million people now, that means it will have 20 million people in 17 years.

What this means is that the higher the population growth rate, the faster the population doubles in time and, therefore, if we are to accommodate a larger population, there is really very limited time to accommodate them.

Our concern is really not so much of growth as such, but how fast that growth is; how slow that growth should be; and what we can gain from slowing it down from its current rapid rate. Doubling time tells us how much more time we have to think of ways to accommodate a large population: if it does not grow too fast, we will have more time to plan how to provide the basic services. On the other hand, if it grows very fast, we will have less time to make needed adjustments to fulfill their needs.

## Age-Sex Structure of the Population

The above rates, by themselves, do not say much until one tries to find out what happens when all these sources of change actually change. They do have implications on the status of the population, particularly in terms of age and sex structure. Different levels of fertility and mortality, as well as immigration and outmigration, cause changes in the composition of the population by age and sex. For a national population where the migration component is not important, birth rates affect age/sex structure more than death rates. In other words, the structure of the national population reflects changes in birth rates.

### Sex Ratio

Sex Ratio is simply the number of males per 100 females in a population. This is obtained by dividing the male population by the female population then multiplied by 100.



$$SR = \frac{M}{F} * k$$

Where:

- SR = Sex Ratio
- M = the male population in a given year
- F = the female population in the same year
- K = 100

For example:

M = Male population, 2000 census = 38,524,267  
 F = Female population, 2000 census = 37,979,810

$$SR = \frac{M}{F} * 100 = \frac{38,524,267}{37,979,810} * 100 = 1.014 * 100 = 101.4 \text{ or } 102$$

Based on the 2000 total population count, there were 101 males for every 100 females in the Philippines

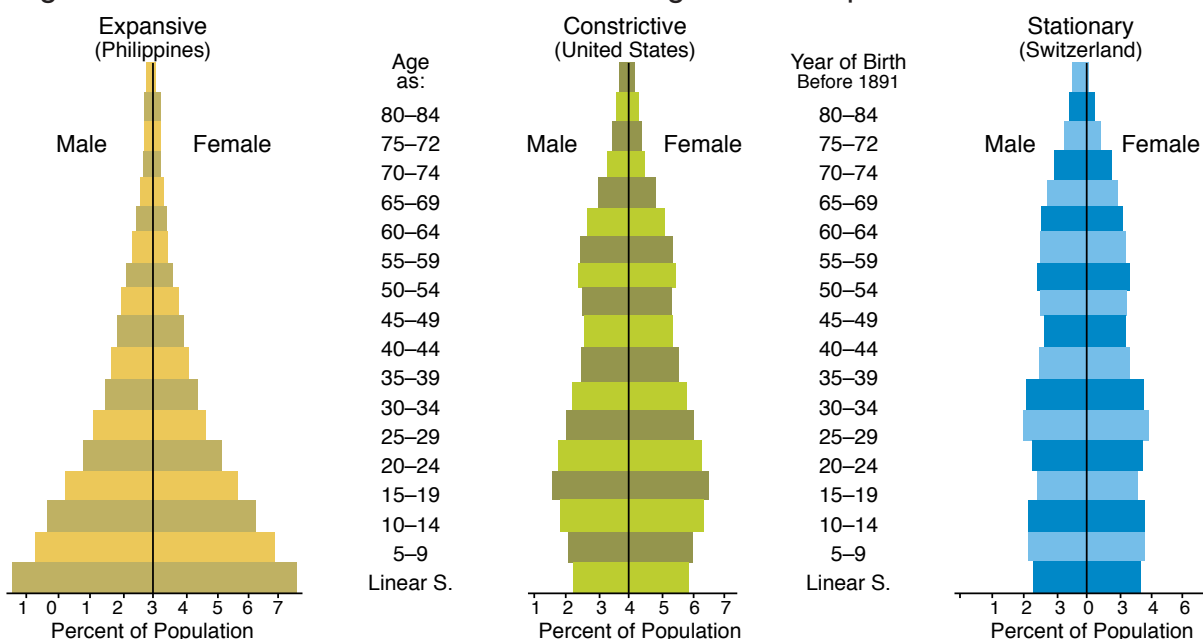
### Population Pyramid

One way to look at the breakdown of population by age and sex is to construct a population pyramid (Figure DE-3). This graphically shows what the proportion of the population of a given age and sex is with respect to total population. It consists of bars: the height represents the age groups while the length represents the absolute population, or a percent of the population in each age group. The sum of the bars is equal to the total population or 100% of the population. The graph usually depicts the male and female populations separately. The bars for males are given on the left of the x-axis and the bars for females are on the right of the x-axis. It is constructed by five-year age group.

There are three general types of population pyramid as shown in Figure DE-3. The first is the expansive pyramid. The age-sex composition of the Philippine population is represented by the expansive pyramid. Those under five years of age are around 17% of the total population and this is made up of about 8.5% males and about 8.5% females, and so on upwards. You can also see that the population of age 65 and over constitutes a very small proportion of the total population.

The population pyramid of the Philippines has a broad base, that is, a very large proportion of population belongs to younger age groups. For example, those 15 years constitute about 40% of total population. This kind of population pyramid is brought about by very high fertility since new births are naturally added to the bottom, producing a broad-based age and sex distribution.

Figure DE-3. The Three General Profiles of Age-Sex Composition



Source: Population Reference Bureau, usin 1976 data



A second type of population distribution is illustrated by the age and sex situation of the United States. This is based on 1976 data, so by now, the age and sex structure of the US would probably have changed significantly. Here is a country that had low fertility for some time, reflected in a smaller pyramid base. You could consider this a population in transition where fertility declines are reflected in progressive decreases in the younger population with corresponding increases among the older population.

Finally, we have the case of Sweden, which for some time has had a very low rate of population growth, in fact, close to zero or even zero. Here, an almost rectangular population distribution is shown. We would expect that the US pyramid would become like that of Sweden over a long period of time as population ages, and each segment moves up until they all die. The upper segment will increase over time and it will begin to look like Sweden's rectangular distribution.

## Dependency Ratios

Different fertility and mortality levels, but mostly fertility levels, imply different age compositions. This implies, in turn, the consideration called dependency burden. Dependency burdens or dependency ratios can roughly be defined by looking at the proportion of the population normally considered dependents relative to the working age.

One dependency ratio is the youth dependency ratio, which is the population aged 0-14 divided by the population aged 15-64 multiplied by 100. The higher the ratio, the higher is the proportion of younger-age group population, and the more young dependents there are per worker. The other dependents are the elderly. The old-age dependency ratio is the ratio of population aged 65 and over to the population aged 15-64 multiplied by 100. As we said, as fertility declines, the age structure changes such that the proportion of population aged 65 and over increases. In other words, as fertility declines, the old-age dependency ratio tends to increase while the youth dependency ratio decreases. A total dependency ratio can be obtained by combining both dependency ratios.

This simply implies that a reduction in fertility would tend to reduce dependency burdens. But the composition of dependents changes. That brings back the question: Who is really more manageable to support, the young or the old?



The calculation of the dependency ratios is demonstrated below using the following data:

P0-14 :	Total population aged 0-14 years based on the 2000 Census = 28,313,897
P15-64 :	Total population aged 15-64 years based on the 2000 Census = 45,257,770
P65 and over :	Total population aged 65 years and over based on the 2000 Census = 2,932,410
k :	100

$$\begin{aligned} \text{Child Dependency Ratio} &= \frac{P_{0-14}}{P_{15-64}} * k \\ &= \frac{28,313,897}{45,257,770} * 100 = 62.6 \text{ or } 63 \text{ dependents} \end{aligned}$$

In 2000, there were approximately 63 child dependents per 100 persons in the working age group

$$\begin{aligned} \text{Old -Age Dependency Ratio} &= \frac{P_{65 \text{ and over}}}{P_{15-64}} * k \\ &= \frac{2,932,410}{45,257,770} * 100 \\ &= 6.5 \text{ or } 7 \text{ dependents} \end{aligned}$$

There were seven old-age dependents per 100 persons in the working age group in 2000

$$\begin{aligned}
 \text{Age Dependency Ratio} &= \frac{P_{0-14} + P_{65 \text{ and over}}}{P_{15-64}} * 100 \\
 &= \frac{28,313,897 + 2,932,410}{45,257,770} = \frac{31,246,307}{45,257,770} \\
 &= 69.04 \text{ or } 69
 \end{aligned}$$

In 2000, there were 69 dependents per 100 persons in the working the group

## Some Basic Fertility Measures

Fertility refers to the live births that occur within a population. The production of live births is connected with many factors like the start of cohabitation, use of contraception, infant and child mortality and pregnancy wastage. Fertility varies with the characteristics of the mother like educational or occupational status and the like.

### Crude Birth Rate (CBR)

This is the number of births divided by the midyear population. It is usually expressed in terms of thousands. The CBR is a “crude” measure because births are divided by the entire population (including those who do not give birth) and is affected by the age structure. One can have a population with the same fertility rates but because they have different age structure, one will get different crude birth rates.



The formula for CBR is as follows:

$$\text{CBR} = \frac{B * k}{P}$$

Where:

- CBR = Crude Birth Rate
- B = number of births in a given year
- P = total mid-year population of the same year k = 1,000

For example:

$$\begin{aligned}
 B &= \text{number of births in 1990} = 1,930,301 \\
 P &= \text{total mid-year population in 1990} = 60,940,207 \\
 K &= 1,000 \\
 \text{CBR} &= \frac{B * 1,000}{P} \\
 &= \frac{1,930,301}{60,940,207} * 1,000 = 31.7
 \end{aligned}$$

There were 32 live births per 1,000 population in the Philippines in 1990.

### Age-Specific Fertility Rate (ASFR)

Since fertility varies by age, we want to look at fertility in terms of the age groups of women, and the measure is called the age-specific fertility rate. This would be the births in a specific age-group of women, say, age group I, divided by the population of women in group “I”. Very often these age-groups are broken into five-year age- groups.

To get this age-specific fertility rate, we simply need information on the number of births by age-group, say 20-25, the number of women in age-group 20-25, and we divide the births of women belonging to age-group 20-25 by number of women aged 20-25. Generally, you

multiply that by 1,000 to express that per thousand women. Age-specific fertility rate is a refinement of GFR by disaggregating fertility rates by age-group of women of reproductive age.

The age-specific fertility rates could be graphed as in **Figure DE-4** with age-specific fertility rate on the vertical axis and the five-year age group of the women, 15 to 49 years on the horizontal axis. The resulting curve is an inverted “U”, meaning that at very young ages, fertility rates are relatively lower and it usually peaks at age 25-29 and 30-34. Changes in age-specific fertility rates can easily be shown by calculating age-specific fertility for different years (**Table DE-20**).

One might see a much lower level of fertility at each age depending on the pattern; in this case, the graph shows that much of the fertility decline occurs, more or less, at ages 35-49. That is probably what one might expect when there is fertility regulation. Much of this decline here at ages 30-44 over time might be due to fertility regulation within marriage, and also to increase in the age-of-marriage or postponement of marriage. Women here consist of married and unmarried women. Therefore, part of the reason women of younger ages have lower fertility is that many of them are not married, or otherwise not exposed to the risk of childbearing. Those two are not necessarily related because one can be exposed to childbearing even without getting married.

In short, the two factors that affect age-specific fertility rates are marriage patterns and marital fertility or fertility within marriage. Postponement of marriage is clearly reflected in **Table DE-20** where, in more recent years, the age-specific fertility rates of women aged 15-24 are declining.



The ASFR is computed as follows:

$$ASFR = \frac{B * k}{W_i}$$

Where:

- ASFR = Age-Specific Fertility Rate
- B<sub>i</sub> = the number of live births to women in age group I
- W<sub>i</sub> = the number of women in the same age group I
- K = 1,000

For example:

- B<sub>i</sub> = the number of live births to women in age group 15-19 in 1990 = 166,743
- W<sub>i</sub> = the number of women in the same age group 15-19 in 1990 = 3,334,851
- K = 1,000
- ASFR =  $\frac{B_{15-19} * 1,000}{W_{15-19}}$
- =  $\frac{166,743 * 1,000}{3,334,851}$
- = 50

The Philippines had 50 live births per 1,000 women aged 15-19 in 1990.

Figure DE–4. Age-Specific Fertility Rates (ASFRs) per Thousand Women 1993-2003

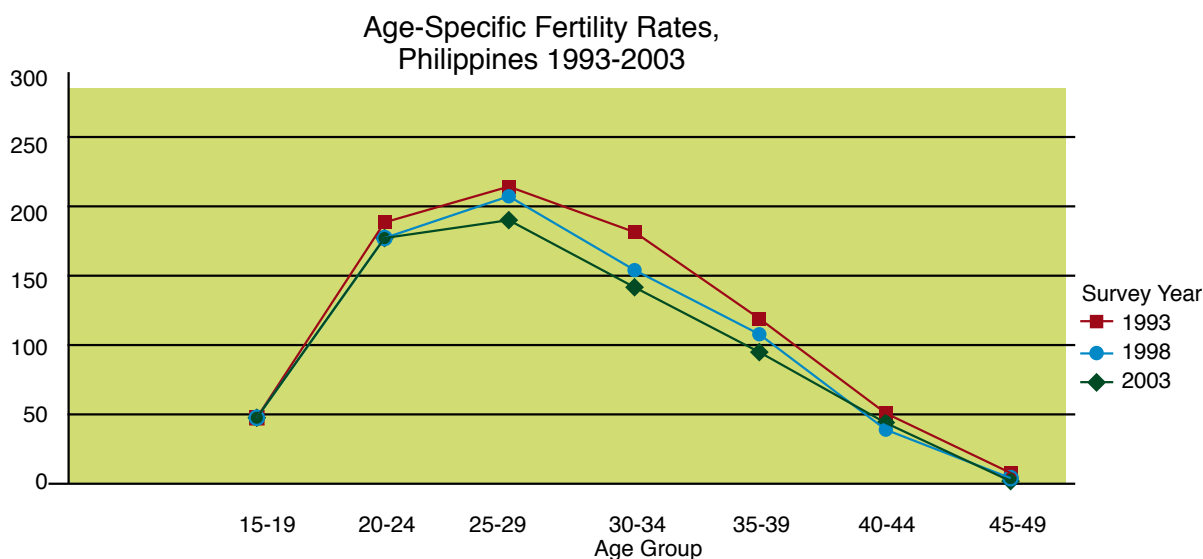


Table DE–20. Age-Specific Fertility Rates (ASFRs) per Thousand Women and Total Fertility Rates (TFRs) per Woman: Philippines, 1993-2003

Age Group	Survey Year		
	1993	1998	2003
15-19	50	46	53
20-24	190	177	178
25-29	217	210	191
30-34	181	155	142
35-39	120	111	95
40-44	51	40	43
45-49	8	7	5
TFR	4.1	3.7	3.5

### Total Fertility Rate (TFR)

This is the sum of all the age-specific fertility rates. In the case of these age groups, one could sum it from age group “i” to “n”. Simply add all of the figures in **Table DE-20**. All of them are in terms of five-year age groups. The birth rates here are averages for each of the five years, hence, the sum of all of these ASFRs is then multiplied by five to get the TFR.

What does TFR mean or tell us? Suppose a hypothetical woman goes through her childbearing age (15-49), bearing children according to the rates in 1970 so that when she is 15-19, she will have, on the average, 0.56 children. By the time she is 20-24 she will have 2.28 children more, and so on until she is finished with childbearing bearing two children on the average; so that during her entire reproductive period, she would have given birth to 5.9 children. That is the concept of TFR.

As one can see, it is actually a hypothetical rate, meaning that is what a woman would be capable of bearing through her entire reproductive or childbearing age, subject to these age-specific fertility rates that we observed in the current period. It will not tell us the number of children that a woman is actually going to have. We have to follow her through time. What is implied by the age-specific fertility rates? Over time, when age-specific fertility rates decline, then obviously, TFR also declines. This is an important concept because it is an excellent summary measure of current fertility that is comparable from population to population. It is a commonly used measure when we talk about fertility.



The TFR is calculated as follows:

$$TFR = 5 \sum ASFR_i$$

Where:

- TFR = Total Fertility Rate
- ASFR = is the age-specific fertility rate for age group i 15-49
- 5 = age group interval

For example:

ASFRs for 2003 are as follows:

	Age Group	ASFR
	15-19	.053
	20-24	.178
	25-29	.191
	30-34	.142
	35-39	.095
	40-44	.043
	45-49	.005
TFR	=	$5 \sum ASFR_i$
	=	5 (.707)
	=	3.5

A woman in the Philippines would bear an average of 3.5 children by the end of her childbearing years if she were to pass through those years bearing children at currently observed age-specific rates.

TFR tells us how many births, on average, a woman might have if she follows the current curve, but we are not only interested in total births but also in the concept of reproduction—the ability of the population to reproduce itself. Who reproduce themselves? Not just any birth or person but female births, the female who replaces her mother.

### Some Basic Mortality Measures

Mortality refers to the occurrence of deaths in a population. The incidence of death is related to many factors like age, sex, occupation, economic and social class. While fertility represents additions to the population and results in the restoration of the population, mortality represents an attrition or reduction in numbers.

### Crude Death Rate (CDR)

Similar to CBR, CDR is a rough measure of mortality. It refers to the number of deaths per 1,000 population. It is crude because it masks the effect of mortality on the population at different ages. It does not show that mortality is high among the infants and highest among the very elderly.



The formula for CDR is as follows:

$$CDR = \frac{D}{P} \times K$$

Where:

- CDR = Crude Death Rate
- D = number of deaths in a given year
- P = total mid-year population in 1990

$$\begin{aligned}
 K &= 1,000 \\
 \text{For example:} \\
 D &= 426,581 \\
 P &= 60,940,207 \\
 K &= 1,000 \\
 &= \frac{426,581}{60,940,207} \times 1,000 = 7.0
 \end{aligned}$$

The crude death rate in 1990 was 7.0 per 1,000 population.

### Infant Mortality Rate (IMR)

IMR is the number of deaths under one (1) year of age per 1,000 live births in a given year.

The infant mortality rates that we get from the vital registration simply measures number of infant deaths over number of births. It simply measures how many infants die in relation to the number of births that occurred in the same year.



The IMR is conventionally computed using the formula below:

$$IMR = \frac{D < 1}{B} * k$$

Where:

$$\begin{aligned}
 IMR &= \text{Infant Mortality Rate} \\
 D < 1 &= \text{deaths to ages } < 1 \text{ year in a given year} \\
 B &= \text{total live births in the same year} \\
 K &= 1,000
 \end{aligned}$$

For example:

$$\begin{aligned}
 D < 1 &= \text{deaths to infants in 1990} &= 109,448 \\
 B &= \text{total live births in 1990} &= 1,930,301 \\
 K &= 1,000 \\
 IMR &= \frac{D < 1}{B} * 1,000 \\
 &= 109,448 / 1,930,301 * 1,000 \\
 &= 56.7
 \end{aligned}$$

As of 1990, there were 57 infant deaths per 1,000 live births in the Philippines.

### Maternal Mortality Rate (MMR)

MMR refers to the number of women who die as a result of complications of childbearing and childbirth in a given year per 100,000 live births in that year. It is obtained by dividing the total number of maternal deaths in a given year by the total live births for the same year, multiplied by a constant (k).

In computing for the MMR, higher constant (100,000) is used because of the much fewer number of events (maternal deaths).



The formula for Maternal Mortality Rate is as follows:

$$MMR = \frac{MD * k}{B}$$





Where:

- MMR = Maternal Mortality Rate
- B = Total live births in the same year
- K = 100,000
- MD = Maternal deaths in a given year

For example:

$$\begin{aligned}
 \text{MD} &= \text{Maternal deaths in 1990} = 1,307 \\
 \text{B} &= \text{Total live births in 1990} = 1,930,301 \\
 \text{K} &= 100,000 \\
 \text{MMR} &= \frac{\text{MD}}{\text{B}} * 100,000 \\
 &= \frac{1,307}{1,930,301} * 100,000 = 67.7
 \end{aligned}$$

In 1990, there were 68 maternal deaths per 100,000 live births in the Philippines.

### Concept of Life Table/Life Expectancy

It will take some time to describe what a life table is but essentially, it is based on age-specific mortality rates: what demographers do is to convert ASDR into mortality probabilities. It tells us what would be the risk of dying in each age group. Demographers use that information to come up with a measure that we often use—life expectancy at birth. This is a measure of overall mortality similar to TFR which, more or less, summarizes information on fertility.

Life expectancy gives us a number that we can compare from time to time, and see whether the mortality situation is improving or not. Life expectancy tells us the average number of years that a person born now will live, given that he is exposed to all of mortality probabilities from age 0 up to age at year of death.

Let us take an example of how life expectancy is usually calculated. List the mortality probabilities in one column, which tells you the risk of dying in that age. If we assume there is only one person and he lives to be 100, the total number of years that he lived is 100 years divided by the number of persons, which is 1, so the average number of years that he lived is 100. That is his life expectancy at birth.

Suppose we come up with a more realistic number. Usually the base used by demographers is 1,000 population. Let us use 100. If all 100 of them lived for 100 years from birth to death at the same time, the life expectancy at birth would be 100 years (100 x 100/100). Suppose 50 of them die at age 50 and 50 of them die at age 100. What would be the average life expectancy that they would contribute? For those who live up to 100, 50 of them would contribute 5,000. The other 50 would die at age 50. How many life years did they contribute? 2,500. All in all, these 100 individuals would have lived 7,500 years. What is the average years that each one had lived? It would be 7,500/100 or 75, on the average. If we have 100 people at the beginning, on the average, they would have a life expectancy of 75 years. That does not mean that all of them will die at age 75. It means that some of them would die somewhere along the line.

This is a crude way of computing life expectancy. Actually, it is being done using a life table where we compute how many die at age 1, at age 2, etc. We have to compute how many each member contributes to the total years lived, and averaging them out by the number of cohorts that we started out with. Eventually, we come up with this measure, which gives us summary measures of the average lifetime that can be expected from a group of people born now, if they are exposed to these kinds of mortality probabilities that are observed at the current period.

Obviously, mortality rates change over different periods. Perhaps mortality declines. If so, the probabilities of dying at each age would decline and the life expectancy at birth would increase. Changes in life expectancy at birth tell us about changes in these mortality probabilities by age, which in turn tell us improvements in socio- economic conditions.

Table DE–21. Philippine Life Expectancy at Birth for Both Sexes, Male and Female, 1902-1995

Years	LIFE EXPECTANCY AT BIRTH $e^0$ (in years)			Difference (F-M)
	BOTH SEXES	MALE	FEMALE	
1902	12.70 <sup>a</sup>	11.54 <sup>b</sup>	13.92 <sup>b</sup>	2.38
1918	25.61 <sup>a</sup>	25.17	26.07	0.90
1938	46.22 <sup>a</sup>	44.80 <sup>c</sup>	47.72	2.92
1948	51.17	48.81	53.36	4.55
1960	53.30 <sup>d</sup>	51.17	55.00	3.83
1970	57.60 <sup>a</sup>	55.24 <sup>e</sup>	60.89 <sup>e</sup>	5.65
1975	59.3 <sup>a</sup>	56.9 <sup>f</sup>	61.8 <sup>f</sup>	4.9
1985 <sup>j</sup>	63.0	61.0	65.0	4.0
1990 <sup>h</sup>	64.80	62.30	67.40	5.10
1992 <sup>h</sup>	65.46	63.00	68.05	5.05
1995 <sup>h</sup>	66.25	63.82	68.80	4.98
2000 <sup>k</sup>	68.0	65.0	71.0	6.0

a Estimated Assuming a Sex Ratio at Birth of 1.05

b Estimated by Sison, Lara, Herbosa and Lazaro as Cited by Jaraillo

c Estimated by Dr. T.J. Jaramillo

d Estimated by Manuel O. Hizon and Isagani de Castro

e Estimated by Luisa T. Engracia

f Estimated by Wilhelm Flieger

j Source: 1987 World Development Report

a Source: Estimates from NSO

k Source: 2002 Philippine Statistical Yearbook

To construct a life table, death rates are needed. One can obtain death rates from the vital registration but they are not very accurate. Thus, demographers try to check the data against census figures in a very elaborate estimate measure

Suppose the data are defective because of poor reporting and, overtime, as the region develops, reporting becomes better. What does this imply? A government worker tries to do as much work to improve health and mortality situations. But instead of expecting it to improve, it worsens. It might be that death rates are really going down but because of better reporting, more deaths are now being reported and so the mortality rates are going up. These are things one has to be aware of in order to interpret data better.

Looking at the figures in **Table DE–21**, in 1990, the national life expectancy at birth was around 65 compared to around 51 in 1948. An improvement in mortality condition is noted.

## Population Growth Momentum

The last concept to be discussed in this chapter is population growth momentum. What this means is that there is an inherent tendency for population to continue to grow, even if you apply the brake on fertility. Part of that momentum is related to the age structure. If in the past we had high fertility, even if fertility is suddenly reduced, it is still possible that the number of births produced by women, even with low fertility, will still exceed the number of deaths. Therefore, a positive growth rate will still ensue.

The reason for this is that because of the broad-based age structure, there are still many women giving birth even if each has a smaller number of births. Even when fertility declines, we still have a large number of women, each producing a given number of children and together those births constitute a number greater than the total number of deaths.

In short, even if fertility is reduced quickly such that  $NRR = 1$ , population will continue to grow long before it finally reaches zero population growth (ZPG).

To illustrate: In a relatively old projection done by the World Bank, the estimated population in 1977 was 44 million. Assuming that the country at that time was able to achieve fertility reduction sufficiently fast, such that by the year 2015 we would have reached  $NRR = 1$ , our population would still continue to grow up to 2075. By that time, the population would be 128 million.

The population momentum is like the momentum of a rapidly moving car. If one suddenly applies the brake, one does not stop exactly at the point where the break was slammed. The weight of the car would carry it forward before screeching to a stop. The same thing with population; the speed of the moving car can be likened to the rate of fertility. If it is very high in the past, the time it will require to reach ZPG would be much longer. Therefore, the size of the ultimate stationary population would be much higher.

What does this mean? No matter what we do about fertility now, whether we succeed in reducing it quickly or not, we can expect a much larger population in the future. The question is not so much whether a population would grow or decline (although we cannot foresee a situation where population size would decline unless we declare war with a superpower nation). We expect population to increase even if fertility declines rapidly.

However, if fertility does not decline rapidly, it will take longer to reach replacement fertility ( $NRR = 1$ ), if we ever reach it at all. It will take even longer for ZPG to be achieved. Therefore, we will have a much larger population size in the future. It is really more of a choice between a slow or rapid population growth because population will definitely continue to grow.

Our task might be easier if the population does not grow too quickly, so that we will then have more time to think of the appropriate strategy to support them.

## Annex DE–4. NSCB Resolution No. 9

Series of 2003

### Adoption of the Operational Definition of Urban Areas in the Philippines

**WHEREAS**, the classification of urban and rural areas remains an important indicator for many data users as it provides a basis for sound policies and decisions pertaining to urban planning and delivery of basic services;

**WHEREAS**, the definition of urban areas, which has been in use since the 1970 Census considers population density, street pattern, and presence of establishments and facilities for basic services;

**WHEREAS**, there were previous attempts to revise the definition of urban areas, the most recent of which was the study undertaken by the Statistical Research and Training Center (SRTC), which proposed the following urban criteria: (1) a city/municipality is to be considered as urban in its entirety if it has a population density of at least 4,000 (The National Capital Region is considered as entirely urban); and (2) a barangay in a city or municipality not classified as urban in the first criterion is to be considered as urban if it has a population of at least 7,000 or it is a poblacion or central district of a city or provincial capital;

**WHEREAS**, the Technical Committee on Population and Housing Statistics (TCPHS) reviewed the 1995 proposed redefinition and recommended the conduct of a validation of the proposed redefinition to ensure consistency, applicability and acceptability of the criteria;

**WHEREAS**, in 2001, the National Statistics Office (NSO), with resources from the Commission on Population and in collaboration with an Inter-Agency Working Group (IAWG) composed of experts from the private sector and representatives from the University of the Philippines Population Institute, Statistical Research and Training Center, National Economic and Development Authority, and the National Statistical Coordination Board (NSCB) spearheaded the project on the "Revalidation of the SRTC Proposed Redefinition of Urban and Rural Areas";

**WHEREAS**, the results of the revalidation survey showed that there was no consistent trend in the shifting of barangay classification from urban to rural or vice-versa and that generalizations could not be made based on the SRTC Proposed Redefinition of Urban and Rural Areas;

**WHEREAS**, recognizing the need to formulate a more up-to-date, practical and realistic definition of urban areas in the Philippines, the POPCOM again commissioned the NSO, in 2002, to determine the most appropriate criteria in classifying an urban area;

**WHEREAS**, the results of the study revealed that the key factors in identifying urban areas are population, presence of establishments and presence of facilities within the two-kilometer radius;

**WHEREAS**, the IAWG presented to the TCPHS the proposed definition of urban areas based on the results of the study and on subsequent suggestions from a consultative forum;

**WHEREAS**, the TCPHS endorses the proposed definition of urban areas because of the soundness of the methodology used and simplicity of application;

**NOW, THEREFORE, BE IT RESOLVED AS IT IS HEREBY RESOLVED** that the Board approve for adoption by all concerned the definition of urban areas recommended by the TCPHS as follows.

If a barangay has a population size of 5,000 or more, then a barangay is considered urban, or

If a barangay has at least one establishment with a minimum of 100 employees, a barangay is considered urban, or

If a barangay has 5 or more establishments with a minimum of 10 employees, and 5 or more facilities within the two-kilometer radius from the barangay hall, then a barangay is considered urban.

**BE IT RESOLVED FURTHER** that:

All barangays in the National Capital Region be automatically classified as urban;

All highly urbanized cities be subjected to the urban-rural criteria in order to determine its urban-rural classification;

The NSO adopt the recommended definition starting in the 2005 Census of Population (PopCen);

The NSO conduct parallel runs for generation of data on urban population using the old and new definitions in the 2005 PopCen; and

The NSO and NSCB spearhead the conduct of an advocacy campaign to inform users on the new definition of urban barangays.

Approved this 13th day of October 2003, in Pasig City

ATTESTED BY:

ROMULO A. VIROLA  
Secretary General

## Annex DE-5. NSCB Resolution No. 6

Series of 2006

### **Adopting the Methodology Used in Generating the 2000 Census of Population and Housing-Based National, Regional and Provincial Population Projections**

**Whereas**, there is a need to prepare population projections to provide planners, policy-makers and program managers with population data between censal years;

**Whereas**, the availability of more recent population data based on the 2000 Census of Population and Housing (CPH) allows the preparation of new sets of population projections;

**Whereas**, the National Statistics Office (NSO), through the Inter-Agency Working Group on Population Projections, formulated the specific methodology used in projecting the population based on the cohort-component method and submitted the same for review by the Technical Committee on Population and Housing Statistics (TCPHS);

**Whereas**, the 2000 -based national, regional and provincial population projections methodology assumed certain future trends in the demographic processes of fertility, mortality and migration required by the cohort-component method of population projections;

**Whereas**, the TCPHS, has endorsed the methodology of national, regional and provincial population projections for approval by the Board;

**Now, therefore, be it resolved as it is hereby resolved**, that the Board approve for adoption by all concerned the methodology for estimating the 2000-based National, Regional and Provincial Population Projections (**Annex BR-07-2006-01**).

**Be it resolved further** that:

the estimates therefrom, to be released by the NSO, be hereby endorsed as the official figures to be utilized for planning and programming purposes; and

Resolution No. 1-05 issued by the Board on 24 January 2005 regarding the 2000-based national population projections be superseded by this resolution.

Approved this 8th day of February 2006, in Pasig City.

Attested by:

ROMULO A. VIROLA  
Secretary General







## Social Sector Study

A major task of the government is to improve the level of human development within the community. Analysis of the Social Sector can, among others, pave the way for the local government to achieve this intention, with the support and assistance of the community and other stakeholders.

The pursuit of desirable outcomes is set within the context of determining and understanding the underlying causes and effects of existing conditions. This will generate proposals or interventions that will support and influence the desired level of delivery of services to the community. Individuals enjoy some level of well being as influenced by the state of health and education, leisure or recreation, safety and comfort. While there are other dimensions of well being, it is important to recognize the effects or benefits of interventions on the overall development of individuals.

The broad framework for analyzing the social sector is provided by the following guideposts:

- What is the health situation in the locality measured in terms of mortality, morbidity, incidence of diseases and such other indicators?
- What is the state of education measured in terms of literacy rate, ratio of enrollment to school- going population and other indicators?
- What is the housing situation in the locality measured in terms of housing needs?
- What is the poverty incidence in the locality? How do this relate to the provincial or national level? What factors brought about the locality's level of poverty?
- What amenities, facilities, and services are present in terms of physical, mental and social development of an individual and the community at large? Are these enough? Are these accessible and equitably distributed in the locality? Are these services also being availed by neighboring towns?
- What environmental concerns/issues need to be addressed?

The Social Sector Study has several component sub-sectors namely: Education, Health, Housing, Social Welfare Services, Protective Services, Sports and Recreation.

A step-by-step guide to a more detailed analysis of these component sub-sectors are found in the succeeding pages. It must be noted, however, that the analysis of sub-sectors shall be centered on providing the details of the above framework. Moreover, each sub-sector study shall be presented in a sector analysis matrix containing the technical findings/ observations, implications, and proposals. These matrices, together with the results of the sub-sector analysis shall be crosschecked and validated to come up with an integrated social sector analysis. A participatory process of conducting integrated sector analysis is likewise presented following the last sub-sector study.

## Social Sub-Sector: Education

### Steps:

#### I. Data Gathering and Processing

##### A. Generate the following data/information and present in table format:

1. Schools by Level, Type, Facilities and Condition, SY \_\_\_\_ (refer to **Table SO-2**).
2. Student–Teacher and Student–Classroom Ratio by Level, SY \_\_\_\_ (refer to **Table SO-3**).
3. Tertiary and Vocational/Technical Schools by Type and Total Enrollment , SY \_\_\_\_ (refer to **Table SO-4**).
4. Historical Enrollment by Level for the Past Five (5) School Years (refer to **Table SO-5**).
5. Projected Classroom, Teacher Requirement in Public Schools, by Level (refer to **Table SO-6**).
6. Historical Enrollment Participation Rate for the Last Five (5) Years (refer to **Table SO-7**).



The output tables are basic information from which assessment of the level of services of the education sector may initially proceed. Other relevant information may be gathered through a consultation process.

##### B. Determine the felt needs, aspirations and issues of the community relative to education through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders.



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to education would you want to be addressed? (Note: Stakeholders should arrive at common issues/concerns thru consensus building).
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of education services?

##### C. Gather additional data/information if warranted by the results of the consultations/meetings conducted

#### II. Data Analysis

Analyze the information gathered and discuss the education sector situation in the locality in terms of the following:

1. Availability, location and condition of educational facilities
2. Adequacy of facilities and manpower based on existing national standards and mandatory requirements per existing laws/policies, e.g. space standards. (Refer to **Annex SO-1**. Standards and Guidelines for Education.. Also check the Revised Edition of the 2007 Handbook on Educational Facilities–Integrating DRR in School Construction

(downloadable from [http://www.rccdm.net/index.php?option=com\\_docman&task=doc\\_view&Itemid=215&gid=79](http://www.rccdm.net/index.php?option=com_docman&task=doc_view&Itemid=215&gid=79)).

3. Accessibility of the educational facilities to the school-going age population in relation to the location and distribution of schools, presence and condition of access roads, and students' safety
4. Discuss trends and present a comparative analysis of the following for at least two (2) reference periods (current and previous years)
  - Enrollment participation rate
  - Drop-out rate
  - Literacy rate

Discussion shall include disaggregated information by male/female. Discuss also the possible reasons for the observed trend. Data may be gathered from DepEd. Refer to **Annex SO-2. Sample Computations using DepEd Methods** for sample computations.

Note: A low EPR or a high drop-out rate may be an indication of the prevailing poverty situation in the locality and/or other socio-economic factors affecting sustained school attendance.



A low EPR or a high drop-out rate may be an indication of the prevailing poverty situation in the locality and/or other socio-economic factors affecting sustained school attendance.

5. Exposure and vulnerability of educational facilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)
6. Discuss identified environment-related concerns/problems affecting the sector

### III. Current and Projected Needs

#### A. Determine the current need for teachers and classrooms based on the above findings and on the prescribed national standards.



The DepEd target of 1:35 student-teacher and student-classroom ratio by 2010 in the elementary level and 1:40 for the high school level, is recommended.

Current classroom need:

$$\text{Current Classroom} = \left[ \frac{\text{Current Enrollment}}{\text{Ratio}} \times \text{Standard Classroom} \right] - \left[ \text{Current No. of Classroom} - \text{No. of Dilapidated/Damaged Classroom} \right]$$

Current teacher need:

$$\text{Current Classroom Need} = \left[ \frac{\text{Current Enrollment}}{\text{Ratio}} \times \text{Standard Classroom} \right] - \left[ \text{Current No. of Teachers} \right]$$

**B. Project the future needs for teachers, classrooms, and spatial/land requirements based on city/municipal vision, projected school-going age population, and other considerations unique to the locality.**

$$\text{Projected Classroom Requirement} = \left[ \begin{array}{cc} \text{Projected School Enrollment} & \text{Standard Classroom Student Ratio} \end{array} \right] \times - \left[ \begin{array}{c} \text{Current No. Classrooms} \end{array} \right]$$

Use the same formula for projecting teacher need.

Projected enrollment is the product of the targeted enrollment participation rate multiplied by the projected school-going age population

$$\text{Projected School Requirement} = \left[ \begin{array}{c} \text{Targeted Enrollment Participation Rate, (TEPR)} \\ \text{Population} \end{array} \right] \times \left[ \begin{array}{c} \text{Projected School Going Age (SGA)} \end{array} \right]$$

Note: The targeted enrollment participation can be obtained from DepED.

**C. Project spatial/land allocation requirements using the Standards and Guidelines in Annex SO-1. Standards and Guidelines for Education.**



To need for spatial expansion of educational facilities and services may be addressed by:

- New schools/classrooms
- Vertical expansion
- Scheduling classes into 2 or more shifts
- Other applicable techniques/ strategies

## IV. Sector Analysis Matrix

**A. Consolidate and validate the findings of the previous steps with the result of the consultation/s.**

1. List the key issues, problems, and concerns of the education sector.
2. Determine the possible implications/impacts of the above issues, problems, and concerns.
3. Consider the impact of Climate Change and Disaster Risks.

**B. Recommend interventions as follows:**

1. Policy options and appropriate strategies.
2. Programs and projects for implementation

**C. Prioritize, tabulate and present the results in matrix form as follows:**

Table SO–1. Sample Education Analysis Matrix

<b>Technical Findings/ Observations</b>	<b>Implications (Effects)</b>	<b>Policy Options/ Interventions</b>
<ul style="list-style-type: none"> <li>• Inadequate school buildings and over- crowded classrooms</li> </ul>	<ul style="list-style-type: none"> <li>• Poor Quality Education</li> </ul>	<ul style="list-style-type: none"> <li>• Construction of new school Building/ classrooms</li> </ul>
<ul style="list-style-type: none"> <li>• Schools easily flooded or situated in flood- prone areas</li> </ul>	<ul style="list-style-type: none"> <li>• Poor Quality education due to frequent disruption of classes</li> </ul>	<ul style="list-style-type: none"> <li>• Possible relocation of school sites</li> </ul>
<ul style="list-style-type: none"> <li>• High dropout rate due to:</li> <li>• Distance and poor accessibility from residence to school</li> <li>• Financial Constraint</li> <li>• Sickly school children due to malnutrition</li> </ul>	<ul style="list-style-type: none"> <li>• Increasing number of Out- of- School Youths (OSY's)</li> </ul>	<ul style="list-style-type: none"> <li>• Improvement of roads linking residential area to school</li> <li>• Provide comprehensive program for OSY's including livelihood opportunities</li> <li>• Initiate implementation of feeding program in schools</li> </ul>





## Notes:

- Ownership – Public/Private
- Facilities:
  - La - Lab
  - S - Shop
  - Li - Library
  - Cl - Clinic
  - CR - Comfort Room
  - P - Playground
  - O - Others
- Indicate condition (if facility is present) as follows:
  - G – Good (Well Maintained)
  - P – Poor (Needs Improvement)
  - C – Critical (Needs Priority Action)
  - N - None / No Such Facility
- Other facilities: Computer room/laboratory, multi-purpose halls/auditorium, etc.
- Used as evacuation center - Yes (Y), No (N)
- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table SO–3. Student-Teacher and Student-Classroom Ratio by Level, SY

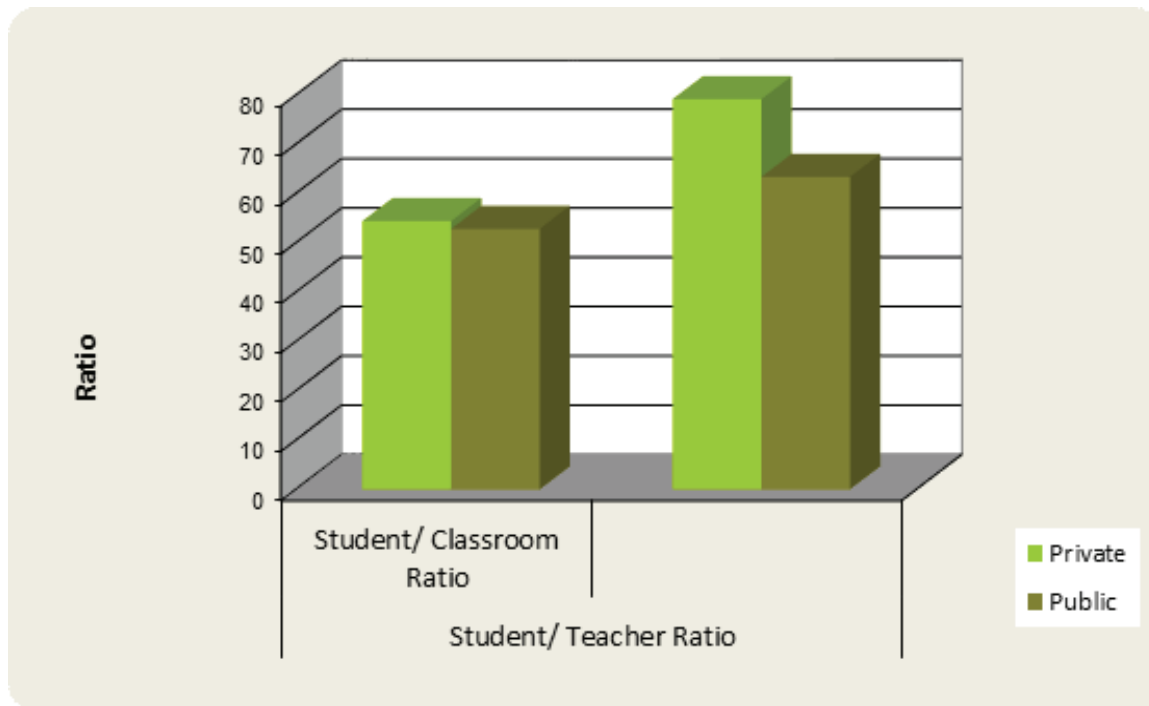
Type/Level	Enrollment			No. of Teachers			No. of Class-rooms	Student/Teacher Ratio	Student/Classroom Ratio
	M	F	Total	M	F	Total			
<b>Private</b>									
Preparatory	55	55	110	0	2	2	2	55	55
Elementary	60	50	110	1	2	3	2	37	55
Secondary									
Junior High School (Grade 7 – 10)	150	200	650	2	3	5	3	55	55
Senior High School (Grade 11 - 12)	120	180	300	3	3	6	4	55	55
<b>Sub-Total</b>	<b>385</b>	<b>485</b>	<b>1170</b>	<b>6</b>	<b>10</b>	<b>16</b>	<b>11</b>	<b>73</b>	<b>106</b>
<b>Public</b>									
Preparatory	100	100	200	0	4	4	3	50	67
Elementary	60	40	100	1	2	3	3	33	33
Secondary									
Junior High School (Grade 7 – 10)	125	175	650	3	2	5	4	55	55
Senior High School (Grade 11 - 12)	150	200	350	2	4	6	5	55	55
<b>Sub-Total</b>	<b>435</b>	<b>515</b>	<b>1300</b>	<b>6</b>	<b>12</b>	<b>18</b>	<b>15</b>	<b>72</b>	<b>87</b>

Source: DEPED District Office, Individual Private School

## Notes:

- Classification: public or private
- Student-Teacher Ratio =  $\frac{\text{Total Enrollment}}{\text{Total No. of Teachers}}$
- Student-Teacher Ratio =  $\frac{\text{Total Enrollment}}{\text{No. of Classrooms}}$

Graph SO-3. Student-Teacher and Student-Classroom Ratio, SY \_\_\_



Source: DEPED District Office, Individual Private School

Classification: public or private

Table SO-4. Tertiary and Vocational/Technical Schools by Type and Total Enrollment, SY \_\_\_\_\_

Name of School	Location (Brgy)	Area (ha)	Ownership	Total Enrollment		Hazard Susceptibility (H/M/L)								
				M	F	Fl	Tc	Eq	Vo	Ln	Ts	Su	Others	
Tertiary														
1														
2														
Total	-		-											
Voc./Tech.														
1														
2														
Total	-		-											

Source: CHED, Primary Survey

Notes:

- Ownership –Public/Private
- Indicate level of susceptibility for all hazards. High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table SO-5. Historical Enrollment by Level for the Past Five School Years

Level	Y <sub>1</sub>				Y <sub>2</sub>				Y <sub>3</sub>				Y <sub>4</sub>				Y <sub>5</sub>			
	M	F	Total	Increase/Decrease (%)	M	F	Total	Increase/Decrease (%)	M	F	Total	Increase/Decrease (%)	M	F	Total	Increase/Decrease (%)	M	F	Total	Increase/Decrease (%)
Preparatory	250	250	500	20	300	300	600	20	350	350	700	16.7	350	350	700	16.7	350	350	700	16.7
Elementary	500	501	1,002	35.5	670	688	1,358	35.5	800	758	1,558	14.7	800	758	1,558	14.7	800	758	1,558	14.7
Secondary																				
Junior High School (Grade 7-10)	4,000	4,005	8,005	9.3	4,400	4,350	8,750	9.3	4,400	4,458	8,858	1.2	4,400	4,458	8,858	1.2	4,400	4,458	8,858	1.2
Senior High School (Grade 11-12)	3,500	3,550	7,050	-1.4	3,500	3,450	6,950	-1.4	4,500	4,545	9,045	30.1	4,500	4,545	9,045	30.1	4,500	4,545	9,045	30.1
Technical/Vocational	50	50	100	50	80	70	150	50	120	80	200	33.3	120	80	200	33.3	120	80	200	33.3
Tertiary	105	95	200	5.5	120	91	211	5.5	130	111	241	14.2	130	111	241	14.2	130	111	241	14.2
TOTAL	8,405	8,452	16,857		9,070	8,949	18,019		10,300	10,302	20,602		10,300	10,302	20,602		10,300	10,302	20,602	

Source: Department of Education District Office, Individual Private School

Notes: Y1 to Y5 are five consecutive years with Y5 having the most recent data.

Graph SO-5. Historical Enrollment by Level for the Past Five School Years

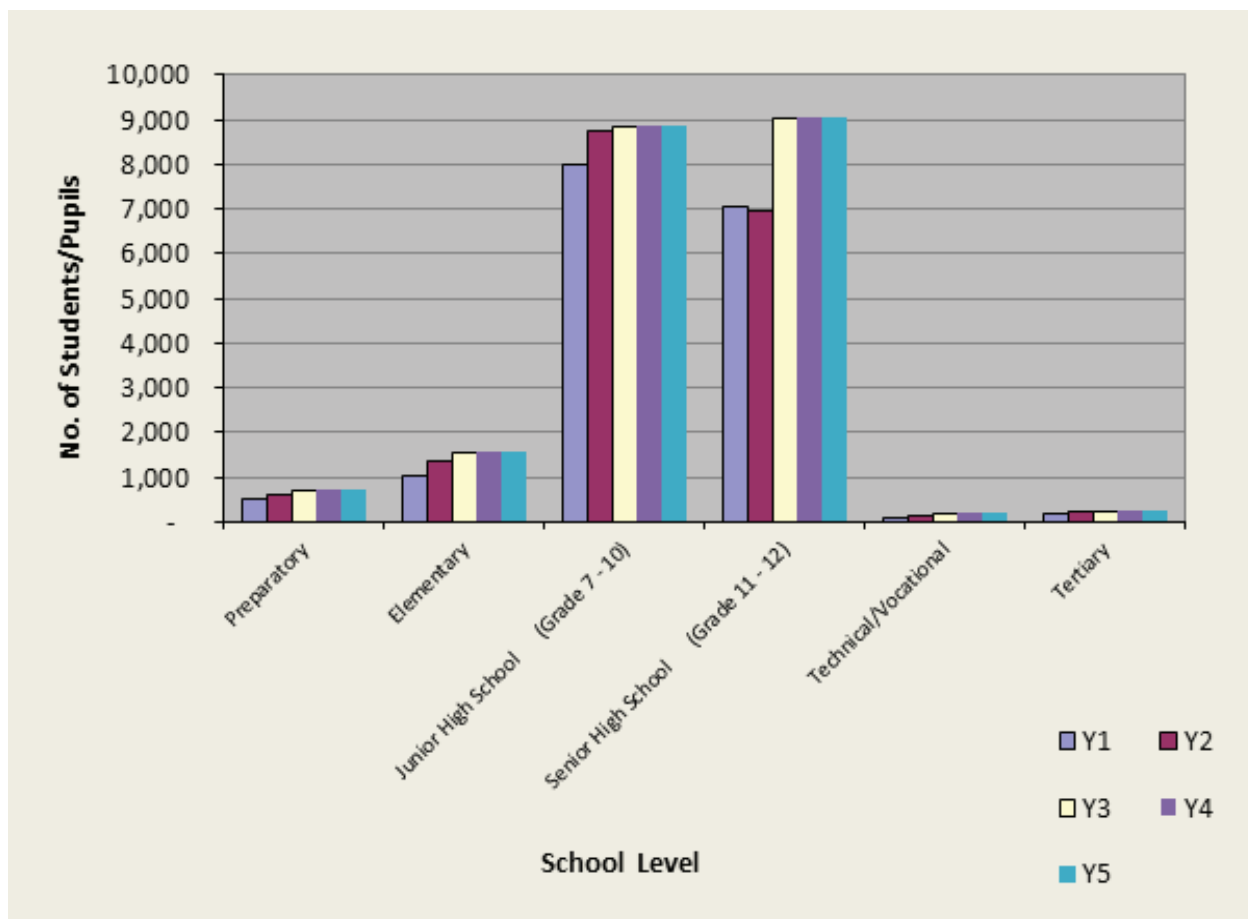


Table SO-6. Projected Classroom, Teacher Requirements in Public Schools by Level

Level	Planning Period						
	Y <sub>0</sub>	Y <sub>1</sub>	Y <sub>2</sub>	Y <sub>3</sub>	Y <sub>4</sub>	Y <sub>5</sub>	Y <sub>10</sub>
<b>Projected Enrollment</b>	<b>16,761</b>	<b>17,222</b>	<b>17,696</b>	<b>18,182</b>	<b>18,682</b>	<b>19,196</b>	<b>21,985</b>
Elementary	6,144	6,313	6,487	6,665	6,848	7,037	8,059
Secondary	4,657	4,785	4,917	5,052	5,191	5,334	6,108
<b>Classroom</b>	<b>356</b>	<b>385</b>	<b>440</b>	<b>495</b>	<b>560</b>	<b>660</b>	<b>720</b>
Elementary	276	300	350	400	455	550	600
Secondary	80	85	90	95	105	110	120
<b>Teacher</b>	<b>371</b>	<b>415</b>	<b>475</b>	<b>535</b>	<b>595</b>	<b>710</b>	<b>750</b>
Elementary	266	300	350	400	450	550	600
Secondary	105	115	125	135	145	160	150

Notes:

- Refer to Demographic Study for the Projected School-Going Age Population
- Y<sub>1</sub> to Y<sub>10</sub> are ten consecutive years with Y<sub>5</sub> having the most recent data.

Graph SO-6. Projected Classroom, Teacher Requirements in Public Schools by Level

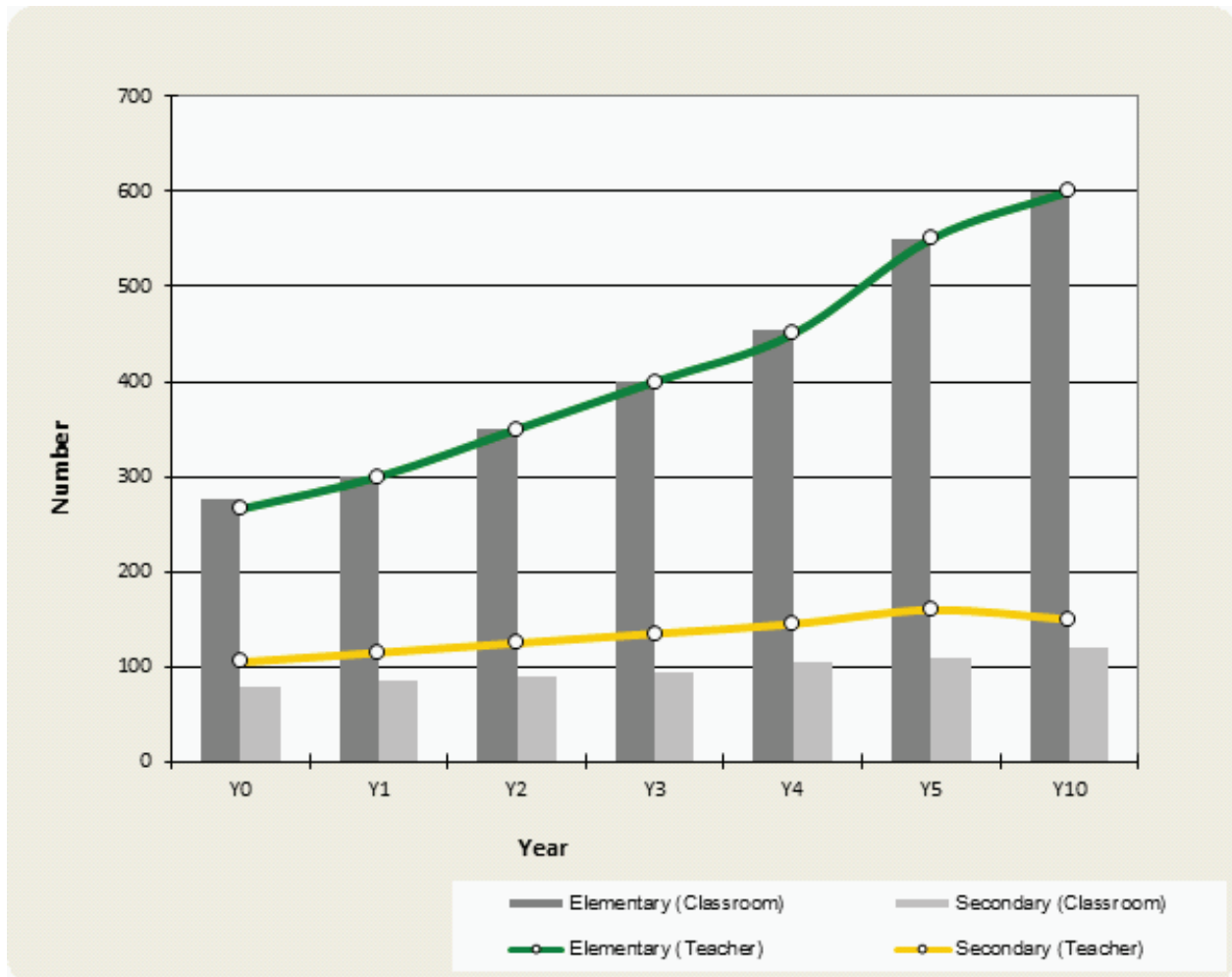


Table SO-7. Historical Enrollment Participation Rate for the Past Five (5) Years

Year	Enrollment Participation Rate (EPR)
Y <sub>5</sub>	80
Y <sub>4</sub>	75
Y <sub>3</sub>	70
Y <sub>2</sub>	80
Y <sub>1</sub>	85

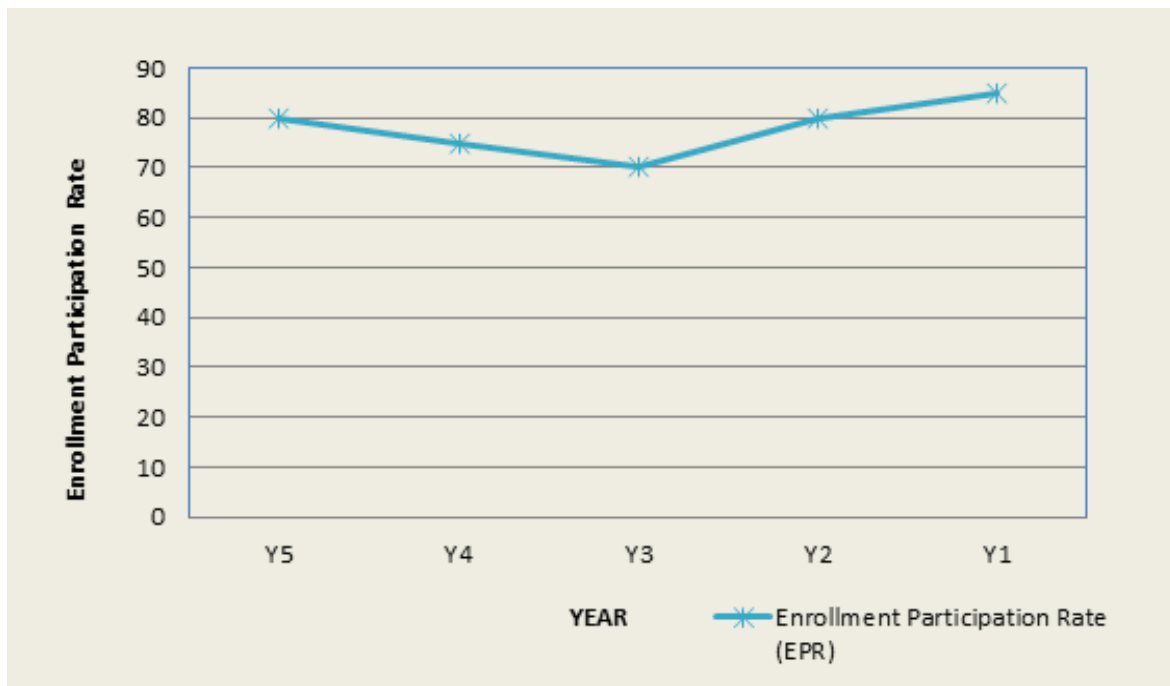
Source: District Office, DepEd.

Note:

- $EPR = (\text{No. of enrollees by level/school-going age population of relevant age level}) \times 100$



Graph SO-7. Historical Enrollment Participation Rate for the Past Five (5) Years



# Annex SO–1. Standards and Guidelines for Education

## Categories of School Buildings

In line with the classification enunciated by the National Building Code of the Philippines school buildings are categorized as follows:

Type I Wood Construction

Type II Wood construction with protective fire resistant materials and one-hour fire resistive throughout.

Type III Masonry and wood construction with exterior walls of incombustible fire resistive construction, and one-hour fire-resistive throughout.

Type IV Steel, iron, concrete or masonry construction with walls, ceilings and permanent partitions of incombustible fire-resistive construction except permanent non-bearing partitions which shall be one-hour fire resistive.

Type V Structural elements of steel, iron, concrete or masonry with walls, ceilings and

Permanent standard school buildings fall under Types III, IV and V while semi-permanent standard type buildings are under Types I and II.

## I. Space Standards

### A. Pre-School (Kindergarten Level)

School site must have a minimum lot area of 500 square meters. The area may be divided into a minimum of 140 square meters for the playground. This area is only good for not more than 4 classes.

Space for playground must be provided, otherwise, easy and safe access to the nearest part of open space not more than 200 meters walking distance from school site may be presented as an alternative.

Classroom size should be 1 ½ square meter per child.

### B. Elementary School Sites

**Size.** The size of the site must meet the requirements of the enrollment and kind of schools as well as the recreational needs of the pupils. It shall be wide enough to make adequate provisions for an athletic field playground, lawns, agricultural activities and future building expansions.

The standard requirements of school site for elementary schools are as follows:

- a. One-half hectare (1/2 ha) for a non-central school which has only one or two classes and no grade above Grade IV.
- b. One hectare (1 ha) for a central school which has six classes or for non-Central School which has from three to four classes.
- c. Two hectares (2 ha) for schools which have from seven to nine classes.
- d. Three hectares (3 ha) for schools which have from ten to twelve classes.
- e. Four hectares (4 ha) for schools which have more than twelve classes.

However, for special cases or where there is difficulty in meeting the above standards, the following may be allowed:

**a. For Rural Areas**

One-half hectare (1/2 ha) for a central school which has six classes, for a non-central school which has from three to four classes. One and one half hectare (1 1/2 ha) for schools which have from seven to ten classes. Two hectares (2 ha) for schools which have more than 10 classes.

**b. For Urban Areas**

One-half hectare (1/2 ha) for central school with 6 classes and non-central schools with 7-10 classes. Three fourth of a hectare (3/4 ha) for eleven to twenty classes. One hectare (1 ha) for twenty one or more classes.

**Elementary School Buildings - Standard Requirements**

**Adequacy.** There should be sufficient number of standard classrooms to accommodate the school enrollment, as well as enough internal spaces for other basic curricular and administrative needs of the school. A standard classroom should provide at least 1.4 sq. meters of space per pupil, and on that basis the standard dimensions of elementary classrooms have been prescribed.

In a complete elementary school, there should be a separate building for Industrial Arts/home economics classes with a minimum standard area of 5.0 square meters per place, or a total of approximately 126 square meters.

Internal space should also be provided for such basic needs as an administrative office, a library (and/or learning resource center), a health clinic (first aid), a guidance and counseling room, toilets, storeroom, lunch counter or room etc. At least 2 electrical outlets should be provided in front of each classroom, for the implementation of any feasible educational technology which requires electricity.

The minimum standards for instructional and administrative spaces are as follows:

1.	Classroom (elementary)	1.40 sq.m. per place
2.	Elementary school shop	5.0 sq.m. per place
3.	Administrative Office	5.00 sq.m. per place
4.	Library/LRC	2.40 sq.m. per place (10% of total enrollment) Provided that it is not smaller than the size of a classroom
5.	Medical/Dental Clinic	28.00 sq.m. gross
6.	Guidance Room	28.00 sq.m. gross
7.	Corridor	Above ground level, the minimum clear width is 2.0 m. provided that the provisions of the National Building Code & Fire Code of the Philippines and other relevant rules and regulations are observed.
8.	Computer Room	1.4 sq.m. per place
9.	Gymnasium/Auditotium	5.0 sq.m. per place
10.	Speech Laboratory	1.4 sq.m. per place

Reference: Handbook on Educational Facilities – DECS 1993 (Revised Edition of Handbook on School Plant) DECS Service Manual 2000

**C. Secondary Schools**

**Size.** The size of the school site is largely determined by the level of education, the size of the enrollment, the type of curriculum offered and the location of the school, i.e., whether urban or rural. The ground area occupied by school buildings and other structures should not exceed 40% of the school site in order to provide adequate open spaces for assembly and co-curricular activities, as well as to conform with national and local regulations and

standards pertaining to setbacks and distances between buildings.

**Minimum standards for instructional and administrative spaces:**

Classroom	1.40 sq.m. per place
Science Laboratory	2.10 sq.m. per place

**Secondary School Shops:**

Practical Arts	5.00 sq.m. per place
Technology and Home Economics	7.00 sq.m. per place
Girls Trades/HOMEMAKING	4.00 sq.m. per place
Wood Trades	5.00 sq.m. per place
Metal Trades	5.00 sq.m. per place
Mechanical Trades	7.00 sq.m. per place
Electrical Trades	4.00 sq.m. per place
Drafting/Drawing	2.50 sq.m. per place
Farm Mechanics	5.00 sq.m. per place
Farm Machinery	6.50 sq.m. per place
Fish Capture/Culture/Preservation	2.50 sq.m. per place

**Administrative and Services Spaces:**

Administrative Office	5.00 sq.m. per place
Medical/Dental Clinics	28.00 sq.m. gross
Guidance Room	28.00 sq.m. gross

**Library/Learning Resources Center**

Capacity of 10% of the enrollment at 2.40 sq.m. per place, provided that the total area is not less than that of a standard classroom. In schools with more than one shift, the basis for computing the area is the shift with the largest enrollment.

**Corridors**

Not required at ground level if appropriate direct access to enclosed spaces is provided. Above ground level, the minimum clear width is 2.0 meters provided that the provisions of the National Building and Fire Codes of the Philippines and other relevant rules and regulations are observed.

Reference: Manual of Information on Secondary Education (DECS – 1993) DECS Service Manual 2000

**D. Colleges and Universities**

1. The area of school site as a general rule will be as follows:

500 or less students	0.50 ha
501 to 1,000	1.00 ha
1,001 to 2,000	2.00 ha
2,001 to 3,000	3.00 ha

As a general rule, the same ratio should be maintained for enrollment in excess of 3,000.

2. For largest colleges and universities the campus should be at least 7 hectares for the minimum number of students which is 10,000.
3. There should be space on the campus for holding class programs and sports activities.
4. The shape of a college site is not important as its total site, since landscape architects and college administrators can adapt a campus plan to a variety of shapes with relatively little less in efficiency. A rectangular plot of ground with length not more than one and one-half times the width heads itself most readily to the proper location of the various college units.

Reference: Guidelines & Standards for Physical Plant & Facilities of Colleges & Universities.

## II. Standard Classroom Dimension

Type of Building	Floor Dimension (m)	Floor Area (sq.m.)	Gross Area Per Place @ 40 Pupils/ Room (sq.m.)
Gabaldon Type	7 x 9	63	1.575
Army Type	6 x 7	42	1.05
Magsaysay Type	6 x 7	42	1.05
Marcos Type	7.3 x 6	43.8	1.095
Bagong Lipunan 1	6 x 8	48	1.2
Bagong Lipunan 2	8 x 6	48	1.2
Bagong Lipunan 3	6 x 8	48	1.2
RP-US Bayanihan	7.35 x 6	47.7	1.192
ESF Building	6 x 8	48	1.2
Imelda Type	8 x 6	48	1.2
Pagcor Bldg.	6 x 8	48	1.2
JICA-EFIP Bldg.	8 x 7	56	1.4
JICA-TRSBP Bldg.	8 x 6.25	52	1.35
Multi-Purpose Workshop	7 x 16	112	2.80
DECS one-room Bldg.	6 x 8	48	1.2
FVR 2000 School Building	7 x 8	56	1.4
Royal Building System	7 x 8	56	1.4
EVG 3D Panel System	7 x 8	56	1.4
Federation of Filipino Chinese Chamber of Commerce and Industry Inc. (FFCCCCI)	7 x 8	56	1.4
Little Red School House	7 x 9	63	1.575
One storey, one classroom building – SEMP	7 x 9	63	1.575
One storey one classroom Building SEDIP	7 x 9	63	1.575
One storey one classroom Building TEEP			

Reference: Handbook on Educational Facilities

Revised Edition of Handbook on School Plant, DECS 1993, DECS Service Manual 2000

## Annex SO-2. Sample Computations using DepEd Methods

### I. Methods of Computing School-Going Age Population

#### A. Sprague Multiplier

Since the usual groupings of NSO (5-9, 10-14, 15-19, and 20-24) are not suited to school-going age population for primary (6-9), intermediate (10-11), secondary (12-15), and tertiary (16-19), education programs prescribed by the DEPED, school-going age population can be determined by applying the Sprague Multipliers.

This Method makes possible the disaggregation of an age bracket, e.g. 0-4 year old into single year estimates i.e. 0,1,2,3,4, etc.

Table SO–8. Sprague Multiplier Age Group Population

Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34
5	0.0336	0.2272	-0.0752	0.0114	-	-	-
6	-0.0080	0.2320	-0.0480	0.0080	-	-	-
7	-0.0160	0.2160	-0.0080	-	-	-	-
8	-0.0176	0.1840	0.0400	-0.0080	-	-	-
9	-0.0128	0.1408	0.0912	-0.0114	-	-	-
10	-0.0016	0.0848	0.1504	-0.0240	0.0016	-	-
11	0.0064	0.0144	0.2224	-0.0416	0.0064	-	-
12	0.0064	-0.0336	0.2544	-0.0336	0.0064	-	-
13	0.0016	-0.0416	0.2224	0.0144	-0.0016	-	-
14	-	-0.0240	0.1504	0.0848	-0.0128	-	-
15	-	-0.0128	0.0848	0.1504	-0.0240	0.0016	-
16	-	0.0016	0.0144	0.224	-0.0416	0.0064	-
17	-	0.0064	-0.0336	0.2544	-0.0336	0.0064	-
18	-	0.0064	-0.0416	0.2224	0.0144	-0.0016	-
19	-	0.0016	-0.0240	0.1504	0.0848	-0.0128	-
20	-	-	-0.0128	0.0848	0.1504	-0.0240	0.0016
21	-	-	-0.0016	0.0144	0.2224	-0.0416	0.0064
22	-	-	0.0064	-0.0336	0.2544	-0.0336	0.0064
23	-	-	-0.0064	-0.0416	0.2224	0.0144	-0.0016
24	-	-	0.0016	-0.0240	0.1504	0.0848	-0.0128



Example:

Age Bracket	Population (Both Sexes)
0-4	2,986
5-9	3,438
10-14	3,198
15-19	2,856
20-24	2,580
25-29	1,871
30-34	1,599



1. To compute for the primary school-going age population, use the following procedures:

- Get the population of age bracket 0-4 and multiply with the Sprague Multiplier under column (0-4) at age 6.
- Use the population of age bracket 5-9 and multiply with the Sprague Multiplier under (5- 9) at age 6.
- Add the results of b.1.1 to b.1.2. The resulting number is the single year estimate (777) at age 6.

$$\begin{array}{rcl}
 2,986 \times -0.0080 & = & -23.888 \\
 3,438 \times 0.2330 & = & 801.05 \\
 \hline
 & & 777.117 \text{ say } 777
 \end{array}$$

2. Follow the same procedure in getting the single-age estimates for the primary school-going age population at age 7, 8, and 9.

- Add the results of b.1.3 and b.1.4. The resulting number is the primary school-going population.

## B. Interpolation Technique

Another method of reclassifying the NSO population groupings into the desired school-going age population group is through the use of interpolation technique.

Interpolation technique assumes that each of the individual age in the age bracket contributes equally to the total population of that specific age bracket.

Example:

Population by Age Group

Municipality A

Age Bracket	Population (Both Sexes)
All ages	58,274
5-9	8,359
10-14	7,399
15-19	6,751
20-24	6,254

Source: Census on Population, NSO/PSA



1. For the primary school-going age (6-10) population:

- Get 4/5 of age group (5-9) =  $\frac{4}{5}(\text{population age group } 5-9)$   
 $= \frac{4}{5} \times 8,359$   
 $= 6,687$

Therefore, the primary school-going age (6-9) population of Municipality A is 6,687.

## 2. For the intermediate school-going age population (11-12)

- Get  $\frac{2}{5}$  (population age group 10-14) =  $\frac{2}{5}$  (population age Group 10-14)  
=  $\frac{2}{5} \times 7,399$   
= 2,960

## 3. Secondary school-going age population (13-16)

- Get  $\frac{3}{5}$  (population age group 10-14) =  $\frac{3}{5}$  (population age group 10-14)  
=  $\frac{3}{5} \times 7,399$   
= 4,439
- Get  $\frac{1}{5}$  of age group (15-19) =  $\frac{1}{5}$  (population age group 15-19)  
=  $\frac{1}{5} \times 6,751$   
= 1,350

Therefore, the secondary school-going age (12-15) population of Municipality A is the sum of 4,439 and 1,350 = 5,789.

## 4. For the tertiary school-going age population (17-21)

- Get  $\frac{3}{5}$  of age group (15-19) =  $\frac{3}{5}$  (Population age group 15-19)  
=  $\frac{3}{5} \times 6,751$   
= 4,051
- Get  $\frac{2}{5}$  of age group (20-24) =  $\frac{2}{5}$  (population age group 20-24)  
=  $\frac{2}{5} \times 6,254$   
= 2,502

Therefore, the tertiary school going age (17-21) population of Municipality A is the sum of 4,051 and 2,502 = 6,553.

## II. School Going Age Population and Present Enrollment

Determine the current enrollment participation rate for all levels using the following formula:



Enrollment Participation Ratio (EPR)

$$\text{EPR} = \frac{\text{No. of enrollees by Level}}{\text{School- going Age Population of Relevant Age Level (computed in b.1 and b.2)}} \times 100$$

Example:

$$\begin{aligned} \text{School going age population in the primary level (6-10)} &= 8,167 \\ \text{No. of Enrollees in the primary level} &= 5,240 \end{aligned}$$

$$\text{EPR} = \frac{5,240}{8,167} \times 100$$

$$\text{EPR} = 64.00\%$$

This means that for every 100 children aged 6-10 years, 64 are enrolled. The remaining 36 do not go to school primarily due to poverty or/ for other reasons.

## III. Computation of Drop Out Rate

DROP OUT RATE is the proportion of pupils/students who left school during the year as well as those who completed the grade/year level but fail to enroll in the next grade/year level the following school year to the total number of pupils/students enrolled during the previous year.



$$\text{Drop Out Rate} = \frac{\text{Enrollment in Y1} - \text{Enrollment Y2}}{\text{Enrollment Y1}} \times 100$$

Where:

Enrollment Y1 = Number of Enrollees in the Beginning School Year1

Enrollment Y2 = Number of Enrollees in the beginning of School Year2

Discuss the possible causes for its decrease or increase per level.

Example:

The following are the enrollment by grade for the school year 2002-2003.

Grade	Enrollment					
	June 2002			March 2003		
	Total	Female	Male	Total	Female	Male
1	10,314	5,670	4,644	10,310	5,668	4,642
2	9,764	5,586	4,178	9,744	5,568	4,176
3	9,582	5,563	4,019	9,578	5,560	4,018
4	9,321	5,478	3,843	9,320	5,477	3,843
5	8,983	5,475	3,508	8,975	5,477	3,498
6	8,972	5,474	3,498	8,972	5,474	3,498



$$\text{Drop Out Rate Grade 1} = \frac{10,314 - 10,310}{10,314} \times 100$$

$$= 0.04$$

$$\text{Drop Out Rate Grade 1 Female} = \frac{5,670 - 5,668}{5,670} \times 100$$

$$= 0.04$$

$$\text{Drop Out Rate Grade 1 Male} = \frac{4,644 - 4,642}{4,644} \times 100$$

$$= 0.04$$

The Dropout Rate for the School Year 2002-2003 for Grade 1 is 0.04 %. Likewise, the dropout rate per Male-Female is 0.04%.

## IV. Methods of Computing Enrollment Projection

### A. Determine the increment participation rate, IPR



$$\text{IPR} = \frac{\text{TPR}_n - \text{EPR}_i}{t}$$

Where:

- IPR = the average yearly increment participation rate
- EPR<sub>i</sub> = the existing enrollment participation rate for the base year at elementary secondary/tertiary level as computed in item c.1.
- TPR<sub>n</sub> = the target participation rate (regional) for elementary/secondary/tertiary level at year n.
- t = the number of years between n and base year i.

1. Projected enrollment participation rate for year (i + 1).



$$\text{EPR}(i + 1) = \text{EPR} + \text{IPR}$$

For succeeding years, add increment enrollment participation rate/IPR to the previous EPR.

$$\text{EPR}(i+2) = \text{EPR}(i + 1) + \text{IPR}$$

2. Projected enrollment is the product of the targeted enrollment participation rate multiplied by the projected school-going age population.



$$\begin{array}{rcccl} \text{Projected} & & \text{Targeted Enrollment} & & \text{Projected School} \\ \text{School} = & & \text{Participation Rate} & \times & \text{Going Age} \\ \text{Enrollment} & & \text{TEPR} & & \text{Population} \\ & & & & \text{(SGA)} \end{array}$$

Note: Target enrollment participation rate can be obtained from DepEd.



**Example:**

- Existing Enrollment Participation Rate (EPR<sub>i</sub>) for SY '00-'01 = 71%
- Target Participation Rate Regional (TPR<sub>n</sub>) for SY 2005-2006 = 75%
- Number of years between SY '00-'01 to SY 2005-2006 (1) = 5
- Projected School-going Age (SGA) Participation

2001	=	5443
2002	=	5655
2003	=	5853
2004	=	6868
2005	=	7270

$$\text{a. IPR} = \frac{\text{TPR}_n - \text{EPR}_i}{t} = \frac{75\% - 71\%}{5} = 0.8$$

$$\text{b. EPR}(i+1) = \text{EPR}(01-02) + \text{IPR} = 71 + 0.8 = 71.8\%$$

c. Projected Enrollment for '01-'01	=	Projected Enrollment (EPR)	X	School-Going Age Population (2001)
Enrollment Participation Rate ('02 - '03)	=	71.8% + 0.8%		
	=	72.6%		
Projected Enrollment ('02-'03)	=	72.6% x 5.655		
	=	4.106		
Enrollment Participation Rate (2003-2004)	=	72.6% + 0.8%		
	=	73.4%		
Projected Enrollment (2003-2004)	=	73.4% x 5.853		
	=	4.296		
Enrollment Participation Rate (2004-2005)	=	73.4% + 0.8%		
	=	74.2%		
Projected Enrollment (2004-2005)	=	74.2% x 6.686		
	=	75.0%		
Enrollment Participation Rate (2005-2006)	=	74.2% + 0.8%		
	=	75.0%		
Projected Enrollment	=	75.0% x 7,270		
	=	5,452		

## B. Linear Regression Analysis:

Linear Regression Analysis may be used for projecting enrollment. This methodology assumes enrollment is dependent on time. The equation which describes this as follows:



$$y = a + bx$$

Where:

- y = Enrollment
- b = Increase in Enrollment per year
- x = Number of years from base year
- a = Enrollment during the base year (adjusted using the equation)

Example:

School Year	Column 1 (x)	Column 2 (y)	Column 3 (xy)	Column 4 (x <sup>2</sup> )
1999-2000	-2	175	-350	4
2000-2001	-1	205	-205	1
2001-2002	0	216	0	0
2002-2003	1	254	254	1
2003-2004	2	234	468	4
Total	0	1,084	167	10



The figures above are used in the following procedures:

- a) The preceding years have graduated negative values and the succeeding years after zero, graduated positive values.
- b) For column 3, multiply the value of x in one school year by y of the same school year, thus, for school year 1999-2000,  $-2 (175) = -350$ . Then, get the total of all values derived from this procedure.
- c) To derive the figures in column 4, get the square of x in one school year. For school year 1999-2000,  $(-2)^2 = 4$ . Then, get the total of all the values derived from this procedure.
- d) To compute for b, which is the increase in enrollment per year, use the following

formula:

$$\begin{aligned}
 b &= \frac{\text{total of } (xy)}{\text{total of } x} \\
 &= \frac{167}{10} \\
 &= 16.7 \text{ (the increase in enrollment per year)}
 \end{aligned}$$

e) To compute for a, use the following formula:

$$a = (\text{average of } y) - (b)(\text{average of } x),$$

Thus

$$\begin{aligned}
 a &= \frac{1,084}{5} - \frac{17(10)}{5} \\
 &= 217 - 0 \\
 &= 217 \text{ (adjusted enrolment for the base year)}
 \end{aligned}$$

f) Using 2000-2001 as the base year, x will be the number of year between this year and the projected enrolment year. Thus to get y, the following formula is used:

- $y = a + bx$
- $= 217 + 17(3)$
- $= 268$  is the Enrollment for Year 2004-2005

g) Projected enrollment for the succeeding school year may be determined in the same manner.



## Social Sub-Sector: Health and Sanitation

### Steps:

#### I. Data Gathering and Processing

##### A. Generate the following data/information and present in table format:

1. General Health Situation for the Past Five Years (refer to **Table SO-10**).
2. Medical Health Facilities and Personnel, Year \_\_\_\_\_ (refer to **Table SO-11**).
3. Ten Leading Causes of Morbidity for the Past Five Years (refer to **Table SO-12**).
4. Ten Leading Causes of Mortality for the Past Five Years (refer to **Table SO-13**).
5. Malnourished Children for the Past Five Years (refer to **Table SO-14**).
6. Existing Cemeteries and Memorial Parks, Year \_\_\_\_\_ (refer to **Table SO-15**).
7. Number of Households in Occupied Housing Units by Type of Toilet Facilities, Year \_\_\_\_\_ (refer to **Table SO-16**).
8. Projected Requirements for Barangay Health Facilities, Year \_\_\_\_\_ (refer to **Table SO-17**).
9. Solid Waste Generation by Source, Year \_\_\_\_\_ (refer to **Table SO-18**).
10. Method of Solid Waste Disposal/Treatment, Year \_\_\_\_\_ (refer to **Table SO-19**).
11. Wastewater Generation by Source and Treatment/Disposal Methods, Year \_\_\_\_\_ (refer to **Table SO-20**).



The output tables are basic information from which assessment of the level of service of the health sector may initially proceed. Other relevant information may be gathered through a consultation process.

##### B. Determine the felt needs, aspirations and issues of the community relative to health through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions such as:

- What issues and concerns related to health and sanitation environment would you want to be addressed?
- In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
- In what ways can the government address/resolve these issues and concerns?

What are your aspirations to improve the level of health services?

##### C. Gather additional data/information if warranted by the results of the consultations/meetings conducted.

## II. Data Analysis

Assess the existing health and sanitation situation of the locality and prepare a brief narrative report in terms of the following:

### A. Health Resources

1. Availability of health facilities in terms of number, services offered, type, distribution/ location
2. Adequacy/accessibility of services
3. Adequacy of health personnel and budget
4. Epidemic occurrence
5. Accessibility to health services and facilities within the 35 km-radius
6. Top leading causes of mortality and morbidity of the population and how these relate to the adequacy and efficiency of health services and facilities, local sanitation and hygiene practices.
7. Exposure and vulnerability of health facilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)

### B. Burial Grounds

1. Availability (number and area) and accessibility (location) of burial grounds in the locality to include services in the adjacent or nearby cities/municipalities.
2. Adequacy of existing burial grounds taking into consideration the following:
  - present condition
  - burial practices
  - approved memorial parks and cemeteries

### C. Solid Waste and Wastewater Facilities

1. Availability, adequacy and description of existing solid waste management/ treatment/disposal methods and facilities (e.g. Material Recovery Facility, Sanitary Land Fill, controlled dumpsite, etc.), location, and operations;
2. Sectors involved and institutional structure (responsible personnel, communities, groups involved and manner of participation in solid waste management);
3. Existing systems and techniques of waste storage, collection, reduction, reuse and recycling, treatment and disposal employed in the city/municipality including those practiced by hospitals and other establishments known to generate toxic, hazardous or nuclear wastes;
4. Sources of pollution/contamination affecting the drainage system;
5. Existing facilities available for wastewater collection, treatment and disposal, coverage area and treatment efficiency and adequacy to cater to existing and projected development scenarios.
6. Impact of the current state of solid waste and wastewater management to the natural ecosystems and health status of the people.



Assess the efficiency of the solid waste and wastewater disposal method in terms of the following:

- **Effect on the human health:** Relate the existing morbidity incidences in the locality with the issue of sanitation. Some diseases may be directly attributed to poor sanitation, which occurs when solid wastes and wastewaters are not properly managed.
- **Impact on the natural system:** Relate the existing environmental quality or status of the ecosystem with waste management. Improper management of wastes causes pollution of water bodies and the atmosphere. Water classification guides (DENR: DAO 1990-34 and 35; DMC 2007-01) may be used as input in monitoring to ensure that water condition is according to the identified best usages.

### III. Current and Projected Needs

Determine the current needs and future requirements for health facilities and personnel as well as burial facilities and solid waste and wastewater management.

#### A. Health Resources

The determination of current needs and future requirements shall consider the following:

- area and location per type of hospital
- number of beds per type of facility
- number of personnel by category
- facilities and kinds of treatment/function/services per level of health services.



The projection of area requirements for health facilities shall be guided by the standards and criteria listed in **Annex SO-3**.

#### B. Burial Grounds

Determine the current need and future requirement for burial grounds based on standards, recognized planning and design criteria.

The future area requirement is computed as follows:

1. Compute for the Crude Death Rate (CDR) following the formula below:



$$\text{Crude death rate} = \frac{\text{Number of deaths} \times 1,000}{\text{Population}}$$

Example:

$$2000 \text{ population} = 20,000$$

$$\text{Number of deaths} = 500$$

$$\text{CDR} = \frac{500 \times 1,000}{20,000}$$

$$\text{CDR} = 25 \text{ deaths per } 1,000 \text{ population}$$

2. Using the CDR, project the number of deaths by multiplying it to the number of projected population. Divide the product by 1,000.



$$\text{Projected Number of deaths} = \frac{\text{CDR} \times \text{Population}}{1,000}$$

Example:

$$\begin{aligned} \text{Projected Population of municipality} &= 22,000 \\ \text{Projected number of deaths} &= \frac{25 \times 22,000}{1,000} \\ \text{Projected number of deaths} &= 550 \end{aligned}$$

3. Consider the number of burials within the city/municipality in projecting the area required for burial grounds. The following steps are recommended:
- Compare the number of deaths and the number of burial permits. The difference is equivalent to the number of burials outside the city/municipality.
  - Add the number of burials outside the municipality to the number of cremations, if any.
  - Subtract the sum from the number of deaths. The result is the number of deaths buried within the city/municipality.
  - To compute for the projected number of deaths to be buried within the city/municipality, get the participation rate by:



$$\text{Participation Rate (PR)} = \frac{\text{number of burial permits}}{\text{number of deaths}} \times 100$$

Example:

$$\begin{aligned} \text{Number of burial permits} &= 300 \\ \text{Number of deaths} &= 500 \\ \text{Projected Number of Deaths} &= 550 \\ \text{Participation Rate (PR)} &= \frac{300}{500} \times 100 \\ \text{PR} &= 60\% \end{aligned}$$

4. To determine the projected area requirement for burial grounds, multiply the projected number of deaths with the participation rate and the minimum plot size of 1.0 meter by 2.44 meters.



Example:

$$\begin{aligned} \text{Projected Area} \\ \text{Requirements for Burial} \\ \text{Grounds} &= \text{projected number of deaths} \times \text{participation rate} \times \\ &\quad (1.0 \text{ m} \times 2.44 \text{ m}) \\ &= 550 \times 0.60 \times (1.0 \text{ m} \times 2.44 \text{ m}) \\ &= 300 \times (1.0 \text{ m} \times 2.44 \text{ m}) \end{aligned}$$

$$\begin{aligned} \text{Projected Area} \\ \text{Requirements for Burial} \\ \text{Grounds} &= 805 \text{ m}^2 \end{aligned}$$

5. Get the capacity of existing cemetery and other private memorial parks to be able to determine if there is a need to identify other burial site.
6. Estimate cemetery requirement based on a minimum plot size of 1.0 meter by 2.4 meters (excluding open spaces, circulation and facility requirements).



Refer to HLURB Rules and Regulations on the Development of Memorial Parks and to the location criteria/guidelines for cemeteries as provided under PD 856 (**Annex SO-3**).

## C. Solid Waste and Wastewater Management

1. Determine the area needed for solid waste management site. This may be carried out using the formula:



$$\text{Area} = \frac{\text{Amount (kg/year)}}{\text{Density (kg/m}^3\text{)}} \times \frac{\text{Residence time (year)}}{\text{Height (m)}}$$

### Sample computation for determination of land area for Sanitary landfill

Given:

Population = 100,000

Waste generation = .5 kg person/day

Waste density = 330 kg/m<sup>3</sup>

Height = 10 m

Residence time = 10 years

#### a. Compute for waste generation

$$\begin{aligned} \text{Waste generation} &= 100,000 \times .5 \text{ kg/day} \times 7 \text{ days/week} \times 52 \text{ weeks/year} \\ &= 18,200,000 \text{ kg/year} \end{aligned}$$

#### b. Compute for land area requirement

$$\begin{aligned} \text{Area} &= \frac{\text{Waste generated (kg/year)}}{\text{Waste Density (kg/m}^3\text{)}} \times \frac{\text{Residence time (year)}}{\text{Landfill depth (m)}} \\ &= \frac{18,200,000 \text{ kg/year}}{330 \text{ kg/m}^3} \times \frac{10 \text{ years}}{10 \text{ m}} \\ &= 55,151 \text{ m}^2 \text{ or } 5.5 \text{ hectares} \end{aligned}$$

#### c. Compute for the total land requirement

The computed land area requirement needs to be increased by 50% to allow for daily cover, roads, receiving areas, fencing, etc. Therefore:

$$\begin{aligned} \text{Total land area} &= 5.5 \text{ ha} \times 1.5 \\ &= 8.25 \text{ hectares} \end{aligned}$$

## Notes:

- Note that sanitary landfill is at the bottom of solid waste management hierarchy, that means, it is being done after other waste minimization strategies such as waste reduction at source, recycling, composting, etc. have been conducted. The Ecological Waste Management Act targeted 25% waste reduction for disposal to sanitary landfill after 5 years implementation of the act.
  - 330 kg/m<sup>3</sup> waste density utilized by the DENR
  - Waste generated should remove fraction to be diverted for composting, recycling, reuse, etc.
  - Target service time of the facility. The DENR prescribes that the site should be sufficient for a landfill with a target service life of up to 5 years.
  - Landfill depth = 10 meters.
7. Select the site for solid waste facilities and indicate in the land use map. The following is the general siting criteria for waste facilities
- Environmentally satisfactory –prevent surface and groundwater pollution, soil contamination, and air pollution
  - Socially acceptable –minimize smell and noise, aesthetic
  - Good accessibility –proper distance, good road infrastructure
  - Good service provision –access to water, power, and sewerage



The minimum location considerations for siting sanitary landfills and controlled dumpsites are found in **Annex SO-4**. Minimum Locational Considerations.

8. Appropriate the necessary land, including the required right-of-way access to the land for the construction of the sewage and/or septage treatment facilities (Sec. 7, RA 9275 – Clean Water Act)



The site selection criteria for sewerage disposal are found in **Annex SO-4**. Minimum Locational Considerations.

9. Identify other viable strategies to contain and manage wastewater such as:
- Establishment of technologies (mechanized/non-mechanized) for wastewater treatment;
  - Protection and preservation of natural wetlands from destruction, loss or degradation, recognizing its role as a natural filtration system for wastewater before it enters a larger body of water;
  - Reuse of wastewater/water reclamation;
  - Provision of market-based mechanisms such as the adoption of “pollution charge” policy.

## IV. Sector Analysis Matrix

### A. Consolidate and validate the findings of the previous steps with the result of the consultation/s.

1. List the key issues, problems, and concerns of the education sector.
2. Determine the possible implications/impacts of the health and sanitation situation to such issues as Economic-commercial, industrial, agricultural; Social-housing, education, social welfare; and Environmental-water supply, garbage, hospital and industrial wastes, cemeteries and burial grounds.
3. Consider the impact of Climate Change and Disaster Risks



**B. Recommend interventions as follows:**

1. Policy options and appropriate strategies.
2. Programs and projects for implementation with due consideration of current and pipeline projects.

**C. Prioritize, tabulate, and present the results in matrix form as follows:**

Table SO–9. Sample Health and Sanitation Analysis Matrix

<b>Technical Findings/ Observations</b>	<b>Implications (Effects)</b>	<b>Policy Options/ Interventions</b>
<ul style="list-style-type: none"> <li>• Poor condition of health centers</li> <li>• Health centers highly susceptible to flooding</li> </ul>	<ul style="list-style-type: none"> <li>• Not conducive environment for health workers and patients</li> </ul>	<ul style="list-style-type: none"> <li>• Renovation of health centers</li> <li>• Relocation to safe areas</li> </ul>
<ul style="list-style-type: none"> <li>• Congested public cemetery</li> </ul>	<ul style="list-style-type: none"> <li>• Risks of burials spilling on adjoining properties/critical areas</li> </ul>	<ul style="list-style-type: none"> <li>• Expansion of existing cemetery in suitable areas</li> </ul>
<ul style="list-style-type: none"> <li>• Improper disposal/inadequate treatment of hazardous/pollutive hospital/industrial wastes</li> </ul>	<ul style="list-style-type: none"> <li>• Population at risk to infection/spread of diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Policy that waste generators shall be responsible for the proper management and disposal of waste and to bear the costs attendant to it.</li> <li>• Provision of space/technology for the disposal/treatment of hospital/industrial hazardous wastes</li> <li>• Imposition of pollution charge policy</li> </ul>
<ul style="list-style-type: none"> <li>• Presence of ecoli / contamination of sources of water supply/ bodies of water</li> </ul>	<ul style="list-style-type: none"> <li>• Exposure to diseases</li> <li>• Health risks to families /individuals using water from these sources/bodies of water</li> </ul>	<ul style="list-style-type: none"> <li>• Periodic testing of water source</li> <li>• Study source of contamination and propose actions accordingly</li> </ul>

V. Tables

Table SO–10. General Health Situation For The Past Five Years

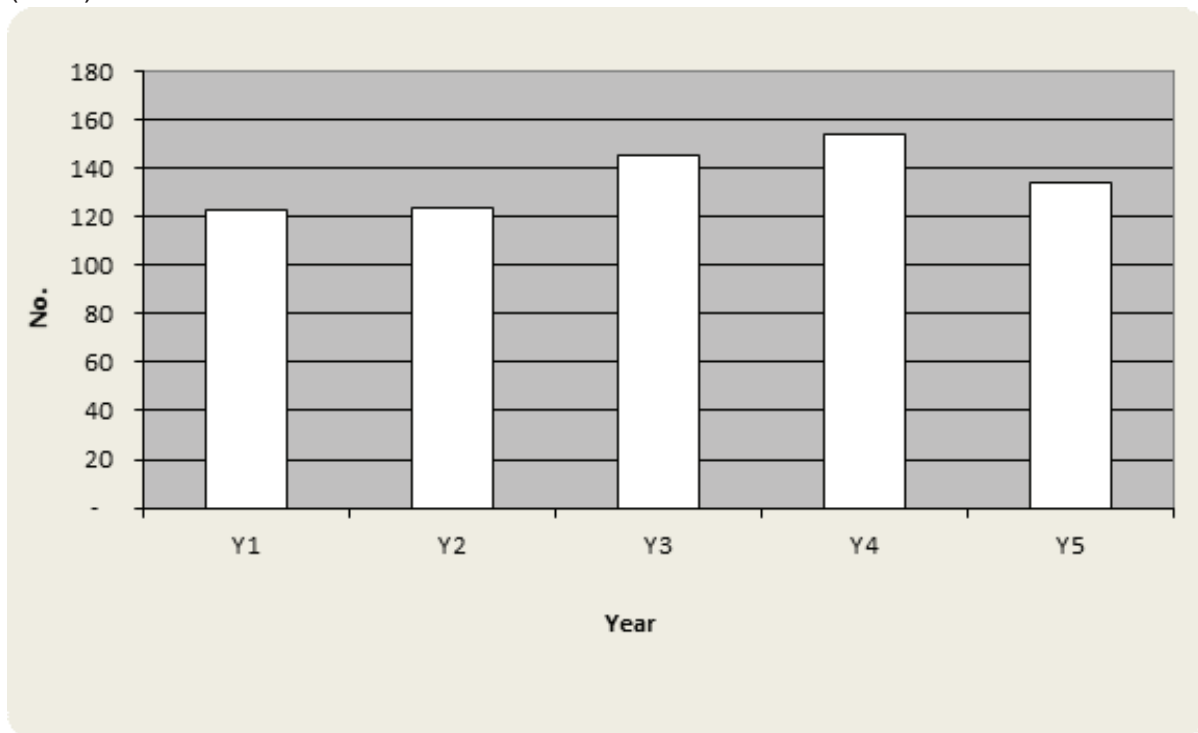
Health Indicator	City/Municipal										Provincial	
	Y <sub>1</sub>		Y <sub>2</sub>		Y <sub>3</sub>		Y <sub>4</sub>		Y <sub>5</sub>		Y <sub>5</sub>	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Fertility</b>	5		10		12		18		5		25	
Crude Birth Rates (CBR)	123		124		145		154		134			
Total Fertility Rate (TFR)												
<b>Morbidity</b>	6		12		8		10		12		20	
General Medical												
Consultative Rate												
Hospitalization Rate												
<b>Mortality</b>	8		10		14		8		12		24	
Crude Death Rate (CDR)	123		134		77		98		76			
Proportioned Mortality Rate(PMR)												
Infant Mortality Rate (IMR)												
Young Child Mortality Rate(YCMR)												
Maternal Mortality Rate (MMR)												

Source: Municipal Health Office, Local Civil Registry / Hospital Records

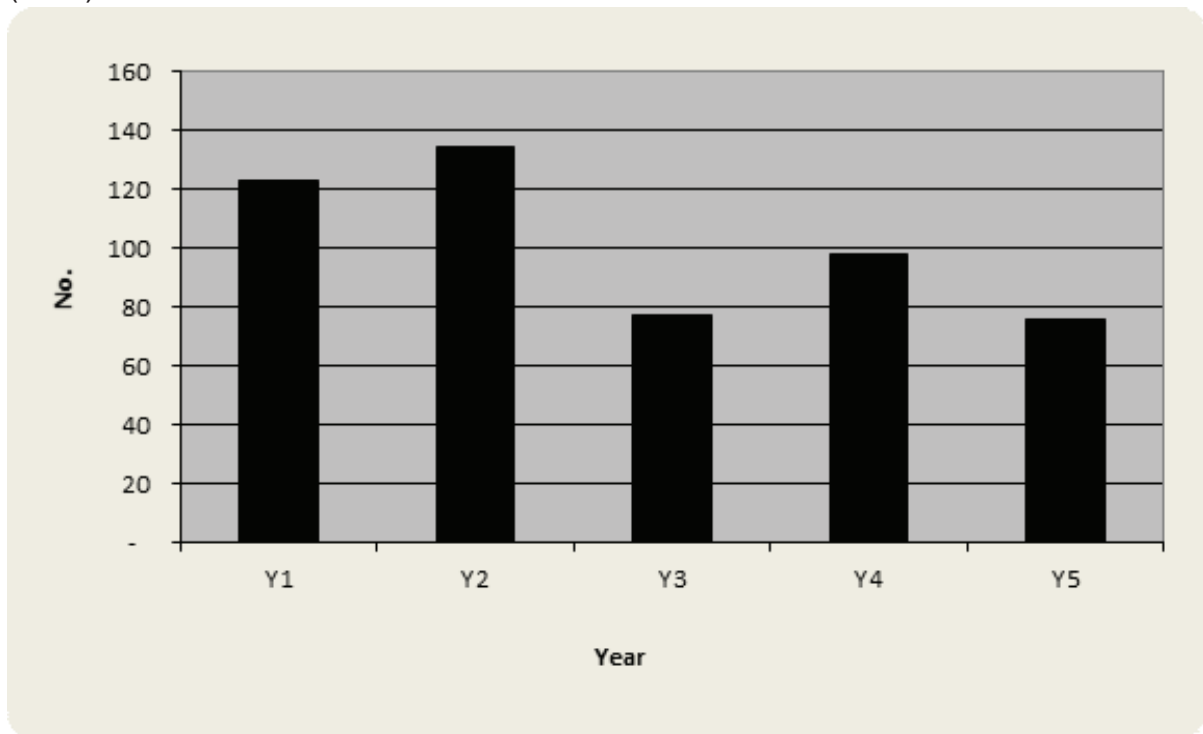
Notes:

- Y1 to Y5 are five consecutive years with Y5 having the most recent data
- Refer to **Annex SO-8** for the Definition and Sample computation

Graph S0-10a. General Health Situation for the Past Five Years: Crude Birth Rates (CBR)



Graph SO-10b. General Health Situation for the Past Five Years: Crude Death Rates (CDR)





SI-Sanitary Inspectors

Oth - Others

- Physical Condition – Operational (O), Needs Repair (NR), Not Operational (NO)
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

**Table SO–12. Ten Leading Causes of Morbidity for The Past Five Years**

Causes	No. of Deaths				
	Y <sub>1</sub>	Y <sub>2</sub>	Y <sub>3</sub>	Y <sub>4</sub>	Y <sub>5</sub>
1.					
2.					
Total					

Source: Municipal Health Office/Hospital Records/Local Civil Registrar.

Note:

- Y1 to Y5 are five consecutive years with Y5 having the most recent data

Table SO–13. Ten Leading Causes of Mortality for The Past Five Years

Causes	City/Municipal												Provincial										
	Y <sub>1</sub>			Y <sub>2</sub>			Y <sub>3</sub>			Y <sub>4</sub>			Y <sub>5</sub>			Total	%	M	F	%			
	%	Total	M	F	%	Total	M	F	%	Total	M	F	%	Total	M						F	%	
Pneumonia	34.6	18	10	8	36.4	24	10	14	34.6	18	10	8	36.4	24	10	14	39.1	25	15	10	39.4	50	39.4
Cerebro Vascular Accident	19.2	10	6	4	18.2	12	8	4	19.2	10	6	4	18.2	12	8	4	17.2	11	6	5	17.3	22	17.3
Pulmonary Tuberculosis	17.3	9	8	1	10.6	7	3	4	17.3	9	8	1	10.6	7	3	4	9.4	6	2	4	9.4	12	9.4
Gastric Ulcer	7.7	4	1	3	10.6	7	4	3	7.7	4	1	3	10.6	7	4	3	9.4	6	3	3	9.4	12	9.4
Malignancy	3.8	2	0	2	6.1	4	1	4	3.8	2	0	2	6.1	4	1	4	7.8	5	2	3	7.9	10	7.9
Congestive Heart Failure	3.8	2	2	0	6.1	4	2	2	3.8	2	2	0	6.1	4	2	2	6.3	4	3	1	6.3	8	6.3
Respiratory Arrest	3.8	2	2	0	4.5	3	1	2	3.8	2	2	0	4.5	3	1	2	3.1	2	2	0	3.1	4	3.1
Hypovolemic Shock	3.8	2	0	2	3.0	2	1	1	3.8	2	0	2	3.0	2	1	1	3.1	2	2	0	3.1	4	3.1
Myocardial Infraction	3.8	2	1	1	3.0	2	2	0	3.0	2	1	1	3.0	2	2	0	3.1	2	2	0	2.4	3	2.4
Cirrhosis of the Liver	1.9	1	1	0	1.5	1	1	0	1.9	1	1	0	1.5	1	1	0	1.6	1	0	1	1.6	2	1.6
TOTAL		52				66				52				66				64				127	

Source: Municipal Health Office / Hospital Records/ Local Civil Registrar

Notes:

- Disaggregation of number by sex is ideal to have but is not important
- Y1 to Y5 are five consecutive years with Y5 having the most recent data
- % = (Total per cause/Overall Total) x 100



Graph SO-13. Ten Leading Causes of Mortality for the Past Five Years

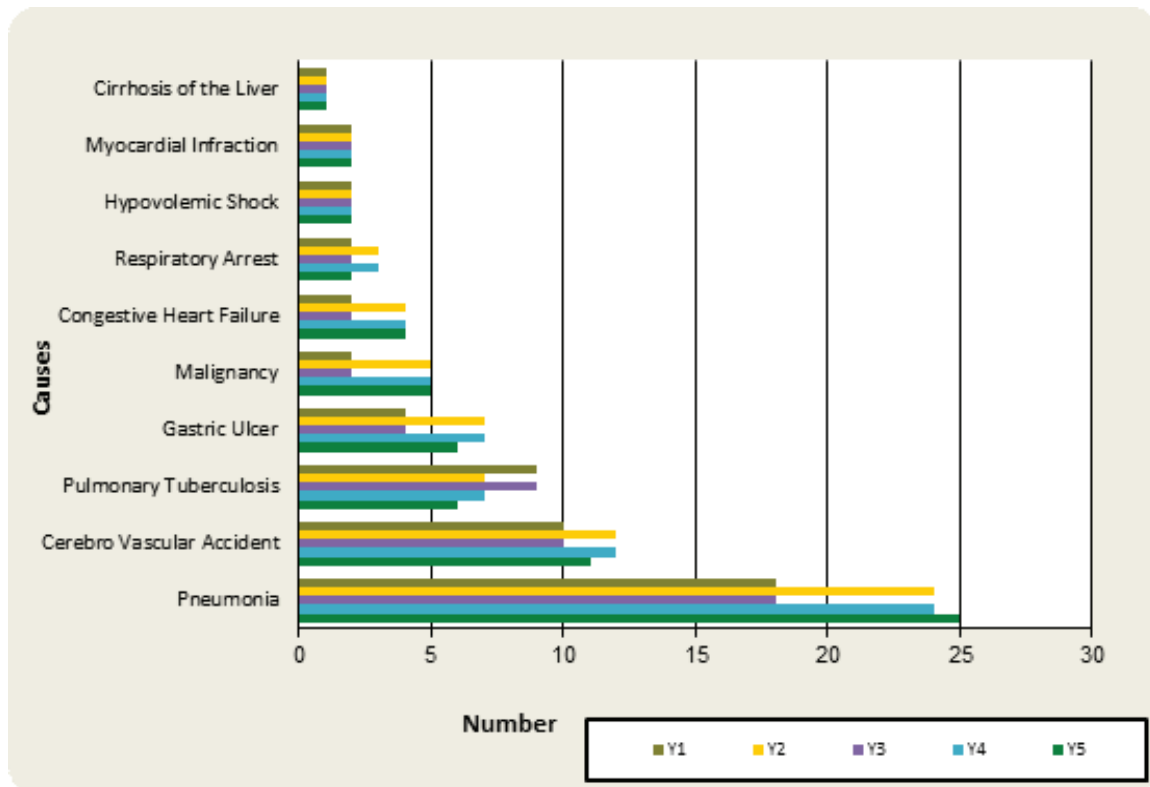


Table SO-14. Malnourished Children For The Past Five Years

Degree of Malnutrition	City/Municipal										Province	
	Y1		Y2		Y3		Y4		Y5		Y5	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1st	1,000	3.95	651	2.60	700	2.74	825	3.19	401	2.60	972.00	2.74
2nd	198	0.78	107	0.43	120	0.47	115	0.44	89	0.43	212.00	0.47
3rd	50	0.20	45	0.18	55	0.22	50	0.19	30	0.18	76.00	0.22
<b>TOTAL</b>	<b>1,248</b>	<b>0.05</b>	<b>803</b>	<b>3.21</b>	<b>875</b>	<b>3.42</b>	<b>990</b>	<b>3.82</b>	<b>520</b>	<b>2.00</b>	<b>1,260</b>	<b>4.43</b>
<b>Total No. of Children (0-15 years)</b>	25,345		25,023		25,555		25,895		26,021		28,416.00	

Source: Municipal Health Office / Municipal Nutrition Council

Notes:

- Y1 to Y5 are five consecutive years with Y5 having the most recent data
- % = (No./Total No. of Children) x 100

Graph SO-14. Malnourished Children for the Past Five Years

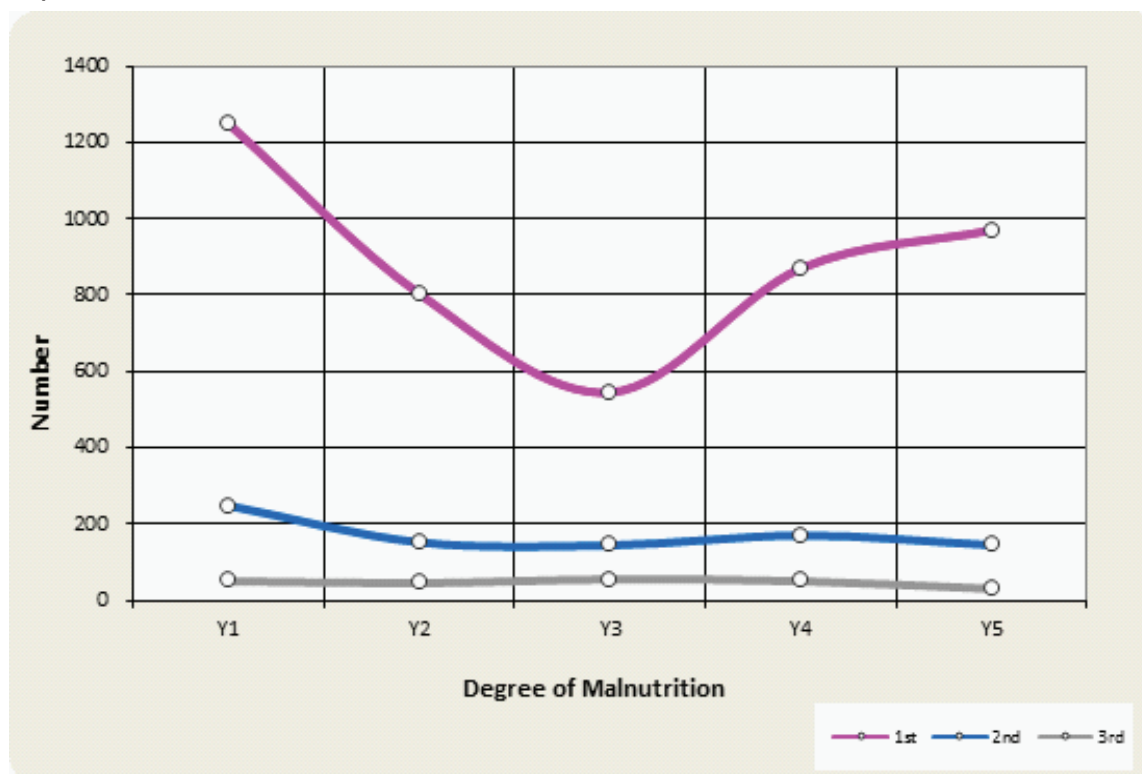


Table SO-15. Cemeteries And Memorial Parks, Year \_\_\_\_\_

Name of Cemetery/ Memorial Park	Brgy.	Ownership	Area (ha)	Capacity (No. of Plots)	Remarks

Source: Primary Survey

Notes:

- Ownership – Public/Private
- Remarks may include other characteristics of the cemetery: for example, if the cemetery is only for Catholics, Muslim, etc.

Table SO-16. Number of Households in Occupied Housing Units by Type of Toilet Facilities, Year \_\_\_\_\_

Barangay	Type of Toilet Facility (No.)							
	Sanitary				Unsanitary			
	Own Flush	Shared Flush	Closed Pit Latrine	TOTAL	Open Pit Latrine	Drop/Overhang	No Facility/Field	TOTAL
Brgy. A	75.00	32.00	7.00	114.00	12.00	-	-	12.00
Brgy. B	89.00	46.00	12.00	147.00	11.00	-	-	11.00
Brgy. C	78.00	20.00	9.00	107.00	6.00	-	-	6.00
<b>TOTAL</b>	<b>242.00</b>	<b>98.00</b>	<b>28.00</b>	<b>368.00</b>	<b>29.00</b>	<b>-</b>	<b>-</b>	<b>29.00</b>

Source: NSO/ PSA; City/Municipal Records

Notes:

- Type of Toilet Facility
  1. Own flush - refers to water-sealed type of toilet facility leading to a depository, and is used exclusively by a household
  2. Shared flush – same as own flush but shared with other households
  3. Closed Pit Latrine – toilet facility without water-sealed bowl and box for sitting/squatting. The depository is usually made of tubes with concrete/clay covered top with a small opening.
  4. Open Pit Latrine – same as closed pit but without covering

5. Drop/Overhang – can be a pail system wherein fecal matter is contained in a pail and is picked up for disposal, or any other type of toilet facility not belonging to the earlier types.

6. No facility/field – refers to households without toilet facility

Source: <http://www.nscb.gov.ph/ru11/glossary/population/TF.htm>

Graph SO-16. Number of Households in Occupied Housing Units by Type of Toilet Facilities, Year\_\_\_\_\_

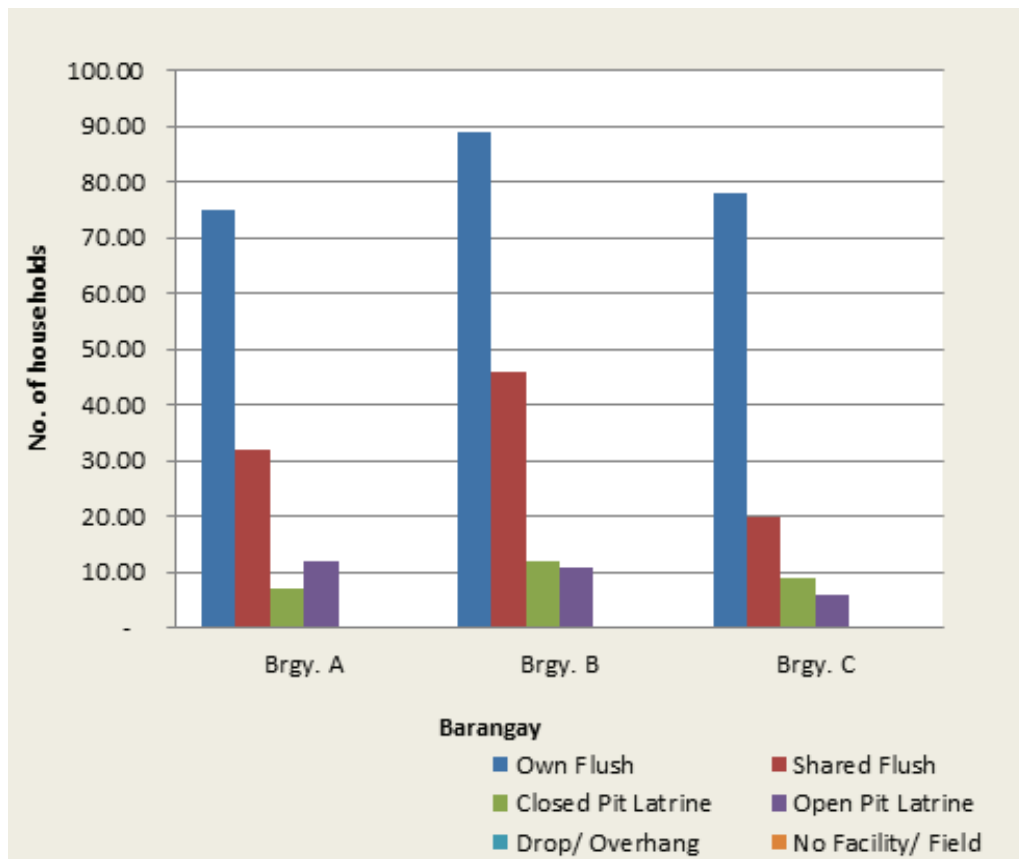


Table SO-17. Projected Requirements For Barangay Health Facilities, Year\_\_\_\_\_

Barangay	No. of Barangay Health Station*					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10
<b>Total</b>						

Note:

- \* Computed Based on Ratio of 1 Barangay Health Station per 5,000 Population and using the Projected Population in demographic study.

Table SO–18. Solid Waste Generation by Source, Year \_\_\_\_\_

Source	Types of waste	Volume of solid waste generated (tons/day)	Volume of solid waste collected (tons/day)	Disposal methods/ treatment facilities	Disposal site
Domestic					
Commercial					
Industrial					
Hospital					
Others					

Source: Primary survey; City/Municipal Records

Table SO–19. Methods of Solid Waste Disposal/Treatment, Year \_\_\_\_\_

Methods	Quantity (Total city/municipal solid waste generated)	No. of household served	Agency Responsible
1. Collected and disposed to:			
- Open Dump			
- Controlled Dump			
- Sanitary Landfill			
2. Composting			
3. Recycling			
4. Not collected:			
- Burned			
- Dumped in individual openpit (not burned)			
5. Others			

Table SO–20. Wastewater Generation by Source and Treatment/Disposal Methods, Year \_\_\_\_\_

Source	Volume of wastewater generated (tons/day)	No. / Percentage connected to a central sewerage system	Disposal methods/ treatment facilities	Disposal site
Domestic				
Commercial				
Industrial				
Hospital				
Others				

## Annex SO–3. Definition of Terms and DOH Standards

Crude death rate is the number of deaths per one thousand (1,000) mid-year population of a given area.

Epidemic refers to the occurrence in a community or region of cases of an illness clearly in excess of expectancy. Expectancy varies with the nature of disease, its mode of transmission, and community characteristics, among other things. This is also relative to the usual frequency of the disease in the same area, among the specific populations, and at the same season of the year.

Source: Department of Health (DOH).

Table SO–21. Summary of Health Services Facilities and Functions

Level of Health Services	Facilities	Kinds of Treatment/ Function/Services
First Level	Referral Hospital	Non-departmentalized hospital that provides clinical care and management on the prevalent diseases in the locality Clinical services include general medicine, pediatrics, obstetrics and gynecology, surgery and anesthesia Provides appropriate administrative and ancillary services (clinical laboratory, radiology and pharmacy) Provides nursing care for patients who requires immediate, moderate and partial category of supervised care for 24 hours or longer
Second Level	Referral Hospital	Departmentalized hospital that provides clinical care and management on the prevalent diseases in the locality, as well as particular forms of treatment, surgical procedure and intensive care Clinical services provided in the First Level Referral Hospital as well as specialty clinical care Provides appropriate administrative ancillary services (clinical laboratory, radiology and pharmacy) Nursing care provided in the First Level Referral Hospital, as well as total and intensive skilled care
Third Level	Referral Hospital	Teaching and training hospital that provides clinical care and management on the prevalent diseases in the locality, as well as specialized and sub-specialized forms of treatment, surgical procedure and intensive care Clinical services provided in the Second Level Referral Hospital as well as sub-specialty clinical care Provides appropriate administrative ancillary services (clinical laboratory, radiology and pharmacy) Nursing care provided in the Second Level Referral Hospital, as well as continuous and highly Specialized critical care
	Infirmery	A health facility that provides emergency treatment and care to the sick and injures, as well as clinical care and management to mothers and new born babies
	Birthing Home	A health facility that provides maternity service and post-natal care, normal spontaneous delivery and care of newborn babies
	Acute-Chronic Psychiatric Care Facility	A health facility that provides medical service nursing care, pharmacological treatment and psychosocial intervention for mentally ill patients
	Custodial Psychiatric Care Facility	A health facility that provides long term care, including basic human services such as food and shelter to chronic mentally ill patients

Source: Bureau of Health Facilities and Services (Department of Health)

Table SO–22. Standards in RHU Personnel Population per RA No. 1082

Category	LGU/Catchment Population	Personnel			
		Doctor	Nurse	Midwife	RSI
I	2,000 or Less	-	-	1	1
II	2,001 - 5,000	-	1	1a	1a
III	5,001 - 10,000	1	1	1	1
IV	10,001- 20,000	1	1	2	1
V	20,001- 30,000	1	2	2	1
VI	30,001- 40,000	2	2	2	2
VII	40,001- 50,000	2	2	3	3
VIII	50,001- over	2	4	4	3

Source: Department of Health (DOH)



#### Standard Area per Hospital/Clinic

Municipal Hospital	=	1.5 ha
Provincial Hospital	=	1.5 ha
Regional Hospital	=	2.5 ha
Medical Center	=	3.5 ha



#### Criteria for Establishing a New Hospital (Government)

The proposed hospital is at least thirty five (35) kilometers away from any existing government hospital;

- The hospital will be accessible as a referral facility to a minimum of three (3) RHU or main health center facilities in the catchment area;
- The permanent population to be served within the catchment area is at least 75,000 population; and
- In the case of island municipalities or inaccessible areas due to mountainous terrain or geographic barriers, the following shall apply:
  - The catchment population shall be at least 25,000 or more
  - The area shall be at least 3 hours away by the usual means of transportation



#### Location Criteria/Guidelines for the Different Hospitals and Health Facilities

##### Rural Health Units

- Barangay Health Station (BHS) –the BHS is the initial unit which dispense basic health care i.e. maternal and child care, immunizations, treatment of simple medical conditions, nutrition, family planning, sanitary health care, emergency treatment and health education. The recommended service zone is from three (3) to five (5) kilometers considering transport availability for both the patient and medical staff and serving a population of 5,000. The BHS is manned by full-time rural health midwife. It should be centrally located and grouped with the other institutional facilities such as chapel, school and park/playground.
- Main Health Center (MHC) –The MHC engages in a broad range of activities covering mostly referrals from the BHS and the preventive, promotive and curative aspects of



health care. The MHCs are under the administrative and technical supervision of the Municipal Government. A municipality should have one MHC regardless of the number of population, thus the catchment area is the whole municipality.

#### City Health Center

In a city, the City Health Center (CHC) renders the same services as that of the Main Health Center but under the administrative and technical supervision of the City Health Office.

Both the MHC and CHC should be located preferably near the commercial section of the municipality/city where public transportation is available.

Main Health Center and City Health should be guided by the following considerations:

- Every municipality/city should have at least one MHC/CHC (for every 50,000 population)
- Planned within the context of the poblacion:
  - The use of MHC/CHC will be optimized if the site is close to the market center;
  - It should be accessible to major roads and bus routes;
  - It should be located in areas with no obnoxious smells, noise or hazardous traffic condition; and
  - It should be free from flood dangers; sub-soil condition must be acceptable.

**Municipal Hospital** –The hospital has a service zone with a radius of approximately thirty (30) kilometers. It should be located in settlements not provided with hospital services, thus, serving as local gravitation points and socio-economic centers. In special cases, it may be located in remote areas and provided with adequate transport facilities.

**Secondary Care District Hospital** –The hospital provides definitive care in the four (4) basic specialties, namely: medicine, surgery, obstetrics, gynecology and pediatrics. These specialties are however not departmentalized and required to have services as radiology, pharmacy, dietary and laboratory in areas where the provincial hospital is accessible, facilities for emergency cases are provided.

The secondary care district hospital has a service radius of at least thirty five (35) kilometers servicing the municipality or municipalities where it is located including its periphery.

**Tertiary Care Provincial Hospital** –The hospital offers services that of district hospitals but on a departmentalized basis. Additional facilities/services such as operating rooms, dental services and out-patient units as well as support services/facilities like x-ray and laboratory are provided.

The hospital should be located preferably at the capital town, catchment area is the whole province.

**Tertiary Care Regional Hospital** –The regional hospital is usually located in the regional center and offers more services than a provincial hospital. Facilities/services provided are: Intensive Care Units (ICU), Coronary Care Units (CCU), Eye, Ear, Nose and Throat (EENT) services, orthopedics and delivery room facilities. Nursing services to assist the specialists are likewise provided.

A regional hospital will be located within the context of the region to serve the most number of people in the region. A regional center must have a medical center or a regional hospital.

A nursing staff is provided from RHU to Tertiary care level to assist the specialists.

**Medical Center** –The Medical Center offers special care beyond the capabilities of Regional Hospital. This center provides opportunities for training, teaching and research in the medical field.

**Government Hospital** –It is a hospital operated and maintained partially or wholly by the National, Provincial, Municipal or City Government or other political subdivision, board or other agency.

**Private Hospital** –It is a hospital owned, established and operated with funds raised or contributed through donations, or by private capital or other means by private individuals, association, corporation, religious organizations, from company or joint stock association.

**General Hospital** –It is a hospital that provides services for all kinds of illnesses, diseases, injuries or deformities.

**Special Hospital** –It is a hospital that provides services for one particular kind of illness/ disease or health medical care need.

**Teaching and Training Hospital** –It is a fully departmentalized hospital with accredited residency training program in a specified specialty or discipline.



#### **Location Criteria/Guidelines for Cemeteries**

As per PD 856 (Sanitation Code of the Philippines), burial grounds, cemeteries, memorial parks, or any place duly authorized by the government for permanent disposal of the dead should be:

- At least twenty (20) meters distance from any dwelling unit, and no house shall be constructed within the same distance from any burial ground (Sec. 90b).
- Fifty (50) meters distance from either side of the river or fifty (50) meters distance from any source of water supply (Sec. 90 c).
- No burial ground shall be located in an area with high water table, water recharged aquifers, water bearing rocks or where soil permeability is good.
- Cemeteries are preferably designed in sparsely populated area but not outside city/ municipality limits or on the periphery of the town proper and away from the city/ municipal water system.
- Cemeteries are preferably located on grounds free from flood hazards.
- A new cemetery should also be located in an area not distracting the opening of future streets and arterial grounds.
- Cemeteries should be away from watershed of lakes or streams to maintain safe water supply.

## Annex SO-4. Minimum Locational Considerations

### Sanitary Landfills

- The site shall be accessible from major roadways and thoroughfares, provided that if it is not accessible, the project design shall include means of access.
- The site shall have an adequate quantity of earth cover material that is easily handled and compacted; as an alternative, an offsite guaranteed source of cover material shall be identified.
- If the site is located within two (2) kilometers of an airport runway, it shall not pose a bird hazard to aircraft. The Owner/Operator shall institute a bird control program so as to prevent hazards to aircraft if bird population becomes significant due to the operation of the landfill. The site shall comply with other requirements for safety of flying aircraft in terms of height of structures, such as provisions for obstruction lights, if required.
- Locations of public water supply intakes located within one (1) kilometer from the facility, including active public drinking water supply wells, shall be shown on a facility map.
- The facility shall not be constructed within 75 meters from a Holocene fault or known recent active fault.
- If significant archaeological and cultural resources are present at the site, such resources shall be protected and preserved.
- If the site is a habitat of listed endangered species, mitigation measures for protection of the species as required by applicable laws shall be included in the project proposal.
- The site shall be chosen with regard to the sensitivities of the community's residents. The Sangguniang Bayan of the host LGU shall adopt a resolution confirming compliance with the pertinent siting, design criteria and standards. The resolution shall be deemed as having fully satisfied the public sensitivity requirement of this section.
- The site shall be located in an area where the landfill's operation will not detrimentally affect environmentally sensitive resources such as aquifers, groundwater reservoir or watershed area, by provision of the following special mitigation measures and additional criteria:
  - The facility shall be a minimum 50 meters away from any perennial stream, lake or river.
  - The site shall be evaluated for presence of geologic hazards, faults, unstable soils, its foundation stability, and its hydrogeologic character. The site shall not be located in a floodplain.
  - It shall be provided with a composite base liner system consisting of a minimum 1.5 millimeter (mm) thick high density polyethylene liner (HDPE) underlain by a soil liner with a minimum thickness to 0.60 meter (m) and maximum permeability of  $1 \times 10^{-6}$  centimeter/second (cm/sec).
  - A Geosynthetic Clay Liner (GCL) with a minimum thickness of 6.4 mm and permeability of  $1 \times 10^{-9}$  cm/sec or less, may be substituted for the soil liner. Likewise, the design of the final cap shall be equivalent to its liner system in terms of permeability. The thickness of the final cover system shall be at least 1.5 m including a minimum 0.60 m thick soil foundation layer, its final cap, a drainage layer, and a vegetative layer of at least 0.30 m thick. If the thickness of the equivalent final cap makes the entire cover system less than 1.5 m thick, the deficiency shall be made up by increasing the thickness of the foundation layer.
  - Strict liner and final cap Construction Quality Assurance (CQA) and testing shall be performed by a third party experienced in earthwork, clay and geosynthetic liner

installation, quality assurance supervision, testing and inspection. The lead CQA person, as a minimum qualification or experience, must have supervised the installation of at least 100,000 square meters each of clay and geosynthetic liner system; the CQA person or firm shall submit a construction completion report within 60 days of liner or final cap construction completion to the Department, certifying that construction of each liner system was performed and completed in accordance with its plans and specifications. The CQA report shall be certified by a registered Civil or Geotechnical Engineer or other registered Engineer, provided that the certifying Engineer shall have at least designed or supervised the installation of soil and geosynthetic liners of quantities similar to those of the lead CQA person.

- The design of the landfill shall be statically stable and shall be able to withstand the effects of a ground acceleration generated by an earthquake of 100-year or more recurrence interval.
- A separation of at least two (2.0) meters shall be maintained between the top of the liner system and underlying groundwater.
- A temporary impoundment for drainage runoff shall be provided with a detention time sufficient for sediment removal and/or reduction, prior to its discharge.
- The site shall be large enough to accommodate the community's waste for a period of five (5) years or more during which people must internalize the value of environmentally sound and sustainable waste disposal.
- The site chosen shall facilitate developing a landfill that will satisfy budgetary constraints, including site development, operation for many years, closure and post-closure care and possible remediation costs.
- Designation of a separate containment area for household hazardous wastes.
- A gas control system shall be provided when the volume of waste in the landfill has reached 0.5 million metric tons. The owner/operator shall consider recovery and conversion of methane gas into usable energy if economically viable. Prior to installation of gas control facilities, perimeter boundary gas monitoring shall be performed in accordance with Section 2(b) of Rule XIV.
- Groundwater monitoring wells shall be placed at appropriate locations and depth for taking water samples that are representative of groundwater quality and for predicting groundwater flow.
- Cover shall consist of a daily soil cover at least 6 inches in thickness applied at the end of each workday. Alternative Daily Cover (ADC), maybe used provided that the owner/operator can demonstrate to the Department in writing, the equivalency of the proposed ADC in controlling infiltration, vector, odor and litter based on technical research or studies. In areas within the landfill that will not be used for at least 180 days, an additional interim soil cover of 6 inches thick shall be placed over the existing daily cover. The final cover shall consist of, from bottom to top, the foundation layer (consisting of 0.60m thick soil layer including interim cover), a final cap with an equivalent permeability as that of its liner system. A drainage layer and a vegetative layer. Installation of final cover shall be completed within six (6) months from the last receipt of waste.

#### **Minimum Requirements for locating Controlled Dumpsites**

- Drainage and runoff control shall be designed and managed such that storm water does not come in contact with waste and that discharge of sediments into the receiving body of water is minimized. Appropriate erosion protection shall be installed at storm discharge outfalls;
- Provision for aerobic and anaerobic decomposition shall be instituted to control odor;
- Working areas shall be minimized and kept at no more than a ratio of 1.5 square meter

(sq.m) or less per ton/day (tpd) of waste received on a daily basis, e.g. 30 sq.m working area for a 20 tpd facility;

- Provision of maintained all-weather access roads;
- Controlled waste picking and trading, if allowed by owner/operator, in order to facilitate daily covering and compliance to Subsections (a) through (e) above;
- Provision of at least 0.60 m final soil cover at closure, and post-closure maintenance of cover, drainage and vegetation; Post-closure maintenance shall be for a period of ten (10) years;
- Site shall not be located in flood plains and areas subject to periodic flooding and it shall be hydro-geologically suitable, i.e., adequate separation or clearance between waste and underlying groundwater and any surface body of water shall be provided. Engineering controls shall be provided otherwise.

### **Site Selection Criteria for Sewerage Disposal**

1. Sewerage disposal system should be at least 25 meters away from shallow wells and 15 meters away from deep wells;

2. The design should be based on a thorough assessment of the site for percolation rate, depth of water table, drainage and flooding characteristics;

3. For a sewerage disposal to work well, the slope should be from 0-8%, the permeability class is rapid, the percolation rate is greater than 180 mm/h, the depth of the water table is greater than 180 cm. As a rule, areas that have impeded drainage and prone to flooding should not be used for sewerage disposal;

4. There should be estimates of the required absorption area for drain fields and seepage pits given the percolation rate;

5. The depth to bedrock must be 120 meters or more below the disposal field, that is about 180 meters below the surface;

6. The groundwater table must be at least 120 meters below the disposal field;

7. For assessment purposes, the potential for sewerage disposal of various solid are:

- Loam (good)
- Clayey loam (poor)
- Organic (poor)
- Sand, sandy loam, gravel (fair)

## Social Sub-Sector: Housing

### Steps:

#### I. Data Gathering and Processing

##### A. Generate the following data/information and present in table format:

1. Housing Situation for the Last Three Censal Years (refer to **Table SO-24**)
2. Housing Backlog, Year \_\_\_\_ (refer to **Table SO-25**)
3. Informal Settlement Areas, Year \_\_\_\_ (refer to **Table SO-26**)
4. Inventory of Residential Subdivisions & Condominium Projects, Year \_\_\_\_ (refer to **Table SO-27**)
5. Resettlement Areas, Year \_\_\_\_ (refer to **Table SO-28**)
6. Housing Facilities and Utilities Situation for the Past Three Censal Years (refer to **Table SO-29**)
7. Occupied Housing Units and Lots by Tenure Status for the Past Three Censal Years, (refer to **Table SO-30**)
8. Occupied Housing Units by Condition (State Of Repair) of the Building and Year Built, Year \_\_\_\_ (refer to **Table SO-31**)
9. Inventory of Potential Lands for Housing, Year \_\_\_\_ (refer to **Table SO-32**)
10. Current and Projected Housing Need (refer to **Table SO-33**)



The output tables are basic information from which assessment of the level of service of the housing sector may initially proceed. Other relevant information may be gathered through a consultation process.

##### B. Determine the felt needs, aspirations and issues of the community relative to housing through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders.



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions such as:

1. What issues and concerns related to housing and the environment would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of housing services?

##### C. Gather additional data/information if warranted by the results of the consultations conducted



## II. Data Analysis

Assess the existing housing situation of the locality and prepare a brief narrative report in terms of the following:



Refer to **Annex SO-5**. Assessment Tools and Methods and Annex SO-6 Glossary and Classification of Housing Terms.

1. Ratio of households to occupied housing units based on the standard ratio of one household in one housing unit (1:1). Ratio higher than 1:1 indicates the existence of doubled-up households and a shortage in housing units. (Doubled-up households (DUHH) are housing backlogs that need to be considered in determining housing need/demand).

2. Ratio of household population to occupied housing units (average number of occupants per occupied housing unit).

3. Acceptability of housing units by structural quality of construction materials of walls and roofs: concrete, semi-concrete; housing units made of mixed and light materials, barong-barongs and others. Five percent (5%) of housing units made of mixed and light materials are estimated lost due to obsolescent and decay annually. Lost and obsolete units are for replacement of new units. These are also backlogs to be considered in determining housing need/demand.

4. Need for repair of housing units whether major, minor or totally dilapidated.

5. Density per housing units or number of persons and floor area of a housing unit will determine congestion or availability of space in housing unit.

6. Upgrading needs of households in occupied housing units in terms of: tenure status; infrastructure needs or access to services; and structure improvement needs or condition of housing unit and needs for repair.

- o Tenure status of households in occupied housing units: percentage of owner households; renting households; and those occupying houses or lots with or without consent of owner.

- o Renters and those occupants for free with consent of owners are households with upgrading needs. The households-occupants of houses or lots for free without the consent of owners can be considered informal settlers. These groups must be considered in planning.

- o Access of households in occupied housing units to services and utilities such as water, power, garbage disposal, sanitation and roads. Percentage of household served or provided with these services will determine the accessibility of households. Households not served by the services/facilities are included in the table of households with upgrading needs.

- o Households in occupied housing units that needs major repair or are already dilapidated are also included in those households with upgrading needs.

7. Location, area, and impacts of existing housing projects (private subdivision projects) and programs (government/civic organization housing programs) in the city/municipality.

8. Location, area, and extent of existing blighted areas, informal settlements, and/or settlements in environmentally critical and high risk areas.

9. Location, area, and extent of other housing problems with physical impacts such as congestion, peace and order, etc.

10. Exposure and vulnerability of settlements to hazards (refer to CCA and DRR section of

### III. Current and Projected Needs

Determine the current needs and future requirements for housing and present in short narrative form:

a. Extent of housing needs/demand, current and projected, in terms of housing units needed and upgrading needs. (Refer to **Table SO-33** on Summary of Housing needs and **Annex SO-5** and **SO-6** for methods, and definition of terms). Housing needs should also consider resettlement/relocation and replacement of housing units affected by disasters (natural or man-made).

b. Land requirements based on housing needs assessment.

c. Availability of housing resources: land, infrastructure, and financing.

d. Matching of housing needs/demands to available resources/supply for housing.



Actual land allocation for shelter in the land use plan may vary depending on the total urbanizable land and the LGU's prioritization for land allocation for urban uses as determined by its development vision and development thrust/strategy.

### IV. Sector Analysis Matrix

#### A. Consolidate and validate the findings of the previous steps with the result of the consultation/s.

1. List the key issues, problems, and concerns of the housing sector.
2. Determine the possible implications/impacts of the key issues, problems, and concerns.
3. Consider the impact of Climate Change and Disaster Risks

#### B. Recommend interventions as follows:

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects

#### C. Prioritize, tabulate and present the results in matrix form.

Table SO- 23. Sample Housing Analysis Matrix

Technical Findings/ Observations	Implications (Effects)	Policy Options/ Interventions
<ul style="list-style-type: none"> <li>Fisher folk settlements in foreshore lands in Brgy. ___.</li> </ul>	<ul style="list-style-type: none"> <li>Uncontrolled settlements in public properties</li> <li>Deterioration in water quality</li> <li>Detrimental to fishery production and ecological balance</li> </ul>	<ul style="list-style-type: none"> <li>Identify suitable relocation sites for settlers along foreshore lands and river easements</li> <li>Establish a system to periodically monitor encroachment on public properties</li> </ul>
<ul style="list-style-type: none"> <li>Settlements in flood/ landslide prone areas/ near sanitary landfill</li> </ul>	<ul style="list-style-type: none"> <li>Expose lives of residents to wrath of natural calamities</li> </ul>	<ul style="list-style-type: none"> <li>Relocate settlements in high risk areas to safer areas</li> </ul>

Table SO–24. Housing Situation for the Past Three Censal years

	Censal Year 1	Censal Year 2		Censal Year 3		Latest Censal Year	
		No.	% Increase/Decrease	No.	% Increase/Decrease	No.	% Increase/Decrease
Households (HH)	9522	9669	1.54	9669	0.00	9819	1.55
Household Population	47609	48347	1.55	48347	0.00	49096	1.55
Housing Units (HU)	9265	9388	1.33	9388	0.00	9676	3.07
Occupied HU	9138	9278	1.53	9278	0.00	9472	2.09
Vacant HU	127	110	-13.39	110	0.00	204	85.45
Ratio of HH to Occupied HU	0.19	0.19		0.19		0.20	
Ratio of HH Population to Occupied HU	5.21	5.21		5.21		5.18	

Source: NSO/PSA

Graph SO-24. Housing Situation for the Past Three Censal Years

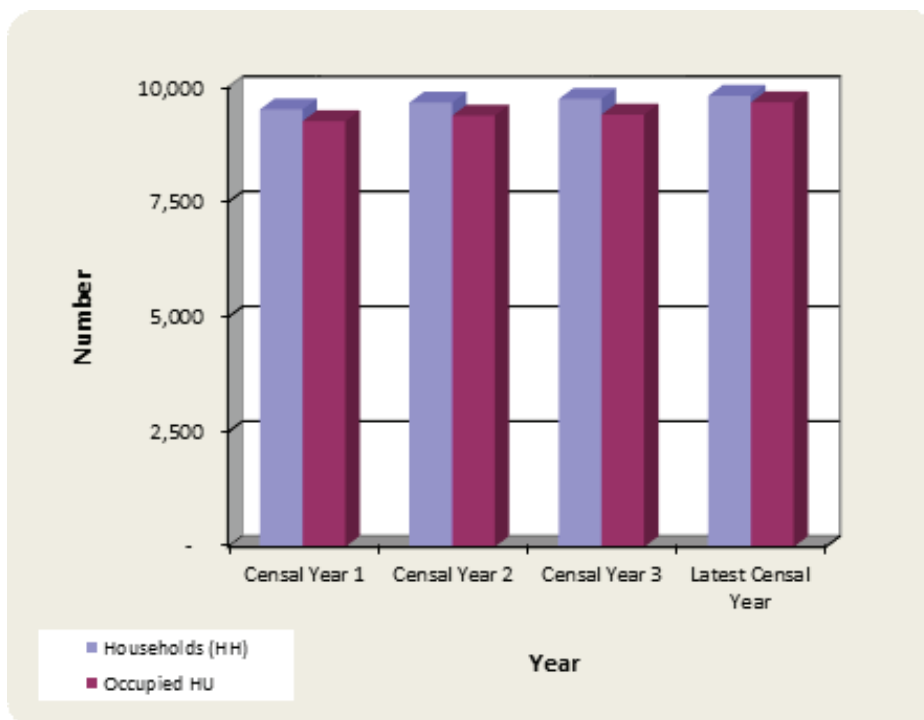


Table SO–25. Housing Backlog, Year \_\_\_\_\_

Backlog	Censal Year 1		Censal Year 2		Censal Year 3		Latest Censal Year	
	No.	%	No.	%	No.	%	No.	%
Doubled – Up Households	50	0.25	30	0.17	30	0.17	25	0.14
Unacceptable Housing Units	80	0.4	65	0.37	65	0.37	70	0.38
Makeshift / Salvage/ Improved HU	70	0.35	80	0.46	80	0.46	90	0.49
Others								
<b>Total Backlog</b>	<b>200</b>		<b>175</b>		<b>175</b>		<b>185</b>	

Source: NSO; City/Municipal Social Welfare and Development Office; CPDO/MPDC; Local Housing Board; Local Urban Poor Affairs Office

Notes:

Backlog:

1. *Doubled – Up (DUHH) = No. of Households (HH) – No. of Housing Units (HU)*
2. *Unacceptable Housing Units = 5% of HU made of mixed materials*
3. *Mixed Materials = HU with walls and roof made of wood, cogon/Nipa/ Anahaw, asbestos and others (NSO data on Occupied HU by construction materials)*
4. *Makeshift / Salvage / Improved HU (per NSO data)*
5. *Others*

Graph SO-25. Housing Backlog, Year \_\_\_\_\_

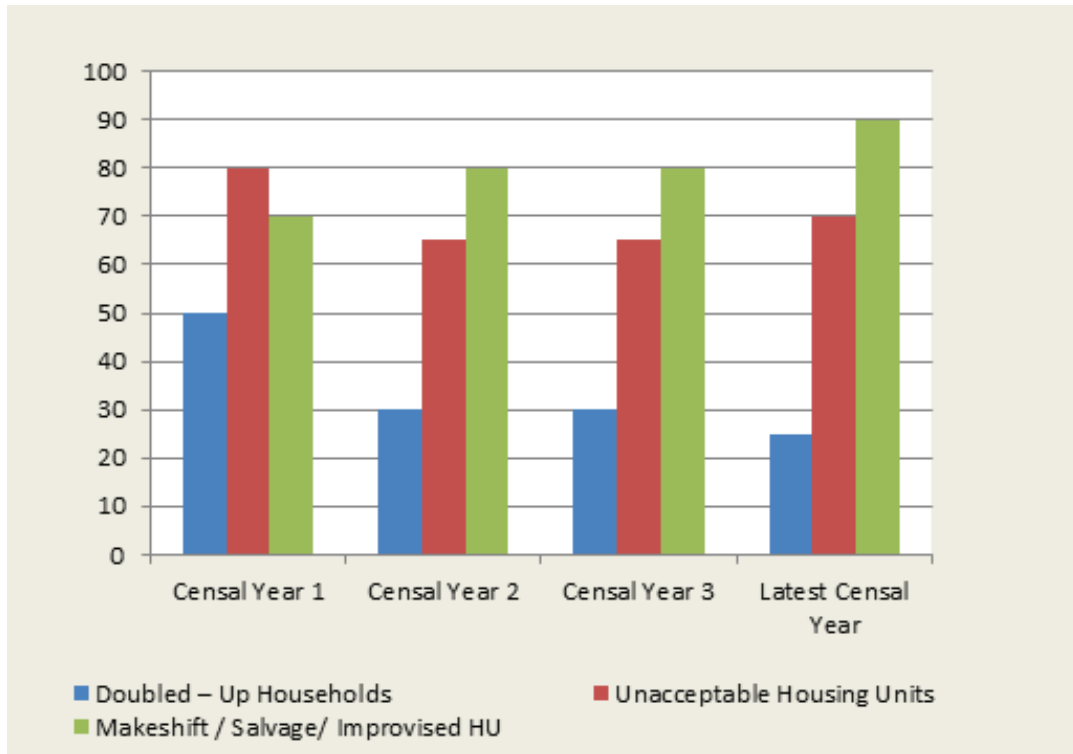


Table SO–26. Informal Settlement Areas, Year \_\_\_\_\_

Hazard Susceptibility (H/M/L)	O								
	Su								
	Ts								
	Ln								
	Vo								
	Eq								
	Tc								
	Fl								
Utilities Present (Y/N)	Total								
	C								
	T								
	S								
	P								
W									
Year Occupied									
Settlers Origin									
Population	Total								
	F								
	M								
No. of Households									
Agency									
Program/s									
Zoning Classification									
Land Ownership									
Area (ha)									
Name of Settlement (if applicable)									
Brgy.									

Source: City/Municipal Social Welfare and Development Office, City/ Municipal Planning and Development Office Board, Local Urban Poor Affairs Office

Notes:

- Name of settlement – indicate Sitio, Purok, Organization, etc.
- Land ownership – public/private
- Program – housing, livelihood, health, land acquisition, onsite upgrading, etc.
- Agency – government, NGO, international, LGU
- Settler's origin - indicate City/Municipality if from outside LGU, indicate Barangay if from same LGU
- Utilities Present - Yes (Y), No (N); types of utilities: Water (W), Power (P), Sewerage and waste disposal (S), Transportation (T), Communication (C)
- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table SO–27. Inventory of Residential Subdivisions and Condominium Projects, Year \_\_\_\_\_

Name of Subdivision/ Condominium	Type	Brgy.	Area (ha)	No. of Lots/ Units	Hazard Susceptibility (H/M/L)								
					Fl	Tc	Eq	Vo	Ln	Ts	Su	Others	
St. John Village	Open Market	Brgy. 1	4.98	275									
Dreamcrest Homes PH. I	Socialized Housing	Brgy. 2	1.30	119									
Simple Subdivision PH. I	Residential Condominium	Brgy. 3	0.68	325									
Sarmiento Homes Muzon PH.I	Economic Housing	Brgy. 4	2.34	567									
Four Lane Heights Commercial Subdivision	Commercial Condominium	Brgy. 5	2.04	22									
<b>TOTAL</b>													

Source: LGU, Housing and Land Use Regulatory Board, National Housing Authority

Notes:

- Type – Open Market, Economic Housing, Socialized Housing, Medium Rise housing, Cooperative, Civic Organization Housing Project, Others
- Indicate level of susceptibility for all hazards - Low (L), Moderate (M), High (H)
- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table SO–28. Resettlement Areas, Year \_\_\_\_\_

Name of Resettlement Area	Brgy	Land Ownership	No. of Households	No. of Housing Units	Utilities/ Facilities/ Amenities	Administration	Hazard Susceptibility (H/M/L)							
							Fl	Tc	Eq	Vo	Ln	Ts	Su	Others
<b>Total</b>														

Source: National Housing Authority, Civic Organization, Cooperative, City/Municipal Planning and Development Office, Local Urban Poor Affairs Office

Notes:

- Land Ownership - Government/Private
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Administration – NHA, GK, Habitat, LGU, Other
- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)



Table SO–29. Housing Facilities and Utilities Situation for the Past Three Censal Years

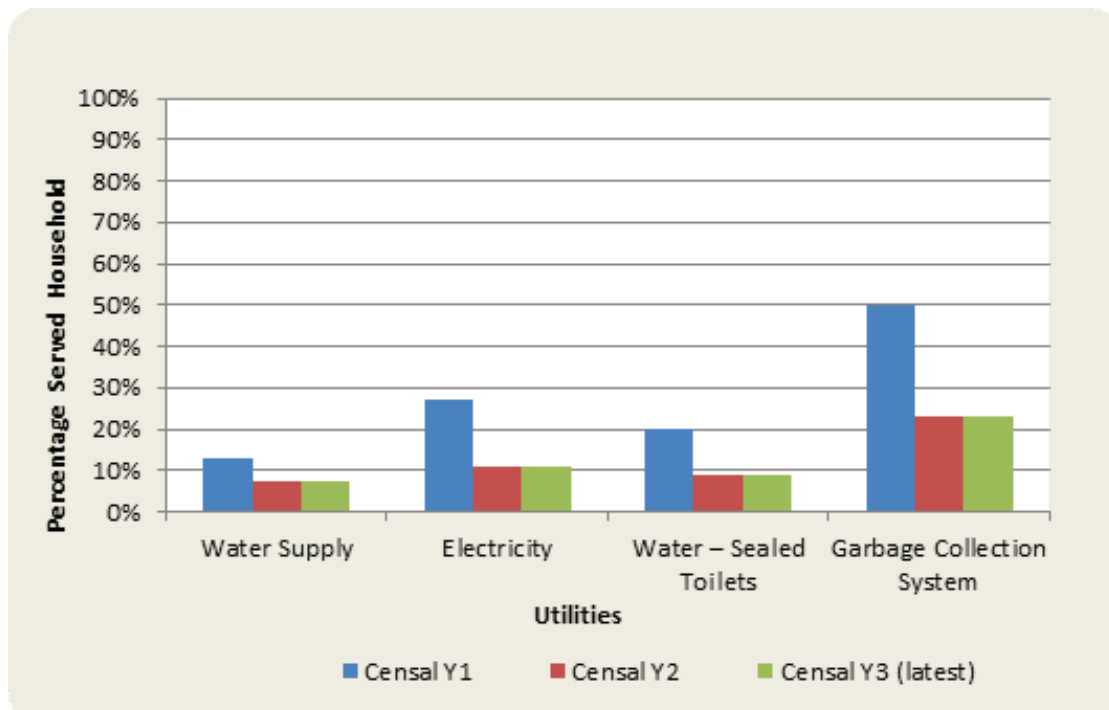
Utilities	Censal Y <sub>1</sub>			Censal Y <sub>2</sub>			Censal Y <sub>3</sub> (latest censal year)		
	Housing Units	No. Served	% Served	No. of Housing Units	No. Served	% Served	No. of Housing Units	No. Served	% Served
Water Supply	2750	350	13%	3500	250	7%	3500	250	7%
Electricity	1300	350	27%	2800	300	11%	2800	300	11%
Water – Sealed Toilets	1500	300	20%	2300	200	9%	2300	200	9%
Garbage Collection System	1000	500	50%	1750	403	23%	1750	403	23%
Total		1153			1153			1153	

Source: NSO/PSA

Note:

- % Served = (No. Served/Housing Units) x 100

Graph SO-29. Housing Facilities and Utilities Situation for the Past Three Censal Years



Source: NSO/PSA

Table SO–30. Occupied Housing Units and Lots by Tenure Status for the Past Three Censal Years

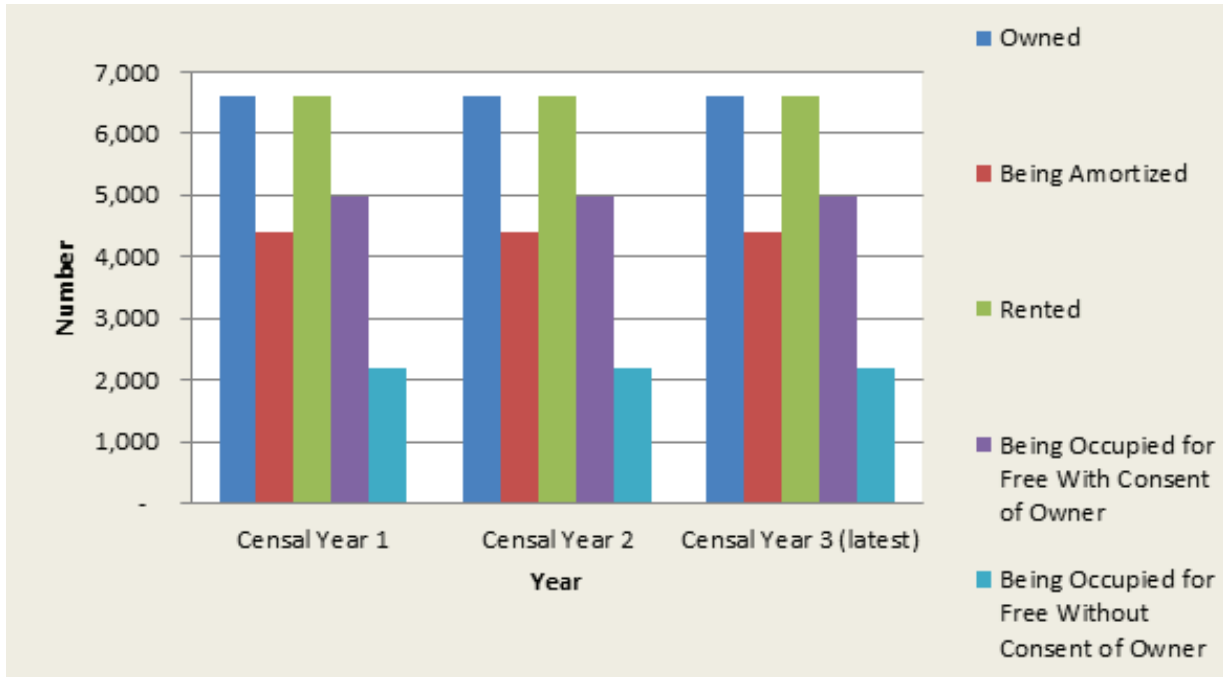
Tenure Status	Censal Y <sub>1</sub>				Censal Y <sub>2</sub>				Censal Y <sub>3</sub> (latest censal year)			
	Housing Unit		Lot		Housing Unit		Lot		Housing Unit		Lot	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Owned	6,618	27%	3,450	16%	6,618	27%	3,450	16%	6,618	27%	3,450	16%
Being Amortized	4,412	18%	3,450	16%	4,412	18%	3,450	16%	4,412	18%	3,450	16%
Rented	6,617	27%	3,343	15%	6,617	27%	3,343	15%	6,617	27%	3,343	15%
Being Occupied for Free With Consent of Owner	4,963	20%	10,786	50%	4,963	20%	10,786	50%	4,963	20%	10,786	50%
Being Occupied for Free Without Consent of Owner	2,206	9%	566	3%	2,206	9%	566	3%	2,206	9%	566	3%
Total	24,816	100%	21,594	100%	24,816	100%	21,594	100%	24,816	100%	21,594	100%

Source: NSO/PSA; LGU

Note:

$$\% = (\text{No. of housing units per tenure status} / \text{Total no. of housing units}) \times 100$$

Graph SO-30a. Occupied Housing Units by Tenure Status for the Past Three Censal Years



Graph SO-30b. Occupied Lots by Tenure Status for the Past Three Censal Years

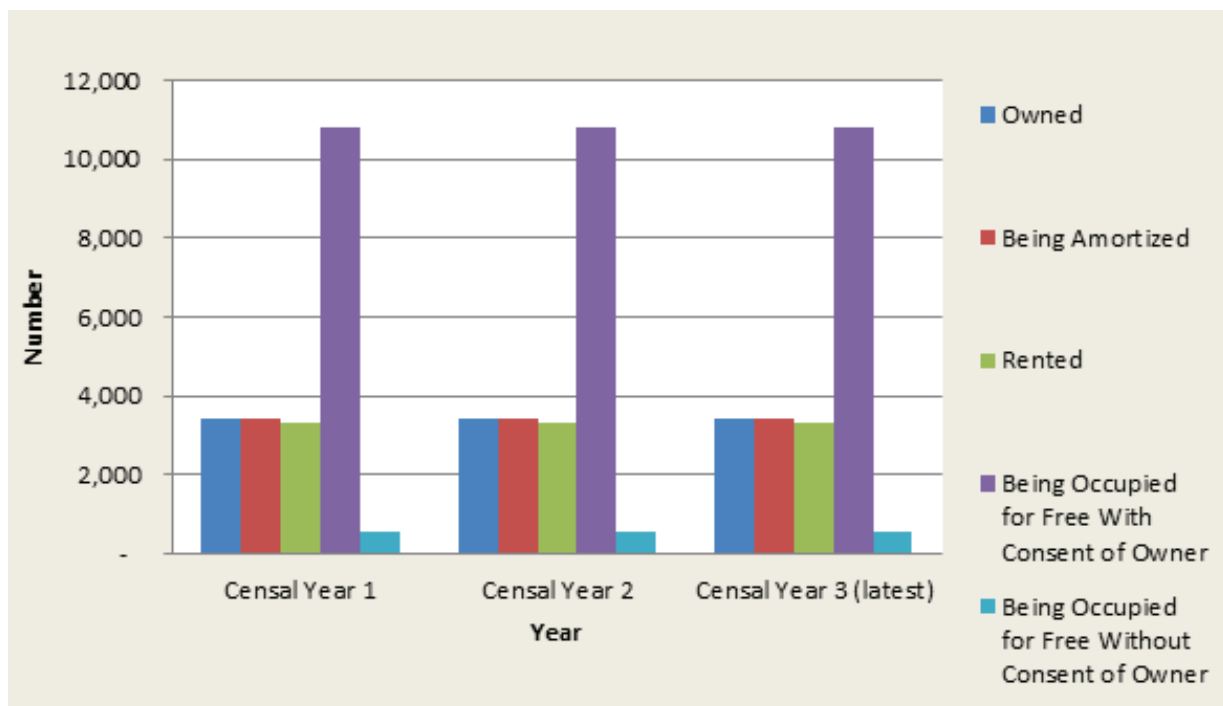


Table SO–31. Occupied Housing Units by Condition (State of Repair) of the Building and Year Built, Year \_\_\_\_\_

Year Built	Total Occupied Housing Unit	CONDITION (State of Repair ) OF THE BUILDING						
		Needs No Repair/ Minor Repair	Needs Major Repair	Dilapidated/ Condemned	Under Renovation/ Being Repaired	Unfinished Construction	Under Construction	Not Reported
1990 - 2000								
1986 - 1990								
1981 - 1985								
1971 - 1980								
1961 - 1970								
1957 - 1960								
1950 or earlier								
Not Applicable								
Don't Know/ Not reported								
TOTAL								

Source: NSO/PSA/LGU Reports

Note:

- Update with latest data from NSO/PSA or LGU primary survey

Table SO–32. Inventory of Potential Lands for Housing, Year \_\_\_\_\_

Hazard Susceptibility (H/M/L)	O				
	Su				
	Ts				
	Ln				
	Vo				
	Eq				
	Tc				
	Fl				
Utilities Present	C				
	T				
	R				
	S				
	P				
W					
Zoning Classification					
Actual Land Use					
Fair Market Value					
Classification					
Area (ha)					
Brgy.					
TCT No.					
Owner					

Notes:

- Actual Land Use – Residential, Commercial, Institutional, Industrial, Agricultural, Vacant, Others
- Classification –undeveloped and vacant land; unregistered or abandoned land; government owned land; land outside zoned built-up areas; marginal agricultural land
- Utilities Present – Yes (Y), No (N); types of utilities: water (W), power (P), sewerage facilities and waste disposal (S), road (R), transportation (T), communication (C)

- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table SO–33. Current and Projected Housing Need

Housing Backlog	Y <sub>0</sub> (Present Needs)	Future Housing Need					
		Y <sub>1</sub>	Y <sub>2</sub>	Y <sub>3</sub>	Y <sub>4</sub>	Y <sub>5</sub>	Y <sub>10</sub>
A. Housing Backlog	1000	900	800	700	600	500	0
B. Household Formation due to Increase in Population	175	202	208	214	219	225	1224
C. Upgrading							
TOTAL							

Notes:

A. Current housing backlog may be assumed to be equally addressed within the planning period.

Example:

Planning period = 10 years

Backlog = 1,000 units

Addressed yearly at = 100 units

Hence housing need to backlog is:

$$Y_1 = 1000 - 100 = 900$$

$$Y_2 = 900 - 100 = 800$$

$$Y_3 = 800 - 100 = 700$$

$$Y_4 = 700 - 100 = 600$$

$$Y_5 = 600 - 100 = 500$$

$$Y_{10} = 500 - 500 = 0$$

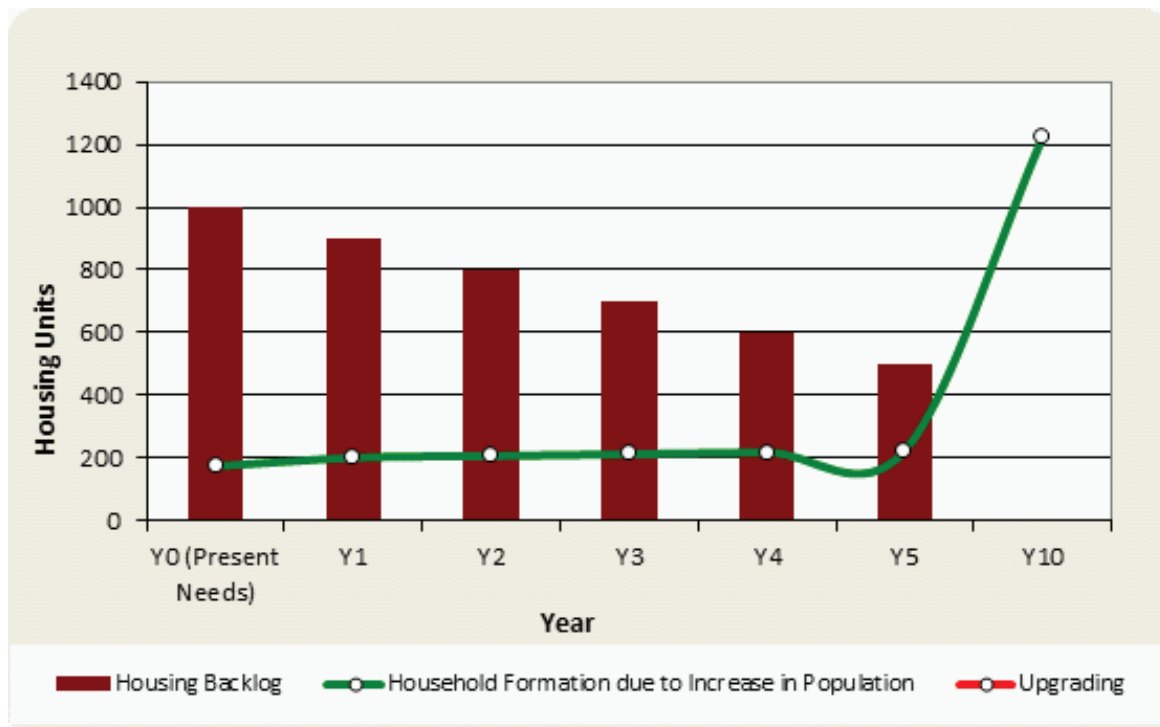
B. Determined as the Net Increase of household due to increase of population within the planning period.

Example:

Net increase of H, Y<sub>1</sub> = Projected HH Y<sub>1</sub> - Current HH

See **Table DE-15** for the projected number of households

Graph SO–33. Current and Projected Housing Need



## Annex SO-5 Assessment Tools and Methods

For uniformity, adopt the UN Shelter Method which was developed by UNDP in the projection of apparent housing demand or housing need where:

Housing Need = Backlog + New Households

Backlog	<input type="checkbox"/> Double occupancy	Dwelling units which are shared by 2 or more households =HHT-DUT  Where: HHT is total nos. of households DUT is total no. of dwelling units
	<input type="checkbox"/> Displaced units	Units to replace those units: 1. In danger areas 2. On lands earmarked for gov't. infrastructure 3. In areas where there is a court order for eviction and demolition  Total Displaced Units is the summation of units defined above
	<input type="checkbox"/> Homeless	Households living in parks, along sidewalks and all those without any form of shelter (NSO Definition)  Based on the information that HUDCC gathered, the acceptable norm in computing the number of homelessness is as follows: 0.1% of urban households 0.001% of rural households
	<input type="checkbox"/> Upgrading	Units for land tenure, infrastructure and structural improvement
New Households	Number of Households formed due to population increase	



### Current Housing Demand (CHD)

Current Housing Demand	=	Total Households 20011	-	Total Housing Units 20011	+	Total Number of Families 20011	-	Total Households 20011 <sup>6</sup>	+	Total Acceptable Housing (5% of housing units made of mixed materials)	+	Barong-barong
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<sup>6</sup> Current data available or the most updated Census on Population and Housing

Total Households (2000)	=	$\frac{\text{Total Population (2000)}^1}{\text{Household size of the mun. at last census}}$
-------------------------	---	---

Example:

Household Population 2000	=	50,000
Number of households 2000	=	8,333
Total Number of Families	=	8,500
Housing Units 2000	=	8,200



Housing made of mixed and light materials = 500 units  
 Barong-barong = 200 units

Solution:

$$\begin{aligned} \text{Current Housing Demand (CHD)} &= [8,333 - 8,200] + [8,500 - 8,333] + [500 \times 0.05] + 200 \\ &= 33 + 167 + 25 + 200 \\ \text{CHD} &= 525 \text{ Housing Units} \end{aligned}$$

**Shelter Needs Assessment**

RA 7279 is specifically concerned with the provision of shelter for the underprivileged and the homeless. To ensure allocation of land and services even to the lowest income groups, it is crucial to estimate the total shelter needs of all income groups in the municipality concerned. Shelter needs are categorized into: new housing units needed to answer the requirements of the future population, new units to cover for housing backlog as well as upgrading need.

**1. Present Housing Needs: New Unit Due to Backlog**

Housing backlog is the number of dwelling units needed at the beginning of the planning period due to doubled-up households, displaced units, and homeless households.

The total new units needed due to backlog are derived by adding up the requirements for doubled-up households, displaced units and homeless.

a. Doubled-up Households

Doubled up household exists when one dwelling unit is shared by two or more households.

The number of households per dwelling unit is used to define double-occupancy or as defined by NSO is the ratio of households to occupied housing units.



Mathematically, doubled up household is expressed as follows:

$$DHHT = HHT - DUT$$

Where:

- DHHT = Doubled Up Household in time t
- HUT = total housing units in time t
- HHT = total number of household in time t

	United Nation	Data
Double Occupancy	Dwelling units which are shared by 2 or more households $= HHT - DUT$ Where: HHT is total no. of households DUT is total no. of dwelling units	NSO CPH Double occupancy rate, urban and rural (1990 CPH) HHT (2000 CPH)

b. Displaced Units (Relocation Need)

These are new housing units needed to replace those occupied by households located in danger and uninhabitable areas or those living on land, which is needed by the government for a major infrastructure project or, in areas where there is a court order for eviction and demolition. Section 29 of RA 7279 mandates LGUs to relocate and provide resettlement areas for the affected households.

To determine the number of displaced units, simply total the number of housing units in danger zones or other uninhabitable areas, those affected by planned government infrastructure projects and those which are subject of a court order for eviction or demolition.

In addition, an estimate of displacement due to natural and man-made disasters can be added to the total.



Example:

Housing units in danger zones (HUDZ)	=	150
Housing units in uninhabitable areas (HUUA)	=	25
Housing units affected by infrastructure projects (HUIP)	=	75
Housing units subject for demolition (HUSD)	=	20

Solution:

$$\begin{aligned} \text{Displaced Units (DU)} &= \text{HUDZ} + \text{HUUA} + \text{HUIP} + \text{HUSD} \\ \text{DU} &= 150 + 25 + 75 + 20 \\ \text{DU} &= 270 \text{ Housing Units} \end{aligned}$$

c. Homeless

Homeless are individuals or households living in parks, along sidewalks, and all those without any form of shelter. Therefore, new units should be provided for these people. There is very little information about the state of homelessness in cities/municipalities except for a study made by the Decentralized Shelter for Urban Development (DSUD).

If homelessness is perceived as an extensive problem in the city/municipality that needs to be addressed, a more detailed study should be conducted to determine the magnitude of homeless people.

If it is assumed that homeless population consists mainly of families; then dividing the number of homeless persons by the average household size will give the number of homeless households. On the other hand, if homeless population consists of distinct individuals, each of these individuals are considered as separate households. Thus, the number of homeless persons is the same as the number of homeless households and this need may be better met through improved institutional care.

Determine the total housing need of homeless using the following formula:



Computing for Homeless Households and Total Need of Homeless

$$\text{Homeless Household (HH)} = \frac{\text{Total Homeless Population (HP)} - \text{Homeless Individuals (HI) Not a member of any household}}{\text{Average Household Size (AHS)}} + \text{Homeless individuals}$$

Example:

300 persons = homeless based on actual survey  
 28 persons = not part of a household  
 5 persons = average household size

Solution:

$$HH = \frac{HP - HI}{AHS} + HI$$

$$HH = \frac{300 - 28}{5} + 28$$

$$HH = \frac{272}{5} + 28$$

$$HH = 54 + 28$$

$$HH = 82$$

	Shelter Method	Data
Homeless	Households living in parks, along sidewalks and all those without any form of shelter (NSO Definition)	Based on the information that HUDCC gathered, the acceptable norm in computing the no. of homeless is as follows:  1. 0.1% of urban households 2. 0.01% of rural households

**2. Future Housing Needs: Due to Population Growth**

Obviously, the number of new housing units that will be required for the future depends largely on the projected size of the population increase and the subsequent formation of new households. Houses will also be needed to replace those that will be destroyed beyond repair by natural and man-made calamities.

a. Time Frame

The planning period should allow for short and long-term strategies. The short term may be five years while the longer term should ideally cover a period of fifteen (15) years, broken down into three, 5-year planning periods. However, of issues raised in terms of data quality, a shorter planning period is preferable.

b. Population Projection

The population in a city/municipality increases due to births that occur and the influx of migrants from other municipalities in search of employment and for a better quality of life. Migrants normally live initially with relatives or else in makeshift houses in illegal settlements until they are able to afford and are provided opportunities for better shelter. Thus, unless provisions are made for migrants, an economically prosperous city/municipality could be confronted by problems of squatting.

Please refer to Demographic Sector for methods of population projection.

c. Number of New Households


As defined by the NSO a household is a social unit consisting of a person or a group of persons who sleep in the same housing unit and have common arrangement for the preparation and consumption of food. While housing unit is a structurally separate and independent place of abode constructed, converted or arranged for habitation by one

household. Structures or parts of structures not intended for habitation such as commercial, industrial, and agricultural buildings, or natural and man-made shelters such as caves, boats, abandoned trucks, culverts, etc., but used as living quarters by household are also considered as housing units.

The estimated number of households in a given municipality is derived by dividing the total population by the estimated household size.

	UN	Data
New Households	<p>Number of Households formed due to population increase = HHT 2004 – HHT 2000</p> <p>Annually: New Hhy = HHTy – HHTy-1</p> <p>Where: HHT is the total households y, given year y-1, preceding year</p> <p>Formula: Population Projection <math>P_n = P_o (1 + r)^n</math></p> <p>Where: Pn= Projected Population Po= Population in base year r= Annual growth rate n= No. of year</p> <p>HHT = Pn/ HH size HHT is total household</p>	2000

d. Estimate future housing needs for projected years by substituting directly this formula:



Future housing demand =  $X e^{rt}$

Where:

X = housing units at latest census  
e = 2.71828 (a constant)  
r = rate of increase of housing units between two censal years  
t = time interval between latest housing censal year and projected planning years

Example:

HU 2000 = 16,482  
HU 1995 = 8,200  
t = 5

Solution:

$$r = \frac{\ln \frac{HU_{2000}}{HU_{1995}}}{t}$$

$$= \frac{\ln \frac{16,482}{8,200}}{5}$$

$$r = \frac{0.698}{5}$$

$$r = 0.1396 \text{ or } 13.96\%$$

$$t = 2003 \text{ (projected year) less } 2000 \text{ (census year)}$$

$$t = 3$$

Therefore,

Future Housing Demand (1998) = Xert

e. Tabulate current and future housing demand according to **Table SO-33**.

f. Estimate Space/Area Requirements and Determine Future Density

Estimation of residential space requirements may be computed using density; expressed as persons per hectare of residential area

Residential Density (includes circulation system and other neighborhood facilities/amenities)	=	$\frac{\text{Total Population}}{\text{Residential Area (Ha)}}$
Types of densities		Density, persons/hectare of residential area
Low		150
Medium		151 - 250
High		More than 250

f.1. Get the residential density in the municipality

f.2. Convert density expressed as persons per hectare of residential area, to households per hectare of residential area

f.3. By dividing 10,000 square meters by the household density, the resulting answer would be the average lot size per household

f.4. Multiply the average lot size by the total number of households to get the total residential area requirement.



Example:

$$\text{Residential Density} = \frac{100,000 \text{ population}}{500 \text{ ha.}}$$

$$= 200 \text{ persons per hectare of residential area}$$

$$\text{Household Density} = \frac{200 \text{ persons per ha. of residential area}}{6 \text{ (average household size)}}$$

$$= 33.3 \text{ households per ha. of residential area}$$

$$\text{Average lot size per household} = \frac{10,000}{33.3}$$

$$= 300 \text{ square meters per household}$$

From the results of the computed density, future housing character/density of the planning area may be determined.

In determining the projected housing needs, it is assumed that previous requirements have been provided for. In actual situations, however, this is not so. About 10 to 15% of the households still double up each year as the case of new marriages who continue to stay with their former families. Thus, in computing for residential area requirements, it is assumed that only 85% of the housing need is provided for.

### 3. Upgrading Need

Upgrading need is defined as the need for improving land tenure status e.g.; provision of minimum security of tenure as in a written contract to possessing a title of land; access to basic services, e.g. dirt road to macadam road; and house condition, e.g. from semi-permanent to permanent structure.

A number of the present housing stock in a city/municipality is not likely to meet the prescribed minimum standards of health and safety. Some would probably be considered as illegal structures because they have been built without consent or written contract from the landowner. But rather than demolish such structures improving or upgrading this could be a cheaper solution and practical approach.

Upgrading need can be determined best by actual survey. The CPH also provides data that can be used for the purpose. Upgrading entails the provision of minimum security of tenure (i.e. title to lot or written contract on land) provision of adequate basic services (electricity, water supply, sanitation, drainage, road access and garbage disposal) and improvement of structure to minimum acceptable level (replacing barong-barong materials)

It is necessary to exclude displaced units from upgrading need because these are included in the calculation of new housing units needed due to relocation need. Including these units in the upgrading need will result in the double-counting of needs.

*Notation.* The LGU has to determine what criteria should be used for upgrading, e.g., basic standard for water supply, sanitation, electricity, drainage, garbage disposal and road access, as well as what is minimum land tenure. All units classified as needing upgrading are understood to be upgradable in place.

	UN	Data
Upgrading Units	Units for land tenure, infrastructure and structural improvement	<p>Makeshift units by region (Compendium of Social Statistics)</p> <p>= Proportion of Makeshift Units 1994 x DUT 2000</p> <p>DUT 2000 = HHT 2000 less double occupancy (2000 est.)</p> <p>Where:</p> <p>DUT is total dwelling (occupied) units HHT is total households Double Occupancy Rate: 1990 CPH, Rural and Urban</p>

Upgrading needs could take any of the following forms, and there can be a situation where units require two or more upgrading needs:

#### a. Tenure Need

Households living in units with inadequate security of tenure on the land they occupy i.e. no legal title or any other written contract on land is considered to require tenure need.

Only those households which are occupying their own housing unit and lot can be considered to have permanent land tenure. Other households with security of tenure problem include those who own the structure built on rent-free land with the consent of

of the land owner.

The NSO Census of Population and Housing (CPH) gives statistics on tenure status of housing units and tenure status of lot in owner-occupied units can be used to determine land tenure need.

#### b. Infrastructure Improvement Need

Households living in units that lack access to one or more basic services such as water supply, sanitation, drainage, road access, garbage disposal and electricity are considered to require infrastructure improvement need.

An estimate of households requiring drainage and road access may be derived from the reconnaissance survey undertaken earlier.

All the foregoing statistics would provide data on the total households requiring infrastructure improvement need which can be further disaggregated on the specific basic service requirement.

#### c. Structural Improvement Need

Households living in units that require improvement of structure to minimum acceptable level are considered to require structural improvement need.

A housing unit meets the minimum acceptable level if it can fully protect the occupants from the elements i.e. rain, wind, temperature and the like.

The data in **Table SO-31** indicate that three categories can be considered to require structural improvement need. These are the housing units under needs major repair, dilapidated/condemned and unfinished construction. Housing units under the first category may have cracks in the interior walls, leaking roofs, holes on the floors and broken windows. Dilapidated/condemned structures are beyond repair and need replacement while unfinished housing units is a partly constructed house. The three categories cannot meet the minimum requirement of acceptability as defined earlier

### **Affordability**

Shelter needs as discussed above is determined by assessing the adequacy of the present provision for housing based on some given norms (i.e. one dwelling unit per household; minimum requirement for basic services and facilities; habitability of existing houses, etc.) and a projection of new housing units based on the formation of new households.

However not all households may have sufficient financial resources to pay for the housing needs as perceived and identified by the planner. The planner should therefore determine various housing options for each of the target groups based on what households can afford. These options can vary from upgrading of their present dwelling to new-owner-occupied dwelling.

In this phase of the exercise an assessment is made of the financial resources of the various income groups, determining their affordability or how much of their income could be made available for housing after excluding other necessary basic expenses such as food, clothing, education, medical expenses, transportation, income tax and recurrent cost of housing.

Affordability analysis enables the planner to identify the types of housing options which are feasible for varied income groups. The actual affordability level shall be the basis for planning of housing programs and projects which the LGU shall implement for their constituents. These options can vary from upgrading of their present dwelling to new owner-occupied dwelling.

In determining the affordability the following information should be established:

a. typical (median) income for each target income group



- b. percentage of income a typical household can spend on shelter-related expenses (for each income group)
- c. number of households in each target income group
- d. loan terms of present housing loan schemes (both private and government lending institutions)

### **Resources Needed for Housing**

#### a. Land Need for Housing

Land is the most critical among the resources required for a shelter program not only because the supply is a fixed quantity but also because a number of activities and uses are in competition with one another for access to the same land. High income housing is in competition with low income housing for land just as commercial and industrial activities are in competition with housing in general. Furthermore, recent policies of the national government stress the need to conserve production agricultural lands specifically those that are irrigated or irrigable.

Although RA 7279 mandates the LGUs to inventory and identify lands specifically for socialized housing, sufficient quantities of land should be identified for all income groups not only for the present needs but also for all land needs within the planning period.

The planner has to determine the total land area needed and to match this with available and suitable land. Scarcity of land means a higher housing density.

Land needed will be estimated for the duration of the planning period on the basis of present design standards and number of different housing options. Minimum lot sizes or bigger lot sizes under Batas Pambansa Blg. 220 (BP 220) or PD 957 can be used depending on the local situation.

#### b. Inventory and Identification of Lands

Having estimated the total area needed for the program the next step is to identify lands suitable for housing that is affordable to the target income groups.

#### c. Infrastructure Need for Housing

The UDHA mandates LGUs and NHA, in cooperation with the private developers and concerned agencies to provide basic services and facilities (infrastructure) for socialized housing and resettlement areas. These basic services and facilities include:

- Potable water;
- Power and electricity and an adequate power distribution system;
- Sewerage facilities and an efficient and adequate solid waste disposal system;  
and
- Access to primary roads and transportation facilities

The housing needs and affordability assessment provides the basic information needed to estimate present and future basic services required for socialized and resettlement areas. From the earlier calculations of affordability, the potential demand for different housing options can be identified. Some of these options may be unserved or partially served lots. The need for LGU/NHA interventions related to the UDHA can be worked out.

In addition, information on the income and affordability levels of those in areas requiring upgrading will enable the identification of the degree of assistance required for the "Backlog".

#### d. Finance Requirements for Housing

The calculations on the amount of assistance to be provided by the LGU for basic services, land acquisition and other forms of assistance (e.g. technical assistance) will give the estimate for total funds required from the LGU budget. The total value of loans required to meet housing needs of all income groups can be calculated using the data on affordable options. By identifying the source of these funds, the value of loans required under different government loan programs can be assessed. This is particularly important for estimating the loan requirements under the Community Mortgage Program (CMP) and other socialized housing programs.

#### **Resources Available for Housing**

Identification of local resources for housing, e.g., land, infrastructure, finance, building materials and labor, is a basic task of the LGU can also mobilize its resources to provide, for example, land and infrastructure as mandated under the UDHA or use its power to influence the supply of other local resources or access other resources, e.g., other funding sourcing, to address its housing requirement or other schemes such as Joint Ventures, Build-Operate and Transfer, etc.

## Annex SO–6 Glossary and Classification of Housing Terms

1. The National Statistics Office (NSO) classified and defined the types of buildings as follows:

- **Single house** –an independent structure intended for one household, separated by open space or walls from all other structures.
- **Duplex** –a structure intended for two households, with complete housing facilities for each.
- **Multi-unit residential (3 units or more)** –this is intended for residential use only, usually consisting of 3 or more housing units.

2. Year the building was built refers to the year when construction was completed and ready for occupancy and not when construction began.

3. Floor area refers to the space enclosed by the exterior walls of the housing unit.

4. Definition and classification of the tenure status of the housing units:

- **Owned/Being Amortized** –The household is the owner and has the legal possession of the housing unit, or the household claims to own it.
- **Rented** –The occupant actually pays rent either in cash or in kind.
- **Being Occupied for Free with Consent of Owner** –The household occupies the housing unit with owner's permission and without paying any rent in cash or in kind to the owner, tenant/lessee or subtenant/subleases.
- **Being Occupied for Free without Consent of Owner** –The household occupies the housing unit without the consent or knowledge of the owner.

5. **Subdivision Project** –shall mean a tract or a parcel of land registered under Act No. 496 which is partitioned primarily for residential purposes into individual lot with or without improvements thereon, and offered to the public for sale, in cash or in installment terms.

6. **Condominium Project** –shall mean the entire parcel of real property divided or to be divided primarily for residential purposes into condominium units including all structures thereon.

7. **Economic and Socialized Housing** –a type of housing project provided to moderately low income families with lower interest rates and longer amortization periods.

8. **Socialized Housing** as defined under RA 7279, refers to housing programs and projects covering houses and lots or homelots only undertaken by Government or the private sector for the underprivileged and homeless citizens which shall include sites and services development, long-term financing, liberalized terms or interest payments and such other benefits in accordance with the Act.

9. **Open Market Housing** –housing constructed and financed by the private sector as a business venture and sold at prevailing market prices and interest.

## Social Sub-Sector: Social Welfare Services

### Steps:

#### I. Data Gathering and Processing

##### A. Generate the following data/information and present in table format:

1. Presence of Social Welfare Facilities and Services Offered, Year \_\_\_\_ (refer to **Table SO-35**)
2. Historical Number of Population Served by Type of Clientele System (refer to **Table SO-36**)
3. Social Welfare Related Projects, Approved/Funded for Implementation, Year \_\_\_\_ (refer to **Table SO-37**)



The output tables are basic information from which assessment of the level of service of the social welfare services sector may initially proceed. Other relevant information may be gathered through a consultation process.

##### B. Determine the felt needs, aspirations and issues of the community relative to social welfare services through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to social welfare services would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of social welfare services?

##### C. Gather additional data/information if warranted by the results of the consultations/ meetings conducted

#### II. Data Analysis

Assess the existing social welfare services situation of the locality in terms of the following:

1. Presence of Social Welfare Facilities and Services Offered (refer to **Table SO-35**)
2. Proportion of each type of clientele served in need of any particular type of social welfare assistance to:
  - a. total clientele served
  - b. total population
3. Percentage of the population living below poverty threshold
4. Historical Number of Population Served by Type of Clientele System (refer to **Table SO-36**)
5. Exposure and vulnerability of social service facilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)



The clientele system refers to a system of categorizing the recipients of the service of the Department of Social Welfare and Development (DSWD) as follows:

- Disadvantaged families
- Disadvantaged communities
- Disadvantaged women
- Disadvantaged children and youth
- Senior citizens
- Persons with disabilities
- Victims of natural and man-made disaster

6. Responsiveness of existing welfare programs, such as Social Reform Agenda vis-à-vis development needs. Relate these programs and projects with the number of clientele served. Refer to **Annex SO-7** and [www.dswd.gov.ph](http://www.dswd.gov.ph) for updates on programs and projects.

7. Adequacy/Inadequacy of appropriate assistance or services available in the city/ municipality based on the DSWD's performance indicators for devolved programs and services

### III. Current and Projected Needs

1.Determine the current need and future requirement for social welfare services based on standards or recognized planning and design criteria embodied in different laws listed in **Annex SO-8**.

2.Determine the need for funding and resources to fully implement the requisite social welfare program per identified welfare requirements of qualified residents.

### IV. Sector Analysis Matrix

#### A. Consolidate and validate the findings of the above steps with the result of the consultation.

- 1.List the key issues, problems, and concerns of the social welfare services sector.
- 2.Determine the possible implications/impacts of the key issues, problems, and concerns.
3. Consider the impact of Climate Change and Disaster Risks.

#### B. Recommend interventions such as:

- 1.Realistic policy options and appropriate strategies
- 2.Programs and projects for implementation with due consideration of current and pipeline projects.

C. Prioritize, tabulate, and present the results in matrix form as follows:

Table SO–34. Sample Social Welfare Services Analysis Matrix

Technical Findings/ Observations	Implications (Effects)	Policy Options/ Interventions
Rise of psycho-social related problems in disaster affected areas	Rise in violence and crimes	Intensify outreach and livelihood programs for disaster victims
Absence of senior citizen care center	Unmet senior citizens' need for socialization and more active community involvement	Establishment of a Senior Citizen care center.

Table SO–35. Presence of Social Welfare Facilities and Services Offered, Year\_\_\_\_\_

Facility	Brgy.	Services Offered	Type of Clientele	No. of Clientele	Staff	Ownership	Physical Condition	Hazard Susceptibility (H/M/L)											
								FI	Tc	Eq	Vo	Ln	Ts	Su	Others				
Senior Citizen Center																			
Daycare																			
Feeding Center																			
Others																			

Source: City/Municipal Social Welfare and Development Office

Notes:

•Services Offered:

1. Family Life Education and Counseling
2. Family Planning Assistance
3. Day Care Services, Supplemental Feeding
4. Medical Care
5. Relief / Rehabilitation
6. Others

•Type of Clientele:

1. Disadvantaged Families
2. Depressed Area
3. Disadvantage Women (18-59 years old)
4. Pre-school Children/Children (0-12 years old)
5. Youth (13-24 years old)
6. Persons with disabilities
7. Senior citizens/ older persons (60 years old and above)

•Ownership - Public/ Private

•Physical Condition:

- Fair/Good-wellmaintained/serviceable
- Poor-needsimprovement
- Critical- needspriorityaction

•Indicate level of susceptibility for all hazards -High (H), Moderate (M), Low (L)

- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

**Table SO–36. Historical Number of Population Served by Type of Clientele System**

Type of Clientele	Previous Years			Current Year	
	Year 1	Year 2	Year 3	No.	Percentage
<b>TOTAL</b>					

Source: City/Municipal Social Welfare and Development Office, NGOs/POs.

**Table SO–37. Social Welfare Related Projects, Approved/Funded for Implementation, Year \_\_\_\_\_**

Name/ Location of Project	Location	Type	Proponent (Government, Private, Other)	Estimated Start Date	Estimated Date of Completion

Source: City/Municipal Social Welfare and Development Office



## Annex SO-7. DSWD Priority Programs and Projects

1. **KALAHI-CIDSS:** KKB stands for “Kapit-Bisig Laban sa Kahirapan (meaning linking arms to fight poverty)-Comprehensive and Integrated Delivery of Social Services: Kapangyarihan at Kaunlaran sa Barangay. It is an innovative program that integrates KALAHI, which is President Arroyo’s program on poverty alleviation, and CIDSS, a DSWD program started in 1992.

The components of the project consist of social preparation, capacity building and implementation support; seed funds for community development projects; and monitoring and evaluation.

**This project was launched in the last quarter of 2002 and started full implementation in January 2003.**

2. **Self-Employment Assistance-Kaunlaran.** A capability building program designed to establish sustainable self-managed community-based organization providing the economically active poor with direct access to productive inputs and assistance for micro-enterprise development.

**SEA Level I.** Involves the organization of 25 or 30 members into self-managed community-based organizations called SEA-Kaunlaran Associations (SKAs) as conduits of various services—social preparation, technical assistance, savings mobilization, capital assistance, and access to social safety nets.

**SEA Level II.** It is a strategy of institutionalizing the gains of SEA-K Level I through the formation of the SEA-Kabayan comprising of 2 to 5 successful SKAs which serves as conduits for increased level of assistance to serve the need for expansion of enterprises and for repair and/or construction of shelter units.

3. **Early Childhood Development (ECD) Project.** A World Bank and Asian Development Bank – funded project designed to enhance the quality and coverage of essential health, nutrition, psychosocial development and early education services for 0-6 years old children. It enhances and supplements LGU resources to meet needs of these children.

4. **Social Protection.** Provision of services to protect the rights and welfare of children, youth, women, older and disabled persons who are abandoned, neglected, abused, exploited or victims of injustice.

- **Center-Based Beneficiaries Provided with Residential, Protective and Rehabilitation Services.** These centers provide 24-hour residential services to street children; abandoned/neglected children; youth offenders; drug dependents; girls and women in especially difficult circumstances; persons with disabilities, and senior citizens/elderlies and other clients with special needs who cannot benefit from community-based services.

- **Communities-Based Beneficiaries provided with Protective and Rehabilitation Services.** These are community based facilities designed to serve either as processing center, skills and capability center, or action center for individuals and groups in crisis situation e.g. NVRC/AVRCs, Malaya Center, etc.

- **International Social Welfare Services.** This pilot project was developed to provide social services to documented and undocumented overseas Filipino workers (OFWs) in Dubai, Abu Dhabi, Singapore, Kuwait, Hongkong and Saudi Arabia. It entails the assignment of professional social workers to provide psychosocial interventions to our migrant workers, assist the labor attaché and handle OFWs’ cases. In Malaysia, a social welfare attaché was established for one year to assist in handling the concerns of OFWs, particularly the deportees.

5. **Relief and Rehabilitation of Mindanao.** This is in line with the government’s commitment to ensure the safe return of families and individuals affected by armed conflicts in Mindanao

to their communities of origin and to assist them in rebuilding their shattered lives

## 6. Institutional Strengthening

• **Performance Management System.** As a step to further improve service delivery the Performance Management System was institutionalized in Secretary Soliman's administration. It provides a systematized planning and evaluation system to assess an employee's performance expectation and developmental needs in relation to the organization's over-all effectiveness.

• **Rationalization and Streamlining Plan** prescribes the proposed functional, staffing, and structure of the DSWD consistent with its new mandate, role and functions under Executive Order 15.

• **Area-Based Standards Network (ABSNET).** The Area-Based Standards Network (ABSNET) is a strategy to institutionalize partnership that would strengthen licensing and accreditation function among the intermediaries. Among the tangible results were: more NGOs operating without license were reached out and motivated to secure license thus, increased the number of NGOs with licenses; closer working relationship among the intermediaries and referral system of clients were developed; and exchange of resources and expertise were facilitated and enhanced.

## Annex SO-8. Related Laws and Guidelines on Social Welfare Services

### 1. Day Care

RA 6972, entitled, "An Act Establishing a Day Care Center in Every Barangay, Instituting Therein a Total Development and Protection of Children Program, Appropriating Funds Therefor, and For Other Purposes", defend the right of children to assistance, including proper care and nutrition and to provide them with special protection against all forms of neglect, abuse, cruelty, exploitation and other conditions prejudicial to their development.

As defined in RA 7876, Day Care Service –is the provision of supplemental parental care to a 0 to 6 year old child who may be neglected, abused, exploited or abandoned during part of the day when parents cannot attend to his needs.

RA 8980 (ECCD Law) Early Childhood Care and Development Act –Early Childhood Care and Development or ECCD is a program which aims to take care and ensure the development of the Filipino child at an early age. This program is enforced through Republic Act 8980 or the Early Childhood Care and Development Act.



Early childhood Care and Development pertains to a broad range of services including health as well as psychosocial and mental development that respond to the needs of the child starting when he or she is in the mother' womb up to the time when he or she reaches the age of six (6).

#### Requirements for Day Care Centers: (Source: DSWD)

- a. Every 500 families must have 1 day care center;
- b. Majority of parents are both working;
- c. The community has no form of socialization (no social activities);
- d. Plenty of street children ages 3 to 6;
- e. Emotionally unprepared parents; and
- f. The community is willing to put-up day care center.

### 2. Senior Citizen Care Center

Section 4 of RA 7876 entitled, "An Act Establishing a Senior Citizens Center in All Cities and Municipalities of the Philippines and Appropriating Funds Therefor", provides that "this is hereby established a senior citizens center, in every city and municipality of the Philippines, under the direct supervision of the Department of Social Welfare and Development, in collaboration with the Local Government Unit concerned.

As defined in the Implementing Rules and Regulations of RA 7876, Senior Citizens Care Center refers to the place established in this Act with recreational, educational, health and social programs and facilities designed for the full employment and benefit of the senior citizens in the city or municipality. It can be any available sheltered structure, a spacious room in a private or public building, a room attached to a community center, a barangay hall or chapel.

The minimum area requirement of the Center for the Senior Citizens is 500 sq. meters per DSWD.

Based on the foregoing provision of RA 7876, the establishment of Senior Care Center shall be in accordance with Rule III (Establishment of Centers) of RA 7876.

### 3. Day Center for Street Children

The Day Center is made available to street children who are 7 to 15 years old and have a family to go home to everyday.

On the other hand, children without families are referred to DSWD Lingap Center or to other non-government agencies which have residential facilities for street children.

### 4. AO No. 82. S.2003 Standards on Social Welfare & Development Service Delivery System in the Local Government Units

While LGUs provide social welfare and development (SWD) services, there is no common framework that guides them on how best they could provide these services to their constituents. Consistent with Article 24 of RA 7160, EO 221, as amended, mandates the DSWD to set standards for quality service delivery to promote and protect the social well being and best interest of the Filipinos. Hence, these standards are formulated and are deemed as important tool for the LGUs to gauge the ability of SWD service delivery at any level of local implementation.

#### a. Staffing

- One (1) Registered Social Worker (RSW) as SWD Officer and
- one (1) RSW as Asst SWDO for Provincial and City level
- SWD office
- One Registered Social Worker (RSW) as SWD Officer for Municipal SWDO.
- Direct or support personnel at Provincial, City and Municipal level
  - Project Development Officer (PDO)
  - Livelihood Evaluation Officer (LEO)
  - Youth Development Officer (YDO)
  - Social Welfare Assistant (SWA)
  - Social Welfare Aide (SW Aide)
  - Manpower Development Officer (MDO) Nutritionist
  - Statistician
  - Information Communication Technology Officer (ICTO) Clerk
  - Driver
  - Utility Worker
  - One (1) Day Care Officer in a City/Municipality to supervise Day Care Workers (DCWs)
  - One (1) qualified DCW for every barangay in a City/Municipality

#### b. Facilities

- Office space 4.0 m<sup>2</sup> per person. Free space of 6.0 m<sup>2</sup> per allotted room for mobility
- A space/room for interview and counseling
- Conference room
- Separate living quarters for male and female personnel in times of disaster or emergency operations
- Ample space/room for receiving clients
- Exclusive space/room for conducting intake interview
- Storage room for stockpiling to relief operations

## Social Sub-Sector: Protective Services

### Steps:

#### I. Data Gathering and Processing

##### A. Generate the following data/information and present in table format:

1. Protective Services by Facilities and Equipment, Year \_\_\_\_ (refer to **Table SO-39**)
2. Barangay Security Force and Volunteers by Type of Service, Year \_\_\_\_ (refer to **Table SO-40**)
3. Fire Incidence for the Past Five Years (refer to **Table SO-41**)
4. Crime Incidence by Barangay for Adult for the Past Five Years (refer to **Table SO-42**)
5. Crime Incidence by Barangay for Children (below 18 years old) in Conflict with the Law for the Past Five Years (refer to **Table SO-43**)
6. Current and Projected Requirement for Police, Fire, and Jail Personnel (refer to **Table SO-44**)



Note: The output tables are basic information from which assessment of the level of service of the protective services sector may initially proceed. Other relevant information may be gathered through a consultation process.

##### B. Determine the felt needs, aspirations and issues of the community relative to protective services through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to protective services would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of protective services?

##### C. Gather additional data/information if warranted by the results of the consultations/ meetings conducted

#### II. Data Analysis

Assess the existing peace and order situation of the locality and prepare a brief narrative report in terms of the following:

1. Capability of existing protective services considering its availability and sufficiency of personnel and equipment/facilities, e.g. police, fire station, jail/detention homes, patrol cars, fire trucks, prisoner vans, etc.
2. Response time of the protective services personnel during crime and fire incidence

3. Availability and sufficiency of barangay tanods in each barangay
4. Condition of the general peace and order situation of adjacent towns
5. Relate the peace and order situation of the city/municipality with the presence of underlying social and economic problems such as drug addiction, unemployment, etc.
6. Exposure and vulnerability of protective service facilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)

### III. Current and Projected Needs

Determine the current need and future requirement based on standards or recognized planning and design criteria listed in **Annex SO-9** and other considerations unique to the municipality/ city.



Example:

Current Population of the Municipality	=	60,000
Existing Number of Policemen	=	20
Police to Population ratio (Min. standards)	=	1 Policeman/ 1000 persons
Projected Population of Municipality, Y1	=	65,000
Projected Population of Municipality, Y2	=	70,000
Total Demand for policemen	=	60,000 x 1/ 1000
	=	60

$$\begin{aligned} \text{Current Police Requirement} &= \text{Total Demand for Policemen} - \text{Actual Number of Policemen} \\ &= 60 - 20 \end{aligned}$$

$$\text{Current Police Requirement} = 40 \text{ policemen}$$

$$\text{Future Requirement} = \text{Projected Population} \times 1 \text{ policemen/} 1000 \text{ persons}$$

$$\begin{aligned} \text{Future Requirement for Year 1} &= 65,000 \times 1/ 1000 \\ &= 65 \text{ policemen} \end{aligned}$$

$$\begin{aligned} \text{Future Requirement for Years 2} &= 70,000 \times 1/1000 \\ &= 70 \text{ policemen} \end{aligned}$$

Use the same procedure to compute for the current and future demand for firemen and jail guards using the prescribed standards.

### IV. Sector Analysis Matrix

#### A. Consolidate and validate the findings of the above steps with the result of the consultation.

1. List the key issues, problems, and concerns of the protective services sector.
2. Determine the possible implications/ impacts of the key issues, problems, and concerns.
3. Consider the impact of Climate Change and Disaster Risks

#### B. Recommend interventions such as:

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects

#### C. Prioritize, tabulate, and present the results in matrix form as follows:

Table SO-38. Sample Protective Services Analysis Matrix

<b>Technical Findings/ Observations</b>	<b>Implications (Effects)</b>	<b>Policy Options/ Interventions</b>
<ul style="list-style-type: none"><li>• Lack of firemen/ firefighting facilities</li></ul>	<ul style="list-style-type: none"><li>• Spread of fire is not easily contained</li></ul>	<ul style="list-style-type: none"><li>• Recruitment and training of fire volunteer brigades</li></ul>
<ul style="list-style-type: none"><li>• Rising incidence of crimes in Brgy. X</li></ul>	<ul style="list-style-type: none"><li>• Deterioration of peace and order</li></ul>	<ul style="list-style-type: none"><li>• Increase police visibility in Brgy. X</li></ul>



## V. Tables

Table SO-39. Protective Services by Facilities and Equipment, Year \_\_\_\_\_

Type of Services	Barangay	Area (sq.m)	Physical Condition of Facility	No. of Personnel	Personnel to Population Ratio	Vehicles		Contact No.	Hazard Susceptibility (H/M/L)											
						No.	Types		FI	Tc	Eq	Vo	Ln	Ts	Su	Others				
Police																				
Headquarters																				
Sub-station																				
Outpost																				
Traffic																				
Fire Protection																				
Headquarters																				
Sub-station																				
Jail Management																				
Provincial Jail																				
District Jail																				
City/ Municipal Jail																				
Others																				
Total																				

Source: Philippine National Police, Bureau of Jail Management and Penology, Bureau of Fire Protection

Notes:

- Physical condition of facility – fair, poor, critical
- Vehicle type – Patrol car; prisoner van; motorcycle; bicycle; patrol boats
- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (FI), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table SO-40. Barangay Security Force and Volunteers by Type of Service, Year

Type of Services	Number of Security Force/ Volunteer	Facilities / Equipment	Condition of facilities/ equipment
Traffic			
Peace and Order			
Disaster			
Auxiliary Services			
Others			

Source: Barangay Office

Note:

- Barangay security force and volunteers with multiple services performed should not be double counted.

Table SO- 41. Fire Incidence for the Past Five Years

Barangay	Origin / cause	Frequency of Occurrence				
		Year 1	Year 2	Year 3	Year 4	Year 5
Total						

Source: Bureau of Fire Protection Local Fire Protection Office

Note:

- Y1 to Y5 are five consecutive years with Y5 having the most recent data  
Philippine National Police, Bureau of Jail Management and Penology, Bureau of Fire Protection

Table SO-42. Crime Incidence by Barangay for Adult for the Past Five Years

Brgy.	Type of Crime	Year 1			Year 2			Year 3			Year 4			Year 5		
		Total	Cases Solved	Offender M F	Total	Cases Solved	Offender M F	Total	Cases Solved	Offender M F	Total	Cases Solved	Offender M F	Total	Cases Solved	Offender M F
Barangay A	<u>Index Crimes</u>															
	<u>Crimes Against Person</u>															
	a. Murder															
	b. Homicide															
	c. Physical Injury															
	d. Rape															
	<u>Crimes Against Property</u>															
	a. Robbery															
	b. Theft															
	<u>Non-Index Crimes</u>															

Source: Local PNP

Notes:

•Y1 to Y5 are five consecutive years with Y5 having the most recent data

•Types of Crime:

1.Index Crimes - crimes which are sufficiently significant and which occur with sufficient regularity to be meaningful. Included in this category are the following crimes: murder, physical injury, robbery, theft and rape

Table SO-43. Crime Incidence by Barangay for Children (below 18 years old) in Conflict with the Law for the Past Five Years

Brgy.	Type of Crime	Year 1		Year 2		Year 3		Year 4		Year 5			
		Total	Cases Solved	Offender	Cases Solved	Offender Total	Cases Solved	Offender	Cases Solved	Offender Total	Cases Solved	Offender	
				M	F			M	F			M	F
Barangay A	<u>Index Crimes</u>												
	<u>Crimes Against Person</u>												
	a. Murder												
	b. Homicide												
	c. Physical Injury												
	d. Rape												
	<u>Crimes Against Property</u>												
	a. Robbery												
	b. Theft												
	<u>Non-Index Crimes</u>												

Source: Local PNP

Note:

- Y1 to Y5 are five consecutive years with Y5 having the most recent data

- Types of Crime:

1.Index Crimes - crimes which are sufficiently significant and which occur with sufficient regularity to be meaningful. Included in this category are the following crimes: murder, physical injury, robbery, theft and rape

2.Non-Index Crimes – all types of crimes not considered as index crimes

Source: <http://www.nscb.gov.ph/ru12/DEFINE/DEF-JUST.HTM>

Table SO- 44. Current and Projected Requirement for Police, Fire and Jail Personnel

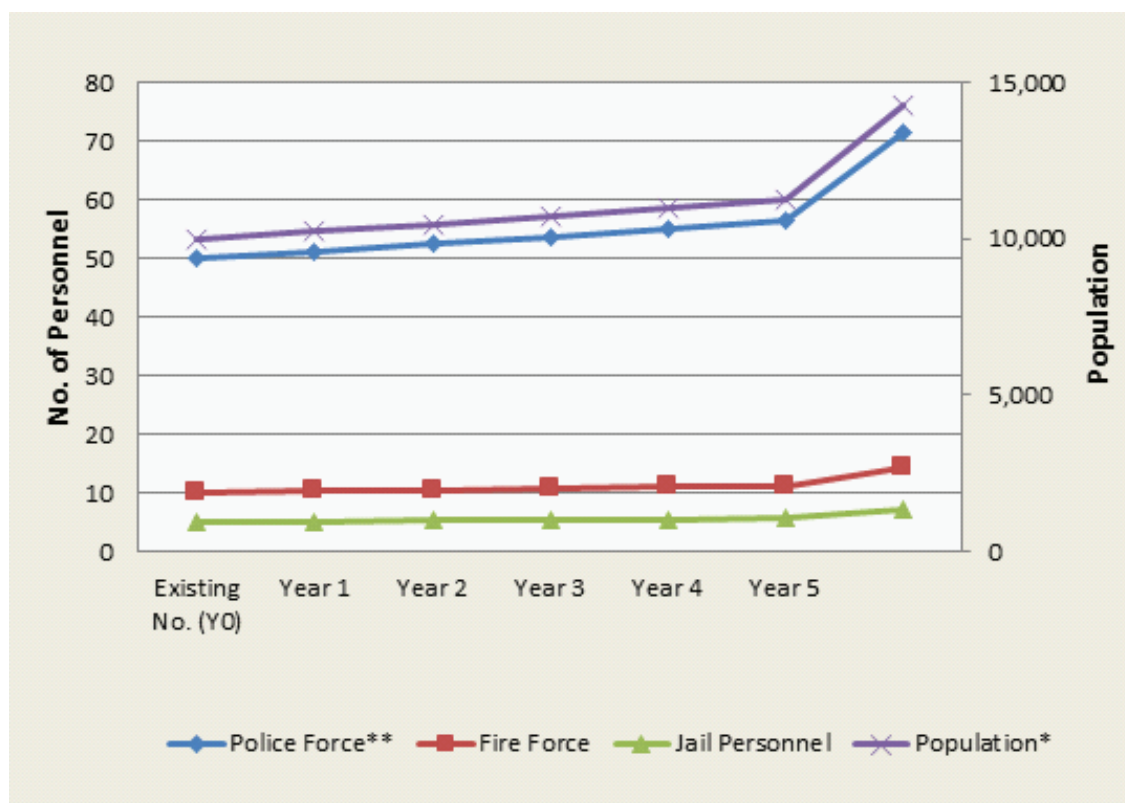
TYPE	Existing No. (Y <sub>0</sub> )	Projected Population* and Required No. of Personnel**					
		Y <sub>1</sub>	Y <sub>2</sub>	Y <sub>3</sub>	Y <sub>4</sub>	Y <sub>5</sub>	Y <sub>10</sub>
Population	10,000	10,240	10,486	10,737	10,995	11,259	14,272
Police Force	50	51	52	54	55	56	71
Fire Force	10	10	10	11	11	11	14
Jail Personnel	5	5	5	5	5	6	7

Notes:

- \*Based on population increase rate = 2.4% per annum

- \*\*Computed based on population projection and standard ratios

Graph SO- 44. Current and Projected Requirement for Police, Fire and Jail Personnel



**Annex SO-9. Standards**

The average manning levels of the PNP nationwide shall be approximately in accordance to the following:

- a. Ideal Police-to-population ratio =  $\frac{1 \text{ policeman}}{500 \text{ persons}}$
- b. Minimum Standard Police-to-Population ratio =  $\frac{1 \text{ Policeman}}{1,000 \text{ persons}}$

The actual protective services strength of the cities/municipalities shall depend on the state of peace and order, population density and actual demands of the service in the particular area.

The urban areas shall have a higher minimum-police-to-population ratio as prescribed by regulations.

The present Bureau of Fire Protection reference to determine the ideal number of firemen in every city or municipality is as follows:

- a. Fireman to Population Ratio is 1:2000
- b. Fire Truck to Population Ratio is 1:28,000
- c. Fire Truck to Fireman Ratio is 1:14

The average manning level of the BJMP nationwide shall be approximated as follows:

- a. Ideal Jail Guard-to-inmate population ratio =  $\frac{1 \text{ jail guard}}{5 \text{ jail inmates}}$
- b. Minimum Standard of jail guard-to-inmate pop'n ratio =  $\frac{1 \text{ jail guard}}{7 \text{ jail inmates}}$

Pursuant to Napolcom Resolution No. 92-36, the classification of police stations by population is shown below:

**Classification of Police Stations by Population**  
(Napolcom Resolution No. 9236)

<b>TYPE Component Cities</b>	<b>Population</b>
"A"	100,000 and above
"B"	75,000 to less than 100,000
"C"	less than 75,000

<b>Municipal Police Stations</b>	<b>Population</b>
"A"	75,000 or more
"B"	30,000 to less than 75,000
"C"	less than 30,000

### Standard Lot Requirements

User	Lot Area (sq.m.)
Police Station Type "A"	2,500
Police Station Type "B"	600
Police Station Type "C"	400
Regional Command	30,000
Provincial Command	10,000
Mobile Force Coy	500

### Classification of Jail Facility by Population

Type of Jail	Inmate Population
DistrictJail	At leastor above 1,000 inmates
CityJail	At least 251 inmates
MunicipalJail	250 inmates and below

### Jail Facility Type and Requirements

Type of Building	Minimum Jail Population	Lot Area(hectare)
A	above 99	1
B	above 20 – 99	0.5
C	20 or less	0.5



## Annex SO-10. Relevant Provisions of the Law

### 1. Fire Station

Chapter IV, Sec. 55-56 of RA 6975 provides, the organization and establishment of Fire Station.

"... At the city or municipal level, there shall be a fire station, each headed by a city/ municipal fire marshall: provided, that, in the case of large cities and municipalities, a district office with subordinate fire stations headed by a district fire marshal may be organized as necessary".

The local government units at the city and municipal levels shall be responsible for the fire protection and various emergency services such as rescue and evacuation of injured people at fire-related incidents and in general, all fire prevention and suppression measures to secure the safety of life and property of the citizenry.

Establishment of Fire Station- There shall be established at least one (1) fire station with adequate personnel, fire fighting facilities and equipment in every provincial capital, city and municipality subject to the standards, rules and regulations as may be promulgated by the Department. The local government unit shall, however, provide the necessary land or site of the station."

### 2. Jail



Chapter V. Sections 62- 63 of RA 6975 provides the organization and establishment District, City of Municipal Jails.

RA 6975 as Amended by 9263 provides for the organization and establishment of District, City and Municipal Jails.

The Jail Bureau shall be composed of city and municipal jails, each headed by a city or municipal jail warden: Provided that, in the case of large cities and municipalities, a district jail with subordinate jails headed by a district jail warden may be established as necessary.

#### 3. Establishment of District, City or Municipal Jail:

There shall be established and maintained in every district, city and municipality a secured, clean, adequately equipped and sanitary jail for the custody and safekeeping of city and municipal prisoners, any fugitive from justice or person detained awaiting investigation or trial and/or transfer to national penitentiary, and/or violent mentally ill person who endangers himself or the safety of others, duly certified as such by the proper medical or health officer, pending the transfer to a mental institution.



Section 7 of Republic Act 9263, otherwise known as the BJMP professionalization Law, provides for the qualification for city and Municipal Jail Warden.

The municipal or city jail services shall preferably be headed by a graduate of a four (4) year course in psychology, psychiatry, sociology, nursing, social work or criminology who shall assist in the immediate rehabilitation of individuals or detention of prisoners. Great care must be exercised so that the human rights of prisoners are respected and protected, and their spiritual and physical well beings are properly and promptly attended to.

The Municipal Jail Warden shall have the rank of Senior Inspector, who must have finished at least second year Bachelor of Laws or earned at least twelve units in a Master's Degree Program in Management, Public Administration, Public Safety, Criminology, Penology, Sociology.

recognized institution of learning, and must have satisfactorily passed the necessary training or career courses for such position as may be established by the Jail Bureau.

The City Jail Warden shall have the rank of Chief Inspector, who must have finished at least second year Bachelor of Laws or earned at least twenty four (24) units in a Master's Degree Program in Management, Public administration, Public Safety, Criminology, Penology, Sociology, National Security Administration, Defense Studies or other related disciplines from a recognized institution of learning, and must have satisfactorily passed the necessary training or career courses for such position as may be established by the Jail Bureau.

The District Jail Warden shall have the rank of Superintendent, who must be a graduate of Bachelor of Laws or earned at least twenty four (24) units in a Master's Degree Program in Management, Public Administration, Public Safety, Criminology, Penology, Sociology, National Security Administration, Defense Studies or other related disciplines from a recognized institution of learning and must have satisfactorily passed the necessary training or career courses for such position as may be established by the Jail Bureau.

They shall assist in the immediate rehabilitation of individuals or detention of inmates. Great care must be exercised so that the human rights of these inmates are respected and protected, and their spiritual and physical well-being is properly and promptly attended.

#### **4. Establishment of Detention Homes for Minor**

Section 13 of the Rules and Regulations on the Apprehension, Investigation, Prosecution and Rehabilitation of Youth Offenders provides for the establishment by the Department of the Interior and Local Government of detention homes for the purpose thereof in cities and provinces which shall be distinct and separate from the jails. A detention home shall, as far as practicable, have a home-like environment.

## Social Sub-Sector: Sports and Receptions

### Steps:

#### I. Data Gathering and Processing

##### A Generate the following data/information and present in table format:

1. Existing Sports and Recreational Facilities by Barangay, Year \_\_\_\_ (refer to **Table SO-46**)
2. Potential Recreation Facility, Year \_\_\_\_ (refer to **Table SO-47**)



The output tables are basic information from which assessment of the level of sports and recreational facilities and services may initially proceed. Other relevant information may be gathered through a consultation process.

Example: Data on major events of provincial, regional or national interest held for the past ten (10) years.

(Refer to **Annex SO-11** for Recreational Facilities).

##### B. Determine the felt needs, aspirations and issues of the community relative to sports and recreation through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to sports and recreation would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of sports and recreation?

##### C. Gather additional data/information if warranted by the results of the consultations/ meetings conducted

#### II. Data Analysis

Assess and describe the sports and recreation situation prevailing in the locality in terms of the following:

1. Availability and efficiency of sports and recreation facilities according to number, type, ownership and areas in each barangay, including facilities in schools and subdivision
2. Conditions of facilities and presence of necessary auxiliary facilities (e.g toilets, benches, lighting facilities, etc.)
3. Appropriateness of facility's location and areas in relation to population concentration for population serve
4. Physical accessibility of the existing facilities, e.g. presence and condition of roads to and from the facilities, natural scenic spots, beaches, etc.
5. Accessibility of the population to the sports and recreation facilities in adjacent towns

6. Availability of potential areas for sports and recreation and opportunities for tourism development
7. Any observed implications/relationship between the lack of sports and recreation and the rise in health and education problems, e.g. drug addiction, poor mental and physical development, etc.
8. Exposure and vulnerability of sports and recreation facilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)



Evaluate capacity of athletes' enthusiasm to excel in national/global competitions given the availability of trainings, facilities; mention any special skills of the city/municipality in sports competitions.

### III. Current and Projected Needs

Determine the Current need and Future requirement for sports and recreation based on Standards, recognized planning and design criteria listed in **Annex SO-12** and other considerations unique to the locality



Example:

Current population of municipality (2005)	=	58,274
Projected population (2010)	=	66,023
Area of existing municipal park	=	20,000 sq.m

$$\begin{aligned} \text{Area requirement 2005} &= \text{population} \times \text{standard} \\ &= 58,274 (500 \text{ sq.m/ } 1000 \text{ population}) \\ &= 29,137 \text{ sq.m} \end{aligned}$$

$$\begin{aligned} \text{Current area requirement} &= \text{area requirement} - \text{present area} \\ &= 29,137 \text{ sq.m} - 20,000 \text{ sq.m} \\ &= 9,137 \text{ sq.m} \end{aligned}$$

$$\begin{aligned} \text{Future Area Requirement for park, 2010} &= 66,023 \times 500 \text{ sq.m/ } 1,000 \\ &= 33,011.50 \text{ sq.m} \end{aligned}$$



The Standards for Recreational Facilities in **Annex SO-12** is suggested to guide the provision of appropriate facilities.

### IV. Sector Analysis Matrix

#### A. Consolidate and validate the findings of the above steps with the result of the consultation.

1. List the key issues, problems, and concerns of the protective services sector.
2. Determine the possible implications/ impacts of the key issues, problems, and concerns.
3. Consider the impact of Climate Change and Disaster Risks

#### B. Recommend interventions such as:

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects

### C. Prioritize, tabulate, and present the results in matrix form as follows:

Table SO-45. Sample Sports and Recreation Analysis Matrix

Technical Findings/ Observations	Implications (Effects)	Policy Options/ Interventions
<ul style="list-style-type: none"> <li>Concentration of sports and recreation facilities in only two barangays</li> </ul>	<ul style="list-style-type: none"> <li>Limited opportunity for residents to indulge in sports and recreation</li> </ul>	<ul style="list-style-type: none"> <li>Identify areas for sports and recreation</li> </ul>
<ul style="list-style-type: none"> <li>Inequitable distribution of sports and recreational facilities</li> </ul>	<ul style="list-style-type: none"> <li>Right- of- way being used as playing area</li> </ul>	<ul style="list-style-type: none"> <li>Provide additional sports and recreation facilities</li> </ul>
<ul style="list-style-type: none"> <li>Location of sports/ recreational facilities in/ near danger areas e.g. cliffs; health hazards e.g. landfill</li> </ul>	<ul style="list-style-type: none"> <li>Risk to the lives/ health of the people</li> </ul>	<ul style="list-style-type: none"> <li>Provide measures to avoid accidents/ any danger; relocate sports/ recreational facilities away from any health hazard structure/ infrastructure</li> </ul>

### V.Tables

Table SO-46. Existing Sports and Recreational Facilities by Barangay, Year\_\_\_\_\_

Brgy.	Type of Facility	Lot Area (sq.m)	Ownership	Physical Condition of Facility	Used as Evacuation Center (Y/N)	Hazard Susceptibility (H/M/L)							
						Fl	Tc	Eq	Vo	Ln	Ts	Su	Others

Source: City Municipal Planning and Development Official, Engineering Office, Office of the Sagguniang Kabataan (SK).

Notes:

- Type of Facility – Sports or Recreational
- Ownership - public/private
- Physical Condition of Facility – Fair, Poor, Critical
- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table SO - 47. Potential Recreation Facility,Year \_\_\_\_\_

Proposed Recreation Facility	Brgy.	Type of Facility	Ownership	Area (ha)	Hazard Susceptibility (H/M/L)								
					Fl	Tc	Eq	Vo	Ln	Ts	Su	Others	

Notes:

- Type of Facility – Sports or Recreational
- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical Cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

## Annex SO-11. Glossary of Terms

**Active Recreation** - activities include hiking, tennis, basketball, swimming, fencing, golf, horseback riding, jogging, sailing, etc.

**City/Municipality Parks** - it is developed to serve the population of a town or a municipality. Its location is recommended to be at the municipality's outskirts for both passive and active recreation. Its facilities include picnic areas, gardens, areas for active games and possibly other amenities such as boating facilities, swimming facilities, etc.

**Neighborhood Park** - primarily made of passive recreation. This should be provided for each neighborhood and usually with open lawn areas, planting and walks. Sculptural form and pools are considered as ornaments. Its size normally requires about 1.2 to hectares.

**Neighborhood Playground** - this is designed to serve children under 14 years of age, and may have additional interesting features to attract teenagers and adults. Its location is in some neighborhood parks school.

**Open Space** - can be best defined according to its functions i.e. as areas for recreation; preservation/conservation, ecology and as tools to enhance and control urban growth.

**Parks and Playgrounds** - is a type of centerpiece open space which may range from neighborhood to City/Municipal Park which caters to the recreational needs of the residents of the community; that portion of the subdivision which is generally not built on and intended for passive or active recreation.

**Passive Recreation** - are activities like nature study, strolling/walking for pleasure, picnicking, playing chess, cards, etc.; seeing movies and other spectacular shows.

**Private Facilities** - refers to both commercial and institutional/organizational facilities which are operated and managed by entrepreneurs for economic gains.

**Public Facilities** - are those administered and funded solely by a government (public) agency. It is a non-profit institution and use of facilities are free and/or fee is charged for its maintenance

**Sports Complex** - contains the basic features of a sports center, but in addition, it has a gymnasium with ample space allotted to spectators' gallery. It must also have training and housing facilities for athletes such as dormitory, cafeteria, classrooms, and administrative offices. All of these facilities must be located in one area, adjacent to one another. An example of this is the Rizal Memorial Sports Complex.

**Sports Field** - any open area distinctly devoted to sports activities. An open-air track and field, an outdoor grandstand, a basketball court may belong under this category. It is usually provided with appropriate lighting facilities.

**Stadium** - consists of a tract oval the center of which may be used for baseball, softball, soccer. In addition, it must have a complementary grandstand and spectators' gallery. An example of this is the Roces Stadium in Quezon City.

## Annex SO-12. Standards for Recreational Facilities



### Sports and Recreation:

1. A minimum of 500 sq.m. per 1,000 population for city or municipal park.

2. A minimum of 0.5 hectare per 1,000 population for playfield/athletic field.

**Athletic Field.** The allocation of external space for the athletic field should allow adequate provision for the laying out of the following basic components, among others:

- a. A standard oval tract with a distance of 400 meters.
- b. A baseball diamond with sides measuring 27.4 meters (90 ft.) long.
- c. A softball diamond with sides measuring 18.2 meters (60 ft.) long.
- d. A soccer football field measuring 90-120 meters (100-130 yards) long and 45-90 meters (50-100 yards) wide.
- e. A basketball court which should be a flat, hard, not grass surface measuring 26 x 14 meters (85 x 46 feet).
- f. A volleyball court measuring 18 meters long and 9 meters wide (60 x 30 feet).
- g. A lawn tennis court measuring 23.77 meters long and 8.23 meters wide (73 x 27 feet), which is the standard for singles. For doubles, a wider court is used, 10.97 meters (36 feet) wide.
- h. Perimeter space should also be provided for the construction of a grandstand or grandstands and bleachers.

Source: Department of Education, Culture and Sports (DECS)  
*Handbook on Educational Facilities (Revised Edition on School Plant) 1993*

### Integrated Social Sector Analysis

After analyzing the various sub-sectors, the findings shall be integrated into a single social sector study. The study shall be presented in both narrative and table format, using the following steps as guide:

1. Convene technical/sectoral working groups to undertake the following:

a. Determine the contribution of the sector to the quality of life of the population based on the following social indicators, among others, by comparing the current or latest information with the previous data:

- Literacy rate
- Mortality/morbidity rate
- Nutritional status
- Percent of homelessness
- Crime rate
- Absence of mandatory recreational facilities and services

b. Cross-check/validate results of sub-sector studies for any duplication or inconsistencies in policies, programs, and projects.

c. Prioritize the issues and problems generated from the sub-sector studies using the



## Integrated Social Sector Analysis

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- Mortality/morbidity rate
- Nutritional status
- Percent of homelessness
- Crime rate
- Absence of mandatory recreational facilities and services

b. Cross-check/validate results of sub-sector studies for any duplication or inconsistencies in policies, programs, and projects.

c. Prioritize the issues and problems generated from the sub-sector studies using the following criteria, among others:

- Urgency of problem
- Seriousness of the problem
- Extent/magnitude of population directly or indirectly affected
- Impact of problem on the strengths, potentials, opportunities and on the achievement of the vision of the locality.
- Other applicable criteria as may be agreed upon.

2. Tabulate prioritized issues/problems with corresponding interventions (policies, programs/projects). This can be presented as follows:

**Table SO-48. Integrated Social Analysis Matrix**

<b>Priority Issues/Problems</b>	<b>Possible Intervention (Policies, Programs/ Projects)</b>	<b>Responsibility Center</b>
<ul style="list-style-type: none"> <li>• Poor water quality</li> </ul>	<ul style="list-style-type: none"> <li>• Improve/upgrade water distribution system</li> <li>• Identify alternative sources of water</li> <li>• Water treatment</li> </ul>	<ul style="list-style-type: none"> <li>• LGU/ Local Water District</li> <li>• LGU/ Local Water District</li> <li>• LGU/ DOH</li> </ul>
<ul style="list-style-type: none"> <li>• Informal Settlers in danger zones</li> </ul>	<ul style="list-style-type: none"> <li>• Possible partnership with concerned stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>• LGU – SB Committee on Housing/ possible landowners/ developers, foundations, etc.</li> </ul>

The following table from the GIS Guidebook may also be used as reference for analysis.

**Table SO-49. Needs Analysis: Presence or Absence of Socio Services by Barangay**

Brgy.	Admin.		Housing (Y/N)			Health (Y/N)				Education (Y/N)				Social Welfare (Y/N)		Protection (Y/N)			Recreation (Y/N)		
	BH		IS	SH	RS	H		PC	PrC	E		S	T	D	Sc	MH	P		F	MF	
	Y/N	C*				Y/N	C*			Y/N	C*						Y/N	C*		Y/N	C*

Notes:

•Check the facilities present per barangay

(BH) Barangay Hall

(IS) Informal Settlers

(SH) Socialized Housing

(RS) Relocation Site

(H) Health Station/Center

(PC) Public Cemetery

(PrC) Private Cemetery (eg. memorial parks, crematorium, etc.)

(E) Elementary School

(S) Secondary School

(T) Tertiary

(D) Day Care Center

(Sc) Senior Citizen Center

(MH) Multipurpose Hall

(P) Police Outpost

(F) Fire Station

(MF) Multipurpose Recreational Facilities

•C\* – Condition

(BH) Barangay Hall

(H) Health Station/Center

(E) Elementary School

(P) Police Outpost

(MF) Multipurpose Recreational Facilities



## Economic Sector Study

The study of Economic Sector in the context of Comprehensive Land Use Planning basically involves the assessment of the current state and growth pattern of local economy with the end view of building and strengthening the economic activities in a sustainable manner.

The key areas/parameters for this study include employment and workforce development, volume and value of production, land utilization, investments in the form of policies, infrastructure and marketing facilities, etc. The broad framework for analyzing the economic sector is provided by the following guideposts:

- What is the economic structure of the city/municipality in terms of economic activities?
- What is the extent of contribution of each activity?
- Which among these activities drive(s) the local economy?
- Where are these economic activities located?
- What is the observed economic development trend/s?
- What are the strengths, weaknesses, opportunities and threats of the local economy?
- How well are the economic activities supported with physical infrastructure, investment/finance, and promotion and marketing strategies?
- What is the extent of capability of the local workforce to produce quality goods and services? Are there measures to enhance skills?
- Are the current economic policies supportive of the development vision of the locality?
- Are these policies supportive of the role of the locality under the development framework of the province or region?
- What policies are needed to accelerate economic growth? Is there a need to formulate policies to achieve equity in business and employment opportunities?
- How much space is needed for economic expansion? Are there potential areas for development and where are these located?
- What environmental concerns/factors need to be addressed/considered?
- What are the vital concerns of this sector? How are these inter-related to other sectors' concerns?

A detailed analysis of the component sub-sectors namely: Agriculture, Commerce and Trade, Industry, and Tourism, shall be undertaken using the steps provided in each sub-sector and consistent with the parameters of the above framework. Results of the sub-sector analysis shall be cross-checked and validated through a participatory process to come up with an integrated economic sector analysis. The guide to an integrated sector analysis follows after the last sub-sector study.

## Economic Sub-Sector: Agriculture

### Steps:

#### I. Data Gathering and Processing

##### A Generate the following data/information and present in table format:

1. Existing Major Agricultural Crops by Area, Production and Market, Year \_\_\_\_ (refer to **Table EC-2**)
2. Comparative Agricultural Crop Areas and Production,  $Y_1$  to  $Y_2$  (refer to **Table EC-3**)
3. Existing Livestock and Poultry Farms, Year \_\_\_\_ (refer to **Table EC-4**)
4. Existing Fishing Grounds and Aquaculture Production, Year \_\_\_\_ (refer to **Table EC-5**)
5. Water Irrigation Systems (refer to **Table EC-6**)
6. Existing Agricultural Support Facilities and Services, Year \_\_\_\_ (refer to **Table EC-7**)
7. Major and Minor Agricultural Occupations/Groups in Urban and Rural Areas, Year \_\_\_\_0 (refer to **Table EC-8**)
8. Strategic Agriculture and Fisheries Development Zones (SAFDZ) (refer to **Table EC-9**)
9. Agrarian Related Concerns, Year \_\_\_\_ (refer to **Table EC-10**)
10. Comparative Area Utilization of Significant Agricultural Activities, Year \_\_\_\_ (refer to **Table EC-11**)
11. Agriculture Related Projects, Approved/Funded for Implementation, Year \_\_\_\_ (refer to **Table EC-12**)



The output tables are basic information from which assessment of the state of the agriculture sector may initially proceed. Other relevant information may be gathered through a consultation process.

##### B. Determine the felt needs, aspirations and issues of the community relative to agriculture through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders.



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to agriculture would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of the agriculture sector?

##### C. Gather additional information if warranted by the results of the consultations/ meetings conducted.

## II. Data Analysis

Assess the existing situation of the agriculture sector covering the following:

### A. Agricultural Production

Historical utilization of city/municipal land for agriculture related activities for the previous years (Comparative Agricultural Crop Areas and Production - refer to **Table EC-3**)

#### 1. Crop Production

- o Location and area of lands devoted to agricultural crop production (refer to **Table EC-2**)
- o Percentage of the municipality's land area devoted to agricultural crop production
- o Area devoted to each crop and percentage of agricultural land planted to each crop. This may be determined using the formula:



$$\begin{aligned} \text{Percentage of crop production} &= \frac{\text{Area devoted to crop production (ha)} \times 100}{\text{Total city/municipal land area (ha)}} \\ \text{Area to municipal/city land area} & \\ \text{Percentage of agricultural land} &= \frac{\text{Area devoted to a specific crop (ha)} \times 100}{\text{Total agricultural area (ha)}} \\ \text{Area devoted to each crop} & \end{aligned}$$

Comparative area and volume of production per major crop (refer to **Table EC-3**)

- o Average production per hectare for irrigated agricultural land and those under private irrigation (refer to **Table EC-2**)
- o Total production and the value of production per major crop (refer to **Table EC-2**)
- o Discuss the agricultural/market distribution per crop and determine the volume of product for local and other consumptions (refer to **Table EC-2**)

#### 2. Livestock and Poultry

- o Location, volume and value of livestock and poultry production (refer to **Table EC-4**)
- o Percentage of production value with that of total agricultural production value
- o Livestock and poultry market distribution and volume of product for local consumptions and export (local/international)

#### 3. Fisheries and Aquaculture

- o Location and description of the Fishery Strategic Development Zones (FSDZs), if any. The FSDZs shall likewise be delineated on the map.



Coordinate with the MAO or DA Regional Office if the locality was identified as one of the Fishery Strategic Development Zones (FSDZs).

- o Area and location of the existing fishing grounds/aquaculture areas in the city/municipality. Refer to **Table EC-5**.
- o Types of marine, aquatic and inland fishing resources by volume and value of production. Include such other activities like seaweed culture, etc.

- o Types of fishing activities, whether commercial fishing, municipal fishing or both
- o The production value compared with the total agricultural production value
- o Availability and adequacy of existing storage/processing facilities
- o Degree and source of pollution/degradation of marine and aquaculture resource areas, if any.

## B. Support Systems

### 1. Physical Infrastructure

- o Existing irrigation facilities by type, location, condition, source of water supply, extent or coverage of service area (refer to **Table EC-6**)
- o Existing condition of farm-to-market roads and the type and frequency of transportation used in transporting goods and services to and from the farm
- o Availability of post-harvest facilities such as milling, warehouse, drying and processing facilities. Refer to **Table EC-7**.

### 2. Credit and Finance

- o Existing agricultural support programs in terms of loans/credit facilities, total or average amount of loan extended/awarded to farmers/farmers' cooperatives
- o Existing market linkages for agricultural and forest products within and outside the LGU
- o Discuss the available financing scheme/s extended to agriculture activities

### 3. Agricultural Support Program and Technical Assistance

- o Existing programs and projects provided by local, provincial, and national agencies and those provided by NGOs and POs
- o Service coverage and number of beneficiaries of these programs/projects
- o Types of technical assistance and extension services available in the locality

### 4. Employment and Income by Activity

- o Percentage distribution of agricultural employment by type (owner cultivator, share cropper, lessee, farm laborer) and other minor agricultural income groups (**Table EC-8**)
- o Comparative analysis of LGU revenues derived from agriculture with other revenue sources

### 5. Areas Covered by National/Local Policies

#### a. Network of Protected Areas for Agricultural and Agro-Industrial Areas for Development (NPAAAD)

- Area, location and impact of NPAAAD to the city/municipality



The NPAAAD ensures the sustained production of the country's basic agricultural and fisheries commodities through the stewardship and utilization of the most productive agricultural and fishery land resources for optimal production, processing, and marketing. The NPAAAD includes:

- i. All irrigated areas;
- ii. All irrigable lands already covered by irrigation projects with firm funding commitments;
- iii. All alluvial plains highly suitable for agriculture, whether irrigated or not;
- iv. Agro-industrial croplands or land presently planted to industrial crops that support the viability of existing agricultural infrastructure and agro-based enterprises;
- v. Highland or areas located at an elevation of five hundred (500) meters or above and have the potential for growing semi-temperate and high-value crops.
- vi. All agricultural lands that are ecologically fragile, the conversion of which will result into serious environmental degradation;
- vii. All fishery areas as defined in the fisheries code of 1998.

Confer with the DA-BSWM on the actual location of the NPAAAD in the locality, the area covered and delineate these NPAAAD areas on the map.

b. Strategic Agriculture and Fishery Development Zones (SAFDZs) - Refer to **Table EC-9**.



SAFDZ refers to the areas within the NPAAAD identified for production, agro processing and marketing activities to help develop and modernize, with the support of government, the agriculture and fisheries sectors in an environmentally and socio-culturally sound manner. (RA 8435 or Agriculture and Fisheries Modernization Act of 1997)

SAFDZ should be recognized and incorporated into the local plans and implemented because they contribute or have the potential to contribute to attaining food self-sufficiency. These should be designated as key production areas and should be protected from land conversion.

c. CARPable Areas/Lands

- Location and area of lands covered by CARP and number of actual beneficiaries (refer to **Table EC-10**)
- Location and number of Agrarian Reform Communities (ARCs)

d. Conversion/Reclassification Areas

The LGU need to coordinate with the MAO and the Department of Agrarian Reform (DAR) for information regarding the following:

- Total area of agricultural lands approved for conversion to non-agricultural uses
- Total area of lands which are no longer subject to reclassification such as:
  - o Agricultural lands distributed to Agrarian Reform beneficiaries;
  - o Agricultural lands with a Notice of Acquisition already issued or voluntarily offered for coverage under CARP;
  - o Agricultural lands covered by Office of the President Administrative Order No. 20, series of 1992, declaring these as non-negotiable for conversion.





Section 4 of DAR Administrative Order No. 1, Series of 2002 defines the areas which are non-negotiable for conversion even when some portions thereof are eligible for conversion. Section 8.4 thereof states that when the agricultural land which is the subject of the application for conversion has been acquired under RA 6657, its conversion shall be allowed only if the applicant is the agrarian reform beneficiary and after the applicant has fully paid his obligation as required under Section 65 of RA 6657.

The authority of cities and municipalities to reclassify agricultural lands to nonagricultural uses and to provide the manner of their utilization and disposition is provided for under Section 20 of RA 7160. The same law also provides the percentage limit of agricultural areas for reclassification as follows:

- For highly urbanized and independent component cities –15%
- For component cities and first to third class municipalities –10%
- For fourth to sixth class municipalities –5%
- Any reclassification beyond or over 15% is subject to authorization by the President upon recommendation of NEDA

“...Rule 5, Articles 36 of the Rules and Regulations Implementing the Local Government Code of 1991 cities the approved zoning ordinance as a requirement for reclassification... The abovementioned condition is further re-affirmed by Article 41 as follows: The comprehensive land use plans shall be the primary and dominant basis for future use of local resources and for reclassification of agricultural lands.” (Joint DAR, DA, DILG and HLURB Memorandum Circular dated 25 March 1995)

For the updated rules and regulations regarding the reclassification and conversion of lands, please refer to the following issuances:

- o DAR Administrative Order No. 1, S. 2002 –2002 Comprehensive Rules on Land Use Conversion
- o DAR Administrative Order No. 05, S. 2007 –Amendments to the 2002 Comprehensive Rules on Land Use Conversion
- o DA Administrative Order No. 2, S. of 2002 –Guidelines for the Implementation of EO 45 dated October 24, 2001... (II. Legal Bases provides the rules governing land use reclassification within and outside NPAAADs and SAFDZs)

### III. Current and Projected Needs

#### A. Identify and discuss the pressing development problems/issues, and constraints being experienced by the agriculture sector in the area as well as the underlying causes:

1. Decrease in agricultural area
2. Decrease in volume of production
3. Environmental degradation
4. Land use conflicts
5. Insufficient infrastructure support facilities
6. Inadequate market linkages
7. Inadequate capital resources and technology

8. Condition of agricultural employment and income opportunities
9. Status of land tenure/implementation of agrarian reforms
10. Rural-urban migration
11. Suitability of agricultural land uses (Refer to **Annex EC-1**)
12. Exposure and vulnerability of agricultural areas and facilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)

**B. Determine the need for agricultural products of the current and future population. All projected information/data arrived at should be examined in relation to other sectors.**

1. Production/Supply Projection

In coordination with the City/Municipal Agriculture Office, determine the following:

- o Current production level of major agricultural crops (rice, corn, vegetables, etc.) from the current yield and the size of the area planted.



Volume of Production = Total Area planted to type of crop X current yield per hectare

- o Projected volume of major agricultural crops.



Use the same formula as above but substitute current yield with potential yield or the highest possible yield of that crop under the most ideal conditions. This can also be determined by using FAO crop yield prediction model or by obtaining data from the Provincial/Municipal Agricultural Office, the Department of Agriculture (DA), and Philippine Statistics Authority (PSA).

- o Current and projected volume of other agricultural products.



The following data may be available from the Provincial/Municipal Agricultural Office, the Department of Agriculture (DA), Philippine Statistics Authority (PSA):

- Livestock and poultry production by city/municipality
- Fishery production by fishing grounds

2. Demand Projection for Agricultural Products

Determine the capacity of projected agricultural products to meet future demands by considering the volume of agricultural product consumed for human nutrition or actual demand.

- o To arrive at the city/municipality's annual demand, multiply per capita consumption with projected population using the formula:



Actual Demand/Required Food Intake = Per Capita Dietary/Food Requirement\* x Projected Population at a given year

It must be noted that actual demand is not the same as Required Food Intake as used by

the Food and Nutrition Resource Council (FNRC).

Actual demand is the amount of food that an individual can consume/afford considering income and preferences.

Food requirement or Recommended Dietary Allowances (RDAs) are the levels of intake of energy and essential nutrients considered adequate to maintain health and provide reasonable levels of reserves in body tissues of nearly all healthy persons in the population.

Use the standards recommended by the Food and Nutrition Resource Council in projecting the dietary/food requirement for the planning period as presented below:

Per Capita Dietary/ Food Requirement Agricultural Product	Standard Requirement (Kg./year)
Cereals and Cereal Products	124
Sugars and Syrups	70
Starchy Roots and tubers	60
Vegetables	39
Fruits	28
Dried Beans, Nuts and Seeds	4
Milk and Milk Products	16
Eggs	4
Fish, Meat and Poultry	54
Miscellaneous	7

- o Compare potential or projected agricultural food production with the projected actual demand by the total population in terms of meeting the standard nutritional requirement level.

- o Determine/identify the necessary inputs or support services to increase production at a level satisfying the target.

#### IV. Sector Analysis Matrix

##### A. Consolidate and validate the findings of the previous steps with the result of the consultation/s.

1. List the key issues, problems, and concerns of the agriculture sector.
2. Determine the possible implications/impacts of the key issues, problems, and concerns

##### B. Recommend interventions such as:

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects

**C. Prioritize, tabulate and present the results in matrix form as follows:**

Table EC–1. Sample Agriculture Analysis Matrix

<b>Technical Findings/ Observation</b>	<b>Implications (Effects)</b>	<b>Policy Options/ Interventions</b>
<ul style="list-style-type: none"> <li>• Decreasing percentage of croplands/area</li> </ul>	<ul style="list-style-type: none"> <li>• Low crop production</li> <li>• Low income</li> <li>• Insufficient food</li> </ul>	<ul style="list-style-type: none"> <li>• Preservation of agricultural lands: - moratorium on agricultural land reclassification</li> </ul>
<ul style="list-style-type: none"> <li>• Environmental degradation of fishing grounds</li> </ul>	<ul style="list-style-type: none"> <li>• Low fish and aquatic production</li> <li>• Low income for fishermen</li> </ul>	<ul style="list-style-type: none"> <li>• Strict implementation of City/Municipal Fishery Ordinance or coastal environmental laws.</li> </ul>



Source: Municipal Agricultural Office

Notes:

- Product Market – Local/Export
- Type of Farming Technology – Traditional, Modern, Ecological
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Drought (Dr), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table EC–3. Comparative Agricultural Crop Areas and Production, Y<sub>1</sub> to Y<sub>2</sub>

Major Crops	Area (ha)			Volume of Production MT		
	Y <sub>1</sub>	Y <sub>2</sub>	% Increase/ Decrease	Y <sub>1</sub>	Y <sub>2</sub>	% Increase/ Decrease
Rice	26540	21162	-25.41	136258	131610	-3.53
Corn	878	1160	24.31	5287	9361	43.52
Coconut	496	253	-96.05	3676	3911	6.01
Mango	131	253	48.22	5550	5204	-6.65

Source: Municipal Agricultural Office

Note:

- Y<sub>1</sub> and Y<sub>2</sub> refer to 2 consecutive years with Y<sub>2</sub> being the year with the most recent data





Table EC-5. Existing Fishing Grounds and Aquaculture Production, Year \_\_\_\_\_

Hazard Susceptibility (H/M/L)	Others						
	Su						
	Ts						
	Ln						
	Vo						
	Eq						
	Tc						
	FI						
Product Market							
Post-Harvest Facilities	Status						
	Capacity						
	No.						
	Type						
Production	Value						
	Volume (mt)						
Barangay							
Fishing Grounds	Marine						
	Inland						

Source: BFAR, MAO

Notes:

- If this table plays a significant role in the economy, a comparative data should be prepared similar to Table EC-3
- Status – Operational (O), Needs Repair (NR), Not Operational (NO)
- Product Market: Local/Export
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (FI), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table EC–6. Water Irrigation Systems

Irrigation System	Year Constructed	Type of Ownership	Type of Irrigation	Capacity of Irrigation System (cu <sup>3</sup> /day)	Area Served (ha)	Hazard Susceptibility (H/M/L)							
						FI	Tc	Eq	Vo	Ln	Ts	Su	O
National													
1.													
2.													
Communal													
1													
2													
Others													

Notes:

- Type of Ownership – Public/Private
- Type of Irrigation – open surface pump; pressurized system open source; others (shallow tube well, sprinkler, etc.)
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (FI), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table EC–7. Existing Agricultural Support Facilities and Services, Year \_\_\_\_\_

Post-Harvest Facilities and Support	Barangay	No.	% Utilization	Type/ Capacity	Remarks
Rice Mill					
Corn Shelter					
Multi-Purpose Drying Pavement					
Mechanical Dryer					
Private Thresher					
Blowers					
Hand Tractor					

Source: MAO, C/MPDO

Note:

- Remarks – (O) Operational, (NR) Needs Repair, (NO) Not Operational

Table EC–8. Major and Minor Agricultural Occupations/Groups in Urban and Rural Areas, Year \_\_\_\_\_

Major and Minor Occupation Groups	Barangay	Urban			Rural			TOTAL		
		M	F	Total	M	F	Total	M	F	Total
Farmers										
Crop farmers										
Orchard farmers										
Ornamental and Other Plant Growers										
Livestock and										
Dairy farmers										
Poultry farmers										
Farm workers										
Fisher folks										
Aqua-farm cultivators										
Inland and Coastal Waters Fisher folks										
Deep Sea Fisher folks										
<b>TOTAL</b>										

Source: NSO/PSA

Table EC–9. Strategic Agriculture and Fisheries Development Zones (SAFDZ)

Name of SAFDZ area (if applicable)	Barangay	Area (ha)	Type of SAFDZ	Hazard Susceptibility (H/M/L)						
				FI	Tc	Eq	Vo	Ln	Ts	Others

Notes:

- Type of SAFDZ
- 1- Strategic Crop Sub-development Zone
- 2- Strategic Livestock Sub-development Zone
- 3 - Strategic Fishery Sub-development Zone
- 4 - Strategic Integrated Crop/Livestock Sub-development Zone
- 5 - Strategic Integrated Crop/Fishery Sub-development Zone
- 6 - Strategic Integrated Crop/Livestock/Fishery
- 7 - Strategic Integrated Fishery and Livestock Sub-development Zone

8 - Remaining NPAAAD Reservation; SD – Sand dunes/beach area; NIPAS; Proposed Tourism

9 - Agro-Forestry Zone

10 - Watershed/Forestry Zone

11 - Built-up Areas; R/L - River wash; EZ – Economic Zone; MR – Military

• Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)

• Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table EC–10. Agrarian Related Concerns, Year \_\_\_\_\_

Concerns	Location	Area (ha)	No. of Farmer - Beneficiaries
A. CARPable Lands			
1. Covered			
2. To be Covered			
B. Agrarian Reform Communities (ARCs)			
Total			

Source: MARO, PARO

Table EC–11. Comparative Area Utilization of Significant Agricultural Activities

Activities	Y <sub>1</sub>		Y <sub>2</sub>		Y <sub>3</sub>	
	Area	%	Area	%	Area	%
Crop Production						
Livestock/Poultry						
Fishing						
Forest Product						

Source: MAO, C/MPDO

Table EC–12. Agriculture Related Projects, Approved/ Funded for Implementation, Year \_\_\_\_\_

Name/ Type of Project	Location	Type	Proponent (Government, Private, Other)	Estimated Start Date	Estimated Date of Completion
• Reforestation Project					

Source: Local Gov't Unit, CENRO/PENRO, DA – BFAR, BSWM, NIA, etc.

## Annex EC-1. Criteria for Suitability of Agricultural Land Uses

1. The site for agricultural purposes should be plains and plateaus and areas of moderate slopes so that modern farm machinery can be used effectively. Moderate slopes (15% maximum for cultivation) favor good drainage, which is required by most crops.
2. Agricultural lands should be of soil type A, B, and C as defined by the Bureau of Soils and Water Management (BSWM). These types are pliable and relatively easy to work with. They are fertile, rich in minerals and other plant nutrients required by most crops. Impervious subsoil that holds water is excellent for paddy rice culture.
3. It should have favorable temperature conditions for various crops. The cold limit of rice is from 28-29°C; of commercial corn production is a mean summer isotherm of 19°C; of cotton, 25°C; of coffee, 15.55-25.55°C. The site meets the moisture requirements of plants.
4. It is accessible to irrigation, transport and electricity.
5. Lands to be devoted as grazing lands are those that have a topography not suited for cropland purposes. The slope ranges from 25%-50%.
6. Areas covered by the CARP and those considered as prime agricultural lands.

These lands should be taken within the landscape ecological context, whereby parameters are measurable and verifiable, and anchored on a more stable land quality or land characteristics. The physical land quality should serve as the backbone criteria. Equally important, the socio-economic criteria in conjunction with other transitional parameters provide complete suitability insights of a given landscape. Likewise, the latter should be categorized into high, moderate, marginal, and not suitable. More so, suitability should be equally specific as to what crops it is most suitable to, needed inputs, etc.

### Fishing Area and Fishing Facilities

1. Fishing areas should be preferably have types I\* and II\*\* climate.

\*Type I climate – have two pronounced seasons, wet from May to October, dry the rest of the year.

\*\*Type II climate – No dry season, very pronounced maximum rain period from November to January.]

2. It should have clay and loam or loam type of soil.
3. Fish collection centers should be located in commercial fish landing ports to maximize use of facilities.
4. Where landing ports are non-existent or could not be built, inland fish collection centers should be located in a locality with the largest production potential or in a place around which the fishing areas are more or less clustered. The rationale is to concentrate supply and thereby possibly induce or justify the putting up of infrastructure support.

In areas where there are large inland fishing resources that are not accessible by motorized transport from landing ports and/or highly populated settlements, the collection center should be located in locality with the largest production potential or in a place around which the fishing areas are more or less clustered.

### Grazing Lands

1. At least seventy five percent (75%) of the area must have a slope of not more than fifty percent (50%).
2. The area should be predominantly covered by herbaceous species well distributed throughout the area and producing at least 500 kilograms air dry weight or 1,000 kilograms green weight per hectare, preferably taken during the first 60 days of the rainy season.

3. The area should be contiguous and not less than 1,000 hectare for economical management.
4. Soil should be stable, medium to heavy texture and erosion resistant. Erosion, if any, must be moderate to slight and can be easily controlled.
5. There must be accessible, continuous and adequate supply of water.
6. The land shall not prevent any restriction in the form of cliffs, ravines, swamps, thick brushes and other similar barriers in the movement of livestock, men, and equipment.

The area must be free from forest occupancy that may hinder range management.

# Economic Sub-Sector: Forestry

## Steps:

### I. Data Gathering and Processing

#### A Generate the following data/information and present in table format:

1. Area and Location of Forestlands by Sub-Category and Primary Use, Year \_\_\_\_ (refer to **Table EC-13**)
2. Volume of Production by Forest Concessionaire, Year \_\_\_\_ (refer to **Table EC-14**)



The output tables are basic information from which assessment of the state of the agriculture sector may initially proceed. Other relevant information may be gathered through a consultation process.

#### B. Determine the felt needs, aspirations and issues of the community relative to forest production through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders.



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/ structuring questions as follows:

1. What issues and concerns related to forest production would you want to be addressed?
2. In what ways can you (as a resident/ community member, stakeholder) address/ resolve these issues and concerns?
3. In what ways can the government address/ resolve these issues and concerns?
4. What are your aspirations to improve the level of the forest production sector?

#### C. Gather additional information if warranted by the results of the consultations/ meetings conducted.

### II. Data Analysis

Assess the existing situation of the forest production sector covering the following:

- Area coverage of forestlands (public lands) from the total city/municipal area. Refer to **Table EC- 13**.



$$\text{Percentage of Forest/ Public Lands} = \frac{\text{Total area devoted to forestry (ha)}}{\text{Total land area of city/municipality}} \times 100$$

- Assess the area and location of production and protection forests and percent distribution from the total forest area



$$\text{Percentage of Production Forest} = \frac{\text{Total area devoted to production forest (ha)}}{\text{Total land area of forestlands (ha)}} \times 100$$

$$\text{Percentage of Protection Forest} = \frac{\text{Total area devoted to protection forest (ha)}}{\text{Total land area of forestlands (ha)}} \times 100$$



- Discuss the existing economic activities of production forest including the number of concessionaires, area covered, type, volume and value of production. (Refer to **Table EC-14**)
- Discuss any reforestation/conservation programs/activities and areas covered.
- Discuss the distribution flow of forest products either as raw materials or as semi-processed products.
- Discuss environmental issues/ concerns that need to be addressed.
- Analysis of forest production is covered in the ecosystem analysis of the forest ecosystem. Analysis can focus on the contribution of forest production (volume and value) to the economy of the locality in terms of employment and income generation.



Source: Community Environment and Natural Resources Officer/ Provincial Environment and Natural Resources Officer (CENRO/PENRO)

Notes:

- Name of Forestry Area – can be the name of steward or organization that applied for the permit
- Type of production: Timber production (natural), Timber production (plantation), Agro-forests, Pasture grazing
- Type of permit: (TLA) – Timber Licenses Agreement; (IFMA) Integrated Forest Management Agreement; (CBFMA) Community based Forest Management Agreement; (FLGMA) Forest Land Grazing Management Agreement; (SLUP) Special Land Uses Permit; (PLTP) Private Land Timber Permit; (CADC) Certificate of Ancestral Domain; (WPP) Wood Processing Plant Permit; (RCC) Rattan Cutting Contract; (OMP) Ordinary Minor Forest Products Permit; other
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table EC - 14. Volume of Production by Forest Concessionaires, Year \_\_\_\_\_

Forest Concessionaire	Area Covered (ha)	Dominant Tree Specie/ Other Products derived	Production		Estimated Number of Workers	Reforestation Activities (ha)
			Total	Value		
<b>Total</b>						

Source: Provincial Environment and Natural Resources Officer/Community Environment and Natural Resources Officer (PENRO/CENRO)

## Economic Sub-Sector: Commerce and Trade

### Steps:

#### I. Data Gathering and Processing

##### **A Generate the following data/information and present in table format:**

1. Inventory of Commercial Areas, Year \_\_\_\_ (refer to **Table EC-16**)
2. Historical Data on Commercial Areas (refer to **Table EC-17**)
3. Business Permits Granted for the Past Five Years (refer to **Table EC-18**)
4. Inventory of Commercial Establishment by Economic Activities (refer to **Table EC-19**)
5. Employment by Type/Classification/ Type of Business and Trade (refer to **Table EC-20**)
6. Existing Programs and Plans for Commerce and Trade, Year \_\_\_\_ (refer to **Table EC-21**)



The output tables are basic information from which assessment of the state of the commerce and trade sector may initially proceed. Other relevant information may be gathered through a consultation process.

##### **B. Determine the felt needs, aspirations and issues of the community relative to commerce and trade through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders**



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to commerce and trade would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of the commerce and trade sector?

##### **C. Gather additional data/information if warranted by the results of the consultations/ meetings conducted**

#### II. Data Analysis

Assess the existing situation of commerce and trade in the city/municipality covering the following aspects:

1. Types of commercial activities, location, and areas occupied (mall, CBD, Commercial strip, neighborhood center, etc.). Include also other areas being served (refer to **Table EC-16**)

Reflect all commercial areas on a map.

2. Growth of commercial activities, in terms of rate of increase in number of establishments, increase in area, and direction of growth (refer to **Table EC-17** and **Table EC-19**)

A simple assessment of rate of increase is done using the following formula:



Rate of increase = 
$$\frac{\text{Current no. of establishments} - \text{Previous no. of establishments}}{\text{No. of years between current year and any year of establishments} \times \text{No. of establishments in the previous years}}$$

Example:

$$= \frac{1250 (2003) - 950 (2000)}{(2003 - 1998) \times 950}$$

$$= \frac{300}{5 \times 950}$$

$$= \frac{300}{4750}$$

$$= 0.06315$$

On the average, the rate of increase is equal to 60 commercial establishments per year.

### 3. Other factors affecting the sector such as:

- o Presence of infrastructure support facilities (water, power, roads, transportation, terminal/parking space, etc.)
- o Production index of the province. This has influence on the emergence and number of specialization shops, and the nature of goods sold.
- o Private sector investments
- o Shopping trends within the municipality as a result of changes in fashion,
- o New inventions/technologies or new manufacturing methods brought about by improvements in the standard of living.
- o Employment status of persons 15 years old and over by major occupation group and major industry group (refer to **Table EC-20**)
- o Average family income and sources of income.

### 4. Percentage of commercial areas against the total built-up area

Compare the land ratio of the commercial area with the total built up area or the total area of lands devoted to urban uses (refer to table on existing land use categories in Step 4–Situation Analysis, Volume 1 of the CLUP Guide.)

### 5. Service area of the existing commercial centers

- o Identify other areas or clienteles outside the town/city being served by these centers.
- o Unique or specialized commercial products or services offered in the town/city.

### 6. Percentage share to total city/municipal income of business activities in terms of business licenses /permits issued.

## III. Current and Projected Needs

Assess and discuss the pressing needs of the sector in relation to:


### 1. Factors/constraints that inhibit the growth of commerce and trade in the locality such as the following:

- o Adequacy of the existing commercial service centers to serve the municipal population considering the nature and distribution of commercial area, location criteria and standard, as well as its influence areas outside the municipality.
- o Efficiency of support facilities such as garbage collection/solid waste management in all

commercial establishments especially the market and slaughter areas.

- o Adequacy of power/water requirements.
  - o Efficiency of infrastructure and traffic problems within the vicinity of the public market and commercial establishments.
  - o Needs of the population for certain facilities/services. The gap between the total demand and the existing services constitute the development needs.
  - o Need for financing source for commercial development
  - o Need for a particular manpower skill and the corresponding training based on existing trends/ demand of the commerce and trade sector. Relate this to the employment profile of the city/municipality.
2. Specific type of commercial activities/services which would require future expansion/ development, considering the current trends and needs in commercial activities, as well as its role in achieving the city/municipal vision.
  3. Future space requirement for commercial purposes.

Projection of area requirement may be guided by the standard: 1.5% to 3% of the total built-up area as shown in the example below:



Example:

Given:

Existing commercial area = 1.0 ha


Projected built-up area increase = 107 ha

Area requirement =  $\frac{\text{Space Standard}}{\text{Projected Built-up Area}} \times \text{Existing Commercial area}$

=  $(.015 \times 107 \text{ ha}) - 1.0 \text{ ha}$

= 0.61 ha



The space standard may not be applicable to certain areas especially those with identified functional role as a commercial center. Thus, area allocation for expansion depends on the chosen development strategy and role of the sector in promoting the city's/municipality's vision, its comparative advantage over adjacent cities/municipalities, and by any planned vertical expansion.

4. Possible location/site for future commercial development/expansion, if any. Present proposed location/s in map form. (Refer to **Annex EC-2. Site Selection Criteria for Commercial Areas**).

## IV. Sectoral Analysis Matrix

### A. Consolidate and validate the findings of the above steps with the result of the consultation/s.

1. List the key issues, problems, and concerns of the commerce and trade sector.
2. Determine the possible implications/impacts of the key issues, problems, and concerns.
3. Consider the impact of Climate Change and Disaster Risks

### B. Recommend interventions such as:

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects (Refer to **Table EC-21**).

**C. Prioritize, tabulate, and present the results in matrix form as follows:**

Table EC-15. Sample Commerce and Trade Analysis Matrix

Technical Findings/ Observation	Implications (Effects)	Policy Options/ Interventions
<ul style="list-style-type: none"> <li>Deteriorating condition of the public market</li> </ul>	<ul style="list-style-type: none"> <li>Decreasing revenue from public market operations</li> </ul>	<ul style="list-style-type: none"> <li>Improvement/Relocation/ Replacement of the existing public market</li> </ul>
<ul style="list-style-type: none"> <li>Increased traffic volume and inadequate parking areas in the CBD</li> </ul>	<ul style="list-style-type: none"> <li>Area is prone to traffic accidents; Loss of revenue for most establishment.</li> </ul>	<ul style="list-style-type: none"> <li>Implement a workable traffic improvement plan</li> </ul>
<ul style="list-style-type: none"> <li>Increased and uncollected volume of market wastes</li> </ul>	<ul style="list-style-type: none"> <li>Danger to health</li> </ul>	<ul style="list-style-type: none"> <li>Regular and more frequent collection and disposal of market wastes</li> </ul>

**V. Tables**

Table EC-16. Inventory of Commercial Areas, Year \_\_\_\_\_

Type of Commercial Areas	Location	Area (ha)	Market Catered	
			Local	Outside (export)
1. 2. 3.	Brgy. A			

Source: Treasurer's Office/Market Administrator/Primary Survey

Notes: Commercial areas include:

- Commercial Business District (CBD)
- Public market
- Commercial strips/talipapa (wet/dry neighborhood commercial center)
- Commercial complex (range of dry goods store, boutique shops, recreational/entertainment establishments and service shops such as food chain branches/establishments)
- Malls (with department stores, supermarket and various shops in one building)
- Other types

Table EC-17. Historical Data on Commercial Areas

Location	Commercial Areas (ha)		% Increase/ Decrease
	Year 1	Year 2	
Brgy.1			
Brgy.2			
Brgy.3			

Source: LGU Business Permits Department/Primary Survey

Note: LGUs may opt to present a 5-year interval data for the last 5 to 10 years



Table EC–18. Business Permits Granted for the Past Five Years

Business Permits	Y <sub>1</sub>		Y <sub>2</sub>		Y <sub>3</sub>		Y <sub>4</sub>		Y <sub>5</sub>	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Primary</b>										
Agriculture, Hunting & Forestry	1	33%	2	33%	3	33%	4	33%	5	33%
Fishing	1	33%	2	33%	3	33%	4	33%	5	33%
Mining & Quarrying	1	33%	2	33%	3	33%	4	33%	5	33%
Primary Sub-Total	3	18%	6	18%	9	18%	12	18%	15	18%
<b>Secondary</b>										
Manufacturing	1	33%	2	33%	3	33%	4	33%	5	33%
Electricity, Gas & Water Supply	1	33%	2	33%	3	33%	4	33%	5	33%
Construction	1	33%	2	33%	3	33%	4	33%	5	33%
Secondary Sub-Total	3	18%	6	18%	9	18%	12	18%	15	18%
<b>Tertiary</b>										
Wholesale & Retail trade/repair of motor vehicles motorcycles personal & household goods	1	9%	2	9%	3	9%	4	9%	5	9%
Hotels/Restaurants	1	9%	2	9%	3	9%	4	9%	5	9%
Transport, Storage & Communication	1	9%	2	9%	3	9%	4	9%	5	9%
Financial Intermediation	1	9%	2	9%	3	9%	4	9%	5	9%
Real Estate, Renting & Business Activities	1	9%	2	9%	3	9%	4	9%	5	9%
Public Administration & Defense/ Compulsory Social Security	1	9%	2	9%	3	9%	4	9%	5	9%
Education	1	9%	2	9%	3	9%	4	9%	5	9%
Health & Social Work	1	9%	2	9%	3	9%	4	9%	5	9%
Other Community, Social & Personal Service activities	1	9%	2	9%	3	9%	4	9%	5	9%
Private Household w/ Employed Persons	1	9%	2	9%	3	9%	4	9%	5	9%
Extra-Territorial Organizations & Bodies	1	9%	2	9%	3	9%	4	9%	5	9%
Tertiary Sub-Total	11	65%	22	65%	33	65%	44	65%	55	65%
<b>TOTAL</b>	<b>17</b>		<b>34</b>		<b>51</b>		<b>68</b>		<b>85</b>	

Source: Treasurer's Office/Mayor's Office

Notes:

- Y1 to Y5 are five consecutive years with Y5 having the most recent data
- % = (No. per type of business permit/Total) x 100

Graph EC-18. Business Permits Granted for the Past Five Years

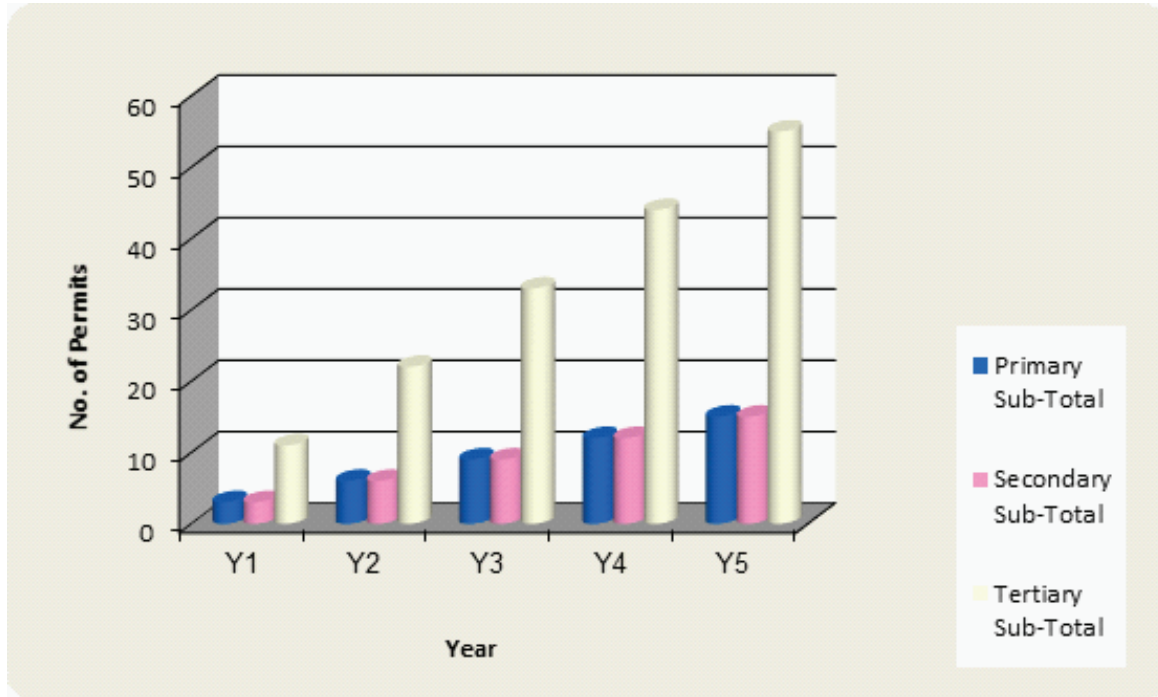


Table EC-19. Inventory of Commercial Establishment by Economic Activities

Economic Activities	Year 1		Year 2		% Inc/ (Dec) Over Previous Year	
	No. of Establishments	No. of Employment	No. of Establishments	No. of Employment	No. of Establishments	No. of Employment
Wholesale and Retail Trade	2	4	1	3	100	33
Hotel and Restaurants, Transport & Storage	1	3	2	4	50	25
Communication	1	3	2	4	50	25
Financial Intermediation	1	3	2	4	50	25
Real Estate	1	3	2	4	50	25
Renting and Business Activities	1	3	2	4	50	25
Public Administration and Defense	1	3	2	4	50	25
Education	1	3	2	4	50	25
Health and Social Work	1	3	2	4	50	25
Other Community, Social and Personal Service Activities	1	3	2	4	50	25
Private Household with Employed persons	1	3	2	4	50	25
Extra Territorial Organizations and Bodies	1	3	2	4	50	25
<b>TOTAL</b>	<b>13</b>	<b>37</b>	<b>23</b>	<b>47</b>	<b>43</b>	<b>21</b>

Source: LGU Business Permits Department/Primary Survey

Notes:

1. The enumerated economic activities are based on Philippine Standard Industrial Classification (PSIC) of the National Statistics Coordination Board (NSCB).
2. Group/summarize existing commercial establishment according to the economic activities based on PSIC classifications for consistency and comparability.
3. Year 1 and year 2 should at least correspond to last two census years. Compare with provincial data.

Table EC–20. Employment by Type/Classification/Type of Business and Trade

Type/ Classification Kind of Business and Trade	No. of Employment	Revenue (in Php)	Population served Markets catered	
			Local	Outside (export)
Wholesale Trade and Retail				
Banking and Finances				
Real Estate/ Construction				
Services				
Others				
TOTAL				

Source: Treasurer's Office/Mayor's Office

Note:

Services include Hotels and Restaurants, transport, storage, communication, education, health and social work, public administration and defense (refer to PSIC).

Table EC–21. Existing Programs and Plans for Commerce and Trade, Year \_\_\_\_\_

Programs/ Projects *	Location	Budget Allocation	Schedule of Implementation	Funding Sources	Implementing Agency/ies

Source: Interview with MPDC, Peoples Economic Council (PEC)

\* Includes Capital Credit Schemes, Tax Holidays/Incentives and the like, Commerce and Trade Prioritization Plan

## Annex EC-2. Site Selection Criteria for Commercial Areas

- 1.The site must be located in the most desirable general area as established by the economic survey;
- 2.The site must be owned or controlled by the developer, or offers the possibility of acquisition;
- 3.Land cost must be in keeping with overall economic consideration;
- 4.Existing zoning must permit shopping center development or reasonable likelihood of rezoning must exist;
- 5.The site must contain sufficient land to permit construction facilities to meet the sales potential;
- 6.The land must be in one piece, free of intervening roadways, right-of-way, easements, major waterways, or other obstacles that would force development in separated portions;
- 7.The topography and shape of the site must permit advantageous planning and reasonable construction;
- 8.The surrounding road pattern and accessibility must allow full utilization of the business potential;
- 9.The structure must be visible from major thoroughfares;
- 10.The surrounding areas should be safeguarded against blight;
- 11.Retail facilities should be exposed to maximize foot traffic;
- 12.Various mechanized traffic types and foot traffic be separated and distinct from one another;
- 13.Maximum comfort and convenience for shoppers and merchants should be provided for; and
- 14.Orderliness, unity and beauty should be achieved.

### Site Selection Criteria for Market/Trading Sites or Trading Centers

- 1.It should be in urbanized area;
- 2.There should be relatively developed economic and servicing activity, as well as an established link with other key areas of the municipality;
- 3.It should be in strategic and convenient locations preferably along existing and proposed land and other modes of transportation to facilitate communication and distribution of goods to other areas dependent on this center for their shopping needs;
- 4.On the basis of market potentials, it should be along major arteries and with more than one line of access.

### Parking and Loading Space Requirements

Provision on parking and loading requirements shall conform to the requirements of the National Building Code.

### Recommended Distances Expressed in Travel Time on Foot or Kilometers:

- 1.From residential zones to:
  - a.Neighborhood center –750 meters or 15 minute travel on foot (maximum);
  - b.Minor CBD –12 km; maximum walking distance, 15-30 minute travel time by public

transport service;

c. Major CBD –45 minutes to one hour travel time from the farthest areas served by the center by public or private transport.

2. From the education center (schools) –a minimum travel time of 15 minutes by public transport.

3. From the health center (hospital) –a minimum of 300 meters or 10 to 20 minutes travel time.

4. From the police station –5 minutes travel time.

5. From the fire station –3 to 5 minutes travel time.

6. From the garbage or disposal area –5 to 10 km or 15 to 20 minutes travel time of garbage truck.

## Economic Sub-Sector: Industry



The industry study shall focus on industries classified according to capitalization, pollution/hazard potential and employment size. See Annex for Classification of industries. The local government unit is encouraged to concentrate on small and medium-scale industries since it has the capability to plan for these types of industries. However, LGUs lacking in potential may as well dismiss plans for industrial development. For areas identified as economic zones by PEZA, or industrial centers by national and regional development plans, the LGU shall coordinate with the PEZA, DTI, and other implementing agencies for the planning, establishment, and operation of such zones/centers.

### Steps:

#### I. Data Gathering and Processing

##### A Generate the following data/information and present in table format:

1. Historical data on industrial areas (refer to **Table EC-25**)
2. Inventory of Existing Industrial Establishments by Intensity, Capitalization, and Employment, Year \_\_\_\_ (refer to **Table EC-26**)
3. Inventory of Existing Industrial Establishment By Manufacturing/Industrial Process; Raw Material Input; Production And Markets, Year \_\_\_\_ (refer to **Table EC-27**)
4. Local Revenue and Industrial Establishment (refer to **Table EC-28**)
5. Product flow
6. Existing hazardous and/or pollutive industries
7. Natural resources with potential for industrial development: mining, manufacturing, logging, etc.
8. Inventory of Local Policies Relating to Industrial Development, Year \_\_\_\_ (refer to **Table EC-29**)



The output tables are basic information from which assessment of the state of the industry sector may initially proceed. Other relevant information may be gathered through a consultation process.

##### B. Determine the felt needs, aspirations and issues of the community relative to industry through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders.



Gathering of information on felt needs and aspirations of the population maybe facilitated by designing /structuring questions such as:

1. What issues and concerns related to industry would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/ resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the industry sector in the locality?

The consultation shall also serve as venue for gathering feedback on or validate data/information on needs, issues and other concerns.

Participation of the following key stakeholders is recommended:

- Industrial establishment owners/key officers or association of owners/officers
- Representatives of rank-in-file employees and skilled workers
- Selected residents in the immediate vicinity of the industry
- Disadvantaged men and women in the sector, e.g., handicapped
- Gather additional data/information if warranted by the results of the consultations/meetings conducted

## II. Data Analysis

1. Present a brief situationer of industrial development in the locality in terms of the following:

- o Number/ type of industries
- o Location and area utilization (refer to land use survey results)
- o Capitalization
- o Input (raw materials)/source
- o Employment /local revenue from industries
- o Product flow
- o Waste disposal system
- o Support services/utilities/facilities (refer to appropriate sector studies, e.g. infrastructure and commerce and trade sectors)

All existing industries by type shall be depicted in a map.

2. Establish the trend of industrial development as well as the causes of such trends in terms of increase/decrease in the following:

- o Areas occupied by industrial activities
- o Employment in the industry sector
- o Revenue generated from industries
- o Volume of products

3. Assess the current support facilities, utilities and services related to:

- o Accessibility
- o Support services (i.e. warehouse, transportation, cold storage, ports/wharves, etc.)
- o Reliability/quality of service

4. Identify any existing hazardous and/or pollutive industries, the location and areas occupied, as well as the type (land, air, water) and extent of pollution brought about by these industries. For this study, it may be necessary to coordinate with the DENR-EMB and concerned groups.

5. Determine adequacy of any anti-pollution device/technology employed to mitigate pollution/degradation

6. Identify areas affected by air/water pollution due to industry and assess extent of degradation.



7. Identify emerging industrial activities and natural resources/areas with potential for industrial development. Match these with local policies and expressed “wants” of stakeholders derived during the participatory assessment.

8. Exposure and vulnerability of industrial establishments to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)



Coordinate with the Mines and Geo-Sciences Bureau (MGB) for the identification and delineation of areas with metallic and non-metallic mineral reserves of known commercial quantities and to determine the potential of a mining industry in the locality.

### III. Current and Future Needs

Considering the current trends and needs in industrial activities assess and provide a report on the needs of the sector as to:

1. Adequacy of the existing industrial establishments considering the nature and distribution of industrial area, location criteria, etc.

2. Other needs and vital growth requirements:

- o Capital financing for industry generation and/or expansion

- Identify all agencies/sectors which provide financial assistance/grants for specific industries.

- o Required manpower skill/s and the corresponding training for such.

- This can be deduced from the analysis of manpower or employment presently utilized by existing types of industries.

- o Marketing strategies and market for perceived surplus products or goods.

- o Power requirements of existing and projected industries.

- o Infrastructure support facilities

- o Anti-pollution devices for pollutive and hazardous industries and economic activities.

- Need for regulating any identified indiscriminate mining and quarrying, and the need for proper monitoring to ensure compliance to established laws.

3. Future expansion/development of industries.

4. Considering the potentials and limitations for industrial development, determine the industry classification (refer to **Annex EC-3**) and intensity suitable for the LGU

5. Compute for land allocation for industrial development based on the following:

- o LGU adopted vision, goals, objectives, and spatial/ development strategy

- o Available land supply vis-à-vis the actual demand

- o Adherence to the principles of sustainable land use planning principles

The LGU may opt to use the following standards in computing for the minimum and maximum allowable industrial allocation.

Table EC-22. Industrial Land Intensity Standards

Intensity <sup>1</sup>	Hectare per 1000 Population	Hectare per Person
Light	0.80	.0008
Medium	2.50	.0025
Heavy	4.00	.004
GROSS	7.30	.0037

Source: Sectoral Planning Guidelines for Industry, 5th Edition, HLURB

<sup>1</sup>Intensity is based on pollution and hazard potential (Refer to HLURB integrated Model Zoning Ordinance and **Annex EC-4** for the detailed listing of industries per classification).

Compute for the industrial land requirement using the following formula:



Industrial Area Requirement = Population x Standard Area per 1,000 population



Example:

Using the formula, industrial land requirement (for light industries<sup>2</sup>) will be computed as follows:

$$\begin{aligned}
 \text{Y1 Industrial Land Requirement} &= \frac{50,000}{1000} \times 0.80 \text{ ha} \\
 &= 40 \text{ hectares}
 \end{aligned}$$

Projection can be made following the sample table below:

Table EC-23. Projected Industrial Area Requirement Y1 to Y5

Year	Population	Area requirement
Y1	50,000	40
Y2	55,000	44
Y3	60,000	48
Y4	65,000	52
Y5	70,000	56

<sup>2</sup>Use the standard recommended for the particular land intensity to be adopted by the LGU. The example used the light intensity standard in the case of an LGU who intends to allow only light industries in the area. It is recommended that low level assumptions should be used unless the locality's development strategy is industrial development.

6. Identify possible site for future development/expansion of industries and reflect on a map.



The following location criteria and considerations shall guide the evaluation of sites for industrial development:

- Impact on the environment;
- Impact on the traffic and the provision of services and utilities like water and sewerage collection systems, telecommunications facilities, electric power, and service roads;
- Proximity and access to transport nodes like ports, airports, bus terminals, and train stations.
- Measures and safeguards against pollution and means to preserve its natural ecosystems as per approved standards on human settlement and

environmental sanitation requirement of the Local Government Code (RA 7160)

Maximum physical characteristics criteria:

Particulars	Criteria
1. Topography	Relatively flat
2. Slope	Level to nearly level (Type A or 0.0-25%)
3. Ground water resources	Good
4. Land capability	Very Good, Good or moderately good (A, Be, Ce, and Cw) respectively
5. Land stability for Urban use	Suitable
6. Erosion potential	None
7. External and Internal natural drainage	Good
8. Flooding hazard	None
9. Prevailing wind direction	Away from other functional zones especially residential zones.

#### IV. Sectoral Analysis Matrix

##### A. Consolidate and validate the findings of the above steps with the result of the consultation/s.

1. List the key issues, problems, and concerns of the industry sector.
2. Determine the possible implications/impacts of the key issues, problems, and concerns.
3. Consider the impact of Climate Change and Disaster Risks

##### B. Recommend interventions such as:

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects (Refer to **Table EC–29**).

##### C. Prioritize, tabulate, and present the results in matrix form as follows:

Table EC–24. Sample Industry Analysis Matrix

Technical findings/Observation	Implications (effects)	Policy options/interventions
<ul style="list-style-type: none"> <li>Industries polluting adjacent river</li> </ul>	<ul style="list-style-type: none"> <li>Environmental degradation</li> <li>Decreased aquatic production</li> </ul>	<ul style="list-style-type: none"> <li>Require all industries to put up their own anti-pollution device</li> <li>Strict monitoring of industries</li> </ul>
<ul style="list-style-type: none"> <li>No industry locators in designated industrial area for the last 5 years.</li> </ul>	<ul style="list-style-type: none"> <li>Land remains idle/undeveloped</li> <li>Projected income not realized</li> </ul>	<ul style="list-style-type: none"> <li>Consider rezoning the area or portion thereof to other uses (i.e. agricultural, residential, etc.)</li> <li>Develop an investment promotion plan in close coordination with DTI, BOI, etc.</li> </ul>

## V. Tables

Table EC–25. Historical Data on Industrial Areas

Year	Industrial Establishments		Area Covered		Employment		Revenue	
	Quantity	Increase/Decrease	Area (ha)	Increase/Decrease	Quantity	Increase/Decrease	Amount	Increase/Decrease
Year 1								
Year 2								
Year 3								
Year 4								
Year 5								

Source: Planning Office/Primary Survey

Notes:

- Year 1 to Year 5 are 5 consecutive years ; Year 5 having the most recent data
- Increase/Decrease = Quantity in Base year – Quantity in Preceding Year

Table EC–26. Inventory of Existing Industrial Establishments by Intensity, Capitalization and Employment, Year \_\_\_\_\_

Barangay	Name of Industrial establishment	Land Area (ha)	Intensity Classification	Capitalization	Employment

Intensity Classification:  $I_1$ - Non-Pollutive/Non-Hazardous  
 $I_2$ - Pollutive/Hazardous  
 $I_3$ - Highly Pollutive/Highly Hazardous



- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

**Table EC–28. Local Revenue and Industrial Establishment**

<b>Year</b>	<b>Revenue</b>	<b>Increase/ decrease</b>	<b>Employment</b>	<b>Increase/ Decrease</b>
Y <sub>1</sub>				
Y <sub>2</sub>				
Y <sub>3</sub>				
Y <sub>4</sub>				
Y <sub>5</sub>				

Source: Treasurer's Office/Mayor's Office

**Table EC–29. Inventory of Local Policies relating to Industrial Development, Year**

<b>P/P</b>	<b>Location</b>	<b>Budget</b>	<b>Implementing Agency</b>	<b>Sources of Fund</b>	<b>Time Frame</b>
1. Establishment of PIE	Brgy. Wawa	P 10M	LGU/DTI	LGU/DTI	1998 - 2000
2. Establishment of Seaport	Brgy. Suba	P 3M	LGU/DPWH	LGU/ DPWH	1998 - 1999

Table EC–30. Fuel and Chemical Depot

Hazard Susceptibility (H/M/L)	Others						
	Su						
	Ts						
	Ln						
	Vo						
	Eq						
	Tc						
	Fl						
Name of Company/Owner							
Capacity (cu <sup>3</sup> /yr)							
Type of Depot							
Year Constructed							
Area Occupied (ha)							
Name of Depot							

Notes:

- Types of Depot – fuel, chemical, others
- Hazards – indicate level of susceptibility for all hazards. High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)



## Annex EC-3. Industry Classification

### A. According to Capitalization

This is useful in determining industry types that a city/municipality can afford to pursue and the amount of land required to support these:

Table EC–31. Industry Classification According to Capitalization

Scale	Capitalization assets
Micro-Industry	150,000 and below
Cottage Industry	Above 150,000 – 1.5 M
Small-scale Industry	Above 1.5 M – 15 M
Medium-scale Industry	Above 15 M – 60 M
Large-scale Industry	Above 60 M

Source: Department of Trade and Industry

### B. According to Employment Size

This is useful in determining which industry types a city/municipality will pursue given the number and skills of the Labor Force Population in search of job in the locality.

Table EC–32. Industry Classification According to Employment Size

Scale	Employment size
Micro-Industry	No specific number
Cottage Industry	Less than 10 workers
Small-scale Industry	10-99 employees
Medium-scale Industry	100-199 employees
Large-scale Industry	200 or more employees

Source: Department of Trade and Industry/ NEDA

### C. According to Degree of Hazard and Pollution

This is useful as decision criteria for the municipality in the choice of specific types of industries that conform to environmental protection.

#### C.1. Hazardous Industries

These industries are fire and health hazards, i.e. their wastes have large amounts of combustible and toxic materials. Non-hazardous industries discharge negligible amount of combustible or toxic wastes.

#### C.2. Pollutive Industries

These industries discharge large amounts of air, water, and solid pollutants. Non-pollutive industries on the other hand emit little or negligible amounts of these pollutants. Based on the hazard and pollution potential, industries are classified into:

- Light Industries (I1)**
  - Non-pollutive/Non-hazardous
  - Non-pollutive/Hazardous
- Medium Industries (I2)**
  - Pollutive/Non-hazardous
  - Pollutive/Hazardous
- Heavy Industries (I3)**
  - Highly pollutive/Non-hazardous
  - Highly pollutive/Hazardous
  - Highly pollutive/Extremely hazardous
  - Pollutive/Extremely hazardous
  - Non-pollutive/Extremely hazardous

## Annex EC-4. Types of Industry

### 1. For Industrial – 1 (I-1)

#### Non-Pollutive/ Non-Hazardous Industries

- Drying fish
- Biscuit factory – manufacture of biscuits, cookies, crackers and other similar dried bakery products
- Doughnut and hopia factory
- Manufacture of macaroni, spaghetti, vermicelli and other noodles
- Other bakery products not elsewhere classified (n.e.c.)
- Life belts factory
- Manufacture of luggage, handbags, wallets and small leather goods
- Manufacture of miscellaneous products of leather and leather substitute and n.e.c.
- Manufacture of shoes except rubber, plastic and wood
- Manufacture of slipper and sandal except rubber and plastic
- Manufacture of footwear parts except rubber and plastic
- Printing, publishing and allied industries and thosen.e.c.
- Manufacture or assembly of typewriters, cash registers, weighing, duplicating and accounting machines
- Manufacture or assembly of electronic data processing machinery and accessories
- Renovation and repair of office machinery
- Manufacture or assembly of miscellaneous office machines and those n.e.c.
- Manufacture of rowboats, bancas and sailboats
- Manufacture of animal-drawn vehicles
- Manufacture of children vehicles and baby carriages
- Manufacture of laboratory and scientific instruments, barometers, chemical balance, etc.
- Manufacture of measuring and controlling equipment, plumb bob, rain gauge, taxi meter, thermometer, etc.
- Manufacture or assembly of surgical, medical, dental equipment and medical furniture
- Ice plants and cold storage buildings
- Quick freezing and cold packaging for fish and other seafoods
- Quick freezing and cold packaging for fruits and vegetables
- Popcorn/ rice factory
- Manufacture of medical/ surgical supplies, adhesive tapes, antiseptic dressing, sanitary napkins, surgical gauge, etc.
- Manufacture of orthopedic and prosthetic appliances (abdominal supporter, ankle supports, arch support, artificial limb, kneecap supporters, etc.)
- Manufacture of photographic equipment and accessories
- Manufacture or assembly of optical instruments
- Manufacture of eyeglasses and spectacles
- Manufacture of optical lenses
- Manufacture of watches and clocks
- Manufacture of pianos
- Manufacture of string instruments
- Manufacture of wind and percussion instruments
- Manufacture or assembly of electronic organs
- Manufacture of sporting gloves and mitts
- Manufacture of sporting balls (not of rubber or plastic)
- Manufacture of gym and playground equipment
- Manufacture of sporting tables (billiards, pingpong, pool)
- Manufacture of other sporting and athletic goods n.e.c.
- Manufacture of toys and dolls except rubber and mold plastic
- Manufacture of pens, pencils and other office and artist materials
- Manufacture of umbrella and canes
- Manufacture of buttons except plastic

- Manufacture of brooms, brushes and fans
- Manufacture of needles, pens, fasteners and zippers
- Manufacture of insignia, badges and similar emblems (except metal)
- Manufacture of signs and advertising displays (except printed)
- Small-scale manufacturing of ice cream
- Dairies and creameries

### **Non-Pollutive/ Hazardous Industries**

- Manufacture of house furnishing
- Textile bag factories
- Canvass bags and other canvass products factory
- Jute bag factory
- Manufacture of miscellaneous textile goods, embroideries and weaving apparel
- Manufacture of fiber batting, padding and upholstery filling except coir
- Men's and boys' garment factory
- Women's and girls' and ladies' garments factory
- Manufacture of hats, gloves, handkerchief, neckwear and related clothing accessories
- Manufacture of raincoats and waterproof outer garments except jackets
- Manufacture of miscellaneous wearing apparel except footwear
- Manufacture of miscellaneous fabricated mill work and those n.e.c.
- Manufacture of wooden and cane containers
- Sawali, nipa and split cane factory
- Manufacture of bamboo, rattan and other cane baskets and wares
- Manufacture of cork products
- Manufacture of wooden shoes, shoe lace and other similar products
- Manufacture of miscellaneous wood products and those n.e.c.
- Manufacture of miscellaneous furniture and fixture except primarily of metals and those n.e.c.
- Manufacture of paper stationery, envelopes and related articles
- Manufacture of dry ice
- Repackaging of industrial products e.g. paints, varnishes and other related products
- Pumping plants [water supply, storm drainage, sewerage, irrigation and waste treatment plants]

## **2. For Industrial – 2**

### **Pollutive/ Non-Hazardous Industries**

- Manufacturing and canning of ham, bacon and native sausage
- Poultry processing and canning
- Large-scale manufacturing of ice cream
- Ice plants and cold storage
- Corn mill/ rice mill
- Chocolate and cocoa factory
- Candy factory
- Chewing gum factory
- Peanuts and other nuts factory
- Other chocolate and confectionery products
- Manufacturing of flavoring extracts
- Manufacture of food products n.e.c. (vinegar, vetsin)
- Manufacture of fish meal
- Oyster shell grading
- Manufacture of medicinal and pharmaceutical preparations
- Manufacture of stationery, art goods, cut stone and marble products
- Manufacture of abrasive products
- Manufacture of miscellaneous non-metallic mineral products n.e.c.
- Manufacture of cutlery, except table flatware
- Manufacture of hand tools

- Manufacture of general hardware
- Manufacture of miscellaneous cutlery hand tools and general hardware n.e.c.
- Manufacture of household metal furniture
- Manufacture of office, store and restaurant metal furniture
- Manufacture of metal blinds, screens and shades
- Manufacture of miscellaneous furniture and fixture primarily of metal n.e.c.
- Manufacture of fabricated structural iron and steel
- Manufacture of architectural and ornamental metal works
- Manufacture of boilers, tanks and other structural sheet metal works
- Manufacture of other structural products n.e.c.
- Manufacture of metal cans, boxes and containers
- Manufacture of stamped coated and engraved metal products
- Manufacture of fabricated wire and cable products
- Manufacture of heating, cooking and lighting equipment except electrical
- Sheet metal works generally manual operation
- Manufacture of other fabricated metal products except machinery and equipment n.e.c.
- Manufacture or assembly of agricultural machinery and equipment
- Native plow and harrow factory
- Repair of agricultural machinery
- Manufacture or assembly of service industry machines
- Manufacture or assembly of elevators and escalators
- Manufacture or assembly of sewing machines
- Manufacture or assembly of cooking ranges
- Manufacture or assembly of water pumps
- Refrigeration industry
- Manufacture or assembly of other machinery and equipment except electrical n.e.c.
- Manufacture or assembly of electrical apparatus
- Manufacture or assembly of electrical cables and wires
- Manufacture of other electrical industrial machinery and apparatus n.e.c.
- Manufacture or assembly of electric equipment – radio, television, tape recorder, stereo
- Manufacture or assembly of radio and television transmitting, signaling and detection equipment
- Manufacture or assembly of telephone and telegraphic equipment
- Manufacture of other electronic equipment and apparatus n.e.c.
- Manufacture of industrial and commercial electrical appliances
- Manufacture of household cooking, heating and laundry appliances
- Manufacture of other electrical appliances n.e.c.
- Manufacture of electric lamp fixtures

### **Pollutive/ Hazardous Industries**

- Flour mill
- Cassava flour mill
- Manufacture of coffee
- Manufacturing of unprepared animal feeds, other grain milling n.e.c.
- Production prepared feeds for animals
- Grains and cement silos
- Cigar and cigarette factory
- Curing and redrying tobacco leaves
- Miscellaneous processing tobacco leaves n.e.c.
- Textile and fiber spinning mills
- Weaving hemp textile
- Jute spinning and weaving
- Miscellaneous spinning and weaving mills n.e.c.
- Hosiery mill
- Underwear and outerwear knitting mills
- Garment and undergarment factories

- Fabric knitting mills
- Miscellaneous knitting mills n.e.c.
- Manufacture of mats and mattings
- Manufacture of carpets and rugs
- Manufacture of cordage, rope and twine
- Manufacture of related products from abaca, sisal, henequen, hemp, cotton, paper, etc.
- Manufacture of linoleum and other surface coverings
- Manufacture of artificial leather, oil cloth and other fabrics except rubberized
- Manufacture of coir
- Manufacture of miscellaneous textile n.e.c.
- Manufacture of rough lumber, unworked
- Manufacture of worked lumber
- Re-sawmills
- Woodworking establishments, lumber and timber yards
- Planing mills and sawmills, veneer plants
- Manufacture of veneer, plywood and hardwood
- Manufacture of doors, windows and sashes
- Treating and preserving of wood
- Wood drying kilns
- Manufacture of charcoal
- Manufacture of wood and cane blinds, screens and shades
- Pulp, paper and paperboard factories
- Manufacture of containers and boxes of paper and paper boards
- Wood and cardboard box factories
- Manufacture of miscellaneous pulp and paper products n.e.c.
- Manufacture of perfumes, cosmetics and other toilet preparations
- Manufacture of waxes and polishing preparations
- Manufacture of candles
- Manufacture of inks
- Manufacture of miscellaneous chemical products n.e.c.
- Tire retreating and rebuilding
- Manufacture of rubber shoes and slippers
- Manufacture of industrial and molded rubber products
- Manufacture of plastic footwear
- Manufacture of plastic furniture
- Manufacture of other fabricated plastic products n.e.c.
- Manufacture of table and kitchen articles
- Manufacture of pottery, china and earthen ware n.e.c.
- Manufacture of flat glass
- Manufacture of glass containers
- Manufacture of miscellaneous glass and glass products n.e.c.
- Manufacture of clay bricks, clay tiles and hollow clay tiles
- Manufacture of miscellaneous structural clay products n.e.c.
- Manufacture of structural concrete products
- Manufacture of asbestos products
- Manufacture of engines and turbines except motor vehicles, marine and aircraft
- Manufacture of metal cutting, shaving and finishing machinery
- Manufacture of wood working machinery
- Manufacture, assembly, rebuilding, repairing of food and beverage making machinery
- Manufacture, assembly, rebuilding, repairing of textile machinery and equipment
- Manufacture, assembly, rebuilding, repairing of paper industry machinery
- Manufacture, assembly, rebuilding, repairing of trade machinery and equipment
- Manufacture of rice mills
- Manufacture of machines for leather and leather products
- Manufacture of construction machinery
- Manufacture of machines for clay, stove and glass industries
- Manufacture, assembly, repair and rebuilding of miscellaneous special industrial machinery and equipment n.e.c.

- Manufacture of dry cells, storage battery and other batteries
- Boat building and repairing
- Ship repairing industry, dock yards, dry dock, shipways
- Miscellaneous shipbuilding and repairing n.e.c.
- Manufacture of locomotives and parts
- Manufacture of railroad and street cars
- Manufacture or assembly of automobiles, cars, buses, trucks and trailers
- Repair garages and shops
- Factories for engines and turbines and attached testing facilities
- Hangars
- Manufacture and assembly plants of aircraft engine
- Repair and testing shops for aircraft engines and parts
- Manufacture of wood furniture including upholstered
- Manufacture of rattan furniture including upholstered
- Manufacture of box beds and mattresses
- Dry cleaning plants using flammable liquids
- Paint stores with bulk handling
- Paint shops and spray painting rooms
- Signs and billboards painting shops
- Warehouses where highly combustible materials are stored
- Factories where loose combustible fiber or dirt are manufactured, processed or generated

### 3. For Industrial – 3

#### Highly Pollutive/ Non-Hazardous Industries

- Meat processing, curing, preserving except processing of ham, bacon, sausage and chicharon
- Milk processing plants (manufacturing filled, reconstituted, or recombined milk, condensed or evaporated)
- Butter and cheese processing plants
- Natural fluid milk processing (pasteurizing, homogenizing, vitaminizing, bottling of natural animal milk and cream-related products)
- Other dairy products n.e.c.
- Canning and preserving of fruits and fruit juices
- Canning and preserving of vegetables and vegetable juices
- Canning and preserving of vegetable sauces
- Miscellaneous canning and preserving of fruits and vegetables n.e.c.
- Fish canning
- Patis factory
- Bagoong factory
- Processing, preserving and canning of fish and other seafoods n.e.c.
- Manufacture of desiccated coconut
- Manufacture of starch and its products
- Manufacture of wines from juices of local fruits
- Manufacture of malt and malt liquors
- Manufacture of soft drinks carbonated water
- Manufacture of instant beverages and syrups
- Other non-alcoholic beverages n.e.c.
- Other slaughtering, preparing and preserving meat products n.e.c.
- Cooking oil and soap processing plants

#### Highly Pollutive/ Hazardous Industries

- Vegetable oil mills, including coconut oil
- Manufacture of refined cooking oil and margarine
- Manufacture of fish, marine and other animal oils
- Manufacture of vegetable and animal oils and fats n.e.c.
- Sugar cane milling (centrifugal and refined)



- Sugar refining
- Muscovado sugar mill
- Distilled, rectified and blended liquors n.e.c.
- Cotton textile mill
- Ramie textile mill
- Rayon and other man-made fiber textile mill
- Bleaching and drying mills
- Manufacture of narrow fabrics
- Tanneries and leather finishing plants
- Pulp mill
- Paper and paperboard mills
- Manufacture of fiberboard
- Manufacture of inorganic salts and compounds
- Manufacture of soap and cleaning preparations
- Manufacture of hydraulic cement
- Manufacture of lime and lime kilns
- Manufacture of plaster
- Products of blast furnaces, steel works and rolling mills
- Products of iron and steel foundries
- Manufacture of smelted and refined non-ferrous metals
- Manufacture of rolled, drawn or extruded non-ferrous metals
- Manufacture of non-ferrous foundry products

#### **Highly Pollutive/ Extremely Hazardous Industries**

- Manufacture of industrial alcohols
- Factories for highly flammable chemicals
- Other basic chemicals n.e.c.
- Manufacture of fertilizers
- Manufacture of pesticides
- Manufacture of synthetic resins, plastic materials and man-made fibers except glass
- Plastics resin plants (monomer and polymer)
- Plastics compounding and processing plants
- Petroleum refineries
- Manufacture of reclaimed, blended and compound petroleum products
- Manufacture of miscellaneous products of petroleum and coal, n.e.c.

#### **Pollutive/ Extremely Hazardous Industries**

- Manufacture of paints
- Manufacture of varnishes, shellac and stains
- Manufacture of paint removers
- Manufacture of other paint products
- Manufacture of matches
- Manufacture of tires and inner tubes
- Manufacture of processed natural rubber not in rubber plantation
- Manufacture of miscellaneous rubber products n.e.c.
- Water and power generation complexes
- Liquid and solid waste management complexes
- Power plants (thermal, hydro or geothermal)
- All other types of complexes for public utilities

#### **Non-pollutive/ Extremely Hazardous Industries**

- Manufacture of compressed and liquefied gases
- Storage tanks, buildings for storing gasoline, acetylene, liquefied petroleum gas, calcium, carbides, oxygen, hydrogen and the like
- Armories, arsenals and munitions factories
- Match and fireworks factories
- Acetylene and oxygen generating plants



## Economic Sub-Sector: Industry



Tourism study at the local level is focused on the identification of local attractions or areas that have tourism potential in order to generate tourist traffic to these areas. Generally, tourism sites (areas) are endowed with natural or manmade physical attributes and resources that are conducive to recreation, leisure, and other wholesome experiences (e.g. educational) and are intended for use of travelers and tourists.

These resources can be characterized at two levels: first level, natural and cultural characteristics indigenous to an area; and second level, attractions, activities and facilities needed to draw, entertain, and accommodate the tourists and travelers in the area.

However, where it is found that the locality does not have any tourism potential, there is no need to prepare a study on tourism.

### Steps:

#### I. Data Gathering and Processing

##### A Generate the following data/information and present in table format:

1. Inventory of Tourism Establishments, Year \_\_\_\_ (refer to **Table EC-34**)
2. Accessibility of Existing Tourism Establishment and Tourist Attraction, Year \_\_\_\_ (refer to **Table EC-35**)
3. Inventory of Tourism Establishments and Support Facilities and Services, Year \_\_\_\_ (refer to **Table EC-36**)
4. Local Revenue and Employment by Tourism Activities for the Past Five Years (refer to **Table EC-37**)
5. Inventory of Tourists by Country of Origin for the Past Five, Years (refer to **Table EC-38**)
6. Cultural and Tourism Activities/ Festivals (refer to **Table EC-39**)
7. Potential Tourist Attractions in the Locality (refer to **Table EC-40**)



The output tables are basic information from which assessment of the tourism sector may initially proceed. Other relevant information may be gathered through a consultation process.

##### B. Determine the felt needs, aspirations and issues of the community relative to tourism through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders.



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to tourism would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve tourism in your locality?

## C. Gather additional data/information if warranted by the results of the consultations/ meetings conducted

### II. Data Analysis

Assess the state of tourism industry in the locality and present a brief situationer in terms of:

1. Nature, location, area of existing tourist spots/attractions. Include facilities, services, and attractions (e.g. white sand beach, boating, cottage, food, etc.) offered by tourist establishments.
2. Presence of cultural/traditional festivals/activities, description and calendar of activities
3. Average number of visitors, tourists visiting the tourist attractions on a daily or monthly basis
4. Peak season of arrival of visitors, trend of arrival
5. Capacity of tourist establishments and facilities to accommodate the influx of visitors to the area
6. Accessibility of the tourist attractions, road conditions, frequency of transport services, etc.
7. Gross annual receipt or income derived from tourism related establishments and rate of revenue compared to total city/municipal revenue
8. Number of employment generated by the tourism industry (% of labor force employed)
9. Exposure and vulnerability of tourism facilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)

### III. Current and Future Requirements

Assess the requirements of tourism sector in terms of the following:

1. Comparative standing of tourism facilities with the requirements for specific types of resorts, restaurants, hotels, etc. as embodied in the following:
  - a. Rules and regulations to govern the business operation of apartment-hotels (apartelles), tourist inns, pensions, motel-hotels (motels), lodging houses and other similar establishments;
  - b. Rules and regulations governing the business of travel and tour guides;
  - c. latest Hotel Code of the Philippines;
  - d. Adequacy of the existing personnel based on staffing requirements set by the Tourism Infrastructure and Enterprise Zone Authority (TIEZA);
  - e. Peace and order situation in the area;
  - f. Identification of other factors to further enhance the beauty of the tourist spots.
2. Based on the existing capacities determined in the inventory vis-à-vis the targeted/ projected visitors establish the additional facilities and services required to handle additional volume of visitors.
3. Analysis of other potentials/possible sites for the establishment of tourist industry using the criteria set by the Philippine Tourism Authority (PTA) as listed in **Annex EC-5**.



The attraction evaluation will determine the appropriateness for development of tourist attractions. It will likewise be the basis of prioritization/ranking/phasing of development. This evaluation will also identify the factors which need to be improved as well as the strengths to be harnessed, to enhance the appeal of the area to visitors/tourists.

a. Identify potential tourist areas. Related livelihood projects such as souvenir production and handicrafts can also be identified.



To avail of government incentives on tourism projects, consult the Department of Tourism (DOT) for the annual listing of tourism activities to be encouraged and given priority, and the tourism facilities required to supply the needs of local and foreign tourists and travelers

b. If the city/municipality has strong tourism potential and if there are supportive industries which could be developed in the area, explore the possibility of a joint venture with the national government and/or tie-up with the private sector to establish a tourist industry.

c. In the determination of tourism project sites, consider government policies with respect to the preservation of the natural environment and the maintenance of ecological balance. Tourism development must also consider national guidelines and standards promulgated by the DOT, TIEZA, and other concerned agencies.

d. In the effort to develop a tourist area, ensure the existence of strong and reliable support mechanism, e.g. necessary linkages and legal support, capacity development, improved transport facilities and access roads, promotion campaign, etc.

e. Identify the positive and negative impacts of tourism. Programs to mitigate the negative impacts and harness the positive impacts should be in place.

f. Prepare local ordinances to regulate tourism development and operations (as to design, character, height of structure, distance from the water, signages, etc.)

4. Prepare map reflecting proposed/identified tourist spots/attractions.

## IV. Sectoral Analysis Matrix

### A. Consolidate and validate the findings of the above steps with the result of the consultation/s.

1. List the key issues, problems, and concerns of the tourism sector.
2. Determine the possible implications/impacts of the key issues, problems, and concerns.
3. Consider the impact of Climate Change and Disaster Risks

### B. Recommend interventions such as:

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects.

**C. Prioritize, tabulate, and present the results in matrix form as follows:**

Table EC–33. Sample Tourism Analysis Matrix

<b>Technical Findings/ Observation</b>	<b>Implications (Effects)</b>	<b>Policy Options/ Interventions</b>
<ul style="list-style-type: none"> <li>• Deteriorating condition of tourist attraction</li> </ul>	<ul style="list-style-type: none"> <li>• Decreasing rate of visitors/tourists arrival</li> <li>• Decrease in tourism generated revenues</li> <li>• Employees laid off from work</li> </ul>	<ul style="list-style-type: none"> <li>• Intensify promotion campaign</li> <li>• Improve access to tourist attractions</li> <li>• Improve peace and order situation</li> <li>• Develop other amenities/attractions/activities that appeal to tourists</li> </ul>
<ul style="list-style-type: none"> <li>• Increasing pollution of beaches</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease in tourist attraction</li> </ul>	<ul style="list-style-type: none"> <li>• Strict implementation and monitoring of pollution control measures</li> </ul>

Table EC-34. Inventory of Tourism Establishments, Year \_\_\_\_\_

Name of Tourist Attraction	Brgy.	Area (ha)	Type of Tourism Products and Services	Description	No. of Visitors	Accommodation		Name of Owner	Hazard Susceptibility (H/M/L)																				
						Type	No. of Rooms		Fi	Tc	Eq	Vo	Ln	Ts	Su	Others													

Notes:

- Types of tourism products and services based on DOT National Tourism Development Plan (2011-2016)
- N - Nature
- SB - Sun & beach
- H - Health, wellness & retirement
- C - Cultural
- L - Leisure & entertainment
- CN - Cruise & nautical

DM - Diving & marine sports

E – Education

M - Meetings, incentives, conferencing and exhibitions (MICE) & events

- Types of accommodation: hotel, resort, inn, pension, others

- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)

- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

**Table EC–35. Accessibility of Existing Tourism Establishment and Tourist Attraction, Year \_\_\_\_\_**

Name of Tourism Establishment	1Means of Transportation Available	Distance from Nearest Airport (km)	Distance from Nearest Seaport (km)	Distance from National Highway (km)	2Access Road		3Accessibility
					Pavement	Condition	

Notes:

<sup>1</sup>Means of Transportation: Land, Air, Water

<sup>2</sup>Access Road: Paved - cement, asphalt  
 - good, fair, poor condition  
 Unpaved - gravel, earth  
 - good, fair, poor condition

No road access

<sup>3</sup>Accessibility: 1 - accessible all year round by ordinary vehicle  
 2 - accessible only during the dry season by ordinary vehicle  
 3 - accessible all year round by 4-wheel drive vehicle only  
 4 - accessible during the dry season by ordinary vehicle and by 4-wheel drive vehicle only during the wet season  
 5 - accessible by walking/trekking/climbing only  
 6 - served by regular transport services (jeepney, tricycle, bus)  
 7 - served by regular boat service or by contracted boat service

**Table EC–36. Inventory of Tourism Establishments and Support Facilities, Year \_\_\_\_\_**

Name of Tourism Establishment	1Facilities Present								No. of Employees	Markets Catered
	af	ff	cf	mf	ef	s/f	tr	others		

Notes:

- <sup>1</sup>Facilities:

af - accommodation facilities (hotels, resorts, picnic huts, cottages, comfort rooms, dressing/ change rooms, swimming pool, vehicular parking)  
 ff - financial facilities (banks and money changers)  
 cf - communication facilities (Telecommunications)  
 mf - medical facilities (hospitals, clinics)  
 ef - restaurants and other eating facilities (restaurants and other food and beverage facilities)  
 s/f - shopping facilities (shopping centers/malls, handicraft

- tr - stores /souvenir shops
  - tr - travel agencies and tour operators, airline offices, passenger ferry/shipping services, Tourist transport operators, airline offices, passengers ferry/shipping services, tourist transport operators/rent-a-car
  - others - churches and other religious facilities, town plaza/parks/zoos, recreational facilities, other entertainment facilities.
- Markets catered – Local, National, International

**Table EC- 37. Local Revenue and Employment by Tourism Activities for the Past Five Years**

Year	Local Revenue	Employment (No.)			Increase/ (Decrease)
		M	F	Total	
Year 1					
Year 2					
Year 3					
Year 4					
Year 5					

Source: LGU

Note:

- Increase/Decrease = Total employment for base year – Total employment for preceding year

**Table EC–38. Inventory of Tourists by Country of Origin for the Past Five Years**

Name of Tourist Attraction/ Establishment	No. of Tourists/Visitors									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign

Source: DOT

Note:

Foreign tourist – indicate Country of Origin, e.g. USA, Canada, France, Italy, Korea, Japan, etc.

**Table EC–39. Cultural and Tourism Activities/Festivals**

Activity	<sup>1</sup> Frequency of Activity	<sup>2</sup> Duration of Activity

Notes:

<sup>1</sup>Frequency of Activity : yearly, semestral, quarterly or monthly activity

<sup>2</sup>Duration : e.g. number of days the activity is held



Table EC–40. Potential Tourist Attractions in the Locality

Barangay	1Potential Attraction	2Within Forestland (ha)	Within A & D Lands (ha)	Hazard Susceptibility (H/M/L)								
				Fl	Tc	Eq	Vo	Ln	Ts	Su	Others	

Source: LGU

Notes:

- 1Potential Attraction: cave, falls, mountains, beaches, natural forest river, lakes, wetlands (e.g. mangroves)
  - 2Within Forestlands : indicate whether production or protection area
  - Types of accommodation: hotel, resort, inn, pension, others
  - Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

## Annex EC-5. Criteria to Determine Attractiveness of an Area and their Corresponding Weights

Group heading	Criteria	Weight	Consideration
Lodging and food	<ul style="list-style-type: none"> <li>Lodging and Facilities</li> <li>Food facilities</li> </ul>	12%	Hotels, inns, resorts, private homes, restaurants, drive inns
		6%	
Recreation and Shopping	<ul style="list-style-type: none"> <li>Shopping facilities</li> <li>Night time recreation</li> <li>Facilities conducive to health, rest</li> <li>Education facilities</li> <li>Sports facilities</li> </ul>	3%	Handicrafts store, gift shops, department stores Nightclubs, discotheques, theaters, cinema  Hot springs, mineral water springs, picnic grounds, hiking trails, parks Zoos, botanical gardens, aquariums, museums Hunting, fishing, scuba diving, swimming, golf, Tennis, Pelotas, horseback riding.
		2%	
		2%	
		2%	
		2%	
Infrastructure and Utilities	<ul style="list-style-type: none"> <li>Accessibility</li> <li>Transportation facilities</li> <li>Communication facilities</li> </ul>	6%	Highways, roads, airports, bridges, piers Land, sea, air facilities  Radio, TV, telephone, Telegram
		6%	
		4%	
Natural factors	<ul style="list-style-type: none"> <li>Natural beauty</li> <li>Climate</li> </ul>	15%	General topography of the area, flora and fauna, lakes and river, sea, island, springs, waterfalls Amount of sunshine, temperature, fresh air
		5%	
Peace and order	<ul style="list-style-type: none"> <li>Security for tourists</li> </ul>	10%	
Social and Cultural factors	<ul style="list-style-type: none"> <li>Artistic and architectural features</li> <li>Festivals</li> <li>Distinctive local</li> <li>Fairs and exhibits</li> <li>Attitude towards tourists</li> </ul>	2%	Local architect - mosques, monuments, old buildings, forts  Religious, sports, music/dance festivals Folk dances, costumes, music, souvenirs Commercial/non-commercial Local congeniality and treatment of tourists
		4%	
		2%	
		2%	
		2%	
Historical	<ul style="list-style-type: none"> <li>Ruins</li> <li>Monuments, memorials, religious and historical landmarks</li> </ul>	4%	Condition and accessibility The extent to which a site may be well known due to important historical events
		4%	

### Rating Score:

Score	Points	Descriptive Rating
91 – 100	3.1 – 4	Excellent
80 – 90	2.1 – 3	Very Satisfactory
66 – 79	1.1 – 2	Satisfactory
65 – below	0.1 – 1	Unsatisfactory

## Integrated Economic Sector Analysis

After analyzing the various sub-sectors, the findings shall be organized into an integrated economic sector study. The study shall be presented in both narrative and table format, using the following steps:

1. Convene technical/sectoral working groups
2. Conduct participatory assessment of the local economy using SWOT assessment and/or other applicable tool (refer to Annex EC-6 for the procedural step in conducting SWOT).
3. Analyze the structure of the local economy using any or combination of the following parameters: employment, value or volume of production, LGU revenue, and land utilization. This will provide an approximate view of the economy and establish the economic driver(s).



For dominantly rural cities/municipalities or where data is not available, the local economic driver(s) may be determined through a participatory process involving the business sector, local government concerned departments such as Permits and Licenses Office, Assessor's Office, Treasurer's Office, Planning and Development Office, and other key stakeholders.

In some cases, the SWOT analysis earlier conducted may already establish an approximate view of the economy and establish the economic driver(s).

- 3.1 Cull out data from the sub-sector studies and generate data on employment by type of economic activity.

Table EC-41. Employment by Type of Economic Activity

Economic Activity	City/Municipality <sup>1</sup>				Province <sup>2</sup>			
	Y <sub>1</sub>		Y <sub>2</sub>		Y <sub>1</sub>		Y <sub>2</sub>	
	No.	%	No.	%	No.	%	No.	%
<b>Primary</b>								
Agriculture, Hunting & Forestry								
Fishing								
Mining & Quarrying								
<b>Primary Sub-total</b>								
<b>Secondary</b>								
Manufacturing								
Electricity, Gas & Water Supply								
Construction								
<b>Secondary Sub-total</b>								
<b>Tertiary</b>								
Wholesale & Retail trade/repair of motor vehicles motorcycles								
Hotels/Restaurants								
Transport, Storage & Communication								
Financial Intermediation								
Real Estate, Renting & Business Activities								
Public Administration & Defense/ Compulsory Social Security								
Education								
Health & Social Work								
Other Community, Social & Personal Service activities								
Private Household w/ Employed Persons								
Extra-Territorial Organizations & Bodies								
<b>Tertiary Sub-total</b>								
<b>TOTAL</b>								

Notes:

- % pertains to percent contribution of activity per sector.
- % = (No. of employment per activity/Total number of employment per sector) x 100
- City/Municipality<sup>1</sup> – generally derived from city/municipal operating units
- Province<sup>2</sup> – taken from NSO/PSA

3.2 Compute for the changes in share of employment of each economic activity to the number of employed persons in the locality for both Y1 and Y2. Reflect results in the appropriate columns in a table generated from 3.1 above. Use the following formula:



$$\% \text{ Share of employment (of a particular economic activity)} = \frac{\text{Employment (in the particular activity)}}{\text{Total employment (in all economic activities)}} \times 100\%$$

Example:

$$\% \text{ of employment (Mining \& Quarrying)} = \frac{\text{Employment (mining and quarrying)}}{\text{Total employment (in all economic activities in the municipality/city)}} \times 100\%$$

3.3 Cull out data from 3.1 and summarize in a table.

3.4 Prepare graphical presentation of the results of step 3.3 using pie chart to aid analysis.

3.5 Determine the level of urbanization of the locality for both Y1 and Y2 using the % shares of employment data in table from 3.3.



$$\text{Level of employment (LU)} = \% \text{ employment in secondary} + \% \text{ employment in tertiary sector}$$

or simply computed as follows:

$$\text{LU} = 100\% - (\% \text{ share of employment in primary sector})$$

3.6 Analyze result of steps 3.1 to 3.5 above. This step is best undertaken in a participatory manner, e.g., meeting of TWG members/sectoral representatives. Analysis of % shares and the shifting of shares of economic activities over a period of time Y1 to Y2 will present a picture of the growth/trend of local economy.

Analysis can be guided by the following questions:

- What economic activity/sector has the highest/lowest employment share in Y1 and Y2?
- What changes (increase/decrease) are noted in the shares of employment from Y1 to Y2?
- What are the reasons/causes behind the changes?
- What are the possible implications?

Interpretations:

- Increasing share of employment in the tertiary (services) sector indicates increasing urbanization in the city/municipality.
- Decreasing share of primary sector over time (Y1 to Y2) shows economy is shifting from agriculture to non-agricultural economic activities.

If % share of employment in primary sector is more than 50%, locality is still predominantly rural, if less than 50%, the city/municipality is deemed urban.

3.7 Cite possible factors/reasons for changes and shifts of % shares of employment of the different economic activities. Among which are:

- Thrust/vision, economic related policies of the city/municipality
- Peace and order, creativity
- Private sector participation
- Potential for development/strength and comparative advantage of the city/municipality
- Functional role of city/municipality
- Other factors such as national policies affecting the overall development of the city/municipality

4. Repeat the same process (Steps 3.1 to 3.7) using revenue, volume or value of production and reflect results in a table, if such data are available. This will help in validating/supporting analysis of the local economy using employment data previously done

**Table EC-42. Value/Volume of Production and LGU Revenue by Type of Economic Activity**

Economic Activity	Barangay	Value/Volume of Production				LGU Revenue			
		City/Municipality <sup>1</sup>		Province <sup>2</sup>		City/Municipality <sup>1</sup>		Province <sup>2</sup>	
		No.	%	No.	%	No.	%	No.	%
<b>Primary</b>									
Agriculture, Hunting & Forestry									
Fishing									
Mining & Quarrying									
<b>Primary Sub-total</b>									
<b>Secondary</b>									
Manufacturing									
Electricity, Gas & Water Supply									
Construction									
<b>Secondary Sub-total</b>									
<b>Tertiary</b>									
Wholesale & Retail trade/repair of motor vehicles motorcycles personal & household goods									
Hotels/Restaurants									
Transport, Storage & Communication									
Financial Intermediation									
Real Estate, Renting & Business Activities									
Public Administration & Defense/ Compulsory Social Security									
Education									
Health & Social Work									
Other Community, Social & Personal Service activities									
Private Household w/Employed Persons									
Extra-Territorial Organizations & Bodies									
<b>Tertiary Sub-total</b>									
<b>TOTAL</b>									

Source: NSO/PSA, Office of the Mayor/Business Permit Office

Notes:

- % pertains to percent contribution of activity per sector.
- % = (No. of employment per activity/Total number of employment per sector) x 100
- City/Municipality<sup>1</sup> – generally derived from municipal operating units
- Province<sup>2</sup> – taken from NSO

Table EC- 43. List of Primary Economic Activities by Employment, Volume of Product, Year \_\_\_\_\_

Name of Establishment Owner	Brgy.	Type of Activity	Years in Operation	Capitalization	No. of Employees	Production		Industry Classification
						Volume	Market	

Source: NSO/PSA, Office of the Mayor/Business Permit Office

Notes:

- Type of Activity - Agriculture, Forestry, Fishing, Mining and Quarrying
- Market - Local, International, Both

Table EC-44. Summary of Secondary Economic Activities

Name of Establishment Owner	Brgy.	Type of Activity	Years in Operation	Capitalization	No. of Employees	Production		Industry Classification
						Volume	Market	

Notes:

- Type of Activity - manufacturing, electricity, gas and water supply, construction
- Market - Local, International, Both
- Industry Classification:
  - Light: non-pollutive/non-hazardous
  - Medium: non-pollutive/hazardous; pollutive/non-hazardous; pollutive/hazardous
  - Heavy: highly pollutive/highly hazardous

Table EC-45. Summary of Tertiary Economic Activities

Name of Establishment Owner	Barangay	Type of Activity	Years in Operation	Capitalization	No. of Employees

Source: NSO/PSA, Office of the Mayor/Business Permit Office

Notes:

- Types of Activity
  1. Wholesale & Retail trade/ repair of motor vehicles/ motor vehicles/ motorcycles personal & household goods
  2. Hotels/Restaurants
  3. Transport, Storage & Communication
  4. Financial Intermediation
  5. Real Estate, Renting & Business Activities



- 6. Public Administration & Defense/ Compulsory social security
- 7. Education
- 8. Health & Social Work
- 9. Other Community, Social & Personal services activities
- 10. Private Household w/ Employees Persons
- 11. Extra-Territorial Organization & Bodies



Information on gross sales and/or local revenue is optional or as may be available, if employment is adequate/readily available. However, for highly urbanized LGUs, this information is recommended to be gathered and analyzed for a more accurate analysis of the sector.

5. Determine the area of specialization of the locality using the index of the concentration of economic activities called Location Quotient (LQ). LQ is a concentration index measurement of a certain economic activity, e.g., manufacturing in the LGU as compared to a larger area, the province. LQ is computed as follows:



$$\text{Location Quotient} = \frac{\frac{\text{Employment (in an economic activity)}}{\text{Employment in LGU}}}{\frac{\text{Employment (economic activity) in the Province}}{\text{Total Employment in the Province}}}$$

5.1 Compute for the LQ for each of the economic activities enumerated in table generated in 3.1 for both Y1 and Y2.



Sample computations:

$$\begin{aligned} \text{LQ manufacturing} &= \frac{\% \text{ Share of employment in manufacturing (municipal)}}{\% \text{ Share of employment in manufacturing (province)}} \\ &= \frac{35\%}{20\%} = 1.75 \\ \\ \text{LQ agriculture} &= \frac{\% \text{ Share of employment in manufacturing (municipal)}}{\% \text{ Share of employment in manufacturing (province)}} \\ &= \frac{35\%}{20\%} = 0.75 \end{aligned}$$



The use of ratio or % share (ratio expressed in %). This will result to same value of LQ.

5.2 Reflect/tabulate the result in the following table.

Table EC-46. Location Quotient

Economic Activity	Y1	Y2
<b>Primary</b>		
Agriculture, Hunting & Forestry	0.75	-
Fishing	-	-
Mining & Quarrying	-	-
<b>Secondary</b>		
Manufacturing	1.75	-
Electricity, Gas & Water Supply	-	-
Construction	-	-
<b>Tertiary</b>		
Wholesale & Retail trade/ repair of motor vehicles/ motorcycles personal & household goods	-	-
Hotels/ Restaurants	-	-
Transport, Storage & Communication	-	-
Financial Intermediation	-	-
Real Estate, Renting & Business Activities	-	-
Public Administration & Defense/ Compulsory Social Security	-	-
Education	-	-
Health & Social Work	-	-
Other Community, Social & Personal Service activities	-	-
Private Household w/ Employed Persons	-	-
Extra-Territorial Organizations & Bodies	-	-

5.3 Interpret the Location Quotient (LQ) as follows:

- Specific economic activity, e.g., manufacturing with LQ greater than 1 indicates greater concentration of the activity in the city/municipality rather than in the province. This means that the city/municipality is relatively specialized in manufacturing activities as compared to the whole province manufacturing activities.
- If LQ is less than 1, the city/municipality is less specialized in the sector/activity than the province or there is less concentration of the activity in the LGU compared to the province.
- If LQ is equal to 1, both the city/municipality and the province have the same level of specialization or concentration of the activity.

6. Determine the economic base or the “driver” of the city’s/municipality’s economy




The Economic Base Model (EBM) for analyzing local economy will be used in this study. It is based on the concept that the local economy is divided into two sectors: the basic sector and the non-basic sectors.

$$\text{Local economy} = \text{Basic sector/activities} + \text{non-basic sector}$$

The basic sector comprises the economic activities resulting in the export of goods/ products and services (including labor) and generating income from outside the municipality/city. This sector generates income that fuels non-basic service sector.

Non-basic sector comprises economic activities on the production of goods and services for consumption within the region.


The model requires computing for the Economic Base Multiplier (EBM) as follows:



$$EBM = \frac{\text{Total Employment}^*}{\text{Employment in basic sector (export oriented activities)}}$$

\*Employment is only among the parameters that can be used as earlier mentioned

6.1 Determine/list industries/economic activities that are deemed basic or export-oriented using primary survey. Export-oriented in this study refers to distribution/consumption of goods/services outside the LGU including international market. If primary survey cannot be undertaken, assume which among the listed economic activities in Table EC- 41 are basic, on the basis of stock knowledge/ interview.



**Note:**

Please refer to Annex EC-7 for determining the classification of economic activities.




**Example:**

Assume:

Basic sector = activities listed as major division A to F

Non-basic sector = activities listed as major division G to Q

6.2 Compute for the Economic Base Multiplier (EBM) using employment data



$$EBM = \frac{ET}{EA + EB + EC + ED + EE + EF}$$

Where:

ET	=	Total employment in the municipality / city
EA	=	employment in agriculture, fisheries, hunting
EB	=	employment in forestry
EC	=	employment in mining and quarrying
ED	=	employment in manufacturing
EE	=	employment in electricity, water and gas
EF	=	employment in construction

6.3 Interpret results as follows:

EBM Value	Interpretation
1:2	means for every job in the basic sector 2 more jobs are generated in the non-basic or service sector or a total of 3 jobs
1:3	means for every job in the basic sector 3 more jobs are generated in the non-basic or service sector or a total of 4 jobs

7. Determine which economic activity will be pursued/ promoted to achieve the vision, given the results/findings in the previous steps

8. Translate the chosen activity to spatial requirements/ using appropriate/agreed criteria.

9. Determine contribution of the sector to the quality of life of the population based on the following indicators by comparing the current or latest information with the previous data:

- a. Employment rate
- b. Population below poverty level

- c. LGU revenue
- d. Average family income
- e. Number of investors
- f. Others, as maybe necessary

10. Cross-check/validate results of sub-sector studies for any duplication and/or inconsistencies of interventions (policies, programs and projects).

11. Prioritize issues and problems using the following criteria:

- Urgency of problem
- Seriousness of the problem
- Extent/magnitude of population directly or indirectly affected
- Impact of problem on the strengths, potentials, opportunities and on the achievement of the vision of the locality.
- Other applicable criteria as maybe agreed upon

12. Tabulate prioritized issues/problems with corresponding interventions (policies, programs/projects). This can be presented as follows:

**Table EC-47. Integrated Economic Analysis Matrix**

<b>Priority Issues/ Problems</b>	<b>Possible Intervention</b>	<b>Responsibility Center</b>
<ul style="list-style-type: none"> <li>• Pollution of water bodies due to industrial discharges</li> </ul>	<ul style="list-style-type: none"> <li>• Strict implementation of waste treatment policies</li> <li>• Community participation in monitoring industrial wastes disposal</li> </ul>	<ul style="list-style-type: none"> <li>• LGU/DENR/DOH</li> <li>• LGU/NGOs/NGAs</li> </ul>
<ul style="list-style-type: none"> <li>• Conflicting economic activities, e.g. manufacturing industries and tourism (beach resorts)</li> </ul>	<ul style="list-style-type: none"> <li>• Strict enforcement of CLUP and ZO</li> <li>• Formulation and application of other development control measures</li> </ul>	<ul style="list-style-type: none"> <li>• LGU (SB committee concerned, Zoning officer, Planning officer)</li> </ul>

## Annex EC-6. SWOT Analysis Technique

SWOT Analysis is a method that enables a planner to generate feasible alternative strategies for the LGU through an assessment of the present conditions, characteristics, and current state and utilization of the LGU's natural/physical, human and fiscal resources.



- Serves as basis for evaluating where the LGU's strength lies. Thus, serves as guide in determining which aspect to pursue and what weaknesses and threats to overcome to take advantage of opportunities.

- Internal strengths can be used to take advantage of external opportunities or to overcome external threats.
- The planners can formulate and pursue defensive-type strategies aimed at overcoming weaknesses and avoiding external threats.
- The planners can formulate and pursue strategies that will improve on the LGU's internal weaknesses by taking advantage of external opportunities.

The SWOT Matrix is an important strategy-formulation matching tool that results in the development of four types of strategies: **Strengths-Opportunities (SO) strategies, Weaknesses-Opportunities (WO) Strategies, Strengths-Threats (ST) strategies and Weaknesses-Threats (WT) strategies.**

### How Is SWOT Analysis Done?



SWOT Analysis is done through a workshop with the participation of the local officials and the various representatives of the different sectors of the LGU and key stakeholders.

- Step 1** Divide the participants into groups/sectors. Assign a presenter for each group/sector.
- Step 2** Using the SWOT Matrix (refer to example below), each group/sector can now proceed to the succeeding steps.

### SWOT Matrix

Always leave this blank	Possible Intervention	Responsibility Center
	OPPORTUNITIES (O)	SO STRATEGIES
THREATS (T)	ST STRATEGIES	WT STRATEGIES

- Step 3** List the key internal strengths in the upper middle cell.
- Strengths refer to the present or inherent features, attributes or characteristics of the LGU that enhance or aid in its development or progress. Strengths should be identified to be able to enhance them. (E.g. vast tract of agricultural roads and power supply, strong political will among local officials)
- Step 4** List the key internal weaknesses in the upper right cell.
- Weaknesses refer to the present human, fiscal or physical attributes that tend to or inhibit the development or progress of the LGU. Weakness should

be analyzed to be able to overcome them. (E.g. inadequate irrigation facilities poor maintenance of existing facilities)

- Step 5** List the key external opportunities in the middle left cell.
- Opportunities refer to the external economic, social, political, technological and competitive trends, conditions, events or circumstances that could significantly benefit the LGU to further improve its existing situation, (e.g. Location of foreign assisted projects, within the BIMP-EAGA)
- Step 6** List the key external threats in the lower left cell.
- Threats consist of external economic, social, political, technological and competitive trends and events that are potentially harmful to the LGU's present and future development or progress, (e.g. presence of EPZA in the adjacent city/municipality)
- Step 7** Match internal strengths with external opportunities and record the resultant SO Strategies in the middle right cell. SO strategies are based on using key internal strengths to take advantage of external opportunities.
- Step 8** Match internal weaknesses with external opportunities and record the resultant WO strategies in the middle right cell. WO strategies are based on overcoming of weaknesses by taking advantage of opportunities
- Step 9** Match internal strengths with external threats and record the resultant ST strategies in the lower center cell. ST Strategies are based on using strengths to avoid threats
- Step 10** Match internal weaknesses with external threats and record the resultant WT Strategies in the lower right cell. WT strategies are on minimizing weaknesses to avoid threats.



The purpose of each matching tool is to generate feasible alternative strategies, not to select or determine which strategies that were developed in the SWOT Matrix will be selected or implemented.

- Step 11** Let each group/sector present their respective output: SWOT Analysis Matrix (Refer to sample SWOT analysis matrix below).

SWOT Matrix

Always leave this blank	STRENGTHS (O)	WEAKNESSES (W)
	Vast tract of agricultural Land	Inadequate irrigation facilities
	Adequate roads, bridges and power supply	Poor maintenance of existing utilities
	Strong political will among local officials	
OPPORTUNITIES (O)	SO STRATEGIES	WO STRATEGIES
LGU is among the small irrigation project areas of the JICA	Local officials to make representations with the JICA project team for early implementation	To cooperate with the JICA authorities to facilitate construction of irrigation facilities in the area
Within the BIMP-EAGA	Expansion and development of commercial and production areas.	Rehabilitation and maintenance of existing facilities
THREATS (T)	ST STRATEGIES	WT STRATEGIES
LGU is located within the typhoon belt	Raise crops which can withstand typhoon	Construct facilities to mitigate floods during heavy downpour
Traffic congestion	Develop alternative roads	Provide additional roads and improve or maintain existing roads

**Step 12**      Generate comments from other groups, select common entries from the groups' outputs and agree to come up with a final matrix using the group work as inputs.



## Annex EC-7. Philippine Standard Industrial Classification (PSIC)

The Philippine Standard Industrial Classification (PSIC) is a statistical classification of economic activities obtained in a country.

The PSIC consists of seventeen (17) major divisions as listed below. For assessment purposes, the PSIC classification is further grouped into three major groupings, as follows:

*Primary sector* – are basically agriculture and natural resource-based economic activities referred to as extractive industry.

*Secondary sector* – consists of the manufacturing, utilities and construction activities referred to as manufacturing sector.

*Tertiary sector* – consists of trade, services, finance, and real estate economic activities referred to as service sector.

Major PSIC Classifications	PSIC Major Division	Economic Activities
Primary (Extractive Industry)	Division A. Division B. Division C.	Agriculture, Hunting and Forestry Fishing Mining and Quarrying
Secondary (Manufacturing)	Division D. Division E. Division F.	Manufacturing Electricity, Gas and Water supply Construction
Tertiary (Service)	Division G.  Division H. Division I. Division J. Division K. Division L.  Division M. Division N. Division O.  Division P. Division Q.	Wholesale and Retail trade, repair of motor vehicles, motorcycles and personal and household goods  Hotels and Restaurants Transport, Storage and Communication Financial Intermediation Real Estate, Renting and Business Activities Public Administration and Defense; Compulsory Social Security Education Health and Social Work Other Community, Social and Personal Service activities Private Household with Employed Persons Extra-Territorial Organizations and Bodies





## Infrastructure Sector Study

Infrastructure study seeks to respond to the major areas of concern in comprehensive land use planning namely: efficient internal and external linkages; improved and equitable access to basic social services, facilities, and economic opportunities; and to stimulate the desired physical growth and development.

The study entails the assessment of the current infrastructure facilities/utilities to determine its capacity to support the existing and future needs/demands of the locality. Decisions on infrastructure development have to consider other factors such as land use policies, costs, and the protection of ecological resources.

The broad framework for analyzing the infrastructure sector is provided by the following guideposts:

- What are the existing infrastructure utilities and facilities in the locality?
- What are their physical conditions? How well are these utilities and facilities managed and maintained?
- Are these adequate, efficient and reliable?
- How can these existing utilities and facilities affect the efficiency and effectiveness of other sectors' performance?
- Do these current utilities and facilities support the development of the locality?
- How can this sector meet the current and projected demands and requirements of the population? How can it improve the delivery of services and strengthen the local economy?

A detailed analysis of the component sub-sectors namely: Transportation, Power, Water, and Information & Communication Technology shall be undertaken using the steps provided in each sub-sector.

Results of the sub-sector analysis shall be cross-checked and validated through a participatory process to come up with an integrated infrastructure sector analysis.

## Infrastructure Sub-Sector: Transportation

### Steps:

#### I. Data Gathering and Processing

##### **A Generate the following data/information and present in table format:**

1. Inventory of Roads by System Classification and Type of Pavement, Year \_\_\_\_ (refer to **Table IF-2**)
2. Inventory of Bridges by Location, Type, Capacity and Condition, Year \_\_\_\_ (refer to **Table IF-3**)
3. Inventory of Ancillary Road Facilities, Year \_\_\_\_ (refer to **Table IF-4**)
4. Inventory of Railways, Year \_\_\_\_ (refer to **Table IF- 5**)
5. Railway Facilities and Services (refer to **Table IF- 6**)
6. Transportation Terminals by Location and Condition, Year \_\_\_\_ (refer to **Table IF- 7**)
7. Inventory of Public Land Transportation Vehicles by Type and Service Routes, Year \_\_\_\_ (refer to **Table IF- 8**)
8. Other Modes of Transport and Facilities (refer to **Table IF- 9**)
9. Road Accidents by Location, Nature, and Frequency for the Past Five Years (refer to **Table IF- 10**)
10. Transport Related Projects, Approved/Funded for Implementation, Year \_\_\_\_ (refer to **Table IF- 11**)



The output tables are basic information from which assessment of the level of service of the transportation sector may initially proceed. Other relevant information may be gathered through a consultation process.

##### **B. Determine the felt needs, aspirations and issues of the community relative to transportation services through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders**



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to transportation would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of transportation services?

##### **C. Gather additional data/information if warranted by the results of the consultations/ meetings conducted**

## II. Data Analysis

Assess the prevailing situation of transportation services and facilities in the locality in terms of the following:

1. Accessibility within the locality and with the neighboring localities by outlining the origin-destination or node/transit points within the locality and the interrelation/integration with regional road network system
2. Existing condition of roads and bridges and determine any isolated areas or gaps in the road network system that require linkage/connection to the urban core/city/municipal proper and to other outlying areas
3. Number of public utility vehicles servicing the LGU population and the location, type, capacity, general condition of the terminals (**Table IF- 7** and **Table IF- 8**)
4. Capacity, frequency and efficiency of service of rail, sea or air transportation system available in the locality. Describe the state/condition of these facilities. Relate the capacity and demand and discuss the contributions to the city/municipality's economic activities (**Table IF- 9**)
5. Roads and transportation facilities affected by hazards
6. Adequacy of existing drainage and sewerage system to contain floodwaters
7. Traffic problems (flooding, road accidents, etc.)/congestion areas within the urban core and other identified parts of the LGU



Information on the number and location of traffic-related accidents is useful to pinpoint areas that present travel safety hazards. The absence of ancillary road facilities also contributes to making some areas hazard prone (**Table IF- 4 & Table IF- 10**).

8. Trend in traffic situation in the Central Business District. Discuss the possible causes of congestion, and its cycle (particular times of day it occurs). Determine also if congestion is related to the capacity of roads to contain the traffic volume, among any other causes. Urban or urbanizing areas experiencing traffic problems may do well to undertake a more detailed traffic management planning.

9. Determine road capacity. Road capacity (supply) is the maximum number of vehicles per unit time such that there is uninterrupted flow of traffic.

The volume is the actual number of vehicles passing through a specific road section or intersection. The ratio of volume to capacity (V/C, i.e., demand to supply) is the measure of level of service of the road or intersection. The lower the value of this ratio, the higher is the level of service or efficiency of the road or intersection.

The following table describes the traffic flow corresponding to the levels of service:

Level of Service	V/C Ratio	Traffic Flow Condition
A	0.0 - 0.20	Free Flow
B	0.21 - 0.44	Stable Flow
C	0.45 - 0.69	Stable Flow
D	0.70 - 0.84	Unstable Flow
E	0.85 - 1.00	Unstable Flow
F	1.00	Forced Flow

10. Exposure and vulnerability of transportation facilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)

### III. Current and Projected Needs

Determine the current and future development needs of the transportation sub-sector in terms of the road network system and its relationship to current land uses and other socio-economic activities.

a. Adequacy of Total Road Length against Population Served (Current Road Requirements)

• Urban Road Requirements



$$\text{Current Urban Requirement} = \text{Urban Population} \times \text{Std. Road to Population Ratio} - \text{Existing Urban Road Length}$$

Example:

Urban Population	=	29,137
Standard Road/Population Ratio	=	2.4 km per 1000 population
Existing Urban Road Length	=	28,363 km
Current Urban Road Req't.	=	(29,137 X 2.4/1000) - 28,363
	=	69,929 - 28,363
Current Urban Road Req't.	=	41.566 km

Explanation: If the given standard for urban road is to be followed, Municipality X presently needs an additional 41.5 km of road in Poblacion area.

• Rural Road Requirements



$$\text{Current Rural Requirement} = \text{Arable Land Area} \times \text{Std. Road to Area Ratio} - \text{Existing Rural Road Length}$$

Arable lands refer to lands suitable for agricultural purposes, i.e. croplands, orchard, pasture, etc.

Example:

Arable land area	=	2,662 hectares
Existing rural road length	=	18.908 km
Standard road-area ratio	=	1.5 km per 100 ha
Current Rural Road Req't.	=	(2,662 ha X 1.5 km./100 ha) - 18.908
Current Rural Road Req't	=	21.02 km

The above calculation gives a very rough estimate of required road length for a city/ municipality. Determining where these roads are or shall be needed depends foremost on the projects' economic viability accompanied by social, technological and physical (engineering) aspects.

b. The condition of existing roads and bridges may also point out needs for upgrading (widening or resurfacing), extension, completion of a route, connecting to another road, etc.

c. Determination of future road requirements

- Projected Urban Road Requirements



Projected Urban Road Requirement =  $\frac{\text{Projected Population} \times \text{Std. Road to Pop'n Ratio}}{\text{Existing Urban Road Length}} - \text{Additional Urban Road Req't}$

Using the data previously given and a projected population of 30,000:

$$\begin{aligned} \text{Projected Urban Road Requirement} &= (30,000 \times 2.4 \text{ km}/1000 \text{ pop}) - (28,363 + 41,566) \\ &= 72.0 - 69.93 \end{aligned}$$

$$\begin{aligned} \text{Projected Urban Road Requirement} &= 2.07 \text{ km} \end{aligned}$$

- Projected Rural Road Requirements



Projected Rural Road Requirement =  $\frac{\text{Total area intended for Agriculture} \times \text{Standard Road to Area Ratio}}{\text{Existing rural length}} - \text{Additional current req't}$

$$\begin{aligned} \text{Projected Rural Road Requirement} &= (3000 \text{ ha} \times \frac{1.5 \text{ km}}{100 \text{ ha}}) - (18.908 + 21.02) \\ &= 45.0 - 39.93 \end{aligned}$$

$$\begin{aligned} \text{Projected Rural Road Requirement} &= 5.07 \text{ km} \end{aligned}$$

d. Where additional roads are deemed necessary, determine where these will be located. Road network proposals should present the overall circulation system, identifying the major thoroughfares within and outside the planning area. The system should link the city/municipality with adjacent towns and major urban centers and at the same time provide mobility and access to major functional/activity areas.



Proposals for construction of new roads and/or upgrading of existing roads should be integrated with the proposed land use. New roads and road upgrading projects should serve the identified expansion areas, specifically for residential, commercial, institutional, and industrial uses.

e. Determine alternative solutions to flooding, congestion, road accidents, etc. such as the provision and/or proper siting of terminals and parking areas, drainage, pedestrian crossing/lanes, cycling paths, overpass/underpass, and other applicable traffic calming signs/strategies.

f. Plans, programs and projects for railroad, water, and air transportation networks may be coordinated with the Philippine National Railways (PNR), Philippine Ports Authority (PPA), and the Air Transportation Office (ATO).

## IV. Sectoral Analysis Matrix

### A. Consolidate and validate the findings of the previous steps with the result of the consultation/s.

1. List the key issues, problems, and concerns of the transportation sector.
2. Determine the possible implications/impacts of the key issues, problems, and concerns
3. Consider the impact of Climate Change and Disaster Risks



**B. Recommend interventions such as:**

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects (refer to **Table IF- 11**)

**C. Prioritize, tabulate and present the results in matrix form as follows:**

Table IF-1. Sample Transportation Analysis Matrix

Technical Findings/ Observations	Implications (Effects)	Recommended Interventions
<ul style="list-style-type: none"> <li>• Insufficient roads</li> </ul>	<ul style="list-style-type: none"> <li>• Less productivity</li> <li>• Traffic congestion</li> <li>• Pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Traffic management</li> <li>• Provision of ancillary road facilities (e.g. elevated pedestrian crossings, PUV stops, etc.)</li> <li>• Widening of major roads</li> </ul>
<ul style="list-style-type: none"> <li>• Clogged drainage ways</li> </ul>	<ul style="list-style-type: none"> <li>• Flooding</li> <li>• Water-borne diseases</li> <li>• Poor road condition</li> <li>• Traffic congestion</li> </ul>	<ul style="list-style-type: none"> <li>• Upgrading of road network and drainage system</li> <li>• Community participation in drainage maintenance</li> </ul>



- C (Condition)
  - Fair – acceptable/serviceable
  - Poor – needs improvement
  - Critical – for priority action
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF–3. Inventory of Bridges by Location, Type, Capacity and Condition, Year

Hazard Susceptibility (H/M/L)	Others						
	Su						
	Ts						
	Ln						
	Vo						
	Eq						
	Tc						
	Fl						
Physical Condition							
Load Capacity (Tons)							
Type							
Year Constructed							
Barangay							
Bridge Name							

Source: DPWH/PEO/LGU Engineering Office

Notes:

- Type: concrete, steel, wood, others
- Physical Condition:
  - Fair – acceptable/serviceable
  - Poor – needs improvement
  - Critical – for priority action
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln),

Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF–4. Inventory of Ancillary Road Facilities, Year \_\_\_\_\_

Road name Per Road Classification	Ancillary Road Facilities Present (enumerate per cell)	No.	Condition
<b>National Road</b>			
1. Road A	Pedestrian crossing	6	Fair
	Traffic light	4	Fair
<b>Provincial Road</b>			
1. Road A	Pedestrian crossing	3	Fair
	Traffic light	2	Fair
<b>City/Municipal Road</b>			
<b>Barangay Road</b>			

Source: Department of Public Works and Highways/Provincial/Municipal/City Engineering Office

Notes:

- Ancillary road facilities – pedestrian crossing, sidewalk, overpass, waiting sheds, street lights, traffic lights, road signage, others
- LGU can identify which road signage should be included depending on the planning needs of the locality
- Physical Condition: (refers to the general condition of each type of ancillary facility per road)
  - Fair – acceptable/serviceable
  - Poor – needs improvement
  - Critical – for priority action

Table IF–5. Inventory of Railways, Year \_\_\_\_\_

Name of Railway	Barangay	Length (km)	Width (km)	No. of Scheduled Trips/day	Physical Condition	Ownership/Operator

Note :

- Condition: Fair, Poor, Critical

Table IF-6. Railway Facilities and Services

Station/ Terminal	Type of Station/ Terminal	Location	Railway Route	Capacity (Tons/ Day)	Terminal Facilities	Frequenc y of Service/ Trips	Physical Condition	Hazard Susceptibility (H/M/L)																	
								Fi	Tc	Eq	Vo	Ln	Ts	Su	Others										
											City A - City C														

Source: LGU Engineering Department, Philippine National Railways

Notes:

- Type of Station: Passenger, Cargo, etc
- Physical Condition: Fair, Poor, Critical
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fi), Tropical cyclone (Tc), Earthquake (Eq), e, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF-7. Transportation Terminals by Location and Condition, Year\_\_\_\_\_

Name of Terminal	Area Occupied (ha)	Barangay	Year Constructed	Physical Condition	Owner/ Operator	Type of Terminal	Terminal Facilities	Hazard Susceptibility (H/M/L)												
								FI	Tc	Eq	Vo	Ln	Ts	Su	Others					
Land																				
Water																				
Air																				

Notes :

- Type of Terminal: tricycle, jeepney, bus, train, truck, seaport, airport, integrated, others
- Physical Condition: fair, poor, critical
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (FI), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF–8. Inventory of Public Land Transportation Vehicles by Type and Service Routes, Year \_\_\_\_\_

Type of Public Utility Vehicle	Registered in City / Municipality				From Other City / Municipality	
	Total No.	Route/Destination			Total No.	Route/ Destination
		Within Barangay	Barangay to Barangay	Barangay to City/ Municipal/ Center		
Buses						
Jeepney						
Taxi/FX						
Tricycles						

Source: Land Transportation Office, City/Municipal Planning and Development Office

Table IF–9. Other Modes of Transport and Facilities

Modes	Facilities	Capacity	Location	Condition	Frequency of Service/ Trips
Rail Transport					
Sea Transport					
Air Transport					

Source: LGU Engineering Dept./Phil. National Railways/ Philippine Ports Authority/Civil Aeronautics Administration/Maritime Industry Authority (MARINA)

\* Facilities May Include Passenger And Cargo Terminals Air And Seaports, Warehouse, Ticketing Office, etc.

Table IF–10. Road Accidents by Location, Nature and Frequency for the Past Five Years

Name of Road	Barangay	Nature	No. of Accidents					Total
			Year 1	Year 2	Year 3	Year 4	Year 5	
All Locations								

Source: Municipal /City Philippine National Police Office

Note:

- Nature of road accidents are based on collision types – angle impact, head-on, hit and run, hit object, hit parked vehicles, hit pedestrian, rear-end, self-accident, slide swipe, no collision stated, others (Source: MMDA, 2009)

Table IF–11. Transport Related Projects, Approved/ Funded for Implementation, Year \_\_\_\_\_

Name/ Location of Project	Location	Type	Proponent (Government, Private, Other)	Estimated Start Date	Estimated Date of Completion

Source: Dept. of Public Works and Highway, City / Municipal Engineering office concerned National Government Agency



# Infrastructure Sub-Sector: Power

## Steps:

### I. Data Gathering and Processing

#### A Generate the following data/information and present in table format:

1. Households Served with Electricity for the Past Three Years (refer to **Table IF- 13**)
2. Number Connections by Type of Users and Average Consumption for the Past Three Years (refer to **Table IF- 14**)
3. Projected Number of Connections by Type of Users and Average Consumption (refer to **Table IF- 15**)
4. Power Transmission/Distribution Line, Year \_\_\_\_ (refer to **Table IF- 16**)
5. Power Substations, Year \_\_\_\_ (refer to **Table IF- 17**)
6. Power Plants, Year \_\_\_\_ (refer to **Table IF-18**)



The output tables are basic information from which assessment of the state of power utilization and services may initially proceed. Other relevant information may be gathered through a consultation process.

#### B. Determine the felt needs, aspirations and issues of the community relative to power services through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to power utilities would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of power services?

#### C. Gather additional data/information if warranted by the results of the consultations/ meetings conducted

### II. Data Analysis

Assess the prevailing situation of power services and facilities in the locality in terms of the following:

1. Areas (barangays) and percentage of households served and unserved by electricity



$$\% \text{ of households served} = \frac{\text{Number of households served}}{\text{Total Number of households}} \times 100$$

$$\% \text{ of households unserved} = \frac{\text{Number of households unserved}}{\text{Total Number of households}} \times 100$$

2. Schedule of power service provision whether 24 hours a day or at certain hours only (indicate whether mornings, afternoons, or evenings). Include any incidence of recurrent or unscheduled power outages/interruptions. Relate such incidents to the capacity and efficiency of the electric power supply system.

3. Average power consumption by type of consumers

4. Exposure and vulnerability of power utilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)

### III. Current and Projected Needs

Determine the current and future development needs of the power sub-sector in terms of provision of electric power supply and its relationship to current land uses and other socio-economic activities.

1. Coordinate with the concerned local electric cooperatives in the conduct of the following:

a. Identify the causes/duration/frequency of electric power interruptions

b. Specify the areas which would require extension, upgrading or improvement of electric power connections/lines

2. Determine and tabulate the projected power requirement of each type of use utilizing the following formula:



$$\text{Future Power Requirement} = \text{no. of projected establishment (domestic, industrial, others)} \times \text{average consumption rate/year}$$

Tabulate projected power requirements using **Table IF- 15**.

3. Based on the projected demand/need for electricity by sector, determine total power requirements, and coordinate/consult the local electric cooperative to determine their projected power supply for the next 3 to 5 years.

### IV. Sectoral Analysis Matrix

#### A. Consolidate and validate the findings of the previous steps with the result of the consultation/s.

1. List the key issues, problems, and concerns of the power sector.
2. Determine the possible implications/impacts of the key issues, problems, and concerns
3. Consider the impact of Climate Change and Disaster Risks

#### B. Recommend interventions such as:

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects.

### C. Prioritize, tabulate and present the results in matrix form as follows:

Table IF-12. Sample Power Analysis Matrix

Technical Findings/ Observations	Implications (Effects)	Recommended Interventions
<ul style="list-style-type: none"> <li>Limited power supply in remote barangays</li> </ul>	<ul style="list-style-type: none"> <li>Remote barangays remain un-energized/deprived access to modern conveniences</li> </ul>	<ul style="list-style-type: none"> <li>Introduction of new type of energy electricity generation technology in cooperation with concerned government agencies/private organizations</li> </ul>
<ul style="list-style-type: none"> <li>Lack of power supply in Barangays X, Y, Z</li> </ul>	<ul style="list-style-type: none"> <li>Low socio-economic activities e.g. investment /income opportunities, recreation, industrial development, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate/negotiate with Power Agencies/NEA/local electric cooperative for extension of service to these barangays</li> </ul>

### V. Tables

Table IF-13. Households Served with Electricity for the Past Three Years

Barangay	Y <sub>1</sub>					Y <sub>2</sub>					Y <sub>3</sub>				
	Total No. of HH	Served		Unserved		Total No. of HH	Served		Unserved		Total No. of HH	Served		Unserved	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
<u>Urban</u>															
Poblacion	147	71	48	76	52	154	96	62	58	38	154	96	62	58	38
Borocboroc	108	40	37	68	63	111	48	43	63	57	111	48	43	63	57
<u>Rural</u>															
Buenavista	804	627	78	177	22	858	643	75	215	25	858	643	75	215	25
Concepcion	104	46	44	58	56	143	58	41	85	59	143	58	41	85	59
Delima	58	16	28	42	72	70	24	34	46	66	70	24	34	46	66
Ipil	177	138	78	39	22	216	188	87	28	13	216	188	87	28	13
TOTAL	1,143	827		316		1,287	913		374		1,287	913		374	

Source: Local Power Service Provider

Note:

- % = (No. of households served/Total no. of households) x 100

Graph IF-13. Households Served with Electricity for the Past Three Years

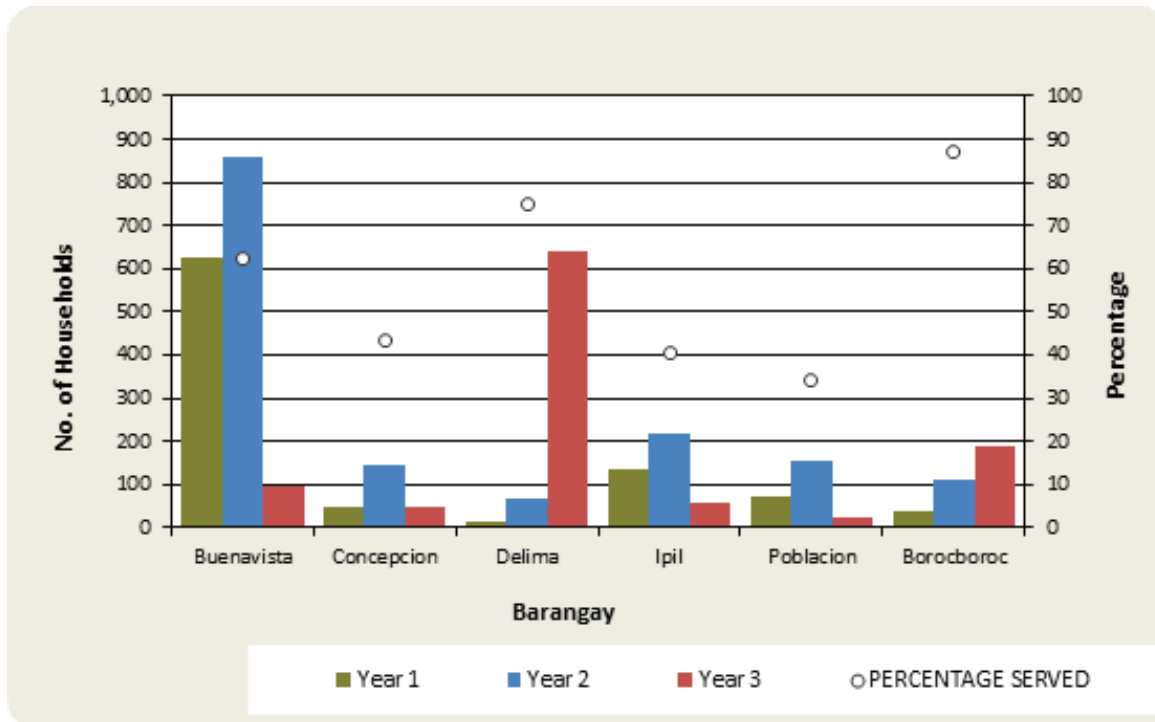


Table IF-14. Number of Connections by Type of Users and Average Consumption for the Past Three Years

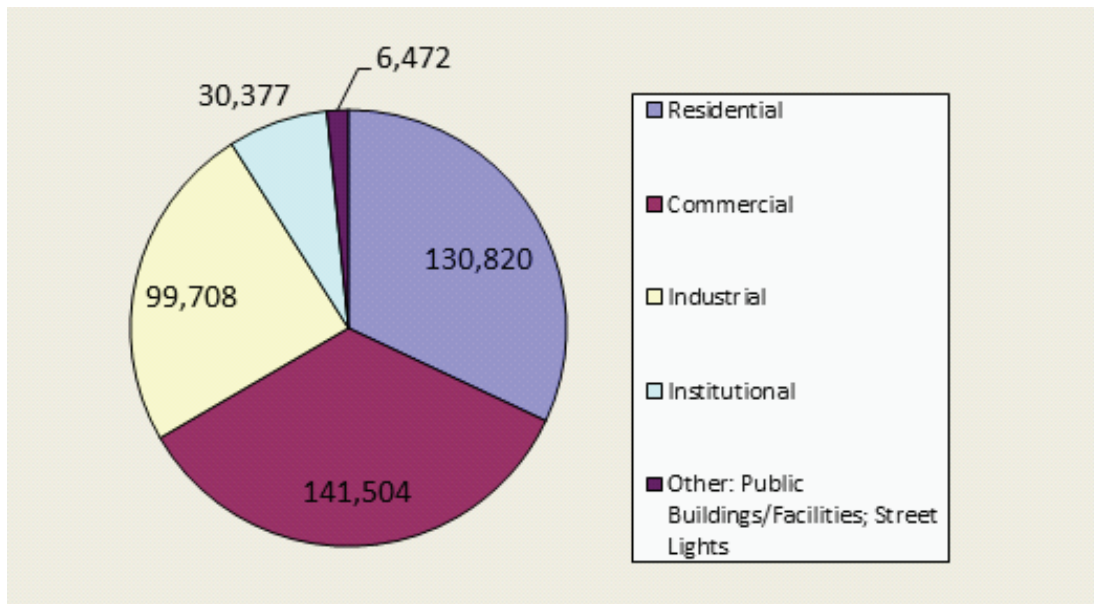
Type of Consumers	Y <sub>1</sub>			Y <sub>2</sub>			Y <sub>3</sub>		
	No. of connections	KW	%	No. of connections	KW	%	No. of connections	KW	%
Residential		70,885	50.1		95,310	33.2		130,820	32.0
Commercial		50,425	35.7		100,652	35.1		141,504	34.6
Industrial		10,309	7.3		71,654	25.0		99,708	24.4
Institutional		8,448	6.0		15,689	5.5		30,377	7.4
Other: Public Buildings/ Facilities; Street Lights		1,368	1.0		3,736	1.3		6,472	1.6
<b>TOTAL</b>		<b>141,435</b>	<b>100.0</b>		<b>287,041</b>	<b>100.0</b>		<b>408,881</b>	<b>100.0</b>

Source: Local Power Service Provider

Note:

- % = (kW per type of consumer/Total kW) x 100

Graph IF-14a. Power Consumption (kW) by Type of Consumers, Year \_\_\_\_\_



Graph IF-14b. Power Consumption by Type of Consumers, Year \_\_\_\_

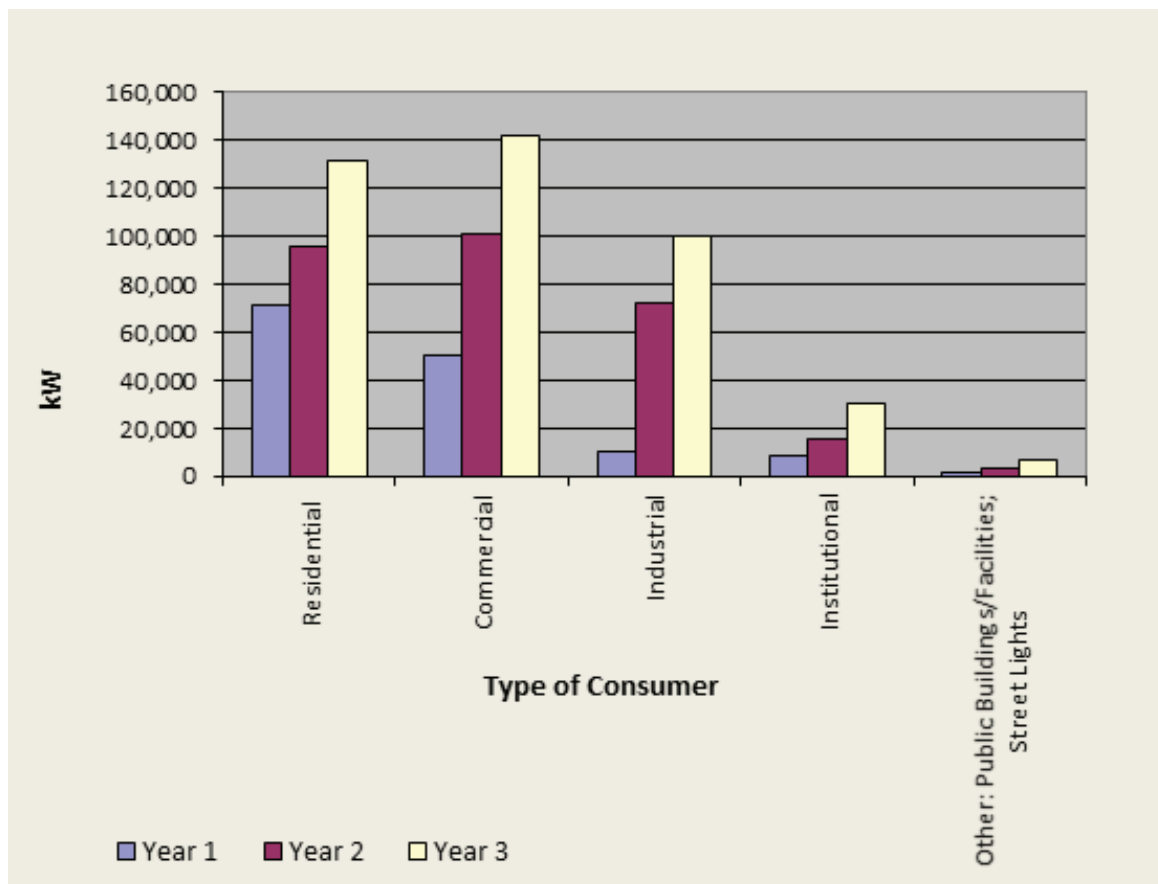


Table IF-15. Projected Number of Connections by Type of Users and Average Consumption (KWH/Mo.)

Type of Consumers	Year 1		Year 2		Year 3		Year 4		Year 5		Year 10	
	KW	%	KW	%	KW	%	KW	%	KW	%	KW	%
Residential												
Commercial												
Industrial												
Institutional												
Other: Public Buildings/Facilities; Street Lights												
TOTAL												

Source: Local Power Service Provider

Notes:

- % = (kW per type of consumer/Total kW) x 100
- Future Power Requirement (kW) = no. of projected establishment x average consumption rate per year

Table IF-16. Power Transmission/Distribution Line, Year \_\_\_\_\_

Name of Line Owner	Year Constructed/Developed	Area Occupied (ha)	Length (m)	Width (m)	Voltage (kV)	Hazard Susceptibility (H/M/L)							
						Fl	Tc	Eq	Vo	Ln	Ts	Su	O

Notes:

- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF-17. Power Substations, Year \_\_\_\_\_

Name of Substation	Barangay	Area Occupied (ha)	Year Constructed	Voltage (kV)	Hazard Susceptibility (H/M/L)								
					Fl	Tc	Eq	Vo	Ln	Ts	Su	O	

Notes:

- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami(Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF-18. Power Plants, Year \_\_\_\_\_

Name of Power Plant	Barangay	Ownership	Area Occupied	Year Constructed	Capacity (MW)	Type of Plant	Date of Commission/ Operation	Hazard Susceptibility (H/M/L)																			
								Fi	Tc	Eq	Vo	Ln	Ts	Su	Others												

Notes:

- Type of Plant – coal, hydrothermal, wind, others
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fi), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)



## Infrastructure Sub-Sector: Water

### Steps:

#### I. Data Gathering and Processing

##### **A Generate the following data/information and present in table format:**

1. Level I Water Supply System by Type and Number of Population Served, Year \_\_\_\_ (refer to **Table IF- 20**)
2. Water Sources of Level II Water Supply System (refer to **Table IF- 21**)
3. Level II Water Supply System by Type and Number of Population Served, Year \_\_\_\_ (refer to **Table IF-22**)
4. Communal Faucets (refer to **Table IF-23**)
5. Level III Local Waterworks System by Type and Number of Consumers and Average Water Consumption, Year \_\_\_\_ (refer to **Table IF-24**)
6. Water Distribution Line (refer to **Table IF- 25**)
7. Other Water Sources, Year \_\_\_\_ (refer to **Table IF- 26**)
8. Existing Surface Water Resources by Type and Classification, Year \_\_\_\_ (refer to **Table IF- 27**)
9. Water Requirement by Barangay Population, Year\_\_\_\_ (refer to **Table IF- 28**)



The output tables are basic information from which assessment of the state of water supply and services may initially proceed. Other relevant information may be gathered through a consultation process.

##### **B. Determine the felt needs, aspirations and issues of the community relative to water utilities through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders**



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to water would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of water services?

##### **C. Gather additional data/information if warranted by the results of the consultations/ meetings conducted**

#### II. Data Analysis

Describe the levels of existing water supply services, facilities, and resources in the city/ municipality in terms of the following:

- 1.Total number of households and/or the area coverage, type, capacity, location, served

by:

- a. Level I - point sources (such as rain collector, wells and springs), generally for rural areas where houses are thinly scattered to justify a distribution system
- b. Level II - communal faucet systems, generally for rural areas where houses are densely clustered enough to justify a piped distribution system providing a number of households with faucets
- 2. Local waterworks system (Level III) by type and number of consumers, average consumption and areas served
- 3. Other water sources in terms of type, location, and volume
- 4. Existing watershed areas, location, and condition
- 5. Existing surface water resources in the locality (e.g. rivers, lakes, water impounding structures and other sources of water). Indicate location and classification/utilization of water bodies (refer to **Annex IF-1**)
- 6. Exposure and vulnerability of water supply utilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the CLUP)

### III. Current and Projected Needs

Determine the current needs and future requirements for water supply service. The analysis should also show the existing water supply service needs of the city/municipality in terms of the following:

- 1. Sufficiency/insufficiency of the existing water supply for domestic, commercial, industrial, agricultural and other uses.
- 2. Needs for improvement of water supply, distribution system, facilities and services, rates, water quality, etc.
- 3. Improvement/upgrading needs of existing major water resources in the locality. Determine existing and potential sources of pollution.
- 4. Other alternative sources of water that can be tapped for future development.
- 5. Projected water demand for the city/municipality. Coordinate with the local water districts/cooperatives or the LWUA, whichever is available in the area, on how to determine the water demand of the locality. Computation may be guided by the following standard requirement developed by LWUA:

Type of Consumer	Level II	Level III
a. Residential	60 lcpd communal faucet	100 – 110 lcpd individual connection
b. Commercial/Industrial	1.0 – 2.0 cumd/connection	
c. Institutional	3.0 cumd/connection	

### IV. Sectoral Analysis Matrix

#### A. Consolidate and validate the findings of the previous steps with the result of the consultation/s.

- 1. List the key issues, problems, and concerns of the water supply utilities sector.
- 2. Determine the possible implications/impacts of the key issues, problems, and concerns
- 3. Consider the impact of Climate Change and Disaster Risks

**B. Recommend interventions such as:**

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects.

**C. Prioritize, tabulate and present the results in matrix form as follows:**

Table IF-19. Sample Water Analysis Matrix

Technical Findings/ Observations	Implications (Effects)	Policy Options/ Recommendations
<ul style="list-style-type: none"> <li>• Level I water system in Brgy. X contaminated</li> <li>• Presence of dumpsite near water source</li> </ul>	<ul style="list-style-type: none"> <li>• Health risk to population</li> </ul>	<ul style="list-style-type: none"> <li>• Upgrading to Level II water supply system</li> <li>• Relocation of nearby dumpsite to eliminate groundwater contamination</li> </ul>
<ul style="list-style-type: none"> <li>• Insufficient water to supply the Poblacion area</li> </ul>	<ul style="list-style-type: none"> <li>• Expensive cost of water</li> </ul>	<ul style="list-style-type: none"> <li>• Develop potential water sources</li> <li>• Coordinate with local water district to increase water pressure/supply in the area</li> </ul>



- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g.coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Graph IF-20. Level I Water Supply System by Type and Number of Population Served, Year \_\_\_\_\_

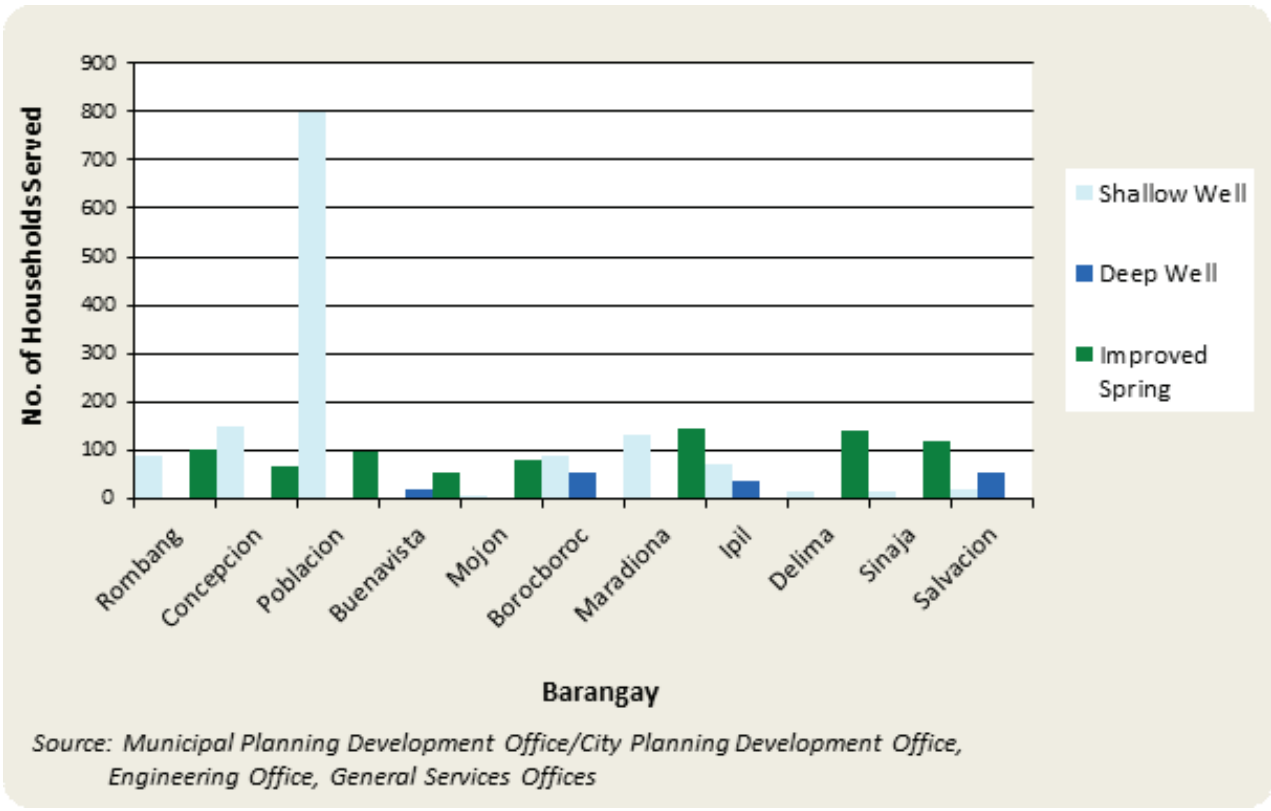


Table IF-21. Water Sources of Level II Water Supply System

Water Source	Barangay	Physical Condition	Hazard Susceptibility (H/M/L)							
			Fl	Tc	Eq	Vo	Ln	Ts	Su	Others

Notes:

- Physical Condition: fair, poor, critical
- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF-22. Level II Water Supply System by Type and Number of Population Served, Year \_\_\_\_\_

Hazard Susceptibility (H/M/L)	Others	Su	Ts	Ln	Vo	Eq	Tc	FI
Physical Condition								
No. of HH served								
Barangays Served								
No. of Communal Faucets								
Water Source								
Pump Capacity								
Year Constructed								
Brgy.								
Pump ID/ Name								

Notes:

- Physical Condition: fair, poor, critical
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (FI), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF-23. Communal Faucets

Communal Faucet ID	Barangays Served	No. of HH Served	Hazard Susceptibility (H/M/L)							
			FI	Tc	Eq	Vo	Ln	Ts	Su	Others

Notes:

- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (FI), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF-24. Level III Local Waterworks System by Type and Number of Consumers and Average Water Consumption, Year\_\_\_\_\_

Name of Barangays Served	Type of Consumer							
	Domestic		Commercial		Industrial		Others	
	No. of Connections	Ave. Water Consumption	No. of Connections	Ave. Water Consumption	No. of Connections	Ave. Water Consumption	No. of Connections	Ave. Water Consumption
TOTAL								

Source: Local Water District

Table IF-25. Water Distribution Line

Pipeline ID	Ownership	Water Pipeline Diameter	Type of Pipe Material	Year Established	Physical Condition	Hazard Susceptibility (H/M/L)							
						FI	Tc	Eq	Vo	Ln	Ts	Su	Others

Notes:

- Ownership – Private/Public
- Physical Condition – Fair, Poor, Critical
- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (FI), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF-26. Other Water Sources, Year\_\_\_\_\_

Barangay	Number of Household Population Served			
	Undeveloped Spring	Open Dug Wells	Rainwater	Water Peddlers

Source: Local Water District



Table IF-27. Existing Surface Water Resources by Type and Classification, Year \_\_\_\_\_

Surface Water (e.g. lakes, rivers, water impounding structures, etc.)	Location	Classification (e.g. Class AA, A, B, C, D. Refer to <b>Error! Reference source not found.</b> )

Table IF-28. Water Requirement by Barangay Population, Year \_\_\_\_\_

Barangay	Current Year				Projected (Year 10)	
	Population	Water Supply	Water Requirement	Deficit/Surplus	Population/Number of Establishments in Year 10*	Projected Water Requirement*

Notes:

- Year 10 = Current year + 10 years
- Water supply at distribution source is based on current capacity.
- Domestic water requirement is based on the projected population in 10 years.
- Commercial, industrial and institutional water requirements are based on the projected number of establishments in 10 years.

## Annex IF-2. Classification of Fresh Surface Water

(Rivers, Lakes, Reservoirs, etc.)

CLASSIFICATION	BENEFICIAL USE
Class AA	Public Water Supply Class I. This class is intended primarily for waters having watersheds which are uninhabited and otherwise protected and which require only approved disinfection in order to meet the National Standards for Drinking Water (NSDW) of the Philippines.
Class A	Public Water Supply Class II. For sources of water supply that will require complete treatment (coagulation, sedimentation, filtration and disinfection) in order to meet the NSDW.
Class B	Recreational Water Class. For primary contact recreation such as bathing, swimming, ski diving, etc. (particularly those designated for tourism purposes).
Class C	<ol style="list-style-type: none"> <li>1. Fishery water for the propagation and growth of fish and other aquatic resources.</li> <li>2. Recreational Water Class II (boating, etc.)</li> <li>3. Industrial Water Class I (for manufacturing processes after treatment.)</li> </ol>
Class D	<ol style="list-style-type: none"> <li>1. For agriculture, irrigation, livestock watering, etc.</li> <li>2. Industrial Water Supply Class II (e.g. cooling, etc.)</li> <li>3. Other inland waters, by their quality, belong to this classification.</li> </ol>

Source: DENR AO No. 34 otherwise known as "Revised Water Usage and Classification/ Water Quality Criteria" amending section nos. 68 and 69 Chapter III of the 1978 NPCC Rules and Regulations.

# Infrastructure Sub-Sector: Information and Communication Technology

## Steps:

### I. Data Gathering and Processing

#### A Generate the following data/information using the data gathered from different sources and present in table format:

1. Communication Services Facilities, Year \_\_\_\_ (refer to **Table IF- 30**)
2. Type of Print Media Available, Year \_\_\_\_ (refer to **Table IF- 31**)
3. Cell Site Network, Year \_\_\_\_ (refer to **Table IF- 32**)



The output tables are basic information from which assessment of the level of service of the information and communication technology sector may initially proceed. Other relevant information may be gathered through a consultation

#### B. Determine the felt needs, aspirations and issues of the community relative to information and communication technology sector through consultations such as general assembly, focus group discussion, barangay consultation or other consultative meetings with identified stakeholders



Gathering of information on felt needs and aspirations of the population may be facilitated by designing/structuring questions as follows:

1. What issues and concerns related to information and communication would you want to be addressed?
2. In what ways can you (as a resident/community member, stakeholder) address/resolve these issues and concerns?
3. In what ways can the government address/resolve these issues and concerns?
4. What are your aspirations to improve the level of information and communication?

#### C. Gather additional data/information if warranted by the results of the consultations/ meetings conducted

### II. Data Analysis

Assess the presence or absence and capacity of information and communication facilities/services in the locality in terms of the following:

1. Type, number, and location/area coverage of existing information and communication facilities
2. Volume of postal and telegraph transactions (letters, telegrams, packages, telegraphic transfers, etc.) for the past 3 years
3. No. of letter carriers
4. Number and area coverage of telephone subscribers, public calling office
5. Availability and coverage of print and/or broadcast media, cellular communications tower, meteorological facilities (weather tracking stations/radar), etc.
6. Availability of internet service facilities/providers

7. Exposure and vulnerability of information and communication facilities to hazards (refer to CCA and DRR section of Volume 2 and Supplemental Guideline on Mainstreaming Climate and Disaster Risks in the CLUP)

### III. Current and Projected Needs

Determine the current and future development needs of the information and communication technology sub-sector in terms of the following:

1. Need for basic information and communication services, for example:

- o One telephone station per city/municipality
- o One post office per city/municipality
- o One letter carrier per 5,000 population
- o One Public Calling Office per city/municipality without telephone service. (Public calling office is a facility that offers basic telecommunication services such as outgoing telephone calling, 2-way telegraph service, and incoming message reception and delivery. Other services such as telex and facsimile may be offered).

2. Indicate areas which will have urgent needs for future ICT service and facility considering the following:

- o Nearness to network center
- o Predominance of economic-related establishments
- o High rate of increase in population
- o Increasing economic status of the residents
- o Areas not presently served
- o Presence of similar firms in the area

### IV. Sector Analysis Matrix

#### **A. Consolidate and validate the findings of the previous steps with the result of the consultation/s.**

1. List the key issues, problems, and concerns of the information and communication technology sector.
2. Determine the possible implications/impacts of the key issues, problems, and concerns
3. Consider the impact of Climate Change and Disaster Risks

#### **B. Recommend interventions such as:**

1. Policy options and appropriate strategies
2. Programs and projects for implementation with due consideration of current and pipeline projects.

**C. Prioritize, tabulate and present the results in matrix form as follows:**

Table IF-29. Sample Information and Communication Analysis Matrix

Technical Findings/ Observations	Implications (Effects)	Recommended Interventions
<ul style="list-style-type: none"> <li>Lack of social acceptability for cell sites due to assumed health/ security reasons.</li> </ul>	<ul style="list-style-type: none"> <li>Low economic investment</li> </ul>	<ul style="list-style-type: none"> <li>Advocacy for social acceptability of telecommunication facilities</li> </ul>
<ul style="list-style-type: none"> <li>No telephone services available in the locality</li> </ul>	<ul style="list-style-type: none"> <li>Residents deprived of fast, modern, and efficient telecommunication services</li> </ul>	<ul style="list-style-type: none"> <li>Representation/ coordination with telephone companies to extend services in the area</li> </ul>

**V. Tables**

Table IF-30. Communication Services Facilities, Year\_\_\_\_\_

Type	Year Constructed	Area Occupied (ha)	Barangay	Ownership		Hazard Susceptibility (H/M/L)									
				Public	Private	Fl	Tc	Eq	Vo	Ln	Ts	Su	Others		
Postal Services			Poblacion	1											
Telephone Service Provider			Poblacion	3	5										
Cell Sites Network			Ipil & Salvacion	2	2										
Public Calling Stations			Poblacion	1	1										
Broadcast and Television Network (radio, television, cable)			Poblacion & Buenavista	1	1										
Others			Poblacion	1											

Source: NTC, Public/Private Companies

Notes:

- Ownership – Public/Private
- Type of Ownership – Public/Private
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

Table IF- 31. Type of Print Media Available, Year\_\_\_\_\_

Type of Print Media	Location	Area Coverage	Circulation		
			Number	Type	Frequency

Source: National Telecommunication Commission/Local Companies

Table IF- 32. Cell Site Network, Year \_\_\_\_\_

Location	Area Occupied (ha)	Antenna Height	Date Installed	Catchment Radius (km)	Owner

Notes:

- Catchment Radius – refers to the service radius covered by the cell site network.
- Owner – refers to the company owner of the cell site network

## Integrated Infrastructure Sector Analysis

1. Convene technical/sectoral working groups to undertake the following:

a. Determine the contribution of the sector to the quality of life of the population based on the following indicators, among others, by comparing the current or latest information with the previous data:

- Percentage of households served by power, waterworks system, garbage collection
- Adequacy of roads, urban and rural
- Availability/frequency/capacity of transportation services
- Percentage of households served by communication facilities

b. Cross-check/validate results of sub-sector studies for any duplication or inconsistencies in identified policies, programs, projects.

c. Prioritize the issues and problems generated from the sub-sector studies using the following criteria, among others:

- Urgency of problem
- Seriousness of the problem
- Extent/magnitude of population directly or indirectly affected
- Impact of problem on the strengths, potentials, opportunities and on the achievement of the vision of the locality
- Other criteria as may be agreed upon

2. Tabulate prioritized issues/problems with corresponding interventions (policies, programs/projects). This can be presented as follows:

Table IF-33. Integrated Infrastructure Analytical Matrix

Technical Findings/ Observations	Implications (Effects)	Recommended Interventions
<ul style="list-style-type: none"> <li>• Brgy. A has no potable water supply</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and develop sources of water</li> <li>• Establish water distribution system</li> </ul>	<ul style="list-style-type: none"> <li>• LGU/Local Water District</li> <li>• LGU/Local Water District</li> </ul>
<ul style="list-style-type: none"> <li>• Traffic congestion</li> </ul>	<ul style="list-style-type: none"> <li>• Adoption and implementation of traffic management scheme</li> <li>• Road widening</li> </ul>	<ul style="list-style-type: none"> <li>• LGU/traffic enforcers</li> <li>• LGU/DPWH</li> </ul>

# Special Area Studies

This section presents additional studies which can be done by the LGU under the situational analysis as outlined in Volume 1: A Guide to Comprehensive Land Use Preparation (Step 4). The decision to undertake these studies will depend on the vision, goals, and objectives of the city/ municipality, and the existence of certain conditions.

The section on Green Growth provides an overview on how to pursue a sustainable development strategy in which economic prosperity goes hand in hand with ecological sustainability. Highly urbanized or rapidly urbanizing cities may find this section useful especially in terms of determining growth indicators that they can track over time.

The section on Urban Design and Development outlines how to conduct intensive studies for specific urban areas (e.g. a central business district, a major commercial corridor, etc.) to be able to develop more detailed strategies and plans.

In case the city/ municipality has existing heritage areas (or plans to declare a heritage area), the section on Heritage Conservation provides an overview on how to document existing heritage and plan for their conservation.

In case the city/ municipality has ancestral domain areas, the section on Ancestral Domain provides a guide to integrating these areas in the CLUP.

Should the LGU have limited capacity, it has the option to forgo these studies until the the CLUP is updated again but in cases where such studies are deemed urgent or necessary, the LGU should allot funds or seek assistance to conduct these studies.







## Green Growth

The Comprehensive Land Use Plan (CLUP) is intended to guide the LGU's long term land use and resource allocation and management policies towards the goal of achieving sustainable development. The mainstreaming of climate change adaptation and mitigation, in addition to the adoption of the ridge-to-reef approach in the new guidebooks, enhances the LGUs ability to protect itself against the adverse impacts of natural disasters that have been occurring at greater frequency and stronger intensities. However, the continued practice of extractive and pollutive economic activities undermines these efforts with their negative impacts on the natural environment.

*The integration of green growth strategies into the CLUP aids the LGU in curbing the current trend of resource depleting, exclusive growth into one that is more sustainable. This special area study may support the economic sector analysis of the LGU towards achieving sustainable economic growth.*

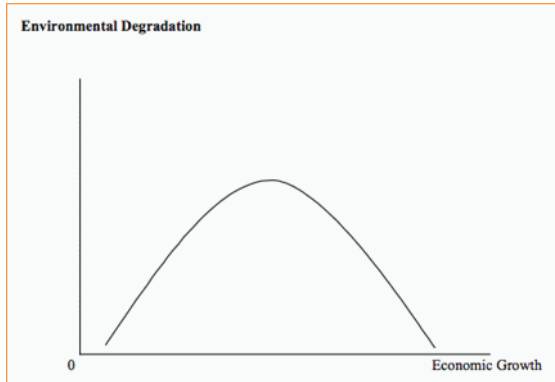
### I. Basic Principles and Concepts

#### A. Economic Growth and the Environment

Economic growth is generally the main focus of all development efforts in the country considering especially that we have an average annual population growth rate of 1.90% (2000-2010). It will provide much needed employment and income for the country's citizens. However, such growth can likewise be detrimental if it progresses in a manner that is not sustainable. One widely accepted theory concludes that the relationship between economic growth and the environment follows an inverted U-pattern<sup>7</sup>. As a country's economy improves, environmental degradation worsens up to a point when environmental impacts cancel out the economic benefits (highest point of the inverted "U"). The population then comes to the realization that such type of development is not sustainable. After which they adopt a shift towards more environment friendly and sustainable practices and achieve a level of development where adverse impacts on the environment are close to nil (bottom part of the inverted "U".)

<sup>7</sup>Israel, Danilo, "The Environmental Impacts of Economic Cycles," PIDS Discussion Paper Series No. 98-43  
<http://dirp3.pids.gov.ph/ris/dps/pidsdps9843.pdf>

Figure GR- 1. The Relationship between Economic Growth and Environmental Degradation



Source: Israel, Danilo, "The Environmental Impacts of Economic Cycles," PIDS Discussion Paper Series No. 98-43, page 7

In the early stage where a country is largely agricultural and per capita incomes are low, consumption of natural resources and raw materials are also low. As the country industrializes, per capita incomes increase, and use of natural resources and production of pollutants and other wastes likewise go up. Aside from the rate of industrialization, pollution is further exacerbated by low environmental awareness and concern among the economic actors, and the weak enforcement of relevant environmental laws. As the economy grows beyond the initial stage, a more technology and innovation based industrialization and increasing per capita income results in less and less environmental degradation with the recognition by government and the private sector that they need to seriously address the worsening state of the environment. This, and the increasing willingness to pay brought about by rising incomes and a greater awareness of environmental concerns, raise resources for investments in less polluting and resource efficient technologies, including stricter enforcement of environmental laws. The resulting effect in the long term is a diminishing marginal degradation and ultimately a zero growth in total degradation at some point.

The Philippine economy has been growing steadily since 2010, with an average 6.0% GDP increase annually. With the country receiving its highest credit rating in history, the economy is expected to expand further in the coming years. Government spending on infrastructure, social services and relief efforts following natural disasters buoyed public expenditure. On the production side, expansion was driven by services, manufacturing and construction. The service sector alone accounts for 57 percent of total GDP, industry and manufacturing 31 percent, and agriculture accounting for the remaining 12 percent.

This growth however has also come at a cost. Air pollution levels in Metro Manila measured in terms of total suspended particulates (TSP) reached 118 micrograms per normal cubic meter ( $\mu\text{g}/\text{Ncm}$ ) in 2013, exceeding the standard of 90 ( $\mu\text{g}/\text{Ncm}$ ) per year and 230 ( $\mu\text{g}/\text{Ncm}$ ) per day established in the 1999 Clean air Act<sup>8</sup>. A World Bank Study (2008) shows that about 72% of the Philippine population had access to improved sanitation, However, it still corresponds to about 20 million people not having access. With an average population growth rate of 2% per annum, an additional 2 million Filipinos will require adequate and clean sanitation facilities each year. The study estimates that poor sanitation led to economic costs in the area of US\$1.4B per year or about 1.5% of GDP in 2005<sup>9</sup>. Metro Manila alone generates an average of 6,700 tons of garbage per day of which only 720 tons is recycled or composted while the rest find their way into the landfill or is illegally disposed in other manners<sup>10</sup>. The country's forests are likewise in a sad state, with only 24 percent of our forest cover remaining, placing it at the bottom among other countries in Southeast Asia. The Philippines' coral reefs, recognized as among the world's most extensive having one of the highest levels of biodiversity are at risk with only 2 percent remaining in excellent condition<sup>11</sup>.

<sup>8</sup>DENR Environmental Management Bureau (EMB, February 2014, <http://newsinfo.inquirer.net/578865/despite-improvement-air-pollution-levels-in-metro-still-high-denr>)

<sup>9</sup>World Bank, Economic Impacts of Sanitation in the Philippines: A five-country study conducted in Cambodia, Indonesia, Lao PDR, the Philippines and Vietnam under the Economics of Sanitation Initiative (ESI), 2008, p. 1. ([http://www.wsp.org/sites/wsp.org/files/publications/529200894452\\_ESI\\_Long\\_Report\\_Philippines.pdf](http://www.wsp.org/sites/wsp.org/files/publications/529200894452_ESI_Long_Report_Philippines.pdf))

<sup>10</sup>Westfall, Matthew, Asian Development Bank (ADB), The Garbage Book: Solid Waste Management in Metro Manila, 2004, p. 14

<sup>11</sup>DENR, April 2013, (<http://newsinfo.inquirer.net/395725/ph-has-se-asias-lowest-forest-cover>)

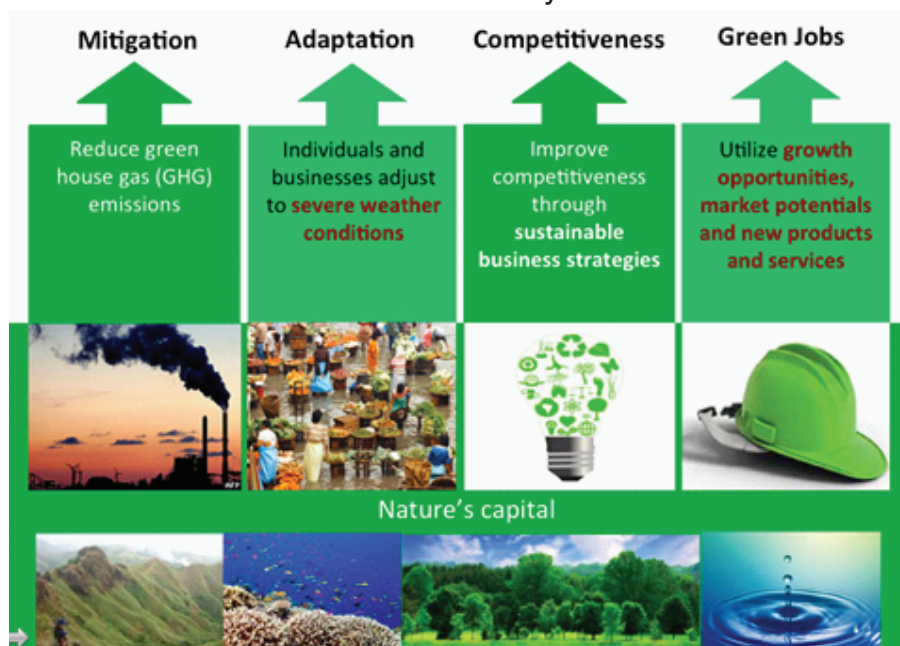
## B. Green Growth

By definition, green growth or green economic development pertains to the pursuit of economic growth while preventing costly environmental degradation, biodiversity loss and unsustainable use of natural resources. (Organisation for Economic Cooperation and Development, OECD). The United Nations Environment Program (UNEP) likewise defines it as a development path whose growth in income and employment is driven by public and private investments to reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity.

Green growth is a driver for promoting competitiveness, innovation, tapping new markets, and generating new jobs, towards achieving inclusive growth and poverty reduction. It is founded on five pillars as follows:

1. **Mitigation** – Reducing green house gas (GHG) emissions.
2. **Adaptation** – Individuals and businesses adjust their lifestyles/ operations in order to withstand severe weather conditions.
3. **Competitiveness** – Businesses improve their bottom line (reduce operational costs) through the adoption of sustainable business strategies and resource efficiency measures (energy efficiency, water efficiency, recycling, and others).
4. **Green Jobs** – A green economy offers new growth opportunities, market potentials and products / services that can generate new investments and employment.
5. **Preservation and enhancement of nature's capital** – Natural resources provides the basis for the majority of global economic activities. If economic growth continues with the current unsustainable extractive practices, it will have serious implications on the future of the local and even the global economy.

Figure GR- 2. Five Pillars of a Green Economy



## C. Sustainable Production and Consumption (SCP)

The past few years have seen a combination of crises that threaten our ability to spread prosperity and sustain our planet. Climate change, environmental degradation, unemployment, poverty, insecurity and inequality are only a few of these. At their roots are prevailing “extractive” and “exclusive” business models that are not capable of shaping a world that respects nature's potentials and limits. The Global Footprint Network is an international non profit organization that provides tools and programs to help countries thrive in a resource constrained world. They developed the “ecological footprint,” a resource accounting tool that measures how much nature we have, how much we use, and who uses what. The Ecological Footprint of the average Filipino was 1.2 global hectares

(gha) in 2009, well within the world limits of the world average available biocapacity<sup>12</sup> of 1.8 gha. However, there was only 0.6 gha of biocapacity available per resident, meaning that the average citizen's demands exceeded what the country's ecosystem could provide.<sup>13</sup> Given the increasing population amidst dwindling natural resources, it is imperative that consumers and manufacturers alike adopt strategies that will shift their practices to those using the least amount of resources and having minimal impacts on the environment.

Sustainable consumption and production (SCP) is about "the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of further generations" (Oslo Symposium, 1994). The concept of SCP is recognized in the Johannesburg Plan of Implementation adopted in 2002 at the World Summit on Sustainable Development (WSSD). It is one of the three overarching objectives of sustainable development, together with poverty eradication and the management of natural resources in order to foster economic and social development<sup>14</sup>. In order to achieve global sustainable development, one of the fundamental changes needed is for societies to adopt a shift in their production and consumption patterns. It likewise calls on government and private sector and all major groups to play an active role in initiating this shift.

## D. Eco Efficient Development

In the same way that a shift is needed in man's consumption and production patterns, the same principle also applies to the way localities are planned. In the concept of *eco-efficient development*, it refers to creating more value for citizens while reducing the use of resources and the production of waste and pollution. Eco-efficiency is concerned with environmental improvements that yield parallel economic benefits that contribute to enhancing competitiveness and improvement of quality of life for its residents.

As an economy expands, the corresponding infrastructure that accompanies it tends to lock it into specific patterns of resource use (such as energy) for decades into the future. Aside from power, water supply, wastewater treatment, public transportation, and solid waste management are among the most basic infrastructure requirements in a locality. Rapid urbanization in the Philippines and the significant shortfalls in almost every kind of infrastructure, these investments may be turned into investments in environmental sustainability and an opportunity to build more sustainable economies.<sup>15</sup>

More and more local government units worldwide are recognizing the benefits of investing in "eco efficient" infrastructure because it addresses the twofold objective of providing the community with needed infrastructure to enhance its livability while minimizing adverse impacts on the environment. In some cases such as power generation, initial investment costs may be higher than traditional infrastructure solutions, but these are offset by lower operating costs in the long term.

For example, local government units can invest in rainwater harvesting areas in their localities. These are essentially natural land features (such as valleys), which, with minimal construction, are designed to capture rainwater during the monsoon season. The water can be utilized for irrigation and other secondary uses during the summer season when the main water sources are prioritized for primary uses such as drinking water and manufacturing processes.

Investments in renewable energy, such as solar power are likewise becoming attractive investments for the private sector to address the country's power shortage. Solar power plants can be built in one year and will only require sunlight and minimal maintenance (cleaning the solar PV panels and trimming the ground) to keep it operational for at least 10 years when some of the panels may need to be replaced. Compare that with a

<sup>12</sup>Biocapacity is defined as the ability of an ecosystem to regenerate and provide services that compete for space. This includes producing useful biological materials and absorbing waste, such as carbon dioxide emissions from fossil fuels.

<sup>13</sup>Global Footprint Network, Restoring Balance in Laguna Lake Region, 2013 Ecological Footprint Report, p. 28, [http://www.footprintnetwork.org/images/article\\_uploads/Philippines\\_2013\\_Ecological\\_Footprint.pdf](http://www.footprintnetwork.org/images/article_uploads/Philippines_2013_Ecological_Footprint.pdf)

<sup>14</sup><http://sustainabledevelopment.un.org/index.php?menu=204>

<sup>15</sup>UNESCAP, Greening Growth: In Asia and the Pacific, 2008, p 18

coal fired plant that will need at least three years to be fully operational, will require the purchase and importation of coal to generate power, while producing harmful byproducts that cause air pollution, smog, and other toxic emissions that contribute to global warming for the duration of its operational lifetime.

Zoning ordinances can likewise support eco efficient development. Mixed use zoning versus exclusionary zoning minimizes the use of fuel for transport needs because citizens can walk to nearby areas for work, play, entertainment and other requirements.

Eco efficient infrastructure is of particular relevance to the Philippines where vast investments in infrastructure development are needed amidst limited financial resources.

## II. General Objectives and Outputs



### Objective

- To integrate green growth in the development thrust and strategies and land use plan



### Key Inputs

- Summary reports of key sectoral/ thematic areas (like socio-economic, demographic, income, production/ productivity, land use/ resource conditions, settlements, ecological/ environmental/ biodiversity, among others)
- Value chain analysis and other relevant studies of key economic sectors in the locality
- Local and Regional Economic Development (LRED)<sup>16</sup> Strategies of the LGU (if available)
- Identified suitable areas for urban development derived from sieve mapping of multi-hazard maps, updated land use maps, vulnerability assessments (if available), and other relevant maps and studies that provide further information on existing natural hazards in the locality.



### Outputs

- Green Growth strategies and policies that can be included in the land use plan and zoning ordinance; and
- List of actions/ potential projects to serve as input to the LGU's other development plans.



### Key Technical Persons/Responsible Groups

- Lead: City/ Municipal Local Economic and Investment Planning Office (LEIPO) or other relevant planning offices involved in economic development
- Contributors: DTI Provincial/Regional Office, Business membership organizations, Industry associations, other organizations involved in the value chain analysis and promotion

<sup>16</sup>The LRED approach is a participatory and action oriented planning and implementation process by which public and private stakeholders work together to improve conditions for economic growth and employment in a locality. The approach was introduced and implemented jointly by the Private Sector Promotion (PSP SMEDSEP) Program of GIZ and the Department of Trade and Industry (DTI) nationwide from 2004-2008.



- Decision-making authority: Local Chief Executive, Economic Committee, Sangguniang Panlungsod/ Bayan
- Consultative Body: Academe, NGOs, POs, Local Development Council

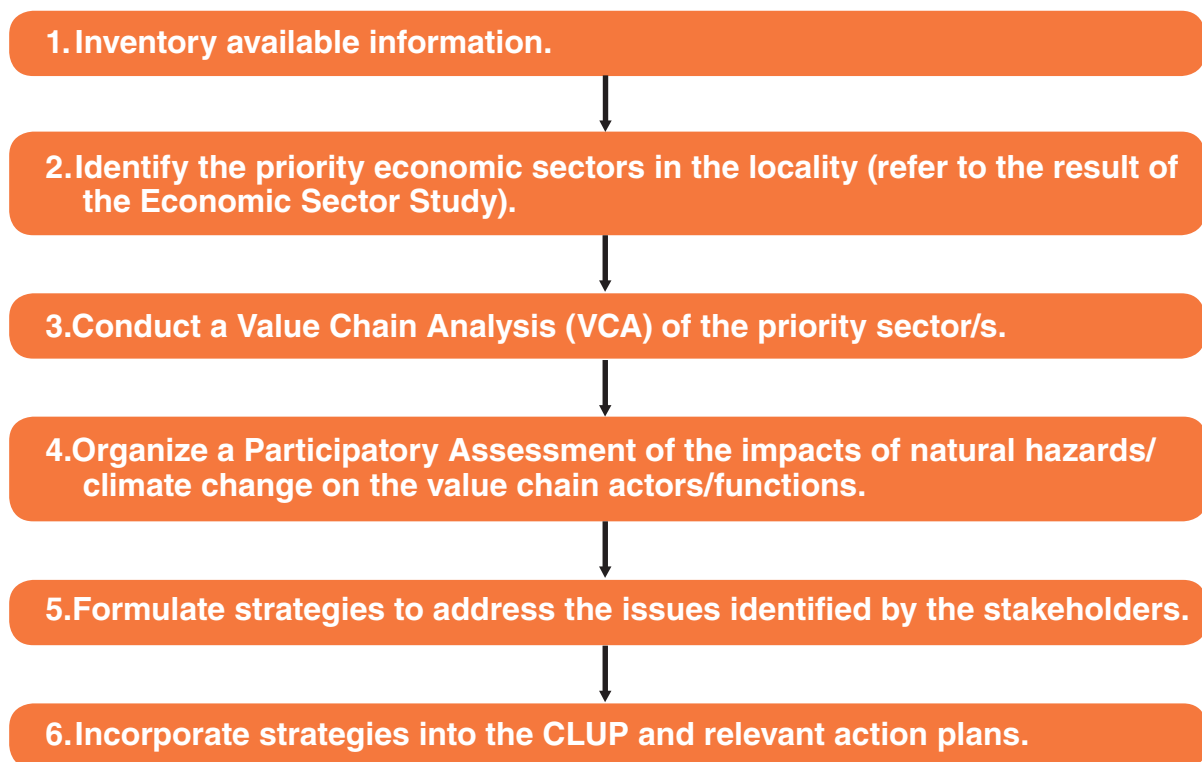
### III. Thematic Area Assessment Guide



#### Steps

The Office of the City/ Municipal Planning and Development Coordinator (C/MPDC), jointly with the City/ Municipal Local Economic and Investment Planning Office (C/M LEIPO) or the staff assigned with local economic development will undertake the following activities:

#### Overview Of Steps



#### 1. Inventory available information.

This may include the following plus other relevant information that may provide further inputs for the analysis:

- Identified suitable areas for urban development derived from sievemapping of multi-hazard maps, updated/ existing land use maps, vulnerability assessments (if available), and other relevant maps and studies that provide further information on existing natural hazards in the locality
- Summary reports of key sectoral/ thematic areas (like socio-economic, demographic/ income, production/ productivity, land use/ resource conditions, settlements, ecological/ environmental/ biodiversity, among others)
- Value chain analysis (if available) and other relevant studies of key economic sectors in the locality
- Local and Regional Economic Development (LRED) Strategies (if available)



## 2. Identify the priority economic sectors in the locality (refer to the result of Economic Sector Study).

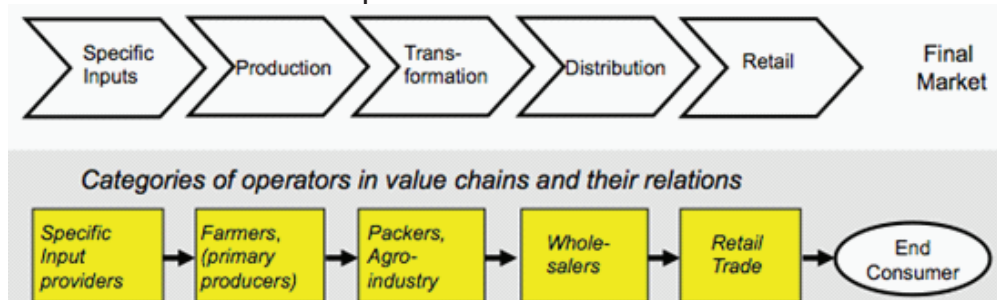
- Validate the results of the Economic Sector Study to determine the sectors which have strong potential for growth and generating income and employment for local residents through a stakeholders' consultation among the local private sector, including business membership organizations, banks operating in the locality, potential external investors, industry and professional associations and other business related groups.
- Engage the Provincial/ Regional office of the Department of Trade and Industry (DTI) in the process. They can likewise provide inputs on existing industry clusters within the locality and other priority sectors that are aligned with the national government's priority investment areas.

## 3. Conduct a value chain analysis of the priority sector/s.

- Update the existing value chain analysis (VCA) for the priority sector identified.
- To conduct a value chain analysis, engage the Provincial/ Regional office of DTI to serve as the facilitator as they are already trained in this approach. They also work very closely with the local private sector and can therefore bring in the necessary stakeholders into the process.

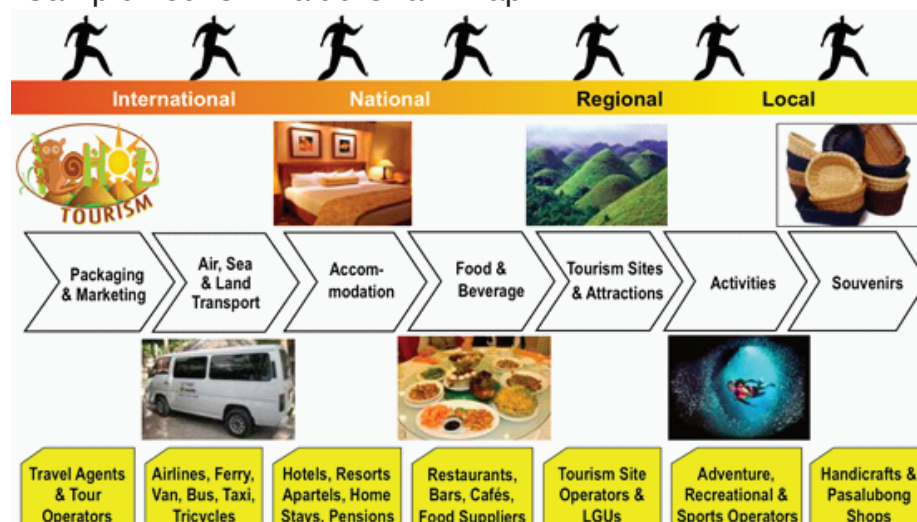
The "value chain" refers to the sequence of related business activities (functions) from the provision of specific inputs for a particular product or services to primary production, transformation, marketing and up to final consumption/service delivery<sup>17</sup>. The approach looks into the set of enterprises that performs these functions, such as the producers, processors, traders and distributors of a particular product or service.

Figure GR- 3. Value Chain Map



The VC can contribute greatly to the development of local enterprises because it creates stronger forward and backward linkages among the different actors across a value chain, enhances coordination between public and private sector by clearly identifying roles, promotes economic viability and sustainability because it is market oriented.

Figure GR- 4. Sample Tourism Value Chain Map



<sup>17</sup>GIZ Valuelinks Module <http://www.valuelinks.org/index.php/material/valuelinks-standard-material>

#### 4. Organize a participatory assessment of impacts of natural hazards/ climate change on the value chain actors/ functions.

- After the value chain analysis for the priority sector/s has been conducted, the next step is to determine the vulnerability of the various actors and processes in the VC to climate change and risks, as well as to identify the opportunities for improving their resource efficiency and resilience.
- This can be done through a workshop. It is important that the same stakeholders who were engaged in the value chain workshop participate in the activity to ensure that the concerns of the priority sectors are addressed.
  - o Materials needed:
    - Large scale LGU map showing the following:
      - Identified suitable development areas
      - Main thoroughfares, natural features (major waterways, bodies of water, volcano, fault lines, etc.) existing natural hazards (fault lines) and barangay delineations;
    - Metacards, pinboards, markers
  - o Workshop flow:
    - The LGU presents the map, discussing the features shown and how the suitable areas for development were identified. LGU also discusses adaptation measures being undertaken to protect the community
    - Workshop participants are each given a round card to represent their business. Ask each participant to mark the location of their business by pinning the card on the approximate location on the map.
    - Once all participants have done this, study the map and identify which businesses/ enterprises are outside the suitable areas for development
    - The Facilitator initiates a guided discussion to determine the problems experienced by the businessowner related to climate change/natural hazards. Responses are written on metacards and posted on a board.
    - A facilitator initiates a guided discussion. He/she reads out several guide questions and the participants write their responses on the metacards and pins them on the board.
  - o Suggested guide questions:
    - To what extent is your business affected by the cost and availability of production inputs (water, power, raw materials, others)? Describe briefly its impacts on your business
    - Was your business/ livelihood affected by any form of natural disaster (i.e. flooding) over the past five years? Indicate the location of your business
    - How would you rate the condition of the natural resources (coastal resources, lowland areas, upland areas) in your locality? Is this having an adverse impact on your business?
    - How would you rate the performance of the LGU in addressing the locality's solid waste management concerns? How is this affecting your business?
    - Is the LGU experiencing problems with regard to water supply? (quality and quantity)
    - How about wastewater? Are there issues of water potability? Water contamination?
- The facilitator processes the responses and clusters them according to specific concern (water, wastewater, energy, solid waste management, etc.)

## 5. Formulate strategies to address the issues identified by stakeholders.

- The results of the participatory assessment of impacts of natural hazards/ climate change on the VC actors/ functions shall form the basis for formulating green growth strategies.
- The strategy formulation process shall take place ideally immediately after the workshop in another step so that there is no need to convene the stakeholders again.
- If there has not been an LRED process earlier, this is the time to initiate an LRED intervention<sup>18</sup>. The LRED Toolkit can be downloaded from [www.greeneconomy.ph](http://www.greeneconomy.ph). One can also coordinate with the DTI Provincial Office for assistance on initiating the LRED Process in the locality.

## 6. Incorporate strategies into the CLUP and relevant action plans

- The city/ municipal planning officials and the economic planning officials translate the strategies into policies and action plans/ programs to be incorporated into the CLUP.
- It is during this step that the LGU can consider approaches, such as sustainable consumption and production and eco efficient development to address the identified concerns.

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<sup>18</sup>LRED strategies have already been elaborated in a number of LGUs nationwide with more than 80 in the Visayas. If a city/municipality is interested to undergo such a structured process to identify the competitive sectors in their locality and set up action plans how to best promote these sectors, coordination with the DTI provincial office for guidance and support is recommended.

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# Urban Design and Development

This guide is a post CLUP and zoning activity that may be undertaken by the LGU in order to come up with a unique character and detailed development strategies for selected areas that is reflective of the CLUP's development goals. However, the basic principles and concepts below may be used in the development of the concept/structure plan of the LGU.

## I. Basic Principles and Concepts

### A. Urban Design

Urban design is a process that planners can employ to provide detailed guidance to the development of areas in the city. Urban design seeks to realize the vision for an area by making the public realm more organized, aesthetically pleasing, and functional. It is the science of 'place-making' which enhances the value of a city and improves the quality of life of its people.

Urban design draws together the fields of planning and transportation policy, architectural design, development economics, landscape and engineering. It considers environmental responsibility, social equity, and economic viability to create livable places of beauty and unique identity (Llewellyn-Davies, 2000).

The physical form of cities is shaped by the manner in which the populace has invested in it over time. In the continuing development of city lands, city managers are confronted with two types of situations:

- **Areas for redevelopment.** This concerns inefficiently performing or outdated existing areas which are candidates for redevelopment. Old developments are normally found in the inner city.
- **Areas for new development.** This concerns still undeveloped or under-developed areas. This concerns city raw land and lightly inhabited areas. These areas are usually located in city hinterlands.

Depending on the situation, a city may prioritize redevelopment of old areas rather than embark on a costly development of new areas. Inner city redevelopment is seemingly more urgent because these are areas where the city's traditional socio-economic activities are taking place. Projects in new areas are typically long term investments where city officials with limited development budgets may put off initiatives until a later time.

Where the city fails to take the initiative in the development/ redevelopment of areas, the private sector can take the lead in the development of these areas. While this scenario fast tracks city development, there is a risk that the city will be placed in a reactive position in the planning and management of the areas. Thus, cities need to take a more proactive role in directing and managing their urban development.

### B. Urban Character

The 'theme' of a city (whether contrived or natural) and its public amenities suggests the

character of a city. The urban character is mostly the criteria used when urbanites seek to compare and identify the 'most liveable city' places. City public elements that are established in the city's unique style and which promote health, access, knowledge, and culture contribute to the admirable character of places. Some of these elements are:

- Parks, plazas and greenbelts ("Lungs of the city"; promenade; social assembly places)
- Accessibility (Wayfinding instruments; public parking sites; green routes, transport stations)
- Public art and street furniture (Rest and recreation; history)
- Cultural centers (Knowledge facilities such as museums; libraries; venue for performing arts; etc.)

## C. Principles of Urban Design

The principles of urban design are as follows:

### 1. Design for all

Urban design should involve people, local communities and those likely to move in. It is a process that needs to generate and draw upon consumer interest. Collaborative planning and a shared understanding of the issues ensure attention to local concerns and reduce resistance from local communities. In addition, local communities can also have a role in implementing and managing projects. Involvement and commitment can be harnessed through early collaboration. Likewise, urban design does not belong to one group. It involves different stakeholders representing different interests. (Llewellyn-Davies, 2000).

### 2. Create places for people

For places to be well-used and well-loved, they must be safe, comfortable, varied, and attractive. They also need to be distinctive, and offer variety, choice, and fun. Vibrant places offer opportunities for meeting people; playing in the street and watching the world go by.

### 3. Conserve heritage

New development should conserve monuments, groups of buildings, or sites of cultural importance, and natural features, geological and physiographical formations and natural sites of national importance.

### 4. Enrich the existing

New development should enrich and complement existing places.

### 5. Make connections

Places need to be accessible and integrated with their surroundings. One must be able to get around by foot, bicycle, public transport, and car - in that order.

### 6. Work with nature

Places must balance the natural (climate, landform, landscape and ecology) and the man-made environment to maximize resource conservation and amenity.

### 7. Mix uses and forms

Stimulating, enjoyable and convenient places meet the various needs of the greatest number of users. They also mix different buildings, uses, ownership, leases, and densities.

### 8. Manage the investment

For projects to be developable and well cared for they must be economically viable, well managed and maintained. This means understanding the market considerations of developers, ensuring long term commitment from the community and the local authority, defining appropriate delivery mechanisms and seeing this as part of the design process.

## 9. Design for change

New development needs to be flexible enough to respond to future changes in use, lifestyle and demography. This means designing for energy and resource efficiency; creating flexibility in the use of property, public spaces and the service infrastructure and introducing new approaches to transportation, traffic management and parking.

## II. General Objectives and Outputs



### Objective

- To provide LGUs an overview of the basic principles and concepts of urban design, as well as urban design assessment to come up with a unique character and detailed development strategies for selected areas that is reflective of the CLUP's development goals.



### Key Inputs

- Urban design assessments (e.g. Visual Preference Survey, Smart Neighborhood Analysis Protocol (SNAP), vacant lands study, land values study, etc.)



### Outputs

- Master plan employing the basic principles and concepts of urban design: areas for redevelopment and areas for new development



### Key Technical Persons/Responsible Groups

- Lead: CPDO/ MPDO
- Contributors: Multi-disciplinary technical support team (can include an urban planner, architect, engineer, finance specialist, heritage specialist, community development specialist, etc. depending on the requirements of the area)
- Stakeholders (e.g. business owners, homeowners, potential investors, community representatives)

## III. Thematic Area Assessment Guide



### Steps

The assessment can be done by a multi-disciplinary team which includes the city, technical specialists, and community stakeholders.



## Overview Of Steps

1. Identify and delineate the boundaries of the particular area to be planned.



2. Assess the context of the area or community.



3. Consider/apply Transect-based planning.



4. Conduct a Visual Preference Survey.



5. Use the Smart Neighborhood Analysis Protocol (SNAP).



6. Conduct a vacant lands study.



7. Conduct a structural and environmental quality survey.



8. Conduct a land values study.



9. Conduct studies of aesthetic features of the planning area.

### 1. Identify and delineate the boundaries of the particular area to be planned.

After the land use plan has been drafted, detailed planning can be done in particular areas such as the following:

- Central business district
- Heritage core
- Main corridors (e.g. major commercial avenues)
- Transit centers (i.e. within a given radius from a transit stop)
- River/ lakeside/ seaside zones
- New development areas

### 2. Assess the context of the area or community.

Context is the area's character and setting. It is natural as well as human: the forms of settlements, buildings and spaces, ecology and heritage, location, and the routes that pass through it. A thorough appreciation of the overall site context is the starting point for designing a distinct place (Llewellyn-Davies, 2000). Communities are also affected by climate change and are vulnerable to disasters, which must not be ignored in planning (See section on **Climate Change Adaptation and Disaster Risk Reduction** for a detailed analysis). The following presents checklists for the assessment of various elements.

- Community

To appreciate the dynamics of a community, conduct a review of the existing community network and policy.

Figure UD- 1. Community and Policy Appraisal (Llewellyn-Davies, 2000)

Subject area	Considerations
Community profile	<ul style="list-style-type: none"> <li>• Stakeholders</li> <li>• Local views, preferences and aspirations</li> <li>• Organizational structures</li> <li>• Census and other statistical data</li> <li>• Cultural characteristics</li> <li>• Safety and security</li> </ul>
Local plan policies	<ul style="list-style-type: none"> <li>• Design</li> <li>• Strategic views</li> <li>• Land uses</li> <li>• Transportation plans</li> <li>• Interim uses</li> <li>• Specific constraints (e.g. airport protection zones)</li> </ul>
Heritage and conservation	<ul style="list-style-type: none"> <li>• Conservation areas</li> <li>• Listed buildings</li> <li>• Ancient monuments</li> <li>• Archeology</li> <li>• Sites of Special Scientific Interest</li> <li>• Local Nature Reserves and other designated ecological sites</li> <li>• Protected flora and fauna</li> <li>• Nature conservation, Countryside and Green Strategies</li> </ul>
Other relevant policies and initiatives	<ul style="list-style-type: none"> <li>• Supplementary planning guidance               <ul style="list-style-type: none"> <li>- Development frameworks</li> <li>- Design guides</li> <li>- Site development briefs</li> </ul> </li> <li>• Other relevant local authority policies</li> <li>• Relevant policies and requirements of other bodies (e.g. RDAs, Environment Agency)</li> <li>• Other local initiatives</li> </ul>

• Place

The feeling of place arises from understanding the physical and human geography, the history and form of past uses, the natural landscape and buildings, both on a site and around it.

Figure UD- 2. Character Appraisal (Llewellyn-Davies, 2000)

Subject area		Considerations
Roles and relationships of the site/area to its strategic context	<ul style="list-style-type: none"> <li>• Function</li> <li>• Linkage to wider area</li> <li>• Relationship to adjacent areas</li> </ul>	<ul style="list-style-type: none"> <li>• Current performance relative to similar areas</li> <li>• Identity</li> </ul>
Contiguous areas	<ul style="list-style-type: none"> <li>• Land uses</li> <li>• Views and skyline</li> </ul>	
Character appraisal	<ul style="list-style-type: none"> <li>• Historical development</li> <li>• Settlement pattern</li> <li>• Archeology (initial appraisal)</li> <li>• Cultural characteristics and heritage</li> <li>• Local history</li> <li>• Colour and textures</li> <li>• Local vernacular</li> <li>• Façade treatments</li> <li>• Roofscape</li> </ul>	<ul style="list-style-type: none"> <li>• Building elements and fenestration</li> <li>• Rhythm and pattern</li> <li>• Details and richness</li> <li>• Local community aspirations</li> <li>• Local/regional building traditions and materials</li> <li>• Other local traditions</li> <li>• Events/festivals</li> <li>• Place names</li> <li>• Natural environment/ecology (plants, trees, etc.)</li> </ul>
Streetscape and public realm analysis	<ul style="list-style-type: none"> <li>• Visual clutter</li> <li>• Lighting</li> <li>• Barriers</li> <li>• Live edges</li> </ul>	<ul style="list-style-type: none"> <li>• Street furniture, public information and signing</li> <li>• Public art</li> <li>• Safety</li> </ul>
Building structures and spaces	<ul style="list-style-type: none"> <li>• Layout and form of spaces</li> <li>• Public/private interface</li> <li>• Layout and form of buildings (including height, scale and massing)</li> <li>• Age and condition of buildings and structure</li> <li>• Relationship between built and unbuilt form</li> </ul>	<ul style="list-style-type: none"> <li>• Sense of enclosure</li> <li>• Types of buildings</li> <li>• Continuity of facades</li> <li>• Urban grain</li> <li>• Public and open spaces</li> </ul>
Uses and activities	<ul style="list-style-type: none"> <li>• Ground floors</li> <li>• Upper floors</li> <li>• Evening economy</li> <li>• Activity spines and nodes</li> <li>• Public open spaces</li> </ul>	<ul style="list-style-type: none"> <li>• Arts and culture</li> <li>• Amenities and facilities</li> <li>• Education</li> <li>• Leisure and recreation</li> <li>• Employment</li> <li>• Wildlife</li> </ul>
Visual analysis	<ul style="list-style-type: none"> <li>• Image and perception of the area</li> <li>• Gaps and enclosure</li> <li>• Views (local and strategic), vistas and landmarks</li> <li>• Skylines</li> <li>• Gateways and thresholds</li> </ul>	<ul style="list-style-type: none"> <li>• Boundaries and barriers</li> <li>• Aesthetic quality</li> <li>• Legibility</li> </ul>

- Natural Resources

A thorough investigation of a site's natural resources will integrate the various needs of the new development and identify the site's possibilities and limitations.

Figure UD- 3. Environmental Appraisal (Llewellyn-Davies, 2000)

<b>Physical Environment</b>
<ul style="list-style-type: none"> <li>• Ground conditions and soils</li> <li>• Surface and groundwater resources</li> <li>• Topography and geology</li> <li>• Climate, microclimate, orientation, exposure</li> <li>• Air quality</li> <li>• Hydrology (inc. water quality and watersheds)</li> </ul>
<b>Land and Land-Use</b>
<ul style="list-style-type: none"> <li>• Property (residential and commercial)</li> <li>• Leisure activities</li> <li>• Agriculture</li> <li>• Forestry resources</li> <li>• Access to the countryside</li> </ul>
<b>Ecology and Nature Conservation</b>
<ul style="list-style-type: none"> <li>• Terrestrial &amp; aquatic habitats &amp; communities</li> <li>• Plant and animal species</li> <li>• Specially protected animals and plants</li> </ul>
<b>Heritage</b>
<ul style="list-style-type: none"> <li>• Landscape setting, structure and type</li> <li>• Archeology</li> <li>• Historic sites and features</li> <li>• Cultural interests</li> </ul>
<b>People</b>
<ul style="list-style-type: none"> <li>• Human health and welfare</li> <li>• Employment</li> <li>• Community and cultural cohesion</li> <li>• Views</li> <li>• Noise and vibration</li> <li>• Transport</li> <li>• Accessibility</li> </ul>

- Connections

The connections between a site and its surroundings are very important.

Figure UD- 4. Movement Analysis (Llewellyn-Davies, 2000)

Subject area	Considerations
Circulation	<ul style="list-style-type: none"> <li>• Access and mobility</li> <li>• Walking</li> <li>• Cycling</li> <li>• Public transport</li> <li>• Private vehicles</li> <li>• Interchanges</li> <li>• Permeability</li> <li>• Barriers</li> <li>• Rights of way</li> </ul>
Legibility	<ul style="list-style-type: none"> <li>• Points of entry/ gateways</li> <li>• Hierarchy of routes and spaces</li> </ul>
Traffic generation	<ul style="list-style-type: none"> <li>• Current levels</li> <li>• Future proposals and projects</li> </ul>
Accommodating cars and services vehicles	<ul style="list-style-type: none"> <li>• Parking</li> <li>• Servicing</li> <li>• Traffic management</li> </ul>

### 3. Consider/apply Transect-based planning.

One of the principles of Transect-based planning is that certain forms and elements belong in certain environments. For example, an apartment building belongs in a more urban setting, a ranch house in a more rural setting. Some types of thoroughfares are urban in character, and some are rural. A deep suburban setback destroys the spatial enclosure of an urban street; it is out of context.

The Transect, as a framework, identifies a range of habitats from the most natural to the most urban. Its continuum, when subdivided, lends itself to the creation of zoning categories. These categories include standards that encourage diversity similar to that of organically evolved settlements. The Transect integrates environmental and zoning methodologies, enabling environmentalists to assess the design of social habitats and urbanists to support the viability of natural ones (Center for Applied Transect Studies, 2009).

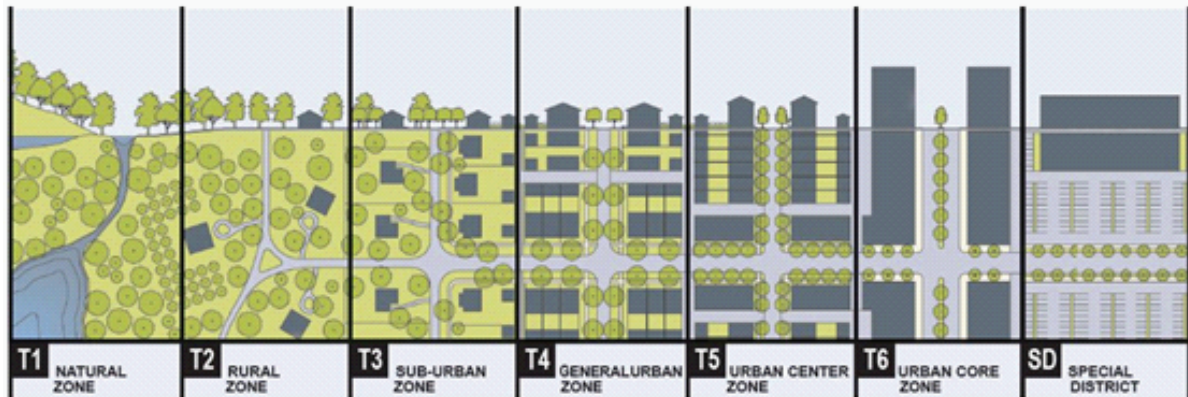
- a. **T-1 Natural Zone** consists of lands approximating or reverting to a wilderness condition, including lands unsuitable for settlement due to topography, hydrology or vegetation.
- b. **T-2 Rural Zone** consists of sparsely settled lands in open or cultivated state. These include woodland, agricultural land, grassland, and irrigable desert. Typical buildings are farmhouses, agricultural buildings, cabins, and villas.
- c. **T-3 Sub-Urban Zone** consists of low density residential areas, adjacent to higher zones that some mixed use. Home occupations and outbuildings are allowed. Planting is naturalistic and setbacks are relatively deep. Blocks may be large and the roads irregular to accommodate natural conditions.
- d. **T-4 General Urban Zone** consists of a mixed use but primarily residential urban fabric. It may have a wide range of building types: single, side yard, and row houses. Setbacks and landscaping are variable. Streets with curbs and sidewalks define medium-sized blocks.
- e. **T-5 Urban Center Zone** consists of higher density mixed use buildings that accommodate retail, offices, row houses and apartments. It has a tight network of streets, with wide sidewalks, steady street tree planting and buildings set close to the sidewalks.
- f. **T-6 Urban Core Zone** consists of the highest density and height, with the greatest variety of uses, and civic buildings of regional importance. It may have larger blocks; streets

have steady street tree planting and buildings set close to the wide sidewalks. Typically only large towns and cities have an Urban Core Zone.

g. **The Civic Zone** consists of Civic Buildings and/or Civic Spaces appropriate to each Transect Zone.

h. **Special Districts** consist of areas with buildings that by their Function, Disposition, or Configuration cannot, or should not, conform to one or more of the six normative

Figure UD- 5. Typical Rural-Urban Transect with Transect Zones (Center for Applied Transect Studies, 2009)



#### 4. Conduct a Visual Preference Survey.

Visual surveys consist of sets of photographs of buildings, streets, sidewalks, shopping centers, parks, and/or other examples of a region's built or natural environment. The images are generally taken from within the community, although some images may be from other areas if a depiction of a certain design principle cannot be conveniently found in the survey area. The images are then shown to residents at public workshops and stakeholder's meetings.

Viewers are asked to rate each image on a scale from -10 to +10 (or -5 to +5). The average rating for each image is calculated and results are presented to the viewers. In this way, participants build consensus on how they would like homes, stores, offices, and streets designed and situated in their communities. Planning professionals are then also better able to understand what appeals to residents (Local Government Commission, 2010).

#### 5. Use the Smart Neighborhood Analysis Protocol (SNAP).

The Smart Neighborhood Analysis Protocol is an example of a point system of evaluating existing neighborhoods in urban areas and proposed infill redevelopment projects in accordance with Smart Growth principles, resulting in Smart Neighborhoods. The SNAP includes a method for prioritizing development projects, to maximize the City's redevelopment efforts and to enhance the benefits of future investments (Farr, D., 2006).

The Smart Neighborhood Analysis Protocol (SNAP) is a comprehensive ranking criteria system used to guide the development of smart neighborhoods. It is anticipated that neighborhood groups will lead the effort for implementing the SNAP by facilitating data collection and analysis by citizen volunteers. The community organization would then compile results and demonstrate support for redevelopment recommendations, and then submit the summary to the City. Based on the results, the City prioritizes neighborhood development sites and focuses its redevelopment efforts appropriately.

##### A. Physical Attributes & Assets

Data collection on physical attributes and assets will be completed by volunteer community stakeholders who will collect information about their neighborhood. The result will provide a vision for a complete neighborhood and serve as a guide to the community's preferred redevelopment projects.

a. Identify site characteristics

- Nodes or places that tend to be busy with pedestrian activity
- Edges or barriers or natural features that serve as edges to the neighborhood
- Landmarks or monuments
- Districts
  - Single-family Residential Districts
  - Multi-family Residential Districts
  - High-rise Residential Districts
  - Mixed-use Districts
  - Retail Districts
  - Office Districts
  - Civic or Institutional Districts
  - Industrial Districts
  - Parks or trails
- Corridors
  - Transit
  - Rail
  - Water features

b. Make an inventory of neighborhood uses

- Convenience food store
- Family restaurant
- Coffee shop
- Bank
- Laundry/dry cleaner
- Drug store
- Medical/dental office
- Day care center
- Elementary school
- Library
- Community center
- Place of worship
- Post office/government services
- Park
- Transit lines

c. Map the neighborhood

- Identify the center of activity
- Identify Pedestrian Shed
- Identify neighborhood boundaries

d. Navigate through the neighborhood

- Identify key connector streets
- Identify street connectivity patterns
- Identify barriers to pedestrian circulation

e. Evaluate the pedestrian environment

- Safe and rewarding
- Safe but uninteresting
- Pedestrian/auto conflict zone
- Missing pedestrian path



## B. Neighborhood Capacity Building

Data analysis and scoring will be completed by sponsoring community organization.

### a. Summarize site characteristics

- node of activity present (yes = 4 points)
- mixed-use district present (yes = 6 points)
- mix of single-family & multifamily housing (yes = 2 points)

### b. Compile neighborhood mapping results

- Determine neighborhood center and size
  - Less than 525,000 square meters = 0 point
  - 525,000 to 600,000 square meters = 1 point
  - 600,000 to 700,000 square meters = 5 points
  - 700,000 to 800,000 square meters = 4 points
  - Greater than 800,000 square meters = 0 points
- Count households in walking distance (5 minute walk) of neighborhood center
  - Use categories present
    - 0 to 2 use categories = 0 point
    - 3 to 5 use categories = 2 points
    - 6 to 10 use categories = 4 points
    - Greater than 11 use categories = 6 points
  - Total uses present
    - 0 to 3 establishments = 0 point
    - 4 to 8 establishments = 2 points
    - Greater than 9 establishments = 5 points

### c. Summarize neighborhood features

- Evaluate block size
  - 240 to 395 meters = 3 points
  - 396 to 475 meters = 2 points
  - 476 to 550 meters = 1 point
  - Over 550 meters = 0 point
- Determine connector street quality
  - All connectors are pedestrian-friendly = 3 points
  - At least one connector is pedestrian-friendly = 1 point
  - No pedestrian-friendly connectors = 0 point

### d. Analyze pedestrian zone study

- 3 points if connector and commercial Streets within 200 meters of neighborhood center are as follows:
  - Safe and rewarding 70%
  - Safe but uninteresting 0-20%
  - Pedestrian/auto conflict zone 0-15%
  - Missing pedestrian path 0-5%
- 1 point if connector and commercial Streets within 400 meters of neighborhood center are as follows:
  - Safe and rewarding 70%
  - Safe but uninteresting 0-20%
  - Pedestrian/auto conflict zone 0-15%
  - Missing pedestrian path 0-5%
- 2 points if residential Blocks within 200 meters of neighborhood center are as follows:
  - Safe and rewarding 70%
  - Safe but uninteresting 0-20%
  - Pedestrian/auto conflict zone 0-15%

- o Missing pedestrian path 0-5%
- 1 point if residential blocks within 400 meters of neighborhood center are as follows:
  - o Safe and rewarding 70%
  - o Safe but uninteresting 0-20%
  - o Pedestrian/auto conflict zone 0-15%
  - o Missing pedestrian path 0-5%
- Crosswalks within 200 meters of neighborhood center
  - o 8 or more crosswalks = 2 points
  - o 5 to 7 crosswalks = 1 points
- Crosswalks within 400 meters of neighborhood center
  - o 8 or more crosswalks = 1 points
  - o 5 to 7 crosswalks = 0 points
- e. Summarize neighborhood opportunities
  - Identify opportunity sites
  - Identify new connections
- f. Compile results and complete score sheet

### **C. Evaluate Smart Development Potential**

Summary and scoring will be completed by City Department coordinating the SNAP.

- a. Compile neighborhood mapping results
  - Evaluate stakeholder participation
    - o Less than 15 participants = 0 point
    - o 16 to 30 participants = 1 point
    - o Over 30 participants = 2 points
  - Evaluate parcel inventory
    - o Complete data sets = 2 points
  - Evaluate assets and incentives
    - o New schools new neighborhoods site = 4 points
    - o Brownfields available for redevelopment = 3 points
    - o Neighborhood shopping campaign = 1 point
    - o Community Garden = 1 point
    - o Other similar community assets and initiatives = 1 point each
  - Evaluate development capacity
    - o Mixed-Use = 4 points
    - o Urban Residential = 2 points
  - Evaluate potential partnerships
 

Each partner is 1 point = 1 to 4 points

    - o Local Chamber of Commerce
    - o Local developers
    - o Business owners considering locating in the neighborhood
    - o Other similar partners who have the capacity to invest in or promote the Smart Neighborhood.
  - Evaluate funding opportunities
    - o Over P500,000 in funds raised = 1 point
    - o Over P1,000,000 in funds raised = 1 point
    - o Compiled list of funding sources = 1/2 point
    - o Applicable in-kind donation = 1/2 point each
  - Summarize opportunity sites
    - o 20,000 square meters or more within 200 meter radius = 4 points
    - o 80,000 square meters or more within 400 meter radius = 2 points

- Summarize new connections

If streets that are currently disconnected may be reintegrated into the street grid, to the extent feasible, and if any new streets are connected with surrounding street grid = 2 points

- Evaluate completeness of submittal

Submittals were sufficiently and accurately completed = 2 points

b. Evaluate additional resources and opportunities

- Prioritize special zoning designations
  - o Special Development District = 3 points
  - o Commercial Mixed Use Zoning District = 2 points
- Determine adaptive reuse opportunities
  - Any building with historic or local significance targeted for adaptive reuse = 1 point
- Determine applicability of additional resources
  - Excluding those resources identified by the Community Organization, each funding resource identified by the City = 2 to 4 points
- Evaluate market support for redevelopment
  - Market study supporting the type of development or land uses appropriate for the development of a Smart Neighborhood = 3 points

c. Conduct final scoring and prioritization

If scoring for all 3 Parts meets the minimum threshold, SNAP qualifies for prioritization.

- Part A minimum of 15 points (A score over 40 for Part 1 indicates a Smart Neighborhood with existing development momentum)
- Part B minimum of 12 points
- Part C minimum of 5 points

### C. Implement the SNAP Results

The SNAP Ranking Criteria results for a given project may be used to evaluate the redevelopment potential for the site as well as to facilitate comparison among multiple sites, to help determine which are potentially the strongest Smart Neighborhoods.

The SNAPs completed for different sites and neighborhoods throughout the City that meet the minimum required points are prioritized by the Grand Total. The highest-scoring SNAPs will be given priority for the City's development efforts. The intent is to focus on not just one but several neighborhoods at a time to create a critical mass of investment.

Even those projects that do not receive priority for development efforts will benefit from the SNAP Ranking Criteria, which may be used to guide the community as its stakeholders and leaders take stock of available assets.

## 6. Conduct a vacant lands study.

Vacant lands are classified according to topographic and drainage characteristics and availability of improvements near such vacant lands. Vacant lands may be classified as:

a. Prime lands

- 0-15% in slope
- close proximity to water, sewer and other utility lines
- These vacant lands are suitable for industrial, commercial, residential, and other urban uses

b. Marginal lands

- over 15% in slope
- subject to flooding
- unsuitable or uneconomic to develop

Availability of prime vacant lands for development will depend on such factors as

willingness of owners to release the property, existence of clear titles, and absence of other encumbrances on the land.

Data on vacant lands can be presented both with the use of maps and statistical tables. For map presentation, prime and marginal vacant lands should be distinguished by an appropriate legend.

Compute and tabulate areas of vacant lands from the map, using dot grid or plan meter according to previously suggested table formats. The resulting figures can then be compared with identified needs for new development areas.

## **7. Conduct a structural and environmental quality survey.**

The study of the quality of the urban environment and of man-made structures (residential, commercial, industrial, and institutional) is aimed at identifying the so-called urban renewal area. Urban renewal actions are of two types:

- a. Rehabilitation – the improvement or restoration of identified blighted areas; and
- b. Redevelopment – clearance and rebuilding of areas which are in more advanced stages of blight.

Conditions of blight are categorized into two types:

### i. Simple form of blight

- Physical indicators:
  - o Structural deterioration
  - o Missing sanitation facilities
  - o Structures in disrepair or lacking in elemental maintenance
  - o Presence of trash and rubbish accumulations
  - o Noise
  - o Odor
  - o Missing community facilities (e.g. schools, playgrounds, public water and sewerage systems, adequate street and drainage facilities, etc.)
- Social Indicators:
  - o High rates of juvenile delinquency
  - o Low health and welfare indices
- Economic Indicators:
  - o tax delinquency
  - o untitled land properties
  - o declining property values
  - o large number of building vacancies

### ii. Complex forms of blight

- Physical indicators:
  - o Mixture of incompatible land uses (e.g. pollutive industries in the middle of residential areas)
  - o Obsolete or impractical layout of lots, block and streets
  - o Unsafe and unhealthful conditions
  - o Usually subject to floods, marshiness or tidal flow

The presence of simple forms of blight calls for rehabilitation measures. These may involve such actions as spot condemnation of structures, building repairs, or provision of missing sanitary facilities through sanitation code enforcement, a public improvement program for the provision of missing community facilities and a campaign for voluntary clean-up, painting and improved building maintenance standards. The presence of too many forms of simple blight may, however, call for the more drastic measures of clearance and redevelopment. The presence of complex forms of blight call for redevelopment measures.

## 8. Conduct a land values study.

The land values goes into an investigation of the structure of land values, upward or downward graduations and trends of change in these values. Actual market values are arrived at only by extensive and costly studies which may not be practicable in most situations. Land values of urban lots or rural lots, which are usually available at the municipal/ city Assessor's Office. Assessed value figures may be refined based on comparison with known selling prices and the approximate percentage deviation of assessed value from market values.

## 9. Conduct studies of aesthetic features of the planning area.

Land use planning is also concerned with the preservation and development of certain natural and man-made features of the planning area in a manner calculated to enhance these qualities for the enjoyment of residents, as well as visitors to the locality. Studies of aesthetic are most directly related to the amenity considerations involved in land use planning.

Aesthetic features are determined on the basis of perceptual considerations— as these are observed in such terms as beauty, pleasantness, sense of spaciousness, and historical value. Since these considerations are largely subjective in nature, it is important to establish some acceptable and valid criteria for determining which features of the locality are to be reserved for aesthetic considerations.

There is no method yet devised by which aesthetic features can be studied on a wholly objective manner. Criteria used will largely depend on local policies and the values of those concerned— local officials, planners, and the citizens alike.

As to what to look for in conducting aesthetic studies, local planners may be guided by the following:

- Identify three-dimensional characteristics of the city's/ municipality's site and the man-made features which have been added to the site.
  - o Six basic ground forms of city/municipal sites
    - level or gently sloping or rolling
    - sloping sites, backed by hills, or steeper slopes
    - valley or gorge sites
    - amphi theatrical or fan-shaped
    - bowl-shaped
    - ridged or hilltop
  - o Forms of man-made features
    - urban textures
    - green areas
    - circulation facilities
    - paved open spaces
    - individually significant architectural masses
- Record significant paths and vantage points from which the city/ municipality can usually be perceived.
  - o the panorama – sweeping view of sections of the city/municipality
  - o the skyline – applicable in areas with conglomeration of tall structures
  - o the vista – view seen from an opening, such as a street or a boulevard
  - o the urban open space – through the experience of the individual in motion.

The next step after the thorough analysis and understanding of the area or community is the design of the master plan itself which defines the urban structure of the city (Llewellyn-Davies, 2000):

- Movement Framework (Volume 1 Annex 6-7 Growth Pattern Options)
- Land Use (Volume 1 Annex 4-5 General Land Use Categories, and Annex 8-6 Innovative Land Use and Urban Design Rules)

- Density, Facilities, and Form (Volume 1 Annex 8-6 Innovative Land Use and Urban Design Rules)
- Energy and Resource Efficiency (Volume 1 Annex 8-7 Green Urban Development Performance Guidelines)
- Landscape (Volume 1 Annex 8-6 Innovative Land Use and Urban Design Rules, and Annex 8-7 Green Urban Development Performance Guidelines)
- Landmarks, Vistas and Focal Points (Volume 1 Annex 8-6 Innovative Land Use and Urban Design Rules)
- Blocks, Parcels and Plots
- Streets and Public Spaces (Volume 1 Annex 8-6 Innovative Land Use and Urban Design Rules, and Annex 8-7 Green Urban Development Performance Guidelines)
- Utility Infrastructure (Volume 1 Annex 8-6 Innovative Land Use and Urban Design Rules, and Annex 8-7 Green Urban Development Performance Guidelines)

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# Heritage Conservation

## Introduction

### Cultural Heritage

Cultural heritage refers to the totality of cultural property preserved and developed through time and passed on to posterity (National Cultural Heritage Act of 2009 or RA 10066).

The National Cultural Heritage Act of 2009 (RA 10066) was enacted specifically “to protect, preserve, conserve and promote the nation’s cultural heritage, its property and histories, and the ethnicity of local communities”. The Act also provides for the designation of Heritage Zones to protect the historical and cultural integrity of a geographical area. In this regard, the National Historical Commission of the Philippines (NHCP) issued the Guidelines, Policies and Standards for the Conservation and Development of Historic Centers/Heritage Zones (Annex HE-1)

The responsibility of maintaining and conserving the Historic Centers/Heritage Zones is vested in the Local Government Units (LGUs), with technical assistance of the national government, through the National Historical Commission of the Philippines (NHCP) and the National Museum (NM).

Cultural heritage is likewise defined as the legacy of physical artifacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations. Cultural heritage includes tangible culture (such as buildings, monuments, landscapes, books, works of art, and artifacts), intangible culture (such as folklore, traditions, language, and knowledge), and natural heritage (including culturally significant landscapes, and biodiversity). (WIKIPEDIA, The Free Encyclopedia)

The study of cultural heritage is important because when one lists important features of a community, it indicates group consciousness of local identity, socio-cultural practices and environment. The collective significance of such points of memory and consciousness may need to be conserved and enhanced in order to foster community identity and set the stage for future heritage significance..

The collective significance of a site can only be appreciated in terms of its intangible connections to a community’s consciousness and environment.

The intrinsic values of a site or settlement, which is the concern of any Land Use Plan, must also look into the socio-cultural setting of the site. Any future plans must be in tune with the local culture and mindset.

### Genius Loci or Spirit of Place

Genius Loci or Spirit of Place is an internationally accepted term in conservation circles as an indicator of tangible cum intangible quality that defines a certain heritage resource, if not any locus of habitation. It conveys the cultural essence of a site encompassing the meanings of a place accrued through time and through its past and present uses. Expressed through the built heritage, these intangible heritage values give the place its

distinctive character.

The spirit of a place resides in its authenticity, retention of which is an essential condition of heritage conservation. It is therefore imperative to identify the authentic elements that define the character of a place and convey its spirit, and, second, to ensure that through the conservation process these elements are maintained, safeguarded and celebrated. (UNESCO Hoi-An Protocols 2009)

“The primary concern, therefore, is to isolate the major components of a place's identity of spirit, and then divide these components into logical ingredient sets for future decision making activities. To do this we must accept the notion that each place has a definable character, spirit, and identity; and we must then apply that attitude to the preservation and revitalization process.” (Garnham, p.7)

## I. Basic Principles and Concepts

Historic Town Centers, Heritage Zones and old districts are great landmarks. They represent the accumulation of diverse cultures, the innumerable achievements of our forefathers as well as experiences of loss and pain. For centuries these historic sites have been the arena of everyday life, providing Filipinos of all classes, cultures and faiths, an open space to see the dawn or enjoy the sunset, spend time with loved ones and friends, and partake of the town's social life. They are sites, too, of important events, and places where Filipinos, known and unknown, lived and died. These important sites and structures give us a sense of community and identity anchored on a shared past. They are our common patrimony, and the responsibility to preserve them for posterity is ours.

### 1. Continuity

We preserve these sites not to bring back old glories, but to remind us that our past is there for us to build upon to achieve a better and happier future. We are not driven to keep these sites merely for the purpose of beautifying them for tourists; rather, we desire to share these sites with local and foreign visitors so that they, too, may appreciate the traces of our past and know us better as a people. The preservation of historic sites is part of the development of a community unafraid to look back while living in the present and building a collective future. Continuity is thus a key to the community's development – the continued use of old sites in the continuity of time. The Historic Center/Heritage Zone is not a dead space but a vibrant, living heritage that progress and growth respect, integrate into the larger setting, and promote for future generations to enjoy and pass on to their heirs.

### 2. Conservation and Re-use

If continuity amid progress is a crucial element in the development of towns and sites, conservation is its partner. A modern urban center without old buildings and other things accumulated from the past is not progressive because it shows no continuity from past to present, little evidence of change, no logical period variations and patterns. Indeed many modern cities have become clones of each other, being literally alike and having no distinct personality. Conserving historic edifices and sites helps define the community's identity and growth.

Moreover, contrary to the conventional perception that conservation is static and therefore abhorrent to development, conservation involves the adaptive reuse of old objects in which our past is inscribed, melding that past in the fullness of its character and individuality with the demands of present day life and future needs. The town's cultural development reflects the various layers of its built and natural environments: the people who have lived in it, and how the town has valued and cared for them. Conservation, therefore, is not anti-development. It is, in fact, future-oriented since it aims to hand over valuable objects from the past, produced by earlier generations, to coming generations of Filipinos, with their fullest possible historicity. (Guidelines, Policies and Standards for the Conservation and Development of Historic Centers/Heritage Zones, 2012)

## II. General Objectives and Outputs



### Objective

- To identify and appreciate the cultural heritage of a city/ municipality
- To create a database and composite maps of cultural resources of a city/ municipality
- To preserve and revitalize the cultural character and uniqueness of the city/ municipality
- To promote and protect the historical and cultural integrity of a geographic area through the designation of historic centers/heritage zones and integrating these into the city/municipal Comprehensive Land Use Plan (CLUP) and Zoning Ordinance.



### Key Inputs

- Cultural Mapping Form (**Annex HE-2**)
- Intangible Heritage Form (**Annex HE-3**)
- NHCP Survey Form 2012\_2 Identification of Significant Historical Structure (**Annex HE-4**)



### Outputs

- Database/list of cultural resources
  - A centralized inventory of information about heritage resources found in the locality
  - Assessments and descriptions of the significance, location, status, and condition of these resources
- Cultural Resource Maps/Image maps
  - Visual representations/illustrations of cultural resources, printed and online, such as pictures, maps, graphs, charts, etc.
- Policy options, regulations, and recommendations for the preservation and protection of cultural heritage/resources.



### Key Technical Persons/Responsible Groups

Special expertise from the following organizations could also be tapped:

- Government agencies
  - National Commission for Culture and the Arts (NCCA)
  - National Museum (NM)
  - National Historical Commission of the Philippines (NHCP)
- Non-government organizations
  - Heritage Conservation Society
  - International Committee for Monuments and Sites - ICOMOS (Philippines)
  - Local historical societies, cofradias, etc.

## Overview Of Steps




### 1. Conduct an inventory of historical and heritage resources and socio-cultural practices and accomplish Table HE-1.

- Gather and consolidate all existing data from different sources based on the different categories of cultural resources. Utilize the following forms in gathering data:
  - Cultural Mapping Form of Built Heritage (**Annex HE-2**)
  - Intangible Heritage Form (**Annex HE-3**)
  - NHCP Survey Form 2012\_2 Identification of Significant Historical Structure (**Annex HE-4**) – this form is utilized for significant historical structures proposed for declaration as Historic Centers or Heritage Zones by the NHCP or the National Museum.
- Request technical help, if needed, from any local undergraduate and graduate students of local technical schools, especially architecture, art studies graduates and local historians to help in the gathering of data and preparation of the composite maps of

cultural resources.

- Refer to part IV. Components of a Historic Center/Heritage Zone under the Guidelines, Policies and Standards for the Conservation and Development of Historic Centers/Heritage Zones, NHCP 2012 (Annex HE-1) for the list of cultural heritage resources/assets that may be present in the locality. These shall form part of the inventory of the cultural resource of the city/municipality.



- **Cultural resource mapping** is a systematic approach to identifying, recording, classifying and analyzing a community's cultural resources. (MCPI, Cultural Resource Mapping: A Guide for Municipalities)
- **Cultural resources** are defined as the collective evidence of the past activities and accomplishments of people. Buildings, objects, features, locations, and structures with scientific, historic, and cultural value are all examples of cultural resources. (Cultural Resources FAQ - New York State Museum)
- There are two kinds of cultural resources that are the focus of cultural mapping: 1) **Tangible cultural assets** (includes built heritage, e.g. buildings, churches, plazas, etc., natural heritage or natural wonders; and 2) **Intangible cultural assets** (e.g. stories, legends, customs and rituals, songs, poetry, etc.)

**Figure HE-1** Cultural Resource Framework below shows a sample summary of a community's tangible and intangible cultural assets.

Figure HE-1. Cultural Resource Framework



Source: [mappingauthenticity.com](http://mappingauthenticity.com)





Notes:

- Type of heritage object: monument, shrine, building, street name, museum, etc.
- Description: tangible or intangible
- Responsible agency: 1. UNESCO (World Heritage Sites); 2. National Historical Commission of the Philippines (NHCP); 3. National Commission for Culture and Arts (NCCA); 4. National Museum; 5. HLURB; 6. LGUs
- Indicate level of susceptibility for all hazards: High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)

## 2. Establish the cultural character and uniqueness of the community.

Establish what the community wishes to preserve, and where they would like to go from there. This exercise can be incorporated in the Visioning and Goal Setting of the CLUP Preparation. The following are some guide questions (Maintaining the Spirit of Place, Garnham 1985)

- What do you think is special about your town/community?
- If you could change anything in your town/community, what would it be?
- What are the things you hope would never change in your town/community?
- When showing out of town guests your town/community, what places would you be sure to show them?
- In your opinion, what are the three (3) most attractive streets in your town/community?
- What things do you think make a neighborhood nice?
- What improvements would you like to see made in the downtown area of your town/community?
- What is the natural character/quality of your town that needs to be conserved?
- What is the cultural character/quality of your town that needs to be conserved?
- What is the visual character/quality of your town that needs to be conserved?



Tip: Socio-cultural values and economic values are indicative of a community's capacity to take the initiative and take responsibility for land use planning. If a community's goals are not in sync with any proposed Land Use Plan as indicated by the LGU's Planning Departments, it only reflects the gap between what the community envisions itself and its representatives' perceived vision for the community.

The conditions for civic pride and its manifestations in cultural events and a healthful environment are only possible if a link is made with physical and judicial planning taking into consideration civic vision and self-confidence.

## 3. Consider the ancestral legacy's uniqueness and self-identity in the LGU's vision and goals.

Include the established uniqueness and self-identity (result of Step 2) of the LGU into the CLUP's Vision.

## 4. Establish what we call the “Spirit of Place” or “Diwa ng Lunan”.

- Determine the cultural assets that are to be preserved (e.g. plazas, etc.)
- Determine tangible structures which are indicators of collective memory, future hopes and dreams.
- Identify what these structures and assets mean to the LGU.
- Indicate these in a map. Create a composite map of as many or all socio-cultural, visual and image maps of the community based on the inventory (step 1) and the abovementioned indicators.



Aside from principles mentioned in the introduction, there are seven (7) facets of cultural worth which the LGU can use in heritage conservation and planning:

- Originality (first of its kind)
- Indigenosity (original/native to a place)
- Authenticity (purity, genuineness)
- Uniqueness (one of its kind)
- Historicity (connection to past significant or momentous events)
- Magnitude (superlative degree or extent, quantitatively measured)
- Excellence or greatness (in artistic, intellectual, scientific, humanistic or technical quality)

Examples of Image Map:

Figure HE-2. Image map of San Juan Batangas, 2009



Figure HE-3. Image Map Quiapo (2010)



## 5. Assess the vulnerability of cultural resources to the effects of climate change and natural hazards based on the result of the climate and disaster risk assessments.

The result of the vulnerability assessment should guide the LGU in proposing for conservation and preservation measures and/or risk preparedness programs/ projects to ensure the protection of these cultural resources against natural calamities and disasters.

Any restoration or rehabilitation intervention for old/existing buildings shall ensure the preservation and extension of the building's lifespan, and/or guarantee zero or minimal alteration of their historic or cultural value.

## 6. Seek assistance from the National Historical Commission of the Philippines (NHCP) or the National Museum (NM) for the declaration of the identified heritage sites/structures.

The LGU may propose the declaration of identified heritage sites or structures by the NHCP or NM as historic centers/heritage zones in keeping with Art. IV, Sec. 13(c) of the National Cultural Heritage Act (RA 10066).

Both agencies are mandated to extend technical and other forms of assistance to the LGUs and private property owners for the preservation and development of historic centers or heritage zones.

The outputs from the inventory and mapping of historical and heritage resources, socio-cultural practices (e.g., customs, traditional celebrations, etc.) that are unique to the locality, shall be submitted to the NHCP or NM as basis for evaluation prior to the declaration of the proposed heritage sites or structures.

Sec. 2, Rule 1, VI. Policies and Standards of the NHCP Guidelines, Policies and Standards

for the Conservation and Development of Historic Centers/Heritage Zones (**Annex HE-1**) contains the planning requirements for declaration of heritage sites or structures.

## **7. Assess the economic viability of improving heritage resources (e.g. tourism potential).**

Heritage resource mapping and conservation is an important tool for showcasing the distinctiveness of a place and for identifying economic development opportunities for the LGU.

The LGU may conduct studies for the revitalization of historic centers or heritage zones, including measures to improve business investments, provide leisure and entertainment, upgrade public services, government infrastructure works, and develop heritage tourism.

The LGU shall promote the historic center or heritage zones for educational and socio-economic growth and benefits. Likewise, it shall encourage programs and projects promoting local products together with history and culture.



### **Heritage and Tourism**

The enhancement of heritage for the benefit of tourism is only one of the many possible means of development. It is sometimes the simplest and often the most interesting from the economic point of view. If well - conceived and managed, tourism has the capacity of making heritage sites profitable. Tourism will position a heritage site in an economic process that can enhance heritage and successfully support local development. (Handbook-tourisme et-patrimoine p.20)

In the International Cultural Tourism Charter (Managing Tourism at Places of Heritage Significance) 1999, it is stated:

“Before heritage places are promoted or developed for increased tourism, management plans should assess the natural and cultural values of the resource. They should then establish appropriate limits of acceptable change, particularly in relation to the impact of visitor numbers on the physical characteristics, integrity, ecology and biodiversity of the place, local access and transportation systems and the social, economic and cultural well being of the host community. If the likely level of change is unacceptable the development proposal should be modified.”

Developmental strategies must therefore be put in place from the outset to cover all sites of heritage tourism potential, and it must be stressed in terms of impact to local culture and environment. Assessment of such Heritage tourism potential is therefore vital at the planning stage, and not after.

## **8. Consolidate and validate the findings of the above steps**

## **9. Prioritize, tabulate and present the results in matrix form (refer to Table HE-2, sample heritage matrix)**

## **10. Recommend interventions such as policy options and appropriate strategies, programs and projects for implementation**

Refer to NHCP Guidelines, Policies and Standards for the Conservation and Development of Historic Centers/Heritage Zones (Annex HE-1) for the policies and policy guidelines, planning requirements, management requirements, and land use policies and regulations, among others.



Table HE-2. Sample Analysis Matrix

Technical findings/ Observations	Issues and concerns	Effects, impacts, implication	Policy options/interventions
Declared Historical and Architectural Significant Building in state of deterioration/decay	Owner not interested in conserving the building, plans to sell the property	Possible loss of landmark if developed for other use; affects the integrity of the cultural significance of the place	Provide incentive for maintaining the property as historical building; Apply for compulsory repair order with the appropriate cultural agency (NHCP or NM)
Historical and Architectural Old Houses being demolished/replaced	Modernization of the structure by the heirs	Loss of significance of the place	Provide incentive for maintaining the original architecture; Implement "adaptive reuse" of the structure

# Annex HE-1. NHCP Guidelines, Policies and Standards for the Conservation and Development of Historic Centers/Heritage Zones

## NATIONAL HISTORICAL COMMISSION OF THE PHILIPPINES

### GUIDELINES, POLICIES AND STANDARDS FOR THE CONSERVATION AND DEVELOPMENT OF HISTORIC CENTERS/ HERITAGE ZONES

The guidelines and standards apply to sites that the National Historical Commission of the Philippines (NHCP) or the National Museum (NM) has declared Historic Centers or Heritage Zones, by virtue of:

- Sec. 4 of PD 26: "The National Museum and the National Historical Commission are hereby vested with the right to declare other such historical and cultural sites as National Shrines, Monuments, and/or Landmarks, in accordance with the guidelines set forth in R.A. 4846 and the spirit of this Decree;" and
- Sec. 12, Art. IV of RA 10066: "The National Historical Institute and the National Museum in consultation with the Commission and the Housing and Land Use Regulatory Board or other concerned agencies, shall designate Heritage Zones to protect the historical and cultural integrity of a geographic area."

The guidelines shall constitute an integral part of the memorandum of agreement that accompanies the official declaration of the site, between the NHCP or NM and the local government unit (LGU) where the site is located. The guidelines not only set the standard but vest responsibility in the LGU for maintaining and conserving the Historic Center/ Heritage Zone.

#### I. Objectives

The guidelines aim to promote the preservation of significant historical, cultural and social sites and environment, consisting of tangible and intangible cultural and historical properties; and enhance and provide order, continuity and identity to the growth and progress of our historic towns for the benefit and enjoyment of succeeding generations of Filipinos. LGUs shall thus be guided in the management and maintenance of Historic Centers or Heritage Zones found in their localities. The guidelines shall also serve as reference for the Department of the Interior and Local Government (DILG), and the Housing and Land Use Regulatory Board (HLURB), the Department of Public Works and Highways (DPWH), and other official regulatory agencies, national and local, whenever and wherever applicable.

LGUs may also use these guidelines as the basis for granting tax holidays and financial incentives to private builders and site developers who engage in and support the conservation and preservation of historic and cultural sites and structures.

#### II. Concept and Principles of Historic Centers/Heritage Zones

Historic town centers and old districts are great landmarks. They represent the accumulation of diverse cultures, the innumerable achievements of our forefathers as well as experiences of loss and pain. For centuries these historic sites have been the arena of everyday life, providing Filipinos of all classes, cultures and faiths an open space to see the dawn or enjoy the sunset, spend time with loved ones and friends, and partake of the town's social life. They are sites, too, of important events, and places where Filipinos, known and unknown, lived and died. These important sites and structures give us a sense of community and identity, pride and dignity anchored on a shared past. They are our common patrimony, and the responsibility to preserve them for posterity is ours.

We preserve these sites not to bring back old glories for we cannot, but to remind us that our past is there for us to build upon here and now for a better, happier future. We

are not driven to keep these sites merely for the purpose of beautifying them for tourists, rather, we desire to share these sites with local and foreign visitors so that they, too, may appreciate the traces of our past and know us better as a people. The preservation of historic sites is part of the development of a community unafraid to look back while living in the present and building a collective future. Continuity is thus a key for the community's development – the continued use of old sites in the continuity of time. The Historic Center/ Heritage Zone is not a dead space but a vibrant living heritage that progress and growth respect, integrate into the larger setting, and promote for future generations to enjoy and pass on to their heirs.

If continuity amid progress is a crucial element in the development of towns and cities, conservation is its partner. A modern urban center without old buildings and other things accumulated from the past is not progressive because it shows no continuity from past to present, little evidence of change, no logical period variations and patterns. Indeed many modern cities have become clones of each other, being literally alike and having no distinct personality. Conserving historic edifices and sites helps define the community's identity and growth.

Moreover, contrary to the conventional perception that conservation is static and therefore abhorrent to development, conservation involves the adaptive reuse of old objects in which our past is inscribed, melding that past in the fullness of its character and individuality with the demands of present day life and future needs. The town's cultural development reflects the various layers of its built and natural environments: the people who have lived in it, and how the town has valued and cared for them. Conservation, therefore, is not anti-development. It is, in fact, future-oriented since it aims to hand over valuable objects from the past, produced by earlier generations, to coming generations of Filipinos, with their fullest possible historicity.

### **III. Definition of Terms**

**ADAPTIVE REUSE** – utilization of buildings, other built-structures, and sites of value for purposes other than that for which they were originally intended. In order to conserve the site, its engineering integrity and authenticity of design.

**BEAUTIFICATION** – process of making the appearance of an object or group of objects simple, neat, orderly, coordinated (interrelated as in a group of buildings), attractive, enhanced and good looking. Beautification does not necessarily mean placing ornaments or decorating as these may be overdone, without prejudice to traditional or ethnic cultural tendencies that produce extraordinary artistic expressions.

**BUFFER ZONE** – special protective zone (area, strip, belt) around an historic district, center, town or property. It must be part of the local land use and zoning regulations, such as, for example, road right of way.

**BUILDING CODE** – collection of rules and regulations adopted by authorities with jurisdiction over the design and construction of buildings, alteration, repair, quality of materials, use and occupancy, and related factors; contains minimum architectural, structural, and mechanical standards for sanitation, public health, welfare, safety, and provision of light and air.

**CONSERVATION** – all the processes and measures of maintaining the cultural significance of a cultural property, including but not limited to, preservation, restoration, reconstruction, protection, adaptation or any combination thereof. Conservation is part of development.

**CONSERVATION PLAN** – program for the preservation and protection of sites and structures, including allowable uses and practices. The conservation plan is an element of the master development plan of the town or city.

**CONTINUITY** – uninterrupted connection; succession; maintaining existence. In the restoration of monuments and sites, the continuity of culture and history is satisfied through their preservation.



CONTEXTUAL ARCHITECTURE – quality of an architectural work that blends and harmonizes the structure with its surrounding environment of groups of buildings and structures, the site and the natural surroundings, with respect to proportion, scale, color, and design so that the collective appearance expresses a complete and distinct character and visual quality.

DEVELOPMENT – progressive changes physically, culturally, socially and economically.

ENVIRONMENTAL PROTECTION – safeguarding the environment for the benefit of inhabitants.

HERITAGE RISK – endangered sites of cultural and historical significance.

HERITAGE ZONE – see historic center.

HISTORIC CENTER – 1) historic zone, district core, precinct, town, legacy zone, heritage area, zone, or town; 2) a designated area with historical and other special significance, consisting of buildings or group of buildings, and their environs that collectively contribute to the area's importance and character; 3) a place where a significant event in history occurred; 4) any town, district or ancient settlement site with special historic and/or cultural significance. Historic centers are sometimes called living museums, outdoor museums, or museum preserves. Whether inhabited or uninhabited, historic centers are preservation areas.

INTEGRATION – process of introducing or fitting a new and compatible construction, addition, component or feature into an existing building, structure, or group of buildings, the resulting product of which is a homogeneous entity. The process does not considerably alter the original character of the building, structure or group of buildings, since the new addition is always subordinate to the existing building, structure, or group of buildings. In the long run, historical periods or cultural layers will accumulate to enhance the distinct character of the place.

LAND USE – assignment of function/s to a land area; classification of particular areas or plots according to the manner in which they are utilized, and their relationships with adjacent uses and integral components.

LAND USE, NONCONFORMING – land use that is inconsistent with the use as prescribed in the zoning ordinance. Nonconforming use may be prohibited or stopped if found to be detrimental to the surrounding community or to the public.

PRESERVATION – see conservation

REFERENCE BUILDING – any building or structure with special feature/s that make it a focal point of the historic center/heritage zone (e.g., church, town hall, casa real).

TOWN/CITY PLANNING – integrated development of towns/cities and their environs. For most of its history, town planning dealt primarily with the regulation of land use and the physical arrangement of city structures, as guided by architectural, engineering, and land development criteria. In the mid-20th century, town/city planning broadened to include the comprehensive guidance of the physical, economic, and social environment of a community. Elements, characteristic of modern town planning include: (1) general plans that summarize the objectives of (and restraints on) land development; (2) zoning and subdivision controls that specify permissible land uses, densities, and requirements for streets, utility services, and other improvements; (3) plans for traffic flow and public transport; (4) strategies for economic revitalization of depressed urban and rural areas; (5) strategies for supportive action to help disadvantaged social groups; and (6) guidelines for environmental protection and preservation of scarce resources.

URBAN RENEWAL – regeneration, modernization, revitalization of an old, deteriorated or blighted portion of a town or city, with the objective of preparing the town or city for present and future demands of urban living. Urban renewal is also implemented to address urban problems or upgrade existing conditions that are no longer compatible with modern times, provided old buildings are adaptively reused.

VISUAL CORRIDOR – a stretch of cohesive buildings, streetscape, open spaces, and natural landscape, consistent with the historicity and architecture of the historic town.

VISTA POINT – selected viewing station where beautiful townscape and striking panorama can be appreciated. Vista points enhance visual experience and interests. There can be several vista points, which can be located either within or outside the historic core. Vista points must be preserved, protected and developed.

ZONING ORDINANCE – legal instrument that implements the town or city plan.

#### **IV. Components of a Historic Center/Heritage Zone**

A Historic Center/Heritage Zone includes but is not limited to the following elements:

1. Town plaza or its equivalent, including original features such as:
  - bandstand, park benches, fountains
  - monuments and markers
  - trees and shrubs, trellises
  - pavements, balustrades, gateways and arches
2. Social structures and spaces
  - old churches (including convents), mosques, temples and sacred spaces
  - school buildings and school compounds, escuela pia
  - old residential buildings, single or in groups, of any material
  - hospitals, dispensaries
  - games and sports facilities and centers, old cockpits
  - theaters and other sites of public entertainment
  - old cemeteries
3. Economic sites and structures
  - public markets
  - industrial buildings and complexes
  - structures originally used as artisan shops, workshops, studios, kilns
  - old commercial buildings, old shops
4. Political sites and structures
  - provincial capitol buildings and site
  - municipal/city hall buildings
  - provincial jails, court houses
  - casa real
5. Military/defense sites and structures
  - watch towers, fortifications
  - battle sites
  - World War II landing sites
  - guerilla lairs
6. Transport facilities
  - train stations, transport terminals
  - piers, docks
7. Archeological features and infrastructure
  - archeological sites and features
  - identified ruins of important edifices and structures

- arches, gates, fences, walls, bridges
  - water reservoir towers, wells
  - monuments and memorials (old and new)
  - lighthouses, viewing decks
8. Natural sites and indigenous settlements
- caves
  - heritage trees
  - beaches, rivers, creeks, canals, other waterways
  - rice terraces
  - indigenous villages, fishing settlements
9. Others
- town/city plan and growth patterns (traces of time, period contributions and variations), significant additions
  - streetscapes
  - clusters of buildings

## **V. Heritage at Risk: Threats to Historic Centers/Heritage Zones**

The offenses and threats include but are not limited to the acts enumerated below:

### **A. Offenses Against Historic/Heritage Sites and Structures**

The following acts run counter to, violate, or undermine the official declaration of historic sites and structures.

1. Illegal demolition, destruction
2. Visual distraction or obstruction, including power and telecommunication poles and cables
3. Noise pollution
4. Trash accumulation, unhealthy or unsound sanitation practices
5. Alteration, falsification, competition (a structure that competes with or subordinates a historic/heritage structure), modernization, beautification, replacements, or wrong intervention
6. Mutilation, cannibalization, vandalism
7. Removal of historical markers from original site and unauthorized relocation (transfer to another site)
8. Abutment/encroachment
9. Excessive implantations
10. Unauthorized or abusive reuse or occupation
11. Abandonment/neglect
12. Over-commercialism, unmanaged tourism (large commercial billboards, pylons and signage)
13. Heavy construction or industrial activities, environmental pollution and hazard
14. Unauthorized renaming of buildings, streets
15. Non-observance of carrying capacity of sites and building

### **B. Potential Threats from Public Works**

The following acts run counter to, violate, or undermine the official declaration of historic sites and structures.

1. Constructions on town plazas

2. Street widening
3. Street elevation, re-grading
4. Sewer, drainage, flood control projects
5. Opening up of new streets, alleys, rights-of-way
6. Transportation and communication lines or structures (ports, container yards, towers, welcome arches, telephone and television cables and signage installations)
7. Bridges, elevated highways, interchanges, overhead commuter train tracks
8. Building or complex upgrading, rehabilitation projects
9. Urban renewal and re-subdivision
10. Demolition works
11. Electrical lines, poles, facilities
12. Conflicts with building, fire, electrical codes and local ordinances
13. Local beautification programs
14. Building or complex reuse (conversion)
15. Reclamation projects
16. Commercial billboards, signage installations and barangay welcome arches
17. Heavy construction activities such as:
  - a. Excavation
  - b. Pile driving
  - c. Heavy equipment operation

### **C. Potential Threats from Private Construction Activities**

Below are activities by private builders that could affect (directly or indirectly) existing historic/heritage sites and structures.

1. Unauthorized transformation (physical or functional)
2. Alteration, unauthorized addition
3. Cannibalization of original features, trading or trafficking of original features, components of historic structures
4. Demolition of historic structures to give way to new construction
5. Unauthorized construction within the historic site/edifice and its premises
6. Unauthorized visual distraction or obstruction
7. Adjacent construction activities that may adversely affect historic sites/ structures
8. Unauthorized private restoration and renovation owrks
9. Unauthorized reuse (non-compatible/non-conforming)
10. Obstruction of parks, plazas and open spaces, streets, alleys and sidewalks

## **VI. Policies and Standards**

### **Rule 1. Policies and Policy Guidelines**

Sec. 1. General Policies. The National Government, through the National Historical Commission of the Philippines (NHCP) and the National Museum (NM), hereby adopt the following policies to govern the exercise of government planning, development, conservation and regulatory functions in historic centers/heritage zones:

- A. Planning and development efforts of the national government, the municipal government, and the private sector shall be synchronized with the objectives of restoration, conservation, and preservation of Historic Centers/Heritage Zones, and shall conform to approved development plan for these centers/zones, in keeping with

these rules and regulations.

B. All efforts at planning and restoration shall be directed towards ensuring that the general original appearance and architectural and environmental qualities of buildings, structures and their setting within the designated portion of the Historic Center/Heritage Zone conform to and/or be compatible/harmonious with the town's progressive historic character and ambience, upon consultation and in coordination with the NHCP/NM.

C. Development of Historic Centers/Heritage Zones shall be anchored on the conservation and historic continuity of the town's distinct character and identity as expressed through its diverse cultures.

D. The NHCP and NM shall encourage and support the preservation and development of private properties by extending technical and other forms of assistance. LGUs are encouraged to give tax and other incentives to property owners and developers who shall participate in the restoration and adaptive reuse of historic sites and structures.

E. The administration and enforcement of the provisions of these rules and regulations are hereby vested in the LGU and its designated instrumentalities (local building official or a special council created by the LGU for this purpose).

Sec. 2. Planning Requirements. The following are required in planning the conservation and development of Historic Centers/Heritage Zones. These requirements shall be submitted to the NHCP or NMP prior to the declaration of the proposed site as basis for its evaluation:

A. Passage of a municipal/city law that embodies these principles, guidelines, and rules. LGUs shall adjust existing ordinances, plans, building codes and related requirement to conform to these rules and regulations.

B. Inventory and mapping of historical and heritage resources and socio-cultural practices (e.g., customs, traditional celebrations, etc.) unique to the local community and Historic Center/Heritage Zone, in keeping with Art. IV, Sec. 13© of the Heritage Law (RA 10066). These activities and projects shall require historical research, architectural and engineering surveys, and legislation of local ordinances.

C. Restoration of land use and zonal plan and regulation, including open spaces, parking areas or strips, and reversion of illegally converted uses and zones.

D. Integration of the foregoing items into the master development plan/comprehensive land use plan for the Historic Center/Heritage Zone in particular, and of the town or city in general.

F. Identification and designation of a protective buffer zone. This shall allow the LGU to assign stricter regulations within the Historic Center/Heritage Zone, balanced standards within the buffer zone, and more liberal standards outside the buffer zone.

G. Conduct of studies for the identification and establishment of vista points and visual corridors within and outside the Historic Center/Heritage Zone, for protection and development.

H. Regulation of outdoor commercial billboards and signage systems within the Historic Center/Heritage Zone.

Section 3. Management Requirements. Once declared a Historic Center/Heritage Zone, the LGU shall undertake the following measures to ensure the preservation and sustainability of the site.

A. Conduct of studies for the revitalization of Historic Center/Heritage Zone, including measures to improve business investments, provide leisure and entertainment, upgrade public services, government infrastructure works, and develop heritage tourism.

B. Harnessing of local/traditional products and small business or home industries for sustainable historic preservation program.

- C. Integration of other programs, projects and activities that highlight local history and culture.
- D. Professional skills training program for conservation managers and staff.
- E. Periodic review of local ordinance and their implementation, and improvement as necessary.
- F. Creation of a local Development and Conservation Council (or its equivalent, hereinafter referred to as Council) to implement these policies and standards and propose others that require the passage of local ordinances. Specially formatted guidelines and regulations are encouraged to suit local conditions and needs.
- G. Adoption of a risk preparedness program for the protection of the Historic Center / Heritage Zone against natural calamities and disasters, fire, etc.
- I. Maintenance and protection of the surrounding natural environment, including open and green spaces; promotion of clean environment.

## **Rule II. Land Use Policies and Regulations**

Sec. 1. General Land Uses. All buildings to be constructed in the area including lots owned by private person and entities shall be designed for residences, light commercial establishments, and institutions. The following uses shall be allowed in any zone or area in the declared Historic Center/Heritage Zone. Original land uses and zoning policies in relation to the historic evolution of the town should not be subjected to conversion, which would alter the following:

- A. Mixed residential and commercial uses where generally, the upper floors of buildings are used as residences and the ground floors as shops, offices, restaurants, craftsmen's workshops and retail outlets.
- B. Current uses of buildings as of the date of the enactment of the resolution, except warehouses, lots used for parking trucks and container vans, and for the storage of crates and of hazardous and highly flammable materials.
- C. Other uses and activities that will contribute to the growth of a progressive community, while preserving the essential character of the town.

Sec. 2. Specific Land Uses. The following are the preferred building uses and limitations within the designated Historic Center/Heritage Zone.

- A. Residential uses that include one-, two-, and multi-family dwellings, including boarding houses, lodging houses, apartments houses, apartment hotels, residential condominiums, and housing of any material.
  1. Accessory uses customarily and reasonably incidental to the use of one- or two-family dwellings and located in the same lot.
  2. Auxiliary uses customarily conducted in dwellings and homes, such as offices of physicians, dentists, lawyers, architects, engineers, and other professionals, including artists' studios.
  3. Customary incidental home occupations such as beauty parlors, barber shops, tailoring and dress shops, sari-sari stores, retail drugstores, bakeshops, small cottage industries such as embroidery, handicrafts, graphic arts shops, and other, conducted within a dwelling, provided:
    - (a) No heavy mechanical equipment that is environmentally offensive to the immediate neighborhood is used.
    - (b) Such home occupations do not require external alterations, or involve construction features or use equipment not customary in dwellings.
  4. Uses for light recreation such as parks and playgrounds.



- B. Commercial establishments such as the following:
1. Neighborhood convenience stores (sari-sari) selling miscellaneous items.
  2. Commercial establishments that support the historical character of the zone and reflect the local culture and way of life.
  3. Lodging facilities, inns, and pension houses.
  4. Service shops such as shoe-shine/repair shops, locksmith and related services, laundry shops, tailoring shops, repair shops, photographic and portrait studios.
  5. Branch offices of employment services, communication services, banks.
  6. Hardware stores, such as those dealing in electrical, electronics, plumbing, ceramics, cement, building materials and other similar products.
- C. Institutional uses such as the following:
1. Educational institutions such as day-care centers, nursery and kindergarten, elementary, high schools, college and university.
  2. Municipal and other government offices.
  3. Chapels, temples, and other places of worship, monasteries, seminaries, civic and charitable institutions.
  4. Local civic centers, barangay halls, auditoriums, cultural halls, and museums.
  5. Medical and dental clinics, convalescent and nursing homes.
  6. Clubhouses, lodges, recreational and other social centers operated by the government or by private groups as organizational facilities for the benefit of their families and members.
  7. Small power plants and machinery used in churches, schools, museums, parks, playgrounds, community centers, dwellings and their accessory buildings, provided that such power plants and machinery are so located as to cause the least inconvenience or disturbance to adjoining residences and that they do not cause injury or nuisance to occupants through fumes, poisonous gases, smoke, noise vibrations and other nuisances.
- D. Town Plaza as temporary site for town festivities, carnivals, flea markets, town celebrations, entertainment and amusement activities, and special public events:
1. Town festivities, carnivals, flea markets, town celebrations and special events shall all be treated as temporary functions and uses of public space such as town plazas and town centers, also temporary. The LGU shall regulate the manner of use, time period, program content and purpose, installations, sanitation and cleanliness requirements for the use of any public space within the town.
  2. Public safety and security requirements shall be imposed on all activities to be held in the public space. Police assistance shall be provided by the LGU at the site for the period of the activities.
  3. Damages to public spaces and permanent installations shall be the liability of the activity organizer.
  4. Proper respect shall be given to existing monuments and markers in the town plaza when used for temporary flea markets, carnivals, or any other special public events.

Sec. 3. Prohibited Structures. Any structure or establishment that pollutes the environment, obstructs, or does not conform to the historical character and/or cultural value of the historic center/heritage zone shall not be allowed within the site.

Sec. 4. Non-conforming Uses. Any application for a non-conforming use within the heritage



site shall be subject to public hearing, where the presence of the National Historical Commission of the Philippines (NHCP) and the National Museum (NM) shall be mandatory.

### **Rule III. Building Requirements**

Sec. 1. Architectural Guidelines. The following building requirements and architectural design standards shall serve as guidelines. Deviations shall be allowed on a case to case basis, as determined by the NHCP, as long as they promote the general policies and principles involved as provided in Sec. 3 below.

Sec. 2. General Policies and Principles Affecting Architectural Standards. The following general policies shall be enforced in the construction, reconstitution, and alternation of buildings and structures in the Historic Center/Heritage Zone, except those covered by R.A. 10086, prohibiting the unauthorized modification, alternation, repair, and destruction of original features of all National Shrines, Monuments, Landmarks and other important historic edifices.

A. Historic precedents shall, whenever available, be respected and adopted as the primary consideration in allowing or disallowing specific architectural structure or designs.

B. The urban scale of the Historic Center/Heritage Zone shall be observed. Monolithic designs in buildings and structures that are out of scale in relation to the block and its immediate vicinity are prohibited.

C. In all rehabilitation, reconstruction, or renovation of buildings and structures, the materials and techniques to be used shall be in harmony with the historical period architecture and construction.

D. All new buildings and structures or additions shall be allowed to adopt current styles, layout and designs, provided that these new buildings, structures, or additions are in harmony with the distinct town character in terms of scale, proportion, texture, color, shape, height, and other external key features, and after consultation with the NHCP.

Sec. 3. Standards and Requirements of Architectural and Town/City Plans. All buildings and structures shall conform to the following architectural design standards and requirements:

A. Restoration scheme. Restoration or rehabilitation schemes for old/existing buildings shall be either full or partial restoration, provided the restoration or rehabilitation intervention will ensure the preservation and extension of the buildings' lifespan, and/or guarantee zero or minimal alteration of their historic or cultural value.

B. Building ruins. Good judgment, professional consultation, and careful study shall be needed to decide whether to restore, reconstruct, rehabilitate or retain building ruins.

C. Building context. New buildings, building additions and in-fills shall either adopt the old historical style or carry the current style that is contextual/compatible with the existing building and the prevailing town character.

D. Building height. No structure shall rise over twelve (12) meters or be higher than the reference building identified by the local council or regulatory body.

E. Roofscape. Roof finishes shall be consistent with or appropriate to the historic and cultural nature of the Historic Center/Heritage Zone, and may include clay roof tiles, tiled decks, or similar material as may be approved by the local council. Garden roof shall be encouraged.

F. Streetscape. Street and road pavements shall be maintained in good condition for safety and appearance, since they serve as visual corridors of the historic center. Building facades shall also be well maintained in order to emphasize the historic town character and ambience of streetscapes.

G. Sidewalk and arcade. Sidewalks and arcades shall be paved with non-slip or textured material/s. Sidewalk surfaces shall have gradual pitch, and shall not have

steps or abrupt change in elevation for easy access and public safety. Sidewalks and arcades shall be free from obstruction such as poles, traffic light switch cabinets, plant boxes, and other utility guy wires, devices and installations. Manholes shall be securely covered and flushed to the sidewalk surface. Streetlights and street nameplates and poles shall conform to the National Building Code for public safety and convenience. Hawkers, stalls and commercial displays shall not obstruct sidewalks and arcades.

H. Building cluster. Building clusters shall be preserved, even if the individual building components belong to different period developments, so that historic variations are highlighted for historical and cultural education purposes. Integration. Any new addition or change in the historic setting shall be subordinate to the existing and prevailing historic character. This does not mean that new additions should be designed to carry the historical styles. Special techniques of introducing current period designs into existing historic fabric can be undertaken in order to make them compatible with the historic town character and ambience, while promoting the progressive growth of the community.

I. Any new addition or change in the historic setting shall be subordinate to the existing and prevailing historic character. This does not mean that new additions should be designed to carry the historical styles. Specific techniques of introducing current period designs into existing historic fabric can be undertaken in order to make them compatible with the historic town character and ambience, while promoting the progressive growth of the community.

J. Exterior walls.

1. The following shall be the requirements for the ground floor:

(a) Sidings shall be made of any of these materials: brick, adobe, wood, stucco, plaster, or any material inherent to the area and the period.

(b) Doors shall be any of these types: solid wood panel doors; solid wood plank doors with wrought iron nail heads, escutcheon, etc; wrought iron or wooden grilles.

(c) Windows may be grilled. Grilles may be in any of these materials: wood or metal, which may be plain, turned, and decorated like balusters but following the grillwork design of the period.

(d) Entry passages and sidewalk finishes may be in any of these materials: piedra china, adobe blocks, cobblestones, bricks, tiles, wood blocks.

(e) Historic building facades or rows of buildings along streets should not be heavily altered. Any alteration or damage sustained just by one building in the row may also cause damage to the whole building cluster.

2. The following shall be the requirements for the upper floors:

(a) Sidings shall be made of any of these: plain wooden sidings, wooden sidings which are varnished, painted, or tinted, masonry sidings which may be plastered and painted, tooled and veneered.

(b) Windows shall be any of these types: sliding, swing-out, swing-in, louvered or fixed.

(c) Window panes may be of clear, frosted, etched or tinted glass, or capiz shells.

(d) Sash frames shall be made of wood or wrought iron.

K. Building exterior

1. Exterior lighting. Exterior lighting shall utilize historically appropriate light such as tungsten and incandescent. The allowable materials of each facility shall be as follows:

- (a) For lamp posts or street lights: wrought or cast-iron.
- (b) For wall bracket and gatepost lamps: wrought iron, cast-iron or copper, with clear, colored or frosted glass panes, or leaded shell panes.

## 2. Exterior signs

- (a) Exterior signs shall either be parallel or perpendicular to the street.
- (b) Materials shall be wrought iron, cutout, sheathing or wood panels, and shall be painted or varnished.
- (c) Sizes of exterior signs shall depend on the façade, with the maximum size of signs at 85 cm by 85 cm.
- (d) The following are not allowed: neon lights (except if placed behind show windows or windowed doors of a small eatery or special shops), exterior fluorescent lights, roof signs, and plastic panel signs and/or metallic signboards.
- (e) Building signage shall be regulated, and placement shall be limited to a horizontal strip on the second floor level.
- (f) No tarpaulin commercial ads and billboards, and signage pylons/towers shall be allowed along the established main thoroughfares.

## 3. Exterior projections. The following are not allowed: awnings, canopies, arcades, tents, and other temporary substructures and additions.

L. Town plazas and pocket gardens or their equivalent. Town plazas and pocket gardens or their equivalent are historical marks of Philippine towns. They serve as the focal point of community activities, and are considered breathing spaces of urban populations. It is imperative to maintain and retain these places as permanent open spaces. There should be a preference for more green areas/surfaces than paved areas/surfaces. The reintroduction of traditional plants shall also be encouraged.

M. Parking facilities. Parking within individual properties and off-street parking shall be allowed in certain areas subject to certain conditions.

N. Facilities for persons with disabilities (PWD). Provisions for persons with disabilities are required under BP 344 (Accessibility Law), but these must fit functionally and be in harmony with the main structure or edifice.

O. Limitations. These guidelines are not intended to constrain the creativity of the designer, nor preclude the use of advanced, innovative technology, provided:

- 1. The materials and techniques used are compatible with and do not cause harm or damage to the original materials and building techniques, and
- 2. The materials or features do not distract or dominate the overall character of the building or structure and its immediate surroundings.

P. Buffer zone. The buffer zone is a protective area/strip/belt surrounding a Historic Center/Heritage Zone, which could be streets or established boundaries such as creeks, rivers, cluster areas, town plazas, fenced properties or compounds, or natural surroundings. The historic core shall be subject to stricter regulations, which are gradually relaxed within the buffer zone and beyond. An inventory of historical and built cultural resources is a prerequisite to the establishment of the buffer zone. Ideally, the minimum effective buffer zone coverage would be considered best practice, and its implementation synchronized. The boundaries of the buffer zone shall be formally established by a geodetic survey.

- 1. The identification of the buffer zone for the Historic Center/Heritage Zone shall be undertaken by the LGU with assistance from the NHCP. The identification of vista points and visual corridors must be integrated in the buffer zone.
- 2. When the buffer zone is established, the LGU shall issue a corresponding local

ordinance supported by a location, resource map, and photographs, for the permanent protection, and appropriate assignment of regulations for the historic core, the buffer zone and the rest of the town/city.

3. To ensure the effectiveness of the local ordinance and the buffer zone, a periodic review and assessment of the ordinance shall be undertaken by the LGU in collaboration with the NHCP, after which, necessary revisions and improvement shall be undertaken.

Q. Firewalls. Firewalls are a protective measure against fire damage or total loss of property/ies. The LGU shall regulate the design, size, height and strength of the firewall.

R. Visual corridors and vista points. The LGU, with assistance from the NHCP, shall identify the locations of the vista points as strategic places for beautiful panorama and photo opportunities. The LGU may also identify streets, passages between rows of buildings, staircases, trails and pathways that possess exciting views at different angles that highlight the unique characteristics of the Historic Centers/Heritage Zones. Vista points may also be located outside the centers. These identified locations and points shall be mapped, protected and developed because of their town pattern value/s.

S. Outdoor/monumental lighting. Outdoor lighting (street or park lighting) is encouraged for night time public access and security, and for enhancing the beauty and features of Historic Centers/Heritage Zones. Monumental lighting is encouraged for night time illumination of significant landmarks and structures to highlight the features of Historic Centers/Heritage Zones.

T. Buildings and places with official markers installed by the NHCP, National Museum, or ICOMOS-World Heritage Committee. The LGU shall provide equal protection for all national historical and cultural heritage sites of the country, and those that are inscribed as World Heritage Sites.

U. Tourism development. The LGU shall promote the Historic Center/Heritage Zone in its jurisdiction for educational and socio-economic growth and benefits. Programs and projects promoting local products, history and culture are encouraged.

V. Community development. LGU programs and projects for Historic Centers/Heritage Zones shall be supported with public services that provide peace and order, security and safety, cleanliness, good roads and parking areas, public toilets, information kiosks, garbage collection, fire protection, jobs generation, skills training, small businesses and home industries.

W. Environmental protection. Heavy trucks, buses and public utility jeepneys, and tricycles are prohibited along main thoroughfares and streets. Only light vehicles are allowed. Pedestrian traffic should be encouraged by the LGU. The LGU shall promote the greening of the Historic Center/Heritage Zone and its continued maintenance.

X. Urban renewal vs. urban regeneration. Urban renewal may be considered a grave threat to urban conservation and a wrong way to develop, since it will basically replace the various buildings and structures that make up the historic identity of the place. On the other hand, urban regeneration shall promote the revival of the place by the adaptive reuse and preservation of the various buildings and structures in the Historic Center/Heritage Zone.

#### **Rule IV. Non-conforming Buildings and Structures**

Sec. 1. Non-conforming Buildings or Structures. Non-conforming buildings or structures refer to the condition or actual uses of lands or buildings which legally existed prior to these rules and regulations, or which are now prohibited under present regulations. Nonconforming buildings or structures shall fall under two categories, namely: (i) those nonconforming to use, and (ii) those nonconforming to architectural design standards.

Sec. 2. Compliance. All nonconforming buildings or structures shall conform to the requirements below prior to the renewal of their permits.

A. New construction, alteration, or renovation of buildings and structures shall conform to or harmonize with the existing characteristics of the site, so as to encourage a progressive urban growth anchored on a peaceful coexistence of various historical periods.

B. Facades of original buildings shall be retained as much as possible. Otherwise, a faithful copy should be resorted to or modern construction methods used, but in the context of the overall development of the Historic Center/Heritage Zone. Clusters of buildings, their arrangement and relationships as well as to the site, should be respected, preserved, and enhanced.

C. Nonconforming new building constructions/additions prior to the ordinance/s shall be given a grace period of three (3) years to undertake necessary adjustments in order to comply with the prevailing architectural and historic center rules and regulations.

D. Telecommunication antennae, towers, discs and similar installations and structures shall not be allowed within the Historic Center/Heritage Zone and buffer zone.

#### **Rule V. Permit, Clearance and Other Requirements for Alteration**

Sec. 1. Permit System. No person, firm or entity, including any agency or instrumentality of government, shall erect, construct, alter, repair, move, convert, or demolish any building or structure or cause the same to be done without first obtaining a clearance from the local council and a building permit from the local building official. LGUs are encouraged to allot a percentage of the conservation permit fees to the Historic Center/Heritage Zone.

Sec. 2. Preliminary Consultations. Before any formal application for a development permit is filed, the local Council shall undertake initial discussions with the applicant as to the various requirements of the permit system.

Sec. 3. Procedure.

A. In order to obtain a clearance from the Council for the development and improvement of land, buildings, or structures, or any form of repair and reconstruction of buildings or structures, construction of new public facilities, the applicant shall provide the following information to support the application form obtained from the Council:

1. A description of the work to be covered by the clearance applied for, and/or project studies.
2. Description and ownership of the lot on which the proposed work is to be done, as evidenced by the Transfer Certificate of Title (TCT) and/or copy of the contract of lease.
3. Clearances or permits, if any, previously secured from the NHCP or any other regulatory body for the same property.
4. At least two (2) sets of corresponding plans and specifications prepared, signed, and sealed by a duly licensed architect or civil engineer in case of mechanical plans, by a registered electrical engineer in case of electrical plans; and by a licensed sanitary engineer or master plumber in case of plumbing or sanitary installation plans.

B. The designated Council shall evaluate, process and pass upon the application within a period of one (1) month from the submission thereof. If the application merits approval, the applicant shall be issued a clearance by the Council with the terms and conditions it may impose, and a copy of the approved final drawings.

C. The applicant shall reproduce the final drawings in five (5) sets of plans for the application of a building permit from the local building official. When satisfied that the work described and the plans and specifications submitted conform to the requirements of the Building Code and other pertinent rules and regulations, the building official shall, within fifteen (15) days from payment of the required fees by the applicant, issue the building permit.

Sec. 4. Effectivity of Clearance. The clearance issued by the Council shall be effective for a period of one (1) year from the issuance. Failure to undertake the development applied for shall subject the developer to revalidate his clearance. Failure to do so before undertaking any development shall be considered unauthorized development subject to the penalties provided herein.

Sec. 5. Archeological Assessment. If a Historic Center/Heritage Zone yields significant underground artifacts within any construction site, an archeological resource assessment and the retrieval of artifacts shall be undertaken and/or supervised by the National Museum. Clearance by the National Museum shall be necessary.

#### **Rule VI. Penalties**

Sec. 1. Monitoring. The Council shall monitor and oversee all developments within the designated portion of the town/city for compliance with its policies, rules and regulations and these guidelines and standards. In case of noncompliance or violation, the council shall take steps stated in the succeeding sections.

Sec. 2. Issuance of Enforcement Notice. In case of noncompliance or violation of these rules and regulations, or of the terms and conditions imposed in the clearances and permits granted, the Council shall issue an enforcement notice to the owner and/or occupant of the building or structure, which shall contain the following:

- A. Specific violation or noncompliance committed;
- B. Period within which to comply;
- C. Opportunity for owner/occupant to be heard or to explain noncompliance or violation; and
- D. Penalties to be imposed in case of failure to comply with the law or correct the violation.

Section 3. Violations. The following activities shall be subjected to the penalties provided herein:

- A. Any deviation from or modification of the approved architectural plans without the official clearance of the Council.
- B. Any unauthorized change in the use of the building or structure.
- C. Illegal construction undertaken without prior approval of the Council and the local building official.
- D. Violation of the terms and conditions imposed in the clearance or construction permit issued.
- E. Violation of any provision of these rules and regulations.
- F. Consistent or repeated violation of any of these rules and regulations.

Sec. 4. Hearings. The Council shall conduct hearings to determine the nature and extent of the violation. For this purpose, the affected party shall be given the opportunity to present witnesses and documentary evidences in his defense.

Sec. 5. Penalties. The LGU shall set its scheme of penalties, which shall be consistent with these rules and regulations.

Sec. 6. Enforcement of Penalties. The enforcement and imposition of penalties for administrative violations are hereby vested in the Council in close coordination with the LGU and the local building official.

**Rule VII. Effectivity.** These rules and regulations shall take effect upon their promulgation.

**(SGD.) MARIA SERENA I. DIOKNO**

**(SGD.) FE B. MANGAHAS**

**(SGD.) RENE R. ESCALANTE**

**(SGD.) FERDINAND C. LLANES**

**(SGD.) ABRAHAM P. SAKILI**

**(SGD.) VICTORINO M. MANALO**

**(SGD.) ANTONIO M. SANTOS**

























**(SGD.) JEREMY BARNES**

**(SGD.) LUDOVICO D. BADOY**











































## Annex HE-2. Cultural Mapping Form

Copyright from Arch. Jojo Mata

PART 1		
CULTURAL MAPPING OF BUILT HERITAGE		
1. Name/ Pangalan:		
2. Aproximate age/ Tinatayang edad:	2. Location:	2. Approach:
 Hispanic  American Period 1900		
2. Ownership/ Pagmamay-ari:		
 Individual  Private  Company  Government		
2. Heritage Structure/ Pagmamay-ari:		2. Historical Significance/ Kahalagahan sa kasaysayan:
 House/Bahay  School/ Paaralan  Church/ Simbahan  Mosque  Chapel/ Kapilya  Bell tower/ Kampanilya  Cemetery/ Sementeryo  Municipal Hall/ Munisipyo  Monument/ Monumento  Plaza  Bridge/ Tulay  Ports/ Daungan  Airport/ Paliparan  Light house/ Parola  Public Market/ Pamiilihan		
		2. Cultural Significance/ Kahalagahan sa Kultural:
		2. Usage/ Gamit:
		2. Physical Condition/ Kalagayan
		 In use/ Nagagamit  Abandoned/ Di Nagagamit  Condemned/ Mapanganib

## PART 2

# PHYSICAL INVENTORY

Building Component	12. Physical Description/ Kaanyuan:	13. Materials/ Materyales:	14. Condition/ Kalagayan:																								
 Roof	 Ornate  Plain  Others	 Shingles or Tile  Concrete  GI Sheet  Others	<input type="checkbox"/> Excelent /Mainam <input type="checkbox"/> Good/ Maayos <input type="checkbox"/> Poor/ May sira <input type="checkbox"/> Badly deteriorated/ Lubhang pagkasira																								
 Truss	 Exposed  Concealed  Others	 Steel  Lumber  Local Material  Others	<input type="checkbox"/> Excelent /Mainam <input type="checkbox"/> Good/ Maayos <input type="checkbox"/> Poor/ May sira <input type="checkbox"/> Badly deteriorated/ Lubhang pagkasira																								
 Walls	 Decorated  Painted  Bare	 Adobe or Natural stone  Reinforced concrete  Wood  Others	<input type="checkbox"/> Excelent /Mainam <input type="checkbox"/> Good/ Maayos <input type="checkbox"/> Poor/ May sira <input type="checkbox"/> Badly deteriorated/ Lubhang pagkasira																								
 Windows	 Arched  Angular  Others	 Glass  Capiz  Others	<input type="checkbox"/> Excelent /Mainam <input type="checkbox"/> Good/ Maayos <input type="checkbox"/> Poor/ May sira <input type="checkbox"/> Badly deteriorated/ Lubhang pagkasira																								
 Floor	 Decorated  Plain  Others	 Marble  Tile  Wood  Others	<input type="checkbox"/> Excelent /Mainam <input type="checkbox"/> Good/ Maayos <input type="checkbox"/> Poor/ May sira <input type="checkbox"/> Badly deteriorated/ Lubhang pagkasira																								
<b>15. Other Features/ Karagdangang Katangian:</b>																											
 Columns  Sash & Woodworks  Ironworks  Balusters  Relief  Paintings/ Fresco  Ceiling Decor  Staircase  Original Furnishing/ Lumang Muebles  Others																											
<b>16. Threats/ Panganib :</b> Cross out all applicable answer/ Eksan ang lahat ng maaaring sagot.	<b>17. Structural Stability/ Katayuan:</b>		<b>18. Photo/ Larawan:</b>																								
<input type="checkbox"/> a. Lack of funds <input type="checkbox"/> b. Economic growth <input type="checkbox"/> c. Population growth <input type="checkbox"/> d. Lack of community support <input type="checkbox"/> e. Local government mandate <input type="checkbox"/> f. National government mandate <input type="checkbox"/> g. Geological Factor <input type="checkbox"/> h. Deterioration due to natural elements <input type="checkbox"/> i. Natural aging <input type="checkbox"/> j. Others. Please identify _____ _____ _____	<b>FLOOR JOIST</b> <input type="checkbox"/> Excelent /Mainam <input type="checkbox"/> Good/ Maayos <input type="checkbox"/> Poor/ May sira <input type="checkbox"/> Badly deteriorated/ Lubhang pagkasira  <b>COLUMNS</b> <input type="checkbox"/> Excelent /Mainam <input type="checkbox"/> Good/ Maayos <input type="checkbox"/> Poor/ May sira <input type="checkbox"/> Badly deteriorated/ Lubhang pagkasira  <b>BEAMS</b> <input type="checkbox"/> Excelent /Mainam <input type="checkbox"/> Good/ Maayos <input type="checkbox"/> Poor/ May sira <input type="checkbox"/> Badly deteriorated/ Lubhang pagkasira  <b>TRUSSES</b> <input type="checkbox"/> Excelent /Mainam <input type="checkbox"/> Good/ Maayos <input type="checkbox"/> Poor/ May sira <input type="checkbox"/> Badly deteriorated/ Lubhang pagkasira 		Identify if there is a photo of the following/ Markahan kung mayroon larawan ng: <table border="0"> <thead> <tr> <th></th> <th>Original/ Orihinal</th> <th>Current/ Kasalukuyan</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> Structure Facade/ Harap ng istraktura</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Right Side Elevation/ Kanan</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Left Side Elevation/ Kaliwang</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Rear Elevation/ Likuran</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Interior/ Loob</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Approach/ Daan patungo sa istraktura</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Surrounding Structure/ Mga kalapit na istraktura</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table> <b>19. Key Map:</b> <input type="checkbox"/> Included/ katakip <input type="checkbox"/> No Key Map/ Walang katakip		Original/ Orihinal	Current/ Kasalukuyan	<input type="checkbox"/> Structure Facade/ Harap ng istraktura	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Right Side Elevation/ Kanan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Left Side Elevation/ Kaliwang	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Rear Elevation/ Likuran	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Interior/ Loob	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Approach/ Daan patungo sa istraktura	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Surrounding Structure/ Mga kalapit na istraktura	<input type="checkbox"/>	<input type="checkbox"/>
	Original/ Orihinal	Current/ Kasalukuyan																									
<input type="checkbox"/> Structure Facade/ Harap ng istraktura	<input type="checkbox"/>	<input type="checkbox"/>																									
<input type="checkbox"/> Right Side Elevation/ Kanan	<input type="checkbox"/>	<input type="checkbox"/>																									
<input type="checkbox"/> Left Side Elevation/ Kaliwang	<input type="checkbox"/>	<input type="checkbox"/>																									
<input type="checkbox"/> Rear Elevation/ Likuran	<input type="checkbox"/>	<input type="checkbox"/>																									
<input type="checkbox"/> Interior/ Loob	<input type="checkbox"/>	<input type="checkbox"/>																									
<input type="checkbox"/> Approach/ Daan patungo sa istraktura	<input type="checkbox"/>	<input type="checkbox"/>																									
<input type="checkbox"/> Surrounding Structure/ Mga kalapit na istraktura	<input type="checkbox"/>	<input type="checkbox"/>																									
<b>Documented by/ Pangalan ng nagtala:</b> _____		<b>Date/ Petsa:</b> _____																									
Please attach labeled photos and Key Map on a separate sheet./ Maaring isama ang mga larawang may pananda at Key Map sa hiwalay na papel. <b>Date of earlier documentation/ Naunang petsa ng pagtatala:</b> _____																											

## Annex HE-3. Intangible Heritage Form

Copyright from Ms. Patricia Ma. Santiago

	Name	Outstanding Features	Participants	Process
A. Festivals				

	Name	Year	Composer/ Lyricist	Process/ Score	Feature
B. Song/Music					

	Name	Year	Choreographer	Process/ Steps	Feature
C. Dance					

	Name	Outstanding Features	Materials	Mechanics
D. Local Technology				

	Name	Outstanding Features	Materials	Mechanics
E. Local Sports/ Games				

	Name	Outstanding Features	Materials	Mechanics
F. Rituals				

	Name	Year	Author	Publication	Feature
G. Poetry/ Literature					

	Name	Outstanding Features	Ingredient	Recipe
H. Culinary Arts				

	Name	Outstanding Features	Locality	Speakers
I. Language				

	Name	Outstanding Features	Occasion	Example
J. Jokes				

	Name	Outstanding Features	Topic	Narration
K. Beliefs				

	Name	Outstanding Features	Healer	Process
L. Healing Arts				

	Name	Outstanding Features	Custodian
M. Secret Knowledge			

## Annex HE-4. NHCP Survey Form (2012)

NEDA APPROVAL NO. A 0729 – 10200 – R 050 – B

**REPUBLIC OF THE PHILIPPINES  
NATIONAL HISTORICAL COMMISSION OF THE PHILIPPINES**

**Identification of Significant Historical Structure**

**Entry Number:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Region:	Province:	Type:	Number:

**1. NAME**

Common:

And/or historic:

**2. LOCATION**

Street and number:

Barangay/Barrio:

City/Town:

Province:

Region:

**3. CLASSIFICATION**

Category	Ownership			Status	Accessible to the Public
Building <input type="checkbox"/>	Private <input type="checkbox"/>	Public acquisition: <input type="checkbox"/>		Occupied <input type="checkbox"/>	Yes <input type="checkbox"/>
Structure <input type="checkbox"/>	Both <input type="checkbox"/>	In progress <input type="checkbox"/>		Unoccupied <input type="checkbox"/>	No <input type="checkbox"/>
Site <input type="checkbox"/>	Public <input type="checkbox"/>	Being considered <input type="checkbox"/>		Preservation work in Progress <input type="checkbox"/>	
<b>Present Use</b>					
Shrine <input type="checkbox"/>	Commerce <input type="checkbox"/>	Industrial <input type="checkbox"/>	Ecclesiastical <input type="checkbox"/>	Others (Specify) _____	
Monument <input type="checkbox"/>	Education <input type="checkbox"/>	Health <input type="checkbox"/>	Museum <input type="checkbox"/>	_____	
Landmark <input type="checkbox"/>	Entertainment <input type="checkbox"/>	Private Residence <input type="checkbox"/>	Scientific <input type="checkbox"/>	_____	
Agriculture <input type="checkbox"/>	Government <input type="checkbox"/>	Military <input type="checkbox"/>	Transportation <input type="checkbox"/>	_____	

**4. OWNER OF PROPERTY**

Owner's Name:

Street and Number:

City/Town:

Province:

**5. LOCATION OF LEGAL DESCRIPTION**

Registry of Deeds: National Archives, Bureau of Buildings, etc.

Street and Number:

City or Town:

Province:

Approximate area of property (square meters)

**6. DESCRIPTION**

<b>Condition</b>	Excellent <input type="checkbox"/>	Good <input type="checkbox"/>	Fair <input type="checkbox"/>	Deteriorated <input type="checkbox"/>	Ruins <input type="checkbox"/>	Unexposed <input type="checkbox"/>
<b>Integrity</b>	(Check one)			(Check one)		
	Altered <input type="checkbox"/>	Unaltered <input type="checkbox"/>		Moved <input type="checkbox"/>	Original Site <input type="checkbox"/>	

**Describe the present and original (if available) physical appearance**

**7. LOCATION PLAN (Attach other photographs and sketches)**

## 8. SIGNIFICANCE

**Period:** Spanish  American  Post-War

**Specific Date (s)**

**Areas of Significance** (check one or more as appropriate)

Commerce <input type="checkbox"/>	Architecture <input type="checkbox"/>	Political <input type="checkbox"/>	Transportation <input type="checkbox"/>
Communications <input type="checkbox"/>	Literature <input type="checkbox"/>	Religion <input type="checkbox"/>	Urban Planning <input type="checkbox"/>
Education <input type="checkbox"/>	Military <input type="checkbox"/>	Science <input type="checkbox"/>	Others (Specify) <input type="checkbox"/>
Engineering <input type="checkbox"/>	Music <input type="checkbox"/>	Sculpture <input type="checkbox"/>	_____
Industry <input type="checkbox"/>	Painting <input type="checkbox"/>	Social/Humanitarian <input type="checkbox"/>	_____
Landscape <input type="checkbox"/>	Philosophy <input type="checkbox"/>	Theater <input type="checkbox"/>	_____

**Statement of Significance** (Include Personages, Dates, Events, Etc. )



**9. MAJOR BIBLIOGRAPHICAL REFERENCES****10. FORM PREPARED BY**

Name:

Organization and Designation:

## References

“Implementing Rules and Regulations of Republic Act No. 10066 otherwise known as the National Cultural Heritage Act of 2009”

Guidelines and standards applying to sites that the National Historical Commission of the Philippines (NHCP) or the National Museum (NM) have been declared Historic Centers or Heritage Zones

Balangkasan (NCCA Publication)

Measurements and Indicators of Heritage as Development, Rypkema & Cheong, ICOMOS 2011

Does Investment in the Built Fabric of Historic Towns Drive Economic Recovery? Shipley & Reeve, ICOMOS 2011

Risks Generated by Tourism in an Environment with Cultural heritage Assets, Milos & Tomas Drdacky, Intl Preservation News No. 52 Dec 2010

Maintaining the Spirit of Place, Garnham 1985

The International Cultural Tourism Charter (Managing Tourism at Places of Heritage Significance) 1999

Burra Charter (Australia ICOMOS, 1999)

Florence Declaration on Landscape 2012

Charter for the Conservation of Historic Towns and Urban Areas (Washington Charter 1987)

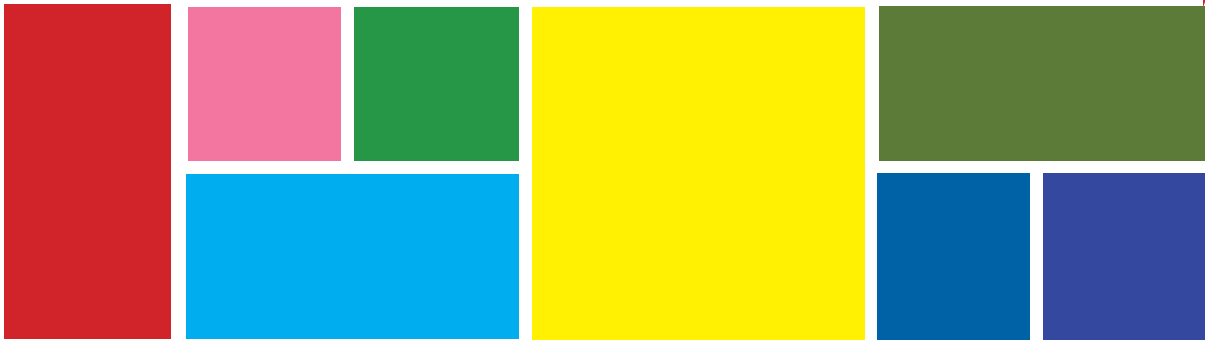
Xi'An Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas (ICOMOS 21 October 2005)

The Venice Charter for the Conservation and restoration of monuments and Sites (ICOMOS 1964)

Hoi-An Protocols (ICOMOS 2005)

Handbook Tourism & recent Heritage (Borghi, Mariotti & Safarzadeh 2011)

Risks Generated by Tourism in an Environment with Cultural heritage Assets, (Milos & Tomas Drdacky, Intl Preservation News No. 52 Dec 2010)



## Ancestral Domain

It is the declared policy of the State to recognize, respect, promote and protect all the rights of Indigenous Cultural Communities/Indigenous Peoples (ICCs/IPs) within the framework of the Constitution and national unity and development. These rights encompass the four (4) bundles of rights as embodied in Republic Act 8371, otherwise known as the Indigenous People's Rights Act (IPRA) of 1997, namely:

- Right to Ancestral Domains (Chapter III);
- Right to Self-Governance and Empowerment (Chapter IV);
- Right to Social Justice and Human Rights (Chapter V); and,
- Right to Cultural Integrity (Chapter VI)

As matter of policy, the State also declares that it "shall institute and establish the necessary mechanisms to enforce and guarantee the realization of these rights, taking into consideration their customs, traditions, values and beliefs" (Chapter I, IPRA).

### I. Basic Principles and Concepts

The management of ancestral domains is guided by the principles of self-governance and self-determination, participatory planning and cultural integrity.

- **Self-governance and Self-determination** – The State recognizes ICC/IP rights to self-governance. These include rights to invoke customary laws, Indigenous Knowledge Systems and Practices (IKSPs), and Indigenous Political Structures (IPS) by virtue of which they are able to exercise and assert the four (4) bundles of rights.
- Self-delineation is the guiding principle in the identification and delineation of ancestral domains (Sec. 51, Chapter III, IPRA). The issuance of the Certificate of Ancestral Domain Title (CADT) and Certificate of Ancestral Land Title (CALT) represents the State's formal recognition of the right to possession and ownership of identified and delineated ancestral domains and ancestral lands.
- Ancestral domain is an encompassing term that includes land, waters and other natural resources occupied, possessed, utilized and devolved by customary law or inheritance since time immemorial. These lands are private but communal in nature where the communal ownership extends to the future generation of ancestral domain owners. The domains serve as the material bases of ICC/IP cultural integrity.
- Cultural Integrity – as embodied in the IPRA, cultural integrity is the ICC/IP right to preserve and protect their culture, traditions and institutions (Sec. 29, Chapter III, IPRA). This includes right to community intellectual rights, religious and cultural sites and ceremonies, indigenous knowledge systems and practices (IKSP), access to biological and genetic resources and others.
- Customary Laws refer to the body of written and/or unwritten rules, usages, customs and practices traditionally and continually recognized, accepted and observed by respective ICCs/IPs (Section 3 (f), Chapter II, IPRA). These laws take primacy in cases involving ICCs/IPs (Sec. 65, Chapter IX, IPRA) and resolution of land conflicts in ancestral

domains (Sec. 7(h), Chapter III, IPRA).

- Existing property rights regimes – property rights within the ancestral domains already existing or vested prior to the effectivity of IPRA shall be recognized and respected (Sec. 56, Chapter VIII).
- Participation – As a matter of policy, the State recognizes its obligations to assure maximum ICC/IP participation in the direction of education, health and other services in order to render public services more responsive to the needs and desires of ICCs/IPs (Sec. 1 (f), Chapter I, IPRA). This includes ICC/IP participation in CLUP and other planning processes in territories where there are ancestral domains and indigenous communities and peoples.

## II. General Objectives and Outputs



### Objective

The core objective of this section is to interface CLUP with ancestral domains and plans of ICC/IP communities and to identify intersections for developing coordination mechanisms and inter-phasing of relevant processes. Specifically:

- To define the ancestral domain boundaries and traditional land uses and identify their intersections with lands covered by the CLUP.
- To assess the current situation of the LGU's ancestral domains, specifically, its natural resource base/ assets, including biodiversity; condition of these assets; their current and traditional uses and existing and potential opportunities and threats to sustainable development.
- For ancestral domains without ADSDPP, to document relevant indigenous knowledge, systems and practices (IKSPs) on land use and zoning arrangements.
- To document risks and vulnerabilities for climate change adaptation, disaster risk management, and land use conflicts
- Assess ICC/IP needs, problems, concerns and opportunities for sustainable development



### Key Inputs

- Ancestral Domain boundary
- Ancestral Domain situationer including social, economic, environmental, and conflict profiles, indigenous knowledge systems and practices (IKSP), and IP/AD policies and mechanisms



### Outputs

This exercise is expected to generate the following outputs:

- Map of the ancestral domain boundary within an LGU territory reflecting assets, resources and traditional land uses, existing and proposed
- Summary table of the AD Assets within the LGU territory with corresponding area/ quantity
- Formulation and documentation of the ICC/IP development framework, vision and preferred spatial strategies and development thrusts.
- Documentation of indigenous knowledge systems and practices (IKSP) in relation to land use and zoning arrangements

- Integration of ancestral domain land use and zoning arrangements as delineated by the ICCs/IPs into the CLUP and ZO
- Stakeholder analysis, i.e. the identification of institutions, organizations, population groups and sectors that have legitimate interests and declared goals and positions either as key stakeholders, primary stakeholders and secondary and tertiary stakeholders.

The analysis should generate relations of power, competing and/or converging interests, goals and positions on certain issues and areas of cooperation and synergy.



## Key Technical Persons/Responsible Groups

Using the participatory planning approach, this exercise shall include the following stakeholders:

- National Commission on Indigenous Peoples (NCIP) representative
- IPS/IPO leaders or their designated representatives
- IP mandatory representative, if any
- Other IP leaders and sectors nominated by the NCIP and/or the IPS
- ADSDPP Community Working Group, in ancestral domains where there is an existing ADSDPP or where an ADSDPP process is ongoing
- CLUP TWG

## III. Thematic Area Assessment Guide

ICC/IP communities are characterized by cultural and ethnic diversity and level of social, economic and political development. Similarly, their ancestral domains are of varying statuses in terms of formal recognition, size, topography and terrain, natural resources attributes and geographical scope.

The thematic area assessment shall take the following into account:

- Ancestral domains with ADSDPPs
- Ancestral domains without ADSDPPs
- Ancestral domains that straddle two or more municipal/city LGUs
- Ancestral domains that straddle several two or more municipal/city LGUs across two provinces
- Ancestral domains that are included in existing FLUPs
- Ancestral domains that are excluded or do not yet form part of existing FLUPs
- LGU territories with ancestral domains but do not have FLUPs

The thematic assessment should be preceded by an appreciation of the context in coordination with the NCIP, DENR and concerned ICC/IP community (i.e. in Step 1 of the CLUP process). NCIP central, regional and provincial offices have a list of approved CADTs and CALTs and pending applications for recognition. The list of recognized IPS leaders is available in the CADT claim book and in the registry of NCIP.




## Steps

The following matrix (Matrix 1) shows the linkages of planning steps of CLUP, ADSDPP and FLUP. Interfacing CLUP with these procedures, while taking into account the contextual considerations, will help improve efficiency in processes, effectiveness in determination of strategies, improvement in multi-stakeholder collaboration and enhancement of transparency in planning.

At the time of CLUP preparation, the LGU situations in relation to ADs and FFLs will vary not only in the availability or absence of ADSDPPs and FLUPs but also in other contextual issues such as geographical scope of the ADs and FFLs, demographic and ethnic configuration, climate and disaster stresses on land and other natural resources and level of social, economic and political development.

**Matrix AD-1. Comparative Linkages of CLUP, ADSDPP and FLUP steps**

Enhanced CLUP Guidelines 2013	ADSDPP Guidelines 2004	FLUP Guidelines 2012
Organize	Pre-planning consultations Organization of the working group/planning team Preparation of the work and financial plan (WFP)	Preparing for FLUP
Identify stakeholders		Engaging LGUs for FLUP
Set the Vision	IP/AD development framework formulation	
 Analyze the Situation	Data gathering and assessment	Community profiling and mapping Situational Analysis
Set the Goals and Objectives		
Establish Development thrusts and spatial strategies	Interface of IP/AD development framework with existing government policies/plans/programs/projects , rules and regulations	
Preparing the land use plan	Program/project identification and prioritization Formulation of the ADSDPP implementation strategies and management plan	Planning the allocation of FFLs and prioritizing sub-watersheds
Draft the Zoning Ordinance		
Conduct Public Hearing	Presentation, Validation and Approval of Draft ADSDPP with IC/IP Community Members	Drafting, legitimization and approval of FLUP
Review, adopt and approved the CLUP and ZO	Submission of ADSDPP to NCIP	
Implement the CLUP and ZO	Incorporation of the ADSDPP into Local Government Plans	
Monitor and evaluation the CLUP and ZO		

## Interfacing CLUP with ADSDPP

Interfacing CLUP with ADSDPP (and other plans) means juxtaposing planning frameworks, guidelines and procedures, agency and local government mandates, composition of technical working groups and configuration of stakeholder participation. Interfacing enables identification of intersections with which to define form and content of cooperation and complementation, areas of actual and potential conflict and means of addressing these conflicts and pooling of resources to reduce redundancy and inefficiency in planning processes.

Interfacing also suggests laying down certain assumptions such as the self-governing right of ICCs/IPs over their ancestral domains, the legal mandates of the HLURB and municipal/city LGUs on the formulation of the CLUP and the corresponding mandate of the DENR, LGUs and FFL stakeholders in FLUP. From the CLUP perspective, interfacing means coming face to face and conversing with the frameworks, guidelines and procedures for ADSDPP and FLUP and taking stock of the ADSDPP/ancestral domain and FLUP/FFL information that needs to be taken into consideration in CLUP preparation and implementation.

Taking stock of AD and FFL information requires processes that require shorter or longer time depending on the availability or non-availability of ADSDPPs and FLUPs and other actions necessary to address information gaps. Some actions may include conflict management especially in situations where there are overlaps of LGU, FFL and AD territories or overlaps in tenure rights. Even in cases where ancestral domains have been delineated and recognized, there would be situations of pre-existing land tenure rights that can engender conflicts if not addressed and managed.

Some political processes will impact on technical processes in situations where ADs and FFLs (especially watersheds) straddle more than two municipal/city LGUs and/or two or more provincial LGUs. While there is an available venue for coordinating CLUP, ADSDPP and FLUP actions between two or more municipal/city LGUs, the structures necessary for coordinating similar actions between two or more provinces may require negotiated interim mechanisms or structures.

### Matrix AD-2. Guide for Interfacing and Sensitizing CLUP to Ancestral Domains and Forests and Forestlands

CLUP Preparation Steps	Scenarios			
	If there is AD and ADSDPP	If there is AD but no ADSDPP	If there is FLUP	If there is no FLUP
1. Organize	Include IPS/IPO and NCIP- Community Service Center (CSC) in technical coordination meeting and ADSDPP data in the inventory of materials	Coordinate with NCIP-CSC to identify IPS leaders who will be consulted during the technical coordination meetings	Include CBFM POs in the technical coordination meetings; include FLUP data in the inventory of materials	Coordinate with DENR for identification of FFL stakeholders that may be included in the technical coordination meetings
2. Identify stakeholders	Coordinate with IPS/IPO and NCIP-CSC on scope of CLUP process; Determine boundary of the AD based on CADT claim book and ADSDPP	Coordinate with NCIP-CSC to identify IPS; orient IPS on scope of CLUP process; Determine boundary of the AD based on CADT claim book	Coordinate with forest co-management body for identification of stakeholders; Determine boundary of FFL based on FLUP	Coordinate with DENR for identification of stakeholders; Determine boundary of FFL based on DENR records
3. Set the vision	Take into account the IP/AD development framework and vision as elaborated in the ADSDPP	Support ICC/IP community visioning process	Utilize FFL vision as embodied in the FLUP	Support FFL stakeholders' visioning process
4. Analyze the situation	Include relevant ADSDPP data in the new baseline data; Involve IPS/IPO as resource person in the sharing of the AD management plan	Support IP/ICC processes (e.g. community mapping) in generation of relevant AD data for inclusion in the new baseline data; Involve	Include FLUP data in the new baseline data; Involve FLUP stakeholders in the review of other management plans; Utilize FLUP projections	Include relevant FFL/ENR data in the new baseline data; Involve DENR and FFL stakeholders in the review of other management plans;



4. Analyze the situation (con't)	and as participants in the review of other management plans; Support enhancement of ADSPP projections; Identify issues and conflicts	IPS/IPO in the review of other management plans; Support ICC/IP community process with applicable tools and technical expertise in making projections; Identify issues and conflicts	in the analysis; Identify issues and conflicts	Support processes in making projections; Identify issues and conflicts
5. Set the goals and objectives	Take into account the IP/AD development framework and vision as elaborated in the ADSDPP	Support ICC/IP community processes in formulating goals and objectives	Utilize FFL vision as embodied in the FLUP	Support FFL stakeholder processes in formulating goals and objectives
6. Establish development thrust and spatial strategies	Utilize strategic development thrusts, options and spatial strategies as embodied in the ADSDPP as reference; Support enhancement of the ADSDPP if the options and spatial strategies need to be clarified	Support ICC/IP community processes in formulating strategic development thrusts, options and spatial strategies	Utilize FFL stakeholders' strategic development thrusts, options and spatial strategies	Support FFL stakeholder processes in formulating strategic development thrusts, options and spatial strategies
7. Prepare the land use plan	Use ADSDPP land use plan and zones as input for identifying intersections with CLUP and ZO; Support enhancement of land use aspect of ADSDPP if there is a need to	Support ICC/IP community land use planning and zoning arrangements such as provision of tools and technical expertise; Use identified land use and zoning arrangements as input for identifying intersections with CLUP and ZO	Use the FLUP land use plan and zoning arrangements as input to CLUP and ZO; Harmonize FFL land use plan and zones with CLUP and ZO	Support FFL stakeholder land use planning and zoning arrangements with applicable tools and technical expertise; Harmonize the identified land use and zoning arrangements with the CLUP and ZO
8. Draft the zoning ordinance	Use ADSDPP land use plan and zones as input for identifying intersections with CLUP and ZO; Support enhancement of land use aspect of ADSDPP if there is a need to	Use identified land use and zoning arrangements as input for identifying intersections with CLUP and ZO	Harmonize FFL land use plan and zones with CLUP and ZO	Harmonize the identified land use and zoning arrangements with the CLUP and ZO
9. Conduct public hearing	Involve IPS/IPO in the public hearings and stakeholder consultations; Mobilize IPS/IPO as resource person for sharing the AD land use plan and zoning arrangement; Identify and address land use conflicts	Involve IPS/IPO in the public hearings and stakeholder consultations; Mobilize IPS/IPO as resource person for sharing the AD land use plan and zoning arrangement; Identify and address land use conflicts	Involve FFL stakeholders in the public hearings and stakeholder consultations; mobilize FLUP co-management body as resource person for sharing the FLUP land use plan and zoning arrangement; Identify and address land use conflicts	Involve FFL stakeholders in the public hearings and stakeholder consultations; Identify and address land use conflicts
10. Review, adopt, and approve the CLUP and ZO	ICC/IP community exercises autonomous process of adopting the ADSDPP land use plan and zoning arrangement	ICC/IP community exercises autonomous process of adopting the ADSDPP land use plan and zoning arrangement	Harmonize LGU legislative action on FLUP with CLUP and ZO	Harmonize LGU legislative action on FLUP with CLUP and ZO
11. Implement the CLUP and ZO	IPS exercises self-governing authority over AD land use and zoning; LGU and IPS establish coordination mechanism for parallel but complementary enforcement; LGU adopts relevant	IPS exercises self-governing authority over AD land use and zoning; LGU and IPS establish coordination mechanism for parallel but complementary enforcement; LGU adopts relevant	LGU and DENR activates co-management body for enforcement of FLUP and zoning arrangement	LGU and DENR creates co-management body for enforcement of FLUP and zoning arrangement

11. Implement the CLUP and ZO (con't)	projects for integration in the LDIP and AIP; IPS and LGU agree on grievance procedure in case of conflicts arising from enforcement of ZO and ADSDPP	projects for integration in the LDIP and AIP; IPS and LGU agree on grievance procedure in case of conflicts arising from enforcement of ZO and ADSDPP		
12. Monitor and evaluate the CLUP and ZO	LGU involves IPS/IPO in monitoring and evaluation in coordination with the mandated IP representative	LGU involves IPS/IPO in monitoring and evaluation in coordination with the mandated IP representative	LGU mobilizes FLUP co-management body for monitoring and evaluation	LGU involves FFL stakeholders in monitoring and evaluation

## What the CLUP needs to know and consider about Ancestral Domains

### 1. Boundaries of the Ancestral Domain (AD)

Boundaries of AD with approved Certificate of Ancestral Domain Title (CADT) can be secured from the nearest National Commission on Indigenous Peoples (NCIP) office. These may also be obtained from DENR, the provincial LGU and other offices and from the ICC/IP community if the CADT has an ADSDPP.

The planning team can download approved CADT maps from the NCIP website at <http://addis.ncip.gov.ph>. The boundaries of claimed ancestral domains are also available in the CADT claim book and database of the NCIP Provincial Delineation Teams (PDTs).

If the boundary map is not available, the NCIP, IPS/IPO, LGU and other stakeholders should coordinate for the conduct of the perimeter survey. It may also happen that ancestral domains would be in the process of delineation and perimeter survey at the time of the CLUP preparation.

Table AD-1. Ancestral Domain, Year \_\_\_\_

Name of Ancestral Domain	CADT No.	Date Awarded (yymmdd)	Date Issued (yymmdd)	Area Occupied	Hazard Susceptibility (H/M/L)								
					Fl	Tc	Eq	Vo	Ln	Ts	Su	Others	

Notes:

- CADT – Certificate of Ancestral Domain Title
- Indicate level of susceptibility for all hazards - High (H), Moderate (M), Low (L)
- Types of hazards – Flood (Fl), Tropical cyclone (Tc), Earthquake (Eq), Volcano (Vo), Landslide (Ln), Tsunami (Ts), Storm Surge (Su), Others (e.g. coastal erosion, sea level rise, land subsidence, liquefaction, strong wind, change in temperature, change in rainfall, etc.)



Note:

It is important to consider conflict management capacity in recognizing and dealing with actual and potential conflicts over boundaries given that the community maps (based on oral narratives) may be at variance with official base maps and previous cadastral surveys. Each individual narrative may also diverge from each other depending on the references of the storyteller such as age, rank in the IPS, date and form of acquisition of territory, physical markers and others.

## 2. Ancestral domain situationer

This data is available in the ADSDPP. If there is no ADSDPP, the CLUP TWG may coordinate with the nearest NCIP office and the IPS for generation of required data such as:

- Social, economic, political and environmental/ecological profiles, including the conflict profile
- IKSP relevant to land use planning and zoning arrangements
- IP/AD policies and mechanisms applicable to land use and zoning arrangements and enforcement

## 3. Physical/Spatial data

### a. Community Maps

The CLUP TWG can provide support for ICC/IP community mapping.

- In coordination with the NCIP, the IPS gives the mandate for the creation of the community mapping team and designation of the members of the team.
- With the support of the CLUP TWG, the community mapping team shall prepare a sketch map where key features of the ancestral domain (such as water bodies, sacred places, trails and roads, vegetation, sector boundaries, barangay boundaries, mountain peaks, caves, ridges, reefs and other physical features) are to be plotted. The sketch mapping shall be preceded by oral narratives of the IPS, elders and key persons familiar with the physical features of the AD.
- The sketch map shall serve as a reference for more detailed preparation of the thematic maps that combines existing maps from various agencies and the “ground truth” from community mapping.
- The community mapping team shall also prepare land use conflict map. This will be preceded by a short exercise on conflict mapping.
- The CLUP TWG and community mapping team will conduct field validation, preferably using GPS, to ground truth key features, landmarks or points in the sketch map.
- The IPS legitimizes the field-validated map through a validation process using customary procedures.



Some pointers for Facilitators in community/sketch mapping:

- Begin with oral narratives on the boundaries of the ancestral domain
- Position the plastic/ manila paper atop a table or on the floor in a spacious room or place that has a good view of the area to be mapped.
- Ask the community mapping team what features or landmarks they want to begin with (roads, rivers, existing settlements, mountain peaks, etc.)
- Ask them what colors and symbols they want to use to represent the key features and indicate this on a sheet of manila paper or plastic
- Inquire about the locations and extent of existing resources (such as forests, minerals, rivers/ water bodies, cultivated areas, grasslands/ open lands) and their traditional uses (such as hunting areas, rattan gathering, honey bee collection, areas for gathering of medicinal plants, wildlife habitats, fishing areas, wildlife/ fish sanctuaries, burial grounds, areas for religious ceremonies, settlements, water sources for domestic use and irrigation, kaingin and agricultural cultivations, agro-forestry farms and other uses)
- Encourage members of the community mapping team to participate by inviting each of them to work on different parts of the map.

- At the end of the sketch mapping activity, ask them to look at the map and see if there are any corrections that they want to change.
- If the community is satisfied with the map, discuss with them the next activity, which is field validation (“ground truthing”) and technical integration.

### b. Thematic Maps

The ADS DPP Guidelines of 2004 do not explicitly include thematic mapping. However, if the AD has an existing ADS DPP, the document provides relevant information to enhance existing thematic maps from various agencies. If the AD has no ADS DPP, the CLUP TWG and the community mapping team shall produce the thematic maps. **Table AD-2** outlines the type of maps that need to be produced.

**Table AD-2. Thematic Maps of the Ancestral Domain**

No.	Thematic Maps	Description	Source
1	Traditional Land Use/resource use map	Shows agro-forestry, built up, cultivated areas, hunting areas, sacred areas, NTFP gathering, etc.	NAMRIA, DA-BFAR, DENR, CLUP, community maps
2	AD Projects Map	Show all forestry and coastal projects and programs by various agencies, e.g. reforestation projects	Project documents
3	Tourism areas map	Existing and potential tourism sites (caves, water falls, lakes, etc)	Tourism office, community mapping
4	Hazard maps	Note: hazards falling under AD/land areas shall be delineated...	MGB, PHIVOLCS, PAGASA, NAMRIA, PDPFP
5	Watershed/Drainage maps	Refer to forest land study, maps...but, show details of areas within AD/Lands areas.	DENR
6	Mining tenement map	Show details of tenement areas within AD lands	MGB, NCIP, Provincial Mineral Resources Development Board (PMRDB)
7	Issues map		LGU, NCIP
8	Biodiversity map	Refer to biodiversity special area study	PAWB, PAWCMZ
9	Tenure map	CADT, CALT, Community-Based Forest Management Agreement (CBFMA), Industrial Forest Management Agreement (IFMA), Integrated Social Forestry (ISF), Industrial Timber License Agreement (ITLA)	NCIP, DENR, MGB
10	Soil Map	Refer to LGU maps; but show areas of AD	BSWM
11	Settlement map	-do-	ADS DPP CBWG generated; or IPS in coordination with NCIP
12	Infrastructure map	-do-	ADS DPP CBWG generated; or IPS in coordination with NCIP
13	Resource Use map	-do-	ADS DPP CBWG generated; or IPS in coordination with NCIP

### c. Resource Assessment

The resource assessment is aimed at determining the quantity, quality and location of natural assets using valuation criteria such as economic, cultural and social values, biodiversity conservation and use, and ecological services. The assessment should also consider the effects of climate changes and disaster risks and, correspondingly, the function of assets management in climate change adaptation and disaster risk reduction.

If the AD has an ADS DPP, some relevant information might be available in the document. However, the information might need enhancements in terms of characterization of assets, concepts and terminologies and other details.



#### Some Key Questions for Qualitative Resource Assessment

- What are the available resources in the ancestral domain?
- What is your general observation about the condition of these resources in the last 10-20 years (remain the same, reduced, increased, totally lost)?
- Have there been changes in the amount and quality of these resources? Any estimate of the changes?
- What are the possible causes of these changes?

Summarize the results of the Qualitative Resource Assessment in Tables **AD-3** and **AD-4**.

**Table AD-3. Resource Assets, Uses and Locations within the Ancestral Domain**

Type of Resources (indicate local terms for these resources)	Locations (barangay or sitios)	Area (hectares)	Traditional Uses (areas for hunting, fishing, rattan gathering, honey collection, kaingin, picnic, water source, etc)	Relevant IKSP for sustainable management of assets
Primary forest/ close canopy forest				
Residual/ open canopy forest				
Grasslands				
Open/ cultivated areas				
Ancestral waters				
Caves				
Water falls				
Lakes				
Other resources				

Table AD-4. Perceived Changes in the Condition of Resource Assets inside ancestral domains

Resources (LikasYaman)	Situation/Kalagayan last 20 years (walangpagbabago, nadagdagan, nabawasan, ubosna o nasirana)	Increases (+) or decreases (-) in the number of species (Gaanokadaminab awas/ nadagdag)	Reasons for the increase or decrease in the number of species (Mgakadahilanan)
Primary forest/ close canopy forest			
Open canopy/ second growth forests			
Mangrove forests			
Cultivated lands			
Grasslands/ brushlands			
Habitats of endangered species			
No. of Wildlife species (specify species)			
Nature based tourism			
Water resources (quantity/quality)			
Fishery resources (catch)			
Other resource assets			

Certain factors (e.g. imbalance between supply and demand for water, population growth and demand for space) and motive forces (such as private sector investments, government spending for public infrastructure) that may trigger and drive changes in the conditions of natural assets. Most would either induce conflicts or represent dynamic and competing interests and goals. The underlying issues, conflicts and causes should form part of the resource assessment.

All these shall be visualized by overlaying the CLUP thematic maps on the AD boundary map with GIS annotation of the resource assessment and underlying issues and conflicts.

#### 4. Indigenous Knowledge Systems and Practices (IKSP)

Most IKSPs on land use planning, zoning arrangements and sustainable resource management are still undocumented. Some ICC/IP communities are reluctant to share their IKSPs, especially on genetic resources for food and medicines, for fear of losing community property rights. In some cases, the reluctance is due to research methods that are lacking in cultural sensitivity.

If the AD has an ADSDPP, the document includes a chapter on IKSP. However, the conventional method of documentation focuses on extraction of IKSP data that refers mainly to past practices. The preferred approach to IKSP documentation is for ICC/IP communities to voluntarily share – through oral narratives – relevant IKSPs on land use planning, zoning arrangement and sustainable resource management.

Hearing from the community narratives, it is important to take note of the following:

- Living practice and continuing transmission;
- Availability of material conditions; and,
- Adaptation to changing conditions.

Some IKSPs may have been lost or transformed due to changes in the material conditions.

Document the relevant IKSPs and put them on the last column of **Table AD-3**.

## 5. ICC/IP Development Framework

The ICC/IP development framework contains the vision/aspirations, priority development thrusts, preferred strategies of ICC/IP communities and priority programs and projects. If the AD has an ADSDPP, the information would be available in the document. However, the ADSDPP itself may need enhancement in terms of the spatial dimension of the development framework. Although the ADSDPP is both a development and land use plan, the document itself might have more information on the former rather than the latter.

To generate the necessary information, the CLUP TWG should engage the NCIP and the ICC/IP community, through the IPS, for further discussions on the IP/AD development framework. The TWG provides technical support in the conduct of the exercise.

- Begin the discussion with a review of the resource assessment and land/resource use map.
- Facilitate the examination of existing land use and preferred spatial strategies for the future land use changes.
- Overlay the proposed land use changes on the AD map.
- IPS leads in the internal legitimization of the proposed land use change using customary procedures.
- CLUP TWG adopts the validated IP/AD development framework and preferred spatial strategies as relevant reference in the CLUP preparation

## 6. Institutional Assessment

This process aims to examine existing and future programs and projects of relevant government agencies, local government units and NGOs that will serve as opportunities for ICC/IP communities.

The data can be generated through various ways such as consultations, roundtable discussions, focus group discussions, key informant interviews or a simple survey.



### Some Key Questions for Agencies and NGOs

- What are the current projects that can support ADSDPP implementation and/ or the needs of ICC/ IP communities?
- Do they have regular budget for these projects or other activities that can support ADSPP activities and/or the needs of ICC/ IP communities?
- Are there mechanisms by which ICC/ IP communities can engage these institutions to avail assistance?

Consolidate the data from the consultations and place them on **Table AD-5**.



Table AD-5. Institutional Assessment

Institutions	Current projects/ activities that can support ancestral domains and/or ADSDPP implementation	Available budget	Ways for the ICC/IP Community to Avail Assistance
DENR			
MLGU			
BLGU			
PLGU			
NGOs			
NCIP			
PCW			
Other agencies			

Note:

- PCW - Philippine Commission on Women

## Annex AD-1. Sample List of Medicinal Plants Used by the Bugkalot IPs

Name of Plant (Pangalan ng halaman)	Parts of the Plant to be used (Bahaging gagamitin)	Preparation method (Paraan ng paghahanda)	Disease or ailment that can be cured (Sakit na nagagamot)
1. Kawdiked	Dahon	Nilalaga sa katamtamang dami ng tubig at kapag kumulo ay palalamigin saka iniinom	Malarya/sakit ng tiyan
2. Betek	Balat	Nilalaga pagkatapos ay iniinom	Malarya
3. Ola-ola	Dahon	Pinipitpit at pinapatak	Pang ampat ng sugat
4. Tabeget (Pako)	Ugat	Nilalaga at iniinom	Binat
5. Seke	Ugat	Nilalaga sa katamtamang dami ng tubig	Panghugas ng sugat
6. Asidaong	Balat	Kinakatas at pinatutulo sa sugat.	Panghugas ng sugat
7. Saha ng saging		Ibabalot sa nagkukombulsiyong tao	Pampahupa ng mataas na lagnat
8. Oweng no ewe (Katas ng sinunog na yantok)	Tiyan ng yantok	Susunugin at kukunin ang kulay itim na malagkit at yon ang isisiksik sa ngipin	Sakit sa ngipin
9. Lipa	Ugat	Kakatasin at siyang ipapahid sa parte ng katawan na nadampihan ng lipa.	Hapdi at kati na dulot ng lipa
10. Yantok	Ubod	Ini-ihaw at pinapakain	Malarya
11. Botngog	Baging	Pinipitpit at pinipiga pagkatapos ay ipinapatak.	Sugat
12. Rongo-rongo	Baging	Pumuputol ng isang dangkal ang haba at hinihipan sa kabilang dulo na pinapapatak sa dila ng bata ang katas nito	Aras
13. Cogon	Ugat	Nilalaga sa katamtamang dami ng tubig at ipinaiiinom	Mahirap umihi
14. Ungsol/ kamias	Dahon	Nilalaga	Pagsusuka

## Annex AD-2. Sample List of Species Used as Sources of Food by the Bugkalot IPs

Types of Plants and Freshwater Produce (Uri ng halaman at lamang tubig)	Parts Used (Bahagi na ginagamit)
A. Plants (Mga halaman) 1. Pugahan 2. Yantok 3. Pako 4. Bulala 5. Nami 6. Tapinit (wild strawberry)	Ubod Ubod at bunga Talbos Bunga Lamang ugat Bunga
B. From rivers and brooks (Buhat sa ilog at sapa) 1. Susu 2. Hipon 3. Bezek (bunod) 4. Palos 5. Palaka 6. Talangka 7. Isda (Dalag, Tilapia, Bedew, Kuwidew, Bulasi, Mabuo)	

## Annex AD-3. NCIP Administrative Order No. 1. Series of 2004

**REPUBLIC OF THE PHILIPPINES**  
*Office of the President*  
NATIONAL COMMISSION ON INDIGENOUS PEOPLES  
Quezon City  
NCIP Administrative Order No. 1, Series of 2004

**SUBJECT: GUIDELINES ON THE FORMULATION OF THE ANCESTRAL  
DOMAIN SUSTAINABLE DEVELOPMENT AND PROTECTION PLAN (ADSDPP)**

Pursuant to sub-paragraph (o), Sec. 44 of R.A. 8371, otherwise known as the Indigenous Peoples Rights Act of 1997 and other related provisions, the following guidelines are hereby promulgated:

**ARTICLE I  
PRELIMINARY PROVISIONS**

**Section 1. Constitutional and Legal Framework.** The State shall recognize and promote all the rights of indigenous cultural communities (ICCs) within the framework of national unity and development and shall protect the rights of indigenous peoples to their ancestral domains to ensure their economic, social and cultural well-being. The State shall likewise recognize the inherent right of ICCs/IPs to self-governance and self-determination, and respect the integrity of their values, practices and institutions as well as guarantee their right to freely pursue their development and equally enjoy the full measure of human rights and freedoms without distinction or discrimination.

**Section 2. Policy Statement.** The sustainable development and protection of the ancestral domain by the ICCs/IPs themselves is the manifestation of their rights to self-governance and self-determination. To guarantee the exercise, enforcement and realization of these rights, the ICCs/IPs shall prepare their own ancestral domain sustainable development and protection plan (ADSDPP) in accordance with their customary practices, laws and traditions.

**Section 3. Objectives.** These guidelines shall provide guidance in the formulation of the ADSDPP as a tool for the empowerment of ICCs/IPs towards the fulfillment of the general well-being of the current ICC/IP generation without compromising the needs of future generations. The ADSDPP shall, among others: (a) ensure the compliance of ICCs/IPs to their responsibilities to maintain ecological balance, restore denuded areas as well as to observe the requirements of the IPRA; (b) facilitate the conduct of the FPIC process; and (c) provide a checklist of prioritized development programs/projects as ready reference for collaborative efforts with development partners and/or grant of assistance to ICCs/IPs in an ancestral domain.

**Section 4. Approaches.** The ICCs/IPs' view on development puts emphasis on the inter-generational responsibility of the present generation to comprehensively and sustainably manage their ancestral domain and all resources found therein so that future generations may enjoy them. The realization hereof requires appropriate development standards and culturally sensitive approaches, thus:

a. **Rights-Based Approach to Development.** The ADSDPP is a framework for the process of human development that is normatively based on, and operationally directed to, the recognition, promotion and protection of fundamental human rights which are inherent rights of a person as a human being, and rights as indigenous peoples.

b. **Holistic/Comprehensive and Integrated.** The ADSDPP shall be an instrument through which the ICCs/IPs' rights to ancestral domains/ lands, self-governance/empowerment,

social justice/human rights and cultural integrity as provided in the Indigenous Peoples' Rights Act are recognized, promoted and respected. It shall likewise be used to protect the holistic and integrated adherence of a particular ICC/IP community to their customs, religious beliefs, traditions and indigenous knowledge systems and practices as they assert their character and identity as peoples. The sustainable development and protection of ancestral domains shall be all-inclusive.

c. **Community/or People Driven.** The process and steps in the preparation of the ADSDPP shall ensure that the ICCs/IPs shall take major leadership roles and full participation in the determination of their own development needs and priorities and subsequently how these needs and priorities shall be met as they formulate, implement and evaluate their ADSDPPs.

d. **Freedom of Initiative and Self-reliance or Non-Intervention.** Economic opportunities created by the state shall be extended to the ICCs/IPs on the basis of freedom of initiative and self-reliance. The ICCs/IPs shall freely pursue their economic, social and cultural development of their own choice and at their own pace in a manner determined by themselves towards national unity and development. The option of the ICCs/IPs to adopt a sustainable development and protection plan shall be respected under the principle of free pursuit of development as a people.

e. **Culture Sensitive.** The ADSDPP shall be culturally appropriate and responsive with the customs, traditions, values, beliefs, interests and institutions of ICCs/IPs. The ADSDPP shall be used as a tool to preserve and protect such culture, traditions and institutions.

f. **Gender-Responsive.** The ADSDPP shall likewise be gender-sensitive where gender issues are clearly articulated in the situation analysis and appropriate interventions and indicators of change are incorporated to address those issues.

g. **Consultative.** The ADSDPP preparation shall be consultative. Consultations shall go beyond ICCs/IPs to account for other stakeholders or entities that may be affected in any way by planned interventions within the ancestral domain such as the ICCs and non-ICCs in areas adjacent to the ancestral domain, and development agents of government (local and national).

h. **Iterative and Strategic.** The iterative planning process shall allow for strategic changes in ADSDPP requirements and technologies for AD development change over time. A strategic planning approach capitalizes on indigenous resources that abound and focuses on critical development issues within the ancestral domain.

**Section 5. Operating Principles.** In the exercise of the right to self-governance and self-determination, the ICCs/IPs shall ensure that the development and management of ancestral domains shall adhere to the following principles:

a. **Freedom of ICCs/IPs to Pursue Economic, Social and Cultural Development.** In the pursuit of economic, cultural and social development, the ICCs/IPs shall decide on all programs, policies, plans and projects within the ancestral domain and prioritize the same. In consonance herewith, the ICCs/IPs can formulate a sustainable development and protection plan for their ancestral domain in any form, provided that it contains the basic components as provided under Article II of these guidelines. As such, members of ICCs/IPs in the ancestral domain must give their consent in accordance to customs and traditions, and they shall participate in the planning process.

b. **Fulfillment of Responsibility to Future Generations.** The ancestral domain is owned by the race and the responsibility of the current generation of ICCs/IPs to sustainably manage and protect their ancestral domains in order to preserve the options for future generations is enormous and cannot be ignored. In the management of the ancestral domain, due consideration must be given to the resources as well as conflict management systems, indigenous knowledge, systems and practices, and peace building mechanisms and institutions of the ICCs/IPs.

c. **Interdependence.** The ancestral domain and all resources found therein cannot be

separated from the social and economic systems and the benefits derived therefrom.

d. **Just and Equitable Sharing of Benefits.** IC/IP communities shall be fairly allocated benefits derived from the management of land and resources within their ancestral domains.

e. **Comprehensive.** The sustainability of development and protection of ancestral domains shall be holistic and all-inclusive of all the aspects of the life and environment of ICCs/IPs.

**Section 6. Definition of Terms.** The terms and phrases defined under Section 3 (a) to (p) of R.A. 8371 and Rule II (a) to (z) of the Implementing Rules and Regulations shall be given the same meanings when used herein and in addition thereto:

a. **Ancestral Domains Sustainable Development and Protection Plan (ADSDPP)** – refers to the consolidation of the plans of ICCs/IPs within an ancestral domain for the sustainable management and development of their land and natural resources as well as the development of human and cultural resources based on their indigenous knowledge, systems and practices. Such plan shall be the basis of the Five Year Master Plan for ICCs/IPs.

b. **Effectiveness** – refers to the extent to which the strategies and activities progressively realized the desired results given the amount and quality of material and human resources brought into a program/ project.

c. **Gender Gap** – refers to a manifestation of gender inequality, where significant disparity in male and female access to productive and service resources.

d. **Gender Issues** – refers to problems that are results of the way boys and girls or women and men have been socially constructed which cause negative effects or gender gap on social status and human relationships such as inequality and discrimination.

## ARTICLE II BASIC COMPONENTS OF THE ADSDPP

**Section 7. Basic Components.** The ADSDPP is a long term comprehensive spatial and development plan with at least five years programming of activities with the purpose of identifying and implementing programs and projects to strengthen self-governance, alleviate poverty, protect the environment and cultural integrity, and build lasting peace and genuine development within ancestral domains of particular ICCs or IP groups. Hence the ADSDPP document shall contain three parts as follows:

### a. **Ancestral Domain and Community Situationer**

1) **Ancestral Domain Situationer.** This component shall include the profile and conditions of the natural base or resources of the ancestral domain such as its environmental and ecological conditions and other land and spatial conditions as maybe defined by the community. It shall also include the indigenous resource systems and management practices and customs and traditions as well as a description of the land ownership systems that helped shape the present conditions of the ancestral domain and the IC/IP community as owners and stakeholders. The problems and conditions shall also be determined, especially, but not limited to, the environmentally critical areas.

2) **Community Situationer.** This component shall include the history of the tribe, their origin and time immemorial formation of the ICCs/IPs as a distinctive social and cultural group. It shall also present and discuss the life ways of the ICCs/IPs and their social, cultural, political and economic systems and status of human development, including the prevailing conditions and situations as well as the factors affecting the development of ICCs/IPs. The agriculture and agro-forestry as major activities in ancestral domains shall be described to include the traditional or customary practices such as the traditional systems of self-help or mutual cooperation. Potential economic activities or opportunities may also be established in this component.

3) **Indigenous Knowledge Systems and Practices (IKSPs).** The indigenous knowledge systems and practices of IC/IP communities on land use systems, land ownership systems, forest and watershed management and protection, water resource management and protection, marine resource management, and mineral resource management and protection basically form part of the sustainable development and protection plan. The manner of transferring IKSPs through generations shall also be indicated as well as the capacity of ICCs/IPs to protect their community intellectual rights.

4) **Development Needs of the ICCs and their Ancestral Domain.** This portion shall highlight the needs, problems and concerns to fully develop the ICCs/IPs and their ancestral domains. It shall also identify collective/or community traditional capacities used to either protect or claim their rights to their ancestral domains and lands, to self-governance and empowerment, social justice and human rights and right to cultural integrity. The extent or magnitude of the problem shall be presented and concerns for determining priorities shall be indicated. Likewise, the strengths, weaknesses, threats and opportunities as well as probable resources shall be indicated.

b. **Development Plans and Programs** – The ADSDPP shall specify plans and programs to meet the identified needs of the community and the ancestral domain. The spatial and development plans/programs and activities include those pertaining to, among others, ancestral domain/territorial integrity, forest and marine conservation/protection or renewal, water security, pollution prevention, environmentally critical areas, commitment to maintain ecological balance, land utilization and management, and the socio-economic or human resources development of the ICCs/IPs.

c. **Implementation Policies and Mechanisms** - The ADSDPP shall embody policies, structures, procedures and other mechanisms to ensure the implementation of the plan. The implementation plan may include the following:

1) **Regulatory Instruments.** The ICCs/IPs shall clearly define the manner and the tools for regulating the use of land, marine and natural resources within the ancestral domain.

2) **Implementation Schemes.** In the implementation of the ADSDPP, consideration of the following is suggested:

a. The IP community shall take full ownership, responsibility and accountability for the programs/ projects' outputs and activities;

b. Accountability would measure performance, pinpoint responsibility, and allow continuous improvement; and

c. Plans and programs would lead to the sustained development of the ICCs/IPs capacities to claim/assert their rights.

3) **Benefit and Responsibility Sharing Schemes.** The plan shall contain specific policies on sharing of benefits, if any, as well as responsibilities among ICCs/IPs. In case, of benefits from utilization, extraction or development of resources, Section 2, Part II, Rule III of the rules and regulations implementing the IPRA shall be applied. Likewise, schemes to fulfill the responsibility of maintaining ecological balance and restoring denuded areas in the ancestral domain shall also be specified in the plan.

4) **Packaging and Marketing.** The preparation of the sustainable development and protection plan as a package of programs, plans and projects and the presentation for funding thereof before government agencies and instrumentalities, the private sector, international aid agencies, and other donor groups is an option for the concerned ICCs/IPs to exercise.

5) **Monitoring & Evaluation.** The progress of the ADSDPP implementation shall be the full responsibility of the ICCs/IPs and the tools to monitor and evaluate the IP community's ADSDPP shall form part of the Plan.



### ARTICLE III THE ADSDPP FORMULATION

**Section 8. Basic Steps in the ADSDPP Formulation.** The formulation of the ADSDPP shall primarily be guided by the principle of self-determination, participatory planning and cultural integrity with the main objective of ensuring the sustainable development and protection of ancestral domain resources and the enforcement of the rights of ICCs/IPs to their ancestral domain as well as their rights as a people and as citizens. The responsibility of formulating the ADSDPP rests with the community and they may avail of the services and expertise of other agencies and support groups. Upon request of ICCs/IPs, the NCIP shall facilitate the formulation of the ADSDPP, and the planning process shall proceed as follows:

**a. Pre-Planning Consultations.** In preparation for the ADSDPP formulation, a series of consultations shall be conducted by the NCIP field office with the following objectives:

1. Fully inform and educate all IC/IP community members of their rights and responsibilities pursuant to existing policies and regulations.
2. Get the commitment of concerned IC/IP community members to formulate their ADSDPP.
3. Identify members of the working group to formulate the ADSDPP.

**b. Organization of the Working Group/Planning Team.** A Working Group or Planning Team shall be organized which shall comprise the traditional leaders and recognized representatives from all ICC/IP sectors such as the women, youth, children, farmer/fisher folks of the tribe that owns the ancestral domain. To facilitate the planning process, sub-working groups may be organized by ancestral domain unit and/or ICC/IP sector to assist the core Working Group.

**c. Preparation of Work and Financial Plan (WFP).** Prior to the formulation of the ADSDPP, the core Working Group (WG) shall prepare a work and financial plan indicating the planning activities, specific outputs, schedules, responsible persons/groups per activity, and the budgetary requirements including probable resources or sources of funds. This shall be done in consultation with the Council of Elders and other members of the community. Thereafter, the same shall be endorsed to the NCIP, through the provincial and regional offices, for approval and possible funding assistance.

**d. Data Gathering and Assessment.** Data gathering or baseline survey and assessment is the preliminary step in the planning process to produce the ancestral domain profile and situationer. The Working Group(s) shall conduct a participatory baseline survey focusing on the existing population, natural resources, development projects, land use, sources of livelihood, income and employment, education and other concerns. The survey shall include the documentation of the ICC/IP culture or IKSPs and historical accounts or inventory of documents relative to the sustainable development and protection of the ancestral domain. Likewise, it includes the appraisal of the quality and quantity of existing natural resources in the ancestral domain. The baseline survey shall target both secondary and/or primary data with the aid of survey instruments and procedures.

The Working Group shall assess the data/information, identify and prioritize problems/issues and concerns, determine needs and gaps, and try to understand the underlying causes and how particular problems affect particular sectors of the community. The output shall be presented to the community for validation of its accuracy and reliability before proceeding to the succeeding steps of the ADSDPP formulation process hereunder.

**e. IP/AD Development Framework Formulation.** Immediately after the validation of the assessed data, the community shall collectively formulate the framework for their development as a people and the sustainable development and protection of their ancestral domain. This shall reflect their collective vision, mission, general objectives or long-term goals, priority concerns and development strategies that will set the direction

of the program/project identification and prioritization in the ADSDPP. The process shall involve the evaluation of alternative development options without compromise of the ICCs/IPs' duties and responsibilities to their ancestral domains. The framework shall be written in the language understood by all IC/IP community members, and translated in English.

**f. Interface of IP/AD Development Framework with Existing Government Policies/Plans/ Programs/Projects, Rules and Regulations.** After completion of the IP/AD development framework, other government and non-government agencies, most crucial of which are the DENR, DA, DAR, DPWH, and so forth shall be invited to present their existing policies/plans/projects so that ICCs/IPs will be fully apprised of development opportunities as well as limitations. The inputs, with possible commitments, will further guide the identification of programs in the ADSDPP. On the other hand, other GOs and NGOs will be informed of the real desires and aspirations of ICCs/IPs, which they may consider in the review and reformulation of their respective policies/plans/ programs/projects.

**g. Program/Project Identification and Prioritization.** Based on the development framework, programs/projects/activities including basic services required shall be identified and prioritized. A brief description of each program, project and activity shall be presented and suggestions on implementation strategies and/or mechanisms may be included. The presentation shall include all available resources and external assistance that could be tapped by the IC/IP community.

**h. Formulation of ADSDPP Implementation Strategies and Management Plan.** Proposed plans to implement and manage the ADSDPP and its specific parts shall be indicated to include the monitoring and evaluation systems and tools to be used in measuring and checking the progress of development programs and projects. The Council of Elders/Leaders shall oversee the implementation and management of the ADSDPP notwithstanding the visitorial powers of the NCIP. To assist the Council of Elders/Leaders (CEL), the IC/IP community may institute a special body or bodies that will take charge of specific tasks that will be identified.

**i. Presentation, Validation and Approval of Draft ADSDPP with IC/IP Community Members.** The working group shall conduct IC/IP community assembly(ies) to present the draft ADSDPP for their validation and approval. The presentation shall be aided by visuals including maps and in a manner that is understood by all IC/IP community members. When applicable, the English translation of the ADSDPP shall also be subject for validation.

**j. Submission of ADSDPP to NCIP.** Upon validation and approval, the community through its Council of Elders/Leaders shall submit the ADSDPP to the NCIP through the Provincial Office (PO). The ADSDPP shall be incorporated into the Medium Term or Five Year Master Plan for ICCs/IPs, which shall be the basis of programs/projects to be identified in the annual and medium term budgetary proposals of the NCIP as well as other agencies concerned with the welfare of ICCs/IPs.

**Section 9. Incorporation of the ADSDPP into the Local Government Plans.** After approval of their ADSDPP, the ICCs/IPs shall submit the same to the municipal and provincial government units having territorial and political jurisdiction over them for incorporation in their development and investment plans. The LGUs are also encouraged to provide financial and technical assistance in the implementation of the ICCs/IPs' development plans.

#### **ARTICLE IV SUPPORT TO ICCs/IPs FOR ADSDPP FORMULATION**

**Section 10. NCIP Role and Support.** The NCIP, with the Ancestral Domains Office as lead office, shall assist the ICCs/IPs in the formulation and implementation of their ADSDPP in the following manner:

- a. Help facilitate and document the planning process;
- b. Organize the ICCs/IPs and ensure that they are well informed of their rights to effectively participate and successfully formulate their ADSDPPs;
- c. Provide and/or facilitate the provision of technical assistance in the formulation of ADSDPPs through the field offices, particularly the provincial offices;
- d. Provide information and assist the concerned ICC/IPs in tapping or utilizing external resources and accessing basic services of the different government agencies and other support groups;
- e. Ensure that the ADSDPPs include plans/programs/activities in compliance to the ICCs/IPs' duties and responsibilities to their ancestral domains;
- f. Ensure that the ADSDPPs are incorporated in the local development plans; and
- g. Install the mechanism to ensure that the ADSDPPs shall serve the purpose of certification precondition as provided in the NCIP Administrative Order. No. 3, series of 2002.

**Section 11. Capacity Building of ICCs/IPs.** The capacity of ICCs/IPs to formulate and implement the ADSDPP shall be developed in terms of techniques in planning, development technologies, documentation of historical accounts and culture, project development, production of localized IEC materials, resource mobilization or fund sourcing, and plan management. The ICCs/IPs through their Council of Elders/Leaders may execute an undertaking/agreement with expert individuals or entities/support groups along this endeavor, with NCIP as third party. Any entity/person(s) who are willing to assist in the ADSDPP formulation shall present their proposal for consideration by the Council of Elders/Leaders.

## ARTICLE V SPECIAL PROVISIONS

**Section 12. Conversion of ADMPs/ADRMPS to ADSDPPs.** ICCs/IP communities may modify their existing Ancestral Domain Management Plans or Ancestral Domain Resource Management Plans pursuant to DENR DAO 96-34 and other plans into ADSDPPs in accordance with these guidelines. For this purpose, the community may constitute a team to review the ADMP/ADRMPS. However, communities that opt not to modify their ADMPs/ADRMPS shall still submit copy of said plans to the NCIP.

**Section 13. Ancestral Lands within Ancestral Domains.** Members of ICCs/IPs may opt to secure formal recognition or Certificate of Ancestral Land (CALT) of their individually owned lots within ancestral domains.

**Section 14. Migrants within Ancestral Domains.** The rights of migrants in ancestral domains to their private properties will be respected and protected in accordance to Section 56 of the IPRA. On the other hand, the migrants shall also recognize the rights of the ancestral domain owners.

Migrants occupying specific areas as distinct community within an ancestral domain can formulate their own development plan provided this does not impinge on the interest and welfare of the ancestral domain owners. Any expansion of occupied areas and/or development plan not in line with the ADSDPP shall be subjected to FPIC as provided in NCIP AO No. 3, series of 2002.

**Section 15. Conflict of ADSDPP with other Plans.** In case of conflict with other plans, the ADSDPP as approved by the community shall take precedence over the other plans. If conflict is between the ADSDPP and its consolidated version at the municipal, provincial, regional or national level, the original ADSDPP as approved by the community shall prevail.

**Section 16. Resource Utilization.** The traditional utilization of resources by ICCs/IPs within their ancestral domains that is governed by customary laws, traditions and practices of the IP/IC community shall be recognized and respected.

**Section 17. Confidentiality of Information.** All information on the concerned ICCs/IPs community obtained in the course of the preparation of the ADSDPP shall be considered part of the community intellectual property, and is deemed private and confidential and be held as such unless the free and prior informed consent (FPIC) of the IP/IC community is secured.

**Section 18. Free and Prior Informed Consent.** Extractive utilization and exploitation of resources within ancestral domains notwithstanding the ADSDPP shall be subjected to FPIC as provided in NCIP AO No. 3, series of 2002.

**Section 19. Orientation on the Guidelines for ADSDPP Formulation.** A nationwide orientation on these guidelines shall be conducted for the key ICC/IP elders/leaders, assisting NGOs, and the NCIP staff at all levels.

**Section 20. Prohibition.** Any person, group or entity shall be prohibited from undue interference in the formulation of ADSDPPs.

**Section 21. Sanctions.** Any violation of the provisions hereof by any personnel of the NCIP shall be a ground for disciplinary action and where a staff/representative of an NGO and IPO is involved, customary law and/or application of Section 5, Part II, Rule IV of the IRR may apply without prejudice to the filing of the appropriate criminal case for acts and omissions defined and punished under applicable laws.

#### **ARTICLE VI FINAL PROVISIONS**

**Section 22. Repealing Clause.** Sections 1, 2 and 3, Part II, Rule VII of Administrative Order No. 1, series of 1998 are hereby modified accordingly.

**Section 23. Effectivity.** This Administrative Order shall take effect fifteen (15) days after its full publication in two (2) newspapers of general circulation in the Philippines.

Approved:

January 30, 2004

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## References

National Commission on Indigenous Peoples. 2004. NCIP Administrative Order No. 1, Guidelines on the Formulation of the Ancestral Domain Sustainable Development and Protection Plan (ADSDPP).

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