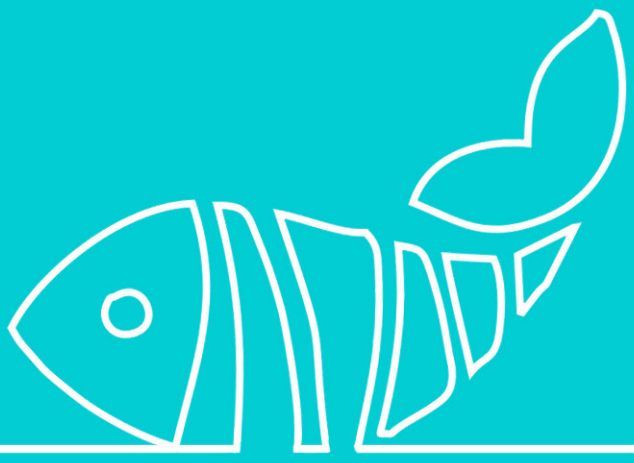
NATURAL RESOURCE ASSESSMENT (NRA)

Communities For Resilience (CORE)



TRAINING MANUAL

Natural Resource Assessment Training Manual

About the CORE Series

The Communities for Resilience (CORE) is a flagship capacity-building program of the Climate Change Commission (CCC). CORE aims to help poor and highly vulnerable communities adapt to climate change and reduce their risk to extreme weather events and natural hazard impacts.

CCC developed a compilation of user-friendly manuals intended to increase competencies of national and local government institutions, civil society, private sector, and local communities on disaster risk management; climate change adaptation and mitigation; and mainstreaming of climate change and disaster risk reduction in local development planning and decision-making.

Dubbed as the CORE series, these tool kits were demonstrated in several pilot cities and municipalities to converge efforts on local climate action, and to integrate lessons learned from its implementation. These will also continue to undergo a series of enhancements based on current updates and innovations relevant to building resilient communities, and will not necessarily be limited to a step-by-step guide of modules and manuals.

Similarly, other tools will be developed in the future as part of the series in the form of videos, best practice case studies, etc.

This initial set of seven manuals was reviewed and vetted by the Commission's National Panel of Technical Experts (NPTE) in November 2017.

The CORE Series are available at www.climate.gov.ph.

Acknowledgment

This publication is part of the CORE Series initiated by the Climate Change Commission (CCC). This series of toolkits is based on scientific research, available literature and relevant works.

This module is a result of the collaboration between the **Climate Change Commission (CCC)** and the **Foundation for Rural Enterprise and Ecology Development of Mindanao (FREEDOM), Inc.**

We would also like to acknowledge the Commission's National Panel of Technical Exports (NPTE), whose members contributed competent technical guidance and informed discussions that brought various perspectives into focus.

Our special thanks to the participating State Universities and Colleges(SUCs), private Higher Education Institutions (HEIs), and the Local Government Units (LGUs).

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Preface

Efforts to defeat poverty and promote social justice will be difficult to sustain unless measures are undertaken to help poor and highly vulnerable communities adapt to climate change. Changes in temperature and precipitation patterns, sea level rise, and extreme weather events can easily undermine development gains that the country has attained in recent years.

The Philippines posting the highest average increase in sea level since 1901 immediately puts at risk 13.6 million Filipinos living in coastal areas across the archipelago. Studies from the Philippine Atmospheric, Geophysical and Astronomical Services Administration and the University of the Philippines have also shown that current and future shifts in temperature and rainfall regimes will have significant impacts, mostly adverse, on our agriculture, forestry, water and coastal resources, health, and urban areas – bearing serious implications on our food and water security, energy sufficiency, human security, and ecological and environmental stability.

Meanwhile, destructive weather events will continue to pose a direct threat on our people and overall socio-economic development. From our country's experience with typhoons Yolanda (2013), Pablo (2012), Sendong (2011), Ondoy (2009), and Frank (2008), we already know that reconstruction costs take a substantial chunk off of our national budget. This challenge even becomes more daunting as we center rebuilding efforts on making communities more resilient to both sudden and slow onset of the impacts of climate change.

The country has already made progress in confronting climate change since the enactment of the Philippine Climate Change Act in 2009 and the Philippine Disaster Risk Reduction and Management Act in 2010. For its part, the Climate Change Commission (CCC) has been very active in promoting climate change action on both domestic and international fronts. But much remains to be done.

As early as 2009, the United Nations Office for Disaster Risk Reduction identified three non-climatic factors responsible for the continuing escalation of disaster risks worldwide, most notably in developing countries. These are poor urban governance, vulnerable rural livelihoods, and declining ecosystems. Because of inherent "multidimensional inequalities," the poor and highly vulnerable communities end up experiencing more the adverse impacts of climate change.

It is in this context that CCC's Communities for Resilience (CORE): Convergence Program is conceptualized and implemented. The Commission understands that building resilience requires a whole-of-society approach and that the starting point for this is the integration of disaster risk reduction and climate change adaptation and mitigation into the development policies, plans and programs of the national government and local government units (LGUs), especially in areas that are highly susceptible to the impacts of climate change.

The CORE initiative specifically aims to strengthen the planning capacity and overall resilience of LGUs along the country's 18 major river basins– areas which are sensitive to temperature changes, rain-induced floods, drought, sea level rise, extreme weather events, and other water- and weather-related hazards. All in all, the CCC is bringing its flagship capacity-building program on climate change to 48 provinces, 56 cities, and 777 municipalities that are vulnerable to climate change, with the goal of covering all the 80 provinces and 1745 LGUs and cities as it rolls-out the CORE initiative.

The CORE program neither aims to reinvent the wheel nor duplicate past and ongoing efforts by other government and non-government actors in the disaster and climate change communities. Rather, it seeks to build on existing partnerships, adopt tested tools and methodologies, and harmonize different approaches from various sectors, including non-government organizations, private sector and the academe.

State Universities and Colleges, in particular, will be tapped for their resources and expertise on research, tools development, and capacity building. Under the CORE program, regional academic institutions will undergo training in science- and risk-based action planning for climate change to strengthen their capacities in guiding local decision makers and LGU planners on Vulnerability and Risk Assessment, Environment and Natural Resource Accounting, Natural Resource Assessment, Greenhouse Gas Inventory, Climate Change Expenditure Tagging, Geographical Information System, and in accessing financing windows that support climate change initiatives.

This publication is one of those training manuals. The menu of methodologies and tools being offered under the CORE program is intended to raise national awareness and competence on climate change actions among national and local government institutions, civil society, private sector, and communities, including students from Grades K to 12. To LGUs, it is hoped that this would serve as a useful and practical guide as they prepare or enhance their Local Climate Change Action Plans (LCCAP).

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Abbreviations and Acronyms

BAU	Business-As-Usual
CBA	Cost-Benefit Analysis
CC	Climate Change
CCA	Climate Change Act
CCC	Climate Change Commission
CCO	Climate Change Office
CDP	Comprehensive Development Plan
CEA	Cost Effectiveness Analysis
CLUP	Comprehensive Land Use Plan
COP	Conference of Parties
CoRE	Communities for Resilience
CSOs	Civil Society Organizations
CVRA	Climate Vulnerability and Risk Assessment
DP	Disaster Preparedness
DRFI	Disaster Risk Financing and Insurance
DRR	Disaster Risk Reduction
DRRM	Disaster Risk Reduction and Management
ENRA	Environment and Natural Resource Accounting
EWS	Early Warning System
GAA	General Appropriations Act
GG	Green Growth
GhG	Greenhouse Gas
GoP	Government of the Philippines
INDC	Intended National Determined Contributions
LCCAP	Local Climate Change Action Plan
LDRRMP	Local Disaster Risk Reduction Management Plan
LDRRMC	Local Disaster Risk Reduction Management Council
LDRRMF	Local Disaster Risk Reduction Management Fund
LGU	Local Government Unit
MCA	Multi-Criteria Analysis
NCCAP	National Climate Change Action Plan
NDRRMC	National Disaster Risk Reduction Management Council
NDRRMP	National Disaster Risk Reduction and Management Plan
NFSCC	National Framework Strategy for Climate Change
NGOs	Non-Government Organizations
NRA	Natural Resource Assessment
OCD	Office of Civil Defense
PDP	Philippine Development Plan
PPFDP	Provincial Physical Framework and Development Plan
PSF	People's Survival Fund
RA	Republic Act
RTM	Risk Transfer Mechanism
VRA	Vulnerability and Risk Assessment

Definition of Terms

Natural Resources - Useful raw materials that occur naturally within a community.

Natural Resource Assessment - A process of determining the state of the natural resources of a community

Natural Assets - These are assets from the natural environment, such as biological assets (produced or wild), land and water areas with their ecosystems, subsoil assets and airi

Renewable Resources that are replenished by the environment over relatively short periods of time (e.g., geothermal energy and biofuels)

Non-renewable Resources that do not renew themselves at a sufficient rate for sustainable economic extraction (e.g., minerals and natural gas).

CRGG Framework - Is a participatory, systematic, and objective process for "climate-proofing" of local development plans to address local development priorities while considering the impacts of climate change, underlying trends in local economic growth, and effects on community welfare (GGI, 2015).

Secondary Data - Data that come from published studies and reports, e.g., censuses, comprehensive land use plans, and provincial development and physical framework plans.

Rapid Natural Resource Assessment - A quick, accurate and inexpensive evaluation of the status of the natural resources of a community (to supplement the secondary data) for planning purposes.

I. Introduction

Natural resources are useful raw materials that occur naturally within a community. The inhabitants cannot make natural resources but these can be modified and altered in ways that are beneficial to them. For example, water can be turned into hydroelectric energy, sunlight into solar power, and minerals into steel. There are several ways to classify natural resources; if natural resources come from living things or organic materials, then they are considered biotic resources. Biotic resources include plants and animals while biotic resources originate from non-living materials (e.g., air, sunlight, water and minerals). Renewable resources are replenished by the environment over relatively short periods of time (e.g., geothermal energy and biofuels) while non-renewable resources do not renew themselves at a sufficient rate for sustainable economic extraction (e.g., minerals and natural gas).

Maintaining healthy and stable natural resources (or ecosystems) is a necessity in the face of a changing climate. Natural resources provide essential services for communities: food and water; cultural and recreational benefits; support functions such as nutrient cycling, water cycling, soil formation and retention; and regulating functions on climate change impacts such as floods, droughts, strong winds and soil erosion. The impacts of climate change are chains of inter-related events that affect the overall resiliency of the natural ecosystems and the people depending on their environmental services. For instance, typhoons and floods destroy crops and infrastructure (dams, roads, power) which are the foundations in attaining food security (supply, distribution, and consumption), water sufficiency and energy security.ii

To address the challenges brought by climate change impacts, the Philippine government enacted Republic Act (RA) 9729 (the Climate Change Act of 2009), RA 10121 (Disaster Risk Reduction and Management Act of 2010), and R.A. 10174 (the People's Survival Funds Act of 2012). These legislations provide the legal and institutional bases to strengthen local climate resilience and capacities of communities in building Communities for Resilience (CORE). Capacity building of LGUs is a priority in planning for their Local Climate Change Action Plans (LCCAPs) and local disaster risk reduction management.

The natural resources of a community should be considered when identifying climate change adaptation and mitigation measures for local planning and decision-making. In turn, this will help promote ecological stability and sustainable economic development in the community. These natural resources are significant contributors to the well-being and development of on-site stakeholders as well as the off-site communities, both directly and indirectly.

1.1 Overview

The Training Manual on Natural Resource Assessment (NRA) focuses on the current state of the municipality's natural resources to establish the baseline conditions as an input to CORE planning. Maintaining healthy and stable natural resources (or ecosystems) is a necessity in the face of a changing climate. Natural resources provide essential services for communities: food and water; cultural and recreational benefits; support functions such as nutrient cycling, water cycling, soil formation and retention, and regulating functions on climate change impacts such as floods, droughts, strong winds and soil erosion. The impacts of climate change are chains of inter-related events that affect the overall resiliency of the natural ecosystems and the people depending on their environmental services.

This manual details the process in assessing a locality's natural resources and the components of the NRA assessment in terms of data and information gathering, data analysis, and report writing and presentation. The first part discusses the NRA framework in the context of the CORE planning framework); the second part is about the community's profile; and the third part tackles the sectoral NRAs, namely, agriculture, water, coastal/marine, biodiversity, forestry, minerals, and tourism.

1.2 Summary of Topics

Session 1: Introduction to Natural Resource Assessment

1.1 Pre-Training Assessment

1.2 Expectations Check

1.3 Overview of NRA Module

Session 2: Concepts of Natural Resources Assessment

2.1 Definitions and Elements of Natural Resources

2.2 Natural Resource Assessment and Natural Resource Management

2.3 Natural Resources and Development Planning in the Face of Climate Change Impacts

Session 3: Understanding Natural Resource Assessment in the context of the CORE planning process

3.1 Role of NRA in CORE Planning Process

3.2 Relative Position of NRA in the CORE Planning Process

3.3 NRA Data Sources

Session 4: Steps in conducting NRA in the context of CORE planning

4.1 Formation of the NRA Team (interdisciplinary; from Different LGU Departments)

4.2 Identification of Natural Resources to be Assessed

4.3 Prioritization of the Identified Natural Resources

4.4 Validation of the Prioritized Natural Resources to be Assessed

4.5 Data and Information Gathering

4.6 Data Processing and Analysis

4.7 Report Preparation and Reporting (Utilization and Communication)

II. Learning Objectives

At the end of Natural Resource Assessment Manual, the participants will be able to:

- Understand and operationalize the natural resource assessment process;
- Identify and prioritize the key natural resources to be assessed;
- Determine the relevant natural resources data and where to collect such data;
- Assemble, process and analyzed the NRA data collected; and
- Prepare the NRA report for reporting (utilization and communication).

III. Manual Content

Session 1: Introduction to Natural Resource Assessment

This session will include the conduct of Pre-Training Assessment, Expectation Check, and an Overview of the NRA Manual. The overview shall include module description, learning objectives, content, schedule, and general introduction on NRA.

Session 2: Concepts of Natural Resource Assessment

Natural Resources are natural assets (i.e., raw materials) occurring in nature that can be used for economic production or consumption. They can be defined further as critical resources supplied by nature that are irreplaceable or very expensive to replace if used up or destroyed. The municipality's inhabitants cannot make natural resources but these can be modified and altered in ways that are beneficial to them. For example, water can be turned into hydroelectric energy, sunlight into solar power, and minerals into steel.

There are several ways to classify natural resources

Renewable resources: Those replenished by the environment over relatively short periods of time such as geothermal energy and biofuels, etc.

- Biotic Resources: Those that come from living things or organic materials such as plants and animals, etc.
- Abiotic Resources: Those that originate from non-living materials such as air, sunlight, water and minerals, etc.
- Renewable resources: Those replenished by the environment over relatively short periods of time such as geothermal energy and biofuels, etc.
- Non-renewable resources: Those that do not renew themselves at a sufficient rate for sustainable economic extraction such as minerals and natural gas, etc.

Natural resources provide essential services for communities like food and water; cultural and recreational benefits; support functions such as nutrient cycling, water cycling, soil formation and retention, and regulating functions on climate change impacts such as floods, droughts, strong winds and soil erosion. The impacts of climate change are chains of inter-related events that affect the overall resiliency of the natural ecosystems and the people depending on their environmental services. For instance, typhoons and floods destroy crops and infrastructure (dams, roads, power) which are the foundations for attaining food security (supply, distribution, and consumption), water sufficiency and energy security.

Natural Resource Assessment (NRA) determines the current state of the municipality's natural resources to establish the baseline conditions for planning and decision-making. NRA results serve as a benchmark for monitoring and evaluation of the CORE project's results and impacts. With 2016 as the base year, the CORE's objectives would be tested after the planning period of 10 years, 20 years or 30 years (Figure 1).

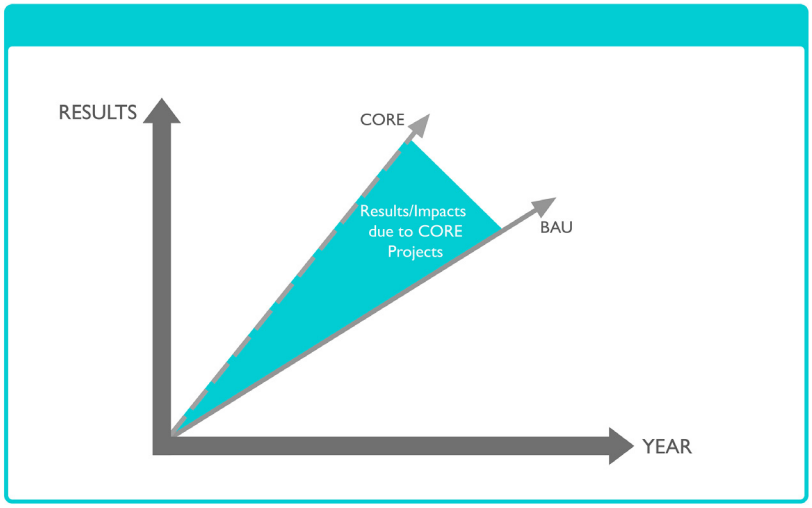

Figure 1. NRA results can be used to measure the impacts of CORE planning on the ecosystem of a municipality in relation to business-as-usual planning scenario.

Session 3: Understanding the Natural Resource Assessment in the context of the CORE planning process

The NRA Framework in the Context of the CORE Model

In line with the provisions of Republic Act 9729 (the Climate Change Act of 2009) as amended by R.A. 10174 (the People's Survival Funds Act of 2012), the implementation of climate change action plans at the local level will be packaged using the concept of ecologically stable and economically resilient towns or ecotowns.

The National Climate Change Action Plan (NCCAP) refers to an ecotown as a planning unit composed of municipalities or a group of municipalities located within and in the boundaries of critical key biodiversity areas (forest, coastal/ marine and fishery, or watersheds), highly vulnerable to climate change risks due to its geography, geographic location, and poverty situation. The climate change and disaster risk resilience of the communities and the ecosystems within these ecotowns will be strengthened and enhanced towards their conversion to Communities for Resilience (CORE).

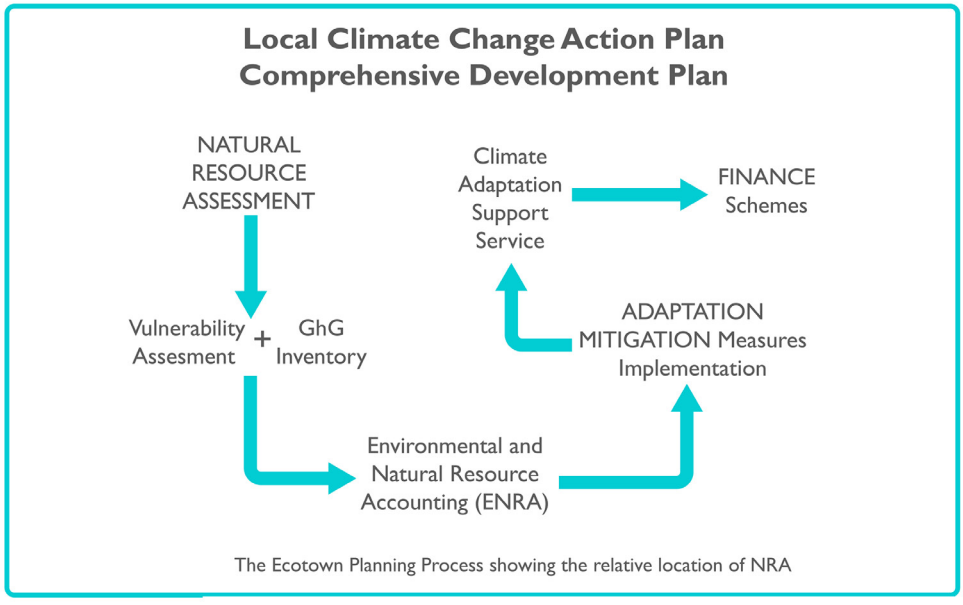

Figure 2. The CORE Planning Process showing the relative location of NRA.

The CORE planning process is the first step in the development of the local climate change action plans (LCCAP) operationalized in the comprehensive land use plan and other development plans (Figure 2). It is the basis of the other CORE components such as: vulnerability assessment; environmental and natural resource accounting; adaptation and mitigation measures; and finance schemes.

NRA looks deeply into the ecological and socio-economic-related data and information of the CORE areas based on their ecosystems, land uses and economic activities. This profiling also considers the identified natural and climate-related hazards and economic development.

NRA's main objective is to determine the state, utilization, management and potentials of the natural resources of the community. It involves the inventory and assessment of land cover and stocks of resources through characterization and identification of critical issues and future opportunities which includes the conduct of sectoral assessment for forestry, water, agriculture, coastal/marine, and minerals. Other considerations include existing natural resource management regimes, climate change risk areas, potentials for ecotourism and other relevant uses. An integral component of NRA is mapping through geographic information system-remote sensing (GIS-RS) that are validated with the community.

The objective of rapid assessment is to gather available data that can be used by the local government for their planning. It includes research and assembly of a provincial profile with focus on the collection and organization of statistics from the Provincial Development and Physical Framework Plan (PDPFP); and other statistical compilations of climate projections based on "top-down" climate modeling data applicable to the province that characterizes the natural asset base. The assessment shall also consider the local development plans and trends based on the PDPFP, economic trends and poverty incidence patterns as shown in available statistics, and key private sector development plans. These data are then analyzed and synthesized as inputs to the next planning stages.

Session 4: Steps in conducting NRA in the Context of CORE Planning

As shown in Figure 3 and described in Table 1, the NRA for a municipality's CORE planning involves the following:

1. Constituting an NRA team with members coming from the LGU's various offices to plan and implement the NRA activities;
2. Identifying, prioritizing and validating the natural resources data to be collected;
3. Collecting secondary data from the CLUP and relevant reports;
4. Consolidating, processing, and analyzing the collected data; and
5. Preparing the NRA report and reporting the results as inputs to the other elements of CORE planning.

Data collection, collation and analysis should be done for the physical and natural resource assessment of the municipality focusing on aspects important for CORE planning. This would entail the assessment of the biophysical assets that include agriculture, forests, coastal and marine, water, biodiversity and minerals.

The NRA data will come mainly from secondary sources (review of literature) such as the CLUPs and other documents. The idea is to build upon data and information that are already available at the national, regional, provincial, and local levels. Data to be collected, processed and analyzed should include quantitative and qualitative information on the municipality's major sectors and subsectors that are time-based trends. The existing baseline data and information should be summarized as technical reports that include discussion of results with tables, graphs, and maps.

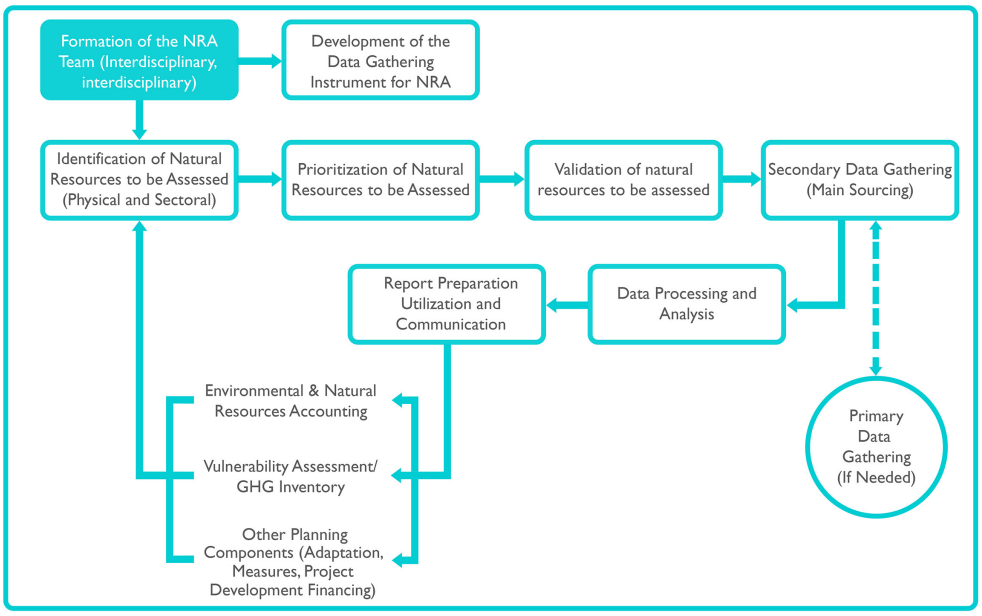

Figure 3. Procedural Flow of the NRA Process of CORE Planning

Step 1: Constituting an NRA team

An interdisciplinary NRA team should be formed with members coming from the various units of the LGU to ensure NRA's interdisciplinary nature. The team shall be trained on the basics of NRA by trainers coming from the State Universities and Colleges (SUCs) and would undertake the entire NRA process from planning to implementation. An initial activity is to develop the data gathering instrument for NRA to be guided by the suggested template (Annex 1).

Step 2: Identification of the natural resources to be assessed

Collectively, the members of the planning team should identify the natural resources at the municipal levels based on the CORE planning framework. The data gathering instrument template (Annex 1) can be used for the identification of natural resources. The output would be a long list or a menu of natural resources to be assessed in the municipality.

The suggested natural resources to be identified in a given municipality includes the following:

- Physical features (location, topography, climate, slopes, climatic type, geology, etc.)
- Sectors and their subsectors:

– Agriculture (crop, livestock and poultry and fisheries
– Forestry (closed canopy, open canopy, shrub lands, grasslands, etc.)
– Water (surface and groundwater)
– Minerals (metallic, non-metallic)
– Coastal and marine (mangroves, coral reefs, sea grass)
– Biodiversity (terrestrial flora and fauna, aquatic flora and fauna)

Step 3: Prioritization of the natural resources to be assessed

From the long list of identified natural resources, the members of the planning team and stakeholders' representatives should prioritize the natural resources to be assessed. The criteria for prioritization should be developed by the NRA team and to be validated by the stakeholders. Prioritization can be done by consensus, multi criteria analysis, and other techniques.

Step 4:Validation of the natural resources to be assessed

The prioritized natural resources shall then be validated further with all the stakeholders by the NRA team. This can be done by public consultations.

Step 5: Data and information gathering

Secondary Data Gathering. As specified by the CORE planning framework (Stage 1, Step 2), secondary data gathering should be the primarily means of data gathering. Existing information on the natural resources of the LGUs will be collected and compiled. A key goal of this step is to build upon information that already exists at the provincial, national and local levels for the CORE planning effort.

Primary Data Gathering. Additional surveys and field measurements may be needed but these will be carefully done based on the need to fill major data gaps, and preferably rapid and inexpensive to implement.

Step 6: Data assembly, processing and analysis

The existing baseline data and information should be summarized as technical reports that include discussion of results with tables, graphs, maps and photographs for use in overlaying demographic, agricultural, economic development, and related information.

The qualitative and quantitative analysis should include the following details:

- Narrative description of the provincial and municipal settings (demographic, physical, economic, and environmental) with summary tables showing gender-disaggregated patterns where available;
- Set of tables and maps describing climate impacts on the province/municipality;
- Quantitative and qualitative listing of the provincial/municipal assets base;
- Matrix highlighting key components of existing provincial economic development plans, municipal plans with provincial implications, and of existing trends in key industries not necessarily covered by government plans; and

Synthesis and integration of the salient and relevant features for climate adaptation and mitigation options.

Step 7: Report preparation, packaging and report utilization (Communication)

Under the CORE planning framework, the NRA results shall serve as inputs to the environmental and natural resource accounting and vulnerability analysis. The results would also establish the baseline scenario for monitoring and evaluation of the adaptation measures that will come out of the CORE planning exercise in comparison with the business as usual planning model.

The natural resource assessment task is not for stocktaking purposes alone. The NRA data and information reflect the different human, institutional, and physical assets and resources that can be integrated in planning of economic development and climate change adaptation. The NRA analysis will guide the planners to formulate climate adaptation options with inclusive economic development goals and climate resiliency for the communities.

IV. Exercises

Worksheet for the Natural Resource Assessment (NRA) for CORE Planning

Direction: Using an available CLUP (if you have copy from your place) as a secondary data source, fill-up the following items:

1. Location where CORE planning will be applied:

   a. River Basin:

   b. Municipality/City:

2. Natural Resource Assessment Worksheet (see matrix next page)

NATURAL RESOURCE ASSESMENT WORSHEET

Natural Resource	No./Qty.	Unit	Description	Data Sources (w/ Dates)	Remarks
PHYSICAL FEATURES					
1. Coordinates (Location)					
2. Total Land Area					
(a) No. of islands		No.			
(b) Coastline length		km			If applicable
(c) Marine territorial waters		ha			If applicable
(d) Coastal territorial waters		ha			If applicable
3. Topography					
(a) Average elevation		m			
(b) Highest elevation		m			
4. Slope					
(a) Category I		ha	Includes all level to nearly level land w/ controlling slope ranging from 0-30.		
(b) Category II		ha	Includes all gently sloping to undulating land w/ slope ranging from 3-10%.		
(c) Category III		ha	Includes all moderately sloping to rolling land w/ slope ranging from 10-15%.		
(d) Category IV		ha	Includes steeply rolling lands w/ slope from 15-45%.		
(e) Category V		ha	Includes all mountains and lands with slope greater than 45%.		If applicable

Natural Resource	No./Qty.	Unit	Description	Data Sources (w/ Dates)	Remarks
5. Soils					
(a) Soil classification (group)					
— Class I (Example)		ha	Mountainous soil		
— Class II (Example)		ha	Lowland		
— Class III (Example)		ha	Upland soils having rolling topography		
— Class IV (Example)		ha	Beach Sand		
(b) Soil types					
— Type I		ha	Clay		
— Type II		ha	Loam		
— Etc.		ha			
6. Land Use and Classification					
(a) Alienable and Disposable Land		%			
(b) Forest Land		%			
— Forest Reservation		%			
— Timberland		%			
— National Parks, Game Refuge and Bird Sanctuaries		%			
— Civil Reservation		%			
— Mangrove Areas		%			

Natural Resource	No./Qty.	Unit	Description	Data Sources (w/ Dates)	Remarks
TOTAL		%			
7. Land Cover					
(a) Closed Forest, Broad-leaved		ha			
(b) Inland Water		ha			
(c)Mangrove Forest		ha			
(d) Open Forest, Broad-leaved		ha			
(e) Other Land, Built-Up Area		ha			
(f) Other Land, Cultivated, Annual Crop		ha			
(g) Other Land, Cultivated, Perennial Crop		ha			
(h) Other Land, Natural, Barren Land		ha			
(i) Other Land, Fishpond		ha			
(j) Other Land, Natural, Grassland"		ha			
(k) Other Wooded Land, Fallow		ha			
(l) Other Wooded Land, Shrubs		ha			
(m) Other Wooded Land, Wooded Grassland		ha			
TOTAL		ha			
8. Geology/Geomorphology					

Natural Resource	No./Qty.	Unit	Description	Data Sources (w/ Dates)	Remarks
9. Climate					
(a) Climatic Type					
(b) Rainfall Pattern					
(c) Temperature					
(d) Wind					
(e) Relative Humidity					
10. Air (and Noise)					
(a) Air Quality (Air Pollution)					
(b) Noise Level					
SECTOR					
A. Agriculture Sector					
1. Crop Subsector					
(a) Rice		ha			
- Irrigated		ha			
- Non-irrigated (rainfed)		ha			
(b) Coconut		ha			
(c) Fruit trees		ha			
(d) Vegetables		ha			
(e) Root crops		ha			
(f) Others (specify)					
2. Livestock and Poultry Subsector					

Natural Resource	No./Qty.	Unit	Description	Data Sources (w/ Dates)	Remarks
(a) Livestock					
- Cattle		No.			
- Carabao		No.			
- Etc.		No.			
(b) Poultry					
- Chicken		No.			
- Ducks		No.			
- Etc.		No.			
3. Fisheries Subsector		mt			
(a) Freshwater					
(b) Coastal (municipal)					
(c) Aquaculture					
B. Water Sector					
1. Surface Water					
(a)Principal Rivers & Drainage Areas		ha			
(b)Lakes		ha			
(c)Springs		No.			
(d)Irrigation Reservoirs		No.			
(e)Hydroelectric Dams		No.			
2. Groundwater					

Natural Resource	No./Qty.	Unit	Description	Data Sources (w/ Dates)	Remarks
(a)Location of Major Aquifers					
(b)Extraction					
3. Water Use					
(a)Domestic					
- Level I		No.			
- Level II		No.			
- Level III		No.			
(b) Agriculture (Irrigation)		MCM	Million Cubic Meters		
C. Coastal and Marine Sector					
1. Mangroves		ha			
2. Coral reefs		ha			
3. Seagrass		ha			
D. Forestry Sector					
1.Protection Forests		ha			
2.Production Forest					
(a) CBFMA		ha	CBFMA - Community-based forest management agreements		
(b) FLGMA		ha	FLGMA - Forestland grazing management agreements		
(c) SIFMA		ha	SIFMA - Socialized industrial forest management agreements		

Natural Resource	No./Qty.	Unit	Description	Data Sources (w/ Dates)	Remarks
(d) AFLA		ha	*AFLA - Agroforestry lease agreements*		
E. Mineral Sector					
1. Metallic					
(a) MPSA	v	ha	*MPSA - Mineral production sharing agreement*		
(b) Exploration		ha			
2. Non-Metallic					
(a) Quarry		ha			
(b) Sand and Gravel		ha			
F. Biodiversity(Protection Lands)					
1. Flora					
(a) Terrestial					
(b) Aquatic					
2. Fauna (Wildlife)					
(a) Terrestial					
(b) Aquatic					
3. Protected Areas					
(a)NIPAS Areas		ha	*NIPAS - National Integrated Protection Area System*		
(b)Core Zones		ha			
(c)Restricted Buffer Zones		ha			

Natural Resource	No./Qty.	Unit	Description	Data Sources (w/ Dates)	Remarks
(d) Controlled Buffer Zones		ha			
(e) Mangroves		ha			
(f) NPAA Areas		ha	NPAA - Network of Protected Agricultural Areas		
(g) SAFDZ Areas		ha	Strategic Agriculture and Fisheries Development Zones		
G. Ancestral Domains					
1.CADC		ha	Certificate of Ancestral Domain Claims		
2.CADT		ha	Certificate of Ancestral Domain Titles		
H. Other Natural Resources (Specify)					
1.					
2.					
3.					
4.					
5.					

V. Endnotes

I. Definition from Glossary of Statistical Terms, stats.oecd.org/glossary/detail.asp?ID=1729

II. Various estimates point out that the annual damages wrought by typhoons, floods and droughts cause a significant dent to the Philippine gross domestic product (GDP). For example, The World Bank (WB, 2015) estimated that the economic damage and other losses due to climate-related disasters that hit the Philippines in the last 5 years (2009-2014) amounted to at least $18.6 billion or P799 billion, while around 10,000 people casualties due to Typhoons Yolanda, Ondoy, Pepeng and Sendong. FAO (2016) stated that the El Niño phenomenon (drought) has been especially destructive in Mindanao, which is the Philippines' breadbasket, supplying more than 40 percent of the nation's food.

References and Reading Materials

Mahan, C.G., J.P. Vanderhorst, and J.A. Young(2009). Natural Resource Assessment: An Approach to Science Based Planning in National Parks. Environment Management 43: 1301-1312.

Philippine Statistics Authority (http://psa.gov.ph/) . The PSA portal is full of useful information that you can use. Here are some:

- Compendium of Philippine Environment Statistics.
- Retrieved from http://www.nscb.gov.ph/publication/environment/envi_cpes.asp
- Country STAT Philippines. Retrieved from http://countrystat.psa.gov.ph/
- National Accounts. Retrieved from http://psa.gov.ph/nap-press-release/data-charts

Types of Natural Resources." BOUNDLESS ECONOMICS. (26 May 2016).

Retrieved 11 Jul 2016 from https://www.boundless.com/economics/textbooks/boundless-economics-textbook/natural-resource-economics-36/introduction-to-natural-resource-economics-136/types-of-natural-resources-536-12633/

United Nations Databases

- Food and Agriculture Organization of the United Nations (FAO) Database
  - FAO. FAOSTAT: http://faostat.fao.org/
  - AQUASTAT: http://www.fao.org/nr/water/aquastat/dbase/index.stm
- International Union for Conservation of Nature and Natural Resources (IUCN) http://www.iucnredlist.org/
- UN Data http://data.un.org/
- United Nations, Department of Economic and Social Affairs, Population Division,http://www.un.org/esa/population/
- United Nations Framework Convention on Climate Change (UNFCCC) Secretariat: http://unfccc.int/ghg_emissions_data/items/3800.php
- United Nations Statistics Division (UNSD) Demographic Statistics Yearbookhttp://unstats.un.org/unsd/demographic/products/dyb/default.htm
- United Nations Statistics Division (UNSD) Energy Statistics Database: http://unstats.un.org/unsd/energy/default.htm
- United Nations Statistics Division (UNSD) Environment Statistics Database http://unstats.un.org/unsd/environment/qindicators.htm
- United Nations Statistics Division (UNSD) Millennium Development Goals (MDG) Indicator Databasehttp://mdgs.un.org/unsd/mdg/Data.aspx
- United Nations Statistics Division (UNSD) National Accounts Database http://unstats.un.org/unsd/snaama/introduction.asp

Annexes

A. Suggested NRA Report Outline

B. NRA Data Gathering Instrument Template

Annexes

Annex A. Template for the Outline of NRA

1. Community Profile (Situational Analysis of a Province or a Municipality)

A. Physical features

- Location
- Area (land and territorial waters)
- Climate
- Topography
- Slope
- Geology
- Soil resource

B. Population (Demography)

- Population
- Population growth rate
- Population density
- Socioeconomics

2. Sectoral NRA

A. Agricultural Sector

- Introduction
- Agricultural area (total area vis-a-vis other land uses), disaggregated by crops
- Number of farms (average area of landholdings/farmer)
- Agricultural commodities grown and raised (crop, livestock, and fisheries)
- Demography (population, growth rate, density, migration patterns)
- Employment and income
- Off-farm and non-farm livelihood
- Agricultural commodities grown (location, area, productivity)
- Hazard exposures (floods, droughts, land slides/soil erosion, pests and diseases)
- Management
- Major issues in the agricultural sector
- Results and discussion
- Conclusion and recommendation

B. Water Sector

- Introduction
- Groundwater resources
- Surface Water Resources
- Springs
- Potable Water Supply & Facilities
  - Level I (Point source)
  - Level II (Communal faucets)
  - Level III (House connection system)
- Agricultural Water Supply & Facilities
- Management
- Issues: Water supply
- Results and discussion
- Conclusion and recommendations

C. Coastal and Marine Sector

- Introduction
- Coastal areas
- Mangroves
- Coral reefs
- Sea grass
- Fishery
- Management
- Issues and Challenges
- Results and discussion
- Conclusion and recommendations

D. Forestry sector

- Introduction
- Production Forests
- •Protection Forests
- Management
- Issues
- Results and discussion
- Conclusion and recommendations

E. Biodiversity resources (Protection areas)

- Introduction
- Biological Resources
  - Terrestrial
  - Aquatic
- Major issues
- Management
- Results and discussion
- Conclusion and recommendations

F. Mineral resources

- Introduction
- Mineral deposits
- Mineral exploration and extraction
- Mineral resource management
- Issues
- Results and discussion
- Conclusion and recommendations

Annex B. NRA Data Gathering Instrument Template

National Resources	Area (Km)	Unit/ Count	Data Sources (With Dates)	Description / Notes	Verified by & Acceptable to The NRA Team	
MUNICIPALITY					YES	NO
A. PHYSICAL FEATURES						
1.1 Total land area						
1.1.1 No. of islands						
1.1.2 Length of the province (N-S)						
1.1.3 Coastline length						
1.1.4 Coastal territorial waters						
1.2 Topography						
1.2.1 Average elevation						
1.2.2 Highest elevation						
1.3 Slope						
1.3.1 Category I				Includes all level to nearly level land with controlling slope ranging from 0 - 30.		
1.3.2 Category II				Includes all gently sloping to undulating land with slope ranging from 3 -10%.		

National Resources	Area (Km)	Unit/ Count	Data Sources (With Dates)	Description / Notes	Verified by & Acceptable to The NRA Team	
1.3.3 Category III				Includes all moderately sloping to rolling land with slope ranging from 10 -15%.		
1.3.4 Category IV				Includes steeply rolling lands with slope from 15 - 45%.		
1.3.5 Category V				Includes all mountains and lands with slope greater than 45%.		
1.4 Fault lines						
1.5 Soils						
1.5.1 Soil classification (group)						
1.5.2 Soil types						
1.6 Land Use and Classification	Area (ha)	%				
1.6.1 Alienable and disposable land						
1.6.2 Forest land						
a) Forest reservation						
b) Timberland						
c) National parks, game, refuge and bird sanctuaries						
d) Civil reservation						
e) Mangrove areas						

National Resources	Area (Km)	Unit/ Count	Data Sources (With Dates)	Description / Notes	Verified by & Acceptable to The NRA Team	
TOTAL						
1.7 Land Cover						
1.7.1 Closed forest, broadleaved						
1.7.2 Inland Water						
1.7.3 Mangrove Forest						
a) Open forest, broadleaved						
b) Other land,built-up area						
c) Other land, cultivated, annual crop						
d) Other land, cultivated, perennial crop						
e) Other land, naturotbanen land						
f) Other land, fishpond						
g) Other land, natural, grassland						
h) Other wooded land, fallow						
Other wooded land, shrobs						
j) Other wooded land,wooded grassland						
Total						

National Resources	Area (Km)	Unit/ Count	Data Sources (With Dates)	Description / Notes	Verified by & Acceptable to The NRA Team	
1.8 Geology/Geomorphology						
1.9 Climate						
1.9.1 Climatic type						
1.9.2 Rainfall pattern						
1.9.3 Temperature						
1.9.4 Wind						
1.9.5 Relative humidity						
1.10 Air (and Noise)						
1.10.1 Air quality (air pollution)						
1.10.2 Noise level						
B. SECTOR						
Agriculture						
1.1 Agriculture Sector						
1.1.1 Rice						
a)Irrigated						
b)Non-irrigated (railed)						
1.1.2 Coconut						
1.1.3 Calamansi						
1.1.4 Fruit trees						

National Resources	Area (Km)	Unit/ Count	Data Sources (With Dates)	Description / Notes	Verified by & Acceptable to The NRA Team	
1.1.5 Vegetables						
1.1.6 Root crops						
1.1.7 Others						

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