

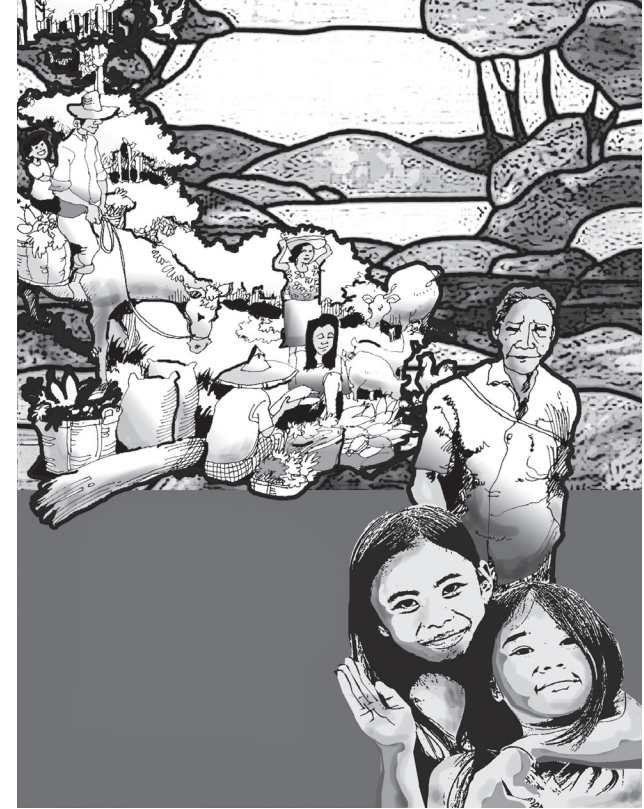
# KNOWLEDGE SHARING FOR COLLECTIVE CLIMATE ACTION

*Edited by*

Alexander G. Flor  
Benamina Paula G. Flor



**KNOWLEDGE SHARING  
FOR COLLECTIVE CLIMATE ACTION**



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Alexander G. Flor  
Benamina Paula G. Flor



Faculty of Information and Communication Studies  
University of the Philippines  
OPEN UNIVERSITY  
2019

***Knowledge Sharing for Collective Climate Action***

Edited by Alexander G. Flor and Benjamina Paula G. Flor  
Faculty of Information and Communication Studies



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to  
*climate action thought leader*  
**Eduardo C. Sison**  
*(1945-2019)*



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We are grateful for the support of the University of the Philippines Academic Program Improvement (API) facility, the Global Environmental Fund, the World Bank, the Department of Environment and Natural Resources, Department of Agriculture, the Asian Institute of Development Studies and most especially the UP Open University who made this open educational resource possible.

Our profound gratitude goes to our talented artist, Bernie Remoquillo, our editorial managers, Gian Rose Cerdena and Jennifer Pareja, as well as our peer reviewer, Dr. Eduardo C. Sison.

We are thankful for your valuable and significant contribution to this volume and to the larger undertaking of collective climate action.

# KNOWLEDGE SHARING FOR COLLECTIVE CLIMATE ACTION

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## Preface

*It is still possible, with strong political will, increased investment and using existing technology, to limit the increase in global mean temperature...but this requires urgent and ambitious collective action.*

### **SDG 13. Climate Action**

*Knowledge Sharing for Collective Climate Action* is an eBook, one of the major references for the Massive Open Online Course developed by the UP Open University titled *Knowledge Management for Development (KM4D)*. It is an open educational resource (OER) registered under the Creative Commons and is freely downloadable to our MOOC participants. The UPOU Faculty of Information and Communication Studies takes great pride in initiating such a course and making it, as well as the eBook, available globally to all interested. This volume is also required reading for two formal online courses offered by UPOU: MMS 131. KM4D, under the Bachelor of Arts in Multimedia Studies; and COMM 350. Information and Knowledge Management, under the Doctor of Communication Program. It may be used as reference in environmental advocacy and communication courses offered by the UPOU Faculty of Management and Development Studies and the UPLB College of Development Communication, which we helped develop.

From the very beginning, KM proponents have maintained that knowledge is best shared as lessons learned, good practices and, interestingly enough, stories. The latter's chief proponent was Stephen Denning, who established the World Bank Knowledge Management Program and is considered the intellectual father of KM4D. This volume contains both good practices and stories that promote collective climate action.



Part A contains ten food security-related climate change adaptation practices compiled under the Philippine Climate Change Adaptation Project or PhilCCAP sponsored by the Global Environmental Fund and the World Bank. It was jointly executed by the Department of Environment and Natural Resources and the Department of Agriculture. One of the technical assistance studies conducted under this project was a *Baseline Survey on the Level of Awareness and Knowledge on the Use of Adaptation Technologies* which was commissioned to the Asian Institute of Developmental Studies (AIDS). The team assembled by AIDS consisted of Dr. Benjamina Paula Flor (Team Leader), Dr. Rogelio Concepcion, Dr. Nestor Baguion and I. One of the deliverables of the undertaking was the documentation of “good climate change adaptation and mitigation practices to serve as a resource guide for government agencies, non-government organizations, private organizations and other users who may find it useful.” It was this intent that prompted us to share this material, with support from the UP Academic Program Improvement facility, through a MOOC.

Part B shares eighteen stories on climate change from the *Dalaw-Turo* initiative. Collectively, they represent the output of four cluster seminar-workshops participated in by DENR officers representing sixteen regions as well as the entire spectrum of the environment and natural resources sector, namely, forestry, mining, lands, protected areas, coastal resources, and environmental management. Its writers range from Regional Public Affairs Officers (RPAOs) to communication specialists, foresters to engineers, and *Dalaw-Turo* veterans to newbies. Its varied scope, notwithstanding, the stories adopted one overarching theme, climate change.

*Dalaw-Turo* (DT), the literal translation of which is *teaching visits*, is an environmental outreach program initiated in the early nineties by the DENR Protected Areas and Wildlife Bureau. Its

aim is to educate communities on pressing environmental issues through participatory rural theater, songs, games and other local and indigenous media.

My earlier work on environmental communication articulates on the concept of *environmental interpretation*, a communication activity designed to forge emotional and intellectual connections between an audience and the messages or meanings inherent in the environment. The good practices and stories contained in the eBook are now being made available to the rest of the world and may be used as vehicles for environmental interpretation. After all, the agency for climate change knowledge sharing resides more in us than in our environment. Hopefully, knowledge sharing will lead to collective climate action.

**ALEXANDER G. FLOR**

Faculty of Information and Communication Studies  
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## List of Acronyms and Abbreviations

AIDSI	Asian Institute of Developmental Studies, Inc.	LAN	Local Area Network
ATI	Agricultural Training Institute	LGU	Local Government Unit
BAR	Bureau of Agricultural Research	LMS	Land Management Service
BOL	Bureau of Lands	NGO	Non-Government Organization/s
CapDev	Capacity Development	PAO	Public Affairs Office
CAR	Cordillera Autonomous Region	PAWB	Protected Areas and Wildlife Bureau
CBFMD	Community Based Forest Management Division	PAWCZMS	Protected Areas, Wildlife and Coastal Zone Management Service
CCA	Climate Change Adaptation	RPAO	Regional Public Affairs Office
CCC	Climate Change Commission	PAP	Programs, Activities, Projects
CLUP	Comprehensive Land Use Plan	PhilCCAP	Philippine Climate Change Adaptation Project
CMS	Content Management System	PMO	Project Management Office
CoC	Community of Champions	RA9729	Climate Change Act
CoP	Community of Practice	SCCF	Special Climate Change Fund
CSO	Civil Society Organization	SDG	Sustainable Development Goal
DA	Department of Agriculture	TA	Technical Assistance
DENR	Department of Environment and Natural Resources	TNA	Training Needs Assessment
DT	<i>Dalaw Turo</i>	TWG	Technical Working Group
ECS-FFS	Enhanced Climate Smart Farmers' Field School		
EMB	Environmental Management Bureau		
ERDB	Environmental Research and Development Bureau		
ERDS	Environmental Research and Development Service		
FASPO	Foreign Assisted Projects Office		
FB	Facebook		
FM	Frequency Modulation		
FMB	Forest Management Bureau		
FMS	Forest Management Service		
GEF	Global Environment Facility		
IFS	Integrated Farming Systems		
IEC	Information, Education and Communication		
KAP	Knowledge, Attitudes and Practices		
KM	Knowledge Management		
NCCAP	National Climate Change Action Plan		



## PART A.

# GOOD CLIMATE CHANGE ADAPTATION PRACTICES

## PROLOGUE TO PART A

This collection consisting of ten peer-reviewed good practices were selected through a contextualization of the new normal and the rationale for climate change adaptation and building resiliency. While there are many good practices on climate change adaptation, we formulated a set of criteria informed by a sound and logical framework. Thus, good practices identified cut across sectors, multi-levels, and *in situ* applications.

Our colleague, Roger Conception, may be credited for enumerating the following assumptions as our bases for selection:

***Nothing is permanent but change.*** Achieving sustainable intergenerational development under the new normal finds its major challenge by the Gautama's words of wisdom, "Everything changes, nothing remains without change" and Heraclitus affirmation that "Nothing endures but change." Further recent statements<sup>1</sup> confirmed that the present and future generation must recognize the rules under the new normal, insisting that "Building back better entails not just the simple restoration of communities, but fortifying them that they may be ready for future disasters. And that "Business as Usual" has no place if we have to survive the new normal since "it is more efficient to prioritize resilience now, rather than to keep rebuilding."

<sup>1</sup> President Benigno S. Aquino III: Briefing on the reconstruction Assistance for Yolanda Plan, December 18, 2013.



**Change is multidimensional and multilateral.** These statements stated in different episodes of change and development, confirm that the on-going multi-dimensional global climate change systems are a moving target that requires local to national co-adaptive actions on the constantly changing local weather systems characterized by micro-variations in local rainfall distribution, amidst, continuing increase in temperature. This is attributed to the archipelagic nature and variable mountainous landscapes that shields and natural divides that create wet and dry areas in the country.

**Good adaptation practice, in time, must transform into co-adaptive practice.** By nature, each practice has shared benefits and surprises from serendipitous outcomes, extending to co-strategies for disaster and risk reduction. These new attributes of managing change invokes broader than usual outlooks and outcomes requiring multiple stakeholders participation – Good practices providing the elements of “Co-Adaptive Good Practices” where positive and negative co-benefits are shared by the food security sector with broader thematic development sectors such as human safety, water, ecological and energy security, of adaptation and mitigation measures and appropriate indicators are given due attention in planning and implementing climate change adaptation with mitigation practices. The contribution of good practices may have direct and indirect impacts and contribution to the reduction, prevention and avoidance of disasters and risks related to climate change and other emerging natural disasters and risks (El Niño. Earthquake).

**Good practice reduces the threat of the tipping point from progressing towards the new normal.** Good practices face new and continuing challenges of developing programs for managing the progressive development of spatial and temporal tipping points towards the moving targets of new normal. This requires proactive governance to effectively mainstream strategic programs for managing moving targets of changing global climates and their impacts local weather systems on Food Security and Human Safety, amidst the spatial and temporal convergence of disasters, risks and socio-economic and ecological impacts of climate change, El Niño/La Niña, including non-predictable earthquakes.

**Building resilience to support survival food systems, household coping strategies become part of the multi-level adaptation systems.** Good practices must continuously contribute to building resilience of co-adaptive farming systems at different levels of agro-related livelihood systems: from backyard survival/coping food security systems to the entire sets of micro-variations of the landscape farming systems, collectively contributing to the country’s food security program, amidst the variable governance and changing climate and weather systems.

These assumptions outlined by Roger have informed the selection of the ten good practices featured.

# CHAPTER 1




## **GOOD PRACTICE: Social Mobilization through Community Radio for Climate Awareness and Adaptation**

*SOURCE: Sustainability and Prospects of Community Radio Stations  
(Flor, B., Gopela, J. and Magsino, M. UPLB, 2015)*

### **INTRODUCTION**

Announcements about occurrences of strong typhoons, tsunamis, or storm surge on television and radio before, during, and after the event may increase awareness but communities still suffer the consequences or have high casualties. As well, climate alerts on national TV may



increase cognition but do not get people to action. This is because information dissemination is geared toward the general public who may not have experienced the messages or cannot relate with what was conveyed. Messages maybe technically correct but do not address local conditions. Hence, TV viewers or radio listeners have nonchalant attitudes or oblivious towards the new normal. Understanding the new normal requires a more engaging and action-oriented communication strategy to ensure climate change adaptation. This strategy is called social mobilization through community radio. Radio among the media channels is the mainstay and resilient to change. It is cheap and a companion medium that continuously deliver entertainment, information, and education, the latter being the noblest role in development.

## DESCRIPTION

**Social mobilization** is the process of bringing together all feasible and practical inter-sectoral and social allies to raise people's awareness of the demand for a particular development program, to assist in the delivery of resources and services, and to strengthen community participation for sustainability and self-reliance (McKee, 1992). It is also the act of rallying together as many social allies - government leaders, nongovernment organizations, civil society, and business sector - to own and support a certain development program.

Socmob has six elements, namely, advocacy; Information, Education, and Communication (IEC); community organizing; capability building; monitoring and evaluation; and networking and alliance building.

**Advocacy** refers to organization of information into arguments used to persuade or convince a specific group of people to take necessary action on a specific goal. It can be in the form of pleading, defending, recommending, and supporting a policy. It is aimed at national and local leaders, policymakers, and decision-makers.

**Information, Education, and Communication (IEC)**, on the other hand, aims to generate a knowledgeable and supportive environment for decision-making. It includes the allocation of adequate resources to inform and engage various stakeholders through multiple communication channels in order to change knowledge, attitudes, opinions, and values.

**Community Organizing** involves building the community's capability for problem solving, decision-making and collective action. The community organizer serves as catalyst for the neighborhood to initiate action. This component of socmob adheres to the belief that improvements in services can be achieved if people participate in their delivery, which is nowadays referred to as *social capital formation*.

**Capability Building** refers to harnessing the community's potential, particularly in sustaining itself. Training to improve people's knowledge, attitudes, values and skills is given. It aims to develop competencies in dealing with their networks, resource sharing, problem solving, and collective action.

**Monitoring and Evaluation** seeks to determine the effectiveness of the programs as well as to improve the efficiency. It identifies weak spots of the program



and thereby makes necessary adjustments. It likewise determines impact and allows assessment of how much of the defined goals have been met.

**Networking and alliance building** brings together those who have similar interests and programs. It consists of four pillars of governance such as LGUs, NGOs, business sector, and civil society composed of schools, media, religious, and socio-civic organizations. Networks are the structures of living systems such as the community. Networks themselves behave like living systems being composed of people. However, centralized networks are short-lived compared to distributed networks. Networks value interconnectivity, reciprocity, and plain activity. More importantly, networks thrive with content else the network dies.

**Community radio** unlike commercial stations requires a two-way process where there is an exchange of views and the adaptation of media by communities. AMARC (French acronym that stands for the World Association of Community Radio Broadcasters), forwards “In an ideal world community radio allows members of a community to gain access to information, education and entertainment. In its purest sense, it is media in which the communities participate as planners, producers and performers and it is the means of expression of the community, rather than for the community.”


Furthermore, community radio was described as non-profit; community ownership and control; and community participation. According to AMARC, “This non-profit requirement does not mean that the initiative or radio station cannot be operated along business lines nor generate

commercial revenues. It does not mean either that the radio station cannot generate income in excess of its basic expenditure... It rather means that any surplus income generated has to be ploughed back into the project, be spent or invested into the development of the station.”

Social mobilization in this case will capitalize on community radio because it could only be the lone facility that would be functional in times of crises. Other channels of communication will likewise be used especially interpersonal ones. Doing social mobilization, however, cannot happen overnight. It will require commitment and dedication among stakeholders to make it work. The intention for using socmob through community radio is to educate and socially prepare the people in the community through regular local programming with participation of the people.

### **GOOD PRACTICE**

In six community radio stations in the Philippines investigated, it was found that CRS played facilitative and catalytic roles in social transformation processes. CRS sets social agenda, facilitates governance communication, enables changes in norms, and moves people to action. The synergistic action of Local Government Units, academe, civil society, and relevant national agencies through block time and community programs with guidance from the Community Radio Councils led to systematic programming and strengthened people’s capacities in addressing local issues. Running 7 days a week on an average of 15 hours/day showed that CRS performed their role even with partial support.




There were five models of operation that surfaced in the study. The first model is the Academe-National Government-Local Government Partnership (ANLP). This is the case of DXNQ. DXNQ (Radyo Kalumonan) was established with assistance from the National Nutrition Council. NNC had established more than 30 community radio stations all over the country as vehicle for disseminating information about good nutrition in areas with high incidence of malnutrition. Since Barangay Bato-Bato, San Isidro, Davao Oriental had the highest rate of malnutrition in the area; the radio station was installed there. However, the establishment was done in partnership with the academe and the Kalumonan Development Foundation, which is headed by the mayor of the municipality. This is one of the projects, of the president of the community-radio contracting firm. The academe needed a radio station as laboratory for their communication students, hence, the partnership.

In terms of ownership, it is a quad partite among LGU, academe, a national government agency (NGA), and a local foundation. The NGA, in this case is NNC who provided the equipment and audio facilities. It started with 100 watts but will be increased from 100 to 500 watts within the year. The College, on the other hand, provided the radio station (which used to be the office of the school coordinator and was converted into the radio station). NNC trained them on how to run the radio station. The role of the LGU was tapped to meet manpower requirements like the radio communications engineer, announcers, and other personnel who went on board to run their own programs. Mr. Kiko Flores of Media Zone through NCC trained them on reporting, announcing, and using audio facilities.

The second exemplar in operating a “CRS” is public-academe partnership (PAP) of DXVL. The case in point is the University of Southern Mindanao’s community radio station. While the model is not truly a CRS by definition, the practice is worth emulating. Like many universities, USM is no exception. They cannot operate commercially and did not engage in private participation when it first aired. However, when the policy of the university was imposed for all units to become income generating, the Department of Development Communication banked on going commercial in partnership with a public-owned broadcasting service, Philippine Broadcasting Service, the Radyo ng Bayan Network. Their story is something that state universities and colleges can learn from.

The third model is the **Academe-LGU Partnership (ALP)** operated by DWTG and DWRL. Started by TAMBULI, a UNESCO project in the late 90s, these two radio stations are community-based. However, securing a frequency for CRS from the National Telecommunications Commission proved difficult but with the academe to request one for educational purposes was easier. Hence, the LGUs had to partner with the Cagayan State University, which had campuses in Lal-lo and Gonzaga, where the radio stations are.

The fourth model is the religious/church-managed CRS. The DYMI Spirit FM radio station is a good example of a Religious/Ecumenical-Private Partnership (RPP). DYMI is managed through a corporation named “For the Greater Glory of God Holdings, Incorporated” (FTGGGH) with community people serving as anchors of the different programs of the station.



DYMI Shine Radio/ DYMI Spirit FM advocates for building relationships among catholic parishioners of Iloilo and its nearby provinces. With its tagline “*sama-sama* together, always and forever,” the role of the station is to bring people closer to God and help them address issues that concern people (e.g. environment).

The fifth model is **LGU-Private Partnership (LPP)** that is with the local government unit in partnership with Manila Broadcasting Company. It operates under the leadership of the Local Chief Executive cum Mayor of Kalibo, Aklan. Being a partner of MBC, the radio station follows programming protocols and guidelines observed by MBC. Meanwhile, the public through the listeners are tapped as contributors in some of the station’s programs.

DYYM 98.5 Hot FM informs the people of the various programs initiated by the local government. It makes the public aware of the activities of the different LGU line agencies including the Office of the Mayor. It coordinates with the communities and encourages community people to get involved in the various programs spearheaded by the LGU.

The CRS to be able to play its role must be fully funded by either the LGU or through private-partnerships. Its sustainability is determined by a well-staffed but flat organizational structure for faster decision-making. Staffing may include a radio station manager, a licensed radio operator technician, an anchorman/woman, a field reporter, and volunteers from the community. Ideally, volunteers should run the station but this practice is not sustainable. The lean staffing shall provide the daily services to operate the station. Block timers from relevant government offices

should form part of the organization to ensure accuracy and flow of content. The Community Radio Council, composed of the church, the academe, elders, and other stakeholders is tasked to oversee the operations of CRS in terms of programming and with the Philippine Federation of Rural Broadcasters to perform oversight function.

Community radio stations through participatory radio can serve as major channel or medium for information dissemination, education, and social transformation. The CRS at the same time should collaboratively work with relevant government offices, organizations, groups, and units to ensure a holistic approach in facing the challenges. As information sources, they shall provide content on a continuing basis, and properly captured and stored in a database that can be accessed by anyone who would need the information. Crucial to the operation is strong support from the Local Government Unit for funding and logistical support or a public-private partnership maybe resorted to whichever is applicable and allowed. While the CRS is the major channel of information dissemination, social mobilization must complement the strategy to ensure action on the ground. CRS anchors along with LGU staff, representatives from relevant agencies must join together to explain or demonstrate expected disasters like earthquakes, tsunamis, etc. The telecommunication companies should likewise be involved in providing the last mile linkage to ensure that CRS have Internet connections that are linked to PAGASA, Philvocs, National Mapping and Resource Information Authority, Department of the Interior and Local Government, Department of Social Welfare and Development, Department of Health, Department of Education, Climate Change Commission, Philippine Federation of Rural Broadcasters, the Academe,

the Church, Department of Agriculture, Department of Environment and Natural Resources, National Risk Reduction and Management Council, etc. There should be close collaboration among these relevant agencies in giving out information to avoid confusion and miscommunication among CRS anchors or information officers task to gather information. The National Telecommunications Commission, on the other hand, should allocate frequencies to LGUs without a community radio station. Ideally, all municipalities should have one CRS to make sure that they are in the loop and ready to discuss with their constituents, relevant topics or issues that they should be familiar with.

The need to put in place such networking is crucial to explain extensively in a popular manner threats to the people and the environment along with the concomitant risks. More often than not, threats are communicated but risks are not. As a result, people end up speculating, in limbo, or having cognitive dissonance. CRS announcers when properly trained on these technical issues can better explain such occurrences in simple and popular manner.

The study concludes that a lean organizational structure with ample support from the Local Government Unit, the church, private companies, or public companies can sustain CRS operations. This should be complemented by worthy contents that are relevant that respond to community needs. Localized programming sustains listenership because a community radio only discusses things that matter. Finally, CRS, as the last mile linkage in times of disaster may be the only resort to save people's lives.

## CHAPTER 2




### GOOD PRACTICE: How to Adjust Cropping Calendars

*SOURCE: Enhanced Climate Smart Farmer Field School Program (PhilCCAP, 2014)*

#### INTRODUCTION

Many of our climate change adaptation good practices deal with the management of residual moisture. With the prevalence of long dry spells and droughts, we need to maximize rainfall utilization and minimize irrigation application. Furthermore, we encounter uncertainties in weather patterns brought about by climate change. Many times, the situation requires us to adjust our cropping calendars.



To plan our crop and to determine our planting strategies we need climate information and forecasts. We normally begin land preparation at the start of the rainy season to maximize rainfall utilization. We plant without a standard crop plan as a basis of our farming activities the whole year round. Given climate information and forecasts, we should prepare our own crop plan by analyzing rainfall and crop water demand.

## FAQs ON CROPPING CALENDARS

**What is a cropping pattern?** A cropping pattern shows the definite sequence of crops to be planted in our fields at a given period in relation to water supply.

**What is a cropping calendar?** A cropping calendar indicates the ranges of each crop growing period for every season and the amount of water required in relation to available water supply.

**What is the Importance of cropping patterns and calendars?** Cropping patterns and calendars are important guides for proper and timely land preparation. They provide guidance for right seed materials to be planted at the proper time and dates. They guide us in the effective utilization of available water supply. They provide the proper timing for the harvesting month.

**What are the bases of a cropping plan?** There are five bases for a cropping plan: weather and climate condition; rainfall pattern and distribution; turn around period (or the time between crops); crop growing period, soil type, and landscape position; and water supply.

**What is a cropping parallelogram?** A cropping parallelogram is a simple instrument or geometric tool used to test a potential cropping pattern, sequence or area to be cultivated versus the available water supply.

## GOOD PRACTICE

**Basic information needed.** To adjust our cropping calendars, we need the following information:

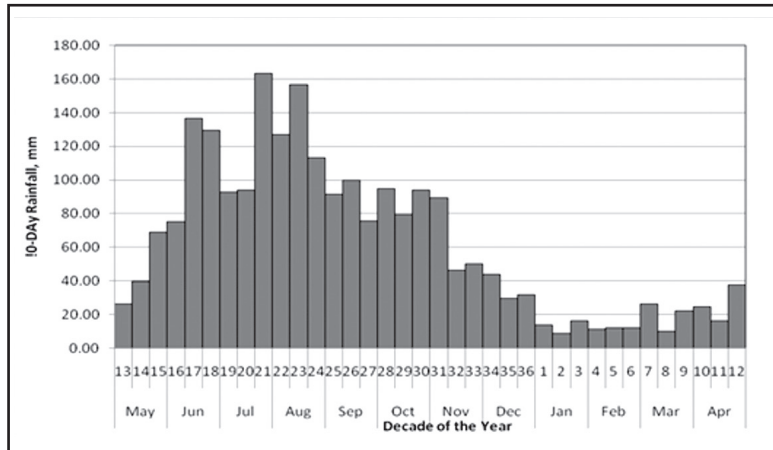
1. Crop duration – How many days does it take from planting to harvesting given the crop and the variety that we will use?
2. Crop water requirement or CWR – How many millimeters of water does our crop require?
3. Rainfall data – How much rainfall do we expect every 10 days and every month under normal, El Niño, and La Niña conditions?

**Tools and materials.** We need the following tools and materials.

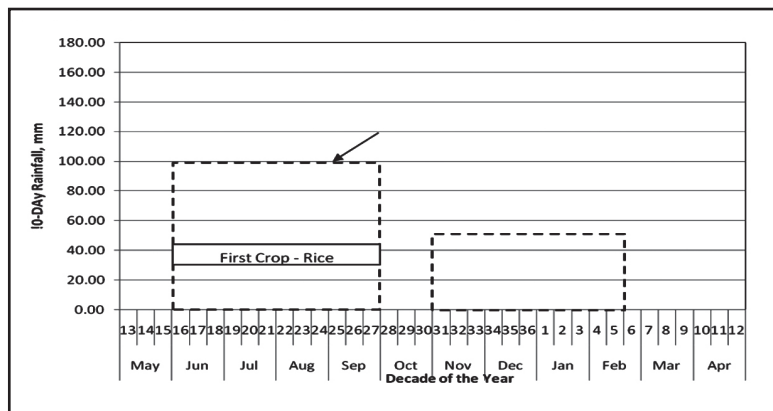
1. Graphing paper
2. Transparent plastic sheet with vertical and horizontal lines similar to the graphing paper
3. Pentel pen or permanent marker

**Steps in determining the start of our cropping calendar.** There are three simple steps in determining when we should initiate our planting. We do this through a *cropping parallelogram*.

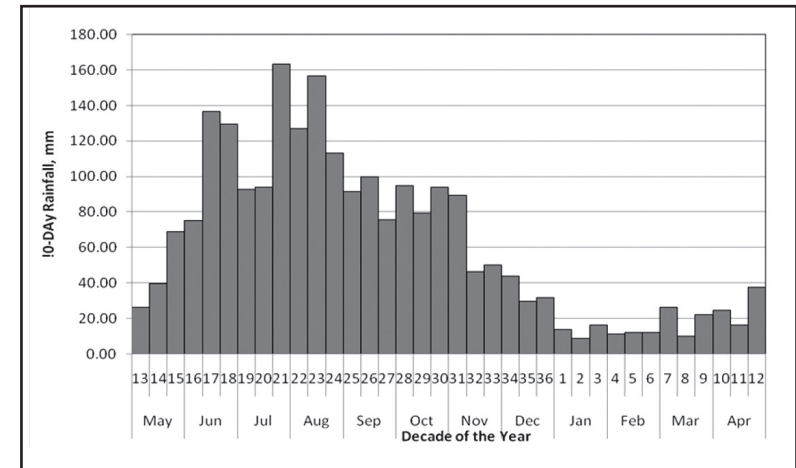
1. Prepare a rainfall data chart for a one-year period (10-day or monthly)



2. Draw a horizontal line in a separate transparent sheet with a length equivalent to the growing period of the crop and a vertical line equivalent to the crop water requirement (CWR) for example rice as presented below:



3. Overlay the transparent plastic sheet to the rainfall chart to determine the right time to start the cropping. The cropping period should coincide with the duration where we can maximize rainfall utilization and minimize irrigation application.



**Parameters for the development cropping calendar.**

With the cropping parallelogram overlaid on the rainfall chart, we determine how we can best utilize rainfall resources. We will know when we should begin our land preparation and initiate our cropping calendar.

In developing our cropping calendar, we need to take into consideration rainfall and rainfall forecast. We also have to consider relative humidity and evapotranspiration, if this information is available.

## CHAPTER 3




### **GOOD PRACTICE: How to Conduct Agro-Ecosystem Analysis**

*SOURCE: Enhanced Climate Smart Farmer Field School Program  
(PhilCCAP, 2014)*

#### **INTRODUCTION**

Climate change affects our weather, the insect pests in our fields, water depth and soil moisture. These things affect the growth of our rice crop. To adapt to climate change, we need to know how the factors that determine the development of the rice plant are affected. We do this through agro-ecosystem analysis.



Agro-ecosystem analysis or AESA is a way of understanding the interactions of the different factors in the field, which directly or indirectly affect the growth and development of the rice crop. It identifies all the things that affect our crop and situates them in a process useful for our understanding and decision making.

### **GOOD PRACTICE**

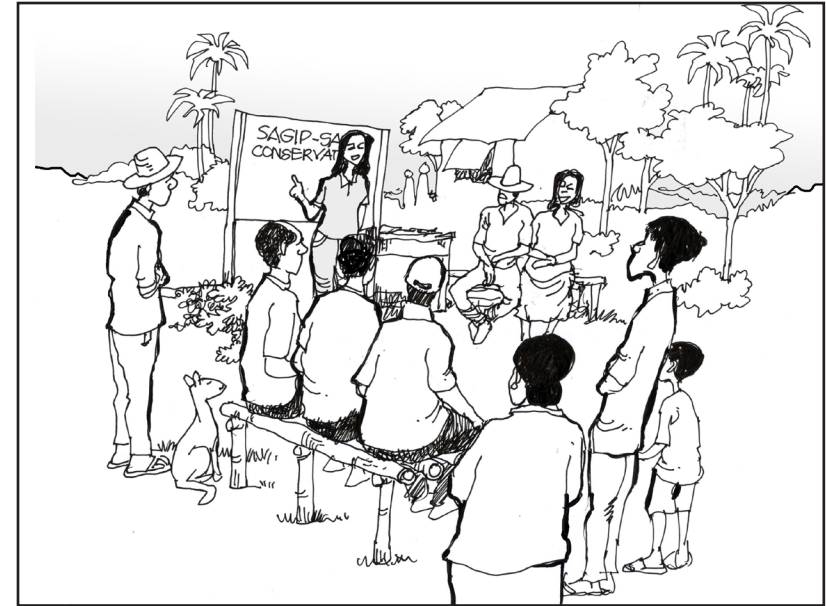
**How is AESA done?** Agro-ecosystem analysis is being done by monitoring the weather, insect pests, natural enemies of insect pests, disease incidence, water depth, weeds, rodents, Golden Apple Snail, fertilization, soil moisture and nutrient condition, growth and development of the rice plant every week.

**Period of Monitoring.** Weekly monitoring begins 15 days after transplanting and ends 2 weeks before harvest.

**Steps in AESA.** The steps in conducting agro-ecosystem analysis are as follows:

1. Randomly pick a hill and record your observations and data gathered. Get a minimum of 5 sample hills (in zigzag direction, at least 2 meters from the border) per hectare/variety of uniform crop growth.
2. Observe and record in sequence the following:
  - 2.1. At the canopy for highly mobile insects
  - 2.2. At the middle part of the rice plants between tillers
  - 2.3. At the base of the rice plants
  - 2.4. In the water, if there are plenty of helpful aquatic predators such as water spiders, mesovelia and microvelia which are effective in controlling the population of hoppers.
3. Observe the sample hills for plant health, diseases, leaf damage.
4. Determine Nitrogen deficiency using the Leaf Color Chart (LCC)
  - 4.1. Take at least 10 LCC readings at random
  - 4.2. If 6 or more readings will be lower than 4 apply 30 kg of Nitrogen per hectare
5. Measure the water level using a meter stick or improvised bamboo stick.
6. For plant development data, mark five representative hills and measure the average plant height, count the average number of leaves of the mother plant, and the average number of tillers and record data.
7. Determine weed status by rating weed density as abundant, frequent or rare
  - 7.1. Abundant when the field is almost covered by weeds
  - 7.2. Frequent when weeds occur in spots
  - 7.3. Rare when the weeds are almost absent
8. Observe and record the population of Golden Kuhol and the extent of damage.
9. Observe for presence of rats and the extent of their damage.
10. Observe and take note of the general crop situation and the weather condition.
11. Consolidate your data.
12. Based on your observations of the interactions among factors that affect the growth and development of you rice crop, decide on your course of action.

## CHAPTER 4




### GOOD PRACTICE: Barangay Sagip-Saka Conservation Farming Villages

*SOURCE: Santiago B. Utzurum, Jr. and Christopher A. Ablan. Silliman University, Dumaguete City*

#### INTRODUCTION

***The Relationship between Land Use Change and Climate Change.*** Land-use change is related to climate change as both a causal factor and a major way in which the effects of climate change are expressed. As a causal factor, land use influences the flux of mass and energy, and



as land-cover patterns change, these fluxes are altered. Projected climate alterations will produce changes in land-cover patterns at a variety of temporal and spatial scales, although human uses of the land are expected to override many effects. Humans will change land use, and especially land management, to adjust to climate change and these adaptations will have some ecological effects.

***The Soil as Contributory to, and Recipient of, the Impacts of Climate Change.*** In the interplay of the soil and the atmosphere, the soil can be both a contributor to, and a recipient of, the impacts of climate change. In the past, land management has generally resulted in the considerable depletion of soil organic matter and the release into the atmosphere of such radioactively active gases as carbon dioxide, methane, and nitrous oxide. Global climate change, to the extent that it occurs, will strongly impact all soil processes. At this time, the task of soil management should be to restore soil organic carbon in order to enhance soil structure and fertility and to help counter the atmospheric greenhouse effect.

***Addressing the problems: Land degradation, desertification, and drought.*** A staggering 75% or 22.8 million hectares of the Philippine's total land area already suffers from slight to severe erosion. Soil erosion affects 70% of the 13 million hectares of alienable and disposable lands, with 13 provinces having more than half of their areas eroded. There are about 14.3 million hectares of sloping lands (16%-50%) in the country. The high influx of farmers to the uplands compromises the stability and sustainability of these fragile landscapes. It is expected that with the rapid growth of the population and the apparent lack of livelihood opportunities in the lowlands, migration into the upland


communities will continue. Consequently, the degradation of the uplands, due to erosion facilitated by unsustainable farming practices, will remain unabated, causing sustainable losses in ecosystem services emanating from the uplands with negative consequences on the lowland, coastal, and marine, environments.

The government, through the leadership of the Bureau of Soils and Water Management (BSWM), launched the National Action Plan (NAP) to combat densification and land degradation in the country. This plan hopes to accelerate the implementation of programs that will combat land degradation, desertification, and drought, and subsequently poverty, in the most vulnerable areas of the country. One of its crucial objectives is to improve upland farming systems by providing site-specific packages of technologies to address the declining productivity and deterioration of the fragile upland environments. It is within this framework that the Conservation Farming Villages (CFV) Program was conceptualized and implemented.

## **MOBILIZING UPLAND VILLAGE RESIDENTS**

***The Conservation Farming Villages (CFV) Project.*** The Conservation Farming Villages (CFV) Program is a strategy to catalyze the transformation of traditional upland farming systems into sustainable upland production systems that will address upland degradation and stimulate upland community development.

***The Project Over-all Goal.*** The over-all goal of the project is to improve life in communities living in marginal land areas through better livelihood, agricultural productivity and environmental security. It aims to help farmers improve



their economic conditions by strengthening their capacities to manage natural resources thereby protecting their communities against environmental degradation while sustaining their sources of livelihood.

**The CVF project in the Visayas: Location and Characterization.** The Municipality of La Libertad, Negros Oriental was chosen as the pilot area for the implementation of Sustainable Upland Farming through the establishment of Barangay Sagip-Saka Conservation Farming Villages for the Visayas area.

La Libertad is a third class municipality in Negros Oriental located in the northern part of the province. It is bounded by the town of Guihulngan in the North, Tañon Strait in the east, the municipality of Jimalalud in the south, and by the municipality of Binalbagan of Negros Occidental in the west. It belongs in the First District of the province and is divided into 29 barangays. The town is accessible by land transportation from the provincial capital, Dumaguete City, which is 105 kilometers away.

**CFV Sites in La Libertad.** The CFV sites, Barangays Elecia, Pitogo, Aya and Nasunggan, are situated in the upland communities of La Libertad. These barangays were identified as project sites based on the need to rehabilitate the upland farming areas and to improve their local agri-based economy.

The project sites were selected based on the following criteria:

1. It is an upland barangay and most of its land area is above 18% slope;

2. The barangay has a reliable source of water;
3. It has a problem with soil erosion;
4. The barangay is within the critical watershed;
5. The barangay has active agricultural production;
6. The barangay is accessible to land transportation;
7. The LGU is willing to support and assist in the implementation of CFV project;
8. The LGU is supportive of the proposed technological interventions; and
9. Few or nonexistent national programs have been implemented.

## CRITICAL PROBLEMS

An analysis of data gathered and validated during the various stakeholders' meetings conducted revealed that the critical problems undermining the development of the upland communities of La Libertad are extensive deforestation, forestland degradation and soil erosion.

These problems result in low land productivity and subsequently, low farm incomes of upland farming communities. It also affects lowland areas through downstream flooding and siltation. During the occurrences of El Niño events, water shortages may also occur.

## ESTABLISHMENT OF CONSERVATION FARMING VILLAGES FRAMEWORK

Conservation Farming Villages is a modality for enhancing the transfer of conservation farming technologies and practices anchored on participatory planning, monitoring, and evaluation at the community level. Specifically, the program aims to:

1. Enhance farmer's adoption of Sloping Land Methodologies (SLM) through model Science and Technology-based farming in the uplands, thereby enhancing their productivity and farm efficiency as well as conservation and protection of fragile upland resources;
2. Capacitate key groups and stakeholders in the community to better manage the fragile upland resources on a sustained basis;
3. Conduct sustainability exercises to ensure that upland community development in general, and adoption of model farmers, in particular, are on a sustainable basis and are incorporated in the local planning and implementation process; and
4. Establish linkages among research-extension agencies and organizations for capacity-building and provision of support systems for the conservation farming communities.

Thus, the CFV Program adopts a community-based participatory approach to technology development, promotion, and utilization wherein researchers, extension workers, farmers, development workers, and other stakeholders learn and work together. It gives importance to the integration of efforts into local planning, monitoring, and program evaluation processes to sustain the life of the farming system and the commitment of the various stakeholders.

Under the CFV concept, sloping land farming models are identified through participatory approaches, integrating the basic elements of on-farm research, training, capacity development and technology diffusion. Profitability and environmental management strategies are incorporated in

farm planning processes. The experiences of practicing farmers are documented and used to encourage other farmers to duplicate their practices. Farmers' trainings, across-visits and field days are among the activities that are conducted to allow farmers to observe and experience.

### **STRATEGIES TO COMBAT THE EFFECTS OF CLIMATE CHANGE, BIODIVERSITY LOSS, LAND DEGRADATION AND DROUGHT**

A participatory and bottom-up system of selection of the most appropriate technologies in the area is one of the major deliverables of the project. This includes a combination of the technologies and approaches that have already been proven or tested for increasing land productivity and promoting land conservation and rehabilitation, as modalities to combat the effects of climate change, biodiversity loss, land degradation and drought. This includes, but is not limited to, the following:

1. Sloping Agricultural Land Technologies including livestock component
  - 1.1. Contour farming
  - 1.2. Alley cropping/use of hedgerows
  - 1.3. Use of natural vegetative strips/grass breeds
  - 1.4. Composting/vermi-composting
  - 1.5. Multi-species cropping
2. Conservation Tillage
  - 2.1. Minimum tillage
  - 2.2. Cover cropping/green manuring
  - 2.3. Mulching
3. Construction of physical barriers to erosion
  - 3.1. Bench terracing
  - 3.2. Contour rack walls
  - 3.3. Canals and soil traps

4. Water saving technologies/water management
5. Change in crops, Cropping patterns, and market matching

## **PROJECT IMPLEMENTATION**

On October 27, 2008 an Inception Meeting attended by representatives from the National Economic and Development Authority (NEDA), Philippine Council for Agriculture Forestry and National Resources Research and Development-Agriculture Resources Management Research Division (PCARRD-ARMRD), Silliman University, members of the LGU, La Libertad Technical Working Group (TWG), and representatives of the proposed Barangay CFV sites in La Libertad was held at Silliman University, Dumaguete City. During the meeting, the participants were oriented on the program goals and objectives, mechanics for implementation, and program expectations or deliverables.

### **Development of Sloping Land S and T based Farms**

Through the partnerships among FVs, change agents, scientists and experts, specific training programs were undertaken to increase the awareness and knowledge of village farmers in participatory approaches to Sloping Land Methodologies. Farmers were trained on the scientific way of sustainable farming in managing their own farms. They are expected to practice what they learned through a demonstration farm which they established.

The S and T based model farm establishment is a simple process, as follows:

1. the identification of the CFV farm;
2. the identification and assessment of the interventions needed;

3. the application and testing of the interventions; and
4. the eventual promotion of said interventions to adjacent farms once confidence on the positive performance of the interventions has been achieved.

The S and T base model farms serve as a showcase of a package of technologies that demonstrate the profitability and productivity of the farm components, as well as its importance in combating land degradation and other adverse factors occurring or yet to happen due to climate change.

The marketability of products is a major concern as this area is oftentimes mentioned by farmers. To address the issue, Supply Chain Analysis (SCA) was employed on the intervention. This means that interventions are not only limited to the production system of the FV farm but includes factors that are related to marketing and other points in the supply chain. The establishment of S and T based model farms will show the farmers the benefits gained from adopting scientific best agricultural practices.

### **SUCCESS INDICATORS/ COMMUNITY SUSTAINABILITY INDICATORS**

The CFV program which started in October 2008 to October 2011 has set modest expectations/targets as indicators of success. These include the following for the CFV La Libertad, Negros Oriental:

1. Three (3) Conservation Farming Villages established;
2. 1,995 farmers and other stakeholders trained on SLM/Conservation Farming Technologies and other relevant topics;

3. Ten (10) trainings on relevant topics conducted;
4. 162 hectares adopting SLM/Conservation Farming Technologies;
5. 15 S and T based model farms established;
6. 30% rate of adoption for conservation farming technologies/approaches;
7. Three (3) trading posts/CFIS established;
8. Ten (10) relevant IEC materials produced/translated into the vernacular and distributed to beneficiaries;
9. Ten (10) Trainers from collaborative groups and institutions identified and trained on SLM concepts and approaches;
10. Three (3) farm field days to showcase CFV achievements;
11. One (1) farm cross-visit for farmers-volunteers and change agents;
12. One (1) People's Organization or Farmer's Association formed and organized;
13. Reduction of soil loss in project sites to ten (10) tons/hectare/year, at least 20% increase in farm income;
14. At least 20% increase in yield of various crops;
15. One (1) relevant program in the project site;
16. Two (2) related program/governance policies formulated and advocated; and
17. One (1) mainstreaming activity (institutionalization) in the LGU

## RESULTS OF THE INTERVENTIONS


Although a final impact assessment is yet to be undertaken, preliminary results gathered are very encouraging. Assessed against expected target outcomes, the project on the average is running at 80-85% accomplishment of targets.

The interventions implemented by the community (CFV Barangays) have instilled an increased consciousness of the fragile nature of upland resources. As a modality for climate change adaptation and to combat land degradation/soil erosion, the interventions have resulted in the over-all well-being of the natural resource environment leading to improved socio-economic parameters in the community. However, much more needs to be done. This is the challenge.

## PROBLEMS ENCOUNTERED AND COPING MECHANISMS

A program rarely achieves its intended objectives without running into problems, issues, and difficulties. In the case of the CFV La Libertad implementation the following problems were met in the course of implementation.

1. Occurrence of El Niño lasting from the 4th quarter of 2009 and lasting until the 2nd quarter of 2010. This event impacted on activities that were implemented as this resulted to the death of approximately 30% of the Agro-Forestry species already planted on the site. The farmers had to rapidly set-up and grow replacement planting materials on top of what was yet to be site-planted in areas that were still not planted. The SPMT then embarked on the establishment of Barangay Agro-Forestry Nurseries in the CFV sites instead of having one centralized nursery. In retrospect, this proved to be a boon to the project as the FV's were trained on Agro-Forestry Nursery Management that enabled them to produce their own planting materials.

- 
2. Delay in the release of funds due to bureaucratic requirements sometimes affected the delivery of necessary interventions. The project was able to overcome this concern through linkages and tapping the resources of both NGO's and GO's with relevant or related programs, or program partners.

## LESSONS LEARNED

In the course of the project implementation, valuable insights and lessons were gathered that greatly help or facilitate the delivery and accomplishment of the intended objectives/outputs.

1. The community's (stakeholders) actual realization, and identification of the problem besetting their situation and that they can do something about the problem and are willing to be involved in the solution to their problems is of primary importance; and
2. The strong functional support of the LGU to the community's initiatives and undertakings to empower itself to solve its problems, and in the process, improve its socio-economic well-being.

The strong partnership forged between PCARRD, Silliman University, LGU La Libertad, and the CFV community with strong support from other sectors such as GOs and NGOs, contributed much to the achievements of the project. However, in the ultimate analysis, it is the "sense of ownership" by the community and the LGU of the project, the control by the stakeholders over events that have happened or are about to happen, impacts greatest on the sustainability of a project even after the life of a project is over.

## PROJECT PARTNERS

The project achievements would not have been possible without the generous support in terms of resources, technical assistance, and financial assistance from informal and formal partners as follows:

1. Provincial Agriculture Office;
2. Philippine Coffee Board;
3. Department of Agriculture, RFU-7;
4. Bureau of Fisheries and Aquatic Resources;
5. Philippine Coconut Authority;
6. Department of Environment and Natural Resources;
7. NORSU-CVCIRRD 7;
8. Plan International;
9. PhilDHRRA;
10. Provincial Environment Natural Resource Division (ENRD); and
11. GTZ-KFW Project.

## CHAPTER 5




### **GOOD PRACTICE: Community Food Bank**

*SOURCE: M S Swaminathan Research Foundation, Chennai, India  
[http://www.mssrf.org/sites/default/files/1.Community%20Food%20Grain%20Bank \(English\).pdf](http://www.mssrf.org/sites/default/files/1.Community%20Food%20Grain%20Bank%20(English).pdf)*

#### **INTRODUCTION**

The Community Food Bank (CFB) brings opportunities for Gene-Seed Banking for sustainability and relevance to inclusive growth. The CFB is a proactive collective response to the advent of New Normal where Super-typhoons, the Big One, super flooding creates annual disruption of economic activities that leads to massive transient seasonal food



insecurity among poor and displaced communities in the Philippines and around the globe.

The CFB creates food security resilience among the most vulnerable who have no access to decent works and livelihood. A Food Bank is a common tool for transient, seasonal hunger alleviation. It has been practiced in Davao where the Tagum City Food Bank feeds malnourished children of Mindanao. David Wasson, an award winning Seattle chef and cooking instructor has also adopted this practice. There are food banks in South Korea, Japan and Taiwan and Singapore.

Community food banks have been established in various parts of the USA. Eden Food for Change was founded in Canada and the Global Food Banking Network is currently running in South Africa.

## FAQS

**What is a Community Foodgrain Bank (CFB)?** The community level foodgrain bank (CFB) is a mechanism for decentralized storage and management of food at the grass-roots level, to address the problem of transient/seasonal hunger. Seasonal hunger covers the lack of purchasing power (lack of assets absence of livelihood opportunities) and natural calamities like flood and drought. A CFB is therefore a bank with a difference. The deposit base of the bank is foodgrain. Foodgrain is lent out for a certain period at a rate of interest. Repayment is also in delivered kind for principal and interest.


**What are the benefits of having a CFB?** CFB triggers collective action or “Bayanihan” by the community. It ensures food security of women and children in times of

crisis (natural calamities such as drought and flood, and also household crises such as illness and unemployment). It ensures food security for poor people during lean periods and help the tribal community break the trap of debt and bondage to moneylenders. It reduces the incidence of starvation and creates conditions for providing focus on nutrition security, environment, hygiene and overall development, leading to overall improvement in the quality of life.

**Is CFB a new concept?** The concept of CFBs is not new. Tribal communities are known to set aside foodgrain for lean periods or for the celebration of festivals, marriages and funerals. The idea of community-managed foodgrain banks is to build sustainable institutional mechanism at the grass-root level to address food scarcity.

**How is the CFB collective stock built?** Ideally, stock is raised by the contribution of all the members. Support from the government or any development partner will help strengthen the stock and is crucial in areas of acute food scarcity. Building on the initial stock support and prompt repayment, the community increases the stock and expand revolving food grain fund for wider community food support system.

**What are the advantages of CFB mechanism?** Foodgrain is available during the lean period and increase address transient food scarcity to improve its contribution to inclusive growth. Favored are landless laborers and small marginal farmers to meeting their daily consumption needs. Being low interest rates, poor communities are protected from “loan sharks.” CFBs can prevent distress sales for transient cash of non-foodgrain produce by small



and marginal farmers during the harvest season, to meet foodgrain needs. When CFBs have larger stocks than normally required, the excess stocks can be used to carry out food-for-work activities designed to meet community priorities. CFB operations being a decentralized mechanism, the community have wider options to support their preferred foodgrain to store in the bank. Neglected but nutritious cereals, which had in the past constituted the staple diet of tribal communities, can be brought back into the consumption chain

### **GOOD PRACTICE**

The CFB operates by allowing its members to borrow foodgrain from the bank, and repay it back to the bank including interest in kind or cash with interest, usually after harvest. In this manner, the stocks are maintained and recycled on a regular basis. The members also increase additional food grain commitments every year increase the collective stock, which contribute to making the lending operation self-sustaining. Sustainability of the CFB is dependent on livelihood security of the community

### **Criteria for Selection of CFB Villages**

How do you decide which village needs a CFB? The following criteria may be used:

1. The village has a history of food insecurity
2. The village economy is very poor in terms of resources and production potential.
3. A substantial percentage of the population consists of landless persons and wage laborers.
4. Most of the farmers have small and marginal holdings.

### **Steps in Getting a CFB Started**


**Baseline Survey.** Rapport building with the community and a preliminary, overall survey of the village economy and society should be conducted. Participatory appraisal of the existing food problem (food availability, sources of food, daily intake, identification of lean period) should follow. Analysis of PRA and assessment of quantity of food support required to address lean periods of shortage should be done. This would be followed by a participatory preparation for the implementation of micro-level plan to address the issues.

**Determine the Quantity of Foodgrain Required.** The following factors determine the foodgrain requirement of the CFB.

1. Duration of lean period
2. Total population and food habits
3. Established standard for minimum cereal requirement per day

### **Foodgrain Bank Management**

Each CFB will have a Foodgrain Bank Management Committee drawn from among the members. The members of the foodgrain bank (ideally the entire adult population of the village) will elect the officers and members of the foodgrain bank management committee. The number may vary depending on the number of members in the foodgrain bank but there must be at least 50% representation for women. The tenure of the management committee may differ from village to village. The members of the foodgrain bank are entitled to avail loans in time of need. The



modalities of running the foodgrain bank may differ from village to village. The foodgrain bank members are eligible for loans.

### **Potential Problems of the Management Committee**

If the village is large and has different communities, problems may arise in managing the foodgrain banks and conflicts may arise. Often poor families may default: Those who have not been able to get good harvest and do not get wage labor in lean periods. Initially, the quantity of foodgrain stored may not fulfill the requirement of the entire community: Collective decision will be taken on how to distribute it. <sup>TM</sup>

### **Storage System**

Where will the foodgrain be stored? Initially, if there is no common storage place, the entire contribution can be stored in the house of one of the members in traditional storage structures. Ideally, a common storage structure that is moisture and pest proof has to be constructed. The storage place should be protected from wind and water and so ideally built on raised ground. The house should be always clean and dry and protected from any pest and rodent attack.

### **Some examples of Food Grain Storage System in India**

**Amar/Gadia:** it is made up of bamboos or wooden sheets with cow dung layered inside; the height from the floor is minimum one ft. It has one outlet in the lower part and an outlet in the upper part. Only foodgrain are kept in this structure.

**Doli:** generally made of bamboo, round shaped and 5 to 7 ft. in height with 1mt. radius Thick layers of cow dung are smeared on the inner and outer sides; the foodgrain to be kept are mixed with some herbal pesticides like neem leaf, karanj leaf etc. In this structure, only paddy and wheat can be kept, the upper part is covered with straw, mud and cow dung.

**Bamboo stem:** Some tribal farmers store vegetable seeds in the space between the two nodes of the bamboo stem.

### **Traditional Methods of Foodgrain Preservation**

Foodgrain can be mixed with dried leaves and inflorescence of Basil leaves and waste of iron to prevent from attack by storage insects. Paddy can be mixed with dried Neem Leaves, Turmeric Leaves and Lemon Leaves powder to prevent damage to the foodgrain from storage insects and pests.


Seeds/Foodgrain of pulses such as Black gram, Green gram is mixed with ash and dried neem leaf powder. A cloth containing salt is kept in the container to prevent the foodgrain from insects and pests.

Seeds/grain of Pigeon Pea are mixed with red soil and sun dried for one day.

Beyond the Food Bank: Opportunities for Gene and Seed Bank Continuum for

### **CFB Sustainability**

The CFB has to be seen as an entry point for development activities. Sustainability of the CFB requires attention to



livelihood security issues, viz. paying attention to improve production and profitability of farming and training in and initiation of alternate income generation activities. Closely linked to the sustainability of the CFB are the Gene-Seed Bank, which make the approach holistic, bringing in the perspective of biodiversity conservation and sustainable development. Gene-seed bank is stored in a common storage place, usually contiguous with the Foodgrain Bank

### **Seed Bank**

A Seed Bank is a facility for storage of collected seeds by the farmers, which can be accessed during times of seed shortage. It ensures that seeds are available for cultivation even in times of distress. The whole farmer community involved in the process of cultivation contributes some amount of seeds from all the varieties they have and cultivate

The objectives behind the formation of Seed Bank are:

- To make different varieties of seeds available <sup>TM</sup> Good quality seeds will be available on time <sup>TM</sup>
- To ensure that there is no dependency on money/seed lenders for seed during the sowing season <sup>TM</sup>
- To create awareness about need to conserve indigenous varieties of seeds
- To promote conservation of local land races and development of new seeds

The farmers take seeds when they require and repay with interest after harvest. The Seed Bank gives seed support only during sowing time whereas the Foodgrain Bank addresses the food need through the year.

### **Gene Bank**

While cultivation of different varieties on field is in-situ, it is necessary to preserve a record and samples of them ex-situ, in the gene bank as described above, to protect from loss due to various circumstances.

The proper management of Gene Banks will help to ensure food security in future and will promote biodiversity by preserving a large variety of seeds and avoiding monoculture.

### **Establishing a Community Gene-Seed-Foodgrain Bank**

Community ownership and management is at the core of the Community Seed Gene-Foodgrain Bank. The consent, cooperation and contributions of everyone are required. The community contributes germplasm samples to the Gene Bank.

In most cases, the Foodgrain Bank is the first intervention, set up first to address the immediate problem of food scarcity. The Seed Bank and Gene Bank follow as the need to make the intervention sustainable comes to be realized by the stakeholders.

The Foodgrain Bank Management Committee will also maintain the Seed Bank, collect varieties of seeds from other areas, collect information regarding market prices of the seeds and maintain unused seeds.

## Record Keeping

The following registers are needed to manage the Food Banks

1. Foodgrain Deposit/Stock Register
2. Foodgrain Loan & Repayment Register
3. Individual Food Bank Pass Books
4. What record books are needed for a Seed Bank?
5. Seed Deposit/Stock Register Seed Loan & Repayment
6. Register Seed Sale
7. Register Individual Seed Bank
8. Pass Book
9. Some Templates for Recording Transactions of Food Bank

## CFB Register Formats

### 1. Foodgrain Deposit Register

- 1.1. Crop Deposited
- 1.2. Variety of the Crop
- 1.3. Date of Deposit Quantity (Kg)
- 1.4. Name & Signature of the Depositor
- 1.5. Signature of Secretary

### 2. Foodgrain Loan & Repayment Register

- 2.1. Crop taken
- 2.2. Date of Loan
- 2.3. Issue Quantity of Loan in (Kg)
- 2.4. Signature of the borrower

- 2.5. Quantity of loan repaid in (Kg)
- 2.6. Interest collected in (Kg)
- 2.7. Date of loan repayment Balance due after repayment in (Kg) (Principal +Interest).
- 2.8. Signature of the Secretary

### 3. Seed Deposit Register

- 3.1. Crop Deposited
- 3.2. Variety of the Seed
- 3.3. Date of Deposit
- 3.4. Quantity in (Kg)
- 3.5. Signature of Depositor
- 3.6. Signature of Secretary

### 4. Seed Loan & Repayment Register

- 4.1. Crop to be Taken
- 4.2. Variety of the seed
- 4.3. Date of the Loan Quantity of Loan in (Kg)
- 4.4. Signature of the Borrower
- 4.5. Quantity of loan repayment in (Kg) Interest collected in (Kg)
- 4.6. Date of loan repayment
- 4.7. Balance due after repayment in (Kg)
- 4.8. Signature of the Secretary

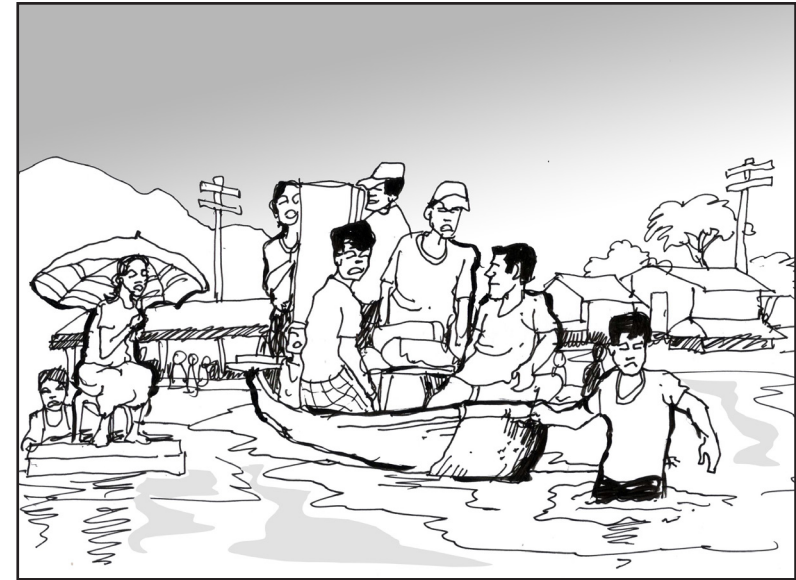
### 5. Food Bank Pass Book

- 5.1. Deposit No.:
- 5.2. Page No.:
- 5.3. Name of the CFB Village:
- 5.4. Total No. of members:



- 5.5. Household Composition: Name, Age, Sex, Education
- 5.6. Signature of the member
6. Date of loan repayment
  - 6.1. Crop Deposited
  - 6.2. Variety of the Crop
  - 6.3. Date of Deposit
  - 6.4. Quantity in (Kg)
  - 6.5. Signature of the Secretary
7. Foodgrain Bank Loan & Repayment Details
  - 7.1. Crop to be taken
  - 7.2. Date of Loan
  - 7.3. Quantity of Loan in (Kg)
  - 7.4. Signature of the borrower
  - 7.5. Quantity of loan repayment in (Kg)
  - 7.6. Interest collected in (Kg)
  - 7.7. Date of loan repayment
  - 7.8. Balance due after repayment in (Kg)
  - 7.9. Signature of the Secretary
8. Seed Bank Deposit Details
  - 8.1. Crop Deposited
  - 8.2. Variety of the Seed
  - 8.3. Date of Deposition
  - 8.4. Quantity in (Kg)
  - 8.5. Signature of the Secretary
  - 8.6. Seed Bank Loan & Repayment Details
  - 8.7. Crop to be Taken
  - 8.8. Variety of the seed
- 8.9. Date of the Loan
- 8.10. Quantity of Loan in (Kg)
- 8.11. Signature of the Borrower
- 8.12. Quantity of loan repayment in (Kg)
- 8.13. Interest collected in (Kg)
- 8.14. Date of loan repayment
- 8.15. Balance due after repayment in (Kg)
- 8.16. Signature of the Secretary
9. Seed Sale Details
  - 9.1. Date of Selling
  - 9.2. Variety of Seed
  - 9.3. Quantity in (Kg)
  - 9.4. Unit price
  - 9.5. Total amount in (Rs.)
  - 9.6. Buyer's Name & Address


## CHAPTER 6



### **GOOD PRACTICE: Climate Smart Agricultural Adaptation**

Nestor Baguion

The word “adaptation” describes a “system” persisting in a changing “environment” at any given time and place because that “system” is malleable manifested by its special ability to adjust strategies matching corresponding stress changes. A tolerance range is bounded by maximum and minimum threshold limits. On the one hand, as long as the impinging factor swings back and forth within tolerance range there is no need to adapt. On the other hand, inflexible systems exposed to environmental factors



swinging back and forth beyond their respective threshold limits get exterminated.

A system that expands threshold limits by changing strategies to circumvent stress is said to be adaptive. The process is adaptation. Systems with broad tolerance ranges (e.g. Muyong-Payoh System tolerant to droughts/pluvials) are more persistent than those with narrow tolerance ranges (e.g. Swidden Farming System intolerant to droughts/pluvials). As long as the swing of change does not go beyond tolerance range, business-as-usual strategies may be opted (e.g. Muyong-Payoh System is expected to persist in spite of ACC/AGW). On the other hand, if there is high certainty that institutional changes cause stress beyond tolerance (e.g. land privatization and individualistic entrepreneurship), then appropriate social change paves to communal resiliency (e.g. back to communal ownership/cooperation through the modern version of cooperativism plus carrying capacity population management).

ACC/AGW will certainly bring runaway stresses archipelagic-wide at various frequencies, intensities and magnitudes as time moves on to the future. More than 7000 islands are present while territories are grouped into barangays, municipalities, provinces, regions and country. The country in turn is divisible into various sets of landscapes recognizing small islands, medium islands and large islands. For large islands, the landscape may be subdivided into two, (1) alienated plains/lowland hills and (2) public lands (higher elevation with >18% slopes). Diagnosis reveals that the whims of the landowner determine the use of alienated lowland-hilly lands while higher elevation public lands are generally left untended and are being subjected to continued deforestation.

With good IEC, farmer landowners will tow the Climate Smart Agriculture way. Although agriculture at lowland plains differs from hilly lands, both consider new strategies to achieve climate change adaptation. In the event that “public land” wastelands are institutionally opened for development, selectively, CSA Adaptation strategies would also apply. At this point of the report up to the end, it is nice to consider the term “farmer” as the entity composed of landlord and farmer tenant(s) tandem.

Good practices for climate change adaptation in agriculture have been published ((LANSIGAN, F.P. et al., 2009; SALCEDA, J.S. No date; ALAM, M. et. al. 2012; STERRETT, CHARLOTTE, 2011; UNFAO-IWGCC, 2007; GARDNER, JOHN et al., 2009; GERO, A. et al., 2010) and grouped as follows: Crop Protection, Soil Management, Water Management, Seed Banking, Early Warning to Farmers and Feasibility Study as Decision Tool.

### **Crop Protection**

Crop protection can be satisfied through the use of indigenous knowledge. The indigenous knowledge that Tubli (*Tuba Derris spp*) can stupefy fish led researchers to isolate rotenone from the roots of the plant. Rotenone kills insect pests. It is now used commercially to control crop pests in agriculture. Holok is an ancient Ifugao pest management system that uses herbals. If the community is anchored on cooperative management, the problem of weed management is easy through hand weeding. Multi-cropping schemes and crop rotation are inherent in indigenous polyculture farming systems.



## Soil Management

Both farms at flat lowlands and hilly sloping lands welcome the use of organic fertilizers instead of inorganic chemical fertilizers. Organic fertilizers come from commercial sources or sourced locally by the farmer. The advantage of organic fertilizer use is the increase of organic matter in the farm soil. Application of soil organic matter increases humus, a colloidal organic substance that resists further decomposition but regarded important because it helps the soil hold water. This is relevant in times of drought.

Communities may change strategy with regard to solid waste management. Past practice was to burn organic waste in incinerators. New practice is the segregation of biodegradable from non-biodegradable waste. The biodegradable waste is decomposed with the help of native earthworms. Non-biodegradable wastes are burned in incinerators. Decomposed wastes are distributed to farms as organic fertilizers. Coconut groves, fruit tree orchards, banana plantations, live fences and landscaping trees in gardens, public places and roadsides are sources of plant litter. Instead of burning dry litter, decomposition of piled litter mixed with livestock fecal matter plus earthworm activity produce nutrient-rich organic fertilizers for sustainable agriculture.

Tillage at flat lowlands inside rice paddies bounded by dikes is benign, but malignant when applied at steep slopes because of the soil erosion expected during rains unless terracing has been done. On steep slopes, farmers apply the stick-and-dibble approach of planting crop seeds. Another way is raising seedlings first then transplant directly to holes. Farmers also place mulch on top of the soil in


between seedlings. The mulch may consist of cut grass materials. These procedures minimize soil erosion and water loss while young crops grow during early rainy season. In SALT, parallel rows of nitrogen-fixing trees and shrub hedges are planted along contour of slopes to prevent soil erosion. Alley cropping is the term for crops planted between rows of trees/hedges. Trees also protect crops from strong winds such as during typhoons.

Soil analysis reveals uplands usually have low soil fertility and tends also to be acidic. Experts' prescription for liming and chemical fertilizers will start the farm. Through the years of organic soil fertilization, soil fertility improves. Succeeding chemical fertilizer use decreases, while organic fertilization increases until it becomes entirely organic.

## Water Management

Water management connotes wise human actions about water in relation to agriculture. Water varies with climate, scarce during drought and excessive during pluvial and typhoon events. There is also geographical variation on the abundance and scarcity of water, for example, evenly distributed rainfall at eastern Luzon in contrast with very seasonal at western Luzon. For both cases, rainfall volume increases towards higher elevation. Rainfall becomes streamflow and its character depends upon the watershed's forest cover and topographic features. It varies from completely forested to completely denuded catchment. At any given time and place, good water management is very relative to different places across varying climate types.

In any given watershed that have undergone diagnosis (i.e. vegetation, topography, geology/soils, climate, hydrology



and sociological features), a reliable set of human actions on good water management is possible. After diagnosis, the following can be realized: (1) hazard map indicating landslide/flood-prone and landslide/flood-free locations (i.e. this bears on safe location of villages and farms or as basis for vulnerability assessment if villages and farms are given prior to diagnosis); (2) location of water impoundment for village-level water use (drip irrigation for rain-fed farms, canal-irrigation for paddy farms); (3) points where drinking water filtering is best located; (4) location of ponds for crab, duck, freshwater fish, and kangkong production; (5) any or combinations of hydro-, solar and wind electric generation may be tapped to pump water above the water impoundment level for agricultural, domestic and potable water supply purposes; and, (6) when vegetation of watershed catchment is badly deforested, stakeholders' reforestation (stream/river bank to ridge) would restore hydrologic properties and increase the system's tolerance to runaway climate change (e.g. megadroughts and strong typhoons). Water and electric power can be shared downstream at alienated agricultural lowland plains through collaborative multi-stakeholders' initiatives.

### **Seed Banking for Agricultural Crops**

“The more, the merrier” applies well for the practice of keeping native varieties of different crops at the granary. Rice is an example of a crop with many varieties. Rain-fed rice and paddy rice are at extremes, the former tolerant to low soil water, the latter to prolonged submergence in water. There are many others aside from these two extremes including outliers like salt tolerant varieties. Knowing the tolerances of the other varieties will help the farmer choose which appropriate variety(s) to cultivate given prior early

warning by climate/soil experts. IRRI is already playing a lead role towards this direction for rice. Since rice is known to reduce yield with increasing temperature, IRRI is developing rice varieties with higher tolerance to heat in anticipation to global warming. This best practice can be extended to other agricultural crops with the help of government agencies and international institutions.

### **Early Warning to Farmers**

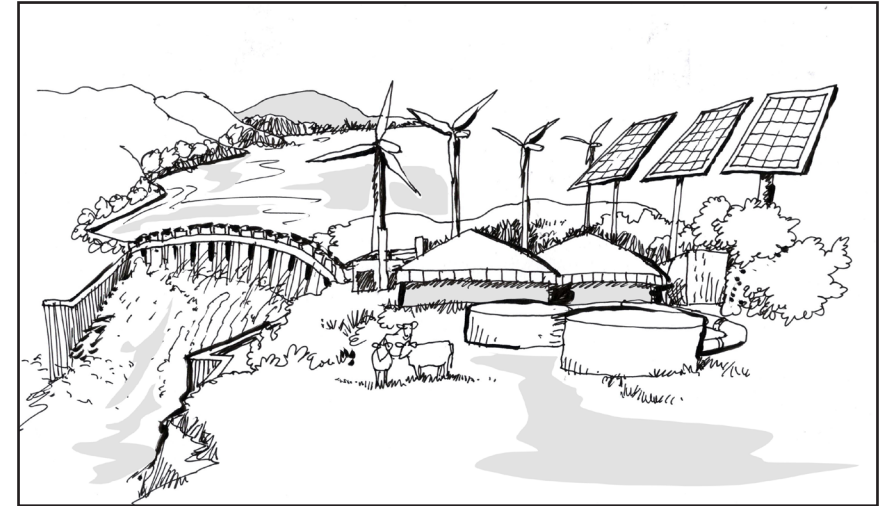
This is a good practice because it gives a farmer a chance to revise planting plan when a credible source tells there is expected deviation from the usual weather and climate norm. PAGASA is the country's climate science authority. It relays its findings of upcoming runaway weather/climate events (e.g. typhoons, drought, early or late rainy season, etc.) to the DA, DENR and DILG and, in turn, relayed down to municipal and barangay LGU. In places where cellphones do not work, two-way radio transceivers would be more reliable. A barangay climate-lookout may sound the alarm to farmers to get prepared and avoid exposure to stressful runaway climate events. If barangay folks know where fault lines traverse their area, they should associate them with typhoon warnings. Hence, they avoid flood prone riverbanks at the same time avoiding landslide prone hillsides and seek refuge to evacuation centers located away from river and hillsides. This is early warning with regards to Disaster Risk Reduction Management (DRRM). The principle works similarly with early warning for CSA. Farmers can respond to early warning and avoid or minimize exposure to climate risks and hazards with possible responses such as (1) change the usual variety/crop and instead plant one that is tolerant to the warned climate change, (2) use same variety but plant it earlier or later than usual schedule, and (3) totally

abort planting if warning threatens to destroy crop (e.g. farm is at flood-prone or landslide prone area) and limit planting at hazard free area. Early warning if done properly saves lives and crops.

### Feasibility Study as Decision Tool

Farmers are not trained to do feasibility studies to fine tune CSA that gives acceptable Internal Rate of Return (IRR) and Net Present Value (NPV). Making it simple, IRR and NPV are measures of profit. Profit in layman's terms is the money one gets (net money earned) after subtracting the total sale (gross sale) minus investment (production costs). In previous discussions, much talk has been spent in changing agricultural production strategy to circumvent adverse climate change impact in the future. Now the topic goes into searching whether or not CSA is economically feasible? Whether a single farmer (one farm lot) or a whole cooperative (many lots), the same feasibility study method is used. It involves three kinds of analysis: (1) cost analysis, (2) operational analysis and (3) market analysis. The first, cost analysis, lists all factors of production (e.g. drip irrigation, organic fertilizer, labor, land, transportation, cost of planting materials, energy costs, post-harvest costs, marketing costs) and corresponding money invested. The second, operational analysis looks into the coordination of all actors of production including the presence of a favorable business environment. The third, market analysis is plain mathematics imputing money values to harvests with published market prices. The adaptation strategy is deemed feasible when the estimated total sale exceeds the costs hence the realization of positive net revenue (interest rate considered). It is nice to think that in climate change adaptation proponents are economically rewarded while in mitigation they help make a better world (Baguion, N.T., 2014).


## CHAPTER 7



### GOOD PRACTICE: Climate Smart Agricultural Mitigation

Nestor Baguion

Agriculture is one of the factors singled out as emitting greenhouse gases to the atmosphere. In the tropics, slash-and-burn agriculture not only released carbon dioxide through burning biomass but also caused deforestation. Slash-and-burn agriculture removed forests that sequester carbon dioxide into biomass. Agriculture had been using beast-of-burden (carabao, cattle, and horse) to cultivate or plow fields for raising agronomic crops. Then affluent farmers shifted to mechanized farming powered by fossil fuels to accomplish plowing, irrigation, weeding, harvesting and post-harvest. Another side of agriculture as contributor



to ACC/AGW is the finding that both, tropical rice paddies and livestock production, are emitters of methane to the atmosphere.

The word “mitigate” connotes action that makes an outcome less severe. Climate Change is mitigated through reduction of greenhouse gas emissions in the atmosphere. If the conduct of global agriculture is modified such that greenhouse gas to the atmosphere is significantly reduced, one may call this development as Climate Change Mitigation in Agriculture. Strategies that are doable in the Philippines considered as climate change mitigation fall into the following categories: (1) Agriculture powered by renewable energy – hydropower, solar power, biogas; (2) Agriculture that avoids burning of biomass – switch to Sloping Agricultural Land Technology (SALT) plus organic agriculture; (3) Agriculture that integrates trees for carbon sequestration – biogas fuel for cooking, no need to cut trees for fuel; and (4) Livestock production coupled to biogas production and organic farming.

Use of renewable energy in the Philippines as support to agriculture cites the following experiences (United Nations Development Program-Global Environmental Facility-Small Grants Programme, 2002; 2004):

1. Hydropower: a) Installation of a hydro power plant in Barangay Maglahus, Cateel, Davao Oriental in January 1995 to December 1996; b) Cateel Micro-hydro Power Rehabilitation Project, December 1998 to May 2001; c) Community-based biodiversity conservation and micro-hydro power generation towards sustainable development in Sitio Sangab, Barangay Pichon, Caraga, Davao Oriental; d)

Community-based watershed management and micro-hydro power development project in Sitio Adugao, Barangay Uminap, Malibcong, Abra October 28 1999 to May 2000; e) Apayao community-based resource management project power service for 70 households and power for agricultural mill in Sitio Buneg, Barangay Nabuangan, Conner, Apayao; f) Community-managed water resource utilization and biodiversity protection for micro-hydro generation in Marahan, Calinan District, Davao City, July 2001; g) Community-based micro-hydro power and watershed protection for rural electrification and agricultural processing in Sitio Tablo, Lemdalag, Lake Sebu, South Cotabato, July 2004; h) Dumalaguig alternative source of energy, Barangay Dumalaguig, Impasugong Bukidnon, July 2003;

2. Solar Power: a) Solar-powered (photovoltaic/PVP) water pumping system, Purok Takilay, Barangay Sarabia, Koronadal November 1997 to November 1998; b) Solar-powered water pumping system, Barangay Buloc, Tubungan, Iloilo January 31, 2000 to May 2000; c) Batanes alternative energy and livelihood development project (solar-powered mini-cold storage and solar battery charging system), July 1995
3. Biogas: a) Biogas production and utilization (3 units provide cooking gas to 16 households, reduction of tree cutting for fuelwood, plus organic fertilizer for food security); b) Project featuring 10 biogas digesters in Barangays Hagbuyo and San Isidro, San Miguel, Bohol January 31 2000 to May 2000.

Agriculture that avoids burning of biomass has some examples.

1. In Barangays Hagbuyo and San Isidro, San Miguel, Bohol January 31 2000 to May 2000, due to the installation of biogas digesters for energy generation, the community stopped tree cutting for fuel and reduced methane emissions because livestock fecal matter are in biogas digesters.
2. Same as above in Barangay Taneg, Mankayan, Benguet June 1998 to May 2000 Reduction of tree cutting for fuel wood due to biogas production. Livestock production coupled to biogas production and organic farming.
3. In Barangays Hagbuyo and San Isidro, San Miguel, Bohol January 31 2000 to May 2000, 100 swine were dispersed to community residents for livestock production cum swine fecal material production for biogas digesters


## CHAPTER 8



### **GOOD PRACTICE: Land Use Planning**

Nestor Baguinon

Based on the above Diagnosis, symptoms indicate an ecologically unhealthy Philippines upon which an impending ACC/AGW threatens a chaotic tipping-point under a “business-as-usual” scenario. The Diagnosis also presents a historical analysis showing circumstances of adaptation by pre-colonial Filipinos to extreme rainy periods during Medieval Warming and extreme dry periods during Little Ice Ages. Hunting-gathering Negroid Filipinos adapted through migration following where forests retreat as natural climate events come and go in cycles. Natural forests are



sources of food during lean years when extreme climate events strike. The Muyong (natural forest) coupled to Payoh (rice terraces) of Ifugao presents another adaptation to natural climate change. The former (forest) supplies water for irrigation even during extreme drought events while the latter (rice terraces) prevents soil erosion even during extreme pluvial events. The concept Coupled Agro+Forest Ecosystems (CAFÉ) takes the Muyong-Payoh as one of its examples. Agroecosystems and Forest ecosystems are mutually exclusive, but they synergistically complement when coupled. CAFÉ is a tested concept for ecological Land Use Planning (LUP) at landscape level that could be used to rescue the Philippines' 9 million denuded uplands while achieving the twin goals Climate Change Adaptation and Mitigation.

Deforested public lands shall be subject for LUP in a 50:50 ratio: (1) 50% of the landscape will be returned to Mother Nature (i.e. biodiversity corridors will interconnect fragmented natural forests again as Land for Nature) and (2) the remaining 50% will be for agroforestry development (e.g. land for the production of commercial timber, pulp-and-paper, medicine, livestock, food security, renewable energy, etc. as Land for Man).

Strictly, Land for Nature will be for biodiversity conservation. Its sequestration of carbon dioxide through rainforestation merits its role as Climate Change Mitigation. Land for Man designed as agroforestry satisfies both Climate Change Adaptation and Climate Change Mitigation roles. As opportunity for Nature reclaiming some of its lost grounds, native flora and fauna at the brink of extirpation will be rescued through the increased area that are interconnected (not anymore fragmented).

As agroforestry, Land for Man will be composed of six compartments (1) forestry plantation compartment, (2) silvipasture and livestock compartment, (3) renewable energy and water use compartment, (4) agriculture compartment, (5) post-harvest and processing for value-added compartment, and (6) human settlement+offices+farm to market road compartment. Actors who are previously poor will be alleviated from poverty and will be able to send their children to college (hopefully will return to serve the agroforestry cooperative).

Archipelago-wide replication of LUP will have positive impact to the environmental and economic well-being of the country, but government change agent actors who will take roles in capacity-building have to undergo rethinking/retooling first in order not to repeat mistakes of the past. There is no room to write all the details here, but the philosophical and scientific foundations have to be briefly laid-out. Three points are mentioned below.

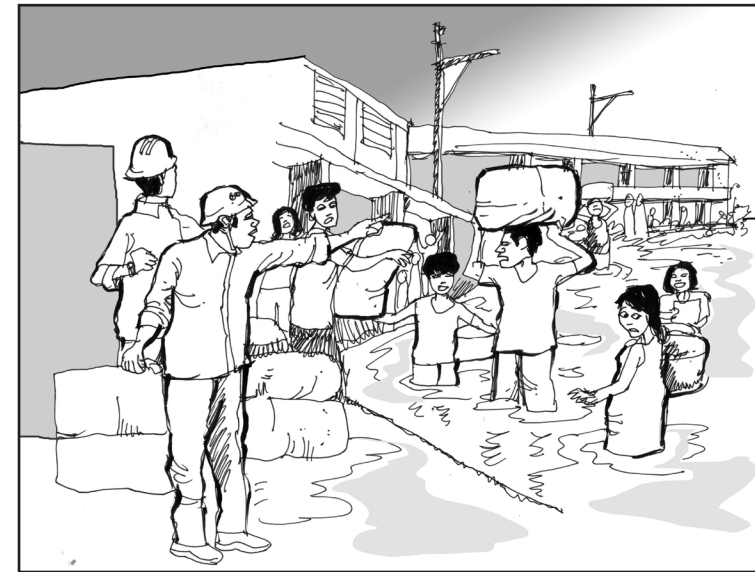
First, the old paradigm that forest can be artificial or natural will be replaced by the new paradigm “only natural forests are forests” therefore anthropogenic tree plantations are excluded in Land for Nature but are included in Land for Man.

Second, consistent with the first, the word reforestation must apply only for the establishment of biodiversity corridors through “rainforestation” using native tree species only. Tree plantations in Land for Man are primarily intended to serve people’s interests (anthropocentric). Hence, in tree plantations, exotic tree species with high commercial value may be included but not if they are bioinvasive (i.e. propagules of exotic species invade Land for Nature to

compete native species for finite space, nutrients, etc. and/or serve as vectors of pests/diseases that could wreak havoc to natural ecosystems). Tree plantations using only native tree species with high commercial value will be perfectly safe and they may serve as buffer separating biodiversity corridors from agroforestry that may contain exotic crop species. The buffer nullifies the chances of bioinvasion from Land for Man to Land for Nature.

Third, LUP removes privatization of land and stick to communal ownership. Actors who will be running the Agroforestry Cooperative are “stewards” for both Land for Man and Land for Nature. The word “stakeholders” applies to both stewards and change agents (i.e. concerned people from the Philippine government and international institutions such as the UN, financial institutions, etc.). This is a revival of the old pre-colonial “spirit of community cooperation” that serves the interest of the commons but benign to the environment. In exchange for the genuine care/protection of the environment, stewards are economically rewarded. Stakeholders’ M&E will assure such Yin-and-Yang relationship will persist intergenerationally.


## CHAPTER 9



### **GOOD PRACTICE: Urban Governance for Climate Change Resilience**

Rogelio Concepcion

The Philippines’ urban areas can be classified as (1) coastal urban (e.g. City of Manila along Manila Bay), (2) lowland riverside urban (City of Manila around Pasig River), (3) lowland landlocked urban (Cabanatuan City), (4) highland riverside urban (part of Baguio City), and (5) highland landlocked urban (part of Baguio City). There is one common character of urban areas, the presence of a commercial center mixed with the presence of schools



at various levels (pre-school to elementary to high school and finally to colleges and universities) and of buildings for government agencies and business offices, hotels, bus terminals, airports, residences/dormitories, malls, hospitals and industrial-processing zones. High population density differentiates urban with towns surrounded by farms and small barangay villages.

Governance is generally the same but the former (the urban) is focused more on (1) traffic management, (2) peace and order related problems, (3) sustaining safe potable water supply and food to urbanites, (4) public health related issues such as solid waste disposal and prevention of foreign borne diseases that could become epidemic, (5) pollution of air, streams, rivers and seashores, (6) sustaining energy supply, and (7) problem of exploding population especially the urban poor, most of whom turn to begging in order to survive.

Given the above urban character, it is very difficult for city governments to achieve climate resilience considering the large volume of greenhouse gases that are spewed by motorists in cities and, possibly too, methane emissions from solid waste effluents. In the Philippines, urban electricity is still mainly supplied by coal fired plants, for example, in Metro Manila electricity comes from Mauban, Quezon, Pagbilao, Quezon and Mariveles, Bataan aside from the diesel-fired power plant in Taguig, Rizal. The daytime temperature of Metro Manila is the highest in the archipelago because of localized spewing of greenhouse gases mainly from motorists.

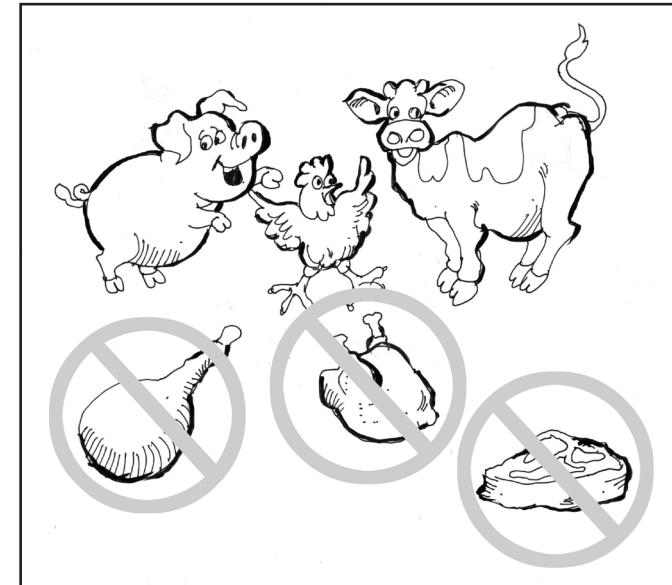
Climate change adaptation under urban governance is a challenge because of the high population density of urban poor people. Poor urban people have cheap frail houses and these are located at riverbanks, coastal zones and in landslide prone hillsides (e.g. in Metro Manila, on or near Marikina Fault Line). They are the most vulnerable during strong typhoons, storm surges and flash floods. Mortality of poor people hit by climate extremes have been documented in Cagayan de Oro City and Iligan City at the wake of typhoon Sendong and in Tacloban City by typhoon Yolanda. These happen in spite of Disaster Risk Reduction Management trainings having started in the country. Cities are requiring poor urban people to participate in drills including hazards such as typhoons and floods and also earthquakes. There is one adaptation recommendation that has been avoided by urban governments and this is the option of relocating urban poor to frontier areas where they could work, become productive and get alleviated from poverty. Why this is avoided is because most cities do not have frontier wilderness areas.

Climate change mitigation under urban governance has been implemented in first world countries, e.g. U.S.A. (ILG, 2011). Best practices areas are enumerated as follows: (1) Energy efficiency and conservation, (2) Water and wastewater systems, (3) Green building, (4) Waste reduction and recycling, (5) Climate-friendly purchasing, (6) Renewable energy and low-carbon fuels, (7) Efficient transportation, (8) Land use and community design, (9) Open space and offsetting carbon emissions, and (10) Promoting community and individual action. In order that these 10

## CHAPTER 10

best practices areas will be doable in Philippines' urban areas, there has to be a program of "capacity-building" among elected government officials, concerned staff from government line agencies, concerned staff from local government units from mayor's office to different barangays, metropolitan police enforcers, metropolitan health community, concerned government and private schools, concerned metropolitan engineers involved in design and infrastructure constructions, and involved metropolitan civil society groups on "Urban Governance for Climate Change Adaptation and Mitigation". The reference, Institute for Local Government (2011) entitled "Climate Action & Sustainability Best Practices Framework" presents how California, USA address Climate Change Adaptation and Mitigation for its cities and counties.

Reading through this reference (attached in this report) gives the impression that the Philippines must undergo capacity building to be able to replicate the good example of California, USA in urban governance for climate change resilience.



### GOOD PRACTICE: Reducing Meat Consumption

*SOURCE: Livestock's Long Shadow, Rome: Food and Agriculture Organization of the United Nations*

#### INTRODUCTION

The New Normal forces us to make lifestyle changes. We find ourselves adapting our routines and choices to expend less energy, consume fewer resources, save water, and make maximum use of our land. There is one practice, popular in some cultures but unpopular in others that is so versatile that it covers all these agendas in one sweep. This good practice, however, carries some cultural baggage. This practice is vegetarianism.



## HOW MEAT EATING EXACERBATES GLOBAL WARMING

Vegetarianism allows us to save on energy, consume fewer resources, save water and make maximum use of land at the same time.

In 2006, the Food and Agriculture Organization of the United Nations published a report titled, *Livestock's Long Shadow: Environmental Issues and Options*. The report states that, "The livestock sector emerges as one of the top two or three most significant contributors to the most serious environmental problems... dealing with land degradation, climate change and air pollution, water shortage, water pollution and loss of biodiversity" (Seinfeld et al., 2003)

The report documents how:

- giant lagoons of manure from pigs, chickens and cattle release methane gas which is 23 times more warming than carbon dioxide.
- chemical fertilizers and pesticides produce nitrous oxide which has 300 times the global warming potency of CO<sub>2</sub>.
- eighteen percent of greenhouse gases that contribute to global warming come from the livestock sector. This is more than all the cars, trucks, airplanes, and all other forms of transport combined (13 percent) and all the homes and offices in the world put together (8 percent).

A meat-eater turned vegetarian reduces his/her carbon footprint by 1.5 tons per year (Steve, 2006). Eating one kilogram of meat releases as much greenhouse gases as driving a car 155 miles or a 100-watt light bulb for 20 days (Bittman, 2008).

Furthermore, nearly half of our water for domestic consumption is used to raise animals for food because water is used for growing crops for feed; providing drinking water to animals; and cleaning massive amounts of waste (Shiilabhadrananda, 2008). An animal based diet uses at least 12 times more water than a vegetarian diet. A vegetarian diet requires 300 gallons of water per day, while a meat-based diet requires more than 4000 gallons of water per day. While 1.1 billion people do not have access to clean and safe drinking water, over 5,000 gallons of water is used to produce one pound of beef<sup>1</sup>.

Note that it takes 23 gallons of water to produce a pound of lettuce while it takes 5,214 gallons to produce a pound of beef. You can save more water by not eating a pound of beef than by not showering for six months. (Robbins, 1987, p.44)

According to the Union of Concerned Scientists in 1999 the two most damaging things done to create global warming is driving a car and eating meat...More than one-third of all fossil fuels used in the USA in 2002 were for raising animals for food (Schollosser, 2001, p.240)

- The growing of corn and soy for feed uses fertilizer, pesticides and energy devouring farm machinery.
- The grains must be transported to feed manufacturers.
- Electricity is used to operate the mills.
- Etc.

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<sup>1</sup> [www.100waystosavetheplanet.org](http://www.100waystosavetheplanet.org)



If meat consumption was reduced by 20 percent, it would be the equivalent of shifting all cars from petrol to hybrids. One vegetarian in an SUV is eco-friendlier than a meat-eater in a bicycle. (Leighton et al., 2003 p. 368).

### GOOD PRACTICE

This good practice is simple and uncomplicated. Just reduce our meat consumption to one half of what we usually consume, individually, collectively and globally. Then we would have achieved our greenhouse gas reduction targets. And possibly live longer in the process.

### EPILOGUE FOR PART A

An incidental product of the above compilation is a typology of business as usual (BAU) versus new normal good practices, which we now present to you in tabular form:

ELEMENTS	BUSINESS AS USUAL	THE NEW NORMAL
Nomenclature	Best Practice	Good Practice/ Best Fit
Change Vector	Lateral	Multi-Lateral
Adaptation Outlook	Climate Change Adaptation	Climate Change Co-adaptation
Purpose of Sharing	Knowledge Gain	Action/Mobilization
Management Objective	Risk Reduction	Risk Avoidance/ Prevention
Economic Consideration	Least Cost	Maximum Co-Benefits
Intervention Focus	Rural Areas	Urban Areas
Function	Specific	Thematic
Response	Single Level	Multi-level
Target	Defined	Moving
Coverage	Sectoral	Trans Sectoral
Temporal Frame	Short Term	Long Term/ Inter-generational
Spatial Frame	Micro	Macro
Impact	Uni-Dimensional	Multi-Dimensional



Given the comparisons between BAU practices and New Normal practices, the following criteria for identifying good practices were adopted:

1. Does the practice respond to unilateral or multilateral change?
2. Does the practice lead to co-adaptation among diverse stakeholders?
3. Does it lead to action or community mobilization?
4. Does it avoid or prevent risk rather than reduce risk?
5. Is it co-beneficial among stakeholders?
6. Is it thematic rather specific?
7. Is it applicable in many levels?
8. Is it long term rather than short term?
9. Does it cover macro rather than micro?
10. Are its targets moving rather than defined?
11. Does it cover many sectors?
12. Do benefits accrue to many?
13. Is it inclusive rather than exclusive?

This set of questions now serve as a practical guide for determining good climate change adaptation practices.



## PART B. STORIES FROM DALAW TURO

### PROLOGUE FOR PART B

Part B contains a set of eighteen modules that promote climate change mitigation and adaptation. They do so from the point of view of eighteen themes: Forest Protection; Watershed Management; Wildlife; Coastal Resource Management; Protection of Water Bodies; Protected Areas; Riverbank Rehabilitation; Geohazards; Water Conservation; Waste Segregation; Responsible Mining; Ecotourism; Wetlands; Ridge to Reef; Reforestation; Clean Air; Caves; and Peatlands.

These resources were designed not as *teaching* modules but as *learning* modules, the main difference being the former is teacher-oriented while the latter is learner centered. In other words, the primary users of these modules are not DENR IEC or public affairs officers. The modules are meant principally for learning communities – grassroots organizations, private voluntary organizations, community-based groups, and schools – that make-up both performers and audiences of *Dalaw-Turo* or DT. In DT, learner-participants inadvertently become environmental interpreters and articulators. This situation allows others within the community to learn from their interpretation and articulation as well. It is to the learner-participants that this section on module utilization is addressed.

The modules follow a structure that provides all the information necessary to implement a DT session. At the core of each module is a story line. You, as learner-



participant, shall interpret, perform and articulate this story line in a dramatized skit. Thus, you need to internalize the plot, the messages inherent in the story, as well as the specific characters that you will be portraying.

It is recognized that these skits will have to be interpreted within a specific localized context. Efforts have been made to allow for such creative interpretations and deviations. A trademark of these modules is *flexibility*. Places, names, settings, time, local color, plot twists and turns, and endings may be changed as appropriate. Furthermore, these story lines are not set in stone. As in all cultural forms, they are dynamic and are expected to change and evolve.

While compiling this work, issues on the creativity, originality and craftsmanship of these stories have been raised. One may say that these story lines may be a little rough on the edges given current creative writing standards. However, it should be emphasized that the intention of DT is not to excel in creativity but to encourage environmental interpretation and articulation. The plots were products of spontaneous group discussions, which, to the participants' better judgment, reflected the state of the environment. The authors' professions have made them de facto custodians of environmental knowledge. And, as in the case of myths and legends of old that have had profound influences in our collective unconscious, these plots have been woven intuitively. Thus, we see recurring themes of disregard for our environment, leading to abuse, devastation, retribution, repentance and finally, reformation.

We underscore the fact that the workshops that produced these storylines were not meant to be creative writing sessions but environmental interpretation and articulation

sessions. To judge them on the basis of creativity, originality and craftsmanship would be taking the DT experience out of context.

**The DT Session.** Traditionally, a *Dalaw-Turo* session is made up of a number of activities revolving around a dramatized skit with an environmental message. These include briefings about DENR activities, community singing and chanting, lectures, games, and opening and closing remarks from a local government official.

A typical DT session approximates the following program.

### RUNDOWN SHEET

**Venue:** *Barangay Sine, Municipality of San Aquilino, Province of Mindoro Oriental*

**Date:** *19 November 2010*

TIME/ DURATION	ACTIVITY	RESPONSIBLE PERSON
09:00-09:05	Introduction of Dalaw Turo (DT) Team and Dalaw Turo Concept	Ate Nene
09:06-09:20	"DENR at Your Service"--our mission, our vision, our mandate	Ate Vee
09:21-09:25	DT Chanting "Kalikasan, pangalagaan para sa ating kinabukasan" DT Clapping Awit Para sa Inang Kalikasan (DENR Hymn)	Ate Merlyn



TIME/ DURATION	ACTIVITY	RESPONSIBLE PERSON
09:26-09:36	Mini Lecture: Components of Nature Tubig Lupa Hangin	Ate Rye Ate Mila Ate Sally
09:37- 09:50	Skit (Ridge to Reef) When the Mountain Meets the Sea	
09:51-10:10	Environmental Game WEB OF LIFE	Ate Nene, Ate Vee
10:10-10:15	DT Chanting DT Clapping	
10:15-10:30	Closing Remarks	DT Partner (i.e. Baraggay Chair )

DENR. This is followed by chanting and signing to set the tone of the session. A lecture is then given on the subject matter before the skit is presented. What follows is an environmental game and some chanting and clapping once again. The session ends with some closing remarks from the LGU.

As in the contents of the modules, the rundown sheet is just an indicative program which you may deviate from as appropriate.

**Parts of the Module.** The module begins with its title and credits.

**Rationale.** This is followed by the rationale of the learning module. For this particular set of modules, this section attempts to answer the following questions: How does the subject matter relate to climate change? What do communities need to know about the subject matter? Why?


This section will supply the technical information that will be presented during the DT Session’s mini-lecture.

**Objectives.** Each DT module should contain a set of instructional objectives. From the pedagogical point-of-view, objectives may be classified under three major categories: cognitive (relating to knowledge gain); affective (relating to attitude change); or behavioral (relating to changes in behavior) objectives. These roughly correspond with the KAP (knowledge, attitude, practice) used in communication campaigns.

Another typology used in the classification of objectives are based on the AIDA (awareness, decision, interest, action) phases in the adoption of innovations. Using this as an example, we may come out with the following set of objectives for the Peatlands module:

After participating in the *Dalaw Turo* Peatlands Session, community constituents should be:

1. Aware of the importance of peatlands in climate change.
2. Interested in peatlands.
3. Able to decide a peatland policy within the community.
4. Implement peatland conservation programs.



**Story Line.** During the cluster workshops that produced these modules, the authors were required to conceptualize a story line. *Dalaw Turo* story lines should be simple enough to be accommodated in dramatic interpretations as well as in several other indigenous, local and popular media art forms. This section, in turn, is composed of the following subsection:

1. **Characters/ Protagonists** - Characters have been conceptualized in such a way that community members may relate with, even if these are fantasy characters
2. **Synopsis or Plot.** The synopsis gives a brief description of the plot in four paragraphs. The plot is how you would arrange events to develop the basic message. It is the sequence of events in a story or play. The plot is a planned, logical series of events having a beginning, middle, and end. Conflict is essential to the plot. Without conflict there is no plot. It is the opposition of forces which ties one incident to another and makes the plot move.

The four paragraphs of this subsection are:

**Introduction** - The beginning of the story where the characters and the setting is revealed.

**Rising Action** - This is where the events in the story become complicated and the conflict in the story is revealed (events between the introduction and climax).

**Climax** - This is the highest point of interest and the turning point of the story. The reader wonders what will happen next; will the conflict be resolved or

not. Climax as a three-fold phenomenon: the main character receives new information; accepts this information (realizes it but does not necessarily agree with it; and acts on this information (makes a choice that will determine whether or not he/she gains his objective).

**Resolution**- How conflict is resolved.


Some of the module writers opted for a more detailed treatment of this section. Instead of a plot, they wrote scenarios or narrative scripts.

**Message Recapitulation.** The module ends with a short recapitulation of the message or theme. In the actual DT Session, this may be delivered as slogans by the performers.

### **Knowledge Sharing Strategy**

The initiative of mainstreaming *Dalaw Turo* as a knowledge sharing for all subsectors covered by environment and natural resources is timely and relevant given the recent developments in information, education and communication theory and practice or praxis.

**Communication Praxis.** Communication observers are in general agreement that the world is now in the Information Age where information is a critical resource. There has been a shift in the global power dynamic favoring information and communication over the more conventional economic resources such as capital and land. The richest, most privileged people nowadays are information workers. Thus, we assume and perform potentially powerful and influential



roles as information and communication workers in the environment and natural resources sector within the context of the Information Age.

Furthermore, communication theorists and researchers have undergone a significant paradigm shift in the past two decades, moving from linear, top down models towards more cyclical, bottom up participatory approaches. The Convergence Model of Communication has replaced the traditional SMCRE Model. Participants in the communication process are no longer classified as dominant sources and passive receivers but as co-equals. The goal of communication is no longer seen as persuasion but as mutual understanding. These same theorists and researchers submit that communication campaigns should not be media centric and source oriented, and that communication undertakings should be directed at not just changing behaviors, but at transforming social norms, which determine behaviors.

There has also been a pronounced change in communication practice. At the national level, the role of communication in national agenda setting has been recognized. Laws and national policies can be influenced or triggered by media coverage. Our national experience since 1986 has shown that media can indeed make or break national leaders from presidents to cabinet secretaries, senators to congressmen.


*Dalaw Turo* is consistent with the pronounced changes in communication theory and practice. It is participatory, cyclical and non-linear. It is not media centric nor is it source oriented.

***Big Media, Little Media, My Media.*** Additionally, national communication campaigns are no longer the exclusive purview of Big Media such as national dailies, national television and radio. Little media such as community radio stations, community newspapers, community cable television have been more and more co-opted in national media campaigns. Nowadays, another category besides Big Media and Little Media, have gained much prominence and an increasingly significant role in national media campaigns. This category, known as My Media, involves social networking using digital media such as Facebook, Twitter and YouTube that capitalizes on Web 2.0 or the provision for user generated content in the World Wide Web, thus encouraging direct participation in the communication undertaking itself. One's Facebook page is actually one's published website. One's Twitter account becomes an individualized television channel, considering Twitter's slogan, "Broadcast yourself."

With its use of local media and indigenous art forms, *Dalaw Turo* employs Little Media. Furthermore, it can potentially benefit from My Media as will be discussed in later sections.

***Networking.*** Another element that is assuming a dominant role in today's communication undertakings is networking. A network is a structure made up of nodes and links. Networking involves establishing links among like-minded nodes. Networks form the natural structures of living things. Thus, organisms, ecosystems, communities and societies are structured as networks, or networks of networks.

Networks may be personal or social, individual or institutional, analog or digital, so long as there are nodes that are connected by links. Information travel via networks,



knowledge is shared through networks. Thus, networking has become a built-in, common strategy in most IEC activities or communication campaigns.

In the environment and natural resources sector, whom do we network with? Insofar as grassroots IEC undertakings are concerned, networking is done through the so-called Four Pillars of Governance: the local government unit (LGU); non-government organizations (NGOs); civil society; and the private sector. Civil society, itself, is composed of: the Church; media; schools; and socio-civic organizations. Although non-profit in nature, non-government organizations are differentiated from civil society groups since the former are organizations who perform services parallel to government agencies and are thus registered as such. Similarly, although privately run, NGOs differ from the private sector in the sense that the latter is profit oriented. Another phrase used for the private sector is the business sector or the corporate sector.

*Dalaw Turo* makes full use of networking strategies with the participation of local government units, schools, non-government organizations and the private sector. A phenomenon that provides a good rationale for networking is the Network Effect or Metcalf's Law, named after the leader of the team of information technologists who developed the Ethernet or the local area network or LAN system. Metcalf argued that the value of computing resources available to any node within a local area network increases exponentially with the number of nodes. A sociologist, David Reed, extended the concept of Metcalf's Law to social networks and argued that the social capital of a well-integrated social network also increases exponentially with the number of nodes. With this, we can propose

another definition of social capital - the economic value produced by individual or social networking. Networking generates synergies that add value to our communication undertakings.

***Indigenous and Local Communication.*** It has already been stated that, as practiced for the past two decades, the DT system involves indigenous and local communication. The significance of this strategy can be further appreciated with a discussion of knowledge management and the so-called deep ecology approach to environmental communication.

Knowledge management or KM is a newly evolving discipline that considers knowledge or intellectual capital as a manageable asset. Its goal is the sharing and reuse of knowledge. Although, KM involves ICT enabled tools, early practitioners have noted that the traditional means of sharing knowledge was through story telling. *Dalaw Turo* sessions are actually story telling sessions using local and indigenous media.

The deep ecology approach in IEC, on the other hand, is based on the following:

1. Living systems such as organisms and ecosystems need to perform three critical functions with its environment in order to survive: exchange of materials; exchange of energy; and exchange of information. Exchange of information is communication. Thus, communication is a critical function for every living organism or ecosystem.
2. Ecosystems are and made up of natural and cultural subsystems; both have profound influences on the other.

3. We can only have lasting and sustainable impact from our environmental IEC if we tap cultural strategies.

Thus, DT has been on the right track by employing indigenous media and art forms. It has been consistent with knowledge management and the deep ecology approach by employing storytelling and tapping cultural strategies.

The Philippines has a wealth of these: *alamat* or legends; folk dances; *paminipig*; *composo*; *bandillo*; *balitaw*; *sangyaw*; *awit/ harana*; *zarzuela*; *binalaybay*; *pantomina* and others. To this list, we can add an array of popular media that can supplement DT such as: komiks; street dancing; games; cheer dance; rap; puppet shows; concerts; and street theater. Furthermore, we can share our DT stories via Facebook and YouTube bringing to bear the synergies created by social networking and My Media on our environmental and natural resources agenda.

## Chapter 11 Forests



### WRITERS:

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## RATIONALE

Reforestation and climate change are interrelated. Forests are natural “carbon sinks”. They play a great role in preventing and mitigating climate change by decreasing the amount of carbon dioxide accumulation in the atmosphere. They also provide both direct and indirect ecological and economic benefits. They play a significant role in the global carbon cycle that affects climate change. Consequently, forests affect other ecosystems.

The Government promotes reforestation activities because of its important ecological benefits. Examples of these benefits are clean water, clean air, healthier environment, sustainable supply of food, provision of habitat for wildlife species, and prevention of flash floods and landslides. Despite the Government’s efforts to promote reforestation, there is still a decrease in the country’s forest cover due to indiscriminate logging, forest fires, conversion of forest land to agricultural land, and illegal human settlements. Around 15.8 million hectares out of 30 million hectares of the country’s land area is forest land. However, the forest cover is decreasing at a rate of two percent per year. As of 1997, there were only 5 million hectares of forest cover in the country.

The Government and communities are the major actors in reducing deforestation and its impact/consequences. Communities need to be aware that reforestation is not limited to planting in deforested areas but also in any vacant areas. They should also be aware of the harmful consequences of deforestation such as soil erosion which results to siltation of water bodies thereby causing destruction and degradation of low lying areas and coral

reefs. They should also be informed of the benefits such as employment opportunities for upland dwellers.

## OBJECTIVES

After completing this module, community constituents should:

1. recognize the importance of forests, its contribution to the socio-economic progress and welfare of communities;
2. accept responsibility for the protection of the environment;
3. discuss the benefits of balanced ecosystems and sustained environmental conditions of the community;
4. cooperate in ENR programs such as UDP, CBFMA and Solid Waste.

## STORY LINE

1. **Title**      THE DAWNING OF OGUP

2. **Characters**

Salome	Mother
Ipe	Son
Ine	Daughter
Andoy	Father
Rio	DENR Forester
Gener	Chairman of Barangay Cares
Mr. Roter	NGO representative.

### 3. The Plot

**Introduction.** The town of Ogup, Lion-Un has 2,400 hectares of land area, 35 percent of which is forest land. The main sources of livelihood of the people are upland farming, wood carving and charcoal making. It is in this area where the biggest tree plantation showcases the reforestation projects in the region.

**Rising Action.** The mood is happy among the wildlife in a forest composed of eagles, birds, monkey, flowers, and butterflies.

In a nearby area, inside a nipa hut, Nanay Solome is busy preparing for the day's meals while Ine is sweeping the yard. Ipe is fetching water from a nearby spring

Tatay Andoy is tending seedlings in a nursery with groups of people from the neighborhood

Suddenly...Nanay freezes, reminiscing the past.... (*Curtain closes and eventually opens...*)

At 4 o' clock in the morning, Nanay is running, shouting and screaming, instructing her husband and children to vacate the house and go to a safe place. She is in a panic telling them that some of their neighbors' houses were buried under mud and that their house is in danger of being the next. Everyone is screaming and crying in total darkness under heavy rains and strong winds. Everyone seems to be lost, looking for their loved ones while crying out their names. Suddenly, more houses are carried by the strong current of mudflows. In an instant, everything is in total devastation.

**Climax.** After several hours, rescue teams arrive to the site consisting of representatives from the LGUs, Red Cross, NDCC, paramedics and volunteer groups. There are clearing, retrieval operations, and provision of first aid and relief goods.

Nanay Salome is kneeling down, still sobbing and praying, and in between sobs, uttering the names of her husband and children. At this point she is surprised and relieved when among the crowd; she sees one of the rescuers holding her children. She rushes to Ipe and Ine and hugs them very tightly. Then they all asked, "Where is Tatay Andoy?" He then appears from among the crowd. Tired, dirty but relieved.

**Resolution.** A meeting is being held at the barangay hall which was attended by the Municipal and Barangay Councils, NDCC, DENR and other volunteer groups. They are discussing the causes of the incident. They realize that lack of forest cover coupled with the effects of climate change caused the mudflow to occur. The unusual and prolonged heavy rainfall and storms resulted in soil erosion that eventually caused the mudflow.

Forester Rio from the DENR introduces an upland development program through the community-based forest management agreement. This aims to restore the forest cover by establishing a forest plantation in the area and at the same time provide livelihood and employment in the community.

Mr. Roter, an NGO representative, commits to provide assistance in the form of planting material.

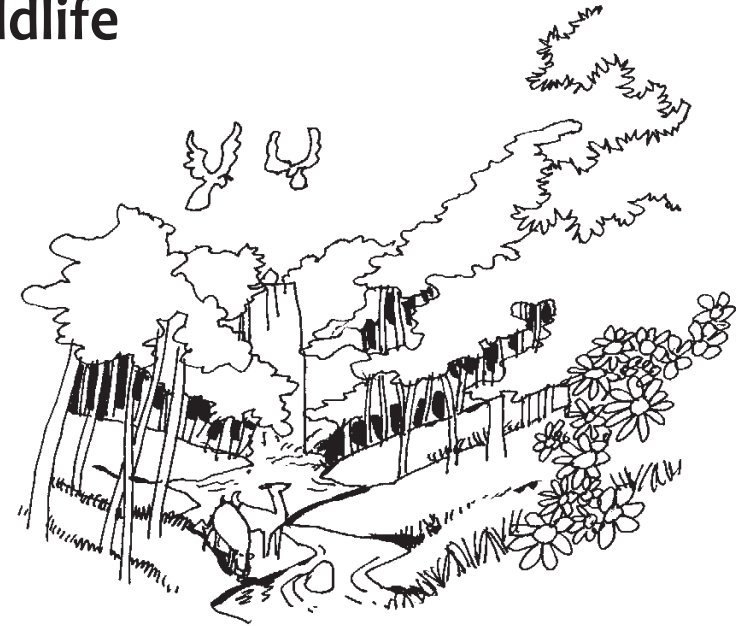
Barangay Chairman Gener encourages his constituents to organize themselves into a people's organization and challenges everyone to start all over again.

Mayor Al Dabes of Ogup, Lion-un invites his constituents to participate in the town fiesta. The group decides to have “Bukanegan” and “Awit Para sa Kalikasan” depicting reforestation and climate change.

### MESSAGE RECAPITULATION

1. Forests are carbon sinks,
2. Forest mitigates the occurrence of Climate Change,
3. Protect the Environment, Protect Life, Plant More Trees!

## Chapter 12 Wildlife



### WRITERS

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**RATIONALE**

There is no question that climate change is a menace to wildlife biodiversity; it threatens life, productivity and resources. The extinction of species is a result of imbalances in the ecosystem. Biodiversity is a life support system, that once is lost, will be gone forever.

Communities need to know that climate change affects our lives and that biodiversity plays an important role in countering these. A case in point is the role of biological resources, specifically plants, which serve as carbon sink. Communities must also realize their role and participate in biodiversity conservation to mitigate the effects climate change.

**OBJECTIVES**

After completing this module, communities should be able to:

1. discuss the causes and effects of climate change;
2. enumerate adaptation and mitigating measures for climate change;
3. describe the importance of biodiversity;
4. identify the unique biological resources in the region;
5. pursue conservation of biological diversity; and
6. implement a biodiversity conservation initiative.

**STORY LINE**

1. **Title** PARADISE LOST, SHATTERED DREAMS

2. **Characters/Protagonists**

Linglingay	The Philippine eagle
Kalaw	The hornbill
Leya	The orchid
Medusa	The snake
Robert	The crocodile
Ka Tomat	The household head, farmer, timber poacher, kainginero
Tommy	Ka Tomat’s only son
Manang Maring	Ka Tomat’s wife

3. **Plot**

**Introduction.** In a virgin forest, wildlife still abound. Orchids are found everywhere. People who visit the area to commune with nature regularly see snakes and eagles. The wildlife have fun boasting about their beauty and role in the ecosystem; each claiming that he is the most important creature God has made. A family, who lives within the buffer zone of the virgin forest, enjoys this bounty of nature.

To preserve these wildlife species, a team from DENR conducts regular lectures on biodiversity conservation; especially on climate change and how it is already felt in other areas.

**Rising Action.** Years later, in spite of these lectures, Ka Tomat enters the virgin forest and starts doing activities



destructive to nature. He converts the forest into a *kaingin* area and plants corn. While waiting for harvest time, he cuts trees and sell the lumber he gets from them. He also hunts wildlife to earn more money. He does all this because he intends to provide a luxurious life for his family.

These malpractices by Mang Tomat disturb the wildlife. The Philippine Eagle, snake and crocodile that used to be in this paradise starts feeling the effects of the destruction of the forest. Food for wildlife becomes scarce prompting them to attack the agricultural crops of Mang Tomat. The crocodile that used to be shy becomes aggressive and starts attacking people in the community.

**Climax.** One summer, the snake goes down to the community and seeks refuge in Mang Tomat's house. Feeling hungry, the snake goes out of his way to look for food. Unluckily, it was not able to find prey. He comes back to the house through the bedroom of the family. Here Tommie, Mang Tomat's only child, is fast asleep. The snake stays near the door still waiting for prey. Clueless of the danger that he is about to face, the child wakes up and hurriedly walks through the door. He accidentally steps on the snake. Disturbed, the snake bites him. Upon hearing the screams of his child, Mang Tomat runs fast to their bedroom until he sees his son lying on the floor. At a distance, he sees a snake crawling. This makes him realize that his child was bitten by a snake. Alarmed, Mang Tomat carries his son and rides on a horse to a rural health unit in the barangay proper across the river. When he reaches the river, he finds out that it has become wider making it impossible to cross. Obviously showing great distress, Mang Tomat steadily tries to feel the heartbeat of his son to ensure that he is still alive. After a few minutes, he screams because he knows his child is dead.

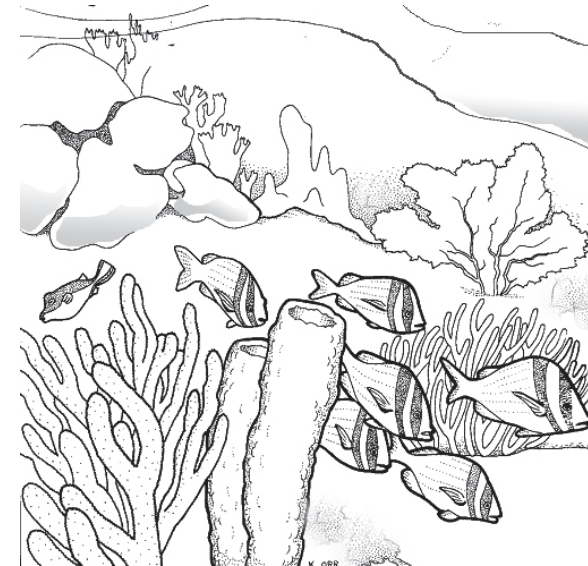
**Resolution.** Mang Tomat, apparently showing the agony of a parent losing his only child, brings home his son. During the wake, he ponders on the lost his child. He recollects images of each of the malpractices he has committed in his mind. The scenes keep on bugging him until he realizes that he was actually the cause of his child's death. Talking to himself, he says "these should not have happened if only I listened to the DENR team who conducted IEC on biodiversity conservation". He also resolves not only to stop his malpractices but also to convince his neighbors and other people in the community to stop their destructive activities and start supporting DENR programs.

#### MESSAGE RECAPITULATION

1. Biodiversity is life. Biodiversity is our life.
2. The earth is enough for everyone's need but not for every man's greed.

## Chapter 13

# Coastal Resources



### CHAPTER WRITERS

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## RATIONALE

Climate change causes sea levels to rise threatening coastal communities. It also makes coastal areas prone to storm surges, erosion, siltation and sedimentation. Climate change leads to the destruction of coral reefs causing a decline in fish catch. Furthermore, the increase in water temperatures that characterize global warming kills plankton, offsetting marine ecological balance.

Coastal communities need to know the role and importance of coastal areas and resources. Coastal areas serve as:

- breeding ground and feeding ground for indigenous terrestrial and aquatic animals;
- stop-over feeding ground for migratory birds;
- transportation and navigational pathways of ships and boats;
- buffer zones and coastal zone stabilizers that minimize sedimentation in adjacent coral reefs;
- traditional fishing areas of communities; and
- ecotourism sites.

They also provide the community with food, livelihood, fuel, medicine and increase land area through soil accretion. Coastal resources like mangrove resources also serve as tsunami shield and spawning grounds for fish and mollusk.

Coastal resource conservation is important since resources are finite and coastal areas post the highest photosynthetic activity in the marine environment.

## OBJECTIVES

After completing this module, communities should be able to:

1. recall the value and uses of coastal resources;
2. internalize the need to conserve coastal resources;
3. participate in conservation efforts;
4. comply with environment-friendly practices in the coastal areas (proper solid waste management, stop using destructive fishing methods);
5. recall various programs, policies and activities of the DENR, and other alternative sources of livelihood.

## STORY LINE

### 1. Title HINAGPIS NI COSTA

### 2. Characters

- |               |   |   |
|---------------|---|---|
| Mang Dyno     | : | A greedy fisherman who uses destructive fishing methods to earn money to fund his vices |
| Bakwa         | : | Mang Dyno's wife who gathers mangrove trees for fuel                                    |
| Garbisa       | : | Mang Dyno's oldest daughter who dumps garbage in the waterways                          |
| Haring Marino | : | Leader of all marine organisms  |
| Tsunamita     | : | Personification of the destructive force of nature in seas                              |

### 3. Plot

**Introduction.** In the coastal area of Barangay San Antonio, Mang Dyno throws his second dynamite pipe. The huge explosion almost throws him off balance in his motorized banca. After a few seconds, big and small fish begin to surface. He gathers them all and happily goes home, looking forward to his next drinking session with the boys.

Mang Dyno is a notorious dynamite fisher. He earns his living from exploiting the seas. He needs this to support his several vice and his family as well.

His wife Bakwa, low in budget, economizes and regularly cuts down mangrove trees in the nearby barangay. She uses the mangrove wood for fuel. She sells what is left over as charcoal to her neighbors so that she can play *pusoy* and gamble with friends. Mang Dyno's oldest daughter Garbisa, for lack of discipline and sense of personal hygiene, throws all the family garbage into the waterways. All the children take the cue from their mother and do the same.

**Rising Action.** The fish can no longer tolerate the practices of Mang Dyno's family. They seek an audience with their leader, Haring Marino. They plead their case for Haring Marino to punish Sergio and his family.

Haring Marino appears before Mang Dyno and begs him to stop. He warns the fisherman of the dire consequences of destroying the environment. Mang Dyno laughs off the warning and is barely impressed by this mystical creature appearing before him. His greed and need is far stronger than the warning of a catastrophe. Thus, Haring Marino orders all the fish in the ocean to go as far away as possible from San Antonio never to return.

**Climax.** Unrepentant Mang Dyno throws more dynamite into the sea. He pledges to destroy every single coral in the sea, choke the water with more garbage, and cut down all mangrove trees if the fish will not return.

Haring Marino decides enough is enough. He summons Tsunamita to unleash her fury to punish Mang Dyno's family. The tides rise and swallow Mang Dyno's home. His children were also swept away and drowned.

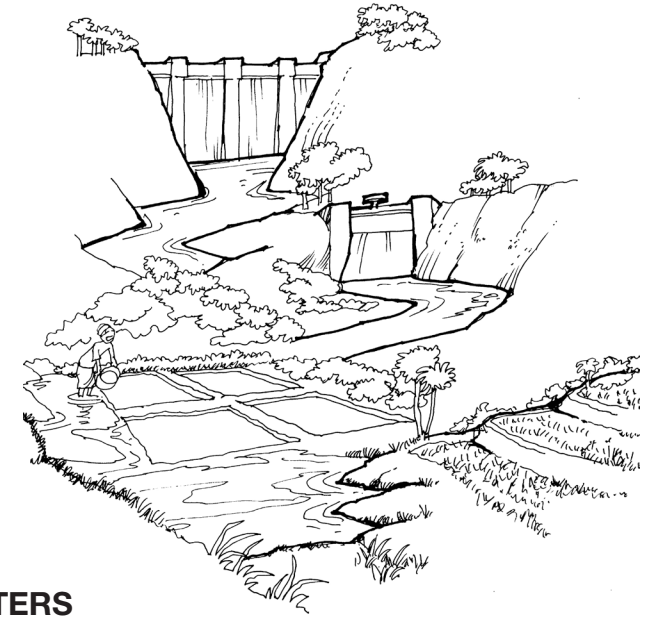
**Resolution.** But Tsunamita is a picky eater after all. She decides the garbage is too much for her. In a final act of scorn, Tsunamita regurgitates Mang Dyno's filthy daughter Garbisa. That's Mang Dyno's final curse - to live with a daughter whose utter disregard for personal hygiene he cannot stomach!

### MESSAGE RECAPITULATION

1. Everything is related to everything else.
2. There is no such thing as a free lunch.
3. Every piece of waste will end somewhere.
4. What goes around comes around; the garbage you throw away will come back to you.

## Chapter 14

# Water Bodies



### MODULE WRITERS

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Miliarete B. Panaligan	CENRO, Real, Quezon, Team Leader-Dalaw Turo, PENRO



## RATIONALE

The enormous power of modern technology is constantly placing stress on the environment. It breaks the vital links of natural processes that maintain the integrity of an ecosystem. This, in turn, affects the climate. Man has played a major role in this environmental assault. He has ignored prudence and his responsibility to be the steward of the environment. This attitude towards the environment is one of the reasons why the environment and other natural resources in the country are being utilized beyond saturation levels. The environment must be managed in such a way as to ensure adequate supply of natural resources for future generations.

## OBJECTIVES

After completing this module, communities should be able to:

1. participate in disseminating information relative to the protection of water bodies.
2. participate in greening activities both in the upland and lowland areas.
3. promote ecotourism through the protection of identified and potential ecotourism sites.

## STORY LINE

### 1. Title VIRGIN NO MORE: RAPED AND DEVASTATED

## 2. Characters/Protagonists

George	A former resident of Cala who later becomes a real estate developer
Maria	Environmental activist
Luis	George's Friend

## 3. Plot

**Introduction.** In a town called Cala, there once lived a young boy, so happy, so cheerful, so curious about life, but innocent.

The young boy admired Cala's rainforests, its thick shade that shielded him from the sun. He enjoyed its waterfalls that flow down and form long winding creeks, He cherished the trek from the mountain peaks to the rolling hills below.

" Few have seen what I have seen. These falls are more beautiful than what they show on television," the young boy told himself.

Cala was home to the young boy. It presented to him with a great variety of ecological wonders, until he became a fully grown man.

**Rising Action.** George grows up and gets his education at Juetena Business School. At school, students are taught that wealth was the sole indicator of success. Nowhere in the school's curriculum did it inculcate upon the students that true wealth lies in being good stewards of God's gifts to man - the forests, rivers and creeks, falls, lakes, springs and beautiful spots that George used to visit and enjoy when he was young.



Upon graduating with highest honors, George was determined to become rich beyond measure. Nothing and nobody will prevent his rise as a great and powerful real estate developer and a “Man of Wealth.” George became a topnotch real estate broker of one of the biggest real estate corporations in the country, the Maharlika Bughaw Group (MBG) of Companies. It did not take long before George became a Manager, Senior Vice-President, President and CEO of MB Group.

George was now at the top of his game. He had all the connections with all the politicians, the police, the activists pretending to lead worthy causes. They were all in his payroll. Even media danced to his music.

“It is not difficult to become rich. All that one has to do is sell residential lots to middle or lower middle class families and have it financed by government financing institutions and the money will come pouring in,” confided George to his associate Luis.

George was adept at bribing government officials to get his permits. He cut the trees where he wanted to build his subdivisions. He constructed A-1 golf courses and paid off all the residents in the areas covered by these golf courses. He was rich beyond measure. He lived in mansions in posh villages and choice seaside locations. He had an unbroken winning streak.

One day George was summoned to the Senate. There he met Maria, who also served as a resource person in her capacity as over-all coordinator of the environmental NGO Earth Care. They sat side-by-side during the investigation conducted by the Senate Committee for Global Warming

and Climate Change headed by Senator Laarni Lopez. Maria presented the issues that confronted the little town of Cala, the same town where George spent his childhood.

“Lake Lagoon,” Maria started, “is now a fetid swamp where only mosquitoes thrive.” George reacts and says to himself, “That is where we used to bath and play. My parents used to catch big tilapias, bangus, and tawilis, we so enjoyed for lunch and dinner”.


Maria continues, “This is caused by the continued and unabated denudation of Mt. Mayumi. When the rains come, the trees are no longer there to absorb the water, and serve as an anti-flood system.”

George reacts, “I know of the cutting of trees at Mt. Mayumi by our company! I got millions selling the timber to the Japanese.”

“As a community social worker, I witnessed many deaths caused by the mudflows during super typhoons in the Sitios of Los Cantos, Carambola, Balid, Di Tunay, Mulach and Tanta in the districts of Lawa and Manuel”.

George mutters to himself, “I did not know that many died in those towns. Some of my relatives and friends used to live there”.

Maria continues her testimony before the Senate Committee, “These incidents would never have happened had it not been for the real estate projects at the resort subdivisions surrounding the lake, your honor”.



Maria ends her presentation with a warning to the committee and the Filipino public. The hearing was aired live by ACDC Cable Channel, Kris-Boy Network, and Kabayan News Network. She warns, “Unless Maharlika-Bughaw ceases to develop these subdivisions at the expense of the environment, a tragedy may occur which all of us will regret”.

After the Senate hearing, George obviously irked, confronts Maria about her advocacy.

“Why are you pressing so hard against us? What we do is for people! We provide them with homes and a hope for a decent future. We also provide jobs for a lot of our countrymen. We are helping the economy!” George tells Maria, almost shouting.

Maria replies, “You may be doing all that, but look at the future as well. Every tree that is cut down is thirty years’ worth of growth and an additional thirty years of waiting for growth. The reduction of forest cover means fewer trees to prevent floods. The soil is eroded to the bodies of water. The lakes, the rivers, become shallower and shallower. During long and strong rains, low lying areas where many of our poor countrymen live, will be flooded. You should have thought of the possibility of people dying a horrible death because of landslides, flooding and mudflow!”

When George left the Senate in his car, he thought of what Maria said to him. He also found her to be very pretty and intelligent and with a genuine concern towards the environment and her countrymen. Though he had many

friends in politics and business, George despised most of them. He found them to be artificial, deceiving to common people, and were only after money and their own interests. He admired Maria because she dressed simply and did not wear any make up. He was also struck by Maria’s eloquence, authority and sincerity when speaking.

**Climax.** Days became weeks, and weeks became months. Then, strong hurricane winds and heavy downpour ravaged the town of Cala. There was no electricity and water service. The devastation was unspeakable. The houses at the sitios of Los Cantos, Carambola, Balid, Di Tunay, Mulach and Tanta were all submerged. Human bodies in advanced stages of decomposition were floating at Lake Lagoon. Local government officials were nowhere to be found. They have gone to Las Vegas to watch the title fight of boxer turned politician Manny Paking. The three top networks ACDC, Kris-Boy, and Kabayan tried valiantly to rescue the young, women and senior citizens trapped by the ravages of the super typhoon Mercy. Mercy packed winds of 300 kilometers per hour and heavy downpour persisted at night. The people of Cala were caught unaware.

George, in the meantime, was concerned about his subdivisions. In his anxiety, he boards his chopper from his posh mansion in Tagaytay City.

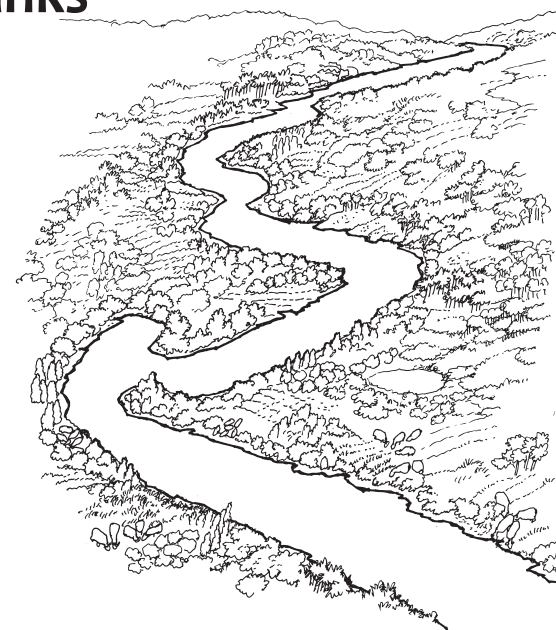
**Resolution.** He visits the once progressive sitio of Carambola. This is the center of commerce for Cala and where his offices are. He also visits his satellite office at Sitio Los Cantos. Los Cantos is where prominent lecturers and professors on environmental conservation and protection reside. It was also home for Maria whom he met at the Senate. When he proceeds to his office at Los

Cantos, he was met with much crying, weeping, gloom and helplessness. He finds out from a report in *ACDC Live!* that Maria was one of those who died while trying to rescue distressed people at the lakeshore areas of Los Cantos. She was the same person George admired for her sincerity and her genuine concern for her village mates. She had also warned the Senate on the impending disaster. She warned, "One day we will all regret that for a brief while, we may have enjoyed the benefits of economic development but at what price?". George realizes that the frail lifeless body he saw on TV is the same woman he had admired. Now she is gone. The young boy had lost his innocence.

#### MESSAGE RECAPITULATION

1. Kagubatan nasira, tubig nawala.
2. Kalikasan lumuluha, Tao Kawawa
3. May Pag-Asa! Mag-kaisa

## Chapter 15 Riverbanks



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## RATIONALE

Rivers are considered to be a vital element in many economic activities.

The quality of rivers is an important factor in sustaining agricultural productivity as well as other livelihood projects, such as fishponds or aquaculture, etc.

Presently, rivers are commonly used for agriculture, as disposal areas for industrial effluence and domestic sewage, and as dumping ground for solid waste. Agricultural chemicals, such as insecticides, pesticides, rodenticides, herbicides, fertilizers and discharges from backyard livestock and piggeries find their way to nearby water bodies. Moreover, eroded soil from nearby farming activities and other sources also add to the pollution load of rivers.

As a result, river systems undergo deterioration and dramatic changes in flow, reducing their natural ability to adjust and absorb turbulences. With the expected changes brought about by climate change and the demand for water, this could lead to serious problems for both ecosystems and people.

Riverbank rehabilitation is required to enhance the resilience of river ecosystems and minimize impacts. Such effort will reduce risks to ecosystems and people. Preventive actions may also be less costly than reactive efforts taken only once problems have arisen.

*Dalaw Turo* as an IEC strategy will educate stakeholders on the current state of river systems, enlightening them

on hazards and methods in riverbank rehabilitation as an approach to climate change adaptation. It is expected to entertain, encourage broader participation and promote collaborative efforts among stakeholders.

## OBJECTIVES

After completing this module, communities should be able to:

1. identify risk of exposure to hazards such as flooding; and water pollution;
2. apply and practice of proper waste disposal; and
3. internalize values towards riverbank protection and rehabilitation.

## STORY LINE

### 1. Title THE RIVER OF LIFE

### 2. Characters

Makusog and Magayon	Father and Mother
Madunong	Son who becomes a fisherman
Mahigos	Son who becomes a farmer
Elay	Son of Mahigos
Maarte	Wife of Madunong
Inang Kalikasan	Mother earth
Mga Diwata	Messengers of Inang Kalikasan (Buhay-Ilang, Kagubatan and Aqua)
Uran, Paros, and Aldaw	Spirits of nature

### 3. Plot

**Introduction.** A couple (Makusog and Magayon) was sent out of paradise by Bathala for disobedience. They had to live on their own and were deprived of the God-given benefits. They had to look for food and build shelter.

They searched the land for a couple of days before finally finding an ideal place near Minto River. There they had almost everything they needed - fresh air, clean water, and abundant food.

Not long afterwards, they bore two sons, Madunong and Mahigos. Madunong became a fisherman, while Mahigos became a farmer. Eventually, the two raised their own families.

Inang Kalikasan, because of her love for life, sent messages through three Diwatas (Agua, Buhay-Ilang, and Kagubatan) every now and then to warn the two men from disobeying the laws of nature.

Madunong decided to build his home at the bank of the river, while Mahigos chose to build a bit further up.

**Rising Action.** Born by the need to survive, coupled with greed and indolence, Madunong started to overexploit the river. He dumps garbage in the water and uses very fine nets to catch fish. Despite pleas of the fish to spare the small ones and stop the poisoning of water organism, Madunong continues his practice. On the other hand, Mahigos goes on to farming. He turns to cutting trees to clear areas to expand his farm. Despite the pleas of the plants and trees, Mahigos continues as well.

Inang Kalikasan gets fed up and decides to send a bandillo to meet her forces: Uran, Paros and Aldaw. They have no choice but to teach Madunong and Mahigos painful lessons. Both Uran and Paros volunteer to send heavy rains and strong winds on the night of Madunong's wedding.

**Climax.** Flood waters rush and sweep away Madunong's house. Luckily, the house of Mahigos was situated in a higher place. The impact of the flood was lesser, destroying only a portion of his house. Madunong with his wife, Maarte, tremble in fear as they come to the house of Mahigos for shelter. Then everything becomes still. In the morning they leave their shelter to see the river widened, banks eroded, and scoured. The farms are destroyed, and trees toppled down.

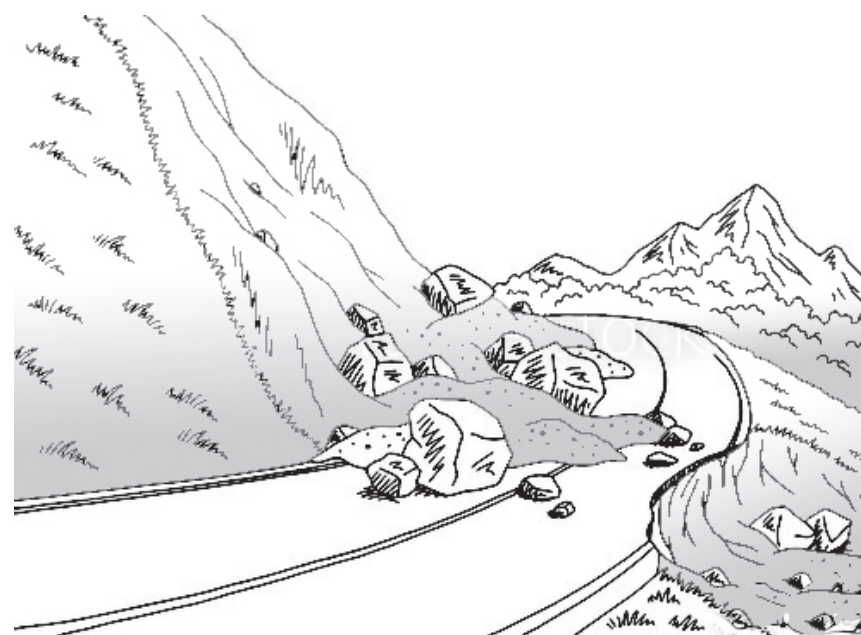
Diwata Aqua relays several messages from Inang Kalikasan. She informs them that they can restore the place by planting bamboo and votive grass along the banks, by refraining from clearing the forest and keeping the waters clean. The brothers have opposing views. Instead of following, Madunong decided to transfer to another place and continues his old ways. Mahigos on the other hand, heeds the advice and goes to rehabilitate the area.

**Resolution.** Years passed. Mahigos had a good life. He got married and had a son, Elay. His brother, Madunong, lived a disordered life with his wife Maarte. She eventually gets tired of living with Mandunong and leaves him. One day, Madunong, sick and hungry and with nowhere to go, decides to go home to his brother, Mahigos. Reunited with his brother, Madunong relinquishes his old ways and lives in harmony with nature.

## MESSAGE RECAPITULATION

1. Save rivers.... save lives
2. The severe impact of floods, whether it happens as a result of climate change or otherwise, are disastrous to people, resources and infrastructure.
3. To be able to continuously provide various benefits to communities, rivers should be preserved and protected.
4. To manage climate risks, we must understand our vulnerabilities and be able to carry out adaptation measures.

## CHAPTER 16 Geohazards



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## RATIONALE

Climate change is an impending environmental threat that results in geohazards. Although geohazards are natural phenomena, sea level rise and unusual rainfall, due to climate change can trigger and increase the occurrence of flooding and landslides. We can prepare for geohazards by raising awareness and conducting activities such as early warning and land use planning.

Numerous communities in the country are landslide- and flood-prone areas. Areas with high, moderate and low potential for landslides have their respective characteristics. Flood prone areas on the other hand are low-lying areas (depressions, valleys, foot slope, plains, etc.) and areas within and near bodies of water (lakes, canals, creeks and rivers). Flooding is usually caused by siltation at the river systems, the damming effect of landslide debris and the large volume of rainfall.

Awareness of the community to these hazards is a primary factor of preparedness. Communities must understand that geologic hazards such as landslide and flooding are natural phenomena attendant to climate change that can occur anytime and without warning. They should also realize that occurrences of this type can result to loss of lives, destruction of property and infrastructure, breakdown of services and displacement of the population. If local governments and communities work together continuously to prepare for these natural calamities, adverse consequences can be significantly reduced and loss of lives can be prevented.

## OBJECTIVES

After completing this module, communities should be able to:

1. identify indications of climate change;
2. describe flooding and landslides;
3. identify the areas in their community that are highly susceptible to landslides and flooding;
4. determine their area ratings in local flood and landslide assessments;
5. discuss experiences on flooding/landslides preparedness;
6. accept the importance of awareness of geohazards;
7. discuss ideas on how to prepare for geohazards;
8. dramatize situations during occurrence of landslide and flooding;
9. accept practices that can help mitigate climate change, thereby, reducing the triggers of flooding and landslides.

## STORY LINE

1. **Title**      GEO'S BOAT
2. **Characters/ Protagonists**

GEO	A special boy; Narrator and Character (*The name Geo is inspired by the Greek prefix geo- that signifies "earth" (e.g. geology -study of the Earth)
DENR	Geo's trusted friend
LORIE	Geo's talking bird
MANONG ISTOY	Farmer

MANANG AKAY      Wife of Manong Istoy  
 NONOY              Three-year old son of Manong Istoy and  
                          Manang Akay  
 PRETTY             Birthing pig  
 MAGKAL            Talking snake  
 BUILDERS/PASSENGERS/RESCUERS  
 TOWN FLOOD FOLKS  
                          Father and mother with a baby  
                          Man/Father  
                          Lolo and Lola with a baby “apo”  
                          A child crying  
                          Woman neighbors  
                          Husband and wife quarreling

### 3. Plot

**Introduction.** One sunny day in the lush town of Bucari, Geo asks his builders to construct a boat.

Geo is a special boy. He is the son of a rich landowner. His family owns most, if not all of the land where the town sits on. He is such a generous boy that he asks his father to distribute the land to the town people. He feels he cannot care for such a vast property all by himself. Besides, he feels lonely.

Geo wants his men to build this boat to save the members of the community where he was born. He loves and cares for this place. Bucari is a beautiful place. It has lush forests in the plains surrounded by tall mountains. The rivers teem with life and ponds are crystal clear. The lands are fertile and abundant with livestock and other kinds of animals that support the needs of the people. It is such a paradise as one could imagine.


Geo knew that the day is at hand when great rains will fall and floods will come to cover most parts of the town. As the world gets warmer, surely great rains will follow and flooding will occur. The mountains would not be able to contain the downpour.

The builders decide to construct the boat even if they do not believe in the coming of the great rain and flood or the caving in of the mountains. They even argue among themselves on how the boat should be built; how big, how it would look like, what will it be made of, and other details. They go on to build the boat because they agree on one thing - they love Geo. They gather in a plateau near the town plaza to build Geo’s boat.

**Rising Action.** While his men were busily building the boat, Geo asked DENR to go look and see in which parts of the town the great flood would first set in. He also wanted to know where it will be the deepest. DENR was trained to do these. The town proper usually experience floods. These floods were not alarming. They were only ankle deep and do not last long. The flood waters flow back to the rivers and into the sea.

Geo also asks DENR to go look and see which parts of the mountains’ soil and rocks would likely slide when the great rain comes. When this happens, it would be like a mountain caving in covering some parts of the town. Geo calls this “landslide”. DENR is an expert in studying landslides.

When DENR finished his study. He found where the landslides will most possibly occur. He also found where flooding will first set in and where it will be deepest. He



drew the mountains, and the rivers, and the whole town. He marked the places where landslide and flooding will most likely happen. He called his drawing a “geohazard map”.

Geo then asked his friend Lorie, a talking bird, to go with DENR and tell the people about the dangers using the map. He also asked PIA, DepEd and DOTC to help DENR and Lorie do the job. They went to the community to inform and warn the people. They also posted the maps all over the town.

Some believed them, but sadly, others did not.

Meanwhile, the builders kept constructing the boat. The boat was built after 365 days.

Days passed and town people went on with their ways. They forgot about the boat perched on a plateau and what DENR’s group told them.

One evening, after days of rain, Manong Istoy comes out of the house to cook rice for his family. He is a farmer living at the foot of the mountain with his family. He also practices “kaingin” so he can sell “uling” and firewood in the town.

Manong Istoy was standing on a root of a big narra tree. Suddenly, the “root” moved, and wiggled. To Manong Istoy’s big surprise, he was standing on a snake’s big and fat stomach Mang Istoy thought that the tree’s roots were just slippery from the rain. The snake tells Istoy that his name is Magkal. Magkal then whispers to Manong Istoy, “why are you still here? Aren’t you supposed to be on Geo’s boat? Go and bring your family”.

Manong Istoy, although a bit scared hearing Magkal talk, ignored the snake’s warning. He continues cooking, and eats dinner with his family.

**Climax.** After dinner, he goes to sleep with Manang Akay and Nonoy, their 3-year old son. During the night, strong winds blow rains that are heavier than what they have ever experienced before. They also hear rumbling sounds from the mountains. The animals become restless and make all kinds of noises. The mountain is collapsing. A landslide is happening.

Manong Istoy and Manang Akay stand up in fear and disbelief. They know they have to leave. They run to and fro, grabbing their chickens. Mang Istoy, ignoring the rain, runs outside shouting the name of Pretty, their pig. Mang Istoy finds Pretty giving birth at that very moment!


Manang Akay, while dragging a sack of rice, is shouting and looking for Nonoy. She then calls for Mang Istoy to come and save her. Manong Istoy, is in a state of panic. He keeps on shouting, “Pretty! Pretty!”.

People are shouting and running. Animals are squealing. The earth is rumbling. Strong winds and rain are pounding It is total chaos.

Suddenly, there is silence and darkness.

**Resolution.** When daytime came, rescuers are busy pulling up people to board Geo’s boat.

Manong Istoy is seen sitting on the boat, head bowed, his hands covering his head. He trembles, cries, and mutters to himself: “Thank you, Lord. You saved my family and Pretty”.



Geo talks to Mang Istoy, “You have been warned by DENR to leave the place but you did not believe. It is dangerous to live here at the foot of the mountain. DENR showed you that with the map”.

Mang Istoy replies, “I am sorry I did not believe DENR. I’ve lived here all my life. What will happen to my farm, my trees, my plants if I leave? With this, I’ve decided to leave. There’s no other way. My family could have been killed.”

That night, while Manong Istoy and his family feared for their lives in the mountain, many folks in the lower parts of the town almost died when the flood came.

A father and a mother with their baby were swept away in the flood.

Inside a home, a man destroyed the ceiling (kisame) of their home so they could go on the roof. The family was drenched in the rain while standing on their rooftop.

An elderly couple suffered of thirst. They were saving a half-filled one-liter container of water for their baby grandson who needed to be fed. The baby was left in their care because the parents had to be somewhere else.

A child was heard crying and saying “Poo-poo, poo”. He didn’t know where to do it. Their home was submerged in water.

Some bystanders managed to laugh after seeing a man climb a tree without his pants on. It was swept away with the flood.

A woman offered her hand to a neighbor. The neighbor said, “Thank you. This is the first time I have seen you recognize us.”

A person was heard saying “I made peace with her during that time. When the flood came, I thought we would all die”.

A husband and wife were quarreling. The wife nagged him for not moving their car to a higher place before the flood came. The husband said, “You care more for the car than for me”.

Geo together with the builders came, sailing on his boat. Mang Istoy, his family, Pretty and the other survivors were on the boat. Water was everywhere. The boat was floating and sailing all over the town. It was still raining. More survivors got on the boat. They have been waiting for Geo’s boat while hanging on to trees or on their rooftops. The boat kept on sailing as long as the town was submerged in water. One morning, Lorie flew away. She came back after an hour. She told the boat passengers that the rain would stop soon. The passengers cheered.

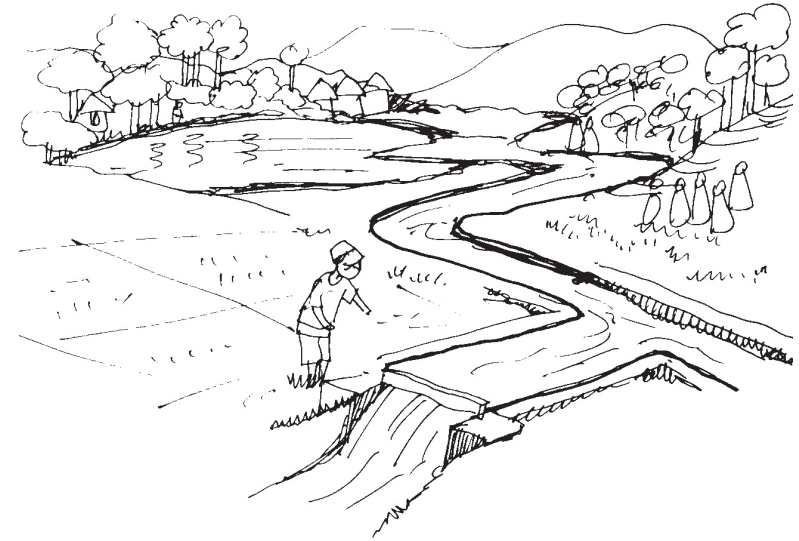
Indeed, the rain stopped, and a rainbow appeared.

### **MESSAGE RECAPITULATION**

The climate is changing  
Expect more floods  
Expect more landslides  
Know where they are  
Know what to do  
Be prepared  
Come ride Geo’s Boat

## CHAPTER 17

# Water



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## RATIONALE

Water is a vital requirement for human existence. Water is the precursor of civilizations.

Climate change impacts on water availability, quality and quantity. Extreme climatic events like droughts have serious negative consequences. They decrease runoff in reservoirs resulting in the reduction of the supply of water. Insufficiency compromises the ability to meet future demands for domestic and industrial consumption.

El Niño coupled with the over pumping of ground water will also contribute to the water supply dilemma. Installation and construction of water impounding/basins may, to some extent, address concerns on water supply. Rainwater catchments can also be developed by the individual or community to help supplement domestic uses.

In this regard, the public must be informed on: the current state of water resources; methods of water conservation; and approaches on the protection of sources of water, such as watersheds.

*Dalaw Turo* is a communication strategy that will provide entertainment and encourage participation of the larger community in water conservation and watershed protection. Awareness will lead the public to gather and propose solutions on problems related to water resources.

In a nutshell, the public should embrace the importance of water in daily life as a prime commodity.

## OBJECTIVES

After completing this module, communities should be able to:

1. have increased levels of awareness on the importance of water;
2. identify and explain the threats or challenges on water resources;
3. describe and cite examples on water conservation measures and initiatives;
4. practice water conservation by constructing a rainwater catchment; or basin in every household; and;
5. comply with at least three among the ten water conservation measures.

## STORY LINE

1. **Title** KING LEONARD'S DREAM
2. **Characters/ Protagonists**

King Leonard	King of Cantipla
Prince Arius	Son of King Leonard in charge of urban areas
Prince Allen	Son of King Leonard in charge of upland areas
Prince Ariel	Son of King Leonard in charge of sub-urban areas
Teacher Hegenio	King Leonard's mentor
Villagers	People in urban, sub-urban and upland areas

### 3. Plot

**Introduction.** The Kingdom of Cantipla is located in Mt. Manungal. It is ruled by King Leonard. King Leonard's dominion extends over plateaus, rolling hills and valleys as far as the eyes can see. Water sources like rivers, springs and waterfalls flourish in the Kingdom. The king has three smart, fine-looking and brawny sons named Prince Arius, Prince Allen, and Prince Ariel.

**Rising Action.** One night King Leonard had a bad dream. The dream was about a severe drought that will hit the Kingdom of Cantipla. The dream brought chills to the king and made him feel dread for the future. This made him consult his adviser, Teacher Hegenio. Teacher Hegenio advised the King to prepare the entire Kingdom. He warned the king that the disaster he has dreamt of will certainly happen soon.

The King then ordered his three princes to lead the three villages to prepare for the coming disaster.

Prince Allen, Prince Arius and Prince Ariel heed the advice of the King. They go to the village and give the best advice on how to prepare and fight the drought.

Prince Allen successfully convinces the villagers in the upland areas to plant trees and construct catchment basins.

Prince Ariel, on the other hand, did well in educating the villagers situated in sub-urban areas. He taught them the value and techniques of recycling, waste segregation, and river clean up.

Prince Arius was the less fortunate. The villagers under his turf were situated in the most densely populated area. They

did not mind his advice about the coming drought. They continued their wasteful way of life in that village. They use water excessively.

**Climax.** The day came when rain stopped and the villagers experienced extreme heat. This worsening situation continued for days, months and years.

The King was saddened when he learned that the villagers overseen by Prince Arius were having difficulties with water. The streets were filled with so many people with empty pails and water canisters. They were lining up for water rations supplied by other villages overseen by Princes Allen and Ariel. Upon learning the chaotic situation at the village of Prince Arius, King Leonard goes to the village and pacifies the villagers with a strong word about water conservation.

**Resolution.** From then on, the villagers under Prince Arius vowed to institute reforms from their wasteful lifestyle and lavish practices. They form technical working groups composed of the most educated constituents of the kingdom. They visit all areas and help rehabilitate and restore water catchments; develop MRFs and sanitary landfills; dredge choked river basins; plant one million trees; and construct accessible farm-to-market roads.

The Kingdom Cantipla lived in harmony once again.

### MESSAGE RECAPITULATION

1. Water is life. Life is water.
2. Conserve Water Now, Every Drop Counts.
3. "Tubig: Ating Yaman, Ating Alagaan"
4. Save Rainwater
5. Protect our watersheds, let's plant trees!

## CHAPTER 18

### Wastes



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## RATIONALE

The correlation between solid waste management and climate change has raised serious concerns across the world. Sites where solid waste is disposed, produces methane, one of the most dangerous greenhouses gases. These disposal sites contribute to yearly greenhouse gas emission by approximately 3 to 4 percent. Climate change experts have predicted that in the coming years, there are chances of emissions increasing at a more alarming rate.

Management of solid waste is becoming a serious environmental challenge since there is lack of awareness among people. Heaped garbage bins overflowing with solid waste is becoming a very common sight in communities all over the world. The stench emanating from these bins may be a problem for all of us but have we ever thought of how we contributed to its creation? The government has embarked upon various voluntary measures to bring down the level of greenhouse gas emission. However, a lot still needs to be done in order to manage municipal solid wastes. Experts are of the view that communities should seek support to capture the emission of harmful gases such as methane and CO<sub>2</sub> which is the result of solid waste decomposition.

Waste generated in the Philippines is estimated at 17,871.53 metric tons per day. Waste generation increase 47 per cent in 2010, or 26,194.95 metric tons per day. Metro Manila alone needs a new landfill that can accommodate 6,000 metric tons of garbage daily. Open dumping is still the most common waste disposal method as controlled dumpsites and sanitary landfills (SLFs) are very limited.

These figures only include garbage that is documented. Much unrecorded volume maybe accumulating each day. This adds to the clogging of waterways and aggravates flooding during rainy season. This garbage pollutes the environment and causes illnesses.

Under R.A. 9003, the Philippine government has laid down several requirements for Local Government Units, concerned agencies and communities to comply as far as the SWM is concerned. Among these is the establishment of Materials Recovery Facilities in Barangays, establishment of SLFs in big cities and advocacy for SWM in households.

Despite this effort, garbage still continues to be a problem in the country. It still remains a threat to the existence of life and continue to be a contributing factor to global warming and climate change.

The people in the communities need to support the government in relation to this aspect. Awareness therefore must be raised on how they would deal with the solid waste management problem. This must be done in order to illicit action and proper behavior in solving the SWM problem.

The conduct of *Dalaw Turo* as one of the IEC strategy is envisioned to be an ideal tool in which the government and SWM implementers can successfully and effectively reach their target audiences. Hence, this module aims to guide practitioners in the conduct of DT on SWM to target schools and communities.

## OBJECTIVES

After completing this module, communities should be able to:

1. identify and internalize proper solid waste management;
2. practice the 3Rs (reduce, re-use & recycle);
3. describe the role of methane gas and carbon dioxide emission as a contributory factor to global warming and climate change;
4. practice segregation of garbage and manage organic waste on their own through composting; and
5. develop a functional Materials Recovery Facility (MRF) for their community and as showcase for other communities.

## STORY LINE

1. **Title** SI HUSAY. SI KUSOG AT ANG DALAWANG DIWATA

### 2. Characters/ Protagonists

Kusog	son
Husay	daughter
Duroto	father
Pintada	mother
Diwata Anyag	good fairy
Diwata Lamire	bad fairy
Kuya Sowam	DENR SWM Coordinator
Kapitan Biron	Baranggay. Chairman

## 3. Plot


**Introduction.** The story starts with a family living in a depressed urban barangay called Brgy. Masi-ot, Calle Dunot. They are a family of four, father (Duroto), mother (Pintada), son (Kusog) and daughter (Husay). The surroundings are messy from the inside to the outside of the house. Garbage is scattered everywhere. -from plastics, tin cans, wrappers, decomposing food wastes, stagnant water to name a few.

Barangay Masi-ot, like other barangay, also experiences hot temperatures. Well-off residents have air conditioners while poor families strive to have electric fans. This provides them relief from hot temperatures. Families who cannot afford to buy electric fans endure the hot temperatures and often get sick.

The barangay is also a flood prone area. A little rain results in flooding due to garbage clogged esteros and waterways.

**Rising Action.** Because of the unsanitary environment and sudden change in climatic condition (from rainy to hot days and vice versa) and extreme temperatures, members of the family often get sick. Securing health services is difficult for them. The barangay has no available health center and barangay health worker.

One day, Husay, the daughter gets sick of diarrhea. She gets high fever and became delirious. In her delirium, Husay has a dream. In her dream two fairies appear, *Diwata Anyag* and *Diwata Lamiri*. The two Diwatas cast their magic powers. *Diwata Anyag* displays a healthful scenario - a paradise-like environment, free of any garbage and harmful



insects, happy and sick-free people enjoying the beautiful environment. In her dream Husay could see a beautiful and serene place. It is full of flowers that fill the fresh air with sweet scent. How Husay longed that she could live in this place and recover from her illness!

Suddenly *Diwata Anyag* hears a loud roar from her back. She sees a fiery, stinky and dirty *Diwata Lamiri*. *Diwata Lamiri* casts her magic wand. A scene of a dirty and chaotic place appears. Garbage is scattered everywhere, stray dogs and animals hungrily scavenge the garbage, the harmful insects flying from one trash pile to the next. *Diwata Lamiri* casts her magic wand again. This time a scene of animated methane and CO<sub>2</sub> gases emanate from the heaps of garbage. The gases fly up to the atmosphere. The sunny day suddenly turns dark. Clouds accumulate, thunder and lightning roars, and heavy rains follow. Rains last for hours and flooding follows. Husay could see herself floating with the animals. She is carried by the waters along with children and young girls like her. They are shouting for help, screaming to death and wandering in the midst of nowhere, desperate to find their families.

*Diwata Lamiri* casts her magic wand once more. This time, King Sun appears in the scene. King Sun shows off its intense light for three successive months. The soil surface cracks and plants wither. The people, Husay among them, feel the intense heat. They perspire, become thirsty and choke.

**Climax.** Husay felt that as if her condition worsens, she struggles to breathe in the stinky and hot air.

As Husay struggled to breath, she groans. Her mother, Pintada, notices Husay and wakes her from sleep. “Husay wake up, wake up!!! You’re dreaming!”, Pintada puts her palm on her daughter forehead.

“Husay you’re having a high fever!” cries Pintada.


Husay replies, “Hu.hu.hu...It was just a dream, Mother, but it looks real.”

Husay tells her mother about her dream. She tells her about the two fairies and the scenes that were flashed in the dream. “Mother, with the dream that I had, I know that I can recover from my illness if we will have a clean house and yard. It felt good to breath flower scented clean air in my dream. I could immediately die if our dirty house and yard will continue to be so” said Husay.

Mother Pintada, ponders. She could not afford to let Husay and other members of her family get seriously sick all the time.

**Resolution.** “The solution is within our family”, Pintada says. “Let us start cleaning our house and yard.” The whole family then helped each other in cleaning their house and surroundings.

While the family was busy cleaning, Kuya Sowam arrived. Kuya Sowam is the Solid Waste Management Coordinator from the DENR. Kuya Sowam helped the family segregate the garbage thrown and scattered by the family. He taught them how to segregate wastes. “First, the garbage should be sorted as biodegradable or non-biodegradable.” Kuya Sowam said.



Kuya Sowam tells Father Duroto to dig a pit at their backyard where they could place the biodegradable wastes such as fruits and vegetables peelings and food waste.

The non-biodegradables were then sorted as recyclables or reusables such as plastics (sand bags and containers, glasses, metals, used fluorescents and others).

Non-biodegradables which could not be used by the family anymore were sold to the junkshop. The family was able to earn a little amount out of the proceeds of their junked items. However, at the junkshop not all non-biodegradable were bought. There are still some residual wastes which need to be deposited somewhere else.

“Oh I see!” Kuya Sowam said, “it’s not a problem”. We will go to Barangay Kapitan Biron so that he will establish a MRF for these wastes.

“Good Morning Kapitan Biron! We have some wastes gathered from the household of Duroto. These are residual wastes which they brought into their compost and sold to the junkshops. Per R.A. 9003 each barangay is required to have an MRF where these types of waste can be temporarily deposited. MRF is beneficial to the barangay because these can solve the garbage and climate change problems. The barangay can also make money from this garbage by processing them into other products as a means of livelihood or other disposition methods” said Sowam.

Sowam adds, “In this way, only a small amount of garbage will land into your dumpsite. This will prolong the use of the dumpsite. This will also lessen the garbage that will be emitting methane and carbon dioxide gases, which is one of the causes of global warming and climate change. Your barangay will truly be clean and healthy.”

Oh I see! That’s good Sowam. I will inform my barangay council to start the establishment of our MRF.

The family of Duroto and Pintada sustained the practice of SWM. The family members no longer got sick of diarrhea and other garbage related diseases. They also continued to recycle, sort their garbage and help the community in advocating proper SWM. They are also benefiting from the fresh and organic vegetables from their backyard using the organic fertilizer from their compost pit.

Solutions to garbage problems as a contributory factor to global warming and climate change rests upon ourselves. Like the family of Duroto and Pintada who tried to practice SWM in their own little way to improve their way of living, others can also do it. Manage your garbage properly. Have a healthy and clean lifestyle.

### **MESSAGE RECAPITULATION**

1. Solid Waste Management: A must to alleviate the impact of Climate Change.
2. Biglang Pagbabago ng Klima, Maraming Buhay ang Nakataya!
3. Tungo sa Laban ng “Climate Change”, hawak-kamay sa pagsasaayos ng basura ang kailangan.
4. May pera sa basura; may kabuhayan sa basura
5. Methane Gas from waste terminates life with haste.
6. Katas at singaw ng Methane at CO2 galing sa basura, mapanganib sa tao at kalikasan.
7. Good quality of life can be achieved through proper solid waste management.
8. Economic progress can be gained through proper solid waste management.
9. Malinis na Kapaligiran, Malusog na Mamamayan

## CHAPTER 19

# Responsible Mining



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## RATIONALE

The Philippines is endowed with rich and varied mineral resources, much of which remains to be explored and exploited. With such vast reserves, the Philippine mining industry has played a major role in the economic growth of the country. However, concomitant with mineral exploitation are environmental problems generated by mining, panning and milling activities. Huge quantities of waste and mine tailings have to be dumped. These can cause pollution of rivers and marine ecosystems, and damage irrigation canals and farmlands through siltation. Prohibited toxic and hazardous chemicals like cyanide and mercury, used illegally by thousands of small-scale miners, find their way to the river system even in urban areas. Forest lands are being denuded, landslides and flashfloods occur at alarming rates in areas defaced by unsystematic and illegal mining operations. Forest land's capacity to absorb carbon has been diminished due to its denudation. These are aggravated by the different impacts of climate change. Thus, intensified measures to implement responsible mining in the different mining communities is vital to lessen or prevent environmental degradation and destruction.

## OBJECTIVES

After completing this module, communities should be able to:

1. differentiate between responsible and irresponsible mining activities;
2. recognize the ridge to reef interconnectivity; and
3. discuss the effects of climate change and how it can generate calamities on environmentally ravaged areas.

## STORY LINE

### 1. **Title** RESPONSIBLE MINING MAKES A DIFFERENCE

### 2. **Characters**


Carding	protagonist
Ogrong	antagonist
Pareng Nardo	friend of Carding
Nicandra	wife of Carding
Doctor Quack	medical officer
Manang Sungit	Vendor
Mang Kepweng	Albularyo
DENR personnel	

### 3. **Plot**

**Introduction.** The story begins with Carding, an upland farmer, whose main livelihood is slash and burn farming. He lives with his wife Nicandra in the mountain slopes of Mt. Pinukis beside the riverbank of Tinuyo River.

**Rising Action.** One day, his best friend and *compadre*, Nardo, visited Carding. In between rounds of *tuba*, Nardo was able to convince Carding to go out with him and engage in small-scale gold mining deep in the heart of Mt. Pinukis. Gold was discovered in the area. A lot of people were going there to explore and try their luck. A large scale mining company was already operating on the other side of the mountain.

Ogrong, the financier and Chinese businessman, welcomed Carding and Nardo and explained their work and salaries. He promised them that if they will work hard in his tunnel,



they will be richly rewarded. Being strict in his management, he warned them that he will not tolerate slackers. The “no work, no pay” policy will be observed at all times. They are not excused even if they are sick. The two friends could not do anything but accept the terms and conditions of Ogrong. They did not have any alternative and they needed work.

Months past, Carding together with his Pareng Nardo engaged in small-scale mining and worked as laborers in Ogrong’s mining tunnel. They started digging and extracting ore which they manually processed using ball mills. Eventually ball mill operators sprouted everywhere and smelting/refining fly-by night processors helped extract the gold with the use of cyanide or mercury. Trees were cut by the miners to use as props or timber piles. Most of their wastes were dumped everywhere particularly at Tinuyo river. Shanties and small houses began to sprout along the mountain side as more and more people migrated to try their luck.


One day, Carding and Nardo decides to go home to visit their families. Upon arrival, Carding learns that his wife Nicandra was sick and the local *albularyo* Mang Kepweng said that it was an extraordinary sickness. He even hinted that his son might have been cursed (*barang*) by envious neighbors. Carding learns that the sickness was also prevalent throughout the community. He decides to bring his son to a municipal hospital. There the doctor tells Carding that his son is suffering from mercury poisoning. This was due to the water they drank from the Tinuyo river which was heavily contaminated with mercury.

Before going home, Carding passes by the market to buy fish for their supper. He was surprised to see that there was

no fish for sale. According to the fisherfolk there was no catch as most of the coral reefs were already destroyed due to heavy siltation. He was told that fish is available in the next town.

So upon reaching the next town, Carding notes how prosperous the town had become. Houses were getting bigger; roads were well paved. There was a newly constructed school building for children in the elementary and high school and a medical clinic as well. The market was clean and full of fruits and vegetables and a variety of fish to choose from. From a distance, he could see children swimming on a clear and sparkling river. Carding decides to banter with the vendor to learn how their town had become prosperous.

The vendor Manang Sungit narrates that ever since Makinang mining company began their mining activities in their area, life improved. Most of the people were employed by the mining company which helped them economically. The company rehabilitated and widened their roads, built school buildings, medical facilities and introduced livelihood programs. Manang Sungit sees a friend from the DENR and calls her to explain further what responsible mining is all about. The DENR staff member explains that under the Mineral Production and Sharing Agreement, the company is mandated to ensure that social equity, economic development and environmental protection shall be strictly implemented and duly monitored by the concerned agency of DENR, in close coordination with a multi-sectoral body represented by the LGU, IP’s, Academe, Religious Groups, NGO’s and other stakeholders. As part of environmental protection, the company is required to rehabilitate the mined-out areas through reforestation and preserve the



culture of the IP's. They are required to implement proper waste disposal and treatment. Under its corporate social responsibility program, the company has to provide for livelihood, health and sanitation, responsive education and capability building to help elevate the living conditions of the affected community.

Carding goes home and invites Pareng Nardo to share a gallon of *tuba*. In between glasses of *tuba*, Carding relates to Nardo what he learned that day. They decided to return to the mining camp the following day to get their salaries and bid farewell to Ogrong as they opted to apply for a job at the Makinang Mining Company.

**Climax.** That night, a storm hit their place. Heavy rains fell in torrents and the wind blew so hard that banana and coconut trees were toppled to the ground.

By the next morning, the storm abated and Carding and Nardo start their journey back to their mining camp. When they arrived, they could not recognize the place. A huge landslide had occurred during the night and buried most of the houses there. Most tunnels collapsed burying miners. There was crying and wailing everywhere. Government rescue workers were trying to save people inside the tunnels.

Ogrong was among the fatalities in the landslide. They overheard from DENR personnel on the site that this tragedy would have been averted if people had been prudent enough to practice safe and responsible mining similar to what was being practiced on the other side of the mountain. Furthermore, they heard that the climate has been changing and that one of its effects is for the communities

to experience more severe storms and rains which could cause landslide and erosion particularly in steep slopes and denuded terrains.

**Resolution.** Thus, Carding and Nardo go home lucky but with a bitter lesson. There is a price to pay when they abuse Mother Nature and it is only by practicing responsible mining that there may be a win-win situation. Never again will they venture on irresponsible mining activities.

### **MESSAGE RECAPITULATION**

*“Responsableng Pagmimina, Tungo Sa Magandang Kinabukasan”*

## CHAPTER 20

# Ecotourism



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## RATIONALE

Tourism activities in coastal areas if not properly managed bring grim consequences to the environment. The tourism industry must now shift to an ecotourism approach to consider protection, responsible presentation, maintenance, management, sustainable use and restoration of our physical and biophysical resources. Tourists must be taught responsible tourism so that our remaining resources may yield the greatest sustainable benefit that we can bequeath to the present and future generations.

Conserving the mangroves, seagrass beds, and corals reefs can reduce the impact of climate change such as flooding and famine. It can also improve the ability of ecosystems to provide critical services in the face of increasing climactic pressures.

## OBJECTIVES

After studying this module, DT learning communities should be able to:

1. practice protection, conservation and rehabilitation in existing habitats;
2. identify ways to improve productivity and biodiversity of corals, seagrass, mangroves and estuaries; and
3. develop community participation in the management of habitats.

## STORYLINE

### 1. Title THE GIFT


### 2. Characters/ Protagonists

Mr. Papillon	A rich foreigner in search of self fulfillment
Ms. Coraline	A native of Kaboan, local tour guide and active community volunteer on environmental protection

### 3. Plot

**Introduction.** In a white sanded island within the Municipality of Kaboan, there lived a lady named Ms. Coraline. She is the president of the Kaboan Coastal Environment Protectors Association. It is a People's Organization organized and empowered by the DENR to help protect the environment. Although Coraline graduated with a degree of Computer Science and had the opportunity to work abroad at an Informatics company, she preferred to stay in her community as a volunteer and tour guide. She was very passionate in her service to the community. She always took the lead in environmental advocacy campaigns in her municipality.

**Rising Action.** One day a philanthropist named Mr. Papillion arrived and checked-in at the famous beach hotel in Kaboan. Mr. Papillion asked the resort manager to recommend a tourist guide. He wanted to explore the area. Coraline being an accredited tour guide by the Department of Tourism and Department of Environment and Natural Resources, was tapped by the hotel to serve as Mr. Papillion's tour guide.



The hotel management recommended tourist destinations within Dagatlandia but Coraline in the course of the tour also suggested to Mr. Papillion to visit Serendia, a small island of Kaboan with pristine coral resources and a white sand bar. It is also covered by lush mangrove forests inhabited by fruit bats and other wildlife. Mr. Papillion decided to accept the invitation of Coraline to visit Serendia after a week in the hotel. They went to Serendia and spent a week there.

**Scene 4.** In Serendia, Papillion found accommodations in a “Home Stay,” a residence of a fisherfolk who could provide bed and breakfast to tourists who want to immerse into the community. Ms. Coraline and Mr. Papillion had enough time to go trekking, bird watching in the mangrove forest, sun bathing, swimming, and getting to know the community. In this way, Mr. Papillion gained better understanding of the plight of the coastal dwellers and the status of the coastal resources in the place. He savored the abundant marine resources - mollusk, sea cucumber, “kinilaw” and other sea food - offered to him by the fisherfolk.

Mr. Papillion and Ms. Coraline enjoyed each other’s company in Serendia Island. Coraline taught Mr. Papillion native dances. He began to learn the culture of the people in Serendia. There he experienced the warmth and hospitality of the local inhabitants while appreciating the beauty and serenity of the island.


After a week, Mr. Papillion moved to another tourist destination. Ms. Coraline continued to work as a tour guide and an environmental advocacy volunteer. She assisted the Bantay Dagat in monitoring illegal fishing and helped facilitate livelihood projects for women. Her expertise in community organizing was tapped by the local government

unit (LGU) of Kaboan. The LGU designated her as a focal person of a community-based project of Kaboan. The project was a Botanical Garden which aimed to promote biodiversity conservation and enhance the integrity of the environment.

Three years later, an opportunity came for Ms. Coraline to attend an investment forum in Manila as a project representative. There she presented her proposal on coastal eco-tourism project development. It focused on shoreline development and habitat conservation for Serendia as a potential coastal ecotourism site of Kaboan. Her project proposal gained appreciation from the forum organizers and it was finally endorsed for funding.

After three months, a representative from the funding institution came over with a grant of Php 50M. Much to Coralline’s surprise it was Mr. Papillion who was the generous donor.

Mr. Papillion took a hands on approach with project start-up activities with Ms. Coraline. The project consultation started with the social mobilization of coastal communities, LGU and other concerned stakeholders. They also sought the assistance of the DENR, BFAR and the DOT to provide them with appropriate guidance. Mr. Papillion and Ms. Coraline friendship grew stronger in the course of project implementation, apart from his goal of sharing his wealth as donor he also developed a passion for loving the environment and caring for the poor. This gave him self-fulfillment.



**Climax.** One day in Serendia Island, they launched a project on habitat protection and conducted a mangrove planting ceremony. as part of the PhP 50 million grant awarded by Mr. Papillion.

On their way back to Kaboan there was a sudden change of weather. They experienced heavy rains, and strong waves. The situation became more horrifying when the pump boat they were riding capsized. It sent them and wood debris floating away in different directions. Unfortunately, the rescue team responded too late. The survivors were already distant and some had drifted into the lonely sea

Mr. Papillion was recovered alive by a fisherman. He was found unconscious clinging to a floating Bitao trunk. He was brought to the municipal infirmary but did not survive. Ms. Coraline, on the other hand, survived by being rescued by a cargo vessel. She was sent back to Kaboan.

The dead body of Mr. Papillion was sent to his homeland in Europe. Ms. Coraline was informed about the death of Mr. Papillion while she was recovering in the hospital.

Coraline felt helpless with the sudden death of Papillion. She thought her dreams for the project were shattered. She thought to herself “why did it have to be Mr. Papillion; he was a very kind man.”

**Resolution.** Two months after the tragedy, Coraline started to pick up the pieces of her life. She gradually made immersed herself in the community. She found that the resources on the island were being depleted. If nothing will be done to protect them they will eventually lose their resources and eventually, tourists.

Coraline’s passion for the environment was renewed. She regained hope and inspiration from the community and the legacy of environmental protection left by her friend, Mr. Papillion. With renewed conviction, she continued what she and Mr. Papillion started.

A few weeks later, a legal counsel of Mr. Papillion arrived looking for Ms. Coraline. Mr. Hope read to her the Last Will and Testament of Mr. Papillion which he prepared prior to his last visit to the Philippines. Coraline was moved to tears upon hearing that she was the sole beneficiary of Papillion’s wealth and businesses. Mr. Papillion emphasized in his Last Will and Testament that Ms. Caroline had his trust and confidence and that she should be his sole heir to enable her to sustain his legacy.

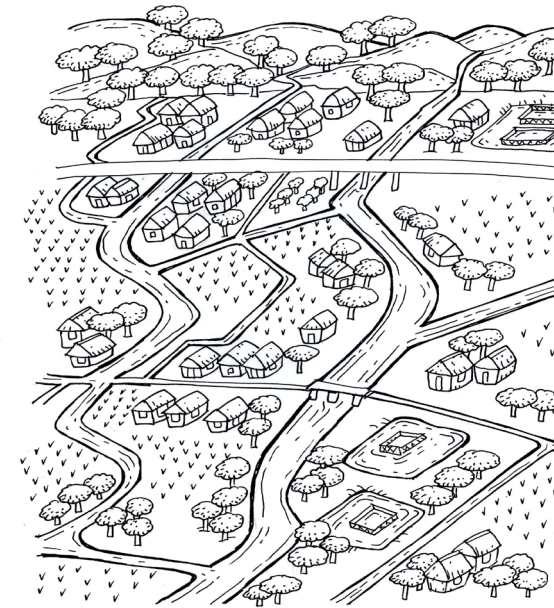
In memory of Mr. Papillion, Ms. Coraline established a foundation for coastal environmental protection and now devotes her entire life to the ecotourism project in Serendia. She became the Chairperson of the ecotourism council. Being the Chair, she assists the LGU in the development of the ecotourism code in their Province.

Her dedication and commitment towards environmental protection garnered several local and international awards. She received several recognition awards and commendations. She dedicated all her awards to Mr. Papillion which she perceived as a “Gift from Heaven”. The Municipality of Kaboan became the Bymber 1 Eco-tourism destination in the country because of: shoreline management strategies; regulation of sand and coral mining; protection and conservation of mangroves; setting-up and maintenance of coastal setbacks for all development; construction and maintenance of seawall; and habitat management.

## MESSAGE RECAPITULATION

Good tourism management should protect the environment.  
Sound environmental management brings in good tourism.

## CHAPTER 21 Wetlands



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## RATIONALE

Wetlands are defined by the Ramsar Convention as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters.

This provides a broad definition of wetlands covered in its mission, including lakes and rivers, swamps and marshes, wet grasslands and peatlands, oases, estuaries, deltas and tidal flats, near-shore marine areas, mangroves and coral reefs, and human-made sites such as fish ponds, rice paddies, reservoirs, and salt pans.

Wetlands are among the world's most productive environments. They are cradles of biological diversity, providing the water upon which countless species of plants and animals depend for survival. They support high concentrations of birds, mammals, reptiles, amphibians, fish and invertebrate species.

Wetlands are also important storehouses of plant genetic material. Rice, for example, which is a wetland plant, is the staple diet of more than half of humanity.

Wetlands, specifically mangrove ecosystems, are important nursery areas and habitats for commercially valuable shrimp, prawn, shellfish, and fish species. Globally, nearly two thirds of all fish harvested depend on the health of wetlands, such as mangroves, seagrass and coral reefs for various stages in their life cycle.

Moreover, wetlands are important bird habitats, and birds use them for breeding and nesting, it is also their source of drinking water and for feeding, resting, shelter, and even for social interaction.

Unfortunately, the attraction of short-term, private-sector profit continues to drive the destruction and degradation of wetlands in many parts of the world. In fact, there are worrying signs that wetlands and the services they provide us with are being lost at a higher rate than some other ecosystem types.

Mangrove ecosystems are seen as useless land by hotel operators, fish pond operators and other developers. They use this as justification for the destruction of wetlands to replace them with hotels, fish and shrimp ponds and other activities they consider more productive. They do not consider the environmental damage, social and economic cost to local communities and humanity.

Where mangroves had been destroyed, the tsunami waves are able to penetrate far inland, destroying homes, inundating farmland and washing away people and livelihoods. This means that people all around the world are becoming more vulnerable to flooding, droughts, storms and their livelihood sources are becoming scarcer.

Poor people in particular are very vulnerable to these impacts. They often depend directly on the foods, fiber and clean drinking water that natural wetlands supply, as well as for shelter and protection

The presence of mangroves and other wetlands can reduce the impacts of increased rainfall, storms, glacier melting and



even sea level rise. These wetlands are crucial in adapting to a changing climate because they can also contribute to water regulation and storage functions.

Therefore, in order to protect people living close or even far downstream from wetlands and their source of livelihoods, we must conserve and restore wetlands. In this way, they can continue to play their significant role in the cycle of life.

### OBJECTIVES

After completing this module, communities should be able to:

1. internalize the importance of wetlands;
2. practice wetlands' protection, conservation and management.

### STORY LINE

1. **Title** CARING FOR OUR WETLANDS: AN ANSWER TO CLIMATE CHANGE

#### 2. Characters/Protagonists

Nanay Dor	mother
Tatay Yan	father
Inday Chane -	daughter
Eggleta	head of the migratory birds
Eggleta 2	
Madam Mina	developer
Bird watcher 1	
Bird Watcher 2	

### 3. Plot

**Introduction.** If there was one thing the residents of Barangay Durian could boast of, it is the vast and unspoiled Arancillo wetlands situated in a populated area of the place. The mangroves are the barangay's heart and soul. The community vowed to protect and preserve them at all times.


Arancillo wetlands, specifically the mangrove areas, are undeniably significant to their lives. It is their source of food. Tatay Yan and other fathers in the barangay gather crabs, shrimps and other fish for their sustenance.

These wetlands are also the staging area of migratory birds and feeding ground of other wildlife species. Inday Chane, together with her friends, love to watch birds scouting for foods here. Also, because it was a protected area, it became one of the ecotourism sites frequented by local and international visitors for bird watching. Birds that fly down here are led by Eggleta, the most powerful of them all.

Nanay Dor, wife of Tatay Yan, runs a sari-sari store. She feels lucky when visitors flock her store increasing her sales.

For how many years, Barangay Durian has been a peaceful abode to its residents. The Arancillo wetlands sustains their need for food and their livelihood.

**Rising Action.** But one sunny day, the situation changed for the worst. A certain Madam Mina informed the community that the area will be converted to a beach resort. The Barangay residents rallied and contested Madam Mina's selfish plans. They never forgot their vow to defend their environment and their Arancillo wetlands. All there



protesting were of no avail. “Its business over environment”, hollered the residents!

Mangroves were cut off and marine life in the wetlands scampered for safety, but others were unlucky and lost their lives.

Much to their dismay and no matter how hard they battled against the mighty Madam Mina, the wetlands were converted to a grand beach resort. Madam Mina succeeded with her self-centered goal. Unfortunately, the beach resort operation coupled with the indiscriminate throwing of garbage by the customers and cutting of mangroves greatly damaged the environment, especially their Arancillo wetlands. The formerly marine rich Arancillo wetlands was dead.

Powerful Eggleta and her bunch of bird friends once visited the place. They were so saddened to see the state of the same wetlands they used to play in.

While Madam Mina was enjoying her profit, Tatay Yan had a hard time looking for money and food. Nanay Dor’s store closed and Inday Chane and her friends occasionally saw the birds hovering in the area. Residents became afraid that one day they might be hit hard by a storm. They did not have mangroves anymore to serve as their buffer zones.

Barangay Durian became a festive place. People came to enjoy swimming, oblivious that they are stepping on productive wetlands that supported both humans and marine life.

***Climax*** Due to land use conversion of the wetlands, throwing of garbage and mangrove destruction, another important ecosystem at Barangay Durian was destroyed. The link between the marine and terrestrial ecosystem was cut off.

Given this reality, barangay officials saw the need to tap the DENR to give lectures to the residents, as well as, the resort operator, Madam Mina, and her employees on mangrove protection, coastal care and wildlife protection. The local officials didn’t want to cause further damage to their wetland ecosystems in the Barangay. Tatay Yan and Nanay Dor together with their daughter, Inday Chane attended the information campaign conducted by DENR.

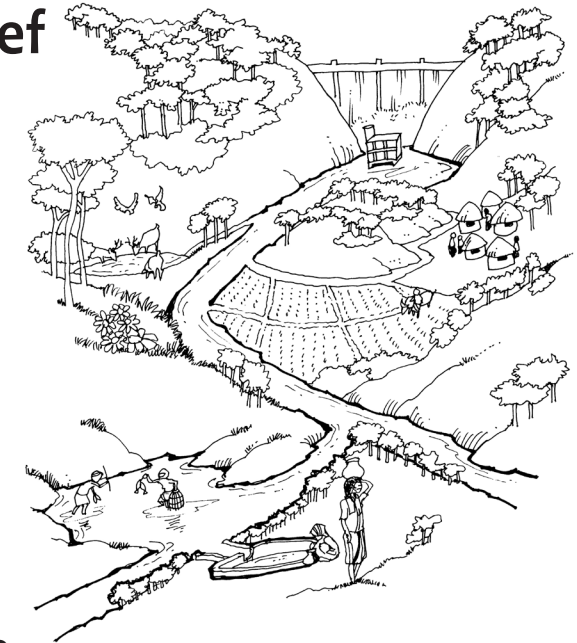
***Resolution.*** In the information campaign Madam Mina was told of her mistakes and was educated on the various environmental issues and concerns. She began to regret her actions and started caring for their environment.

## **MESSAGE RECAPITULATION**

Sustain Life: Protect the Wetlands, Mitigate climate change!

## CHAPTER 22

# Ridge to Reef



### MODULE WRITERS

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### RATIONALE

Environmentalists often refer to differences between upland, lowland and coastal ecosystems. However, these ecosystems are contiguous and affect one another. They interface with one another and are not at all mutually exclusive. Thus climactic changes on one would severely impact on the others.



## OBJECTIVE

After completing this module, communities should be able to define and discuss the ridge to reef concept.

## STORYLINE

### 1. Title THE LOST PARADISE

### 2. Characters/ Protagonists

Mangkono	the Tree
Bibo	the Monkey
Myna	the Bird
Jeffer	the Philippine Eagle
Agua, DENR	the flowing water.

### 3. Plot

**Introduction.** The scene of the story is in a far-away paradise called Malvirosa where Mangkono, Bibo, Myna and Jeffer peacefully and harmoniously co-exist. Mangkono, the sturdy tree, has been home to Myna, the talking bird, for years now. Bibo, the monkey, lives on an old tree nearby while Jeffer’s home is perched on the tallest tree in that forest.

**Rising Action.** One afternoon, while Bibo and Jeffer were busy playing and foraging for food, they hear a loud sound. This was the loudest they have heard so far in their lives. It was an explosion! They scamper for safety, not knowing where to go; until they find themselves together with Mangkono. They ask one another who knows what is

happening, but nobody knows. Suddenly, Myna frantically flies in with shocking news. “There are invaders! There are invaders! I saw them cutting the mountain sides with that bundled thing that explodes when lighted”, Myna said.

As the friends are holding a meeting, they hear a loud roar that was new to their ears. Suddenly they hear a tree fall. This was continuously followed by other trees falling until they lost count of trees that have fallen. This went on for weeks until a wide clearing appeared in the heart of Malvirosa.

One morning, the friends wake up to find themselves in a seemingly different world from the one that they were used to. The brook has become murky and murmurs discordant notes. Myna seemed to be at a loss for words and far from that chirpy bird they knew from before. Life became so chaotic.

By and by, pandemonium breaks loose. They hear loud roars from the machines and rumbles from falling trees. Everybody rushes to Mangkono’s shade for another caucus. Myna reports that the strangers have built their bunk house in the area. They even cut trees for charcoal. Eventually, the friends decide to leave the place the next day to look for safer grounds.

Early on the next day, Bibo, Myna, and couple Jeffer and Ibona wakes up early for the trip of their lives. They come to see and invite Mangkono to join them in their journey. The tree declines since he was deeply rooted in the soil. Mangkono sadly bade his friends goodbye wishing he was like Jeffer who can soar in the sky, or Bibo who can swing from vine to vine, or Myna who can fly.

**Climax.** Just as the friends have reached the neighboring mountain of Busa, thunder breaks and lightning flashes in the sky. A strong wind pounds everything along its path leaving behind trees that have fallen or with broken branches. The rain pours heavily and without let up. In a matter of hours, a mud slide occurs. Despite the presence of the remaining trees and shrubs, the bunk house of the strangers, five of them, were no match to the strength of nature. They took refuge in a cave leaving behind their tools and belongings buried under the mud. After an overnight stay in the cave, all of the five strangers decide to return to their families in the city. They walk agonizingly past all the felled trees and boulders for several hours until they reach their village. They were surprised to learn that their homes were not spared from flood while their families were evacuated to a public school in another village.

**Resolution.** The four animal friends have settled in Mt. Busa. Jeffer and Ibona are now proud parents of Bonita, their eaglet. Myna has finally found her mate Toks who helps her spread seeds thus growing more trees and plants in the area. Likewise, Bibo helps the couple in greening the area. At times, the friends travel to Malviroso to visit Mangkono who was spared from the calamity. The strangers did not return to Malviroso because their financier abandoned their plan of mining the area illegally. The authorities got wind of their evil plans of mining the mountain which was found to be part of the protected area. A patrol team was dispatched and assigned in the area.

### MESSAGE RECAPITULATION

What you do in the uplands affects the lowlands. Everything is interconnected. Everything is interrelated.

## CHAPTER 23 Reforestation



### MODULE WRITERS

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## RATIONALE

In an ecological system, trees are important components that keep the environment healthy. Trees provide oxygen for all living things. Forests contribute significantly to carbon sequestration and watersheds. Trees are also good sources for cures of many bodily ailments and diseases. There are many benefits that man can derive from trees.

Over the years, man has also found that trees can be used to make shelter and protect him from adverse effects of nature. He also discovered that it can be a good source of income to uplift his living standards.

Man in his desire to satisfy his needs, began to look upon the economic benefits of trees and invade the forests. He is overwhelmed by greed which keeps him craving for more. The healthy ecological balance in which human beings are dependent for existence has slowly changed. Some living things in the forest have disappeared. They were aggravated by the presence of so-called “products of technology” that completely ruined the old environmental landscape.

Man’s consistent quests for development have exceeded Mother Nature’s limits. She is upset and slowly unleashes her wrath on the earth by sending waves of natural calamities. Perhaps, this is Nature’s way of reminding man to care of the environment in the face of the modernization.

We must go back to the basics to restore the former landscape. We must teach the people, particularly in the uplands to be aware of the importance of trees. They should be aware that the present situation of our forest is alarming.

Hence this module was conceptualized.

## OBJECTIVES

After completing this module, communities should be able to:

1. recognize the importance of trees in the community;
2. respond to the message of the story by planting a tree.


## STORYLINE

1. **Title** LEAVE A LEGACY, NURTURE A TREE
2. **Characters/ Protagonists**

Ka Ragano	Main character/leader of Kingdom Biting
Bae Melina	Wife of Ka Ragano
Roh and Gah	Children of Ka Ragano & Bae Melina as DENR
DENR	
Urbana	Uban developer
Ka Engyo	Slash and burn farmer
Darya	Land surveyor
Minerosa	Miner

### 3. Plot

**Introduction.** In a kingdom of Bitao, there lived a couple named Ka Ragano and Bae Melina. The kingdom is full of life. It is teeming with lush and verdant trees. In their midst is crystal clear a waterfall that provide water to plants and animals. Across the sky, the Philippine Eagle, shows its pride of its habitat. The rays of the sun glitter from the east shores of the kingdom where people catch fishes for food.



The people are happy and contented. The forest provides everything they need. Their lives are dependent on it. They co-exist with it.

**Rising Action.** Ka Ragano and Bae have children named Roh and Gah. Every day, Roh and Gah play together with the animals in that kingdom. They enjoy the fresh air. One day, while Roh was playing, he trips and sustains a wound on his left leg. Gah, his sister, take a leaf from a tree called matang-hipon and applies it to the wound. It healed after two days and Goh was able to play again.

One day, Ka Ragano hears a roaring sound from a distance. He goes to check where the sound was coming from. He was surprised to see that three men were cutting down big lauan trees. He looks at the machine where the roaring sound was coming from and sees, it has many teeth that can cut hard objects like the trees.

The leader of the three men introduces himself as Logerio, a wealthy business man from the lowlands outside the Kingdom of Bitaoag. He tells Ka Ragano that they were cutting trees to make materials for houses, bridges, schools, and others. A few days after the trees were cut down, a member of the Kingdom reports that he saw a group of people possibly coming from the nearby village. They were clearing and burning wide areas, a practice they called “kaingin”. The group was led by Ka Engyo.

While Ka Ragano was foraging for food, he notices the eagle in the sky. It seemed agitated by the presence of people and heavy equipment use for mining minerals. This disturbs Ka Ragano.

While he was heading home, he meets Minerosa. She introduces herself as a mining operator. She tells Ka Ragano that the minerals they mine will be used as raw materials for steel, utensils, cars, cement, farm implements, cellphones, appliances, and others. This news disturbs Ka Ragano.

Later that day, Ka Ragano meets a group of strangers working with a gadget that looks like a box with three legs. He asks them what this was. Daria, the leader of the group, explains that they are instruments used to survey the area. They plan to pave the way for modernization. They wanted to develop housing subdivisions, commercial establishments and factories that will process all the minerals mined by Minerosa. This makes Ka Ragano uncomfortable and confused. He senses that every activity of the strangers he meets could really change the landscape and environment in his place.

Urbano, the urban developer, comes and begins to implement his multi-million projects. He even includes the development of beach resorts. The roaring of the chainsaw, the humming of bulldozers and the survey activities of Daria and the multi-million projects of Urbano keeps on going until the unexpected came.

**Climax.** Loud thunderstorms scare the people in the Kingdom of Bitaoag. Heavy rains follow. It lasts for days and inundates the greater part of the Kingdom. Rumbling sounds are heard from the mountains. Moments later, boulders and mud rush down and bury many houses, farm lands, animals and an undetermined number of people. Never in the history of the Kingdom did they witness such a horrifying catastrophe as this.



Ka Raganon later learns that one of the people buried in the mudslide was his son, Roh. He tries to save him but everything was too late. Not far from the village, the mudslide also buries the heavy equipment of the mining firm and trapping a dozens of miners, including Minerosa. Logerio and his two team members were swept away by the landslide and buried alive. Urbano, who was currently on a business trip, suffers a heart attack when he learns that his multi-million investments were among those ruined in the mudslide. He is paralyzed and is expected never recovered.

During the rescue operations, DENR personnel visit Ka Raganon to sympathize with the calamity that hit his kingdom, including the unexpected death of his son.

**Resolution.** The DENR explains that this catastrophe was the effect of climate change. One of the causes of climate change is global warming. Global warming is caused by increase concentration of greenhouse gases in the atmosphere like carbon dioxide. Industrialization, urbanization, and commercialization contribute to heavy concentrations of greenhouse gases in the earth's atmosphere.

Trees absorb carbon dioxide and other air pollutants. They also release oxygen in the atmosphere. Trees play an important role in regulating the concentration of greenhouse gases in the atmosphere.

After all that has happened, the community of Ka Ragano realizes the impact of environmental degradation that resulted from irresponsible mining, unsustainable forest resource use, and improper land use. Ka Ragano immediately calls a meeting of his community and explains

the extent of damage that struck Kingdom of Bitaug. He urges everyone to participate in the reforestation efforts/ programs of the DENR. Moreover, he asks the people to be vigilant in protecting the environment.

### **MESSAGE RECAPITULATION**

We need to plant trees.  
The more trees we plant  
the greater the amount of carbon dioxide absorbed.  
We need everyone, young and old alike,  
to participate in the massive reforestation.  
**WE NEED TO LEAVE A LEGACY FOR THE FUTURE  
GENERATION.**

## CHAPTER 24

# Protected Areas



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Information Officer MGB



## RATIONALE

Biodiversity of protected areas and climate change are inextricably linked?

The lack of biodiversity leads to climate change since there are less tree species and robust ecosystems to sequester carbon. On the other hand, climate change affects the biodiversity of protected areas since extreme cases of increase in temperature may cause loss of habitat and extinction of species.

A substantial increase of mean temperature in the range of 30° to 40° C may cause migration of species to other more suitable areas for their adaptation. On the other hand, extreme increase in temperature (50° to 60° C) may cause wildlife species to die out and become extinct.

The community needs to be aware of the importance and benefits of biodiversity and protected areas conservation.

## OBJECTIVES

After completing this module, communities should be able to:

1. determine the impact of destroying biodiversity of protected area;
2. discuss how protected areas can mitigate climate change;
3. identify benefits derived from protected areas; and
4. join and attend the program on protection and conservation of protected areas.

## STORY LINE

1. **Title** ISLA PARAISO (ISLAND OF PARADISE)

2. **Characters/Protagonists**

Apo	-	God of the indigenous people
Narra	-	Leader of the forest
Tamtam	-	Leader of the terrestrial animals in the protected area
Cuckoo	-	Leader of the birds in the protected area
Timber	-	Businessman/ logging
Maguiting	-	Tribal leader
Iglit	-	Son of Maguiting
Indigenous people	-	Cultural communities
PASu	-	DENR Officer

3. **Plot**

**Introduction.** Isla Paraiso is an island that lies in the southern part of Luzon. This island is gifted with pristine waters and vast virgin forests that house different wildlife species which can only be seen in the area. Indigenous people are living in harmony with the elements of the island.

**Rising Action.** The indigenous people of Isla Paraiso give importance to natural resources and consider these as gifts from Anito Maguiting. Their tribal leader always reminds them to protect and conserve their island and species therein. However, his son Iglit did not take his words seriously.



Timber, a businessman engaged in timber poaching, is looking for an area where there are large and valuable forest tree species. He meets Iglit in the town and tells him that he wants to visit Isla Paraiso and take some pictures. Timber asked Iglit to be his guide in exploring the island. He will reward him handsomely. Timber and his group eventually cut a large portion of the vast forest in the island illegally.

PASu learns about the incident of illegal cutting and apprehends Timber. He warns him to stop. If not, he will report to the higher DENR authority and Timber will be punished. However, Timber ignores PASU's warning and continues his wrongdoing.

**Climax.** The wildlife in the island is disturbed and alarmed. Maguiting and his tribe are summoned by Apo. They discuss the continuous illegal logging activity of Timber. Narra tells Apo that many large trees were cut exposing the younger trees to harsh environment. Tamtam complains that most of his animal friends have died. Cuckoo complains that their shelters are already destroyed and a lot of their members have migrated to different places. Apo realizes that he has to teach the group of Timber a lesson. He sends a strong typhoon to the island that causes mudflows and flashfloods. It damages the town where Timber lives. Many houses and properties were submerged while others were swept away by the flood. Isla Paraiso lost its beauty. The previously fresh air and cool breeze are now gone. Instead they feel the heat of the sun directly on their skin.

**Resolution.** Iglit confesses to his father that it was his fault that Timber entered the area. He then asks forgiveness from Apo and the members of the tribe for what he has done. Timber likewise realizes his fault. He made a promises to do

something to prevent the chaos from happening again.

PASu requires Timber to replace the trees they logged. Hand in hand, the group of Timber, tribal people and the DENR rehabilitate Isla Paraiso. The tribal people participate in the enforcement of the protection of the forest and wildlife in the island. They became partners of DENR in all environmental protection and conservation activities.

Timber's group becomes responsible citizens of Isla Paraiso. Narra observes the vegetation improving. Most of the members of Cuckoo return to the island. Tamtam and other remaining forest animals eventually produce more offspring. From then on, the indigenous people in the uplands and the local people work together for the protection of Isla Paraiso.

## **MESSAGE RECAPITULATION**

*Ibalik and kalinangan ng kalikasan, protektahan at alagaan!*

## CHAPTER 25

# Watersheds



### MODULE WRITERS

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## RATIONALE:

Watersheds comprise about 70 percent of the country’s total land area covering 421 river basins, of which 18 are considered major basins. The Cordillera Administrative Region (CAR) is the watershed cradle of northern Philippines that hosts 13 different river basins occupying about 99 percent of the total land area of the region. Many of the major basins are now considered in critical condition due to over-exploitation and mismanagement. Their degradation has resulted in global warming that cause climate change and eventually results in flash flooding, accelerated soil erosion, surface run-off, siltation of dams, reservoirs and water bodies, biodiversity loss, poor water quality, prolonged drought and other imbalances in the ecosystem.

Communities should be aware of the importance of the watershed. It provides life support systems to communities living in the area and downstream, and supports domestic irrigation and infrastructure projects within and outside the region. They should also be informed on technologies to sustain the production capacity of watershed and strategies to control/prevent encroachment within the watershed.

Communities should actively participate in rehabilitation measures of denuded areas, implement solid waste management and watershed protection and conservation measures of biodiversity within the watershed.

## OBJECTIVES

After completing this module, communities should be able to:

1. recognize the importance of watersheds;
2. identify impacts and effects of environmental problems to watersheds;
3. join programs and activities of the government for the protection and conservation of watersheds;
4. internalize proper ENR management strategies through indigenous practices and scientific technologies.

## STORY LINE

1. **Title:** “NATURE MOANS” “Aglaaw ti Aglawlaw”

### 2. **Characters/ Protagonists**

- |                    |                            |
|--------------------|----------------------------|
| Bantay Pulag -     | the watershed              |
| Minero T. Benguet- | the miner                  |
| Karayan -          | the river                  |
| Rea L. Tor -       | the subdivision developer  |
| Bowet -            | the cloud rat              |
| Vegegro -          | the capitalist/businessman |
| Saleng -           | the tree                   |
| Diwata -           | the fairy                  |
| Manggu -           | the forest ranger (DENR)   |
| Shai Mango -       | the elder                  |
| Kapitan Baloy-     | barangay chairman (LGU)    |
| Shontoug -         | the NGO                    |

### 3. Plot

**Introduction.** Bantay Pulag is a lush, verdant and mossy forest, where Bowet, *kiwet*, orchids, *uwak* (hawk), *agila* (eagle), *alingo* (wild boar), *ugsa* (deer), lilies, Saleng, *marapait* (wild sunflower), waterfalls and hot springs abound.

At the foot slope of Bantay Pulag are the people in the community (BIMAAK) who tend and protect the forest. The life of BIMAAK revolves on hunting, farming, small-scale mining, gold panning along Karayan, and tending their lush *batangan* for economic needs. All resources in the community are commonly owned. Their simple life makes everyone happy and contented. During festivities, they have various rituals for thanksgiving (wedding, good harvest), worshipping, and *cañao* (petitioning for personal and community protection from evil, illnesses, and disasters).

**Rising Action.** As natural population grew through time, (which also was coupled with internal migration), demand for food, shelter and other basic needs also increased. Soon, economic activities flourished. People expanded settlements and went up into the watershed. As a result, loss of biodiversity, decrease in water production, soil erosion, river sedimentation and warming of the area were experienced.

The situation worsened when other people engaged in economic development: Rea L. Tor caused the rapid conversion of small portions of Bantay Pulag into subdivisions; Vegegro terraced a larger portion of it for agriculture while Minero T. Benguet explored and eventually mined the rest of the area for gold.

Conflicts among the BIMAAK became more pronounced with the issuance of tenorial instruments by government instrumentalities, whose functions were in conflict with each other, started to proliferate, and thus caused misunderstanding, factions and worst, tribal wars.

Bantay Pulag was threatened. The ecological balance as a watershed was greatly disturbed.

Alarmed at the continuing environmental degradation, Manggu, Kapitan Baloy, and Shontoug, conducted an IEC campaign on environmental management and protection, the proper land use, biodiversity conservation, climate change and mitigation and adaptation measures, and identification of geologic hazards in the area.

**Climax.** Manggu warned BIMAAK on the effects of continuous destruction within the watershed. He wanted to change their perception on the government's watershed protection and management interventions. Some listened while the others simply ignored the warning because of their belief and culture of nature preservation.

The inevitable came. Massive deluge in an unprecedented manner occurred. The rapid decline of the forest cover resulted in recurring forest fires, increasing surface run-off, intermittent changing of temperature, dwindling aquatic life, plants and animals. Flooding occurred in some areas while long drought was experienced in the rest of the community. Issues on ancestral land claims also arose because of concerns for the future as resources depletion continued. BIMAAK took efforts to address the disastrous situation but to no avail.

**Resolution.** BIMAAK realized eventually the effects of their irresponsibility. In response to government interventions, Shai Mango convened Kapitan Baloy and BIIMAAK and resolved to protect and manage Bantay Pulag.

Meanwhile, Manggu and Shontoug re-assessed their programs and projects and enhanced their strategies to suit the needs of BIMAAK and Bantay Pulag.

### MESSAGE RECAPITULATION

1. Nature cries! Destruction worsens!
2. Nature moans! People suffer!
3. Heal the world! Yes, we can!

## CHAPTER 26

### Clean Air



### MODULE WRITERS

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### RATIONALE

Basically, man needs clean air for healthy existence. However, due to rapid urbanization and industrialization, the quality of this important life support has deteriorated to an extent that it endangers human lives instead of supporting it.



Air pollution arising from indiscriminate human activities is one of the major contributors of global warming, which in turn worsens the already alarming rate of climate change at present. Vehicular and industrial emissions as well as burning and decomposition processes produce carbon dioxide (CO<sub>2</sub>), which is the most abundant of all the so-called “Greenhouse Gases”. Due to the lack of vegetation or carbon sinks that could absorb CO<sub>2</sub>, it remains in the atmosphere longer, trapping ultraviolet rays emitted by the sun, thereby increasing the temperature at the earth’s atmosphere.

RA 8749 better known as The Clean Air Act of the Philippines was then enacted to curb the worsening air pollution problems in the country, especially, within prime urban centers like Metro Manila. This law coupled by the implementation of RA 9003 (the Ecological Solid Waste Management Act of 2000), RA 6969 (Hazardous and Toxic Wastes Management Act) and with the support from local initiatives, the present air pollution rate is targeted for reduction by 30 percent in 2011 according to the latest pronouncement by the DENR Secretary. Thus, “regreening” the forests, coastlines, easements of various waterways and open spaces as well as the close monitoring of compliance to industrial and vehicular pollution laws has become the DENR’s immediate management option to address these air pollution issues.

## OBJECTIVES

After completing this module, communities should be able to:

1. identify sources of air pollution;

2. practice simple activities that can ease air pollution that we are currently experiencing, such as: avoid burning of garbage; avoid using aerosols (CFCs); use environment friendly air-conditioning and refrigerating units;
3. join various environmental programs in support of the Clean Air Act (Anti-Smoke Belching Campaign, No Smoking in PUVS, etc.)

## STORY LINE

1. **Title** AIREEN IN URBANIAN LAND


2. **Characters/ Protagonists...**

AIReen	Personification of air
Juan	Representing the ordinary person
JEEpoy	Personification of jeepneys
Fabby	Personification of factories

3. **Plot**

**Introduction.** In the City of Urbania, AIReene circulates and is happy giving fresh air to Juan, the leader in the area, and his constituents. Within the community there also live Fabby, the talking factory and JEEPoy, the talking jeep. Fabby, the pollutive manufacturing plant, is being managed by a greedy businessman who always has an excuse not to install pollution control devices. Almost every day, Fabby continuously emits black smoke which poisons AIReene, Juan and his constituents.

On the other hand, JEEPoy the old public utility jeepney plying within the community, is owned by an operator who thinks that it is more convenient to pay for the fake emission



testing certificate instead of having regular maintenance of his vehicle. Thus, JEEPOy relentlessly spews out black smoke in its everyday route. Juan, on the other hand unmindful of the existing regulation within the community, continuously burns his wastes.

**Rising Action.** As the days went on, AIReene's color slowly changed from white to black due to the continuous emissions coming from Fabby, JEEPOy, and Juan's burning activities. AIReene is already choking. She pleads to Fabby and JEEPOy to stop spewing poisonous smoke but to no avail; the two only laugh at her and continue with their business.

Finally, the City of Urbania is engulfed with black smoke. Juan could now hardly breathe and is always absent in his work because he has developed severe asthma. Likewise, many factory workers and school children develop bronchitis, primary complex and collapsed lungs.

**Climax.** Medical findings and research points out that the continuous deterioration of air quality in the City of Urbania as the culprit in the sudden increase in the number of people with respiratory diseases in the area.

Juan is alarmed with the continuous deterioration of air quality in the City of Urbania. He then seeks the help of his friend, DENRo, an environmentalist. He narrates the current scenario in his place and asks what they must do to arrest the worsening situation.

Being the environmentalist that he is, DENRo explains that the atmosphere has reached its saturation point or has exceeded its carrying capacity in taking all spewed pollutants from Fabby, JEEPOy, and trash burning that it

can no longer cleanse itself. This is the reason why AIReene appears to be black (with all those toxic particulates) instigating the outbreak of respiratory ailments in the City of Urbania.

Juan then realizes that they are the ones to blame for what is happening to their place. DENRo was glad about that realization. Juan then asked what they must do to help solve the problem with all of them willing to cooperate.

**Resolution.** DENRo suggests that the solution to the problem may not be easy but through the concerted effort of everybody it can be done to prevent continuous deterioration of the air quality in Urbania.

Eventually, Fabby's owner invests in the installation of necessary pollution control device; JEEPOy's operator tunes him up regularly and Juan leads his constituents in avoiding harmful activities such as trash burning which could add up to air pollution. Likewise, DENRo leads the Urbanians in planting and nurturing appropriate tree species which did not only help in cleaning AIReene but also improves the locality's temperature and aesthetics.

From then on, the people of the City of Urbania continue with their good environmental practices. AIReene is so happy and become clear again...the surroundings lush... and the people cheerfully enjoy good and healthy life.

## MESSAGE RECAPITULATION

To maintain the air, we breathe is not a responsibility of a few.

Clean air is vital for our existence...

Let's all act NOW to clean the air!!!

## CHAPTER 27

### Caves



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#### RATIONALE

What is the relationship between caves and climate change?

Recent studies conducted by geologists suggest that the tropical Pacific climate system plays a key part in abrupt climate change. The western tropical Pacific is a major

source of heat and moisture to extra-tropical regions, and may therefore influence the global climate response to a variety of factors. The response of the tropical Pacific to abrupt climate changes are recorded on stalagmites found in caves.

Communities should learn to appreciate cave resources. They should not excavate or destroy caves but maintain and preserve them. Preserving caves are important since studies have shown that caves contain records of abrupt climate change in the past. This may guide scientists on climate change influences and patterns.

## OBJECTIVES

After completing this module, communities should be able to:

1. recognize the importance of caves in climate change;
2. accept caves as a valuable resource; and
3. implement cave conservation programs.

## STORYLINE

### 1. Title ANG MAHIWAGANG LIHIM NG KWEBA NI DELY

### 2. Characters/ Protagonists


Dely	An inquisitive girl of 14 years
Old Man	Custodian of the cave
Mr Ruby	Dely's father
Instructor	Faculty member of the UPLB College of Forestry

## 3. Plot

**Introduction.** Delilah Ruby, nicknamed Dely, is a bright and intelligent young girl who excels in her class at the Makiling School in Los Baños. She is fond of science subjects and can occasionally be seen exploring the environs of Mt Makiling on her own. She has often heard stories about caves in the mountain.

A story related by her great grandmother tells of one particular cave that leads to a maze of underground passages, some of which stretches all the way to Mt. Banahaw. Her Lola Sarah, while tucking Dely to sleep, would tell her about the exploits of the guerillas in the Second World War and how they used this cave to travel to Tayabas unmolested by the Japanese. However, Lola Sarah was quick to add that the cave was full of danger because one can easily get lost within. There were areas that exuded toxic sulfuric fumes. The cave is also home to many cobras, bats and other creatures of the night. More importantly, the cave holds many secrets. This last detail stirred Dely's curiosity endlessly. When she's ready, she will find that cave, explore it and make it reveal its secrets to her.

**Rising Action.** When Dely reached second year high school, her biology class made frequent expeditions to the forests and creeks of Mt Makiling to collecting specimen for their experiments. In one such sortie, Dely was separated from the rest of her group. While gathering some ferns in Molawin Creek, she stumbled upon the mouth of a cave camouflaged by thick moss, vines and other vegetation. With her trusty Eveready flashlight, she scanned the insides and found it to be very large indeed. It had a cavernous ceiling wherein long and sharp stalagmites hung. Ignoring



the warnings given by her lola, Dely entered the dark cave and slowly but surely worked her way to getting lost. At the juncture when she became aware of her predicament, the batteries of her flashlight gave way. And just as the light faded, she heard a booming voice: “WHAT ARE YOU DOING HERE?!!!” It was the voice of a ghost.

Towards sunset, Dely’s classmates have become extremely worried about her. When it was apparent that Dely was missing, they formed themselves into search groups of three that would pan out along a 500-meter radius from the location where Dely was last sighted and agreed that would converge again at this point at 6:00 pm. When at the appointed time the search groups returned empty handed, the school and Dely’s family were informed that she was missing. Students from the UPLB College of Forestry were mobilized to conduct a systemic search of Dely along Molawin Creek and its tributaries stretching up to the Makiling watershed. Dawn came and there still was no Dely but her father refused to call off the search.

At around 9:00 AM, Dely appeared miraculously in the upper campus of the UPLB College of Forestry. Wrapped around her was a brown army blanket. The student volunteer who saw her first brought her to the Forestry Development Center where she was made to lie down on a bed in the Center clinic and given warm coffee. The nurse attending to her examined her and found that she was all right and that there were no signs of trauma.

Dely’s parents and school principal rushed to the FDC and found Dely resting in one of the Center’s guest rooms. There she related that she found the mouth of a cave along the Molawin Creek below the Palma Bridge. She explored the


inside of the cave and got lost. After a couple of hours, the batteries of her flashlight were drained. This was when the old man of the cave appeared to her.

Those who were in Dely’s recovery room listened incredulously while she related that a tall white haired bearded old man in tattered white robes and a brown army blanket came to her rescue with a lighted torch. The old man offered to lead Dely to the cave’s exit. While trekking along the cave’s winding crevices, Dely asked the old man who he was and why he was there. The old man was silent at first but Dely persisted on answers. Finally, he said that he was the custodian of the cave’s secrets.

What secrets? Where are they hidden? Dely could not control herself. The old man pointed towards the stalagmites along the path and said, “The secrets of the past that would guide our future.” Dely stopped and stared at the frightening icicle-like structures and asked, “Where? What? How?”

The old man asked in return, “Do you really want to know?” Dely nodded. The old man stopped, sat down on a large rock and motioned for Dely to do the same. For hours he related how these large pointed formations held the clues of our changing climate – how it changed in the past and the patterns that dictated these changes.

“Thirty years ago, Los Baños was cool in the summer and had foggy mornings. Today, the town is hot and humid,” the old man said.



He lamented how many of the cave's secrets have been lost because of the prying eyes and hands of cave explorers who chopped down many of these stalagmites as souvenirs only to be thrown away when they were too heavy to carry. He warned against incursions into the caves that destroy instead of preserve. As custodian of this cave, he said that he will never allow that to happen.

It was morning when Dely and the old man reached the mouth of the cave. Dely observed that they had actually trekked upwards and that the exit of the cave led to Flat Rocks. From there she can find her way to the Los Baños town proper. She was shivering from exhaustion and the old man wrapped his brown blanket around her.

**Climax.** One of the forestry instructors who participated in the search asked, "Is this the blanket?" pointing towards the brown army blanket beside Dely. He picked it up, examined it and found embroidered the initials FMG. He rushed outside and returned with a picture frame and asked Dely, "Is this the man?" Dely's eyes opened wide and she nodded. "Are you sure?" "Yesss," she nodded again. Mr Ruby uttered, "Impossible!"

**Resolution.** The old sepia photo showed the profile of a distinguished looking gentleman taken in the 1950s. On the base of the photo was Speedballed in Old English script, the name, Dr. Francisco Maria Gonzalez.

The instructor uttered without talking to anyone in particular, "Dr. Gonzalez was a Professor of Forest Ecology here at UPLB known for his progressive ideas. He disappeared 40

years ago when Martial Law was declared and has not been heard of since. Even if he was alive today, he would have been more than a hundred years old. Strange..."

Stranger still is the fact that subsequent explorations for mouths of the cave under the Palma Bridge and near the Flat Rocks revealed not even a tiny crevice.

### MESSAGE RECAPITULATION

*"Ang mga kweba ay maraming secreto.  
Pag aralan natin ang mga ito."*

## CHAPTER 28

# Peatlands



### MODULE WRITER

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### RATIONALE

How are peatlands related to climate change?

Peat or *luyong-luyong* in the vernacular is soil which is composed of 65 percent or more of organic matter (i.e., semi-decomposed plant matter). Peatlands relate to climate

change since peat retains carbon and water. Carbon is accumulated as peat. Hence, peatlands constitute a huge carbon store. Peatlands also have high water storage capacity and can mitigate the rise of sea levels due to climate change.

Communities need to be aware that peat is normally black in color and spongy when compared to mineral soil which is made up mostly of inorganic matter. The Philippines has eleven thousand (11,000) hectares of peatlands. These peatlands may contain up to ninety percent water and have high biodiversity value. Although the Philippines have a substantial area of peatlands, the rate of peatland destruction is ten times more than the rate of peat formation.

## OBJECTIVES

After participating in the Dalaw Turo Session, community constituents within or near peatlands should:

1. recognize the importance of peatlands in climate change;
2. accept peatlands as a valuable resource;
3. implement peatland conservation programs.

## STORYLINE

### 1. Title KAYAMANAN NG MGA MANOBO

### 2. Characters/ Protagonists

Bae Mulan	Manobo tribal <i>babailan</i>
Max	Small scale miner

## 3. Plot


**Introduction.** Bae Mulan is a Manobo tribal leader in Laad, a remote swampy area in Eastern Mindanao. In spite of her tribe's lack of material amenities, their community lived on relative comfort, even affording their young children to attend school. The community never went hungry, and neighboring communities began to notice.

Max is a small scale miner in the adjoining community of Kota. During slack times, he would observe the healthy, happy children of Mula who daily passed by his house on their way to and from school. In contrast, Max's children were underweight, always gloomy? and complaining. He wondered what wealth was down there in the peatlands where Bae Mulan and her community were settled.

**Rising Action.** One evening, while drinking gin with his gang, a middle-aged Manobo passed by. They bullied the man into drinking with them. After Taal got very drunk, Max proceeded to quiz him on what made the Manobo live comfortably. Taal, in a drunken stupor, said that they had possessed some treasure. Max and his friends' eyes widened, "Treasure!" Taal answered yes. Where was it? There in the *luyong-luyong*.

Max and his friends drove away the community so that they could get their hands on the treasure. They managed to scare the community away except for Bae Mulan.

**Climax.** Max and friends started digging for the treasure on the peatlands but he could not find any. He cursed Bae Mulan and threatened to kill her if she did not tell him the location of the treasure. He asked her if he was digging at



the right place. She said yes. Max kept on digging deeper and deeper...until he was swallowed up by the swamp.

**Resolution.** Bae Mulan said that the treasure was already in front of him but he failed to see it. It was the peat that protected them from the severe droughts in the area and made their harvest abundant. It was also the peat that prevented flooding during the rainy season by absorbing water during heavy rains. It was the peat that was home to the frogs that fed on mosquitos. It was the peat that made Laad home to diverse species of insects, flora and fauna. It was the peatland that was the Manobo's treasure.

#### **MESSAGE RECAPITULATION.**

*“Pangalagaan ang luyong-luyong. Ito ay tunay na kayamanan.”*

## **EPILOGUE FOR PART B**

### **The Way Forward**

From its beginnings in the nineties to its current form, *Dalaw Turo* has been evolving. For it to be mainstreamed, we need to revisit *Dalaw Turo* and perhaps level it up to the status of an IEC program.

From experience, we know that *Dalaw Turo* is an approach that uses indigenous, local and popular media. It is participatory and involves multiple stakeholders. It is flexible, dynamic and context specific. Moreover, it involves both social learning and social mobilization.

Dalaw-Turo is made up of several elements such as lectures, skits and games. We propose that additional elements be incorporated into the approach. These elements are: learning resources; flexible delivery systems; networks; and a program of action.


#### ***Proposed Elements***

***Sets of Modules.*** This initial set of modules provides exemplars of learning resources required by DENR partners to implement DT. Additional sets should be planned and developed. The complete collection may encompass the following:

***Set One.*** DT Climate Change Modules. Eighteen modules developed by regions.

***Set Two.*** DT Focus Modules. Six modules developed by bureaus.

***Set Three.***DT Specialized Modules. Developed by PAO and/ or DENR partners for specific purposes as the need arises



As learning resources, these modules should include the parts enumerated in the initial section of this volume and should adopt the structure employed herein. Thus a certain uniformity is achieved that can easily be followed and adopted by DT learner-participants.

*Flexible Delivery Systems.* DT may employ additional delivery systems. In fact, a variety of Indigenous, local and popular media can be utilized and organized into a mutually reinforcing system for DT delivery.

*Networks.* Thirdly, DT should tap the synergies produced by networking described in earlier sections. Three types of networks may be used for this purpose: individual; institutional; and electronic. The DT network of individuals should not only be made up of DENR IEC staff and learner-participants. As described in the Prologue, these networks should be made up of DT champions that can serve as advocates. Nodes that will make up institutional networks should come from civil society, local governments, nongovernment organizations and the private sector. Electronic networks such as Facebook, Twitter and YouTube should likewise be tapped. In other words, DT can have both Facebook and Twitter pages as well as fan networks. Video clips of DT skits may be uploaded in a DT YouTube page for sharing and reuse.

Additionally, these nodes should spread horizontally, vertically and laterally, thus leading to integrated multilevel national, regional, provincial, municipal and community networks.

***Towards a National DT Program.*** The way forward for DT must include the design and implementation of a multi-level, multi-tiered and multi-sectoral program with a timeframe, an identified goal, a specific purpose, planned inputs, explicit outputs, sets of activities and verifiable indicators for success.

Given the discussions during the multi-cluster workshops, the *Dalaw Turo* program should also contain the following features:

*Competition, Recognition and Awarding.* As an incentive to DT learning communities, volunteers, partners and champions, provincial, regional and national DT competitions, recognitions and awards should be initiated. Partners will be invited to perform and interpret DT storylines. The best interpretations and performances will be recognized and awarded at the provincial level. The winners of provincial competitions will be invited to perform in regional interpretative competitions. Regional winners will compete to identify the DT national champion.

Cash awards and prizes can be solicited by the DT Network from the private sector.

*Documentation, sharing and reuse.* DT interpretations and performances should be video documented. A DT YouTube account may be established wherein these video clips are uploaded for the viewing of the entire DT community. These videos may be used as exemplars for sharing. It may likewise be downloaded and shown to other audiences.



**Levels of the Proposed DT Program.** The proposed DT Program should be implemented at the following levels:

Community or Grassroots. The most basic level of implementation, this level constitutes the main users of the modules.

Municipal. The municipal level is for social mobilization: the process of bringing together all feasible/ practical inter-sectoral/ social allies to raise people's awareness of climate change, to assist in the delivery of resources/ services, and to strengthen community participation for sustainability and self-reliance.

Provincial. This level is for provincial implementation, networking, recognition awards and resource generation.

Regional. This level is for regional coordination, capacity building, documentation, sharing and monitoring & evaluation.

National. The national level is for policy support, program management, national recognition, curriculum development, materials production and technical direction setting.

**Activities of the DT Program.** Under the proposed DT Program, the following activities may be implemented to ensure that the program is implemented locally, coordinated nationally, and shared globally.

Strengthen Dalaw Turo Network. Individual, institutional and electronic DT networks should be established horizontally, laterally and vertically.

Advocacy of DT. *Dalaw Turo* as a DENR IEC strategy should have its own supporters and advocates, internally within DENR and externally outside DENR.

Establishing and formalizing long-term partnerships. Partnerships with local government units, nongovernment organizations, civil society and the private sector should be forged. As described earlier, civil society includes socio-civic organizations, the Church, media and the academe. DT champions from these sectors should be mobilized.

Provision of institutional endorsement. Appropriate DENR administrative orders on *Dalaw Turo* at the national and regional levels should be drafted, circulated and implemented. This would include appropriate budgetary provisions for the program.

Pretest and Improve DT Modules. The modules developed should be pretested and improved.

Regional Action Planning. Regional action planning workshops should be initiated to ensure program ownership at the regional, provincial, municipal and community levels.

These steps constitute a way forward towards collective climate action.



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## APPENDIX: Sample Script

### ANG PARAISONG NAGLAHO (THE LOST PARADISE)

#### SCENE 1


**NARRATOR:** Sa isang malayo gubat ng Malvirosa, ay makikita ang isang malaparaisionang lugar... Dito matatagpuan ang naglalakihang punong tulad ni Mangkono, na ang tunog kanyang mga dahon sa tuwing humahangin ay tila baga isang musika...at mga batis at talon tulad ni Malaya... na ang agos nito'y tila isa ring malamyos na tinig.Malvirosa, tahanan ng mga luntiang puno, malilinis na batis, makukulay na mga bulaklak at iba pang mga samut saring buhay ilang. dito malayang nakakapaglaro ang mga hayop tulad nina Bibo, malimit maglambitin kay Mangkono, pataluntalon sa sa mga sanga ng ibat ibang mga puno. At mga ibong tulad ni Jeffer na tuwang tuwa sa tuwing dumadapo sa mga sanga ni Mangkono. Sabay din silang naliligo sa mala Kristal na tubig ni Malaya.

#### SCENE 2:

Ngunit isang araw ... nabasag ang katahimikan sa pook ng Malvirosa.

#### SFX: BLASTINGS, SOUND OF BULLDOZERS, CHAINSAWS AND FALLEN TREES...

**NARRATOR:** Gulat na gulat ang magkaibigan...mababakas sa kanilang mga mukha ang matinding takot. Mabilis silang pumunta sa lilim ni Malvirosa... Sinubukan nilang magtago sa isang kweba malapit sa talon... Ngunit sadyang



nakakabingi ang mga pagsabog, ang mga ingay ng bulldozer, chainsaw at nagbabagsakang mga malalaking puno.

Si Mayna na nasa kabilang bundok ay napadako sa lugar nina Bibo at Jeffer. Takot na takot nyang ikinuwento ang mga nasaksihan.

**BIBO:** Mayna, saan ka galling

**JEFFER:** may dugo ang iyong mga pakpak, ano ang nagyari say o?!!!

**MAYNA:** (CRYING) huhuhuhuhuhu...pinuputol nila ang mga puno doon, pinapasabog nila ang bundok upang makadaan ang mga bulldozer, huhuhuhuhuhu aray!!!! Ang sakit sakit ng aking mga pakpak!!!!

**BIBO:** Tulungan mo kami Mangkono... ano ang aming gagawin ngayon

**MANGKONO:** Huwag kayong umiyak, sige na pumunta kayo sa mas mataas ng lugar, mas ligtas kayo doon.

**MALAYA:** sige na sundin ninyo ang sinasabi ni Mangkono, umalis na kayo, bilis!!!!

**NARRATOR:** Mabilis na umalis ang tatlo, ngunit sila ay bumalik kay Mangkono, binubunot nila ito dahil gusto nilang isama.

**BIBO:** Mayna, Jeffer tulungan nyo ako, isasama natin si Mangkono.

(THE THREE TRYING HARD TO UPROOT MANGKONO).

**MANGKONO:** Hindi nyo ako mabubunot dahil ang aking mga ugat ay malalim na nakabaon sa lupa, sige na umalis na kayo, iligtas nyo ang inyong mga sarili!!!

**NARRATOR:** At muli ay malungkot na nagpaalam ang tatlo kina Malaya at Mangkono.

**MALAYA:** Kawawa naman TAYO, hindi tayo makakaalis dito, ano na kaya ang mangyayari sa atin ngayon Mangkono?

**MANGKONO:** Mabuti pa ang mga ibon, may mga pakpak... nakakalipad! Si ungoy may mga paa, nakakalakad, nakakatalon... ako, may mga sanga ngunit hundi makalipad, may paa ngunit malalim na nakabaon sa lupa, hihintayin ko na lang ang aking mapait na kapalaran dito


**SCENE 3:**

**LOGGER 1:** Halikayo dito mga pare!!! Ang lalaki nga mga puno ditto!!!

**NARRATOR:** Nagpatuloy ang kanilang pamumutol ng malalaking mga puno. Isa isang nagbabagsakan, kasali na ditto si Mangkono!... pinatag nila ang isang parte ng lugar upang pagtayuan ng kanilang pangsamantalang tahanan.

**SCENE 4**

**NARRATOR:** Isang gabi, bumuhos ang maracas na ulna, waling vigil, maracas na maracas!!! Nagpatuloy ang malakas na pag ulan sa loob ng tatlong araw... pabugso bugso ang hangin, kulog, at mga pagkidlat...Nagngangalit



ang kalikasan!!! Ito na kaya ang kanyang ganti sa walang patumanggang pagsira ng mga tao sa mga kabundukan???

Nagkaroon ng pagguho ng lupa sa Malviroso, nabuwal ang mga bahay na itinayo ng mga illegal na mga minero, logger, at pati na ang maliliit na bahay ng mga mag-uuling, at kaingero... rumaragasa ang mga putik mula sa Malviroso patungo sa kabayanan!!! Ang mga punong nabuwal kasama si Mangkono ay tinangay patungo sa karagatan! Natabunan ng mga lupa ang mga bakawan, natabunan din ng mga putik ang seagrass beds, ang coral reefs!!!

Malawak ang mga naging pinsala ng baygo mula sa bakundukan ng Malviroso pababa sa kabayanan at karagatan.... Sina Bibo, Jeffer at Mayna, nakaligtas kaya sila??!! Sana nga!!!

## SCENE 5

**DENR:** (Sighing)... Kung sinunod lang sana ang mga itinakdang batas ng pamahalaan! Ngunit alam kung hindi pa huli ang lahat! Patuloy kung gagampanan ang aking mga tungkulin. Alam kung marami ang handang tumulong sa akin! (Looking to the audience)... tulad ninyo!!! Mga kasangga, halikayong lahat, tulong tulong tayo!!!

## SCENE 6

THE CAST OF CHARACTERS, with nametags---DENR, NGO, LGU, COMMUNITY, ACADEME, PRIVATE SECTOR/ INVESTORS APPEAR CENTER STAGE.

**NARRATOR:** Kapitbisig, sila ay bumalik sa Malviroso, at sa marami pang lugar tulad ng Malviroso....muli nilang sisikaping ibalik ang likas na yaman nawala...upang ang mga naiwang lahi nina Jeffer, Mayna at Bibo ay patuloy na makapamuhay , tulad ko, tulad nyo!!!

**NARRATOR:** Ang mga nagsiganap:

Sally Cortez bilang si bibong unggoy, at logger  
Mila Locsin bilang si cute na Myna at DENR  
Nide Dangli bilang si punong Mangkono  
Bai Soraya Maditar bilang si Malayang talon  
Vilma Flauta Nitura, narrator

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#### ABOUT THE BOOK

*From the very beginning, KM proponents have maintained that knowledge is best shared as lessons learned, good practices and, interestingly enough, stories...This volume contains both good practices and stories that promote collective climate action. Part A contains ten food security-related climate change adaptation practices compiled under the Philippine Climate Change Adaptation Project or PhilCCAP sponsored by the Global Environmental Fund and the World Bank. Part B shares eighteen stories on climate change from the Dalaw-Turo initiative... representing the entire spectrum of the environment and natural resources sector, namely, forestry, mining, lands, protected areas, coastal resources, and environmental management.*

*- From the Preface*