

Capacity Strengthening of Five Provincial Governments and State Universities in Integrating **CLIMATE CHANGE ADAPTATION & DISASTER RISK REDUCTION** in the Philippines



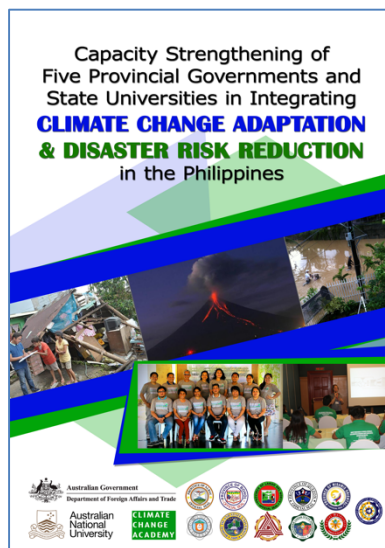
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**CLIMATE
CHANGE
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TABLE OF CONTENTS

ACKNOWLEDGEMENT	4
ACRONYMS	7
EXECUTIVE SUMMARY	8
Chapter 1. INTRODUCTION	16
Provincial Situations of the Five Participating Provinces	21
Profiles of the Six Participating SUCs	32
Chapter 2. BACKGROUND SETTING	37
Roles of LGUs in Mainstreaming CCA and DRR	40
Roles of SUCs in Mainstreaming CCA and DRR	42
The Importance of LGUs And SUCs' Collaboration in Undertaking CCA and DRR	43
The Importance of the Project	44
Chapter 3. LOOKING BACK	49
Component I. Formation of CCA and DRR National Training Team	50
Component II. Development, Preparation and Translation of 18 Training Modules on CCA and DRR Integration in Local Government Development Programs	53
Component III. Delivery of Training Workshops by Members of the National Training Team to Local Scientists, Researchers and Practitioners in the Provinces of Albay, Bohol, Lanao Del Norte, Misamis Oriental and Quezon	60
Component IV. Formation of Local DRR and CCA Technical Working Group and Training Team in Each Province	66
Component V. Re-echo Training at the Barangay Level	68
Component VI. Piloting Mini Projects and Risk Assessment Initiatives with the Use of Participatory Community Risk Assessment and Sustainable Livelihoods Approach	71
Chapter 4. IMPLEMENTATION OF SMALL-SCALE PROJECTS ON DRR AND CCA IN THE FIVE PROVINCES	76
Province of Albay	77
Province of Bohol	87
Province of Lanao Del Norte	110
Province of Misamis Oriental	121
Province of Quezon	126
Chapter 5. CONCLUSION	153
Collaboration of LGUs and Academic Institutions	154
Integration of CCA and DRR to SUCs Extension Programs	154
Reduced Vulnerabilities Through Environmental Management and Economic Empowerment	154
Re-organization of Disaster Risk Reduction and Management Councils	155
Increased Knowledge on DRR and CCA	155
Creation of DRR Network	155
Recommendations	156
BIBLIOGRAPHY	158

TABLES

Table 1	Core Development Issues in DRR and CCA Project Implementation	40
Table 2	Members of the Project's National Training Team	51
Table 3	List of DRR and CCA	56
Table 4	Number of participants during the training and workshop facilitation among provincial government officials and academic researchers and state university and college faculty members	62
Table 5	Number of attendees in the re-echo training-workshops at the barangay level	70
Table 6	List of Small-Scale Projects per Province	75
Table 7	List of Project Implementers and their Roles	89
Table 8	Budgetary counterparts of Community-based and Family-approach Reforestation Project	91
Table 9	Budgetary counterparts of Community-based and Family-approach Reforestation Project	93
Table 10	Budgetary counterparts of Community-based and Family-approach Reforestation Project	96
Table 11	Budgetary counterparts of Rehabilitation of the Barangay Ansilag Boardwalk Project	100
Table 12	Budgetary counterparts of Taro Production Project	102
Table 13	Budgetary counterparts of Tiger Grass and Soft Broom Making Project	128
Table 14	Budgetary counterparts of Punong Itatanim Ko, Pangangalagaan Ko Project	132
Table 15	Budgetary counterparts of Climate Resiliency Project	135
Table 16	Budgetary counterparts of Planting of Fruit Bearing Trees Project	139
Table 17	Budgetary counterparts of Provision of Coconut Seedling to Barangay Project	141
Table 18	Budgetary counterparts of Planting of Fruit-bearing Trees Project	145
Table 19	Budgetary counterparts of Backyard Farming Seminar and Tree Planting Activity	148
Table 20	Budgetary counterparts of Bamboo Project	152

FIGURE

Figure 1	Percentage of the nature of the mini-projects implemented in the five provinces	72
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Understanding the priority concerns of diverse individuals to advance the advocacy of institutionalising disaster risk reduction and climate change adaptation at the community level poses a great challenge in the course of accomplishing this project. Nevertheless, crossing paths and finding common grounds with groups of professionals, academics, local government officials, barangay residents and field practitioners have provided good opportunities in the planning, implementation and completion of this project. I would like to express my gratitude to the following persons and officials of government, state universities and colleges, and local institutions who are my primary partners in the planning and completion of various project activities from March 2013 to April 2015. Many thanks to:

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DORACIE B. ZOLETA-NANTES PhD



ACRONYMS

ANU	Australian National University
APSEMO	Albay Public Safety and Emergency Management Office
BISU	Bohol Island State University
BU	Bicol University
CC	Climate Change
CCA	Climate Change Academy
CCA	Climate Change Adaptation
PDPFP	Provincial Development and Physical Framework Plan
DOST	Department of Science and Technology's Philippine Atmospheric
DFAT	Department of Foreign Affairs and Trade
DRR	Disaster Risk Reduction
LGUs	Local Government Units
MA	Municipal Agriculturist
MOFA	Matabao Organic Farmers' Association
MUST	Mindanao University of Science and Technology
MSU-IIT	Mindanao State University – Iligan Institute of Technology
OCD	Office of Civil Defence
N/P/MDRRMC	National/Provincial/Municipal Disaster Risk Reduction and Management Council
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAR	Philippines Area of Responsibility
PHILVOCS	Philippine Institute of Volcanology and Seismology
P/MDRRMO	Provincial/Municipal Disaster Risk Reduction and Management Officer
PPDO	Provincial Planning and Development Office
PSLP	Public Sector Linkages Program
SLSU	Southern Luzon State University
SUCs	State Universities and Colleges

EXECUTIVE SUMMARY

Due to the country's geographical and physical characteristics, the Philippines has been ranked among the world's most disaster-prone areas (Verisk Maplecroft, 2015). Numerous incidences of disaster events that are annually being experienced by its citizens have prompted the Philippine Government to establish institutions that monitor the conditions of its natural environment degradation and changes in its atmospheric conditions in order to lessen the impacts of calamities that are closely intertwined with the manifestations of two sets of environmental factors. The government has already started to address the pressing need for climate change adaptation and disaster risk reduction by promulgating many laws and instituting government agencies to undertake programs to deal with them, such as in mandating Republic Act No. 10121 and 7927 and institutionalising the Climate Change Commission to study and spearhead climate change related monitoring activities. It has also instituted the Climate Change Academy to provide training among Local Government officials on undertaking climate change adaptation and disaster risk reduction and empower them to undertake climate change adaptation (CCA) capabilities and disaster risk reduction (DRR) and management programs. Under the leadership of Albay Governor Joey Satre Salceda, the Climate Change Academy of the Philippines was founded within the premises of the Bicol University campus in Legazpi City (Climate Change Academy Fact Sheet, n.d.). This PSLP-funded program on strengthening the capacities of officials of Local Government Unit (LGUs) and faculty members, researchers and extension workers of State University and Colleges (SUCs) on integrating CCA and DRR in community development initiatives is in full support of what the Climate Change Academy is already doing in several Philippine towns and cities.

The collaborative partnership of SUCs and LGUs is vital for the management of more relevant projects (Morgan and Mulligan, 2014) in building a more disaster resilient

Philippines. Strengthening the capacity of both LGU and SUC in the integration of CCA and DRR in locally-based community development programs will deliver greater impacts on disaster prevention and preparedness. The SUCs with its academic and extension workers and researchers have the capacity to generate knowledge that can be translated to local knowledge and pass on to local decision makers so they can inform the LGU development and town councils of the connections between development activities and the increasing hazardousness of a place, as what most of the universities and local governments have done in this project. The locally generated knowledge can serve as viable inputs for building data bases and developing DRR and CCA strategies which can be incorporated in instituting and undertaking community development programs and other livelihood and resource management projects. These results were transpired in the offset of the project until the end of its implementation and were attested by the representatives from SUC and LGU collaborators during the inter-provincial trajectory conference.

With funding from the Australian Government's Public Sector Linkages Program (PSLP), the Australian National University through Dr. Doracie Zoleta Nantes, has partnered with the Climate Change Academy to undertake a development project that aims to build the resilience to disasters of a number of disaster-prone communities in the country. The project is titled "*Capacity Strengthening of Five Provincial Governments and State Universities in Integrating Climate Change Adaptation and Disaster Reduction – Philippines.*"

The partnership has led to a two-year program that aims to contribute to project beneficiaries' increased knowledge on disaster risk reduction (DRR) and climate



p19



p43



p50

change adaptation (CCA). The project was implemented from February 2013 to April 2015. The levels of risks that are faced annually by residents of places that are often devastated by extreme weather events and other hazards were taken into account in selecting the partner provinces as pilot areas for project implementation – they are as follows: Albay, Bohol, Lanao del Norte, Misamis Oriental, and Quezon. The provincial, city/municipal and barangay government councils entered into some forms of collaboration with the state universities and colleges (SUCs) in their provinces. The collaborating SUCs are the Bicol University, Bohol Island State University, Mindanao State University-Iligan Institute of Technology, Capitol University, Mindanao University of Science and Technology and the Southern Luzon State University; it is worthwhile to note that these universities have strong advocacy programs in advancing CCA and DRR measures.

Upon deliberation during the inter-provincial write-shop, the *Capacity Strengthening of Five Provincial Governments and State Universities in Integrating Climate Change Adaptation and Disaster Reduction – Philippines* has contributed greatly in capacity-building of the LGUs and SUCs in the five partner provinces, particularly in the development and distribution of learning materials on CCA and DRR, in the creation of social networks at various levels of program implementation, and in supporting programs that will bring economic empowerment. This project has aimed to increase the knowledge and skills in integrating CCA and DRR in development initiatives among project participants in the LGUs and SUCs and it has done so by undertaking six (6) components that are to be facilitated in each of the five collaborating provinces. A National Training Team was formed and it consisted of twenty (20) female and sixteen (16) male climate change and disaster risk reduction and management scientists, specialists, and practitioners. They developed eighteen (18) modules that have simplified the scientific discussions of concepts that are related to climate change adaptation and disaster risk reduction and other concerns which address the

different development and information needs of diverse Philippine communities. Some modular concerns address problems that are brought about by environmental degradation in upland, agricultural and marine environment. They also include geo-hazard mapping, climate change-mindful forest management, organising sector groups' enhancement and improvement of livelihood systems, gathering baseline data on the environmental conditions and level of disastrousness of various places, improving cultural understanding of practices that are associated with coping with disasters, translating environmental governance concepts into everyday life practices, prevention of communicable diseases and dealing with malnutrition and health issues during disaster periods, improving the architectural designs of houses and infrastructures, environment planning, and becoming more well-versed with environmental laws, etc.

The 18 modules were delivered by the writer-developers during a series of workshops that were held in the five provinces. They were able to train 371 (176 males and 195 females) SUC faculty members and researchers, LGU officials, NGO workers and field practitioners. Financial support for holding the training sessions were given by the project



p57



p68



p113

with counterpart funding from local government units. The most enthusiastic attendees of the first set of training in every province were selected; they composed the Provincial Local Training Teams that translated the modules into the vernacular or local languages.

The translated modules were used in the re-echo training-workshops that were held at the barangay level in each province with financial support from the project and counterpart funding from the LGUs. The members of the Local Training Teams, who are SUC faculty members and

researchers, LGU officials, NGO workers and field practitioners, served as resource speakers. The training inputs encouraged the 385 participants (239 males and 246 females) from the participating barangays in five provinces to analyse what and how disasters curtail their everyday life. As a result, the barangay level training participants were inspired to develop project proposals and implement activity plans which aim to strengthen their capacities to undertake and integrate DRR and CCA strategies in daily community initiatives. Also, they were able to plan and undertake the piloting of small-scale DRR and CCA project implementation in their barangays.

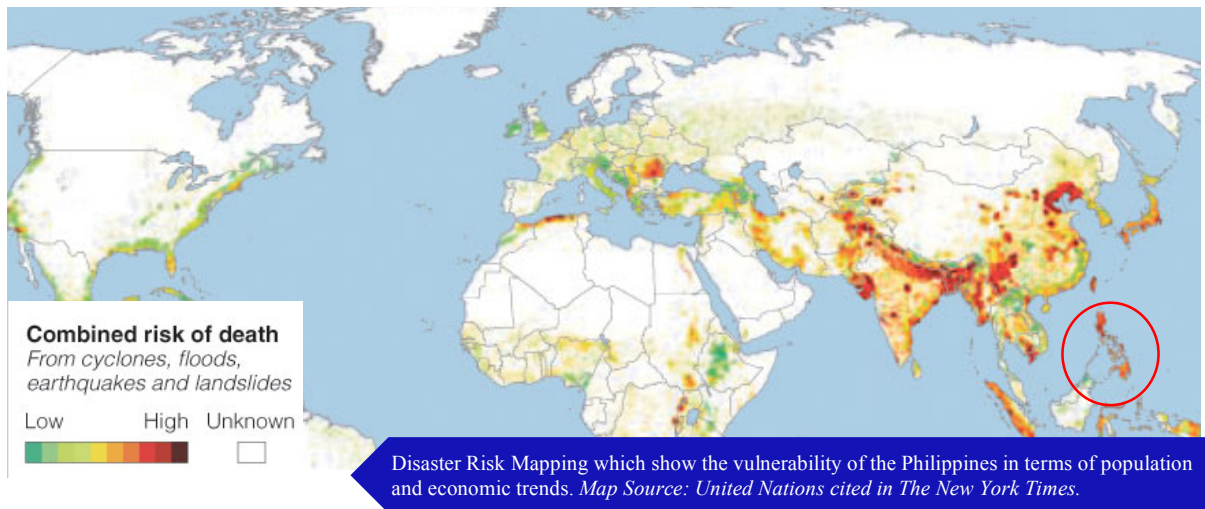
The piloting of 34 mini-projects and undertaking of provincial risk assessments with the use of vulnerability and capacity assessment and sustainable livelihood strategies were conducted in July to December of 2014. Each province was given 10,000 Australian Dollars for piloting of most relevant and implementable-projects on DRR and CCA. Many projects have integrated early warning and communication system, environmental restoration and livelihood strengthening of women's groups into the piloting of DRR and CCA projects.

This project completed five training sessions at the provincial level. Five roll-out trainings were finished by the provincial technical working groups with more than 300 barangay officials in attendance. The participants in the training sessions on CCA and DRR have piloted 34 mini projects on climate change adaptation and disaster risk reduction in different participating barangays and municipalities in the provinces of Albay, Bohol, Lanao del Norte, Misamis Oriental and Quezon. Funding for the piloting of projects was handed to the organised groups of training participants in the presence of town council members. Counterpart funding were allotted by the LGU officials in every partnering barangay. After the write-shop deliberation, it was concluded that transparency in project implementation was one of the respectable outputs of the project implementation.

The holding of training sessions and pilot project implementation has raised the level of understanding of people about disaster risk reduction and climate change adaptation. The dynamic results of the training sessions on DRR and CCA and the pilot project implementation have brought the realisation of the following outputs: 1) information provision and development of strong collaboration between LGUs and academic institutions on community-based DRR and CCA oriented initiatives; 2) integration of CCA and DRR concerns to SUCs extension programs; 3) reduction of vulnerabilities among sector groups through enhancing the importance of environmental management and economic empowerment; 4) re-organization of some priorities and disaster risk reduction and management councils at different LGU administrative levels; 5) increased knowledge in CCA and DRR among the participants of training sessions which were undertaken by the project; and 6) creation of DRR and CCA network support system among project participants in the five provinces.

With the collaborative learning that have been gained in this two-year project, the next generation of project goals and objectives need to be realized. They are as follows: 1) Provision of financial management and organizational strengthening skill-trainings to the PSLP-partner-beneficiaries in the 34 barangays; 2) Production of guidebooks on DRR and CCA, environmental restoration and livelihood empowerment strategies; 3) Continuation of direct fund disbursement to project-beneficiaries in a timely and transparent manner; 4) Fostering of inter-place consultation on how to improve project implementation; 5) Development of monitoring-and-evaluation tools at all project implementation levels; 6) Building a taxonomy of DRR and CCA management strategies and leadership arrangements with unique institutional and organisational systems; and, 7) Convincing leaders to talk with each other regularly irrespective of their political affiliations.

Chapter 1. INTRODUCTION



With the country's geographical and physical characteristics, the Philippines has been highly ranked among the world's most disaster-prone areas (Verisk Maplecroft, 2015). About 20 typhoons per year land on the Philippine Area of Responsibility (PAR) and on average, seven (7) of them bring heavy rains and floods, massive landslide events, and cause large-scale devastation to low-lying areas in hard-hit provinces (Perez, n.d.). The Philippines is located along the western part of the Pacific Ring of Fire and is highly susceptible to seismic and volcanic hazards (Centre for Environmental Geomatics-Manila Observatory, 2005).

The negative impacts that are brought about by the above-mentioned environmental hazards to disaster-prone communities in the country are magnified by the cascading secondary hazard events that follow. Often, they are caused by a number of misplaced and unchecked man-made resource extraction activities that contribute to wide-scale environmental degradation; they render hundreds of communities more vulnerable to disasters that widen some existing socio-economic inequalities among the Filipino people in various parts of the country (Zoleta-Nantes, 2000).

The high incidence of disaster events that are experienced by the country prompted the Philippine Government to establish institutions that monitor the conditions of the Philippine environment and lessen the impacts of calamities, such as the Office of Civil Defense (OCD), the National Disaster Risk Reduction and Management Council (NDRRMC), the Department of Science and Technology's Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), the Philippine Institute of Volcanology and Seismology (PHIVOLCS), and others. These government agencies have been mandated to gather astronomical, meteorological and climatological data and provide weather forecasts, warnings, disaster preparedness and mitigation activities and advisories on floods, typhoons, volcanic eruptions, earthquakes and tsunamis, (PAGASA, n.d.; PHILVOCS, n.d.) and other relevant information and services to the Filipino community on matters concerning their safety.

One good example is the Project DINA or Disaster Information for Nationwide Awareness Project of the OCD which will serve as an avenue of the country's pledge to implement the Hyogo Framework of Action. The project will disseminate information of disaster preparedness and response on seven hazards – earthquakes, tsunami, tropical cyclones, landslides, floods, volcanic eruptions, and fires (OCD, n.d.).

The government has also addressed the pressing need for climate change adaptation and disaster risk reduction by repealing Presidential Decree No. 1566 and passing Republic Act 10121 or the Philippine Disaster Risk Reduction and Management Act of 2010. This law transforms the Philippines' disaster management system from that of providing mainly disaster relief services and short-term responses and highlights the importance of disaster risk reduction and disaster management and prevention. The DRRM Act lays down the importance of strengthening people's capacity to deal with disaster-induced stresses,

maintaining basic functions during the disaster periods and bouncing back better from calamities by prioritizing disaster prevention initiatives, highlighting the value of community involvement in strengthening DRRM and focusing more vulnerability reduction efforts on the most vulnerable sectors (Congress of the Philippines Fourteenth Congress, 2010).

Republic Act No. 7929 or the Climate Change Act of 2009 mainstreams “climate change into government policy formulations, establishing the framework strategy and program on climate change.” This Act led to the establishment of the Climate Change Commission which has been mandated to coordinate, monitor and evaluate the local government units’ (LGUs) measures on climate change adaptation and mitigation. This Act has aimed to build communities that are resilient to climate change-related disasters (Climate Change Commission, n.d.).

There are also initiatives to continue capacity building under the OCD. It has an Education and Training Division which handles trainings for its own personnel, public sector, private sector, and communities on DRRM (Office of Civil Defense, n.d.).

The Climate Change Academy was launched in 2011 under the leadership of Albay Governor Joey Sartre Salceda to support the climate change measures of the Philippine Government. The Climate Change Academy was founded inside the Bicol University campus in Legazpi City. The Climate Change Academy is mandated to empower the Local Government Units (LGUs) on climate change adaptation capabilities and disaster risk management. These community empowering measures include: 1) raising their awareness on disaster risk; 2) offering progressive training on scenario building; 3) training them on climate and disaster risk assessment and management; and 4) providing technical assistance for local management and planning (Climate Change Academy, n.d.).



The Climate Change Academy of the Philippines. Photo Credits to CCA.

Inaugurated in November 2011, the **Climate Change Academy** is the first institution in the country that provides education, research, training and public awareness programs pertaining to climate change and climate change adaptation. The academy is dedicated to the mission of preparing the local communities to be resilient amidst climate change through education and research. (Climate Change Academy, n.d.)

The government has taken initiatives to collaborate with private organizations to strengthen the country's resilience to disasters. Aside from engaging in partnerships with non-government organizations, the Philippines has been seeking assistance from different countries in forwarding disaster risk reduction and climate change adaptation. The Australian Government through the Australian Aid Program has been helping the Philippines in undertaking *“education reforms, sustaining economic growth, maintaining peace and security, building governance that is transparent and has accountability, and mainstreaming disaster preparedness and response”* (Australian Government Department of Foreign Affairs and Trade, n.d.).

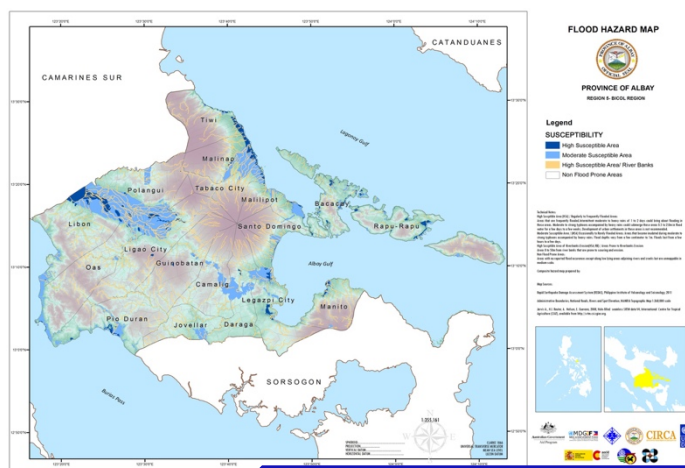


Dr. Zoleta-Nantes introduced the project to Albay Governor Salceda and Deputy Director Daep during their first meeting on March 2013. Photo Credits to Abundio Nunez

With funding from the Australian Government's Public Sector Linkages Program (PSLP), the Australian National University through Dr. Doracie Zoleta-Nantes has partnered with the Climate Change Academy of the Philippines that is headed by Governor Joey Salceda and deputy director Dr. Cedric Daep to undertake a development project that has aimed to build the resilience to disasters of a number of disaster-prone communities. The project is titled "*Capacity Strengthening of Five Provincial Governments and State Universities in Integrating Climate Change Adaptation and Disaster Reduction – Philippines.*" It is a two-year program that has aimed to contribute to project beneficiaries' increased knowledge on disaster risk reduction (DRR) and climate change adaptation (CCA). It has intended to make vulnerable people in disaster-prone communities more active participants in undertaking community-managed projects and more hands-on on disaster prevention and risk management. The program has been implemented from February 2013 to April 2015 with the provinces of Albay, Bohol, Lanao del Norte, Misamis Oriental, and Quezon as partners in advancing collaborative measures on CCA and DRR. Six state universities and colleges (SUCs) have participated in undertaking this program, they are the Bicol University, Bohol Island State University, Mindanao State University-Iligan Institute of Technology, Capitol University, Mindanao University of Science and Technology and the Southern Luzon State University.

PROVINCIAL SITUATIONS IN THE FIVE PARTICIPATING PROVINCES**Province of Albay**

As reported by the collaborating LGU partners in this project, the province of Albay is situated in the Southern Luzon land mass between the provinces of Camarines Sur up in the north and Sorsogon down in the south.



Flood Hazard Map of Albay. Map source:
Province of Albay, et. al.

It is bounded on the east by the Pacific Ocean, on the northeast by the Lagonoy Gulf, and on the west and southwest by the Burias Pass. Further, lying on the northeast of the Albay province's mainland are the islands of Rapu-rapu, Batan, Cagraray and San Miguel, which are all under the province's jurisdiction.

As described in the Albay Provincial Development and Physical Framework Plan, the province is located in the eastern seaboard of the country and is subject to the pressures and consequent effects of the 'Pacific Jinx' (PDPFP, 2011-2016). It is referred to as such because it is situated on the western end of the Pacific Ring of Fire and is highly vulnerable to earthquakes, tsunamis and other volcanic hazards. It is also on the Western Pacific Basin where climatic conditions such as typhoons, monsoon rains, and thunderstorms, among others, are generated and have caused the province to experience more pronounced distribution of precipitation and no pronounced dry season all-year round. According to Albay Public Safety and Emergency Management Office (APSEMO), the locational factors, volcanism processes, inherent physiographic and hydro-geologic factors made Albay as one of the provinces which is most vulnerable to disasters and to the negative effects of climate change.



Small phreatic eruption of Mayon Volcano in May 2013. Photo credits to APSEMO

As described by the APSEMO, the natural hazards in the province have been generally classified in two categories: the geological hazards and the hydro-meteorological hazards. Geologic hazards include the earthquake-induced hazards, volcanic hazards, tsunamis and landslides, while the hydro-meteorological ones include typhoons, storm surges, floods and flash floods. Albay experiences earthquakes that are generated by plate movements in trenches and active fault systems (tectonic earthquakes) as well as by activities of nearby volcanoes (volcanic earthquakes) - the closest of which is the Mayon volcano that is situated at the heart of the province. An estimate of 42,500 households, or 5.3 % of the total population of the province, is considered at risk from earthquakes. Similarly at risk are the human-built structures, development infrastructures, and other real estate properties that are exposed to these seismic hazards.

Whenever Mayon Volcano erupt, the APSEMO reported that about 86 barangays in three cities and six municipalities that are located at the volcano base are considered at risk from pyroclastic flows, ash falls, volcanic avalanches, lava flows, mud flows, and lava fountains among others. Most affected are the barangays that are located within the six-

kilometre-radius-permanent danger zone (PDZ) and the eight-kilometre-radius extended danger zones. A total of 1675 families that live within the 6-kilometer-PDZ of the volcano are categorically at risk (as of September 2010).

The APSEMO report has tackled that Albay lies on Luzon Island's south eastern seaboard and is one area that is first hit by tropical cyclones that land on the Philippines. It experiences, on average, about 20 tropical cyclones each year, and is hard-hit by two major destructive typhoons per year. Their files show that in November 2006, Albay was hit hard by typhoon Reming - one of the most deadly and destructive tropical cyclones that was recorded in the history of extreme weather occurrences in the country. In addition, the LGU officials mentioned that the typhoon brought 466 millimetres of rainfall, a figure that registered as the highest in 40 years. The heavy rainfall caused debris and volcanic materials from the slopes of Mayon Volcano to cascade down as mudflows and buried some communities that have developed at the foot-slopes of the volcano.

Aside from Reming, the recorded history of the province shared by the APSEMO presents that three other major typhoons hit the province in 2006 and in the succeeding year. These typhoons caused flash flood and landslide occurrences in the heavily affected areas. The high levels of risks in affected areas are determined by three factors; high and increased incidence of heavy rainfall, concentration of developed human infrastructures in highly developed areas with high population density, and high incidence of poverty.

According to collaborating APSEMO workers, about 12,190 hectares of the province have been estimated to continually suffer from flood hazards during the rainy season. Numerous built-up areas throughout Albay are annually constrained by floods, most especially in coastal communities. Generally, 396 out of the total 720 barangays of the province experience flood hazards whenever heavy rains fall.

Moreover, the APSEMO workers shared that mudflow is a most destructive secondary hazard event that is brought about by typhoon in areas that are near an active volcano and in areas that are prone to landslide. LGU Officials observed that during the onset of Super Typhoon Reming, destructions were caused in part by rampaging mud and lahar flows from the channels of Mayon Volcano. Three cities and five municipalities that are nestled around the volcano are constantly threatened by mudflows and lahars. Their report mentions that the magnitude of devastation that was caused by Reming had resulted to the relocation of an entire barangay to another barangay within the municipality to ensure the safety of its residents while a permanent mass relocation of about 10,076 families onto safer grounds was undertaken.

With the data of APSEMO, the collaborating personnel revealed that the province is vulnerable to tsunamis and storm surges due to its long coastline of 354 kilometres. As of September 2010, the estimated number of families in 149 barangays that were affected by tsunamis and storm surges was approximately 24,700.

Bohol is also included on the list of places in the Philippines that are highly threatened by the negative impacts of global warming. According to previous PPDO reports, it is ranked 9th among the top 20 provinces that are vulnerable to one (1) meter sea-level rise. Its seascape, which is an eco-tourism asset, is vulnerable to threats of sea-level rise due to global warming and its submersion can cause massive losses in tourism gains and business investments. Cutting of trees in upland communities is commonly practiced. There is degradation of marine ecosystems due to pollution from industries, wastes from agricultural activities including animal husbandry, and garbage disposal systems of human settlements. Coastal erosion and sedimentation are not properly addressed. Dumping and burning of solid wastes that include toxic materials and chemicals still pose a problem as well as the overflowing of sewers. There is an increase in frequency and intensity of the El Niño and La

Niña phenomena which results to agricultural and ecological problems (e.g. disruption of wildlife) and damage to property.

As reported by the Bohol collaborators, there are no volcanoes in Bohol, but adjacent provinces have volcanoes, such as Mt. Kanlaon in Negros Oriental, and Mt. Hibok-hibok in Camiguin; they pose volcanic hazards to Boholanos. Except for the municipality of Bien Unido, all municipalities in the province and the Tagbilaran City are susceptible to earthquakes and earthquake-induced landslides (EIL). For liquefaction, only the following 15 municipalities are not susceptible to such hazards. They are the towns of Antequera, Balilihan, Candijay, Carmen, Catigbian, Corella, Danao, Loboc, Sagbayan, San Isidro, San Miguel, Sevilla, Sierra Bullones, Sikatuna, and Trinidad. Most inland municipalities are not prone to liquefaction but all coastal municipalities are susceptible to this geologic hazard.

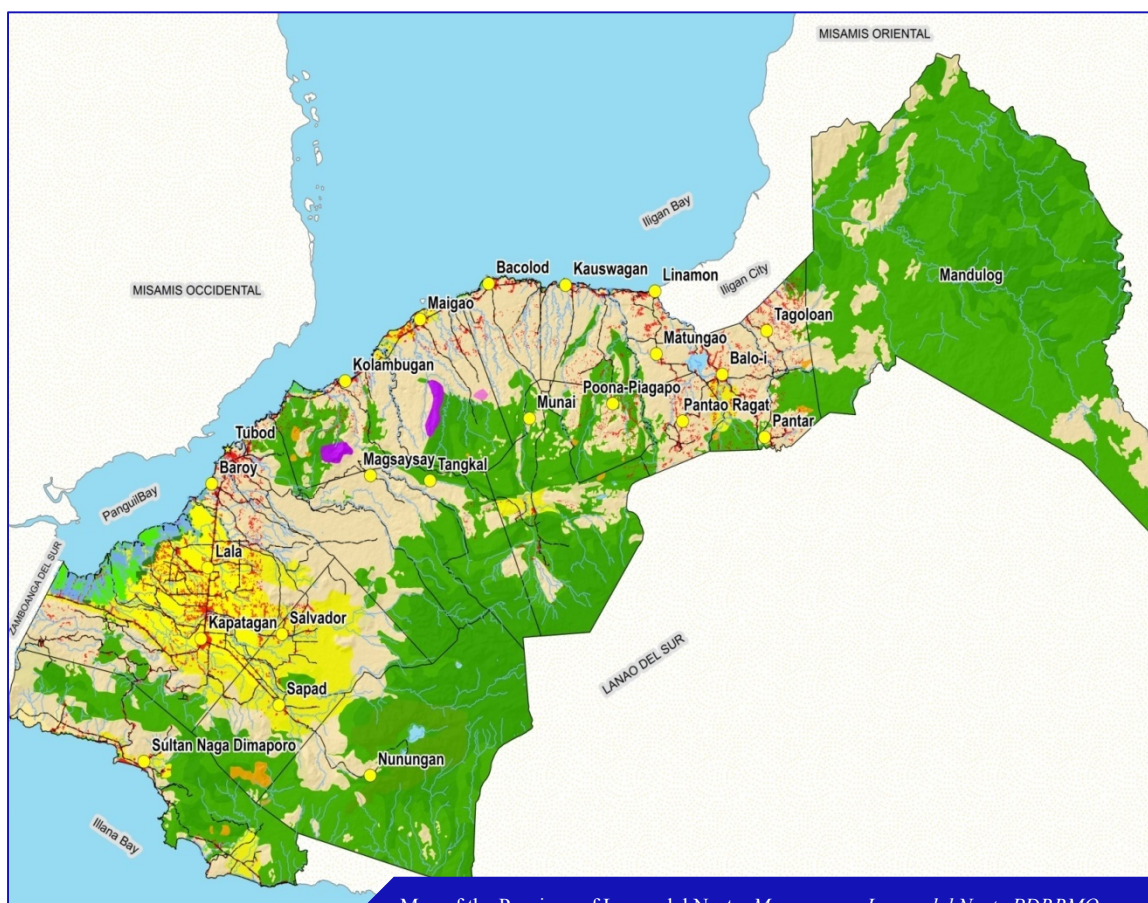
As related by Bohol LGU officials, the twin tragedies of the 7.2-magnitude earthquake and super typhoon Yolanda that struck Bohol in 2013 made the current leadership realize the need to take preventive and mitigating actions that will address the current needs of those adversely affected by the crises. It has aimed to prepare Bohol as a disaster-resilient and climate-smart province.



Aftermath of the 7.2 magnitude earthquake to one of the oldest church in Bohol. Photo credits to Anne Claudine Dayo

Province of Lanao del Norte

Lanao del Norte is situated in Northern Mindanao and is administering parts of Region X. As reported by the project collaborators in the province, it has a total land area of 309, 606 hectares and is composed of 22 municipalities and 462 barangays. Its topography which is considered as an asset is also a major constraint because it can generate flash flood events.



As indicated in a discussion with the PDRRMO of Lanao del Norte, the presence of Lanao Lake Normal Fault System, MF Western Mindanao Extension, and its geographic location expose the province to different geographic hazards - earthquakes, floods, landslides, tsunamis, storm surges and typhoons. Added to these destructive physical events are group conflicts and social hazards, such as the *rido* (family feud) which according to MSU-IIT collaborating political scientists, involves killing the members of feuding families until no

one is left to continue the bloodline. The armed conflict between the feuding families threatens the lives, livelihood and properties of the warring families. The political scientists in the university added that it is important to confront this issue because it adds up to the high level of vulnerability that these displaced families have faced in the last 12 years. The PDRRMO added that the province has experienced 13 natural disasters which resulted to loss of lives, population displacements and they have impaired the people's capacities to go back to their normal lives before the next disaster occurrence.

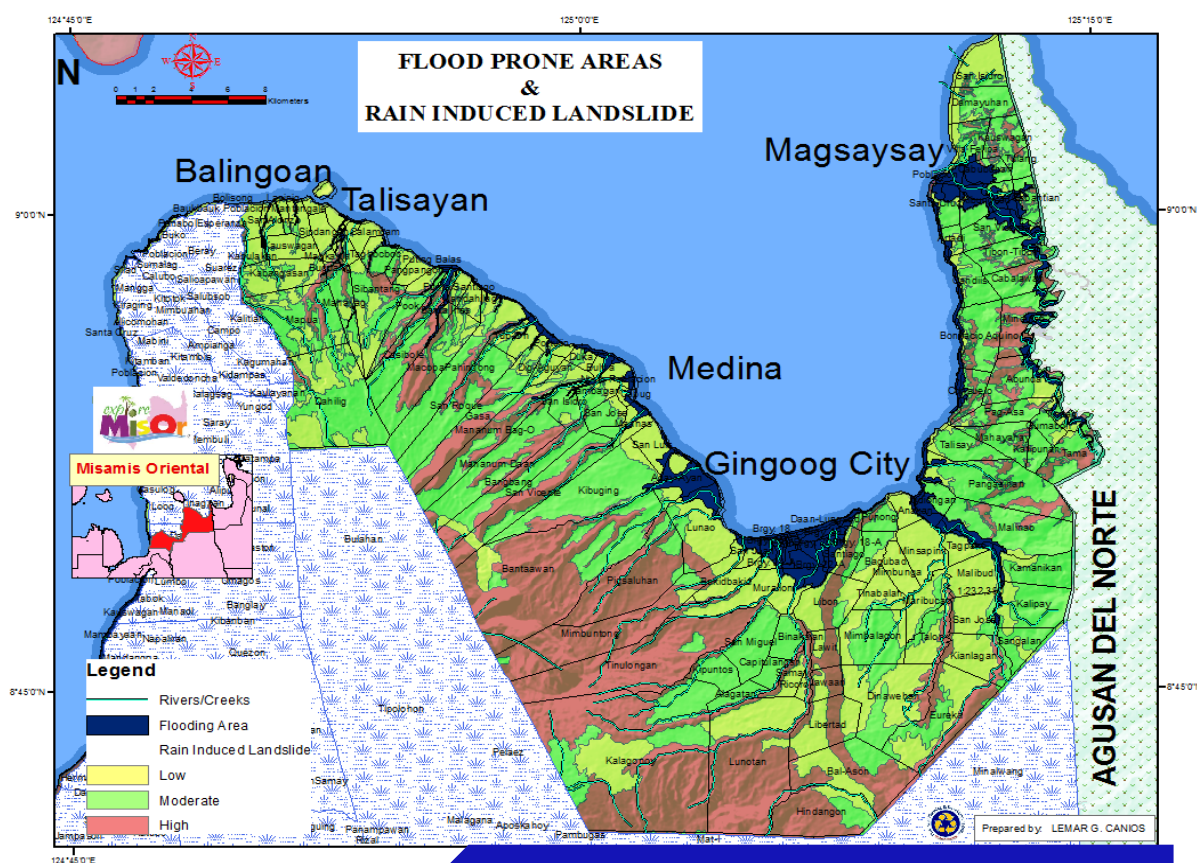
Province of Misamis Oriental

According to the LGU collaborators in Misamis Oriental, the province has a total land area of 3,515.70 square kilometers, and it ranks as the third largest province in Region X; it shared around 17.4 per cent of the region's total land. The province of Misamis Oriental is one of the 25 provinces of Mindanao and one of the five provinces of Northern Mindanao (Region X). It is located along the Northern coast of Mindanao Island. It is bounded on the north by Macalajar Bay, on the west by Iligan Bay, on the east by Agusan de Norte, and, on the south and southwest by the provinces of Bukidnon and Lanao del Norte respectively.

In the past, Misamis Oriental was categorised as a typhoon-free province but due to the changing pattern of climate event occurrences the province lately has been devastated by several strong typhoons. Other than typhoons, some hazards such as earthquakes, ground-shaking, liquefaction, storm surges, flash floods and rain-induced landslides have affected the province.

Misamis Oriental is strategically located in the north central portion of Mindanao. It is considered as the gateway to Mindanao with a new international standard airport that is now located in Laguindingan, Misamis Oriental.

According to the collaborating officials of the province, the flood hazard maps that were prepared by the Mines and Geosciences Bureau of Region X revealed that 6.43 per cent of the province's total area is susceptible to flooding. Cagayan de Oro City is on top of the list of cities/municipalities that may greatly be affected with 13.55 per cent of its total land areas that are susceptible to floods. Selected areas in Cagayan de Oro City have experienced low to high level flooding events due to poor drainage system and siltation of the Cagayan de Oro River and the floods do not subside immediately especially during prolonged and intense heavy rainfalls or extreme weather conditions.



Province of Quezon

The Province of Quezon is composed of 39 municipalities and two cities which are grouped into four districts. It has a total population of 1,987,030 (National Statistics Office, n.d.) with an annual growth of 1.8%. Most of the population, about 1,321,719, reside in rural areas.

Quezon's topography is characterized by rugged terrains with few plains, valleys and swamps. Limited narrow strips of land on river valleys and sea coasts and are available for growing crops. The undulating lowlands along the coast are well drained. The province is very narrow, averaging about thirty (30) kilometres in width. The slopes of the province range from 0-3% slopes and above. The topography of the area permits prime agricultural cultivation activities within the province. In fact, 59% of the area consists of agricultural lands. (Province of Quezon, 2015)

According to the PDRRMO the Province of Quezon is vulnerable to natural disasters owing to its unique geo-climatic features. The PDDRM Office adds that the major natural hazards for the province are earthquakes, landslides, floods, incidences of drought, fire, El Niño, La Niña and others. The province has witnessed a number of great disasters such as the flash flood incident that hit the REINA Area on November 29, 2004, the flood incident that was caused by Typhoon Milenyo on September 28, 2006 and other events. These disasters



Map of the Province of Quezon.
Map source: *Quezon Province*.



Aftermath of Typhoon Glenda in Lucban, Quezon.
Photo credits to Lucban LGU

resulted in losses of lives and properties and disruptions of economic activities, and had caused immense misery and hardship to the affected population.

According to the PDRRMO, the natural disasters have adversely impacted the economic development of the province especially those municipalities that were directly hit by disasters. The disasters divert the energies and resources away from planned growth and development. While natural hazards cannot be controlled, the vulnerability to these hazards can be substantially reduced by planned mitigation and preparedness measures.

PROFILES OF THE SIX PARTICIPATING SUCs

While the LGUs govern the target communities and project beneficiaries, the academe plays an important role in CCA and DRR through undertaking of capacity building and information and education campaigns (IEC). These can mainly be included in the SUCs' research and extension services. The National Service Training Program (NSTP) as a mandated program in SUCs also facilitates disaster preparedness trainings and knowledge-building.

Bicol University

The Bicol University. Photo credits to Anne Claudine Dayo

As indicated on the Bicol University website, it is a premier university in Region V; it offers 67 degree programs spread among its 16 academic units. In its forty-year-experience of providing higher education programs, its presence has been significantly felt in its service communities with its theme *“to be closer to the people through the generation of knowledge and technologies which will make a difference in the lives of the people.”* Included in the thrust of its extension are the provision of disaster education to build resilient communities,

environmental protection and climate change mitigation and adaptation. (Bicol University, retrieved 2015)

Bohol Island State University

According to its Office of Extension and Training Services, the Bohol Island State University (BISU) was formerly known as the Central Visayas State College of Agriculture, Forestry and Technology (CVSCAFT). It is a public institution of higher learning in Bohol, Philippines which operates in several campuses that are spread throughout the province, with the main campus located in Tagbilaran City, Bohol.

The Office added that the Research and Extension Agenda of the university include: agriculture; forestry, natural resources and environment; fishery and coastal resources; education; community development; engineering and technology; tourism; health; and climate resiliency.



The Bohol Island State University in the Municipality of Calape.
Photo credits to Bohol Island State University
www.calape.bisu.edu.ph

Capitol University



The Capitol University.
Photo credits to Capitol University
www.cu.edu.ph

According to Professor Lilian de la Pena, the Capitol University Research and Extension Office and Institute for Development Studies (CUREXO-IDS) is committed to making Capitol University a full-fledged research university in its pursuit of establishing a solid infrastructure of research and community extension service emanating from a learner-centred and globally competitive academic community. Moreover, the priority research areas of CUREXO-IDS from the years 2000 to 2015 are on Business and Industry, Peace Studies, Community Extension and Health, Policy Development and Research, Curriculum Development and Improvement, Environmental Issues, Information technology, Language and Education, Culture and the Arts. With the launching of the Institutional Development Agenda for 2014-2019, Capitol University aims to contribute to the formation of resilient communities in the wake of sporadic disasters that are brought about by climate change.

Mindanao State University – Iligan Institute of Technology



The Mindanao State University – Iligan Institute of Technology is known for its “*excellence in science and technology*”, as well as its “*passion for extensive research and community development*” (MSU-IIT Official Website, retrieved 2015). According to Professor Arnold Alamon, through its Department of Extension the University focuses on wellness/health and sanitation, education/literacy, capability building, alternative livelihood, restoration and rehabilitation of the environment, and entrepreneurial development.

Mindanao University of Science and Technology

As to its official website, the Mindanao University of Science and Technology provides advanced education in mathematics, science technology and engineering. The university is involved in research and extension works that advances the development of an individual’s critical skills and competencies for a global setting.



Southern Luzon State University

Formerly known as Southern Luzon Polytechnic College, Southern Luzon State University is the prime institution of higher learning in the Province of Quezon. The main campus is situated at the foot of Mt. Banahaw in Lucban, Quezon. With its mission to build people, provide quality education and promote healthy environment, the University's research and extension services are anchored on advocating environmental protection and management towards attaining sustainable development. Its Extension Services has been forwarding environment advocacies since its inception through the Institute of Environmental Governance and Dark Green School Program, which both campaign for climate change mitigation and adaptation. (SLSU Profile, 2011)



The Southern Luzon State University Main Campus.
Photo credits to Southern Luzon State University
www.slsu.edu.ph

Chapter 2. BACKGROUND SETTING

The Philippines has been included in the Top 10 list of most vulnerable countries to climate change and disasters for the past 10 years. This is evident in the studies of different organizations worldwide, which delve on both geographical and socio-economic factors as indices of levels of vulnerability. Most of the countries included on the list are underdeveloped countries which are often economically incapable to handle the recovery phases of big disaster events. (Kreft, S., Eckstein, D., Dorsch, L., & Fischer, L., 2015)

The overall economic growth and development of the Philippines is affected by annual occurrences of calamities. Parallel to the report written by Hillier and Nightingale in 2013 where they cited Hellegatte (2012), each time a disaster devastates an area, development gains that have been accumulated for years are lost; often they cause setbacks on the place's economic progression. Thus, funds will be spent only on relief provision and rescue operations if the Philippines will not invest on disaster prevention, preparedness and DRR. As a result, costly rehabilitation programs will be given attention instead of making it as development funds for building infrastructures.



Ruins of Our Lady of Light Parish Church, a more than 100 year-old church in Loon, Bohol, which was destroyed by the 7.2 magnitude earthquake.
Photo credits to Elmo Caralian

The Philippines has been experiencing disasters that are brought about by typhoons and earthquakes. These disasters have devastated millions of properties, killed hundreds of people and caused injuries to thousands of people in affected communities. Typhoon Haiyan or *Bagyong Yolanda* is on top of the list of the worst natural disasters; it recorded an estimated damage costs of two billion US dollars and around 16 million people were affected (Rappler, 2014). The country's history on disaster occurrences has listed volcanic eruptions, earthquakes and typhoons as the deadliest and most destructive events, together with landslides, tsunamis, flash floods, and storm surges.

Mainstreaming of disaster risk reduction and management is a serious concern in governance (Zoleta-Nantes, 2013). The practice of good governance is probably the best way to deal with the negative effects of over-extraction and other associated mismanagement by humankind of natural ecosystems.



Atty. Vistal elaborates on the different programs which intersect with the CCA and DRR initiatives that are being undertaken by the Province of Bohol. Photo Credits to Bohol PPDO

Various stakeholders need to harness DRR and CCA knowledge along with some appropriate technical innovations that could address some challenges that are related to DRRM and would not hamper the communities' development growth. However, DRR and CCA are not viewed within the framework of sustainable development by most LGUs, agencies, private sectors, and communities. This is similar to the report of the Commission on Audit. It also highlighted that often, programs and projects are done on a piece-meal basis and they are undertaken only when the disasters have devastated their communities already. Most importantly, many of the programs and projects are not sustained and they are not incorporated into local development plans; they need to be mainstreamed into national and local policies in order to secure the needed funds and political support to put into place DRRM interventions.

Mainstreaming of DRRM concerns in the Provincial Development and Physical Framework Plan (PDPFP) has to include the application of making decisive policies and transparent decision-making in governance. The production of a Provincial Disaster Risk Reduction and Management Plan, which incorporates the top-most priorities of vulnerable communities during disaster periods, is very important. Multi-million pesos are needed to implement and complete projects that would meet the immediate needs of communities during disaster periods but government resources are limited. Thus, it is imperative to optimize the utilization of whatever resources are available and to practice creativity in outsourcing strategies. Applying the shared principle of participatory planning, responsive budgeting and sound implementation at the grassroots level can lead to the attainment of development that emanates from communities.

Table 1: Core Development Issue in DRR and CCA Project Implementation (Provincial Government of Bohol, 2015)

Component	Major Issues
Policy	▪ Policies in ensuring sustainability of DRR and CCA initiatives ▪ Unclear mandates in mainstreaming DRR and CCA in local development planning
Institutional Arrangements	▪ No defined institutional arrangement to sustain the DRR and CCA initiatives ▪ Undefined lines of coordination ▪ No clear roles and responsibilities of relevant agencies ▪ Weak mechanism for coordination
Knowledge management	▪ Lack of information on undertaking DRR and CCA ▪ Lack of tools for decision making in implementing DRR and CCA
Resource management	▪ Inadequate physical, financial and human resources

ROLES OF LGUs IN MAINSTREAMING CCA AND DRR

As evidenced during the discussions in the provincial workshops in the five collaborating provinces, changes in rainfall patterns, increase in intensity and frequency of typhoons, change in times of extreme weather events' occurrence, and sea-level rise are some aberrations in the regional climate patterns that are now becoming noticeable. The observable connections between global atmospheric warming, changing patterns of weather events, and increasing occurrences of extreme weather events that pose local environmental threats are an emerging concern among local government units. Given this scenario, local government units must play a major role in implementing measures on climate change mitigation and adaptation.

The project has highlighted the importance of instituting a program to increase the knowledge and competency of leaders on CCA and DRR; integrating them into the implementation of community development programs and other livelihood and resource management projects is salient. People and local groups should be involved in implementing

community-managed disaster risk reduction and mainstreaming disaster prevention. Being front-liners in DRRM implementation and management, the LGU must have increased confidence and technical competency in undertaking CCA and DRR integration.

As observed in this project, hazard risk analysis and climate change vulnerability assessment have already been introduced into development planning. The provincial government has laid down some of the foundation for the sound integration of disaster risk reduction and

management (DRRM) and climate change adaptation (CCA) in PDPFP. At the provincial level, the preparation of a risk sensitive and risk responsive PDPFP has manifested through ensuring the empirical identification of areas at risks to disaster events, proper sighting of facilities and other infrastructure development undertakings, and identification of appropriate management and mitigation measures that need to be put in place. At the same time, the need to improve the people's understanding of climate change story, such as providing answers to the following questions *why it is happening, what it means and what needs to be done* has become salient. The need to strengthen the local government's commitment to mainstream disaster risk reduction in their community development initiatives has become prominent, too.



Misamis Oriental Provincial Government installs new communication link repeater at Gingoog City as their counterpart in advancing good communication system for a more prepared community. Photo Credits to Misamis Oriental PDRRMC.

ROLES OF SUCs IN MAINSTREAMING CCA AND DRR

Upon the evaluation of this project's implementation, it was found out that even if numerous IEC materials on disasters have already been produced and distributed in the past, people still focus on undertaking disaster emergency, evacuation and response activities. This scenario proved that the development of more information dissemination and campaign materials for disaster risk reduction and climate change adaptation will help people understand that reduction of risks to future disasters are of utmost importance in increasing their level of safety. Another point taken during the project's evaluation is that institutional mechanisms for developing databases on DRR and CCA and strengthening the people's capacities on undertaking information management, knowledge generation, and sharing and management of limited LGU resources will contribute to the development, documentation, replication and scaling up of good practices on DRR and CCA.

This is where the importance of involving the SUCs becomes crucial. With the academe's capacity in implementing research and extension services, they can play an important role in mainstreaming CCA and DRR. The academe has a pool of experts and resource persons that have the technical capacity to undertake research and extension services, notably in the development of learning materials for DRR and CCA. Data is necessary for planning effective DRR and CCA. The academe can also serve as an archive of knowledge on DRR-CCA. These points were evident during the project implementation.



Prof. Alamon emphasizes the importance of partnerships between academe and LGU in undertaking CCA and DRR projects. Photo Credits to Lanao Del Norte PDRMC

THE IMPORTANCE OF LGUs AND SUCs' COLLABORATION IN UNDERTAKING CCA AND DRR

The collaborative partnership of SUCs and LGUs is vital for the management of more relevant projects for building a more disaster-resilient Philippines. This indicates that the preparation of research-based action plans in LGU development initiatives can serve as an excellent form of CCA and DRR integration in everyday implementation of government programs and projects, which were also points taken in the study of Penalba, Elazegui, Pulhin and Cruz in 2012. Strengthening the capacity of both LGU and SUC in the integration of CCA and DRR in the Philippines will deliver greater impacts on disaster prevention and preparedness. This will mobilize communities in undertaking collaborative and multi-level approaches on climate change adaptation and disaster risk reduction and mitigation.



While SLSU provided the training venue, Dr. Buzar, Quezon PDRMO, and other LGU officials in Quezon served as resource speakers. *Photo credits to Anne Claudine Dayo*

As mirrored in the project facilitation, the LGUs have the capacity to undertake community organization and they have the needed funding for undertaking development projects. The SUCs have the pool of experts for skills and knowledge advancement. The strengths and weaknesses of the two collaborating institutions can be complemented by the strengths and weaknesses of all the other partner institutions. When local government units lack the capacity to undertake DRR and CCA, the academe can play a bigger role in convincing them to undertake the needed program initiatives. If the other situation or condition prevails, that is, if the academe would need the support of the Local government unit on furthering DRR and CCA then the LGUs can play a bigger role such as in the provision of much needed resources for the SUCs to undertake research. These collaboration initiatives have taken place during the project implementation as attested by the collaborators from the five provincial LGUs and six SUCs during the inter-provincial write-shop in Tubod, Lanao del Norte.

Since providing information and education campaign (IEC) to vulnerable communities is necessary for disaster prevention and preparedness, the SUCs can introduce these IEC materials to the community. At the same time, the LGUs will take part and lead in incorporating DRR and CCA in their development initiatives while keeping the LGUs as lead actors and institutions in undertaking emergency response and recovery. Strengthening the capacity of the LGUs, the SUCs and the other stakeholders will increase the community's capabilities to institutionalize the four pillars of DRR.

THE IMPORTANCE OF THE PROJECT

The Capacity Strengthening of Five Provincial Governments and State Universities in Integrating Climate Change Adaptation and Disaster Reduction – Philippines has contributed greatly in capacity building of the LGUs and SUCs in the five partner provinces, particularly

in development of learning materials, creation of network, and economic empowerment. The project was able to increase the technical competency, capacity and confidence among local government unit leaders in undertaking climate change adaptation (CCA) and disaster risk reduction (DRR) and most especially their integration in community development planning.



As part of the project, Capability Building Training on ICS was held at Barangay Oro site in Legazpi City where community and school leaders were taught to save lives and assistance during actual emergency situations. Photo credits to APSEMO.

Capacity Building

As validated by this project, capacity building is a necessary process in the transformation of community members and realization of their life goals. This is especially true for underdeveloped nations. The Philippines' CCA and DRR measures are still on its preliminary stages where skills and knowledge building are indispensable. The *Capacity Strengthening of Five Provincial Governments and State Universities in Integrating Climate Change Adaptation and Disaster Reduction – Philippines* has provided training opportunities which enhanced the capability of each beneficiary in analysing how disasters curtail their everyday life. The trainings have encouraged them in conceptualizing actions that can integrate CCA and DRR to self-planned, self-determined and community-managed projects.

Government officials and researchers and extension workers of state universities and colleges were introduced to the effectiveness of using participatory research and GIS, anthropological and historical documentation, transect-mapping, quantitative and qualitative research methods, and other disaster vulnerability assessment tools.

Development of Learning Materials



SWG of Quezon distributed CDs with the compilation of training modules discussed during the three-day training of trainers.
Photo credits to Quezon Provincial Information Office

One very productive component of the project is the development of training modules which was undertaken by 36 scientists from the Philippines and Australia. They developed training modules on different topics of DRR and CCA that

are being addressed in their fields of specialization and used local examples that people can relate with concerns that relate to their everyday life.

Another important component of the project is strengthening the confidence of target participants on the value of planning the logistics of undertaking community-based CCA and DRRM. It has done so by providing several technical competencies and professional skills among state university and colleges (SUC) researchers, NGO workers and LGU practitioners during the training workshops that were conducted by the training module developers who comprise the members of the National Training Team. Copies of the training modules were provided in digital formats on handy CDs. The translation of contents of the training modules on CCA and DRR into the local languages was made by members of the Provincial Technical Working groups from the LGUs and SUCs. It has facilitated a high level of comprehension

on the otherwise technical knowledge and jargon-laden presentation of DRR and CCA concepts among the attendees of roll-out trainings at the barangay level.

Creation of Network

One very important output of this project is the generation of social capital that has developed from the collaboration among various stakeholders as they have developed as a result of continued interactions and this has become very clear at the end of the project. This has helped in building an invaluable network of people who are committed to forwarding CCA and DRR initiatives. Aside from training provision at the barangay level, the inter-provincial conference and write-shop have become an avenue for knowledge and cultural exchange and created the groundwork for long-term institutional engagements that are based on friendships and goodwill that have been formed among partners in the course of project implementation. The project was able to mobilize the active participation and commitment of countless individuals in each province, municipality, and barangay where it was implemented and proved that people and communities do congregate around DRRM and CCA issues.



The project's TWG from the five provinces exchanged valuable experiences during the inter-provincial writeshop in Lanao del Norte. Photo Credits to Lanao del Norte PDRMC

Economic Empowerment

This project has also led to the validation of another component of the project which is on the importance of building economic empowerment to the participants in the communities, from training provisions at the project onset to piloting of mini-projects. The training workshops that were provided by the scientists and extension specialists have imprinted on the minds of the local government officials, most especially the barangay officials, that they could attain sustainable economic development if they will undertake ecological profiling and proper management of upland forestry, marine coasts and agricultural resources and intersect them with programs on DRR and CCA.

As shown in the implementation of the mini-projects on community-managed DRR and CCA, integrating environmental protection with hazards and disaster risk reduction initiatives can save the economic development gains of the people, especially during and after the onset of extreme weather events. Furthermore, the mini-projects have empowered a good number of women through livelihood augmentation and have greatly benefited the partner communities in five participating province as shown in the effort of participating women's groups in the collaborating communities of Barangays Maranding and Pacita of Lala and Barangay Poblacion of Sapad in the province of Lanao Del Norte.



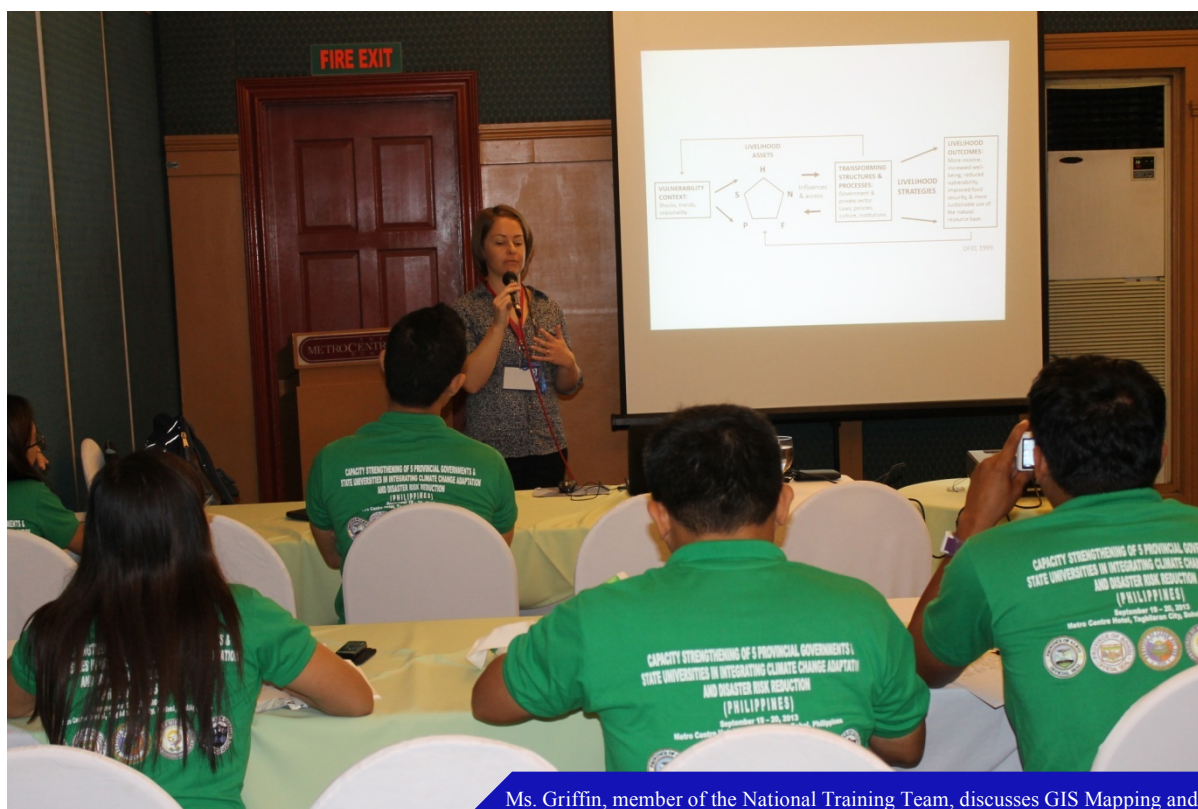
The women of Barangay Maranding showcase the meat processing to the participants of the Inter-Provincial Writeshop. Photo Credits to Lanao Del Norte PDRMC.

Chapter 3. LOOKING BACK

Some features of this CCA and DRR capacity strengthening project

As mentioned earlier, the *Capacity Strengthening of Five Provincial Governments and State Universities in Integrating Climate Change Adaptation and Disaster Risk Reduction to Community Development Initiatives – Philippines* is a two-year program that was implemented from February 2013 to April 2015. With five (5) participating provinces and six (6) state universities, it has aimed to increase the knowledge and skills in integrating CCA and DRR in development initiatives among project participants in the LGUs and SUCs. In order to realize this overall goal, six components were facilitated in each province: 1) Enhance the knowledge contents of the educational materials which are used by the Climate Change Academy of the Philippines in training DRR and CCA practitioners in local government units in different parts of the country; 2) In collaboration with Australian and Filipino CCA and DRR scientists and specialists, develop eighteen (18) training modules on different topics that are closely associated with DRR and CCA and translate them in the vernacular; 3) Train five (5) teams of additional CCA/DRR trainers from provincial and municipal LGU officials and faculty members, researchers and extension members from six state universities and colleges in five Philippine provinces and form technical working groups in the five provinces; 4) Hold roll-out trainings among officials and leaders at the barangay/village level and increase their knowledge on, and capacity in, undertaking DRR and CCA projects; 5) Enhance the knowledge and increase the capacities of officials and barangay collaborators to prepare project proposals and pilot small-scale projects on DRR and CCA; and, 6) Contribute to the building of resilience among farming, fishing and urban communities in five provinces to withstand the impacts of extreme weather events that have been, and will further be, intensified by the now evident changes in global climate patterns.

COMPONENT I. FORMATION OF CCA AND DRR NATIONAL TRAINING TEAM



Ms. Griffin, member of the National Training Team, discusses GIS Mapping and Vulnerability Assessment to future trainers of Bohol Province.
Photo Credits to Bohol PPDO

The formation of a National Training Team formed the first leg of the project. Twenty (20) female and sixteen (16) male climate change and disaster risk reduction and management scientists, specialists, and practitioners willingly shared their expertise on climate change adaptation and disaster risk reduction. They developed modules on different related topics and led the training of CIRCA/CCA training staff members, extension workers in provincial local government units, as well as the local scientists and academic researchers who spearhead DRR and CCA research in the six partner state universities and colleges.

Table 2: Members of the Project's National Training Team

Name	Position	Organization
1. Maria ZitaButardo-Toribio	Researcher	USAID Manila
2. Jesusita O. Colladilla	Associate Professor	School of Environmental Science and Management at UPLB
3. Marco Lagman	Assistant Professor	Department of Geography College of Social Sciences and Philosophy University of the Philippines Diliman
4. Lou AngeliOcampo	Assistant Professor	Department of Geography College of Social Sciences and Philosophy University of the Philippines Diliman
5. Johnson Damian	Instructor	Department of Geography College of Social Sciences and Philosophy University of the Philippines Diliman
6. Laura T. David	Professor	Marine Science Institute, UPD
7. Cesar Villanoy	Professor	Marine Science Institute, UPD
8. Wilfredo Licuanan	Researcher	Marine Science Institute, UPD
9. Fernando Siringan	Professor	Marine Science Institute, UPD
10. Roselle Borja	Researcher	Marine Science Institute, UPD
11. Kristina Cordero-Bailey	Researcher	Marine Science Institute, UPD
12. Eileen Peñaflor	Researcher	Marine Science Institute, UPD
13. Aldwin T. Almo	Researcher	Marine Science Institute, UPD
14. Amillah Rodil	Researcher	Marine Science Institute, UPD
15. Michael Atrigeño	Researcher	Marine Science Institute, UPD
16. Abigail Trinidad	Researcher	Marine Science Institute, UPD
17. Luchie Blanco	Community Organiser	Philippine Business for Social Enterprises
18. Cedric D. Daep	Department Head Executive Officer	APSEMO CIRCA/CCA
19. Abundio V. Nuñez Jr.	Special Operations Officer	APSEMO

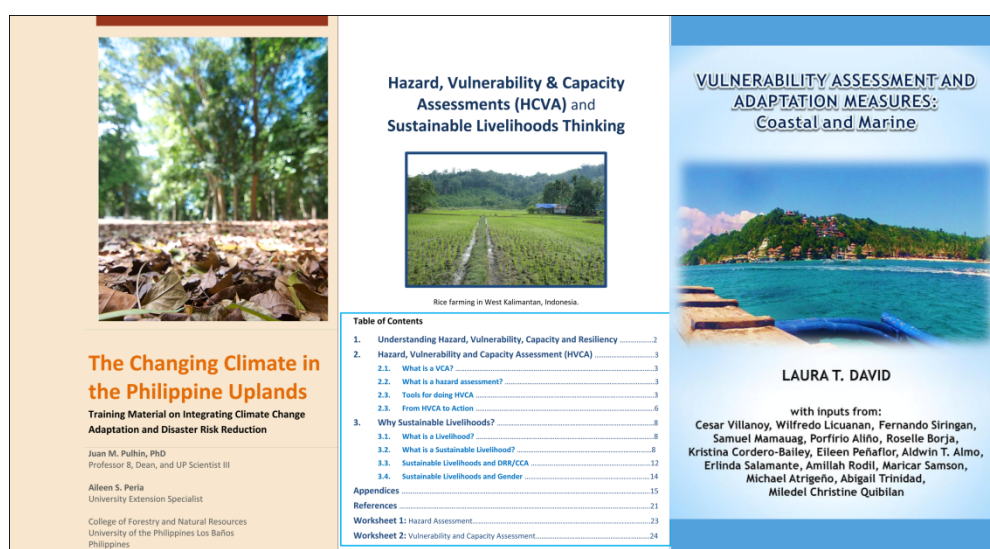
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20. Eugene Escobar	Statistician II	APSEMO
21. Arlene Christy D. Lusterio	Architect and President	Tao – Philippines
22. Juan Pulhin	Professor VIII UP Scientist III	College of Forestry and Natural Resources University of the Philippines Los Baños
23. Aileen Peria	University Extension Specialist	College of Forestry and Natural Resources University of the Philippines Los Baños
24. Arnold P. Alamon	University Extension Specialist	Extension Services Mindanao State University Iligan Institute of Technology
25. Maria Noelyn Dano	Researcher	Bohol Province
26. Evy Elago	Agricultural Engineer	Bohol Province
27. Veronica Avila	Agriculturist	Bohol Province
28. Erlidia F. Llamas-Clark	Clinical Associate Professor	Department of Obstetrics and Gynecology University of the Philippines – Philippine General Hospital
29. Theodore Rommel E. Pestaño	OIC-Regional Director	Mines and Geoscience Bureau – Region V
30. Jose Marcel S. Laud	Senior Geologist	Mines and Geoscience Bureau – Region V
31. Jennifer Ramos	Attorney-at-Law	Pagadian City
32. Christina Griffin	PhD Candidate	Australian National University
33. Ma. Simeona Martinez	Assistant Professor	Department of Geography College of Social Sciences and Philosophy University of the Philippines Diliman
34. Pryor Aldous Placino	Assistant Professor	Department of Geography College of Social Sciences and Philosophy University of the Philippines Diliman
35. Cynthia Zayas	Professor	Centre for International Studies University of the Philippines Diliman
36. Rosauero de Leon		National Development Economic Authority Regional Development

COMPONENT II. DEVELOPMENT, PREPARATION AND TRANSLATION OF 18 TRAINING MODULES ON CCA AND DRR INTEGRATION IN LOCAL GOVERNMENT DEVELOPMENT PROGRAMS

The thirty-six (36) members of the National Training Team developed eighteen (18) modules that simplified the scientific discussions of topics about DRR and CCA. They signed a contract on April 2013 to write 20 pages of background information and training lecture notes and develop a PowerPoint Presentation file (up to 20 slides) for submission in June 2013. However, due to their other work commitments many of the final outputs were submitted on August 2013.

Explanations of concepts in the modules have referred to local problems and geographic situations. The 34 module developers have used practical examples and situations and related them with everyday life concerns so that people would understand better the importance, meaning and urgency of climate change adaptation and disaster risk reduction. These modules have centred on discussion of tools and methodologies for monitoring CC and extreme weather event (EWEs) as well as understanding the impacts of EWEs on various concerns in their everyday life, such as in agriculture, fisheries, forestry, community livelihoods, community and mental health and other related concerns.



Sample modules that were distributed in the five provinces
Photo Credits to the authors of the module

The training modules that were developed have been incorporated by the Climate Change Academy of the Philippines (CCA/CIRCA) in their curricular program on CCA and DRR's integration into local development planning and program implementation. The CCA/CIRCA was mandated by the Philippine Government to provide training to local government officials in the Philippines on climate change adaptation and disaster risk reduction and management. The CCA/CIRCA has been using excerpts of the 18 modules in undertaking their training mandate in other 80 provinces in the Philippines. Some of the developers of the 18 project training modules have already been included on the list of CCA/CIRCA accredited trainers and have served as regular trainers/faculty members of the CCA/CIRCA in Albay Province.

The topics that were explored in the 18 modules were selected based on the subject contents' usefulness in addressing the needs of the Philippines with regards to climate change



Mr. Johnson Damian, a member of the National Training Team, discusses the contents of the training module that he wrote to the aspiring Local Training Team of Lanao del Norte. Photo Credits to Lanao Del Norte PDRMC.

adaptation and disaster risk reduction. For example, the *Damage Assessment and Needs Analysis* module, and the module on *Integrating Early Warning System, Communication Protocol and Evacuation Procedures into a Zero-Casualty Program of the Albay Public Safety and Emergency Management Office and Climate Change Academy* have added useful knowledge on how to reduce human injuries and life casualties during disaster periods among the training/workshop participants. The modules have emphasized to various government agencies the importance of efficient reporting of relevant information and of early warning systems that are interwoven on the community's social network relations and access to telecommunication facilities.

The module on *Community-Health Focused CCA and DRR* initiatives has provided pragmatic approaches on how to reduce morbidity and mortality during disaster emergency and recovery periods. The training materials on *How to adapt residential design and settlements planning to the geographic and climatological characteristics of each province* has contributed to the need to mainstream long-term non-structural adaptation mechanisms among community members and local government officials. The training module on *Disaster Laws* has mainstreamed the drafting of disaster management policies and initiatives to reduce disaster losses from floods, typhoons, storm surges and droughts. Other module titles are listed on the table on the next page.

Table 3: List of DRR and CCA Modules and Corresponding Author/s

Module	Author/s
1. Climate Change Adaptation and Risk Reduction For Agricultural Communities	Maria ZitaButardo-Toribio, PhD, Jesusita O. Colladilla, PhD, PerlynPulhin
2. The Use of the Community-Based Monitoring System and the Ecological Profile as Sources of Usable Indicators for Vulnerability Assessment and Disaster Risk Management	Marco Lagman, Lou AngeliOcampo, Johnson Damian
3. Vulnerability Assessment and Adaptation Measures: Coastal and Marine	Laura T. David, Cesar Villanoy, WilfredoLicuanan, Fernando Siringan, Samuel Mamauag, PorfirioAliño, Roselle Borja, Kristina Cordero-Bailey, Eileen Peñaflor, Aldwin T. Almo, ErlindaSalamante, AmillahRodil, Maricar Samson, Michael Atrigeño, Abigail Trinidad, Miledel Christine Quibilan
4. Damage Assessment and Needs Analysis	Cedric D. Daep, Abundio V. Nuñez Jr., Eugene Escobar
5. Training Material on Adaptation of Residential Design and Settlements Planning for Extreme Weather Events Due to Climate Change	Arlene Christy D. Lusterio
6. The Changing Climate in the Philippine Uplands	Juan M. Pulhin, Aileen S. Peria
7. GIS Mapping and Vulnerability Assessment	Christina Griffin
8. Integrating Early Warning System, Communication Protocol and Evacuation Procedures: The ZERO CASUALITY Strategy	Cedric D. Daep
9. Governance in Integrated Disaster Risk Reduction and Climate Change Adaptation	Maria Noelyn Dano, Evy Elago, Veronica Avila
10. Hazard, Vulnerability and Capacity Assessments and Sustainable Livelihoods Thinking	Christina Griffin
11. Community-Health Focused Climate Change Adaptation and Disaster Risk Reduction Initiatives	Elidia F. Llamas-Clark
12. Introduction to Landslide Hazards and the Use of Geohazard Maps in Disaster Risk Reduction and Management Programs	Theodore Rommel E. Pestaño, Jose Marcel S. Laud
13. Mainstreaming and Institutionalizing Climate Change Adaptation and Disaster Risk Reduction and Management: Salient Provisions of the Laws	Jennifer Ramos
14. Mainstreaming DRRM and CCA into Community Development	Maria Noelyn Dano
15. What to Map: Understanding and Integrating GeoInformation in Disaster Risk Reduction and Management	Ma. Simeona Martinez, Pryor Aldous Placino
16. Research Tools in Generation of Local Knowledge in DRR and CCA for Community-based Intervention: Quantitative Aspects	Arnold P. Alamon
17. Research Tools in Generation of Local Knowledge in DRR and CCA for Community-based Intervention: Qualitative Aspects	Luchie Blanco
18. Using Methods in Anthropology in Disaster Studies	Cynthia Zayas

The above modules were delivered by the writer-developers during a series of workshops that were held in the five provinces; these workshops trained local groups of SUC faculty members and researchers and LGU officials and practitioners. From this trained pool of participants, the members of the Local Training Team and Technical Working Group (TWG) for each province were selected. The topical contents, planning approaches, and various project implementation and monitoring strategies were disseminated extensively during the holding of training-workshops for the provincial, city or municipal and barangay officials and academic researchers in the five partner provinces and six state universities and colleges in Albay, Bohol, Lanao Del Norte, Misamis Oriental and Quezon Provinces.



The Province of Bohol, spearheaded by the Provincial PPDO, conducted a workshop for the translation of modules from English language to Bo'olano. *Photo Credit to Bohol PPDO*

In preparation for the re-echo training-workshops, selected training modules were translated into the following languages: Bikolano, Bo'olano, Visaya, and Tagalog. The selection of training modules was based on the assessment of vulnerabilities of the five provinces. Members of the technical working groups (TWGs) in the five provinces who were

constituted as trainers during the first leg of training-workshops held from September 2013 to December 2013 facilitated the translation of the contents of the training modules from English language into the vernacular. They were not paid for their translation services. They volunteered to translate as their counterpart contribution for project implementation in their province. Faculty members of privately-owned universities such as the Holy Angel University in Bohol, Bohol University, and the Capitol University in Misamis Oriental, and workers of non-government organisations, search and rescue members, and officials of volunteer groups in the five provinces participated actively in the translation of training modules into the local language.

The translation of contents of training modules on CCA and DRR into the local languages has facilitated a high level of comprehension on the technical knowledge and jargon-laden presentation of DRR and CCA concepts by the authors of the 18 training modules. These locally adapted knowledge and information sources have been used in the project's succeeding conduct of community-based research that will lead to the development of databases and information sources on CCA and DRR. This initiative would assure a continuing generation of locally-grounded set of knowledge that can be used for enhancing the information-base of policy making and project planning at the local level.

However, a few provincial teams had encountered certain challenging circumstances that made them unable to translate all the necessary materials for use in re-echo training-workshops. Some SUCs were not able to carry out the translation of the module contents due to the lack of sufficient knowledge among faculty members on the topics. Three provinces (Albay, Bohol and Lanao del Norte) had convinced the LGU officials and SUC researchers and faculty members to work together during the module translation process. For undertaking a similar project in the future, experts on DRR and CCA must work with SUCs during the holding of module contents' translation workshop.

One issue that had slowed down the translation process in the provinces of Quezon and Misamis Oriental was the current teaching and workload of faculty members who have acted as translators. Their full teaching load had lessened their commitment to translate. They only translated modules that are relevant and useful to their respective provincial situations. Others have asserted that translating some technical jargons have been very challenging due to lack of local terms to represent them, thus, during the roll-out training sessions the topics that were not translated were presented in English but were discussed using the local language.



Ms. Theresa Ibarra, Pitogo, Quezon MDRMO and a nurse by profession, discussed one of the translated modules in Tagalog during the training for barangay officials. *Photo Credits to Anne Claudine Dayo*

After holding intensive discussions on the above stated concerns, the contents of the 18 modules have been modified for adaptability and appropriateness to local conditions and the format was popularized for public consumption purposes. Further translation of module contents in a medium that is clear and comprehensible to barangay residents is widely

recommended. Modules must reflect local initiatives and examples. This will level up project participation and serve as future reference among residents and barangay officials as they draft or refine their CCA and DRR initiatives. Furthermore, primarily responsible line agencies for implementing the project contents of a particular module, as stipulated on RA 10121, should be included in designing and translating the contents of training modules. They can provide technical inputs for a more comprehensive and informative discussion of topics.

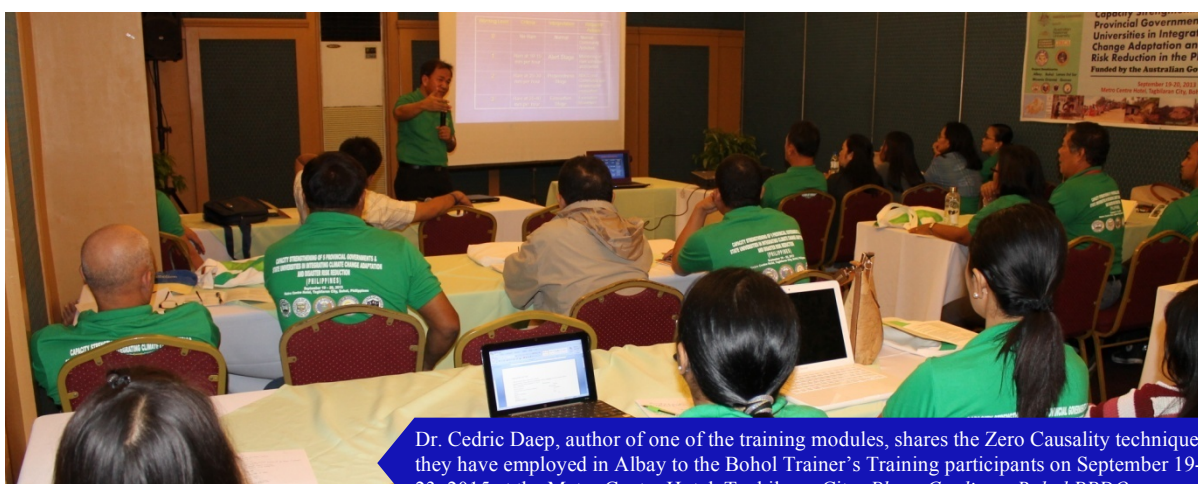
COMPONENT III. DELIVERY OF TRAINING WORKSHOPS BY MEMBERS OF THE NATIONAL TRAINING TEAM TO LOCAL SCIENTISTS, RESEARCHERS AND PRACTITIONERS IN THE PROVINCES OF ALBAY, BOHOL, LANAO DELNORTE, MISAMIS ORIENTAL AND QUEZON



Atty. Ramos provides an orientation on the different laws on DRR and CCA in the Philippines and emphasizes the importance of asking the government to release the People's Survival Fund. Photo Credits to Quezon Provincial Information Office

The provision of training-workshops on CCA and DRR comprises the third component of the Australian PSLP-funded project. A training fund in the amount of AUD 4000 was spent for buying food, training materials and logistics for administrative support per province. In addition, training and data-base building equipment, such as three (3) laptop units, one (1) LCD unit, three (3) digital voice recorders, and one (1) digital camera were

provided to each province. The camera was used in documenting the process of building the LGUs and SUCs research capacity on CCA and DRR. They were used in barangays that conducted the re-training of community members and undertaking of simple CCA and DRR projects.



Dr. Cedric Daep, author of one of the training modules, shares the Zero Causality techniques they have employed in Albay to the Bohol Trainer's Training participants on September 19-23, 2015 at the Metro Centre Hotel, Tagbilaran City. Photo Credits to Bohol PPDO

The National Training Team which consists of 36 scientists and practitioners went to the five provinces to provide lectures and facilitate workshops on DRR and CCA. They enhanced the knowledge of provincial government agency officials and SUC faculty members and extension workers so they can be future trainers on this subject at the barangay level. Graduates of the trainings held re-echo trainings and spearheaded these initiatives in the LGUs of the five provinces.

Five training-workshops were held from September 2013 to December of 2013 in the five partner provinces. The one-month delay in scheduling of the two training workshops (instead of August and November) were affected by the dates of signing the Memorandum of Agreement between the ANU, the CCA and the collaborating five provinces. The delay was caused by the election ban on signing contracts by newly elected officials within the period designated by the Philippine Commission on Elections and the difficulty of getting the endorsement for project implementation among the Provincial Council members. The level of

difficulty that had been experienced depended on the amicable relations between, and political party alliance of, the Governor and members of the Provincial Council.

The training-workshops were held in the capital cities of the five provinces sans the MOA in a number of provinces as per the recommendation of the line agency officials who decided not to align with any of the opposing political figures.

The training-workshops have equipped 371 provincial-based researchers and practitioners (195 females and 176 males) with additional knowledge and skills on how to undertake CCA and DRR strategies that can be integrated to their local development programs. The total figure of 371 who directly benefitted on the first leg of training sessions was more than twice the targeted number of 150 provincial participants that was originally indicated on the PSLP 2012 approved proposal.

The overwhelming success in gathering more participants to attend the training-workshops was a result of constant exchanges of communications between the provincial government officials and state university academic personnel. More importantly, the collaborating local government officials who managed the training/workshops came up with a very economical way of financing the training/workshops and were able to accommodate more participants in training sessions.

Table 4: Number of participants during the training and workshop facilitation among provincial government officials and academic researchers and state university and college faculty members

Collaborating or Partner Provinces in the Philippines	Male (if available)	Female (if available)	Total
Albay	26	22	48
Bohol	42	47	89
Lanao del Norte	30	52	82
Misamis Oriental	27	44	71
Quezon	51	30	81
Total	176	195	371

Concurrent sessions took place during the training as facilitated by the local trainers in different lecture rooms to enable a more-focused learning among people who would be interested to learn more on topics that are in line with their interest and line of work. In a few provinces, there were a mismatch of identified participants and the competency requirements on the topics.

The plenary session for Action Plans that small groups in the training sessions drafted had served as an important venue for knowledge sharing and enabled each participant to learn from what the other groups came up with. This had led to a set of coordinated action plans for the whole group and comprised a set of projects for each represented town during the provincial training sessions.

The facilitation of training workshops has centred on highlighting the need to integrate climate change adaptation and disaster risk reduction on different livelihood and economic development programs that are implemented by various line agencies of the Philippine Government. For instance, the training-workshops that were provided by the scientists and extension specialists of the UP at Los Banos-College of Forestry and School of Environmental Science and Management, the Department of Geography in UP, and the UP Diliman-Marine Sciences Institute have imprinted on the minds of local government and barangay officials that they could attain sustainable economic development if they will undertake a number of things. They are ecological profiling and proper management of upland forestry, marine coasts and agricultural resources, and they can intersect them with programs on DRR and CCA. Integrating environmental protection, hazard management and disaster risk reduction initiatives will save the economic development gains of the people which could be lost during the onset of extreme weather events.



Atty. Ramos lectures on how to mainstream and institutionalize CCA and DRR to the participants of Quezon Trainers' Training on September 14-15, 2013. Photo Credits to Quezon Provincial Information Office

Government officials were introduced to the effectiveness of participatory research, Geographic Information Systems (GIS), anthropological and historical documentation, transect-mapping, quantitative and qualitative research methods, and other disaster vulnerability assessment tools. These were facilitated by the training module developers from Crawford School of Public Policy of the ANU-College of Asia and the Pacific, the PHILDRRA, the Mindanao State University-Iligan Institute of Technology, and the University of the Philippines' Department of Geography and Centre for International Studies.

Upon implementation, the government officials have realized the usefulness of establishing a baseline of the community's socio-economic, environmental and infrastructure resources so it can serve as a reference for monitoring the impacts of development planning activities that may become problematic if they are undertaken in a fraudulent manner.

The module on the *Importance of good governance in undertaking intersecting environmental management and disaster risk reduction programs* highlighted the need to check on how development and disaster and relief aid that originates from government and non-government sources are being used and managed.

The module that introduces the local government officials on various disaster risk reduction and climate change adaptation laws has led the conference workshop participants to draft a call for action by the Climate Change Commission of the Philippines to issue the implementing rules and guidelines for the release of the PhP1 billion People's Survival Funds that have not been released yet so that the money will be used appropriately by local community groups which need them.

Copies of the training modules stored in CDs were distributed to each of the participant. Each province has produced additional copies of the CDs for distribution to various government line agencies in the five provinces.

Upon the completion of the training-workshops, each province was able to identify a set of facilitating and hindering factors that would determine the project implementation success and/or failure. One is the failure to anticipate the need for sufficient time among project participants to develop their training and facilitation skills. Considering that the topics are technical and academic, there must be enough time for the assimilation of project inputs.



Trainer's Training participants of Albay pose for a photo opportunity after the training session. *Photo Credits to APSEMO*

Another is the need to develop a framework or structure which will be the basis for how the topics' presentation will be sequenced. Smooth transition of topic discussions has facilitated better understanding and appreciation of the training contents. It has also been noted that activities must not be scheduled during periods when undertaking government transactions are not allowed; the ban on entering into contracts and assigning of appointments to government personnel due to the holding of elections is an example of such.

COMPONENT IV. FORMATION OF LOCAL DRR AND CCA TECHNICAL WORKING GROUP AND TRAINING TEAM IN EACH PROVINCE



Members of the Bohol Training Team during their Workshop on Training Module Translation.
Photo Credits to Bohol PPDO

A technical working group (TWG) which spearheaded the project was formed in each province before the year 2013 ended. Its members are key officials of the provincial government line agencies and state universities and colleges who were trained by the CCA and DRR national training team between the period of September - December of 2013. They consist of LGU officials and faculty members and researchers of Bicol University, Bohol Island State University, Mindanao State University-Iligan Institute of Technology, Mindanao

University of Science and Technology, Capitol University and Southern Luzon State University.

The members of the TWGs are tasked to undertake the translation of the modules into local languages. Their knowledge on DRR and CCA integration into local community programs were enhanced as they incorporated some locally-generated knowledge when they translated the training modules into the local language. They also adapted the contents of the training modules into the specificities of their local geographies, socio-economic conditions and hazards and disaster profiles. They were also the ones who identified the disaster-prone towns and barangays in their own province.

Members of the five TWGs facilitated the holding of the roll-out or re-echo training/workshop sessions at the barangay or ward levels without receiving compensation from the provincial government and the project proponent. In addition, they facilitated the formulation of initial plans for piloting community-based programs and activities on CCA and DRR in disaster-prone barangays in their own province.

In Quezon Province, the TWG is consisted of the Quezon's ARMOUR – the association of the province's MDRRMO – as suggested by its PDRRMO. Nevertheless, the attendees of the training-workshop from Southern Luzon State University were also given tasks during the module translation. On the other hand, the Memorandum of Agreement (MOA) strengthened the mandate of the TWG of Lanao del Norte which consists of the PDRRMO, PPDO, CDRRMO, MSU-IIT Department of Extension.

However, the composition of the TWG became an issue in Misamis Oriental Province. It mainly caused the slow and sometimes ineffective implementation of this project. Considering the current conflict between the leading elected officials of the LGUs of Misamis Oriental and Cagayan de Oro City, the focal person of CDRRMO was unable to attend any of the TWG meetings. A different representative acted each time as officer-in-

charge for every meeting and this had stalled the implementation of some project activities. Opposition among politicians at the provincial and city levels exist and the relations between elected officials can be a bit complicated and unproductive.

There is a need to eliminate the conflicts that exist between political parties and to institutionalize local disaster risk reduction and management offices to ensure a continuous and proactive approach in undertaking DRR/CCA and this has pointed to the need to the importance of instituting a permanent staff for the DRRM office. Nonetheless, the TWGs have established a network for knowledge exchange and camaraderie. The network members decided that regular meetings of TWGs be held regularly. Furthermore, the TWG was institutionalised also at the barangay level for the creation of a wider and more effective collaborative network system.

COMPONENT V. RE-ECHO TRAINING AT THE BARANGAY LEVEL



Hon. Rommel Maslog, Mayor of Talisayan, welcomes the participants during the Misamis Oriental re-echo training-workshop. Photo Credits to Arnold Alamon

Each provincial DRR and CCA Team in facilitation with the TWG held re-echo training-workshops from January to February 2014. The Misamis Oriental Province opted to hold the roll-out training in April of the same year. The amount of AUD 4000 was provided per province for undertaking combined municipal and barangay trainings on DRR and CCA.

The TWGs invited officials of vulnerable and disaster-prone municipalities and barangays to participate in the re-echo training-workshops. The TWGs also served as resource speakers during the re-echo training workshops at the barangay level.

The training inputs urged participants to analyse what and how disasters curtail their everyday life and encourage them to make project proposals and activity plans on how they can strengthen their capacities to undertake and integrate DRR and CCA strategies in their daily community initiatives. It has enhanced their knowledge on DRR and CCA, as well as their capacities to incorporate DRR and CCA concerns into their local development program planning and implementation.

The barangay officials who were trained during the second leg of training workshops in the collaborating provinces became involved in consultative discussions with members of their communities. They were able to plan the piloting of small-scale DRR and CCA project implementation in their respective barangays. This has paved the way towards the collaboration of provincial and barangay officials in building databases and action plans for integrating CCA and DRR in community development programs.

On top of enhancing the knowledge and skills of the participants, the TWGs were able to identify techniques that would facilitate clear discussions of CCA and DRR topics. The TWG of Lanao del Norte, for example, conducted a series of brainstorming sessions to create an integrating framework that serves as an anchor for determining the flow of topic discussion. Initially, the topics were organised by using the ridge to reef concept. The clustered set of training modules has been suited to the needs of the identified pilot barangays.

One concern that surfaced out during the training delivery was the mismatch between the training participants and the topics presented on hazard and disaster monitoring. It is recommended that identification of functions and roles of the intended participants on

disaster monitoring, evacuation, and knowledge dissemination before the holding of training be conducted. Furthermore, there have been several cases when module contents that were unexplained and translated by the facilitators into the local language made the learning process a bit difficult. In holding of future trainings, topical contents should be explained well using appropriate examples at the barangay level.



A group of barangay officials conceptualizes their Action Plan as a part of the Quezon re-echo training workshop. Photo Credits to Anne Claudine Dayo

The regular holding of institutionalising disaster preparedness activity among the DRRMOs should be included as one of the required topics during the holding of barangay training sessions on CCA and DRR.

Table 5: Number of attendees in the re-echo training-workshop at the barangay level

Collaborating or Partner Provinces in the Philippines	Male (if available)	Female (if available)	Total
Albay	31	32	63
Bohol	54	52	106
Lanao del Norte	23	31	54
Misamis Oriental	61	111	72
Quezon	70	20	90
Total	239	246	385

**COMPONENT VI. PILOTING OF MINI PROJECTS AND RISK ASSESSMENT
INITIATIVES WITH THE USE OF PARTICIPATORY COMMUNITY RISK
ASSESSMENT AND SUSTAINABLE LIVELIHOODS APPROACH**

The piloting of mini-projects and undertaking of provincial risk assessments with the use of vulnerability and capacity assessment and sustainable livelihood strategies were conducted from June to September 2014. The project proponent, in support of the suggestions that were given by the Climate Change Academy staff members and the collaborating provincial government officials and academic researchers, requested the piloting of at least five projects in each province to enhance and strengthen the capacities of more barangays in undertaking DRR and CCA programs.

The savings from frugal travel expenses of the project proponent and unspent travel expenses of Australian collaborators who did not participate in the project due to their heavy work schedules and travel restrictions that are imposed by the DFAT-Australia in Mindanao were used as additional funding for piloting more small scale projects on DRR and CCA.

During the planning workshops on the period January-February of 2014, it was pointed out by the participating barangay officials from the provinces of Albay, Bohol, Lanao del Norte and Quezon that they would need as much financial support as possible in the piloting of at least five action programs on CCA and DRR in each province. They would like to involve various types of disaster-prone communities in their province. The barangay officials who were trained have indicated that they would raise as much counterpart funding that they can generate from their limited amount of resources.

Each province was given 10,000 Australian Dollars for piloting of most relevant and implementable-projects on DRR and CCA. The funds served as beneficiaries' start-up money which convinced provincial, municipal or barangay government to release a part of the 5% disaster-prevention funds. On the other hand, the provincial and municipal LGUS and SUCs shouldered some of the training expenses that were necessary for spearheading the piloting of

small-scale project. As shown on the pie chart below, many of these projects have integrated early warning and communication system, environmental restoration and livelihood strengthening of women's groups into the piloting of DRR and CCA projects.

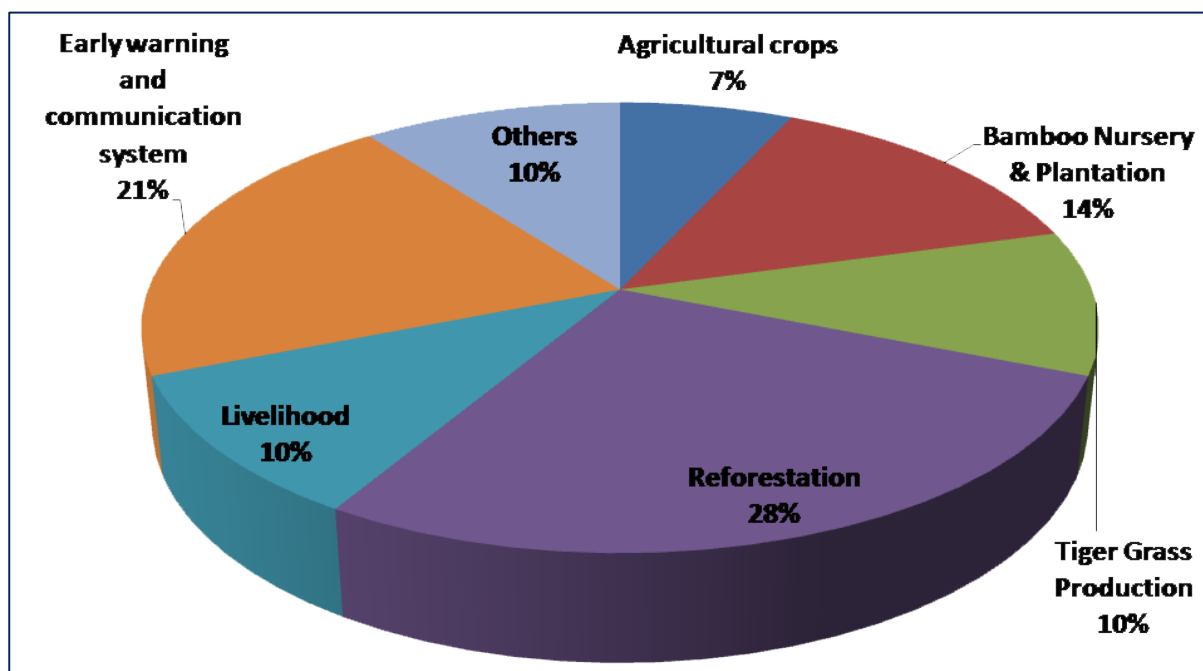


Figure 1: Percentage of the nature of the mini projects implemented in the five provinces

A unique approach of this project is direct issuance of funds to beneficiary-collaborators at the barangay level. Members of the Technical Working Groups handed the funds directly to project beneficiaries with endorsements from local government executive officials. By providing small grants directly to communities, with guidance from, and monitoring by the local government and the academe, the project has contributed to the increased resilience of participating barangay communities and allowed them to determine and implement their respective self-managed DRR and CCA projects.



Mr. Nuñez of CCA hands the seed money for the establishment of bamboo nursery to the barangay chair of Lapinig during the launching of mini projects in Lanao del Norte.
Photo Credits to Lanao Del Norte PPDO

An identified strength of this component is the sharing of project costs with LGUs and SUCs. However, there was difficulty in tapping technical resources particularly in livelihood interventions. The MSU-IIT has encountered some difficulties in tapping their own resources because the project was being implemented in partnership with only two university units, the Department of Extension and the Department of Sociology. There is a need to expand and include the participation of other key players from each academic institution who can contribute to the overall project intervention efforts. This especially becomes crucial in the field of monitoring and evaluation.

The barangays that participated in the project of Misamis Oriental Province were those politically allied to the Governor and the Mayor. Although these communities are located in hazardous areas, other communities that need more focus were not included in the project due to conflicts in their political affiliations. Another cause for the delay in the project implementation was the PDRRMO's lack of province-wide disaster preparedness plan and they only focused their efforts on installation of effective communication systems. They purchased four units of radios each for each of the five participating barangays; three units served as counterpart of the provincial government. The hand-held radios of the project

supported the comprehensive communication network of the provincial LGU; it also installed two towers to facilitate for effective radio communication exchange in various areas of the province.

In Quezon Province, the initial monitoring that should have been conducted by the LGUs was not fully realized due to the lack of monitoring staff in each municipality. Hence, monitoring was conducted by the SUC a few months after the launching of the activity.



Dr. Zoleta-Nanetes of ANU and Engr. Quevada of SLSU visit project site in Brgy. Hagakhakin, Gumaca, Quezon. *Photo Credits to Anne Claudine D. Dayo*

Table 6: List of Small-Scale Projects per Province

Province	Mini Project	Barangay, Municipality
Albay	1. Pili Plantation	Barangay Sua, Camalig
	2. Tiger Grass Plantation	Barangay Calayucay, Sto. Domingo
	3. Growing and Cultivation of Tiger Grass	Sitio Lagsingan, Rapu-Rapu
	4. Fruit-Bearing Trees Nursery and Purchase of Agricultural Implements	Barangay Taysan, Legazpi City
	5. Installation of Flood Markers	Tiwi
Bohol	1. Community- based and Family- Approach Reforestation Project	Sitio Binabaye, Alicia
	2. Fabrication and Assembly of a Rescue Boat	Barangay Mantatao, Calape
	3. Increasing the Capacity among the Residents to Respond to the Four Pillars of Disaster Risk Reduction and Management	Moto Sur, Loon
	4. Rehabilitation of Boardwalk	Barangay Ansilag, Maribojoc
	5. Taro Production	Barangay Abehilan, San Isidro
	6. Organic Fertilizer Production	Tubigon
	7. Bamboo Nursery	Barangay Limocon, Valencia
Lanao del Norte	1. Bamboo Nursery and Production and Establishment of Rural Enterprises for Women	Barangay Poblacion, Sapad
	2. Bamboo Nursery and Production	Barangay Lapinig, Kapatagan
	3. Livelihood Augmentation for Women	Barangay Maranding, Lala
	4. Deboning and Processing of Milkfish Sardines	Barangay Pacita, Lala
	5. Installation of Early Warning Systems	Barangay Santiago, Iligan City
Misamis Oriental	1. Installation of Early Warning Communication Systems: Two-way radio sets	Barangay Macasandig, Cagayan de Oro
	2. Installation of Early Warning Communication Systems: Two-way radio sets and Siren	Barangay Bon-Bon, Cagayan de Oro
	3. Installation of Early Warning Communication Systems: Community Siren Equipment	Barangay Iponan, Cagayan de Oro
	4. Installation of Early Warning Communication Systems: Sets of hand-held radios	Gingoog City Magsaysay Balingoan Balingasag Talisayan
Quezon	1. Distribution of Pili Nut Seedlings	Mauban
	2. Provision of Coconut Seedlings to Barangays	Sampaloc
	3. Climate Resiliency Project on Rice Production through Certified Seeds Dispersal at 22 Rural Barangays	Lucban
	4. Planting of Fruit Bearing Trees	Barangay Mamala I, Sariaya
	5. Planting of Fruit Bearing Trees in Selected Barangays	Pitogo
	6. Punong ItinanimKo, PangangalagaanKo	Gumaca
	7. Backyard Farming Seminar and Tree Planting Activity	General Nakar
	8. Tiger Grass Farming and Soft Broom Making Project	Buenavista
	9. Community-Based Commercialized Bamboo Propagation In Selected Municipalities Of Quezon	Municipalities of Lucban, Infanta, Atimonan and Catanauan

Chapter 4. IMPLEMENTATION OF SMALL-SCALE PROJECTS ON DRR AND CCA IN THE FIVE PROVINCES

The capacity strengthening projects on disaster risk reduction and climate change adaptation in the five provinces which were decided upon by barangay leaders mostly focused on: 1) provision of agricultural crop seedling and propagule; 2) establishment of bamboo nurseries or plantations, development of tiger grass plantations which will support future broom-making among partner-beneficiaries; 3) reforestation of denuded sites for environmental restoration and future fruit production purposes; and 4) and livelihood improvement and strengthening among vulnerable women in poor households. Thirty-four (34) projects were launched at different cities/municipalities in the five collaborating provinces.

PROVINCE OF ALBAY

As to the information given by the APSEMO, the Province of Albay is situated along the Pacific Ring of Fire which made it vulnerable to earthquakes, tsunamis, volcanic hazards, typhoons, monsoon rains and thunderstorms.

With the institutionalization of the Climate Change Adaptation (CCA) – Disaster Risk Reduction Management (DRRM) Training Institute which provides capability trainings to Local Government Units, Albay Province partnered with the Bicol University and Australian National University (ANU) in strengthening the capacity of local government units to undertake this task. The project was spearheaded by the Provincial Government of Albay through the dynamic leadership of Governor Joey Sarte Salceda. Through the staff members of the Albay Provincial Safety and Emergency Management Office (APSEMO) and the CCA-DRR Director Cedric Daep the AusAid Public Sector Linkages Project (PSLP) *Capacity Strengthening of 5 Provincial Governments of State Universities in Integrating*

Climate Change Adaptation and Disaster Risk Reduction in the Philippines was jointly undertaken with the ANU Project Proponent and MNHD Convenor, Dr. Doracie Zoleta-Nantes. They collaborated with the Bicol University President, Dr. Faye Lea Patria M. Lauraya, together with the technical staff of the BU Extension Service Center and other support Colleges/Units, and started the project implementation.

The Province of Albay, the collaborating municipal and city governments, and the Bicol University have initiated five projects in five areas. These projects centred on the establishment of tiger grass farms and reforestation initiatives.

Pili Grove Plantation in Barangay Sua, Camalig

According to the report of the partners from the Province of Bicol, Camalig is a municipality with a population of 63,585 people and 12,717 total households (National Statistics Office, n.d.). It is politically subdivided into 50 barangays; seven (7) of which are urban and 43 are rural barangays. Camalig has a total land area of 13,088 hectares; of which, 9,615 hectares are being used for agriculture. Farming is the primary source of many community residents' income.



In addition, the aforementioned report stated there are five (5) hazardous risks that pose dangers to the Municipality of Camalig, and they are: 1) Flooding; 2) Lahar; 3) Landslide/Earthquake; 4) Liquefaction; and, 5) Ground Subsidence and Ground Settlement.

Project Context

The Pili Groove Plantation is beneficial to the residents of Barangay Sua, a barangay that is located upslope of Mayon Volcano. It barely breaches the six (6) kilometres permanent danger zone that was established by the PHIVOLCS. The project provides an alternative livelihood system for residents of nearby areas. The inarched Pili plantation bears fruit with significant economic value. It will feed the area's aquifer as it catches rainfall and will greatly help growers in the down slope portion of the volcano system during the summer season. It will also serve as a disaster mitigation tool during the onset of volcanic activities and weather disturbances.

The project was undertaken under the leadership of the LGU Camalig DRRM Action Officer and the former Barangay Chairperson of the area. Professor Ma. Julieta C. Gonzales,

the Bicol University College of Agriculture and Forestry Extension Coordinator, has amply provided the needed technical assistance to the project.

Results

The project has encountered several challenges that were posed by the recent Mayon volcanic activities which forced the residents of nearby communities to evacuate. The area was closed due to the dangers that were posed by the eruption activities and had resulted to inadequate management of the pili seedlings. The remaining seedlings will be used to support a plan to expand the project in the adjoining five hectares of lands.



Albay TWG, Dr. Zoleta-Nantes and the beneficiaries hike to the project's area, which just few kilometers away from Mt. Mayon. *Photo Credits to APSEMO*

Fruit-bearing Tree Nursery in Barangay Taysan, Legazpi City

Albay has a population of 182,201 (National Statistics Office, n.d.). Being the capital of the province, it has the most number of barangays totalling to 70. Though the city is considered as the centre of tourism, the APSEMO reported that the City is prone to typhoons, volcanic eruption events, floods, earthquakes and other hazards.



Map of Legazpi City
Map Source: Albay Province LGU

Project Context

The DRRM Action Officer and City Agriculturist proposed the establishment of a fruit-bearing tree nursery at the Taysan Resettlement Site. The project necessitated the involvement of evacuees from Barangay Padang who should be discouraged from resettling back into the eruption-affected areas. The project has vegetable production components and aims to provide economic assistance by providing livelihood to internally displaced persons. This will discourage them from going back to their planting areas that are located inside the perimeter of Mayon Volcano's danger zone.



Project site in Barangay Taysan. Photo Credits to APSEMO

Results

The vegetable garden was affected by recent weather disturbances that hit the locality. The project partners/implementers were able to exercise immediate measures to restart the project. Dedicated beneficiaries re-planted the vegetable plants because the project potential and economic viability remain high.



Dr. Zoleta-Nantes visits the community-managed vegetable-raising area in Barangay Taysan. *Photo Credits to APSEMO*

Tiger Grass Plantation in Sitio Lagsingan, Rapu-Rapu and Barangay Calayucay, Sto. Domingo

According to its DRRM Office, Rapu-Rapu has a tropical climate and receives significant amount of rainfall throughout the year. Its three islands - the Rapu-rapu Island, Batan Island and Guinanayan Island – experience rainfalls even during the driest month. The report added that forty per cent (40%) of storms carrying high-velocity winds in the Philippines pass through Southeast Luzon, the region where Rapu-Rapu is located.



As reported by its LGU, the Municipality of Sto. Domingo has a population of 32,414 people that are scattered in 47.13 sq.km of land area. It has 7,209 households with an average



of five (5) members per household. The report also added that approximately 26.9% of the total households live in urban areas and 73.1% or 5,230 households are rural dwellers. Based on the 2010 CBMS survey results, more than 62% of the total number of households are below the poverty threshold.

Project Context

Compounding the development issues of increasing poverty, rapid population growth, calamities and pressing environmental concerns both municipalities are beset with major hazards, such as typhoons, storm surges, tsunamis, volcanic eruption, liquefaction and ground shaking events, landslides, and lahar flows.

The natural hazards pose challenges to the local DRRMC. The situation is aggravated by inadequate financial resources among members of the population.

Tiger Grass Project aims to provide mitigation measures to the landslide problems that beset the area. Tiger Grass is deeply rooted and is appropriate for soil conservation. It has economic value as the leaves serve as raw materials for soft broom production. The project will provide both environmental benefits and livelihood opportunities among the local residents of the two communities.



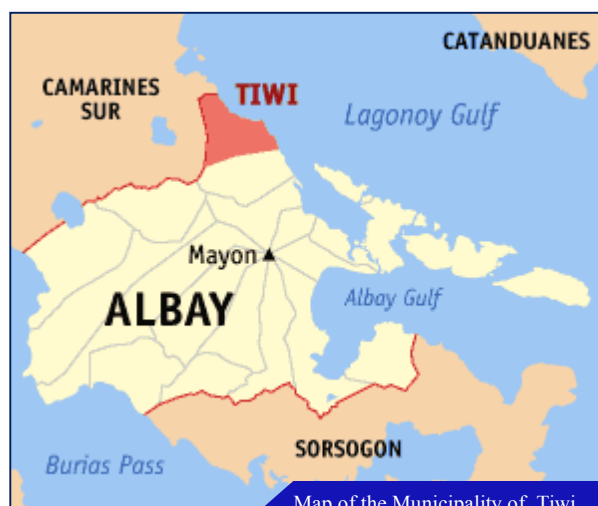
Project Site in Sto. Domingo. Photo Credits to APSEMO

Results

The project faced severe challenges as a consequence of several weather disturbances that hit the locality. The advent of soil erosion in the project sites had destroyed most of the tiger grass spurts. The increased involvement of the local populace has tried to solve this by re-planting them. They need to be educated on the technology of growing the grass as well as the benefits that could be derived from cultivating it. Without greater involvement, it would be very difficult to sustain the project and derive the benefits that the project has envisioned to achieve.

Installation of Flood Markers in Tiwi

Tiwi is a first class municipality with a population of 50,163 and in 25 barangays (National Statistics Office, n.d.). According to its LGU, it is situated at the northernmost boundary of the province of Albay and south of Camarines Sur. Tiwi is approximately 12 kilometres away from the commercial centre of Tabaco City, 39



Map of the Municipality of Tiwi
Map Source: Albay Province LGU

kilometres from the City of Legazpi, and 538 kilometres from the centre of Metro Manila. The APSEMO also added that the villagers ordinarily engage in fishing and planting rice, corn, sugarcane, indigo, fruit-bearing trees, and vegetables. Aside from doing agriculture, they also busied themselves by weaving cotton and abaca clothes, and doing some pottery.

Context and Results of Piloting the Projects

Tiwi Municipal Mayor Leo Templado proposed and undertook the project of installation of flood markers in key canal and river systems of the municipality. The project has proved to be successful with the local beneficiaries citing the installation of early warning as primarily advantageous. The flood level markers with bright colours were clearly visible to alert the residents of changes in water levels during extreme weather conditions, as well as to prompt the residents of the need for evacuation.



One of the area installed with flood marker in Tiwi. Photo Credits to APSEMO

The positive response that was generated from local residents has attested to the effectiveness of the project and indicates the benefits that people have derived from it. The zero-casualty goal of the province continues to be realized in the municipality; with minimal maintenance, the same results can be expected over time.

According to interviews made with the beneficiaries during the project site visits, they no longer need to wait for an advice from their barangay officials if there is a need for evacuation. They were able to determine the level of water themselves.

Facilitating and Hindering Factors and Lessons Learned

The LGU officials and members of the academe are willing to work on these programs. Most of the identified municipalities have received recognition and citations for their CCA and DRR programs. The Provincial Government of Albay in partnership with the Bicol University had been pioneering good governance in undertaking CCA and DRR; thus, the importance of maintaining a strong collaboration with officials of the LGUs and other line agencies is evident. Also, the LGUs and academe are willing to provide counterpart funding for CCA and DRR programs. Many CCA and DRR technologies are cascaded from the Provincial to community levels, thus a zero-casualty goal during disaster can be realized.

Program implementers at the ground level must be oriented on the contents of Memorandum of Agreement between the collaborating partners and the roles, duties and responsibilities of the participating partners must be clearly defined.

In the case of the Bicol University, a Memorandum of Agreement between the LGU and the Bicol University must be executed for each project to assure its sustainability and designations of persons and their involvement on the project must be issued. Most of the time, the need to participate to the activities is issued on short notice. People who are involved in the program are often not available due to their busy schedules. Through the

MOA, assignment and availability of personnel and cost sharing arrangements between institutions will be identified. Other programs can be planned out and discussed including their monitoring and evaluation. In relation to this, monitoring of projects in Rapu-Rapu is difficult because it is an island municipality. Records that are needed in the preparation of reports are often not easily accessible and available.

One important lesson that has been learned from execution of this project is the necessity of having close coordination and partnership between stakeholders and the parties involved. However, despite the challenges that were encountered, such as the occurrence of fortuitous events over which controls are limited, it has been observed that proper and close coordination between and among all stakeholders was strong.

Another lesson pertains to the involvement of the local populace. Amidst the good intentions of leaders, the lack of interest to participate among the beneficiaries will greatly hinder the progress of any project. Thus, the stakeholders' involvement must be assured at the time of project implementation.

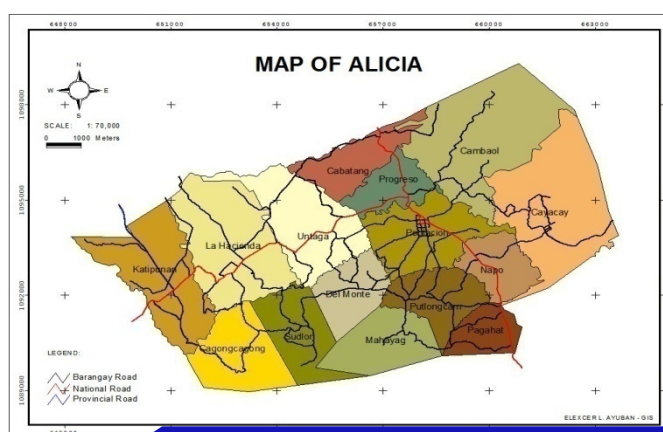
Lastly, the value of generating and sending of feedbacks are an important component in the provision of immediate solutions on some project issues and concerns. For instance, immediate sending of feedbacks would allow for crafting of remedial measures when provision of resources appears to be inadequate.

PROVINCE OF BOHOL

According to the Bohol PPDO, the presence of East Bohol Faults makes the province a geologic hazard prone area. They also added that Bohol has been susceptible to liquefaction events, earthquakes, and landslides. The province, in partnership with the Bohol Island State University, implemented seven small-scale projects. They vary from empowering community programs to holding of agricultural production initiatives such as enriching farm land soils.

Community-based and Family-approach Reforestation Project in Sitio Binabaye, Alicia

Alicia ranked third (3) among the top 20 most deprived municipalities in the province as to the report provided by the Bohol PPDO. According to the office, 96% of total land in Alicia is alienable and disposable while, 4%



Map of the Municipality of Alicia. Map Source: Bohol Province LGU

is timberland or forestland. The climate of the municipality is classified as Type IV under the Corona classification, and is characterized by evenly, distributed rainfall events all throughout the year. In addition to the report, the municipality is part of the Carood Watershed; it is the fifth largest watershed with a span of 20,472 hectares and is located on the eastern part of Bohol Province. It provides significant water source for thousands of households or residents within the catchment and supplies the water requirements of the Bohol Irrigation Projects in Malinao Dam at Pilar, the Bayongan Dam in San Miguel, the Capayas and Ilaya Dams in Ubag, the Cayacay Irrigation in Alicia, and the Irrigation facilities in Canawa, Cadapdapan, Gabayan, Budbod, Tambungan, and Candijay.

Project Context

The proponent of this project is the Local Government of Alicia in partnership with the Australian National University (ANU), the Provincial Government of Bohol through the Provincial Planning and Development Office, and the LGU of



Fruit-bearing seedlings nursery at Sitio Binabaye. Photo Credits to Bohol PPDO

Barangay Cambaol. The project implementers are listed on the table below.

Table 7: List of Project Implementer and their Roles

Role in the Project	Responsible Entity	Responsible Person
Provincial Project Coordinator	PPDO	Atty. John Titus J. Vistal
Asst. Provincial Project Coordinator	PPDO	Engr. Ronilita M. Bunado
Municipal Project Coordinator	Alicia MPDO	Engr. Lydia Riña
Asst. Municipal Project Coordinator	Alicia MAO	Ms.Mansueta M. Mangaya-ay
Barangay Project Coordinator	Barangay Council	Mr.FaustoBernales
Project Supervising Staff	SWM Focal Person	Mr.Panfilo R. Olaquir
	MDRRM Officer	Mr.Anecito C. Miasco

The primary problems that affect the municipality are: declining forest cover due to timber poaching, flooding, soil erosion, low productivity and inadequate supply of water. Also, the handicraft industry which utilizes minor forest products, such as bamboo, has resulted in the decline of the area's biodiversity. This situation needs a raw material replenishment program as well as the establishment and adoption of a long-term and disaster-resilient watershed planning and management approach that can provide the people-desired natural resources, goods and services without adversely affecting the conditions of its soil and water resources.

This project is a rehabilitation of the denuded Cambaol watershed and the reforestation of an area of 40 hectares. It has aimed at developing socially-relevant, self-

reliant and disaster resilient poor farmer families in the community by providing them with skills on forestry management and operation. They call this concept a community-based or family-approach reforestation which aims to increase productivity without dislocating the regular farm activities of farmer-beneficiaries. This scheme promotes the planting of fast growing trees on the initial year to correspond to the farmers' immediate needs and developing a micro-climate for the introduction and development of premium long-term crops.

Results

The project has developed eagerness among the farmer-beneficiaries in sustaining their extra-efforts on planting trees due to some good practices that were introduced to them, such as: 1) nursery operationalization (for tree planting and coffee seedlings cultivation), purchase of grass-cutter for maintenance, and promotion of agro-forestry strategy (inter-cropping technology); 2) establishment of fire brigade volunteers and setting-up a “fire line” for fire protection; 3) establishment of a workable and functional community-based monitoring and management system; and, 4) establishment of a sustained mechanism for collaboration and assigning of counterpart as well as the adoption of a 60%-40% sharing scheme for farm harvest/ products/crops which results from inter-cropping technologies. The sharing scheme will be changed after two (2) years of harvesting the crops to 50%-30%-20%, that is, 50% for the farmers, 30% for the LGU of Alicia and the 20% will go to the account of the project so it will have funds for supporting the planting, maintenance, protection and management expenditures. To summarise, the project was able to provide an operationalized nursery for tree planting and coffee seedling cultivation, a grass cutter was purchased for its maintenance, and a Fire Brigade Volunteers and a Fire Line for protection were established.

Lessons Learned

There were some difficulties at the start of the project implementation because of several bad experiences that were experienced by the farmers on a previous reforestation project. However, it still gained positive impacts that helped urge the farmers, their collaboration and stakeholders to continue pursuing the project.

As the project went on, it was able to visualize a concept of “Adopt a Farmer – Partnership Program” which helped to address the common problems and necessities of the farmers. In this concept, the farmer received support in the amount of Php 1,000 in cash or in kind from a partner, a foster individual or a foster group. Farmers seek for a job or work from another individual to have an earning that can support their daily needs. With this minimal amount, the farmers can sustain their participation in the project during their free time. In return, the partner or foster individual/group receives an equivalent of 10% share of the earnings during harvest time.

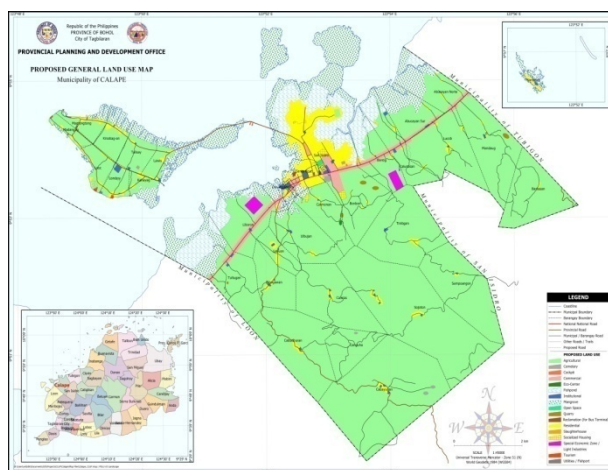
Cost-sharing

Table 8: Budgetary counterparts of Community-based and Family-approach Reforestation Project

ITEM	ANU	PLGU	MLGU	BLGU
Seedlings	55,000			
Construction of Nursery			30,000	10,000
Enterprise capability building			10,000	
Establishment of tree plantation			10,000	5,000
Plantation maintenance, protection and management			10,000	
Monitoring and evaluation		10,000		
Protective gear			7,000	
Total	55,000	10,000	67,000	15,000

Fabrication/Assembly of a Rescue Boat Project in Barangay Mantatao, Calape

According to the Bohol PPDO, Calape is the 24th largest municipality out of 47 municipalities of Bohol Province in terms of land area. It is a 3rd class municipality with 33 barangays, wherein four barangays namely Sta. Cruz, Desamparados, partly San Isidro and



Map of the Municipality of Calape. Map source: *Calape LGU*

Bonbon constitute the town proper or poblacion area. Based from the 2010 Census of Population and Housing, 30,146 comprised its total population; there were 6,696 households with an average household size of 5.

Project Context

Mantatao is one of the outlying island barangays of the municipality of Calape. The municipal LGU reported that it has an area of 51.88 hectares, with 967 people or 195 households living on the island at present. Fishing is their primary source of income and the barangay is the largest contributor of fish catch that is traded in the town market.

People use pump boats as their main form of transportation to go to and from the main island of Bohol. Many children in the island barangay go to the mainland to attend schools in the town proper because only one primary school operates in the island.

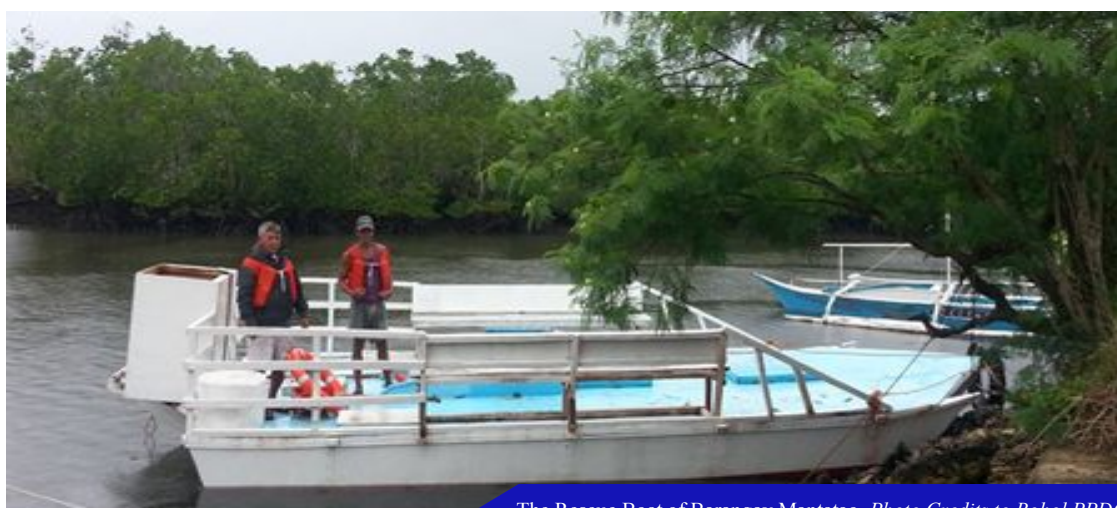
AS to the Bohol PPDO, Mantatao is usually given priority by town rescuers during disaster periods. Transferring of island residents to the mainland is a priority task during typhoon periods because the island is often heavily flooded with rain waters and storm surges because the maximum high tide level in the island is now 40 centimetres above the natural grade line. Given the increasing occurrences of extreme weather events, there is an increasing

need for an island transport boat that can carry as many persons during pre-emptive evacuation operations.

The main objective of the *Fabrication/Assembly of a Rescue Boat Project* is to provide safe sea travel among island peoples during times of emergencies. This innovative project may serve as a model to other island barangays especially in areas that are prone to typhoons and storm surges.

Results

After the project completion, the rescue boat has been used in various calamity occurrences. The local DRRM council has declared a pre-emptive evacuation of residents along the coast including some landslide-prone areas in their island barangay on December 6, 2014 due to the onset of Typhoon Ruby and because of Typhoon Seniang on December 29, 2014. The people of Barangay Mantatao were rescued and shipped to the mainland using the rescue boat that they had assembled for evacuation purposes. During non-typhoon periods, the rescue boat is being used by the barangay to transport goods and people from their barangay to mainland Bohol.



The Rescue Boat of Barangay Mantatao. Photo Credits to Bohol PPDO

Cost-Sharing

Table 9: Budgetary counterparts of Community-based and Family-approach Reforestation Project

Responsible Body	Amount
Australian National University	Php 55,000.00
5% Calamity Funds Barangay Mantatao	49,000.00
5% Calamity Funds Municipality of Calape	46,000.00
Total Project Cost	Php 150,000.00



The participants of the Inter-provincial Trajectory ride on the Rescue Boat. Photo Credits to Bohol PPDO

Increasing the Capacity among the Residents of Moto Sur, Loon to Respond to the Four Pillars of Disaster Risk Reduction and Management

The Bohol PPDO reported that Loon is Bohol's westernmost municipality. It is a second class municipality with 67 barangays and a population of 42,441. The municipality relies on agriculture, fisheries, public transport servicing, trading and retail industry.



At about 8:12 in the morning of October 15, 2013 a 7.2-magnitude earthquake shook the town of Loon and the rest of the Visayas. Loon was the hardest hit municipality. As to the report of the Bohol PPDO, the tremor destroyed basic and strategic public and private infrastructures; rendered thousands of household homeless; and drastically halted and later slowed down government operations and delivery of public services such as water and power supply, healthcare and education, as well as goods that are essential to everyone's daily survival. The earthquakes demolished the human-built heritage of Loon, most especially the Our Lady of Light Church, which is both a national historical landmark and cultural treasure. Among the destroyed landmarks were the old convent (now Sacred Heart Academy), "*Inang-angan*" (coral-stone stairway), *Morada* (mortuary kiosk) and *Cementerio de Mamposteria* (circular graveyard). These are national cultural treasures, symbols and sources of pride in Loon and Loonanon. Another partially destroyed infrastructure is Sombria Bridge which is part of the national highway system in Bohol.

Project Context

Barangay Moto Sur is in the Municipality of Loon. As stated by a barangay official, residents of the densely populated barangay engage in farming, agricultural trading, fishing, and practice of their skills and profession. The people's means of earning money were heavily affected by the Great Bohol Earthquake in 2013. It became imperative for the affected community members that they be capacitated to assume other employment opportunities through the Loon Manpower Development Centre (LMDC), such as engaging in carpentry and other masonry skills.

Increasing the capacity of the residents of Moto Sur to respond to the *Four Pillars of Disaster Risk Reduction and Management* meant strengthening the collaborative initiatives among officials of the barangay, municipal, and provincial governments in Bohol, and the partner funding agencies. It entails the preparation of the community for any calamity or catastrophe that endangers their life and property, as well as the development of capacity of local residents to prepare and respond to disaster risks and adapt to changes in climate patterns.



PPDO led by Engr. Bunado turn-over the funds to the officials of Barangay Moto Sur. Photo Credits to Bohol PPDO

Results

Thirty-eight carpentry and masonry tools and equipment were purchased and stored at the General Services Office of the LGU while waiting for the completion of the repair of the Loon Manpower Development Centre (LDMC) and its accreditation by the Technical Education and Skills Development Authority (TESDA) to offer livelihood skills training courses.

An ordinance that established the LMDC was approved by the *Sangguniang Bayan* or the LGU legislative body on August 1, 2014. The ordinance has yet to be implemented particularly those that pertain to organizing the board of directors, recruitment of mentors, and finalizing the curriculum or training program of the LDMC. It was established through a town ordinance; thus, the annual budget for its maintenance and operation is ensured.

Cost-sharing

Table 10: Budgetary counterparts of Community-based and Family-approach Reforestation Project

PARTICULARS	ANU	Provincial LGU	Municipal LGU	Barangay LGU
	Financial Assistance	Technical Assistance / Labor		
Contribution from development partners	50,000	8,000	9,980	1,000
GRAND TOTAL				Php 68,980.00

Rehabilitation of the Barangay Anislag Boardwalk in Maribojoc

According to its municipal LGU, Maribojoc is a coastal town that is located on the southwestern portion of the Province of Bohol. It is famous for its Punta Cruz Historical Watchtower, the old Holy Cross Church, the scenic Maribojoc Bay, the panoramic mountain ranges, the emerging Abatan River Tour and its hospitable and peace-loving people.



The LGU also provided that Maribojoc is bounded on the northeast by the Municipality of Antequera, by the Municipality of Loon on the northwest, by the Bohol Strait on the southwest and by the Abatan River on the southeast. The Municipality is divided into 22 barangays and has a total area of 6,956 hectares. The biggest barangay as far as land area is concerned is Barangay Jandig, with an area of 508 hectares. The smallest barangays are the Barangay Poblacion and Barangay Anislag with land areas of 70.84 and 70.83 hectares, respectively.

Project Context

The Anislag Boardwalk was newly completed before the 2013 Great Earthquake of Bohol hit the town and was completely damaged by it. The boardwalk was purposely constructed to give access to the barangay fisherfolks and gleaners. It allowed them to traverse a protected mangrove plantation which was purposely reforested by the barangay people many years ago. These mangroves, aside from being buffers of waves, are the habitat of marine resources, which is the main source of livelihood to most of the barangay people. They walked through this area towards the docking area of their fishing boats without

damaging the young mangroves. The old boardwalk had provided the fisher folks with easy access to the seashore and navigational channel that led to the fishing grounds in the area.

The boardwalk was also viewed by the Barangay Officials of Anislag as one source of local income; it is one of the barangay's tourist attractions. The mangroves at the scenic coastal site are worth watching if viewed at the end point of the boardwalk. The serene view creates a relaxing mood to visitors.

Maribojoc is one of the pilot municipalities which partnered with the Australian National University (ANU) through the Provincial Planning and Development Office (PPDO) of the Provincial Government of Bohol. From the partnership, the awareness of Maribojoc's LGU officials on Climate Change Adaptation and Disaster Risk Reduction Management was enhanced. The other groups which collaborated with the project are the Anislag Barangay Council and the Anislag community.

The rehabilitation of the Boardwalk was envisioned to enhance the livelihood opportunities among the marginal fishermen who were devastated by the earthquake events in Barangay Anislag and promote its local eco-tourism industry.

The boardwalk shall be maintained by the Anislag Barangay Government. Fees shall be collected from tourists and the money will be used for the maintenance of the boardwalk. Appropriate legislations for the governing policies in the operation of the boardwalk shall have been passed by the Barangay Council and supported by the Maribojoc Sanggunian Bayan. The community, which is the end user of the boardwalk, was organized to help in the management and maintenance of the boardwalk. They were given inputs on CCA and DRRM by the LGU officials of Maribojoc, thus, cascading some of the learnings from the partnership with the ANU.



Before and after the rehabilitation of Ansilay Boardwalk.
Photo Credits to Ansilay LGU

Results and Lessons Learned

The project is an output of the increasing awareness among the community members on the importance of preserving and protecting the environment and to slow down the resource extraction efforts to attain economic development. This project is a community tourism effort that hopes to encourage environmental protection. This makes the project different from other initiatives whose motives are purely for generating income and operate without community consultation and participation.

The project posed a high development cost. With seed money of only P 55,000 that was granted by this PSLP, the community members became apprehensive that it will be difficult for them to continue the project. The lot owners of the project site had initially shown resistance to grant for free the needed right of way for the community members to access the coastal shores through their private lots. However, after recognising some evidence of close collaboration that exist among the project implementation partners and other local stakeholders, the lot owners had granted right of way or access to their private lands without

cost. However, it is recommended that an agreement be established to institutionalise the community members' access to the seashore through these private lots.

The ownership of the project has been gained through the community's involvement during the project launching. The utilization of local manpower in the project implementation and the provision of information among them on the project status have also contributed to its success.

The partnership with the ANU has motivated the Barangay LGU officials to come up with initiatives that are aimed for the betterment of the community. The project has inspired the BLGU and the community members to aim for bigger projects and partner with NGOs in the near future. The partnerships have enabled complementation of available resources and have made this endeavour more attainable and doable. The sharing of responsibilities has empowered the BLGU in implementing projects and made them realize that CCA-DRRM issues could be integrated in conceptualisation of projects for economic development.

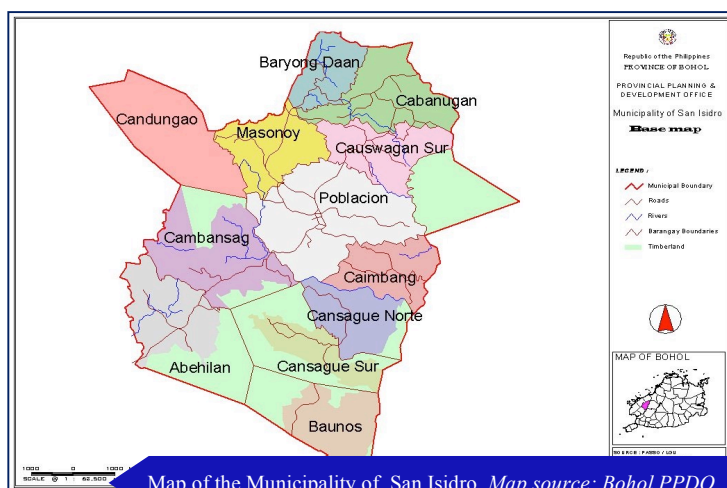
Cost-sharing

Table 11: Budgetary counterparts of Rehabilitation of the Barangay Ansilag Boarwalk Project

Responsible Body	Amount
Australian National University	Php 55,000.00
5% Calamity Funds Barangay Mantatao	120,000.00
5% Calamity Funds Municipality of Calape	166,000.00
Total Project Cost	Php 341,000.00

Taro Production in Barangay Abelian, San Isidro

The San Isidro LGU reported that it is within the 2nd congressional district of Bohol and is located in its northern part. It is 32 kilometres away from Tagbilaran City and covers a total land area of 6,003.5 hectares -



about 1.44 per cent of the province's total land area. San Isidro consists of 12 barangays and all of them are inland or land-locked barangays.

As mentioned in the report of Bohol PPDO earlier, the 7.2 magnitude earthquake caused damages on infrastructure and agriculture and resulted to shortage of food, potable water supply, medicines, and shelter. The bridge that traversed the Abatan River and connected the municipalities of Cortes and Maribojoc was destroyed and left the municipalities of Antequera, Maribojoc, Loon, Calape, San Isidro, and Tubigon inaccessible and without sufficient food for three days.

Because of this experience, Jacinto B. Naraga, the Mayor of San Isidro proposed the planting of Taro - a native crop that is resilient to many types of weather disturbance - and started a food security program during his administration. The Taro Production Project has



aimed to utilize the now abandoned rice paddies for food production and encourage farmers in neighbouring barangays to plant crops that are resilient to all types of disaster.

Many beneficiaries of the Taro

production project are farmers or families that barely subsist and earn a wage below the country's income threshold.

Results and Lessons Learned

Nineteen (19) farmers are the beneficiaries of this project. About 10,000 taro tubers were transplanted on abandoned rice paddies and water-clogged land areas. The pre-identification of lot and beneficiary was made by the barangay officials before the project started.

Target beneficiaries were called for a dialogue between the Municipal LGU (MAO,MPDO) and Barangay LGU officials. It was found out later that some of the identified lot owners are now living in Mindanao. Some land administrators now live in an adjacent barangay in the municipality of Antequera and are not registered residents of Barangay Abehlan. It was resolved that the priority beneficiaries of this project must be original residents of the barangay regardless of the distance of their present residence to the project area.

Cost-sharing

Table 12: Budgetary counterparts of Taro Production Project

Description	Source of Funds				Total Amount
	ANU	PLGU	MLGU	BLGU	
TARO Tubers , up-rooting of seedlings and Hauling at (P5.50/tuber x 10,000	55,000				55,000
Clearing and planting			21,050		21,050
Snacks during orientation, consultation and launching program			950	500	1,450
Transportation of technical personnel		2,500			2,500
TOTAL	55,000	2,500	22,000	500	P 80,000

Bamboo Nursery (Barangay Limocon, Valencia)

Based from the report submitted by its LGU, Valencia was formerly part of Dimiao. Valencia got its name when a parish priest visited the upper barrios and identified the town's topography and panorama as similar to those of Valencia, Spain. The report also indicated that Valencia is a 4th class municipality and is located in the southern fringes of Bohol.



Map of the Municipality of Valencia
Source: Bohol Province LGU

It faces the Bohol Sea. It is 42 kilometres east of Tagbilaran City, the provincial capital and 21 kilometres from the municipality of Jagna where a port is located. It is bounded on the north by the municipality of Carmen, Bohol Sea in the south, the municipality of Garcia-Hernandez in the east and the municipality of Dimiao on the west. According to the 2007 census, Valencia has a total population of 27,586. It has a total land area of 100.77 square kilometres.

Further, agriculture contributes heavily to the economy of Valencia. Majority of the population derive their main source of living from agriculture. Data showed that 39.27% of the total land area of the municipality are devoted to agriculture and are found largely in the lower and central portion of the municipality. A wide variety of crops thrives in the place. Among those predominantly grown are rice, corn, coconut, banana, root crops and fruits.

Project Context

The project is specifically located in barangay Limocon - one of the 35 barangays of Valencia. Some of the barangays near the town centre have modern urban structures while

those which are seated in outlying areas remain rural. By the end of 2007, Limocon had 434 residents.

This project has emerged through a Memorandum of Agreement between the Provincial Government of Bohol (PGBh) and the Bohol Island State University (BISU) with the assistance of the Australian National University (ANU) and the Climate Change Adaptation for Local Government Units in the Philippines (CCA/CIRCA). As an institution of higher learning, BISU has a mandate to work closely with the Provincial Government in undertaking research development and extension programs and projects that support countryside development through direct interaction with and participation of the barangay people.



The site has hosted several projects that BISU did with international organisations such as the Institute of Environmental Rehabilitation and Soil Conservation (ERECN, Japan) with concerns on Soil and Water Conservation, and the ICRISAT, the AERD, and the LINU-IAS. The BISU sustains local partnerships with the Provincial Government of Bohol through the Provincial Planning and Development Office (PPDO) and Provincial Engineers' Office (PEO) that extended a Road Opening Network that supports the Farm to Market Road

initiative. The barangay local government unit (BLGU) and the Limocon Farmers Association (LFA) are partners in the project implementation.

The Bamboo Nursery Project aims to address poverty reduction, soil conservation, reforestation, disaster risk reduction management and climate change mitigation measures in the upland community. It aims to enhance land resources capability and may lead to increase the area's agricultural productivity and farmer's income.

Eventually, the project showcased partly the usefulness of agricultural technologies such as soil and water conservation and specifically the Sloping Agriculture Land Technology (SALT) which is applicable to Limokon because it is a hilly barangay.



Results

The project implementation has resulted to convergence of efforts and collaboration of different sectors and shows the active participation of people's organisations with strong support from the Local Government Unit of Valencia.

The project has installed the structures of the nursery. It has also started the rooting of the bamboo cuttings. The minimal progress of the project was attributed to weather conditions and lack of water supply due to access difficulty, as a result the first nursery was transferred to another site.

Organic Fertilizer in Tubigon

The collaborators from Tubigon reported that the municipality is located along the northwest coast of Bohol. It was established in 1819, has a total land area of 8,187 hectares. Tubigon has 34 barangays; 12 of which are coastal while six are island and 16 are inland barangays. Land areas that are classified under agriculture use comprise the biggest portion of the municipality and is



pegged at 62.78 per cent. Based on the 2010 Census of Population and Housing, Tubigon has a population of 41,608 with 8,621 households. The average household size is 4.8 persons.

Project Context and Results

Tubigon had partnered with an NGO-Rice Watch and Action Network (RWAN) and became their pilot area on *Climate Type 4 for the Climate Resiliency Field School (CrFS)* during the 2012 wet season cropping.

The CrFS Module uses the concept of Farmer Field School (FFS) or *school without walls*. It is an innovative and non-formal focused approach to learning and encourages farmers adopt new technologies by letting them undertake the new practices themselves. Farmers are involved in series of learning exercises in the field for one whole cropping cycle. It has ten (10) modules and offers special topics where farmers are involved in a series of learning exercises on adopting a more holistic approach to farming.

Special topics are designed to help farmers understand its environment, adapt climate change and improve its overall well-being. They are made to understand that agriculture is one key sector that is at high risk due to climate change. They are taught on how agriculture

chemical inputs and various farm operations contribute to global warming and reduce soil fertility. They are made aware of their responsibility to engage in a type of production that will not exhaust the productivity of natural resources, hence the adoption of the technology on organic fertilizer production.

The Organic Fertilizer Production Project has aimed to capacitate farmers to adapt sustainable agriculture practices that will help them address some negative impacts of climate change as well as improve the productivity of their farms. It aims to empower farmers and communities to gain access to, and apply, innovations and technologies in reducing risks that are brought about by climate change while creating livelihood and income augmentation opportunities.

On November 2012, the first batch of graduates of the CrFS organized the Matabao Organic Farmers' Association (MOFA). From the knowledge that they learned from the training, the group has realized the value of producing organic fertilizers with the objectives of restoring the balance of ecosystem, restoring soil fertility, preserving good health and augmenting the family's income. The members started with their self-help fund. With zeal and determination they prompted their members to construct a makeshift workshop area where they can mass produce organic fertilizer.

Unfortunately, the 7.2 magnitude earthquake and typhoon Wilma hit Bohol and it devastated the facility and their initial products. The RWAN provided them with an amount that they can use to build the production centre again. After which, the Australian National University (ANU) gave them funding that had aided them in procuring some needed materials for organic fertilizer production and packaging. They also purchased empty sacks, shovels, plastic bottles of different sizes, and other supplies that would aid them in improving their production and packaging.



Member of MOFA process the fertilizer . Photo credits to Bohol PPDO

The enhanced production of *bokashi* and *foliar* fertilizer was the significant achievement of the project. The MOFA members could avail it now at a lower cost. They were able to pack *foliar* fertilizers in one-litre plastic bottles.

Lessons Learned

One hindrance that was observed was the attitude of some farmers in adopting the use of organic fertilizers; it takes longer for much-needed behavioural changes to take into effect. The struggles that they have to overcome, such as having a minimal local budget for CrFS and the project's conflicts with the current drive of the Department of Agriculture for the purchase and application of commercial fertilizers.

In spite of these hindrances, the project has continued to improve strategies to sustain the group's endeavour. The graduates of the CrFS in upland barangays must be organised and the continuous sharing of experiences between and among their co-farmers, and partners in NGO's, NGA's, LGU's, academic and community institutions must be encouraged. The conduct of CrFS to all rice-producing barangays should be encouraged.

With strong community involvement and LGU support, the project has slowly changed the mind-set of farmers on environment-friendly farming practices. The conduct of

preservation, conservation and protection of the soils and the environment is not an easy task. It should be everybody's business. The application of organic fertilizer has resulted to higher production and increased the soils' fertility. The project has also changed the farmers' mind-set on the usefulness of environment-friendly farming practices. The value of networking and developing linkages with development partners was highlighted during the project implementation. The importance of strengthening community involvement, provision of counter-part funding however meagre the available resources, and gathering of LGU officials support are salient here.



Products of MOFA. Photo Credits to Bohol PPDO

LANAO DEL NORTE

The Province of Lanao Del Norte is vulnerable to earthquakes, floods, landslides, typhoons, and storm surges as stated by the PDRRMO. The province and the Mindanao State University – Iligan Institute of Technology altogether have implemented five projects. Many projects are supportive of the goal of increasing the community's resiliency to disaster events as embodied in the provincial DRR and CCA-enhanced *Provincial Development and Physical Framework Plan (PDPFP)*. They have concentrated on livelihood provision and empowerment of women. The projects are a demonstration of how the proactive engagements of affected communities in hazard risk reduction and livelihood improvement initiatives and the practice of undertaking program planning and project implementation in collaboration with the academe can significantly influence the level of project success.

Bamboo Nursery and Production and Rural Enterprises for Women in Barangay Poblacion of Sapad, Lanao del Norte

Project Context and Results

Two (2) projects were identified in Poblacion, Sapad. These are Bamboo Nursery and Production and Rural Enterprise for Women. The Bamboo Nursery and Production aims to construct a bamboo demonstration farm and nursery to



develop appropriate technologies on bamboo cutting propagation. The ready planting materials are distributed to flood prone communities for planting.

Apart from protection of riverbanks from soil erosion, harvesting of mature bamboos will be an income-generating activity among the Poblacion residents. It will also support the

bamboo tile industry that is being developed in Sapad. This project is managed by the Barangay LGU officials.

The Rural Enterprise for Women, on the other hand, is basically a workshop place in the barangay centre that is focused on producing garments, curtains and other household accessories; it is managed by a women's group. The project intends to augment the existing sewing machine and other sewing equipment that were given to the barangay by the DWSD through the PAMANA program.

The partnership between the Barangay LGU, Municipal LGU and Provincial LGU has facilitated the complementation of resources among them, such as in the provision of technical assistance, holding of training, and installation of systems both in financial management and documentation of project implementation.

The project has enabled the women to enhance their skills as they sew school and athletic uniforms, curtains and furniture covers, and improve their interaction skills while working with other members of the community and managing their own enterprise. This project has generated livelihood opportunity that can augment the family income.

The residents of Sapad and the municipal employees do patronize the services of this rural enterprise. Their school, office and sports uniforms are



Tailoring Shop of the Rural Enterprises for Women at Barangay Poblacion. Photo Credits to Doracie Zoleta-Nantes



Bamboo Production Center at Barangay Poblacion.
Photo Credits to Lanao Del Norte PDRRMC

sewn at the Women's Dress Shop. It has readily provided employment and additional income to members of the Women's Group.

The establishment of a Bamboo Nursery is a first attempt in Lanao del Norte on bamboo propagation. The idea was shared by locals in the community. The day to day observation and hands on experience in the management of the Nursery have provided them with learning insights to further improve the technology. They were able to plant an initial stock of 45 bamboos. Bamboos in the nursery will be distributed free of charge among residents who will plant within the barangay premises. For customers outside the area, the bamboo cutting cost is pegged at P 30.00 each.

The slow marketing and promotion of their products, the immediate need for substantial volume of raw materials, and the difficulties in the procurement of additional equipment are among the challenges that are being faced by members of the organisation. They need to immediately and effectively address them so they can compete effectively with other established garment producers that operate in nearby localities.

For the bamboo nursery project, there is a need to improve the research aspect of the project and facilitate a process documentation of the bamboo technology development.

Bamboo Nursery and Production in Barangay Lapinig, Kapatagan

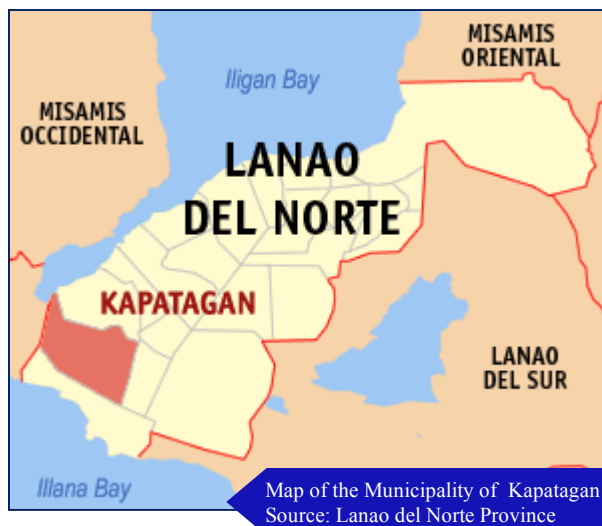
Project Context and Results

Bamboo Nursery and Production

Project is an effort to establish a demonstration farm with nursery to develop the bamboo industry in Kapatagan.

At the same time, it serves as a valuable ecological resource for soil and water

conservation and restoration of degraded lands. Bamboo can play a significant role in linking climate change mitigation with sustainable economic development in communities.





Project Site of Barangay Lapinig. Photo Credits to Doracie Zoleta-Nantes

This project was among the first attempts in Lanao del Norte to establish a Bamboo Nursery. Indigenous knowledge on bamboo propagation was used. The 120 sq. meter-Nursery has accommodated 1,000 bamboo cuttings that are ready for planting. The project provides free planting materials to stakeholders who will raise the cuttings within the barangay. For buyers who are not from the barangay, each planting material costs P 30.00 which is far cheaper than those coming from Bukidnon. This enterprise aims to cover maintenance and other related expenses.

The active participation of people in the community, the support from Barangay, Municipal and Provincial Local Government Units and the partnership with the MSU-IIT have sustained the implementation of the project.

Livelihood Augmentation for Women in Barangay Maranding, Lala

Project Context and Results

The Livelihood Augmentation for Women has provided the collaborators in Lala municipality with two livelihood opportunities- food processing and dressmaking. Food processing and dressmaking were designed for urban women married to pedi-cab drivers, vendors, labourers and those who are engaged in low-paying jobs. The Barangay Centre houses the food processing and rug-making shop where equipment and other supplies are kept for everyone's use.

Food processing involves the production of *longanisa*, *tocino*, salted and coated peanuts and peanut butter. The products are made twice a week and sold in the neighbourhood's vicinities. This initiative has attracted mothers with school children for it provides income and food products to augment the school meal costs of their children. Proceeds of the project are being divided equally to participating members.



Training on Meat Processing. Photo Credits to Lanao Del Norte PDRMC

Rugs are made at the member's house during her vacant time. Finished products are displayed at the barangay display centre. Inter-agency collaboration plays a significant role in the development of this project. Training on food processing and rug making is provided by the Department of Trade and Industry and the Provincial Government of Lanao del Norte.



Provision of sewing machine to Barangay Maranding.
Photo Credits to Lanao Del Norte PDRMC

Deboning and Processing of Milkfish Sardines in Barangay Pacita, Lala



Dr. Zoleta-Nantes examines the bottled sardines that are prepared and packaged by the members of BUKAPA. Photo Credits to Lanao Del Norte PDRMC

Project Context and Results

Bottling of *Bangus* in corn oil and boneless bangus processing are the livelihood initiatives that are members of the *BuKaPa* (*Bulawanong Kababayen-ansa Pacita*) get involved with. They were assisted by the Provincial Government of Lanao del Norte and the Department of Trade and Industry through the provision of skills training, establishment of good manufacturing practices, and industry-assisted ways of packaging and labelling products. The Department of Labour and Employment as well as the Bureau of Fisheries and Aquatic Resources have provided them with processing equipment such as a pressure cooker and a fish dryer.

Raw materials are readily available in the locality. Hence, the production is done year round with the bulk of production taking place at fish harvest time.

Boneless bangus sardine selling is patronized by households within the locality. Through the support and assistance of the Provincial Government and DTI, the bottled sardine products are displayed during trade fairs and agriculture exhibits in Cagayan de Oro.

The project operation is directly supervised by the PDRRMO and she specifically checks on the management practices and assists in the book-keeping and other financial aspects to ensure its sustainability. Earnings that are derived from fish processing are deposited to the group's bank savings and they become part of the capital build up.

This is a good project management strategy and may be used for replication purposes in other areas. As a community managed enterprise, there is a need to strengthen the capacity of members on management through the provision of organisational and financial management training as a set of follow through activities.

One challenge that is faced by the project is the limited market outlet for their finished products. The association tried to join trade fairs and exhibits for product exposure. However during market encounters, the limited volume of production prevents the association to negotiate with buyers.



Participants of Inter-provincial Writeshop visit the processing center of BUKAPA. Photo Credits to Lanao Del Norte PDRRMC

Installation of Early Warning System in Iligan City

As reported by a faculty member of the MSU-IIT, Iligan is a chartered city of Lanao del Norte. It is one of the 10 largest cities with a land area of 813.37 square kilometres. The city is also known as the Industrial Centre of the South for it houses many industrial sites.



Map of the Iligan City. Source: Lanao del Norte Province LGU

Project Context and Results

Barangay Santiago in Iligan City is located at the mouth of the Mandulog River. It is one of the communities that was greatly devastated by the flash floods that was brought about by Typhoon Sendong. The provision of early warning signs is one concrete need of affected community members. With this project, multiple flood markers and evacuation maps were constructed in strategic areas of the community.



Hazard Map and Evacuation Plan installed in Brgy. Santiago as one of the output of the project. Photo Credits to MSU-IIT

Lessons Learned

To be effective in the implementation of DRR and CCA programs, partners at the local level need to be supported with adequate financial, human, material, technical and financial resources. The engagement of LGUs and partners must be clearly determined and their roles and functions in project management must be clearly defined. Implementation mechanisms at the local level (BLGU or POs) should be made in place. Institutional coherence is the most crucial element to ensure the sustainability of programs.



Dr. Zoleta-Nantes and Mr. Nunez monitor the flood markers in Iligan. Photo Credits to MSU-IIT

PROVINCE OF MISAMIS ORIENTAL

According to project collaborators, Misamis Oriental used to be a typhoon-free province. Due to changing climate patterns that are associated with global atmospheric warming, the province has been visited lately by strong typhoons and it is also prone to other hazards, such as earthquakes, ground shaking, storm surges, and rain-induced landslides.

The Province of Misamis Oriental, together with the Capitol University and Mindanao University of Science and Technology, focused on the installation of early warning communication systems as key to disaster preparedness.

Cagayan de Oro City

Cagayan de Oro City saw the imperative function of good communication in preparing for disaster events. The three project sites of the city opted for the purchase of communication accessories, particularly radios for Barangay Bonbon and Barangay Macasandig, and a siren for



Barangay Iponan. The radios that were purchased by the two barangays were added to their existing two-way radio system. Those who are in-charge of emergency and rescue teams, as well as the individual *tanod* or guards who keep watch of the community and who are deployed to check on the vulnerable areas during times of impending calamities, including disaster team leaders, were provided with communication radios. Previously, only the barangay captain, the council members, and the barangay police have access to the radio communication system.

Four radios were purchased by Barangay Macasandig officials using the ANU-provided project funds. Three radios and one unit of mega-phone were acquired by the officials of Barangay Bonbon and they were able to identify the pick-up points and evacuation sites and make sure that this information is disseminated to the barangay households. Iponan purchased a siren. The MUST Engineering Department assisted in the installation of the siren system.



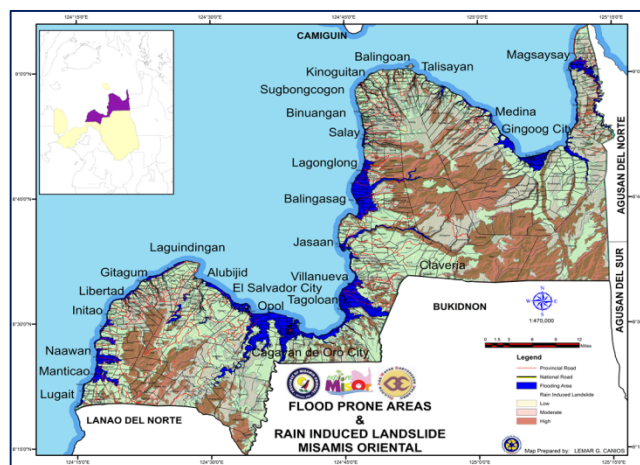
Barangay BonBon Radio Communication Headset.
Photo Credits to Cagayan De Oro LGU



Barangay Iponan Early Warning Device – Bull Horn.
Photo Credits to Cagayan De Oro LGU

Province of Misamis Oriental

The ANU funds were used to purchase seven two-way radios for each of the five participating *barangays*. As for the province, there was delay in the project implementation primarily because the provincial DRRMO wanted to build a systematic plan on how to operate an



Map of Misamis Oriental. Source: Misamis Oriental Province LGU

effective communication and information dissemination plan throughout its vast domain of operations. Moreover, the province would like to have a centralised communication, with the Provincial Capitol as the command centre which effectively deploys instructions and gets information to and from the *barangays*. It is also for this reason why it recommended the purchase of 80 two-way radios for distribution to the *barangays* all throughout the province.

Currently, awareness of people on disaster preparedness has significantly improved because of the initiatives of the LGU officials. The two-way radios that were purchased by the Project have heightened the awareness for disaster preparedness among the *barangay* officials and *barangay tanod* or guards who are utilized to monitor vulnerable areas. Drills have been conducted in several communities. However, the concerted effort of having a good early warning system, effective communications network, and an efficient evacuation protocol constitutes the one program of action that is exhibited by the Province of Albay and is yet to be worked out by Misamis Oriental and Cagayan de Oro.

Overall, the projects in the province and the city emphasize the importance of effective communications as key to disaster preparedness. Both LGUs wanted to install a good network of communication systems throughout their domains before implementing other related initiatives. For instance, with assistance from Korea, the city has installed a rain

gauge and a siren for early warning provision. The project wanted to equip *barangays* in vulnerable areas with the means to effectively communicate signs and signals to relate an impending disaster as well as to report observations to the command centre or base (be it the CDRRMO or PDRRMO) so they can provide help to affected communities.

As stated by the collaborators, the province is willing to purchase 80 two-way radios to effectively monitor communities in times of calamity. Providing two-way radios to the communities is a means to empower them, as well as to communicate with the LGU at the base whatever their situation is. It is not the radios alone that are provided by the heads of the LGU but security to its people, as well. In this way, community participation is created. The work of disaster preparedness easily trickles down to the grassroots. The situation is very different five years ago when disaster preparedness is only an appendix to the LGUs development plan.

Providing effective communication indicates that the LGUs are serious in integrating community participation and awareness with disaster preparedness. The case study of Albay is an inspiration for the LGUs. In the training modules that were developed based on the experiences of Albay, the protocol of communication and evacuation is given credence.

Based on the observations of the TWG in the province, the volatile nature of the political structure of the LGUs in the Philippines has affected the project implementation in the province. The city's point person had resigned and moved to another place when the project was starting. Similarly, the provincial disaster head had resigned when the project was ending. Plans on how to proceed with the project implementation get stunted at times because of this situation. The TWG chair, for one, is the provincial planning and development coordinator and who had to dissociate himself from the project to give way to the new provincial disaster office head. Presently, the provincial government has pronounced its intention to improve its communication network for disaster preparedness. There is hope that

this program will be pursued whoever serves as TWG chair. Following the dismal practice on handling of funds by the person-in-charge of disaster management in the city of Cagayan de Oro, there is no concrete idea at the moment on how the city can further participate in the project.

According to their report, the commitment of the organisation head particularly that of the university president and provincial governor should be seriously considered in the future. Together with their commitment to participate in the project, a full knowledge of their specific responsibilities to the project needs to be assured. In this manner, facilitation of coordination will not become a problem and delays in project implementation and submission of reports can be avoided.



Gov. Emano turns over the project funds to barangay



Purchased VHF Radio Communication



The Province of Misamis Oriental installed a new communication link repeater as their counterpart in the project. The bottom-left picture shows the Shangrila Station of PDRRMO, which accepts reports from barangays. (ALL Photo Credits to Misamis Oriental PDRRMO)

PROVINCE OF QUEZON

The Province of Quezon annually experiences heavy typhoons. In collaboration with the Southern Luzon State University, Quezon Province launched nine pilot projects and many of which concentrated on reforestation activities.

Tiger Grass Farming and Soft Broom Making Project in Buenavista

According to a government official, Buenavista is an upland municipality and has rugged terrain making it vulnerable to flooding and landslides during the advent of natural calamities. Adaptation initiatives that could reduce the rate of soil erosion, control floods and provide livelihood opportunities would be suitable for instituting DRR initiatives among the people in the municipality.

**Project Context**

Tiger grass is the raw material used for soft-broom making. Growing tiger grass is a viable livelihood venture because of its potentials to generate additional income as people harvest its panicles and weave them together. It also helps control soil erosion and manage water conservation. It grows in open areas of logged-over areas, mountain slopes and ravines while the other varieties grow in swamps along muddy streams and in places where there is stagnant or running water. The growing community of tiger grass promotes agroforestry and thrives well in the hilly topography of Buenavista.

Tiger grass farming and soft broom-making projects can augment the livelihood improvement situation of upland farmers in the municipality of Buenavista due to an increasing demand for tiger grass-made brooms. Tiger grass planting offers a potential to

promote agroforestry and reduce soil erosion while increasing livelihood opportunities and providing additional income to project beneficiaries.



Before and after photo of the Tiger Grass Farm in Brgy. Manlana.
LEFT Photo Credits to Anne Claudine Dayo; RIGHT Photo Credits to Buenavista LGU

Results

Training sessions on how to manage Tiger Grass farming were given to project beneficiaries in Barangay Manlana before the planting activity; they are encouraged to share this set of information among their co-beneficiaries. As stipulated on the Memorandum of Understanding between the Provincial Government, the ANU, CCA/CIRCA and the SLSU, the University will provide resource speakers for the training events - trainers who can demonstrate the proper planting procedures in order to get a higher rate of rootstock survival. After a year, the necessary additional training sessions for undertaking soft-broom making will be provided to other beneficiaries.

Two pilot areas were established. One pilot area is located at Barangay Manlana and is being managed by 45 4P's grantees. The strategically located tiger grass farm on a hilly area was planted with 1,125 rootstocks. At least 85% of the tiger grass rootstocks survived in the area

The other site is in Barangay Ibabang Wasay and is being managed by 29 fisher folks. There are 725 rootstocks that are planted in this site. Two months after planting the rootstocks, most of them did not survive.

Lessons Learned

The attitude of the beneficiaries is one key factor in assuring the success of the project. Due to the expected economic impacts of tiger grass farming in the future the beneficiaries have expressed their interest to be involved in the project.

Another key factor is monitoring. Two offices are involved in this project - the Office of the MDRRM and the Office of the Municipal Agriculturist. Both offices do not have enough staff for monitoring and they do not undertake regular site visitation. The beneficiaries in Barangay Manlana are very cooperative and do weeding in the site. It is important to designate a person for monitoring and evaluation to assure the sustainability of the project.

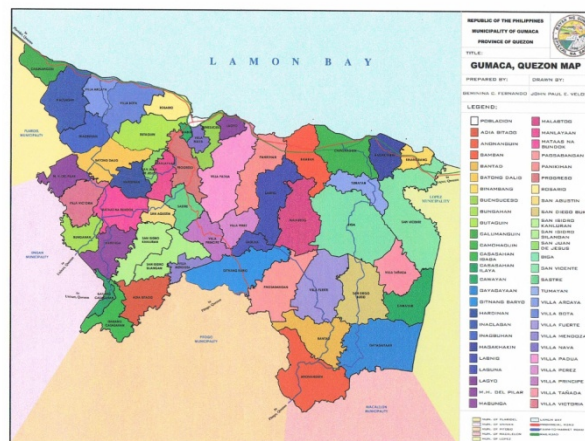
Cost-sharing

Table 13: Budgetary counterparts of Tiger Grass and Soft-Broom Making Project

ITEMS	LGU	ANU
Trainings		
Food	12,000.00	
Documentation expense	1,000.00	
Demo materials	2,000.00	
Distribution of rootstocks		
Tiger grass rootstocks		Php 33,000.00
Fertilizer		7,000.00
	Php 15,000.00	Php 40,000.00
TOTAL	Php 55,000.00	

***Punong Itatanim Ko, Pangangalagaan Ko* in Barangay Hagakhakin, Gumaca**

An official of its LGU has reported that Gumaca is a first class municipality. It is located along the east coast of Quezon Province. The municipality lies on the bank of the Pipisik River and the coast of the Lamón Bay which are both navigable using bancas and motor boats. It is located 196 kilometres southeast of Lucena City and is strategically situated at the crossroads of the Maharlika Highway, which goes to Bicol, and the road that goes to the Bondoc Peninsula. The municipality has a total population of 69,680 (National Statistics Office, n.d.) which is distributed in 59 barangays.



Map of the Municipality of Gumaca.
Source: Quezon Province LGU

Project Context

On June 21, 2014, with Mayor Erwin P. Caralian as Chairman and in coordination with Gumaca's MENRO and MDRRMC, Arbor Day was observed with a kick-off activity to observe the National Disaster Consciousness Month (NCDM). The Barangay Government of Hagakhakin led by Barangay Chairman Adelfa C. Paulite spearheaded the conduct of a Fun Run with the following theme "*Punong Itatakbo Ko, Punong Itatanim Ko*". The activity is in support of the government's National Greening Program and has aimed at increasing awareness among the barangay folks on the importance of planting trees to address some concerns on climate change adaptation and disaster risk reduction.

Punong Itatanim Ko, Pangangalagaan Ko aims to promote and enhance the production of fruits that are endemic at the locality and to increase soil and forest cover. This would minimize the effects of flooding and other natural phenomena, such as soil erosion. At the end of the project, it is expected that the effects of flooding in the area will be minimized.

Also, there will be an increase in forest cover and the promotion and development of high value crop in the municipality will be highlighted. Waterfalls and centuries-old trees with trunks that can be embraced by 10 to 12 persons are also found in its forested area-this will promote the barangay as a tourist destination.

Results



Site 1 is the site where a tree planting was held during the Project Launch.
Photo Credits to Anne Claudine Dayo



Site 2 which is a reforestation site of the project was monitored by Dr. Zoleta-Nantes and partners in SLSU and QPDRMO.
Photo Credits to Anne Claudine Dayo

The project basically provides production support services and 500 mango tree planting materials to identified farmers of Brgy. Hagakhakin, Gumaca, Quezon. The project proponents were directly responsible for its management. The project management team consists of the MDRRMO, the Municipal Agriculturist, the Municipal Tourism Officer, the Barangay Captain, the Farmer Leader, the Sangguniang Barangay Chair for Environment, and the Agriculture or Tourism Officer. They were organised to spearhead the project implementation with the help of farmer collaborators. As core members of the management team, they facilitated the monitoring and periodic assessment of the project.

Under the leadership of the Barangay Captain, 10 individuals served as *Kawal ng Kalikasan*. The group takes the lead in enhancing the level of awareness among the residents on the importance of environmental management. When Brgy. Hagakhakin was hardly hit by Typhoon Glenda, the barangay folks were already made aware of the importance of tree planting activities.

Gumaca is a recipient of the Department of Agriculture's two-year mango research project. It developed the barangay as its pilot area for mango production. Brgy. Hagakhakin is en route to tourist landmarks, such as the waterfalls and the centuries-old trees. Most noteworthy is the active involvement of the project team members, the involvement of the Local Chief Executive himself and the Sangguniang Bayan.

The primary obstacle in the project implementation is the weather condition. Several trees withered and died when Typhoon Ruby came and inflicted damages to crops. Still fresh from Typhoon Glenda, the barangay folks were disheartened and discouraged that their efforts go to waste each time a calamity passes by.

The mango seedlings were distributed to five (5) farmers and were planted in their respective farm lots. They are:

1. Silvestre Milla, 150 mango seedlings
2. Antonio Libao, 150 mango seedlings
3. Jose Tierra, 100 mango seedlings
4. Delfin Canzana, 50 mango seedlings
5. Dennis Argoso, 50 mango seedlings

However, the heavy rains that were brought about by Typhoon Ruby on December 2014 flooded the demo-area. As a result of the floods, 50% of the trees did not survive. To recover, the Municipal Agriculture Office distributed coffee seedlings; Pili trees will soon be procured and distributed to the collaborators for planting in the area.

Lessons Learned

The important lessons that were learned from the practice of eliciting active involvement of the project implementers are as follows: a) giving full responsibilities to the beneficiaries can yield positive results, such as they become more involved and passionate

about what they do; b) start small and dream big; and, c) take small steps before aspiring for bigger undertakings.

Some challenges that were encountered during the initial phase of project implementation are as follows: a) getting the full cooperation and support of the farmers themselves; b) assuring the farmers that they will not suffer loss from the project and instead, will benefit from it in the near future; and, c) to make the farmers realize that the project can suffer from heavy rain occurrences and this is beyond anyone's control.

Cost-sharing

Table 14: Budgetary counterparts of *Punong Itatanim Ko, Pangangalagaan Ko* Project

ITEMS	LGU	ANU
Mango seedlings		Php 40,000.00
Fertilizers	Php 2,500.00	
Labor	2,500.00	
Total	Php 5,000.00	Php 40,000.00

Climate Resiliency Project on Rice Production through Certified Seeds Dispersal in 22 Rural Barangays in Lucban

As indicated by its Municipal Agriculturist, about 80% of Lucban's 50,000 population (National Statistics Office, n.d.) is dependent on agriculture for their livelihood. Of its total land area of 15,415 hectares, 6,963.14 hectares are devoted to coconut, rice, vegetables, fruits and root crops cultivation. Irrigated rice and rain-fed rice lands cover an area of 1,300 hectares and they are tilled by 1,400 rice farmers. Its favourable agro-climatic condition results in the production of 5,200 metric tons of palay in one cropping season.



Project Context

At present, farmers face major challenges that are related to climate change. From January 2014 to June 2014, drought spells had caused some problems on rice production. The yearly rainfall data that was collected by the Office of the Municipal Engineer indicated that the amount of rainfall from January 2014 to June 2014 is only one third of the rainfall amount that was recorded from the period January 2013 to June 2013. A majority of the rain-fed rice fields was not planted with rice and it had worsened agricultural production in the locality.

The current state of rice production in Lucban can be enhanced, intensified and made more climate-resilient. Farmers can increase their income through the utilization of Certified Seeds. The Climate Resiliency Project on Rice Production through Certified Seeds Dispersal in 22 Rural Barangays in Lucban, Quezon has aimed to enhance rice production in the locality through the continuous provision of Certified Seeds of “Palay”.



Site A. Photo Credits to Anne Claudine Dayo



Site B which is infested by golden snails. Photo Credits to Anne Claudine Dayo

Results

The project is facilitated by the Office of the Municipal Agriculturist (OMA) with the help of the Committee on Agriculture and the Farmers' Association of Barangay Aliliw. The MDRRMC and OMA monitor, evaluate, provide technical assistance, and conduct re-planning every cropping season. It was piloted in Brgy. Aliliw where 33 farmers were each given one sack of certified seeds. The Association was chosen for easier monitoring and future roll-out trainings. The beneficiaries have to return an amount that is equivalent to 1.5 sacks of rice after the harvest season.

This project was an innovation of an approach in the past where the LGU had provided funds for seed procurement. As a result of this project, there had been an increase in seed fund recipients of certified seeds dispersal. This project hopes to increase the quality of seeds that are being planted in the municipality. Often farmers often settle to plant seeds which are not certified due to their financial difficulties.

The certified seed dispersal provided financial aid during the planting season and contributed to an increase in the area of fields that were planted with rice. The occurrence of cold weather and golden snail infestation posed as major problems during the project implementation. Rice fields were flooded by heavy rains and some seedlings were not able to survive. A good number of rice seedlings were eaten by the golden snails during the vegetative stage.

After harvest, the farmer-beneficiaries have to return the equivalent monetary value of 1.5 sacks of palay to the Office of the Treasurer as repayment for the seeds that were distributed to them during the planting season. The amount will be deposited in a Trust Fund account and it will be used to procure another batch of Certified Seeds for distribution to the next group of beneficiaries in a barangay which will be determined through a lottery system to prevent any selection bias.

Lessons Learned

Selecting project beneficiaries from a farmers' association is a good strategy to assure project sustainability. It is easier to monitor the project and solicit the equivalent amount upon harvest if the beneficiaries belong to an organisation.

There must be an initiative to stop the infestation of golden snail. This will be helpful not only among the project beneficiaries but to other farmers as well. In addition, a study on what varieties of seeds that are appropriate for the cold temperature of Lucban should be undertaken.

Cost-sharing

Table 15: Budgetary counterparts of Climate Resiliency Project

Components	Duration	Cost (PhP)	Cost Sharing		
			ANU	Proponent (LGU)	Others (Farmer-Beneficiaries)
Documentation	1 month				
Procurement, delivery and distribution of Certified seeds (Palay)	1 month	Php1,220.00 x 33 bags (CS) = Php40,260.00	Php40,000.00	Hauling cost =Php10,000.00 (<i>Estimate only</i>) Additional cost of seeds = 260.00	Labor cost and fertilizer expenses will be shouldered by the farmers @ Php19,680/ha x 33 hectares =Php 649,440.00
Enhancement of rice production	5 months				
Monitoring and Evaluation	continuous				
Re-planning	1 week				
Sub-Total		Php 40,260.00	Php 40,000.00	Php10,260.00	Php649,440.00
Grand-Total					Php699,700.00

Distribution of Pili Nut Seedlings in Mauban

Project Context

Next to the coconut tree, Pili tree is also named as the “tree of life” because of the valuable uses of its parts. Aside from the health and economic benefits from the fruit, the leaves provide shade and acts as wind-breaker. This makes the tree appropriate for agro-forestry. It thrives satisfactorily in harsh tropical climates, and is typhoon-resistant which makes it suitable for the municipality of Mauban as identified by its MDRRMO. Propagation of *pili* in the municipality will forward disaster reduction, food security and increasing livelihood opportunities.



Map of the Municipality of Mauban
Source: Quezon Province LGU

The beneficiaries are Mauban, Quezon farmers who are willing to engage in agro-forestry. The MENRO and the representative from the ABC have participated in the selection of the area and beneficiaries. The MENRO has provided technical assistance on planting, growing and propagation of *pili* trees; the MDRRMO has conducted quarter monitoring to assure the sustainability of the project.



Two of the beneficiaries work in their respective farms. Photo Credits to Mauban LGU

The expected outputs are propagation of *pili* nut trees in strategic parts of Mauban and boost agro-forestry by at least 2%. If the goals are attained, the beneficiaries will have an extra source of income especially when the trees have started to bear fruits.

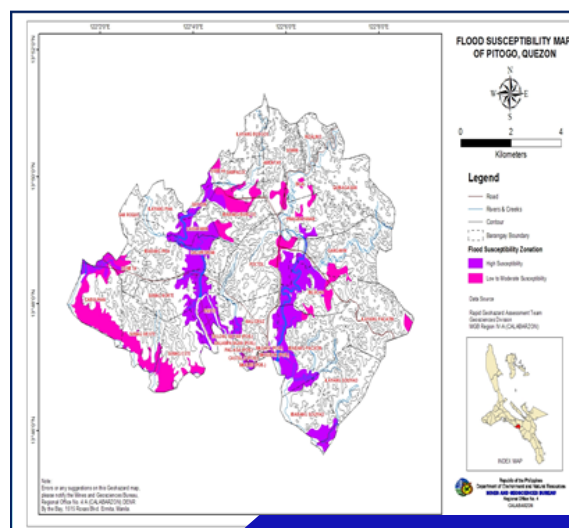
Results and Lessons Learned

The primary obstacle that was experienced by the collaborators during the project implementation is the difficulty in buying *pili* nut seedlings; the nearest supplier which can provide them in bulk is in Bicol Province. The MENRO staff has strategized to buy from farmers in Mauban, Quezon and collected 250 asexually propagated and 870 sexually propagated seedlings.

Each of the 56 beneficiaries was given 20 *pili* nut seedlings. The beneficiaries are from seven barangays; 8 from Tapucan, 7 from Santol, 5 from Alitap, 12 from San Lorenzo, 10 from Rosario, 4 from Lual BO, and 10 from Sta. Lucia. Three seedlings did not survive; only 85% of the *pili* nut seedlings survived.

Planting of Fruit-Bearing Trees in Selected Barangays of Pitogo

Pitogo is divided into built-up and agricultural lands, swamps, marshes, fishponds and water bodies. The municipality is primarily agricultural with 7,667.13 hectares of crop lands which constitute 78.19% of the total land area. The MDRRMO states that Pitogo is extremely vulnerable to a wide range of natural disasters, including



Map of the Municipality of Pitogo
Source: Quezon Province LGU

floods and storm surge occurrences due to its geographical location. Typhoon Glenda devastated its agriculture and fishery resources as well as the houses, infrastructures and lifeline services of the municipality.

Project Context

To alleviate the effects of typhoons on agricultural crops, planting of fruit bearing trees could increase people's income and food production in the recipient barangays.

The Municipal Risk Reduction and Management Council in collaboration with the Barangay Captains, *Sangguniang Barangay* and Farmers Association members and with funding support from the Australian National University had facilitated the dissemination and planting of high value crops, predominantly fruit bearing trees to selected barangays of Pitogo.

The project aims to increase fruit production, reduce soil erosion and decrease incidence of floods through greening activity. The MDRRMO is the project head in collaboration with the following: MENRO, MAO, Barangay Captains of Selected Barangays, members of Farmers Association, and Sangguniang Barangay Chairs on Environmental/Agriculture. Beneficiaries are farmers who are willing to cultivate fruit trees

in their farm lots and along the roadside of farm to market roads in selected barangays of Pitogo.

Results and Lessons Learned

Community awareness increased and resulted to better project implementation. Planting of fruit bearing trees helped stimulate the cooling effect of the environment and increased production of agricultural crops which also increased tourism activities. The project is an endowment of production support services which are mainly fruit bearing tree seedlings to identified farmers. Planting materials comprised of 60 grafted chico, 75 sweet tamarind and 1,850 guyabano seedlings. The seedlings were distributed to 39 barangays. Typhoon Ruby had brought heavy rains and floods and some of the fruit seedlings did not survive.

Active involvement of the community is an important key for the success of project implementation. It is also important to choose an area that is not easily affected by the changing weather and environmental conditions.

Cost-sharing

Table 16: Budgetary counterparts of Planting of Fruit Bearing Trees Project

PARTICULARS	QUANTITY	UNIT COST	LGU	ANU
Guyabano seedlings	1,000	25.00	25,000.00	25,000.00
Chico grafted	60	100.00	6,000.00	6,000.00
Sweet Tamarind	75	120.00	9,000.00	9,000.00
Organic Fertilizer	8 bags	500.00		4,000.00
Labor	1000	5.00		5,000.00
TOTAL			Php 9,000.00	Php 40,000

Provision of Coconut Seedlings to Barangays in Sampaloc

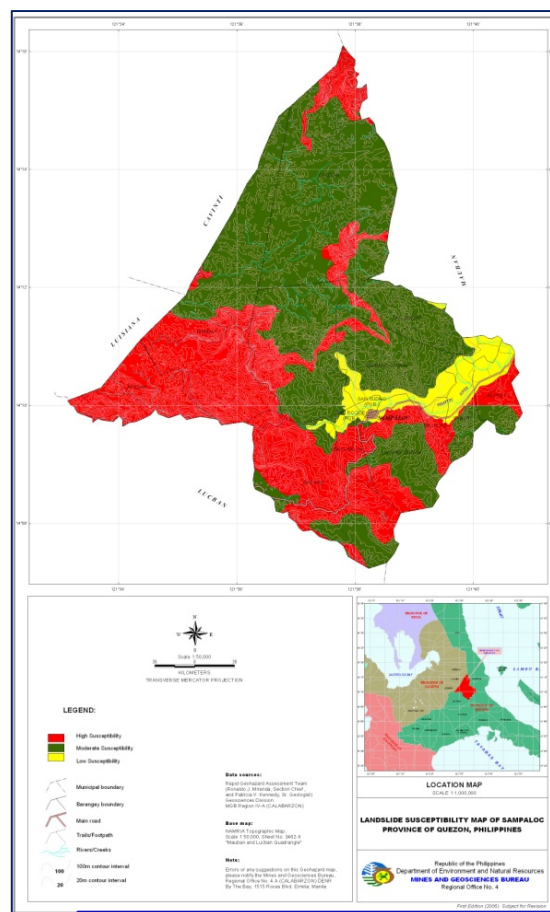
Project Context

Sampaloc is one of the municipalities in Quezon that relies on coconut farming. According to its Municipal Agriculturist, the municipality has 10,478 hectares of lands; of which 80 per cent is used for agriculture. About 5,720 hectares are coconut lands. Unfortunately, 80 per cent of the coconut area suffered from *cocolisap* (Coconut Scale Insect or CSI) infestation as to the information the MA provided.

The Local Government Unit (LGU) of Sampaloc is implementing the SAGIP Program (*Sama-samang Aksyon ng Gobyerno, Industriya at Pamayanan*). It is a national rehabilitation initiative which aims to rehabilitate CSI-

infected coconut trees through these actions: spraying of dishwashing solution and cochin oil; leaf pruning of young and moderately affected leaves; application of fertilizer; and mass production and release of bio-control agents. However, those trees that are greatly affected by CSI were being cut.

Coconut tree re-planting after the LGU rehabilitation will be a good strategy to prevent coconut shortage in the future. The project will restore coconut farms that suffered from *cocolisap*. The areas that will be subjected for re-planting will serve as demonstration farms. Each barangay will be given coconut seedlings as represented by their officer in Agricultural Sector. Provision of Coconut Seedlings to Barangays and establishment of



Map of the Municipality of Sampaloc. Map source: DENR IV-A cited in Quezon PDRMC

coconut demonstration farms in barangays aim to restore coconut trees damaged by the CSI outbreak.

A focused-group discussion was conducted during the monthly meeting of farmer leaders. The project objectives were presented and beneficiaries per barangay were selected depending on their land's location.



Demo farm at Brgy. Apasan, which uses inter-cropping of coconut, banana and guava. Photo Credits to Anne Claudine Dayo

Results

One beneficiary per barangay was given 100 seedlings. It was able to distribute 1,400 coconut seedlings. The supposed number of beneficiaries was 17 or 14 from the barangays and 3 farmer leaders. However, there was an increase in the price of coconut seedlings and this decreased the total number that was distributed. Some beneficiaries applied inter-cropping. High value crops or fruit-bearing trees were planted in the middle of coconut trees. Some opted to plant the seedling as a substitute to their coconuts that were cut down due to CSI.

Cost-sharing

Table 17: Budgetary counterparts of Provision of Coconut Seedling to Barangay Project

ITEM	NO.	AMOUNT PER SEEDLING	LGU	ANU
Coconut seedlings	1,4000	Php 27.00		37,800.00
Hauling				2,200.00
Fertilizer			7,000.00	
TOTAL			Php 7,000.00	P 40,000.00

Planting of Fruit-bearing Tree along the Barangay Road in Mamala I, Sariaya

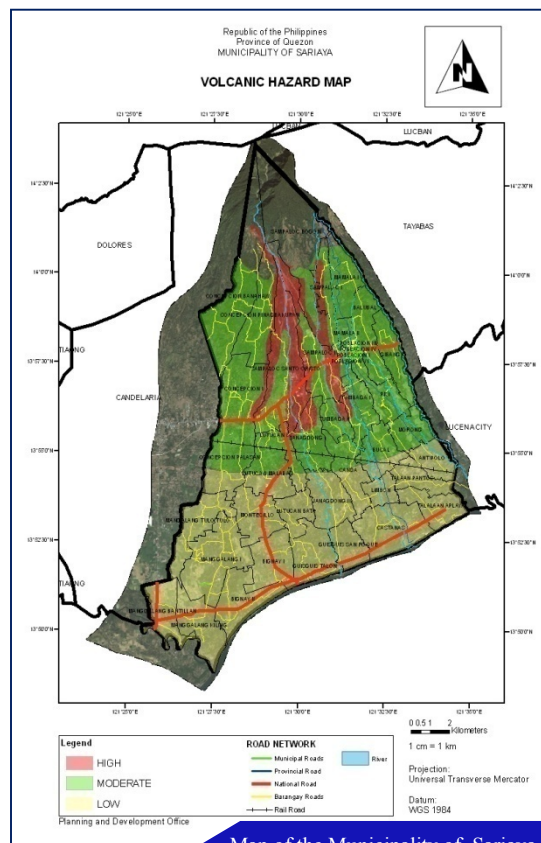
According to the report of its MA, Sariaya is a first class municipality with a total area of 24,530 hectares. About 63.73 hectares comprise the urban areas with 6 barangays; while, 22,839.55 hectares consist the rural areas with 37 barangays. With almost 75% of the total rural area that is devoted to agricultural production, the local government has envisioned the municipality as the future centre of food production in Quezon and also in the CALABARZON Region.

Project Context

With the current effects of climate change, the rising need for simple yet effective environmental enhancement programs is impeccable. Increasing the soil cover of upland areas with fruit bearing trees can minimize soil erosion particularly in sloping areas. This will help in greening the environment, as well as in the promotion of cooler temperatures in the upland and lowland areas.

In Sariaya, planting of fruit-bearing trees along farm to market roads is a good way to diversify crop production and reduce soil erosion rate and flood incidence. Crop diversification also increases fruit production.

Planting of Fruit Bearing Trees in Barangay Mamala I intends to distribute and plant 760 *guyabano* and 150 *mangosteen* along the side of farm to market roads.





Sariaya MDRRM Officer, together with his personnel, during the monitoring of planted seedlings along Mamala I Road. *Photo Credits to Sariaya MDRRMC*

Results and Lessons Learned

Community participation is a most important component in the successful implementation of the project. The project is a collaborative effort between the Australia Department of Foreign Affairs and Trade, the Australian National University, the Southern Luzon State University, Quezon PDRRMO, the LGU of Sariaya thru its MDRMMO and OMA, the Sangguniang Barangay of Sariaya, and the community members of Mamala 1. They are the most immediate institutions that could realize the safeguarding, survival, growth and development of tree seedlings. Beneficiaries should be trained on the proper planting practices to ensure fast growth and higher survival rate.

The project solicited support from the community because people prefer planting fruit-bearing trees due to more tangible benefits they could get from them. Both *guyabano*

and *mangosteen* have food and medicinal value. Also, the shift from forest trees to fruit-bearing trees planting along the road might minimize deforestation.

In addition, Mamala 1 has become the tree planting site for students and other organisations. Tree-planting has provided additional incomes for Barangay Tanods who dig holes for people who plant tree seedlings. At the onset of the project, the community prefers planting seedlings in their farms and backyards. They do not want to plant seedlings along the roads. Beneficiaries usually uprooted FBTs and transfer them to their farms or backyards.

Safeguarding of the trees planted along side of the roads per sitio was tackled in their *Sangguniang Barangay(SB)* regular session and necessary resolutions were passed and approved to institutionalise these activities. From then on, all organizations who wanted to be indulged in the FBT planting activities were course thru the SB.

The project had developed a sense of ownership among the Sangguniang Barangays and community people. They had become true stewards of the project. At present, the community conducts regular monitoring and weeding of the areas where the seedlings are planted.

The project initially targeted to plant 900 fruit-bearing trees. During project monitoring it has been realized that to create greater impacts there is a need to plant more trees since there is a strong participation of the community and there are many organizations which are willing to participate in the project. Aside from the 900, at least 1300 more FBTs were planted by students from different schools and organization alongside Mamala 1 road.

Community participation and commitment is very vital in the success of every environmental project at the barangay. Implementers should make the people realize their sense of project ownership so they can be an effective partner in its implementation. Sensitivity to the culture and opinion of community should always be observed. It is vital to

the delineation and identification of their roles. Successful projects require sustained communication and effective monitoring and evaluation of interventions.

Most residents want fruit bearing trees in their backyards. One should not hesitate to give them one even if that is not the targeted planting site. This will give an assurance that the plant will be taken care of.

Also there is a need to put basal fertilizer and tree guards per seedling planted. This is to protect the tree from stray animals and for easier facilitation of monitoring activities. Monitoring system should always be installed and observed to ensure successful project implementation.

Cost-sharing

Table 18: Budgetary counterparts of Planting of Fruit-bearing Trees Project

PARTICULARS	COST	RESPONSIBLE AGENCY/ORG
150 Mangosteen seedlings @Php140 each	Php 21,000.00	ANU/Aus DFAT
750 guyabano seedlings @ Php 25 each	Php 19,000.00	ANU/Aus DFAT
3,000 Bamboo stakes @ Php 2.00 each	Php 6,000.00	Sangguniang barangay
Labor Digging of holes 900 @ Php 5.00 each	Php 4,500.00	Community people
6 bags organic Fertilizer @ Php 500 each	Php 3,000.00	LGU Sariaya
Total	Php 53,500.00	

Backyard Farming Seminar and Tree Planting Activity in Sentrong Paaralan ng mga Agta, General Nakar

Sentrong Paaralan ng mga Agta (SPA) is an elementary school for the Tribe of Agta. It caters to tribe members of General Nakar in Quezon Province. It has multi-grading system wherein, Grades I to III are being taught in one classroom, and Grades IV to VI in another.



SLSU students brief the SPA students before the conduct of the tree planting. Photo Credits to Anne Claudine Dayo

Project Context

SPA is an adopted community of the Southern Luzon State University. The University provides different extension activities in the area to help the community develop. At present, the surroundings of the SPA consist of different trees, which are mostly used for furniture making. Unfortunately, there are families from outside the tribe which still practice the '*Kaingin System*'. Further, the culture of the community is more on tree planting; hence, there are limited fruit bearing trees within and along SPA.

Backyard farming and revival of trees will benefit SPA and its citizens environmentally and economically. Since markets are far from the place, backyard farming will be convenient for them. In addition, this will help them to have another source of income in case they get involved in mass production of trees.

Backyard Farming Seminar and Tree Planting Activity aim to promote backyard farming in *Sentrong Paaralan ng mga Agta*, and revive the forest by planting fruit-bearing trees within the area.

Dr. Violeto Coronacion, Director for SLSU Infanta, briefed the students of *Sentrong Paaralan ng mga Agta* (SPA) on the importance of backyard farming and tree planting activity. He also explained the applicable planting process to be implemented on their type of land. He grouped the students SPA into four as there will be four areas for tree planting. Each Agta student was guided by an agriculture student from SLSU Infanta. This is to assure that the seedlings are appropriately planted.

Results

The groups were able to plant 2,000 seedlings in four areas. After the tree planting activity, a seminar on backyard farming was facilitated by Dr. Coronacion and Prof. Roldan Jallorina. The participants were given hands-on training on proper potting and bedding.

After the training on backyard farming, the Agta with the help of instructors from SLSU established a vegetable nursery. Since the location of *Sentrong Paaralan ng mga Agta* has a good soil, almost 90% survived as assessed by the community-coordinator from SPA.



Dr. Coronacion lectures on the importance of fruit-bearing trees after the tree planting. Photo Credits to Anne Claudine Dayo

Cost-sharing

Table 19: Budgetary counterparts of Backyard Farming Seminar and Tree Planting Activity

Particulars	Cost	
	SLSU	ANU
Seedlings	0.00	Php 30,000.00
Food	Php 10,000.00	
Materials for the seminar	5,000.00	
Transportation	1,000.00	
Miscellaneous	2,000.00	
TOTAL	Php 18,000.00	Php 30,000.00

Bamboo Project (Community-based Commercialized Bamboo Propagation in Selected Municipalities of Quezon Province)

Project Context

Aside from its economic value, bamboo is beneficial to the environment. It releases 35% more oxygen than other trees of the same height. It provides enough air for heat temperature control, as it lowers light intensity. Bamboo also serves as windbreakers during natural calamities. In addition, the wide-spread root system of bamboo is effective in soil conservation. The roots control soil erosion and are an effective way to sustain stability of river banks (DOST-PCAARRD, 2011).

The impact of climate change in Quezon Province may be lessened through adaptation initiatives. Since the province is prime in agriculture, growing bamboos are more likely to help municipalities in preventing soil erosion and increasing agricultural endeavours and livelihood opportunities. This may also sustain the river banks.

A community-based bamboo production in selected municipalities of Quezon Province will open up economic and ecological benefits. Bamboo will promote healthy environment and will serve as wind-breakers during typhoons. These bamboos will also add in the tourism ventures once they are fully-grown. The project may also help in the future demands of bamboo materials, since the government already forward campaigns to support bamboo and its products.

The three-year Bamboo Project will put forward the integration of CCA and DRR and the livelihood opportunities for interested municipalities. The project aims to grow commercialized bamboos in selected municipalities of Quezon Province for soil conservation, river bank sustainability and future livelihood opportunities. Specifically, it intends to: 1) Train participants from interested municipalities in the province on bamboo farming, plantation and nursery management and potentials; 2) Distribute bamboo propagules

to selected municipalities in Quezon; 3) Establish commercialized bamboo nursery in the university; and 4) Train beneficiaries with bamboo plantation on livelihood opportunities.



Results and Lessons Learned

Southern Luzon State University facilitated a Training-Seminar on Bamboo Production and Plantation Development in partnership with PCAARRD-DOST. It was attended by 31 participants from 14 municipalities of Quezon. One hails from Luisiana, Laguna. The training-seminar includes hands-on demonstration where participants have made a mini-nursery in the university premise.

After the training, 460 bamboo propagules were distributed to the municipalities of Catanauan, Dolores, Infanta and Atimonan for possible plantation establishment. Also, three farmers from Lucban received 10 propagules each. On the other hand, a total of 200 seedlings were planted along Camatian River and within the university.

Instead of four, only three municipalities were able to plant bamboo propagules for plantation establishment. These are: 1) Catanauan – along Bingabing River; 2) Atimonan – Brgy. Tinandog; and 3) Infanta – along the creek of Sanitary Landfill and Assisted Natural Regeneration Planting Project Phase I. Dolores used the bamboo propagules during tree planting activities of students along Lagnas River, Brgy. Silangan, Brgy. Manggahan and Brgy. Maligaya.

As a result of the recent typhoons, bamboos clogged and dammed waterways. It was suggested to avoid planting bamboos along the river area as they cause clogging and destroy bridges. Hence, the bamboos planted along the Camatian River in Lucban were transferred to private lands.

On the other hand, the mini nursery developed during the training-seminar is continuously being monitored wherein 70% of the bamboos survived as of January 2015.

Bamboo is sure to have a good market in the future as the Philippine government is forwarding their initiative to prioritize the plant for furniture making. It is best to establish plantation of commercialized bamboo; however, it should not be planted near the river. Though it is good for soil conservation, the recent scenarios showed that bamboo causes flooding as it clogs rivers. It is best to establish bamboo plantation on steep areas instead. Also, the plantations must be monitored by the university since LGUs have limited personnel to do it.



Site in Catanaun.
*Photo Credits to
Catanaun LGU*



Site in Infanta. *Photo
Credits to Infanta LGU*



Site in Atimonan.
*Photo Credits to
Atimonan LGU*

Cost-sharing**Table 20:** Budgetary counterparts of Bamboo Project

BUDGETARY ITEMS		SLSU	ANU	TOTAL
1.	Training on bamboo farming, plantation and nursery management and potentials	Php 47,700.00	P 52,500.00	Php 100,200.00
a.	Honorarium of speaker	10,000.00		
b.	Food P 420.00x60 pax (P 210.00x2 days)	25,200.00		
c.	Documentation expense	5,000.00		
d.	Training Kit P 50.00x50 pax	2,500.00		
e.	Bamboo Seedlings -610 Kawayangtinik (30,500.00) -80 Giant Bamboo (12,000)		42,500.00	
f.	Materials for the training and establishment of pre-mini nursery		10,000.00	
g.	Miscellaneous	5,000.00		
2.	Establishment of nursery	Php 15,000.00		15,000.00
a.	Labor	5,000.00		
b.	Materials	10,000.00		
3.	Training on bamboo livelihood opportunities	Php 21,600.00		21,600.00
a.	Honorarium of speaker	10,000.00		
b.	Food P 210.00x35 pax	7,350.00		
c.	Documentation expense	3,000.00		
d.	Training Kit P 50.00x25 pax	1,250.00		
4.	Monitoring	20,000.00		20,000.00
5.	Impact evaluation	20,000.00		20,000.00
		Php 124,300.00	Php 52,500.00	Php 176,800.00

Chapter 5.CONCLUSION

The *Capacity Strengthening of Five Provincial Governments and State Universities and Colleges in Integrating Disaster Risk Reduction and Climate Change Adaptation in Community Development Initiatives in the Philippines* was able to implement four trainings of trainers seminar-workshops at the provincial level; five roll-out training-workshops by members of each technical working group in every province for more than 300 barangay officials; and, piloted 34 mini projects on climate change adaptation and disaster risk reduction in Albay, Bohol, Lanao del Norte, Misamis Oriental and Quezon provinces. The project was able to raise the level of understanding of people about disaster risk reduction and climate change adaptation. It brought varying positive impacts on different administrative levels across the five provinces.

The tripartite partnerships of provincial, municipal and barangay local government units with state universities and colleges provided an occasion for: 1) producing local and specific knowledge on disaster risk reduction and climate change adaptation; 2) generating social capital; and 3) organising small-scale initiatives on environmental restoration and livelihood improvement to help build resilient communities.

Based from the deliberations during the Inter-provincial Write-shop in Lanao Del Norte, below observations and conclusions were noted.



Gov. Dimaporo welcomes the participants of the Inter-provincial writeshop. Photo Credits to Lanao Del Norte

COLLABORATION OF LGUS AND ACADEMIC INSTITUTIONS

The Australian Public Sector Linkages Program was able to animate LGUs towards collaborating with academic institutions with the end result of pooling resources towards community-based DRRM and CCA approaches. This collaboration resulted to a strong partnership in undertaking more competent and in planning better CCA and DRR projects.

INTEGRATION OF CCA AND DRR TO SUCS EXTENSION PROGRAMS

State universities and colleges started to integrate and strengthen climate change adaptation and disaster risk reduction to their extension programs. The Mindanao State University Board of Regents approved the establishment of the Mindanao Centre for Resiliency (MCR) which now consolidates all the Institute efforts in the area of DRR and CCA. Meanwhile, the Southern Luzon State University added climate change adaptation and disaster risk reduction to the thrust and priorities of its Extension Services. In fact, the University Board of Regents approved an institutionalized extension program on the mainstreaming of CCA and DRR to barangay governance, women empowerment and livelihood through BRaCe Quezon (Building Resilient Communities in Quezon).

REDUCED VULNERABILITIES THROUGH ENVIRONMENTAL MANAGEMENT AND ECONOMIC EMPOWERMENT

There is collective recognition within the members of the Technical Working Groups of Albay, Bohol, Lanao del Norte, Misamis Oriental and Quezon that addressing some environmental problems and building economic empowerment at the local level reduce the communities' vulnerabilities to negative effects of disasters.

RE-ORGANIZATION OF DISASTER RISK REDUCTION AND MANAGEMENT COUNCILS

The collaborative efforts helped in the re-organization of Disaster Risk Reduction and Management Councils in provincial, municipal and barangay levels.

INCREASED KNOWLEDGE ON DRR AND CCA

The project contributed to beneficiaries' increased DRR and CCA knowledge which they integrated in self-planned, self-determined and community-managed projects.

CREATION OF DRR NETWORK

Among the primary gains of the project is the creation of an invaluable network of disaster risk reduction partnerships from five provincial and 35 city or municipal governments, six state universities and colleges, and numerous barangays and community organizations in the course of project implementation. The generation of this social capital is proof that raising the level of awareness and knowledge level on disaster risk reduction and climate adaptation strategies among collaborating partner-beneficiaries. It can be a strategy for the creation of meaningful partnerships among LGUs, academic institutions and local community organisations which are united in the goal of building resilient communities at the local level.



Collaborators from the five provinces poses for a photo opportunity during the Inter-provincial Trajectory Conference. *Photo Credits to Bohol PPDO*

RECOMMENDATIONS

The overall and cumulative collaborative learning has indicated the need to institutionalize the above project gains. There is a need to provide financial management and organizational strengthening skill-trainings to PSLP-partner-beneficiaries. This will scale up profitable marketing and financial management initiatives that enable economic empowerment and will increase disaster resilience at the household level.

There is also a need to produce guidebooks on DRR and CCA, environmental restoration and livelihood empowerment. Though the modules have discussed some of these areas, a layman-oriented, step-by-step approach will generate greater impact to local communities while increasing both their knowledge and capacities. The availability of guidebooks will also facilitate wider audience and more capacitated individuals.

For a timely and transparent management, it is recommended to continue direct fund disbursement to project-beneficiaries to fund their initiatives on DRR and CCA, environmental restoration and management and economic empowerment. This strategy will prevent delays in both release and reimbursement which often resulted in delay project implementation.

Foster inter-place consultation on the project implementation, as well as exchanges of knowledge and experiences among provincial and municipal governments and state universities and colleges are necessary. This is an excellent avenue for sharing and discussion of varying approaches that may be replicated in other communities.

Monitoring-and-evaluation tools at all project implementation levels must be developed for continuous assessment and measurement of impacts. It is also necessary to make a taxonomy of DRR and CCA management strategies and leadership arrangements with unique institutional and organisational systems for dissemination to other Philippine province.

It is also important to note that leaders must be convinced to talk with each other regularly sans of their political affiliations. This will harness stronger commitment among partners and will eventually paved way to the integration of CCA and DRR to government-funded programs.

These challenges are many. But, the members of the five provincial technical working groups have decided to continue this project and highlight the need to initiate, scale-up and mainstream DRR and CCA strategies through the incorporation of small and medium scale livelihood generation programs to economic development-cum-environmental restoration projects that are specific to the area's hazards geography, socio-economic characteristics and political priorities.

The continuation of this partnership is crucial for the Philippines as it seeks innovative approaches to address the issues of economic underdevelopment and vulnerability to disasters.

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