

The Role of Ecotourism in Resilience Building in Disaster  
Vulnerable Communities in the Philippines

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## ABSTRACT

The Philippine archipelago is known to be one of the world's biodiversity hotspots with diverse natural resources. Its biodiversity is mainly appreciated by local and foreign visitors through ecotourism activities. The Department of Tourism (DOT) identified and listed 81 ecotourism destinations nationwide on their website. In 2015, the DOT estimated that the number of travelers in the country was as many as 38 million. The country remains popular with travelers despite frequent natural disasters. In the 2014 World Risk Report by the UNU, the Philippines placed second after Vanuatu out of 173 countries in terms of natural disaster risk. Furthermore, in the computation of EM-DAT using a probabilistic risk assessment model, the Philippines' average annual loss accounts to 8450.25 million USD. Among the natural disasters that the country faces are earthquakes, floods, volcanic eruptions, tsunamis, and typhoons. Despite these conditions, ecotourism remains popular and is still being developed and pursued in the Philippines.

In this research, the objective is to identify and evaluate the role of the ecotourism business in building resilience in disaster-vulnerable areas. To fulfill the objective, two questions were raised: how ecotourism business is being managed, and what are the contributions of the ecotourism business to community resiliency in disaster vulnerable areas. To answer these questions, policies in disaster management, tourism (general policies) and ecotourism in the Philippines have been reviewed and analyzed, case studies have been done, including field visits, site observations, key informant interview, and focus group discussions.

There hasn't been any framework crafted to measure the contribution of ecotourism in community resiliency in disaster vulnerable areas thus, based on the literature review of existing resilience frameworks, the "Resilience Indicators for Disaster Vulnerable Communities Engaging in Ecotourism" have been developed. The framework consists of three indicators, sustainable social development, economic sustainability of ecotourism, and environmental sustainability. The sustainable social development indicator includes secured livelihood options and stakeholder participation. The economic sustainability indicator includes business plans and financial management. The environmental sustainability includes environmental quality maintenance and resource efficiency in production and consumption systems. Findings from the field studies were combined with secondary data, summarized and analyzed using the developed framework.

Ecological tourism, or ecotourism, in the Philippines hadn't been formally introduced until 1992. In the ecotourism congress in 1999, the formal definition of ecotourism was defined as a form of tourism within a natural and cultural heritage area where community participation, protection, and management of natural resources, culture, indigenous knowledge and practices, environment education, and ethics, as well as economic benefits, are fostered and pursued for the enrichment of host communities and the satisfaction of visitors.

Policies relating to ecotourism have been developed and, at the same time, disaster management policies were also crafted. The policies in ecotourism and disaster management were crafted in parallel without considering the resiliency of ecotourism. Thus, disaster management, tourism, and ecotourism polices have been furthered reviewed and analyzed. Based on the findings, the Philippines have several systems of tourism, ecotourism, and disaster management rules, regulations, and policies. In the national tourism act, there is no emphasis on ecotourism although it is briefly mentioned as a kind of nature-based tourism. There is a national ecotourism strategy, however neither disaster management nor resilience are mentioned. Yet in the ecotourism accreditation requirements, resilience has been mentioned under environmental planning and impact assessment. Disaster management policies have mentioned tourism; however, ecotourism has

not been mentioned. Disaster management policies have mentioned resilience as part of the policies referencing international disaster management strategies.

In better understanding of the contribution of ecotourism to resilience building in disaster vulnerable communities, two case studies have been done. The first case study is the ecotourism business managed by the Indigenous People (IP), the Pamulaklakin Forest Trail (PFT). The second case study is the ecotourism business managed by the government, the Mayon Volcano Natural Park (MVNP). Although managed by different entities, both are conducting ecotourism business, and both are situated in disaster-vulnerable areas. The first case study, the PFT, is near Mount Pinatubo, which last erupted in 1991. The disaster is one of the biggest eruptions in the Philippines. The second case, the MVNP, includes threat of an active volcano, Mount Mayon, one of the most active volcanos in the Philippines. MVNP is also situated in the region in the Philippines which is most frequented by typhoons.

The two case studies present two types of ecotourism management: a community-managed ecotourism business and a government-managed ecotourism business. Findings reveal that the government-managed ecotourism businesses are related to protected areas or ecotourism sites selected by the DOT. Protected areas engaging in ecotourism activities have guidelines to follow whilst other ecotourism businesses do not follow specific guidelines. Despite following the guidelines, a protected area conducting ecotourism business does not guarantee the benefits of increased resiliency of the community around the ecotourism destination.

In the case studies, several benefits derived from the ecotourism business have been identified to increase community resiliency. Among the identified benefits of the ecotourism are generation of job opportunities for community members; disseminating information to the community; conducting community-development programs; provision of basic needs; and serving as buffers against natural disasters. While protected areas conducting ecotourism activities follow certain guidelines, the benefits of the ecotourism business contributing to the increase of community resiliency was mainly identified in the community-managed ecotourism business.

It is imperative to say which system of management is better at maximizing the benefits from the ecotourism business, however some visible advantages and disadvantages of each system of management have been identified. In the community-managed ecotourism business, the absence of a business plan can result in stagnant growth of business and soon the question of sustainability might be raised. In a government-managed ecotourism business, there can be conflict of interest between the government agency and the LGU. In most cases, LGU is concerned about profit generation whilst government agencies, for instance, DENR, is focused on environmental protection and conservation. Furthermore, government-managed ecotourism businesses encounter difficulties and problems in management with the change in officials, whether from the government agencies or the LGUs. Job opportunities could also be limited in ecotourism businesses which are managed by government agencies as specialists are preferred. There are also visible advantages of each management. In a community-managed ecotourism business, the business is easily integrated to the community, especially if the staff are community members, as there is ease in communication. The community-managed ecotourism business, in cases, tend to have a faster and easier decision-making process. Nevertheless, government-managed ecotourism business has a wide network of government agencies, NGOs, as well as private organizations, that could be utilized to improve, promote, and market the ecotourism business.

The Philippines, despite having a growing tourism industry and showcasing its ecotourism destinations to the world, has yet to incorporate the disaster-preparedness or disaster-resilience component to the business. As protected areas are perceived as a drain on the economy, it is wise to incorporate DRR component, not

only to justify cost allocated to protected areas, but to maximize the benefits of the said areas. Improvement in ecotourism business planning is recommended and must be done. Improvements should include: risk factor identification, hazard assessments, ecotourism capacity assessment, identification of failure chain, contingency funds, construction of green and blue infrastructure, and role setting for stakeholders. Further recommendations include incorporation of DRRM in ecotourism policies through: creating a joint circular, putting DRRM into ecotourism and/or making ecotourism a strategy in promoting DRRM in vulnerable but ecotourism potential areas by the NDRRMC and NEDC; issuance of planning guidelines mixing DRRM and ecotourism planning; strengthening decentralization in the ecotourism and DRRM concerns; creating regulatory measures in formulating and implementing their comprehensive land use plan or zoning ordinance and enforcing the building code and other related regulations; and through market-based instruments—ecotourism ventures that promote disaster-risk reduction and resiliency should receive grants.

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## LIST OF ABBREVIATIONS

AAL	Average Annual Loss
BPP	Biodiversity Partnership Project
BRIC	Baseline Resilience Indicators for Communities
CATD	Certificate of Ancestral Domain
CBD	Convention on Biological Diversity
COMELEC	Commission on Elections
CRED	Centre for Research on the Epidemiology of Disasters
DENR	Department of Environment and Natural Resources
DILG	Department of Interior and Local Government
DOT	Department of Tourism
DRM	Disaster Risk Management
DRRM	Disaster Risk Reduction and Management
DTI	Department of Trade and Industry
EbA	Ecosystem-based Adaptation
Eco-DRR	Ecosystem-based Disaster Risk Reduction
EM-DAT	Emergency Events Database
ETAF	Environment and Tourism Administrative Fee
FAO	Food and Agriculture Organization
FPZ	Freeport Zone
GOCC	Government Owned and Controlled Corporation
GSDR	Global Sustainable Development Report
IPAF	Integrated Protected Area Fund
ISDR	International Strategy for Disaster Reduction
IUCN	International Union for Conservation of Nature
LGC	Local Government Code
LGU	Local Government Unit
MICE	Meetings, Incentives, Conventions, and Exhibitions
MVNP	Mayon Volcano Natural Park
NDCC	National Disaster Coordinating Council
NDRRMC	National Disaster Risk Reduction and Management Council
NDRRMP	National Disaster Risk Reduction and Management Plan
NEDC	National Ecotourism Development Council
NES	National Ecotourism Strategy
NIPAS	National Integrated Protected Areas System
NIST	National Institute for Standards and Technology
NOAH	National Oceanic and Atmospheric Administration
PA21	Philippine Agenda 21
PAO	Protected Area Office
PAWB	Protected Areas and Wildlife Bureau
PCB	Philippine Convention Bureau
PDP	Philippine Development Plan
PENRO	Provincial, Environment and Natural Resources Officer
PFT	Pamulaklakin Forest Trail
PFZ	Free Port Zone
PTFCC	Presidential Task Force on Climate Change
RIMA	Resilience Index Measurement and Analysis
SBMA	Subic Bay Metropolitan Authority

SNAP	Strategic National Action Plan
TDP	Tourism Development Plan
TRI	Tourism Resilience Index
UN	United Nations
UNCED	United Nations Conference of Environment and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNISDR	United Nations International Strategy for Disaster Reduction
UNU	United Nations University
UNWTO	United Nations World Tourism Organization
WCDRR	World Conference on DRR

# **The Role of Ecotourism in Resilience Building in Disaster Vulnerable Communities in the Philippines**

## **CHAPTER 1 INTRODUCTION**

### **1.1 Background of the Study**

There is an increasing number of global threats which can potentially or deliberately cause significant economic and social paralysis throughout the world. One of these global threats is climate change, the increase in the Earth's geographic and oceanic temperature due to increasing greenhouse effect. In recent years, the whole world is experiencing significant impact of climate change that includes changing weather patterns, rising sea levels, and extreme weather events.

Risk influenced by climate change includes increasing frequency and effect of natural hazards all over the world. Natural hazards in general are a type of disaster, a naturally occurring physical phenomena either geophysical, hydrological, climatological or biological. Natural hazards include earthquakes, landslide, tsunamis, volcanic activity, floods, droughts, cyclones, and storms. These mentioned natural hazards causes serious disruptions in the functioning of communities and societies including widespread of human, material, economic and/or environmental losses and impacts, exceeding the ability of the affected communities and societies to cope using their own resources (UNISDR, 2009).

In the Centre for Research on the Epidemiology of Disasters (CRED), it has been analyzed that over the past four decades the number of climate and weather-related disasters have more than doubled. The Emergency Events Database (EM-DAT) have recorded 3,017

climate related disasters in the years between 1976 and 1995 while between 1996 and 2015 the record of climate related disasters has increased to 6,392. In addition, 90% of the people affected by these climate related disasters are from low-income countries. The EM-DAT deaths per income group during 1996 to 2015 reveals 9.3% are from high-income, 22.4% are from upper middle income, 46.6% are from lower-middle income, and 21.7% are from low-income. Tallying the economic and human impacts of natural disasters from the 2005 to 2014 data of the United Nations Office for Disaster Risk Reduction (UNISDR), there have been 1.7 billion people affected, 700 000 people killed, and \$1.4 trillion damages in total. These damages and casualties are mainly attributed to flooding, storms and earthquakes. Some notable cases of natural disasters in the past decade includes hurricane Katrina, Rita, and Wilma in the United States (2005); the earthquake in Sichuan in China (2008); the earthquake and tsunami in Tohoku Japan (2011); the flood in Thailand (2011); hurricane Sandy in the United States (2012); the storm surge in the Philippines (2013); the earthquake in Nepal (2015); and hurricane Harvey, Irma, and Maria in the United States (2017) (UNISDR, 2018).

These above-mentioned natural hazards along with other natural hazards have been disrupting sustainable development and their impacts are borne by the most vulnerable sectors of the society affecting livelihoods and compounding poverty. Governments and various organizations have recognized the increasing threats from natural hazards bringing about the increase in interest from various organizations on the way to disaster risk management (DRM) initiatives and resilience building. Increased interest from various organizations has resulted in the emergence of the concept of DRM as a solution-oriented academic concept as well as a public policy orientation. DRM has been defined by UNISDR as “the systematic process of using administrative directives, organizations, and operational skill and capabilities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster” (UNISDR, 2009). DRM as per the United

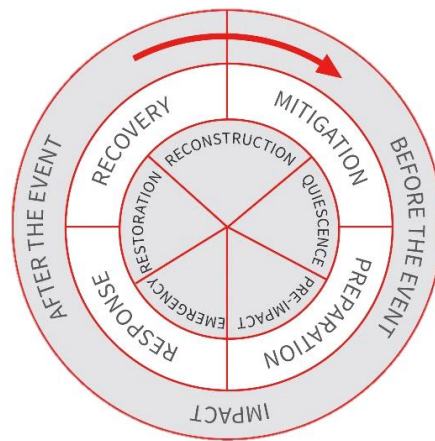
Nations Development Programme (UNDP) aims to “avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness” (UNDP, 2015).

In the first informal debate on disaster risk reduction held in the UN headquarters in Feb. 2011, the former UN Secretary General Ban Ki-moon expressed that “the more governments, UN agencies, organizations, businesses and civil society understand risk and vulnerability, the better equipped they will be to mitigate disasters when they strike and save more lives.” The more organizations know about DRM the better nations and communities can cope with natural disasters and increase their resiliency.

The conference series on disaster and climate risk management organized by the United Nations (UN) can be observed as a global response to disaster management. The latest conference, the 3<sup>rd</sup> UN World Conference on Disaster Risk Reduction (WCDRR), was held in March 2015 in Sendai City, Miyagi Prefecture in Japan. Sendai is a significant venue for the conference as it is one of the areas hit by the 2011 tsunami and earthquake. Post the 2005-2015 Hyogo Framework for Action, the 3<sup>rd</sup> WCDRR conference resulted in the 2015-2030 Sendai Framework for Disaster Risk Reduction which highlights seven global targets and four priorities of action. The Sendai Framework relates into the 2030 Agenda for Sustainable Development Goals (SDGs), the 17 goals which were adopted in September 2015 by UN member states. Among the seventeen SDGs, ten relates to DRR and resilience and among its 169 specific targets, 25 relates to DRR and resilience.

Understanding DRM entails the understanding and knowledge of the disaster management cycle. The cycle which is being used widely today was developed by David Alexander in 2002 (see figure 1). The cycle involves four different phases. The first two phases, mitigation and preparedness occur before the disaster while response and recovery, the last two phases, occur afterwards.

**Figure 1. Disaster Cycle**



[Source: D. Alexander, 2002]

The mitigation phase pertains to the pre-disaster efforts, lessening or limiting of the adverse impacts of hazards and related disasters. In the mitigation phase, vulnerability to disaster impacts (injuries, loss of life, and properties) are reduced. Mitigation efforts include activities such as changes in building codes, land management, and zoning. The second phase is preparedness, these are the knowledge and capacities developed by governments' organization on professional response and recovery including communities and individual's capacity in effectively anticipating, responding to, and recovering from the impacts of likely, forthcoming or current natural hazards. The preparedness phase includes activities such as education, outreach, training, business continuity planning, and emergency planning activities. The third phase of the disaster is response, the provision of emergency services and public assistance in time or directly right after the disaster to save lives, ensure public safety, decrease health impacts, and make sure to provide basic subsistence needs to affected people. The last phase of the disaster is the recovery phase consisting of restoration and improvement efforts, mainly of facilities, livelihoods and living conditions of affected communities. The recovery phase also includes efforts in reducing disaster risk factors.

The recovery phase can be divided into two different stages: the short-term recovery lasting for six to twelve months and the long-term recovery which can last up to decades. One



initiative for recovery is re-building communities to be more resilient to future adversaries. This activity does not solely fall into one phase but also overlaps with the mitigation phase of the disaster cycle. In the inner circle of the disaster cycle in figure 1, it can be seen that what is being done in between the recovery in mitigation phase of a disaster is called reconstruction.

One of community development initiative in reconstruction is the utilization of the natural environment or the ecosystem. Over the last decade, the use of ecosystems in DRR has been receiving increased attention globally. Healthy and well-managed ecosystems have been recognized to maximize delivery of benefits from the ecosystem services including ecosystem services for DRR (Renaud et al. 2013).

Ecosystems offer four services – provision, regulating, habitat or support, and cultural. Provision is the service which describes material and even energy output from the ecosystem (food, crops, raw materials, water, medicinal and ornamental resources). Supporting services are services/processes which enables the ecosystem to provide services. The supporting services includes, nutrient recycling, primary production and soil formation. Regulating services pertains to services/ processes such as carbon sequestration, climate regulation, waste decomposition, waste detoxification, water purification, air purification, pest control, and disease control. The last service is cultural service which is divided into several services including recreation, mental and physical health, tourism, aesthetic appreciation and inspiration for culture, art and design, and spiritual experience and sense of place.

Ecosystems can buffer climate and reduce risks and impacts of natural disasters as part of its regulating services. Furthermore, ecosystems through its regulating services can reduce risks and impacts of storms, droughts and sea-level rise which are becoming more severe and frequent due to climate change. Ecosystems managed wisely, reduces disaster risks, preventing, mitigating and/or regulating hazards. Ecosystems acting as natural buffers,

reduces people's exposure to hazards, reducing vulnerability and further supporting livelihoods and providing basic needs (PEDRR, 2013).

A more formal terminology for the use of ecosystems to DRR is the ecosystem-based approaches to disaster risk reduction or Eco-DRR. In the works of Estrella and Saalismaa it is defined as "the sustainable management, conservation and restoration of ecosystems to reduce disaster risk, with the aim of achieving sustainable and resilient development" (Estrella and Saalismaa, 2013). Eco-DRR incorporates natural hazard risk management and climate change adaptation and shares common features with Ecosystem-based Adaptation (EbA) (UNEP 2015).

In regard to ecosystem services, cultural services - specifically tourism services - are some of the most common yet controversial. According to UN Environment, tourism in general has three main impact areas which are the depletion of natural resources, physical impacts of tourism development, and physical impacts from tourist activities. Over the past decades, tourism has continued to expand and diversify around the world. According to the World Tourism Organization (WTO), tourism can be defined as travel for the purposes of leisure, business or recreation. Although tourism is highly diversified, it can be characterized into categories and divided into niches such as: adventure and extreme (adventure tourism, extreme tourism and space tourism), culture and arts (cultural tourism, heritage tourism, and music tourism), medical and dental (dental tourism, medical tourism, and wellness tourism), natural (ecotourism), and rural (agri-tourism, jungle tourism and rural tourism) tourism.

In the 2013 global economic impact analysis of travel and tourism, the GDP contribution of travel and tourism outweighed automotive and manufacturing in every region in the world. Overall, travel and tourism contribution equaled 9.5% of the global GDP generating over 266 million jobs, US\$754 billion in investments and US\$1.3 trillion in exports. Creating significant contributions to the global economy, tourism is continuously gaining popularity.

In recent studies, tourism is linked to solutions for global problems such as poverty, environmental sustainability, health, and global partnerships.

One particular niche of tourism is ecological tourism, commonly called Ecotourism. It has been described in the work of Ceballos-Lascurain as the fastest growing tourism segment globally, with annual growth of 20% to 25% (Ceballos-Lascurain, 2012). Ecotourism defined by the United Nations World Tourism Organization (UNWTO) is “a form of tourism in which the main motivation of tourists is the observation and appreciation of nature as well as the traditional cultures prevailing in natural areas”. Furthermore, UNWTO mentions that ecotourism should have educational features and features which minimizes negative impacts of activities to the natural and socio-cultural environment. UNWTO also notes that ecotourism should be generally organized by specialized tour operators for small groups and that ecotourism activities should support maintenance and conservation of natural areas used as ecotourism attractions through generation of economic benefits to host communities, organizations and authorities with ecological conservation purposes.

In the international handbook on ecotourism it is mentioned that the benefits of ecotourism fall into three main categories, the environment, local communities, and participating tourists (Ballantyne and Packer, 2013). In the handbook, it is mentioned that ecotourism provides environmental protection through provision of economic incentives for conservation and generation of funds required to implement conservation plans. Furthermore, the handbook mentions that ecotourism facilitates protection of traditional and indigenous cultures in and around the ecotourism destination and develops the visitors’ cultural and environmental awareness, appreciation and respect. Ecotourism, as it strives to provide employment and income for local communities; thus, in theory, helps alleviate poverty and aids in sustaining the well-being of local people. Ecotourism, however, does not only promise benefits. Poorly managed ecosystems can lead to increased exposure to natural hazards leading

to landslides or flash floods. However, the sustainable management of the ecosystems will help improve economic, social, and environmental conditions.

Leading back to DRM, ecotourism is one of the initiatives implemented in long term recovery efforts, long term development plans and reconstruction, as it can play crucial role in human security and poverty reduction. Moreover, ecotourism if sustainably managed can provide other ecosystem services such as “regulation and provision services” enabling ecotourism to be a tool for disaster mitigation similar to Eco-DRR, but with an additional feature of job and profit generation ideal for the local economy and community in and around the ecotourism site.

## **1.2 Research Objectives and Problem Statement**

There are existing studies on ecosystems, protected areas, natural disasters, resilience, and tourism; however, in most cases, each thematic area are considered individually. For instance, ecological studies are often geared towards environmental and biological conservation. Disaster management studies focus more on mitigation, reconstruction, and psychological and emotional trauma/aid. Tourism studies, including ecotourism studies, focus on profitability, sustainability, and management. This study can be differentiated from the fore mentioned studies by its interdisciplinary approach. This study integrates themes of community development, ecotourism, business, and disaster management. The study also identifies the roles of ecotourism in resilience building in disaster vulnerable communities.

Furthermore, this study has an exploratory, descriptive, and explanatory purpose. It is exploratory in that it investigates ecotourism as a catalyst for building resilience in communities. It is descriptive in that it examines the context, strategies, approaches and business of ecotourism. It is exploratory in that it discusses about potentials, barriers and

success factors of ecotourism to contribute to community resiliency in disaster vulnerable communities.

Ecotourism as mentioned in the previous section is a form of sustainable tourism which can help build community resilience, explicitly reducing disaster vulnerability through the regulating ecosystem services and generation of jobs for the community. This study aims to identify the contributions of the ecotourism business in community resiliency in disaster-vulnerable areas in the Philippines. Fulfilling this objective, two research questions were raised. The first question being: How is an ecotourism business managed? The second question being: What are the contributions of the ecotourism business to community resiliency in disaster vulnerable areas?

In order to fulfill the objective of the study and answer the research questions, the Philippines has been chosen as the focus of the study. There are two characteristics that led Philippines to be selected for the study. The first reason is that the Philippines is one of the most vulnerable countries in the world in terms of the risk of natural disasters. The second is that the Philippines is one of the most megadiverse country in the world (WCMC, 2014).

The 2017 World Risk Index reported that the Philippines is the 3<sup>rd</sup> most at risk in terms of disaster risk among 171 countries (mean value calculation from 2012-2016). The ranking has been computed based on four components, exposure to natural hazards, vulnerability, coping capacities, and adapting capacities. In terms of the individual components, the Philippines have ranked 3<sup>rd</sup> on natural hazard exposure (World Risk Index, 2017).

The Philippines is one of 18 mega-biodiverse countries in the world, harboring two thirds of the world's biodiversity and between 70% - 80% of the world's species of plants and animals according to the Convention on Biological Diversity (CBD) and World Conservation Monitoring Center (WCMC). The unique biodiversity in the country is being supported by its

large and diverse variety of ecosystems, landscapes, and habitats. Furthermore, the country derives large benefits from the ecosystems in terms of livelihood such as tourism.

The Philippines, having the previously mentioned characteristics, is a fit for the study. Furthermore, there are two case studies which have been selected to be able to answer the research problem. In the Philippines, there are 81 ecotourism sites which are listed by the Department of Tourism (DOT) and majority of the sites are considered protected areas. Protected areas as defined by the International Union for Conservation of Nature (IUCN) are “clearly defined geographical space, recognized, dedicated and managed, through legal or other protected means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.” According to IUCN and CBD, protected areas may be governed differently, by the government, private individuals, organizations, indigenous people, local communities, or by various stake holders/ shared governance.

In this study two case studies have been selected, a government and indigenous people/local community-managed ecotourism business. The first case is the Pamulaklakin Forest Trail (PFT), a community managed ecotourism business, and the second is the Mayon Volcano Natural Park (MVNP) managed by the government. Although different management types both are conducting ecotourism business, both have been through disasters and still have disaster vulnerabilities.

This research will be providing multi-disciplinary, multi-cultural and inter-faith perspectives on ecotourism as a catalyst of economic and disaster resilience in communities through case studies and analysis of policies revolving around ecotourism and disaster management. The business and entrepreneurial perspectives are introduced and enriched via the investigation of the ecotourism business. Policy inputs, and the way they provide a way to enable the governance mechanism, are also featured in this study. Thus, the study will give

recommendations as to the direction of the government and donor agencies in order to promote entrepreneurial and economic growth.

### **1.3 Literature Review**

In order to highlight the significance of this research, this section examines the existing literature on the natural environment, ecotourism, resilience, and resilience measures.

#### **1.3.1 The Environment and Ecotourism**

The environment is the sum of all conditions affecting the life, development, and survival of an organism (World Bank, 1998). The environment has different functions which earlier studies referred to as “environmental services.” This terminology emerged in 1970s (Wilson and Mathews 1970) and was renamed “ecosystem services” in the mid-1980s (Ehrlich and Mooney 1983). In 1997, the word ecosystem services had gained momentum and the term became a standard in scientific literature. Ecosystem services, as per the Millennium Ecosystem Assessment in 2006, are the benefits obtained by people in the ecosystems delineated into four categories, supporting, provisioning, regulating, and cultural services.

Ecosystem supporting services includes nutrient recycling, primary production, and soil formation. The provisioning services includes provision of food, raw materials, genetic resources, water, biogenic minerals, medicinal resources, energy, and ornamental resources. The regulating services includes services such as carbon sequestration, climate regulation, waste decomposition, and waste detoxification. The last is cultural services which includes the use of ecosystems for spiritual and historical value, recreational experiences including ecotourism, and outdoor sport, science and education, and therapeutic purposes. This study will be mainly discussing the two ecosystem services which are related to disaster management and

ecotourism, the focus of the study. The two services are regulating services and the cultural services.

### **Disaster Management through the Regulating Service of the Ecosystem**

Ecosystems have been used in both research purpose, and for human and social activities as buffers against disasters. These studies and researches are grounded as one of the ecosystems regulating services is the ecosystem serving as buffer to natural disasters. Earlier studies of these cases focus mainly on protected areas. These areas are declared by the IUCN satisfying certain guidelines and is categorized based on six management types. The protected areas are categorized by numbers from one to six and have different purposes as seen in table 1. Apart from the categorization of protected areas by management types, these areas are also classified into four different governance approach. IUCN identifies four governance approach for the protected areas which are government, private, indigenous people and local communities, and shared governance (Dudley, 2018).

**Table 1. IUCN Protected Area Management Type**

<b>Category</b>	<b>Name</b>	<b>Description</b>
1A	Strict Nature Reserve / Wilderness Protection Area	Area managed mostly for science or wilderness protection.
1B	Wilderness Area	Area managed mostly for wilderness protection.
2	National Park	Area managed mostly for ecotourism protection and recreation.
3	Natural Monument	Area managed mostly for conservation of specific natural features.
4	Habitat/ Species Monument Area	Area managed mostly for conservation through management intervention.
5	Protected Landscape/Seascape	Area managed mostly for landscape/seascape conservation and recreation.
6	Managed Resource Protected Area	Area managed mostly for sustainable use of natural resources.

[Source: IUCN Guidelines for Protected Area Management Categories, 2018]

In the coming years, it is predicted that climate change would result in increased number of disasters as well as increase impact with this, protected areas could contribute to the disaster management and climate regulation. Protected areas in general could serve as natural buffers



reducing risks and impacts of various natural disasters. Table 2 summarizes roles of ecosystems in disaster management.

**Table 2. Ecosystems and its Role in Disaster Management**

<b>Natural Hazard</b>	<b>Buffering Role of Ecosystem in Protected Areas</b>
Avalanches & Landslides	<ul style="list-style-type: none"> <li>• Vegetation on slopes stabilizes the soil and anchors snow</li> <li>• Vegetation on the slopes provides physical barrier to earth movements</li> </ul>
Cyclones, Typhoons, & Hurricanes	<ul style="list-style-type: none"> <li>• Coastal ecosystem buffer storm damage</li> <li>• Coastal marshes decrease storm surge impact</li> <li>• Forest reduce risk of land slide caused by storms</li> </ul>
Desertification & Dust Storms	<ul style="list-style-type: none"> <li>• Desert vegetation reduces dust storms and desertification</li> </ul>
Droughts	<ul style="list-style-type: none"> <li>• Forest and natural vegetation provide food for different species</li> </ul>
Earthquakes	<ul style="list-style-type: none"> <li>• Forested catchments suffer less from earthquakes</li> </ul>
Flooding	<ul style="list-style-type: none"> <li>• Wetlands and flood plains stores water efficiently</li> </ul>
Sea-Level Rise	<ul style="list-style-type: none"> <li>• Coastal ecosystems slow down sea-level rise</li> </ul>
Tsunamis	<ul style="list-style-type: none"> <li>• Coastal ecosystems reduce impact of tidal waves</li> </ul>
Volcanoes	<ul style="list-style-type: none"> <li>• Forest slows down the lava flow</li> <li>• Valleys and watercourses contain lava flow</li> </ul>
Wildfire	<ul style="list-style-type: none"> <li>• Protected area personnel's provide advice in managing forest fire</li> </ul>

[Source: Adapted from Dudley, Buyck, et.al., 2015]

Ecosystems can also protect communities during disasters. During avalanches and landslides, ecosystems help protect valley communities. In terms of cyclones, typhoons, and hurricanes, ecosystems protect communities and lessens disaster impacts. Ecosystems also protects other species during disasters providing sustenance on droughts. In general, the various roles of protected areas such as buffering vulnerable communities against natural disasters and aid in lessening the impact of natural hazards is becoming more valuable as the different climatic events becomes more severe (Stolton et al., 2008).

The protection of the ecosystems itself does not stop natural hazards or extreme events. However, there is increasing evidence that well managed, and maintained ecosystems are likely to be more resilient to impacts of natural disasters and decreases the likelihood of ecological and humanitarian disasters (Dudley et. Al., in press). In Japan, forest protection was introduced as early as the 15<sup>th</sup> and 16<sup>th</sup> centuries to counter landslides (Kumazaki et al., 1991). Several policies have been made and now Japan has almost 9 million hectares of protection forest chosen as buffers against natural disasters. In the Middle East, there are protected areas

established over thousand years ago called “Hima,” its main purpose is to prevent deforestation and grassland erosion done by overgrazing (Bagader et. Al., 1994).

In 2015, the IUCN published a handbook called the “Protected Areas as Tools for Disaster Risk Reduction.” This handbook provides guidance to DRR specialists as well as protected areas managers on optimizing the use of protected areas as tools in disaster management. The IUCN is specifically promoting protected areas for DRR however, there is a wider initiative on the use of the environment for DRR which came before the promotion of protected areas for DRR, “The Partnership for Environment and Disaster Risk Reduction (PEDRR).” It has been formally established in 2008 and is a partnership between 23 organizations worldwide composed of UN agencies, NGOs, and different specialist institutes promoting ecosystem management as a key strategy to reduce disaster risk and build resilience in vulnerable communities. The IUCN is a member of the PEDRR and the United Nations Environment Programme (UNEP) is a core member.

PEDRR advocates the promotion of the Ecosystem-Based Adaptation (EbA) which became widespread around 2013. EbA is an evolving strategy in fields of community development and environmental management. EbA is grounded on the utilization of ecosystem services as aid in community adaptation to effects of climate change. A formal definition of EbA is given by the Convention on Biological Diversity (CBD) as, “the use of biodiversity and ecosystem services to help people to adapt to the adverse effects of climate change, including the exercise of sustainable management, conservation and restoration of ecosystems, as part of an overall adaptation strategy that takes into account the multiple social, economic and cultural co-benefits for local communities” (Convention on Biological Diversity, 2009).

PEDRR advocates another tool for DRR which the ecosystem-based disaster risk reduction is (Eco-DRR). This initiative aims to achieve sustainable and resilient development

by reduction of disaster risk through sustainable management, conservation and restoration of the ecosystem (Estrella and Saalismaa 2013: 30). This concept of the Eco-DRR has a premise that ecosystems which are well managed will be able to act as natural infrastructures which would reduce exposure to hazards and further, increase the socio-economic resilience of communities through the provision services of the ecosystem.

The use of protected areas in disaster management as well as employing EbA, and Eco-DRR are examples of regulating services of the ecosystem. An argument however is that maintenance of protected areas can be costly. Protected areas cover about 15% of land and about 10% of total waters of the world. Counting the total number of protected areas around the globe excluding Antarctica, there are 202,467 protected areas according to scientist from IUCN and the UN Environment's World Conservation Monitoring Center in 2016 (UNEP-WCMC and IUCN,2016). Maintaining these protected areas would require an approximate 150-440 billion USD (considering all Aichi targets) according to a study conducted by CBD in 2011. However, in the study of Waldron et al. the computed average annual expenditure on global biodiversity conservation amounts to only 21.5 billion USD (2001 to 2008 average) (Waldron, et.al., 2013).

### **Ecotourism**

The other ecosystem service that will be discussed in the study as mentioned earlier is the cultural service, specifically ecotourism. Even before the terminology ecotourism began to be used in tourism studies, it was already in existence. Natural areas around the world have been tourist destinations for centuries. Geographers travelling around the world in search for new land and species in the mid-20<sup>th</sup> century could be considered as the early ecotourist. In the mid-20<sup>th</sup> century, mass tourism became popular and the increasing global interest in the environment combined made ecotourism popular. Though early traces of ecotourism have been

identified there is no one definition of the term. Definitions varies, country to country and organization to organization.

The evolution and origin of ecotourism is traced back in the relationship of environment and tourism. In the mid-20<sup>th</sup> century, the relationship of the environment and tourism is co-existent. During 1950s, the mass understanding is that tourism has few impacts on the natural environment which brought up some positive and more negative issues in the relation of environmental protection and tourism development. In 1954, the International Union of Official Travel Organizations, now the United Nations World Tourism Organization (UNWTO), introduced into its general assembly a section on the preservation of “tourist heritage” that focused on the protection of tourism “capital” or resources from potentially adverse physical and social effects.

During 1960s, there was increasing environmental awareness and mass tourism became more prominent. Correspondingly, in 1970s, tourism is being advocated as an agent of conservation with the work of the Commissioner General of Tourism in Belgium and the Director of the Swiss Tourism Association. Their work tackles environmental considerations and conservation in tourism development in natural areas in which the concept and practice of ecotourism was based and developed. One of the early references to ecotourism can be identified to be the work of Hetzer (1965/1970) and Ceballos-Lascurain (1987) in characterizing and defining ecotourism.

Today, ecotourism has been evolving and developing. One of the most prominent definitions of ecotourism which is being used worldwide is the definition of the UNWTO which refers to tourism having the following five characteristics in table 3. Another prominent definition of ecotourism is the definition from The International Ecotourism Society (TIES), founded in 1990 and is the oldest ecotourism society. TIES define ecotourism as "responsible

travel to natural areas that conserves the environment and improves the well-being of local people" (TIES, 1990).

**Table 3. Characteristics of Ecotourism According to UNWTO**

No.	Characteristics
1	"all nature-based forms of tourism in which the main motivation of the tourist is the observation and appreciation of nature as well as the traditional cultures prevailing in natural areas"
2	"it contains educational and interpretation features"
3	"it is generally, but not exclusively organized by specialized tour operators for small groups, service provider partners at the destinations tend to be small, locally owned businesses"
4	"it minimizes negative impact on the natural and socio-cultural environment"
5	"it supports the maintenance of natural areas which are used as ecotourism attractions by generating economic benefits for host communities, organizations and authorities managing natural areas with conservation purposes; providing alternative employment and income opportunities for local communities; increasing awareness towards the conservation of natural and cultural assets, both among locals and tourists"

[Source: All quoted from ecotourism characteristics of UNWTO, 2002]

Discussed earlier is the regulating and cultural services of the ecosystem specifically climate regulation and ecotourism. It is observed that in terms of climate regulation protected areas are widely studied and is used as disaster management tool. Initiatives in disaster management and climate change with the use of protected areas are called EbA and Eco-DRR. However, a problem arises in the use of the initiative. Maintaining ecosystems are costly. Ecotourism nevertheless, has a business component/ finance generating component and the ecosystem component which could be a more suitable and sustainable candidate in reducing disaster vulnerabilities. This theme hasn't been much explored and will be the focus of the study.

### **1.3.2 Evolution of Resilience and Community Resilience**

Many authors have described resilience as an overloaded concept. The term resilience has various meaning depending on the field of studies or discipline. Etymologically speaking, the term resilience has been introduced early 17<sup>th</sup> century originating from the Latin verb "resilire" meaning to rebound or recoil (Concise Oxford Dictionary Tenth Edition, 2001). In the academe, the concept of resilience originated in the field of ecology during 1960 to early

1970 as the functional response of interacting populations in relation to the theory of ecological stability (Holling, 1961; Morris, 1963; Lewontin, 1969; Rosenzweig, 1971; May, 1972).

Through the years, the definition and use of resilience in ecology has evolved and changed. Holling, in 1973, defined resilience as the measure of the ability of an ecosystem to absorb changes and still exist (Holling, 1973). There was a minor change in definition of resilience after a decade. In 1984, Pimm, redefined resilience as the speed with which a system returns to its original shape (Pimm, 1984). In 2001, resilience has been defined by Alwang et al., as “the ability to resist downward pressures and to recover from shock” (Alwang et al., 2001). In, 2002, Alkers et al. defined resilience as the systems potential to stay in a configuration and maintain its functions which involves the ability of the system to reorganize after a disturbance. In 2003, Cardona used the term resilience as the ability of the ecosystem or community to absorb shocks and recover. In 2005, Resilience Alliance interpreted resilience as the ability of the ecosystem in tolerating disturbance without collapsing. In 2009, the Stockholm Resilience Centre defined resilience as the capacity of the social and ecological system to withstand perturbations and rebuild and renew itself subsequently.

The definition of resilience evolved in the field of ecology and expanded its use to various fields. The interpretation, definition, and use of resilience extended further to fields such as disaster management and social development. The time when studies on natural disasters became more prevalent, the concept of risk management and resilience became well-known to scholars, academicians and even policy-makers. Among the studies of resilience is community resilience. In general, community resilience is the ability of a community in utilizing its available resources to respond, withstand, and recover from its vulnerabilities. Like its general term, resilience, community resilience has various definitions. In table 4, various definitions of community resilience from different scholars and organization is presented from 2001-2015.

**Table 4. Various Definition of Community Resilience**

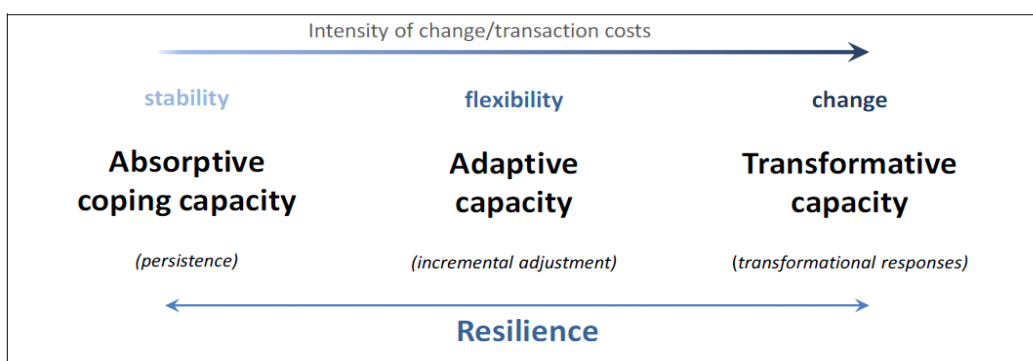
<b>ORGANIZATION/ AUTHOR</b>	<b>YEAR</b>	<b>DEFINITION</b>
Cadell, Karabanow, and Sanchez	2001	"...the ability to adapt to, cope with and even be strengthened by adverse circumstances." (Cadell, Karbanow, & Sanchez, 2001)
Ganor and Ben-Lavy	2003	"the ability of...communities to deal with a state of continuous, long-term stress, which causes gaps between environmental stimuli and their functional coping behavior." (Ganor & Lavy, 2003)
Doron	2005	"...is built in a process of creating and strengthening personal, familial, social, organizational and economic systems to resist and cope effectively in times of stress, threats, crisis and emergencies." (Doron, 2005)
Frankenberger et al.	2007	"collective capacity to respond to adversity and change and maintain function. A resilient community can respond to crisis in ways that strengthen community bonds, resources, and the community's capacity to cope." (Frankenberger et al., 2007)
Cutter et al.	2008	"The ability of a social system to respond and recover from disasters and includes those inherent conditions that allow the system to absorb impacts and cope with an event, as well as post-event, adaptive processes that facilitate the ability of the social system to re-organize, change, and learn in response to a threat." (Cutter et al., 2008)
Norris et al.	2008	"a process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance." (Norris et al., 2008)
Walker et al.	2010	"...the general capacity of a community to absorb change, seize opportunity to improve living standards, and to transform livelihood systems while sustaining the natural resource base. It is determined by community capacity for collective action as well as its ability for problem solving and consensus building to negotiate coordinated response." (Walker et al., 2010)
Pasteur	2011	"the ability of a ...community...to resist, absorb, cope with and recover from the effects of hazards and to adapt to long-term changes in a timely and efficient manner..." (Pasteur, 2011)
DFID	2011	"...the ability of ...communities... to manage change, by maintaining or transforming the living standards in the face of shocks or stresses...without compromising their long-term prospects." (DFID, 2011)
Arbon, Gebbie, Cusack, Perera, and Verdonk	2012	"...when members of the population are connected to one another and work together, so that they are able to function and sustain critical systems, even under stress; adapt to changes...; be self-reliant...; and learn from experience to improve itself over time." (Arbon et al., 2012)
Béné, Wood, Newsham, and Davies	2012	"...the ability to resist, recover from or adapt to the effects of a shock or a change." (Béné et al., 2012)
USAID	2012	"...ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth." (USAID, 2012)
UNDP Drylands Development Centre	2013	"...a transformative process of strengthening the capacity of...communities...to anticipate, prevent, recover, adapt and/or transform from shocks, stresses and change." (UNDP, 2013)

Community and Regional Resilience Institute (CARRI)	2013	“...capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change.” (CARRI, 2013)
Daniel Lerch	2015	“ability of a community to maintain and evolve its identity in the face of both short-term and long-term changes while cultivating environmental, social, and economic sustainability” (Lerch, 2015)
Ostradtaghizadeh, Ardalan, Paton, Jabbari, and Khankeh	2015	“ability of a system, community, or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner including through the preservation and restoration of its essential basic structures and functions” (Ostradtaghizadeh, 2015)

[Source: Compiled by the author from: Cadell, Karbanow, & Sanchez, 2001, Ganor & Lavy, 2003, Doron, 2005, Frankenberger et al., 2007, Cutter et al., 2008, Norris et al., 2008, Walker et al., 2010, Pasteur, 2011, DFID, 2011, Arbon et al., 2012, Béné et al., 2012, USAID, 2012, UNDP, 2013, CARRI, 2013, Lerch, 2015, and Ostradtaghizadeh, 2015]

Table 4 describes the various definition of community resilience. Though various definitions exist, the basis of the definition remains the same, the ability of the community to bounce back to its original state after different adversaries. Understanding community resilience and resilience, also requires the knowledge on resilience capacities which are regarded to be the core of the resilience concept as well as resilience measurements. Figure 2 shows the capacities for resilience by Béné, et al. in 2012.

**Figure 2. Capacities for Resilience**



[Source: Béné, et al., 2012]

In figure 2, the capacities for resilience- absorptive, adaptive, and transformative is presented. The first is, absorptive capacity which is the ability to minimize exposure to shocks and stress through cautionary measure and coping strategies. Absorptive capacity measures peoples’ coping mechanisms to be able to overcome immediate threats through the utilization



of direct available resources. The base for absorptive capacity is to restore the present level of well-being following a critical event. The second resilience capacity is adaptive capacity which is the ability take advantage of opportunities to adjust to potential damages of climate change. The adaptive capacity includes making “pro-active” and informed choices as alternative livelihood strategies and income diversification based on changing conditions basically, employing preventive measures learned through previous experiences. The final resilience capacity is transformative which pertains to governance mechanisms enabling systemic change. The major difference between the three is, coping capacity addresses short term tactical activities, adaptation involves long term planning and strategic activities, and transformation is enhancing people’s well-being considering risks.

The early definition of community resilience is not far apart from the early definition of resilience in general. However, in the succeeding years the definition expanded and became more specific. To one side, exploring the various definitions of resilience and community resiliency is not enough to be used as reference of the study. It is significant to include a review of the capacities for resilience- absorptive, adaptive, and transformative which are regarded to be the core of the resilience concept as well as resilience measurements.

### **1.3.3 Measures of Resilience**

There are numerous measures, indices, and frameworks of resiliency. In this section, seven popular resilience measures are discussed. The framework includes – FAO’s Resilience Index Measurement and Analysis (RIMA), the Baseline Resilience Indicators for Communities (BRIC), the Coastal Resilience Index, the PEOPLES Resilience Framework, the Composite Resilience Index, the Resilience Framework for Measuring Development, and the Tourism Resilience Index (TRI). In table 5, a summary of each framework including the year it was developed, the developer or organization involved in developing the framework, the type of

resilience measured, and the indicators used is indicated. Detailed explanation of each framework together with the measure and/or resilience computation is discussed afterwards.

**Table 5. Resilience Framework Overview**

<b>Framework</b>	<b>Year Developed</b>	<b>Organization/ Author</b>	<b>Type of Resilience</b>	<b>Main Indicators</b>
Resilience Index Measurement and Analysis (RIMA)	2008	Food and Agriculture Organization (FAO)	Household resilience for building secure and resilient livelihoods	<ul style="list-style-type: none"> <li>• Income and Food Access</li> <li>• Access to Basic Services</li> <li>• Social Safety Nets</li> <li>• Assets</li> <li>• Adaptive Capacity</li> <li>• Stability</li> </ul>
Baseline Resilience Indicators for Communities (BRIC)	2008	Hazards and Vulnerability Research Institute, University of South Carolina	Disaster resilience indicators for communities based on the Disaster Resilience of Place (DROP) model	<ul style="list-style-type: none"> <li>• Ecological</li> <li>• Social</li> <li>• Economic</li> <li>• Infrastructure</li> <li>• Institutional Capacity</li> <li>• Community Competence</li> </ul>
Coastal Resilience Index	2010	Mississippi-Alabama Sea Grant Consortium and National Oceanic and Atmospheric Administration (NOAA)	Community self-assessment resilience index	<ul style="list-style-type: none"> <li>• Critical Infrastructure and Facilities</li> <li>• Transportation Issues</li> <li>• Community Plans and Agreements</li> <li>• Mitigation Measures</li> <li>• Business Plans</li> <li>• Social Systems</li> </ul>
PEOPLES Resilience Framework	2010	University of Buffalo State University of New York and National Institute for Standards and Technology (NIST)	Measure of functionality and resilience of communities against extreme events or disasters	<ul style="list-style-type: none"> <li>• Population and Demographics</li> <li>• Environmental/ Ecosystems</li> <li>• Organized Governmental Services</li> <li>• Physical Infrastructure</li> <li>• Lifestyle and Community Competence</li> <li>• Economic Development</li> <li>• Social-Cultural Capital</li> </ul>
Composite Resilience Index	2015	Tom Per Fremont and Tracey Lloyd	Community resilience to natural hazards	<ul style="list-style-type: none"> <li>• Social Environment</li> <li>• Built Environment</li> <li>• Natural Environment</li> <li>• Economic Environment</li> </ul>

Resilience Framework for Measuring Development	2015	Anshul S. Bhamra, Development Alternatives	Measure of resilient nature of development	<ul style="list-style-type: none"> <li>• Social Systems</li> <li>• Environmental Systems</li> <li>• Governance Systems</li> <li>• Economic Systems</li> </ul>
Tourism Resilience Index (TRI)	2015	Mississippi-Alabama Sea Grant Consortium and National Oceanic and Atmospheric Administration (NOAA)	Self-assessment tool for tourism leaders and businesses	<ul style="list-style-type: none"> <li>• Business and Operational Plans</li> <li>• Disaster Preparedness Plans</li> <li>• Marketing</li> <li>• Workforce</li> <li>• Federal State and Local Resources</li> <li>• Resource Access and Knowledge</li> </ul>

[Source: Compiled by the author from: FAO, 2016, Emrich & Cutter, 2013, Sempier et al., 2010, Renschler et al., 2010, Perfrement & Lloyd, 2015, Bhamra, 2015, and Swann et al., 2015]

FAO's Resilience Index Measurement and Analysis (RIMA) Model measures the resilience level in a household. RIMA can be computed and measured with the use of several indicators. There are ten indicators and they are divided to the physical and capacity. The physical dimensions include, Income and Food Access (IFA), Access to Basic Services (ABS), Agricultural Assets (AA), Non-Agricultural Assets (NAA), Agricultural Practice and Technology (APT), Social Safety Nets (SSN), Climate Change (Climate Change), and Enabling Institutional Environment (EIE). The capacity dimension however, includes sensitivity (S), and Adaptive Capacity (AC).

The IFA is an aspect of livelihood which show the household capacity to earn a living. The ABS is the household capacity to rely on valid infrastructure settings. AA and NAA are the key elements of livelihood. APT captures various technological levels for farming activities. SSN are crucial aspects in mitigating crisis. CC is a component affecting households' capacity to make a living. EIE is the level of support coming from the local and the central authorities. The last two components of the model, S and AC are capacity dimensions. S is the degree a household is affected and has been affected by vulnerabilities/shocks. AC, the last indicator is the adaptation capacity of a household.

The baseline resilience indicators for communities (BIRC) includes indicators on ecological, social, economic, institutional, infrastructural, and community competence. The ecological indicator is broken down to several sub-indicators including, the presence of land area in a 100-year flood plain, land area subject to SLR, soil erosion, green space, urban, forest land cover, land with hydric soils, and wetland loss. The social indicator comprises of sub-indicators, the racial/ethnic inequality, educational inequality, physicians, elderly, social vulnerability index, the transport-challenged, the communication challenged, language competency, crime rate, those with special needs, health coverage, and population wellness. The economic indicator comprises for sub-indicators including housing capital, homeowners, employment, median household income, poverty, single sector employment, and business size. The institutional indicator comprises of sub-indicators on recent hazard mitigation plan, NFPI policies, storm ready participation, and municipal expenditures. The infrastructural indicator includes the sub-indicators, presence on mobile homes, shelter capacity, medical capacity, building permits for new construction, evacuation potential, and housing age. The last indicator is community competence which includes sub-indicators on political fragmentation, previous disaster experience, social connectivity, dependency ratio, sense of place, social capital, and migration.

Comparing to the other resilience frameworks, there is no specific formula in the use of BRIC. Furthermore, there are issues on the availability of the framework's variables, recent values, role of census undercount, coverage of variables, and how to quantify the unquantifiable.

The Coastal Resilience Index is a self- assessment community resilience framework. The main objective in using the mentioned framework is to be able to provide community leaders a simple and an inexpensive technique predicting the level of community resilience. There are six indicators in the model. The first indicator is the critical infrastructure and facilities which

deals with questions regarding the existence of critical infrastructure and facilities. Transportation is the second indicator. The indicator deals with the operation of transportation routes and infrastructure subsequently after a disaster, the presence and availability of evacuation vehicles, presence of multiple evacuation routes, and post storm traffic management. The third indicator is the community plans and agreements which looks on the participation in community rating systems, disaster warning systems and mitigation plans, the existence of accredited planning commissioners with formal training plans, MOUs with communities to help out during disasters, the existence of flood plain managers, first- hand experience in disaster recovery within the last 10 years, and communication systems in the phase of a disaster. Mitigation is the fourth indicator and it measures infrastructure standards, flood proofing of non-residential structures, educational program on mitigation, incentive-based mitigation measures, adoption of business codes, hiring certified building inspectors, staffing and adequate number of people to enforce building codes, planned and complete restoration projects, protection and maintenance of coastal habitat, and underdeveloped public lands. Another indicator is the business plan which includes inspecting generators, backup options for basic needs, plans to bring in staff to help reopen the business, and plans for restocking and ice distribution. The last indicator is the social system which investigates the existence of strong faith-based networks, cultural identity, neighborhood associations, business cooperative or working relations, and strong civic organizations.

The PEOPLES resilience framework is a measure of resilience in the community. PEOPLES stand for the frameworks seven dimensions which are: population, environment, organizational, physical, lifestyle, economic, and social/cultural. This index has been developed through expansion of previous research in resilience bridging resilience properties and resilience dimensions, to be able to measure the disaster resilience of different capital assets

and assets classes. The PEOPLES resilience indicator has several indicators and sub-indicators which is listed in table 6.

**Table 6. PEOPLES Resilience Indicators**

MAIN INDICATORS	SUB-INDICATORS
Population and demographics	distribution/density, composition, socio-economic status
Environmental/ Ecosystems	water quality/quantity, air quality, soil quality, biodiversity, biomass, other natural resources
Organized governmental services	executive/administrative, judicial, legal/security
Physical infrastructures	facilities, lifelines
Lifestyle and community competence	collective action and decision making, collective efficacy and empowerment, quality of life
Economic development	financial services, industry–employment services, industry–production
Social/cultural capital	child and elderly services, commercial centers, community participation, cultural and heritage services, education services, non-profit organizations, place attachments

[Source: Summarized by the author based on the PEOPLES Resilience Framework of Renschler et al., 2010]

The composite resilience index measures the resilience of local communities to climate extremes presenting a holistic view of the community’s resilience level. The index consists of four main indicators, the social environment, built environment, natural environment, and the economic environment. The social environment measures and describes the community interactions and mobility which allows the communities and the individuals in the community adapt to extreme circumstances. The sub-indicators of the social environment are: age, transportation access, language competency, and disability. The built environment refers to man-made physical spaces. The sub-indicators of the built-environment includes the medical capacity, shelter capacity/recovery, and internet connectivity. The natural environment indicator includes biodiversity, geographical location, and natural features that has noteworthy impact on the location’s vulnerability. The natural environment has two sub-indicators which

is the vulnerable land and community volunteering. The last main indicator of the composite resilience index is the economic environment which is measure through its sub-indicators: employment, equality, housing capital and wealth.

One more resilience framework is the “The Global Sustainable Development Report (GSDR)” which is use for measuring development (Bhamra, 2015). The framework has four main indicators, social, environmental, governance, and economic indicators. The social indicator is the measure of vulnerability and opportunities available for individuals in the society. The social indicator has four sub-indicator, vulnerability (fulfillment to food, water and sanitation, shelter, and disaster preparedness), human empowerment (educational status, access to financial resources, decent livelihood options, access to information and communication technology, and access to transport), community empowerment (social network integration, decentralization of power and planning, and ownership of assets), and the overall sense of well-being (fulfillment of aspirations, attainment of self-realization goals, and spiritual satisfaction and fruitful living). The second indicator is the environmental systems which is measured through three sub-indicators - disaster resilience (frequency of disaster, disaster preparedness, loss and damage post disaster), status quo environmental quality (quality of air, water and soil, inclusion of environmental costs in the market pricing mechanism, maintenance of biodiversity including agricultural biodiversity, promoting local species) and the future natural base (resource efficiency in production and consumption systems and ecological foot print). The governance indicator is measured through two sub-indicators, resilient governance (accountability, transparency, and decentralized power and control) and integrated development planning (presence of cities/village’s vision, green infrastructure, and resource efficiency in planning). The final indicator is the economic system which has two sub-indicator, sustainable production (use of green technologies, inclusion of environmental costs

in market prices, and resource efficiency of natural inputs) and sustainable consumption (lifestyle patterns and per capita footprint).

The last framework for resilience evaluated for the study is the Tourism Resilience Index (TRI). The framework has six main indicators which is: the business and operational plans; disaster preparedness plans; marketing; workforce; federal, state and local resources; and resource access and knowledge. Unlike previous indicators and frameworks, TRI is more focused on business aspects.

The first indicator is the business and operational plans which examines the presence of a business plan and if it has been updated within the last 12 months. The indicator also looks at the existence of the internal employee communications plan and the inclusion of English and non-English speaking employees. It also examines if there are existing technology/equipment that is used to maximize profitability. It also inspects access of the business to local and regional suppliers, and the existence of business leadership and staff succession plans.

The second indicator of the TRI is disaster preparedness plans. Among all the frameworks, TRI is the only one which has the mentioned indicator. This indicator examines and searches for the disaster preparedness plans for employees, testing of the disaster plans, and training and tabletop exercise programs for disaster management. The indicator also examines if there are employees who are crossed-trained, to carry their normal task and to be able to assist in recovery activities. The indicator also examines the existence of employees trained to manage questions from the general public and media. Furthermore, the indicator checks on the existence of MOUs or contracts with service providers and local businesses during and after disasters, the existence of emergency funds which is good for at least three months, insurance, and personnel with first-hand experience with disaster recovery during the last 10 years.



The third indicator of the TRI is marketing. The indicator examines whether there is a marketing plan, if the plan is utilized on different messaging channels to communicate with different stakeholders. The indicator also looks at the participation of the business with a tourism/destination marketing organization, the existence of a diverse customer base, the provision of diverse secondary attractions and/or activities, and offering packages for your products or services with other business or organizations to expand local business opportunities.

The fourth indicator is workforce which examines if there are enough staff for normal operations under regular working conditions. The indicator also looks at the active recruitment of new employees, access to a trained workforce, existence of reliable transport for employees, employee incentives, non-employee volunteers after and during disasters together with its protocol, employee participation in health and safety trainings, and the provision of resources for the employee's personal safety. The fifth indicator is the federal state and local resources which examines the participation on post-disaster damage assessments, the identification of disaster information, participation in disaster drills, and the coordination with local officials on re-entry and re-opening plan of the business. The last indicator of the TRI is the resource access and knowledge which examines the support and local efforts in natural resource sustainability, the employment and practice of sustainable operations, and the provision of sustainable tips to customers.

While there are several frameworks in measuring resilience, there is no consensus on how resilience should be measured (Béné, 2013). In the seven frameworks discussed earlier, there are various indicators presented. The most common indicator however, is the social, environmental, and economic indicators.

In reviewing previous literature, it is observed that there is a gap on the research on ecosystem services, specifically in linking ecotourism in disaster management. The closest

mention of its linkage is the employment of protected areas to buffer and protect communities from natural disasters and the use of EbA and Eco-DRR. In the Handbook for Practitioners of Eco-DRR in Japan, one of the stated advantages of Eco-DRR is the utilization of other ecosystem services during non-disaster periods like tourism. In the handbook, it is said that Eco-DRR can minimize environmental impact and preserve local sceneries and land areas producing local specialties, supporting tourism while facilitating the use of local resources and creating new jobs. Ecotourism as a part of the cultural services of ecotourism could be a good candidate to be used as a tool for disaster management and community resilience. Comparing to the employment of protected areas for DRRM, ecotourism could generate revenue that can help in maintenance of the natural environment.

In view of resilience indicators, although there are some commonalities across each framework there is no index which measures the resilience of disaster vulnerable communities engaging in ecotourism. Thus, it can be said that there is very limited knowledge about this topic which also makes this research original.

#### **1.4 Analytical Framework and Methodology**

The study was divided into three phases- secondary data gathering, primary data gathering including field work, and finally, integration and analysis. During the first phase, compilation of information through past articles and writings have been done to understand the relation between the environment and tourism, the ecosystem services, ecosystem services, the evolution and definition of ecotourism, resilience, and resilience measures. Site selection, framework development, and coordination for visits were also done during the first phase of the study.

Two sites were selected as case studies. The Philippines has numerous ecotourism sites however, the Pamulaklakin Forest Trail (PFT) and the Mayon Volcano Natural Park (MVNP) has been selected for the study. The sites were selected accordingly based on their management and characteristics which is relevant to the theme of the study. The first site, PFT is a community managed ecotourism business. This site is particularly chosen due to its management. The site is managed by an indigenous group of people which is one of the most vulnerable people during disasters aside from disabled persons, the elderly, woman and girls, and children. The indigenous group are also the inhabitants of the place and makes-up the community around the ecotourism site. More importantly, the site is in a disaster vulnerable area. A motivation for the site establishment is the reconstruction and rehabilitation of the area after the eruption of a nearby volcano. The other site, the MVNP, in contrast to PFT is a government managed ecotourism business. MVNP has distinct characteristics, the site includes a popular tourist destination, the most active volcano in the Philippines. Furthermore, the region where MVNP is located is the most disaster vulnerable area in the Philippines and is further known to have a good DRRM plan.

In the second phase of the study, field visits were done, including interviews, focus group discussions, and site observations. Among the interviewees are: ecotourism managers, local government officials, and staff in the ecotourism sites. In the final stage of the research, analysis of findings, integration, and cross comparison of collected data were done.

The levels of analysis covered the context, operational aspects and output-outcome-impact levels. The contextual analysis focused on historical data. Familiarizing ecotourism at the operational level has been done through data collection with the use of the adjusted business model canvas. Data gathered from the business model canvas has been processed to discuss the operation of the ecotourism business and the contribution of the ecotourism business to the resilience of the community in disaster vulnerable areas are discussed further and, in more

detail, using the resilience indicators for disaster vulnerable communities (engaging in ecotourism).

#### **1.4.1 Data Gathering Tool: The Extended Business Model Canvas**

Various ways can be selected to collect data from the case studies however, the use of the business model canvas, specifically the extended business model canvas is employed. Recalling the research questions there is a need to understand the ecotourism business which the business model captures. The business model canvas can be thought of a tool which shows how a business would and could make profits. However, what a business model canvas is really is that it “describes the value an organization offers its customers and illustrates the capabilities and resources required to create, market and deliver this value and to generate profitable, sustainable revenue streams” (Osterwalder, 2005). The business model is a simple concept, which was developed by Alexander Osterwalder based on his earlier works in 2008. Despite the simplicity of the business model canvas it does not undermine the complex relations of different elements of the business operations and functions.

In this study, the adjusted business model canvas is used. The original business model canvas consists of nine building block which are the, customer segment, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners, and cost structure. Whilst, it is common to use the business model canvas and it does capture different aspects of a business, the extended business canvas includes impact of the business to the society and the environment which will aid in answering the second research question. The additional elements in the extended business model canvas are, the social costs and benefits, and environmental cost and benefits.

The first building block of the business model canvas is the customer segment. This building block describes the customers which the business has. The segments could be different

groups of people or organizations that the ecotourism business reaches and serves. The second building block is the value proposition. The value proposition can be divided into what the ecotourism business is offering their customers, the values or benefit associated to their offerings, how much the customer can expect, the value generated, and to whom is the value being offered. The third building block is the channels which pertains to how the value proposition is directed to the target customers; it is how the ecotourism managers and staff connects and communicates with their customers. The fourth building block is the customer relationships. This block, shows and explain the relationship of the customers with the ecotourism managers/staff/guides.

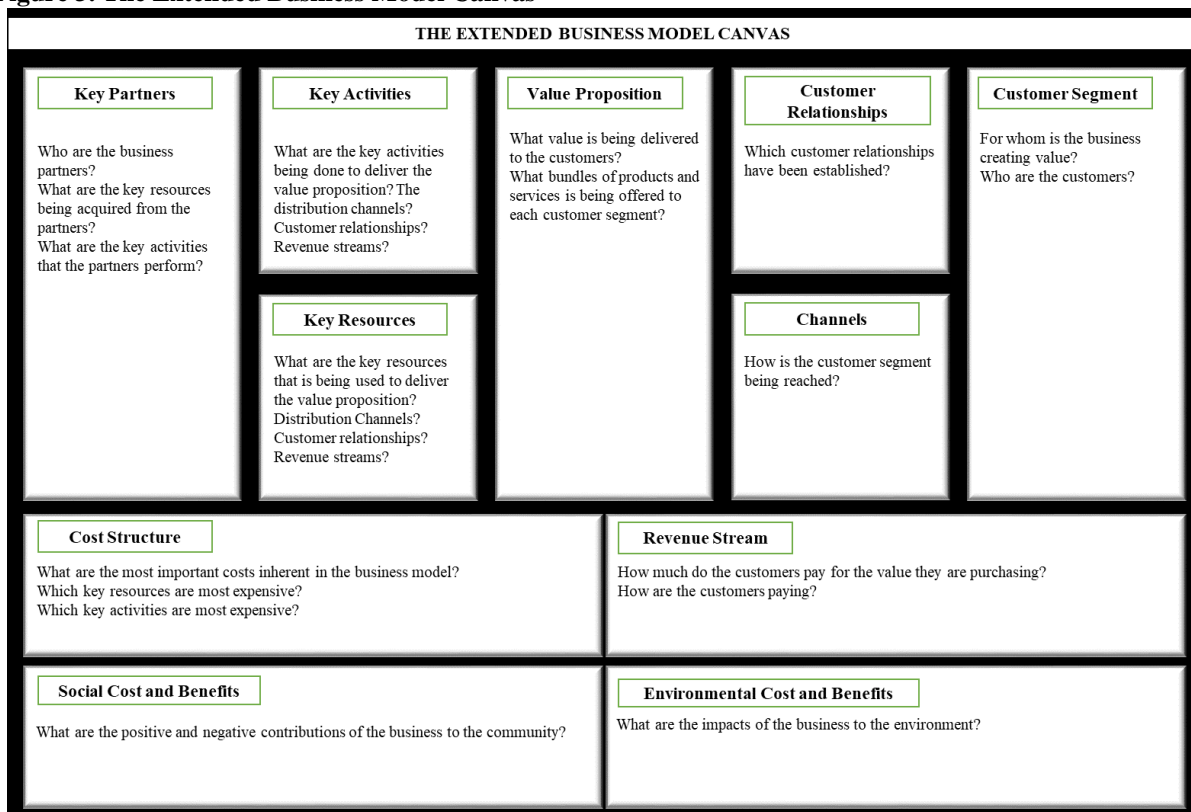
The fifth building block is the revenue stream which describes how the customers are charged for availing the value proposition. Revenue streams also describe how the customers and key activities are developed and related. The sixth building block, the key resources describes the resources needed to be able to deliver the value proposition. This block states and describes, the assets required for the business to function. The seventh block is the key activities. It lists and describes the key processes to put together original business resources and resources contributed by the key partners to deliver the value proposition. The eighth block is the key partnership, these are the different entities which compliments the resources and key activities of the business to be able to deliver the value proposition. The last component of the original business model canvas is the cost structure. This block describes the cost of delivering the value proposition including resources needed, key activities involved and, overall costs incurred to operate a business.

The two additional components of the business model canvas are the environmental and the social cost and benefit. These blocks list and describes the benefits and the shortcomings of the ecotourism business in the social environment and natural environment. Together, the

nine building blocks and the two additional blocks makes up the extended business model canvas which is presented in Figure 3.

The canvas is used in the study as a diagnostic tool during field work and as a basis for interviews as it is simple but doesn't over simplify the complexities in the business and covers the social, environmental, and economic aspects of the business. The left side of the extended business canvas describes the operation of the business, the right side describes the revenue model of the business, and the value proposition serves as a bridge to both sides. The bottom part of the business canvas/ the extended part describes the social and environmental implications of the business.

**Figure 3. The Extended Business Model Canvas**

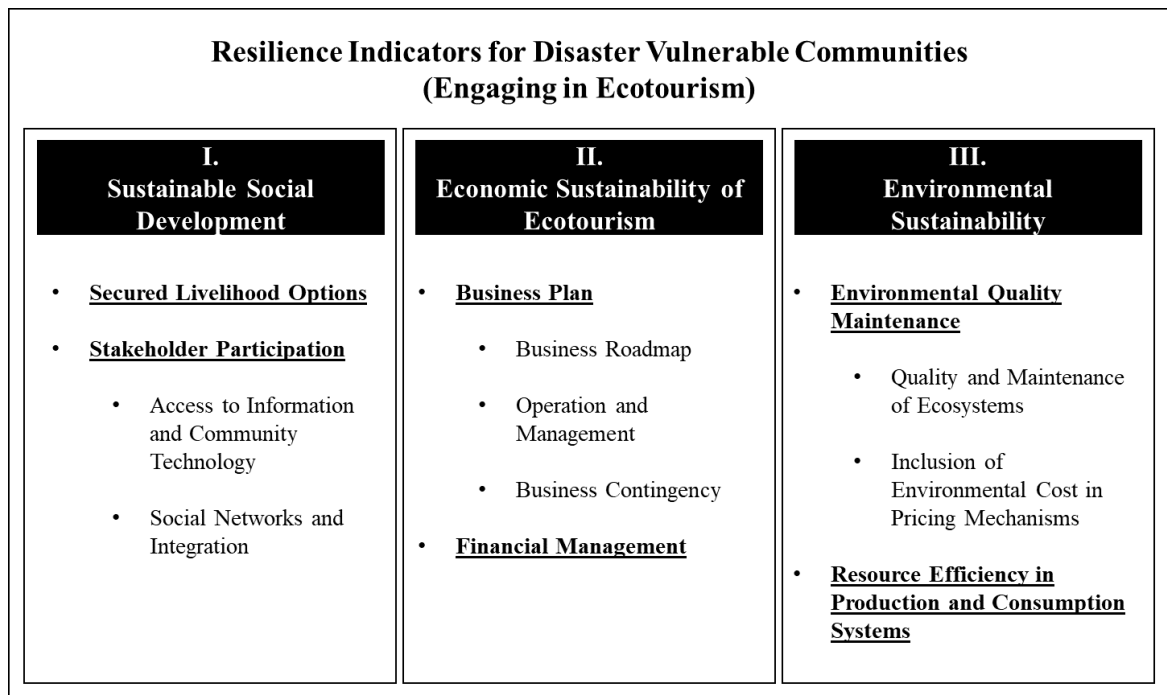


[Source: Modified by the author based on Osterwalder and Pigneur, 2013]

### 1.4.2 Resilience Indicators for Disaster Vulnerable Communities Engaging in Ecotourism

There haven't been any resilience indicators published for disaster vulnerable communities engaging in ecotourism. This is due to the limited studies of the use of ecotourism for such purposes. Based on the literature review, however, there are three main indicators evident in resilience frameworks which is used as the basis for the main indicators of the research framework, the resilience indicators for disaster vulnerable communities engaging in ecotourism. Sub-indicators were also derived based on review of the resilience models. The resulting framework to determine the role of ecotourism in community resilience in disaster vulnerable communities is shown in figure 4.

**Figure 4. Resilience Indicators for Disaster Vulnerable Communities Engaging in Ecotourism**



[Source: Created by the Author]

The three main indicators in this framework are: sustainable social development, economic sustainability of ecotourism, and the environmental sustainability. The tree indicators cover different aspects of the business which is the social, economic, and the environmental aspects.

The first indicator, the sustainable social development is described through two sub-indicators, the secured livelihood options and stakeholder participation. Secured livelihood options pertains to the livelihood opportunities presented by the ecotourism business to the community, the salary, and other livelihood opportunities that is brought about by the business to the community members. The second sub-indicator, the stakeholder participation is further described through the access to information and community technology, and social networks and integration. This sub-indicator pertains to the key partners and the channels of the extended business model canvas. Access to information and community technology pertains to the information or facilities and/or services of the ecotourism management group and their stakeholders which is being shared or is open access to the community. Social networks and integration, on the other hand, is how the business activities fit in with the community.

The second main indicator is the economic sustainability of ecotourism. This indicator has two sub-indicators. The first sub-indicator is business plan which is further divided into three, the business roadmap, operation and management, and business contingency. The business roadmap discusses the overview of the business including the mission, vision, goals and the action plans to achieve these goals. The organization and management sub-indicator discuss the business structure, how it is operated and who manages the business. The business contingency discusses the action plans of the business on how to continue running the business after the shock of a disaster. These sub-indicators of the business plan are mainly associated with the data that can be obtained from the left part of the extended business model canvas. The second sub-indicator is financial management which describes the cash flow statement, income projections, sources, and uses of funds, summary of financial needs, and profit/losses. This is mainly associated with the data that can be obtained from the right part of the extended business model canvas.



The final indicator is the environmental sustainability. The indicator has three sub-indicators. The first is environmental quality maintenance which includes quality and maintenance of ecosystems and inclusion of environmental cost in pricing mechanisms. Quality and maintenance of ecosystems includes biodiversity conservation, promotion of local species, and zoning. Inclusion of environmental cost pertains to the funds allocated by the ecotourism business in the maintenance of the environmental resources. The second sub-indicator is the resource efficiency in production and consumption systems which discusses the utilization of the resources in the ecotourism site.

The extended business model lists and describes the different aspects of the business model including the implications of the business to the society and the environment. However, it does not discuss resiliency, thus, the resilience indicators for disaster vulnerable communities engaging in ecotourism has been made and employed in the study.

## **CHAPTER 2: ECOTOURISM AND DISASTER MANAGEMENT IN THE PHILIPPINES: HISTORY AND POLICY**

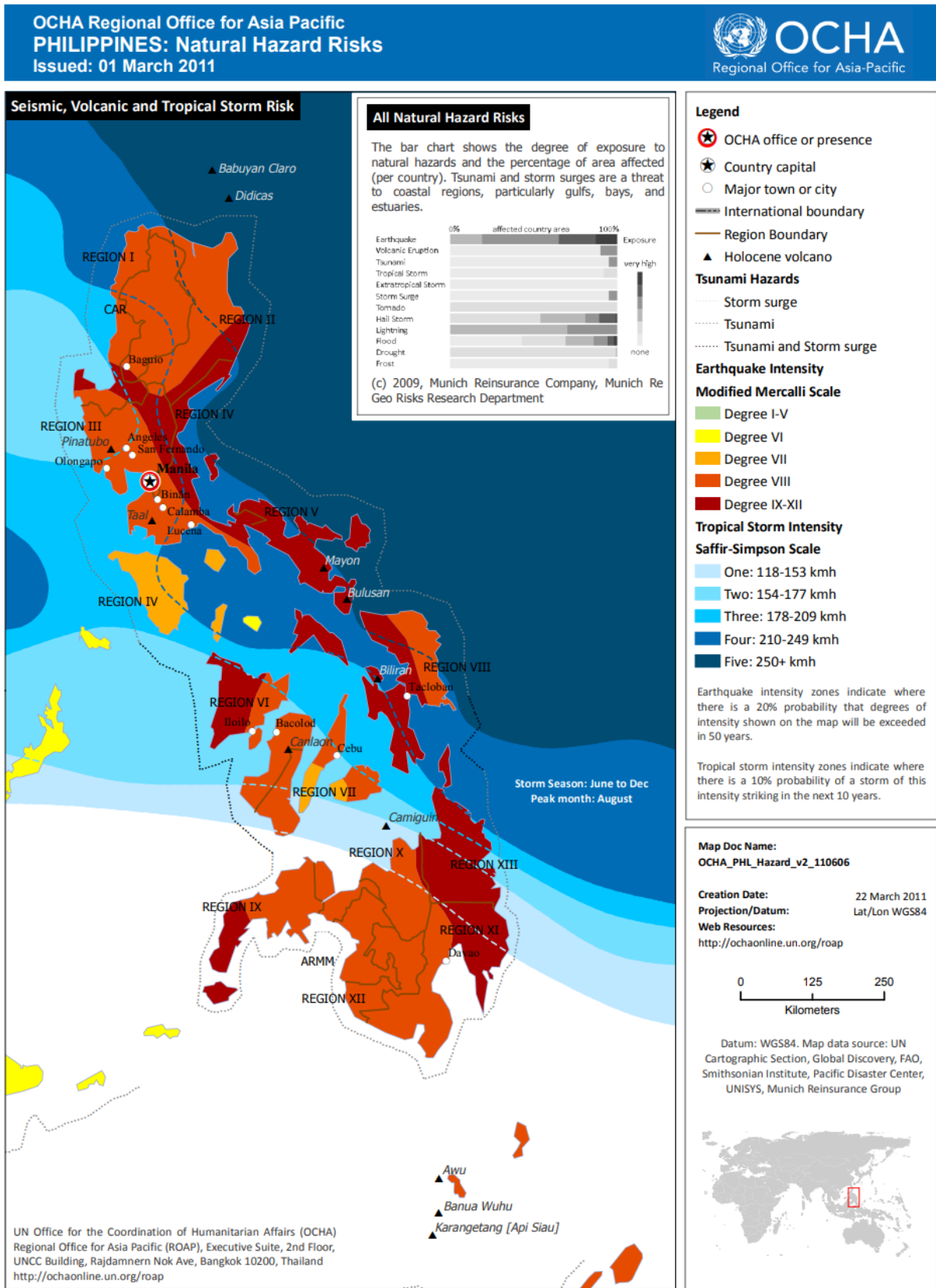
### **2.1 Introduction**

The Philippines is an archipelago comprising 7,107 islands with a rich diversity of flora and fauna. Declared by the Convention of Biological Diversity (CBD), the country is also one of the world's biodiversity hotspots sheltering majority of the world's species and possesses a high number of endemic species (CBD, 2009). The country's rich biodiversity is influenced by fertile soils, good elevation, and the shifting dry and wet season. The diverse and vast concentration of biodiversity in the country is becoming off interest by locals and foreigners alike. A popular activity to enjoy this rich biodiversity is through tourism activities, especially, ecological tourism or ecotourism.

In 2015, the Philippine Department of Tourism (DOT) estimated 38 million (foreigners, locals, and overseas Filipino Workers) travelers in the country. In addition, the country has been consistently nominated for travel and tourism awards regionally and internationally. In 2013 and 2016 the Philippines received the award for Asia's leading beach destination from the World Travel Awards.

Despite the popularity in terms of tourism, the country is being frequented by natural disasters. In the 2014 World Risk Report of the United Nations University (UNU), the Philippines placed second after Vanuatu out of 173 countries in terms of natural disaster risk. The country's vulnerability is brought by its geographical location. The country lays on the Pacific Plate, the Ring of Fire, and the Typhoon Belt. The United Nations for the Coordination of Humanitarian Affairs (UNOCHA) published the Philippine Vulnerability Map last March 1, 2011 which can be seen in figure 5.

Figure 5. Philippine Natural Hazard Risk Map



[Source: United Nations for the Coordination of Humanitarian Affairs (UNOCHA), 2011]

In figure 5, it can be observed that the whole country is disaster vulnerable. Specifically, the map shows seismic, volcanic, and tropical storm risks. The whole country is vulnerable to tropical storms. The north- eastern part of the country have storm risk which reaches 250kmh. In terms of seismic activity, most parts of the Philippines are at risk of experiencing degree VIII-XII.

Between 2005 and 2014 there have been about 18 major disasters in the Philippines causing the death of 1,817 people and 1.6B USD of economic losses (PreventionWeb, 2014). Looking closer at the impact of each kind of disaster the EM-DAT calculated the average annual loss caused by each disaster during the mentioned period using a probabilistic risk assessment model and results are showed in table 7. The table also shows the calculation for the AAL of capital stocks, gross fixed capital formation, social expenditure, total reserves, and gross savings all in percentage.

**Table 7. Average Annual Loss (AAL) by Hazard in the Philippines (2005-2014)**

<b>Hazard</b>	<b>Absolute [Million USD]</b>	<b>Capital Stock [%]</b>	<b>Gross Fixed Capital Formation [%]</b>	<b>Social Expenditure [%]</b>	<b>Total Reserves [%]</b>	<b>Gross Savings [%]</b>
<b>Earthquake</b>	703.46	0.124	1.264	6.160	0.929	0.666
<b>Wind</b>	4071.51	0.718	7.317	35.655	5.379	3.857
<b>Storm Surge</b>	2541.62	0.448	4.568	22.258	3.358	2.408
<b>Tsunami</b>	30.63	0.005	0.055	0.268	0.040	0.029
<b>Flood</b>	545.43	0.096	0.980	4.776	0.721	0.517
<b>Volcano</b>	557.60	0.098	1.002	4.883	0.737	0.528
<b>Multi- Hazards</b>	7,892.65	1.392	14.184	69.118	10.428	7.477

[Source: PreventionWeb, 2014]

The capital stock is the cost of infrastructures excluding road and rail network, telecommunications, and water supply. The gross fixed capital formation is the total investment of the country in new infrastructure and improvement of existing infrastructure. The social expenditure relates to the government spending on education, health and social protection. Total reserves are held by the IMF for IMF members excluding gold reserves. The gross savings is the GDP minus the final consumption expenditure.

In the Philippines, the capital stock is valued at 566 949M USD, the gross fixed capital formation is 55 644.769M USD, the social expenditure is 11 419M USD, the total reserves is 75 688.608M USD, and the gross savings is 105 564.233M USD (PreventionWeb, 2014). Multiple hazards in the Philippines has the highest computed AAL values amounting to 7,892.65M USD. In single hazard events, wind hazards have the highest computed AAL values amounting to 4071.51M USD. Among the different hazards, tsunami has the lowest AAL amounting to 30.63M USD.

Vulnerability of the country to natural hazards puts its total population of about 101 million people (Philippine Statistical Authority, 2017) at risk especially the indigenous groups, people with disabilities, women and girls, and children. Furthermore, 21.6% of the population who is living below the national poverty line would also be at risk during events of natural hazards (ADB Basic Statistics, 2017).

Despite the country's disaster vulnerability and the economic losses due to disasters, the tourism industry in the Philippines is increasing. In 2015, the total travel and tourism contribution is 10.6% of the national GDP (World Travel and Tourism Council, 2016) and in 2016, the total travel and tourism contribution increased to 19.7% (World Travel and Tourism Council, 2017). Additionally, the industry employed 10.3% of total employment in 2015 (World Travel and Tourism Council, 2016) and 18.1% of total employment in 2016 (World Travel and Tourism Council, 2017). Moreover, the World Economic Forum on Travel and Tourism ranked the Philippines, 37 of 136 countries for its natural resources (World Economic Forum, 2017) and 22 of 136 countries for price competitiveness (World Economic Forum, 2017).

The Philippines having pursued tourism for economic development should take into consideration disaster vulnerabilities and resilience. Ecological services of ecotourism should be

explored and understood such as the climate regulation service particularly resilience building to communities which is the theme of this study. This chapter will be discussing ecotourism in the Philippines together with its history, policies, and stakeholders in the country. The relation of ecotourism to community resilience in disaster vulnerable areas would also be explored particularly through government policies such as DRRM policies.

## **2.2 Overview of Ecotourism in the Philippines**

Ecotourism dates back around 1970s through the works of Hetzer and Ceballos-Lascurain. In the Philippines however, ecotourism became popular later in 1991. DOT collaborated with UNDP and WTO to create the Philippine Tourism Master Plan (TMP). The aim of the TMP is to make a world-class tourism destination out of the Philippines following the principles of sustainable tourism development. In 1992, ecotourism was officially introduced in the Philippine National Tourism Congress. In between 1994 to 1998 there have been series of regional seminars and discussion of the concept of sustainable tourism and ecotourism with several government agencies as the, DOT and the Protected Areas and Wildlife Bureau (PAWB) of the Department of Environment and Natural Resources (DENR). In 1998, a technical workshop was conducted to identify the elements and issues of a sustainable tourism development framework.

In June 17, 1999, Executive Order (EO) 111 was issued. The EO established a formal organizational structure for the development of ecotourism in the Philippines called the National Ecotourism Development Council (NEDC) which is composed of the secretaries of the DOT, DENR, Department of Interior and Local Government (DILG), Department of Trade and Industry (DTI), Department of Finance (DOF), Department of Education (DepEd), National Economic and

Development Authority (NEDA), and representatives from the private sector and non-governmental organizations (NGOs). In October 1999, the first National Ecotourism Congress was held. The congress aims to give ecotourism a formal definition and identify its role in promoting sustainable development, management, protection and conservation of the country's environment, natural resources and cultural heritage.

The ecotourism congress resulted in the creation of the formal definition of ecotourism in the Philippine context. Ecotourism in the Philippines is now defined as “a form of tourism within a natural and cultural heritage area where community participation, protection, and management of natural resources, culture, indigenous knowledge and practices, environment education, and ethics, as well as economic benefits, are fostered and pursued for the enrichment of host communities and the satisfaction of visitors” (DOT, 1999). Finally, in 2002, the National Ecotourism Strategy was issued to provide a framework for sustainable tourism development.

The Philippine archipelago has a rich biodiversity being shared and appreciated by locals and foreigners alike through several ecotourism destinations spread throughout the country. The promotion and development of these sites are mainly handled by the DOT which is the key government agency in charge of tourism. The DOT, in their official website have published a list of ecotourism sites tallying to 81 destination throughout the 17 regions of the country (see Appendix 1). Region I or the Ilocos region has the greatest number of ecotourism destinations counting up to 15. The ecotourism destinations in the region includes various sites from gardens, trails, caves, and protected areas. Region XIII or CARAGA is the second region having the most number of ecotourism destinations. The region has 13 ecotourism destinations mainly islands. There are regions however that does not have listings of ecotourism destinations, Region 9 or the Western Mindanao and the Autonomous Region in Muslim Mindanao (ARMM).

Though the DOT released a list of the ecotourism destinations there is no corresponding map. Furthermore, some of the ecotourism destinations listed is not easily seen in the Philippine map. Through research of the corresponding ecotourism site locations (based on coordinates), an ecotourism map is made. The map of the ecotourism destinations listed by the DOT is shown in Figure 6. The numbers correspond to the list of ecotourism destinations found in Appendix 1.

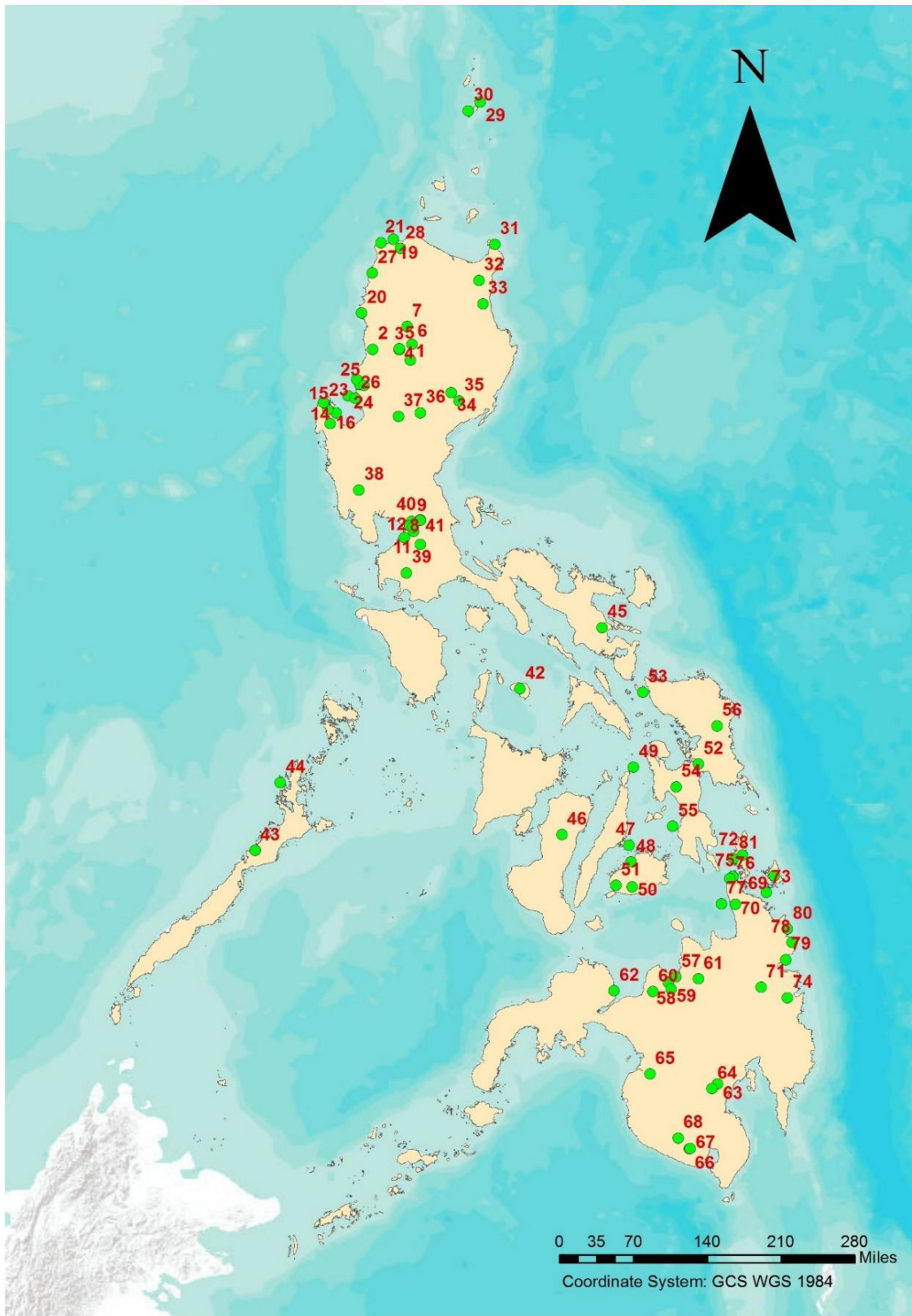
Visualizing the ecotourism map (figure 6) over the hazard map (figure 5) it is evident that most of the ecotourism destinations fall in disaster vulnerable areas. Included in the ecotourism destinations vulnerable to disasters are the two cases which will be discussed in Chapter 3 and 4. In Chapter 3, the case of the Pamulaklakin Forest Trail (PFT) will be presented. PFT is not listed in the map (figure 6) however it is located near number 38, Mt. Pinatubo which is the only ecotourism destination listed in Region III or Central Luzon. The second case, the Mayon Volcano Natural Park (MVNP) which is discussed in Chapter 4 is located in number 45 of the map. Mt. Mayon or MVNP is the only ecotourism destination listed by the DOT in Region V or Bicol.

### **2.3 Policy Support for Ecotourism and Disaster Management in the Philippines**

The Philippines is pursuing its tourism industry despite its disaster vulnerability. Throughout the years, the country has developed strategies and policies to advance and enhance its tourism industry as well as to combat climate change and manage disasters. The following section will discuss the different policies, rules, and regulations in disaster management and climate change, and tourism, especially ecotourism.



Figure 6. Ecotourism Map of the Philippines Based on DOT Site Listings

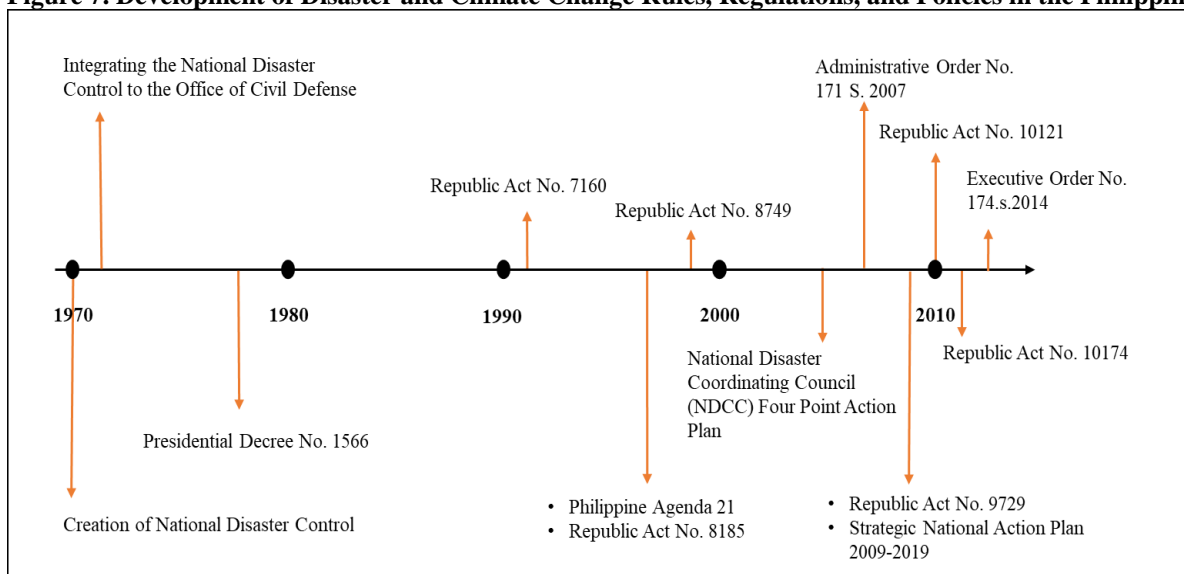


[Source: Created by the Author]

### 2.3.1 Rules, Regulations, and Policies in Disaster Management in the Philippines

Development of disaster and calamity management policies in the Philippines was prompted by typhoon Joan which hit the country in 1970. The government then recognized the high disaster vulnerability of the country. From 1970, there have been several developments in disaster management and climate change rules, regulations, and policies in the Philippines which is summarized through a graph in figure 7.

**Figure 7. Development of Disaster and Climate Change Rules, Regulations, and Policies in the Philippines**



[Source: Created and Compiled by the Author]

During the presidency of Ferdinand Marcos in 1970s, the National Disaster Control has been established. The center has been tasked to keep track of the aftermath of disasters. However, the control center has been abolished and its function and employees were transferred to the Office of Civil Defense (OCD) in 1972. The former president Marcos after 1972, mandated the Presidential Decree No. 1566 in 1978 which strengthens the Philippine disaster control. At the same time, the decree created the National Disaster Coordinating Council (NDCC) headed by the Secretary of National Defense. Regional, provincial, and local coordinating councils were also established however, NDCC remains to be the focal organization for disaster management during the time. The different councils is being operated

through utilization of 2% of the local funding's unappropriated reserves coming from the estimated revenue from regular sources of unforeseen expenditures.

Later 1978, is the Republic Act No. 7160, the Local Government Code (LGC) of 1991. The LGC enables the Local Government Units (LGUs) to access 5% of their estimated revenue from regular sources for occurrence of calamities given the president declares a state of calamity in the jurisdiction of the LGU.

In 1992, the United Nations Conference on Environment and Development (UNCED) popularly known as the Earth Summit has been held in Rio de Janeiro where Agenda 21 was presented. The Agenda is an action plan which works towards sustainable development and recognizes that is a primary responsibility of governments which requires creation of national strategies, plans, and policies. Agenda 21 is divided into four sections, social and economic, conservation and management of resources for development, strengthening the role of major groups, and means of implementation.

Though Agenda 21 is non-binding, the Philippine government created a response through the launch of the Philippine Agenda 21 (PA21) in 1996. PA21 pushes for sustainable development through the principles of unity, the action agenda, and the implementation strategies. Through implementation of PA21, the government envisions a better quality of life for all Filipinos. The visions of PA21 focuses on poverty reduction, social equity, empowerment and governance, peace and solidarity, and ecological integrity.

In 1996, R.A. no 7160 or commonly known as the LGC of 1991 has been amended for better utilization of local government funds. The LGC of 1991 was put into law via the Republic Act No. 8185. The LGC of 1991 has been amended as such 5% of the estimated revenue from regular sources of local governments shall be reserved for relief, rehabilitation, reconstruction and various works and services related to calamities. The funds shall however

be used as determined by the LGU and only in areas affected by a disaster. Furthermore, in cases of fire, the funds will only be used for relief operations.

In 1999, R.A. No. 8749, the Philippine Clean Air Act is mandated. The law creates an Air Quality Improvement Framework monitoring and setting standards for greenhouse gas emissions which causes the increase in global temperature. The policy was made and created by DENR in partnership with different LGUs, NGOs, POs, and the academe.

In 2004, E.O. No. 320, S.2004 has been mandated designating DENR as the authority for the clean development mechanism. The mentioned E.O. is adapted from the clean development mechanism of the United Nations Framework Convention on Climate Change (UNFCCC). The framework aims to implement projects which are focused on the absorption of greenhouse gasses and prevention of emission of greenhouse gasses.

In 2005, NDCC created the Four Point Action Plan focusing on disaster prevention and mitigation. The first action plan focuses on different governmental agencies, the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) and the Philippine Institute of Volcanology and Seismology (PHIVOLCS) to upgrade their forecasting capabilities to warn other agencies against incoming disasters. The second action plan gives emphasis on disseminating information and educating the public on disaster preparedness. The third action plan stresses capacity building of local chief executives and disaster coordinating councils. The last action plan is towards the government strengthening their mechanisms and private sector partnerships.

The Philippines signed in the UNFCCC on June 12, 1992, ratified on August 2, 1994, and signed the Kyoto Protocol on April 15, 1998, ratified on November 22, 2003. Ratification to both signifies the governments concern in addressing issues on climate change which lead to the government crafting Administrative Order no. 171 in 2007. The A.O. forms the

Presidential Task Force on Climate Change (PTFCC) composing different governmental agencies as the DENR, Department of Energy (DOE), Department of Science and Technology (DOST), Department of Agriculture (DA), and DILG including two representatives from the private sector and civil society.

In 2009, Republic Act No. 9729 commonly known as Climate Change Act of 2009 has been mandated creating the country's Climate Change Commission. The commission is the sole policy making body tasked in coordinating, monitoring, and evaluating programs and action plans of the government concerning climate change. The commission is attached to the office of the president where the president serves as the chairperson. Apart from the president, three commissioners are appointed. The commission also has an advisory board composing of 23 secretaries from different local government agencies.

In 2009, the Strategic Action for Plan for Disaster Risk Reduction (SNAP) 2009 – 2019 has been developed. The SNAP pursues the strategic goals of the Hyogo Framework for Action (HFA) which is geared towards building resilience against disasters and takes off from the NDCC four-point action plan. SNAP is based in two guiding principles. The first principle is that DRR is directly linked to poverty alleviation and sustainable development. The second principle is that participation of various stakeholders is needed to mainstream DRR in relevant sectors in the society.

The Republic Act No. 10121 commonly known as the Philippine Disaster Risk Reduction and Management Act has been mandated in 2010. The R.A. has the purpose to strengthen the DRRM system in the country, provide a national DRRM framework, and institutionalize the national DRRM plan. This R.A. changed NDCC to the National Disaster Risk Reduction and Management Council (NDRRMC) and called for creating the National Disaster Risk Reduction and Management Plan (NDRRMP) of 2011-2028.

In 2012 the Republic Act No. 10174 or the People's Survival Fund has been passed into law. The law amends the Climate Change Act of 2009 and incorporates a climate finance feature. However, the climate finance feature is for climate change adaptation. It is a special fund from the national treasury for financing adaptation programs and projects based on the National Strategic Framework.

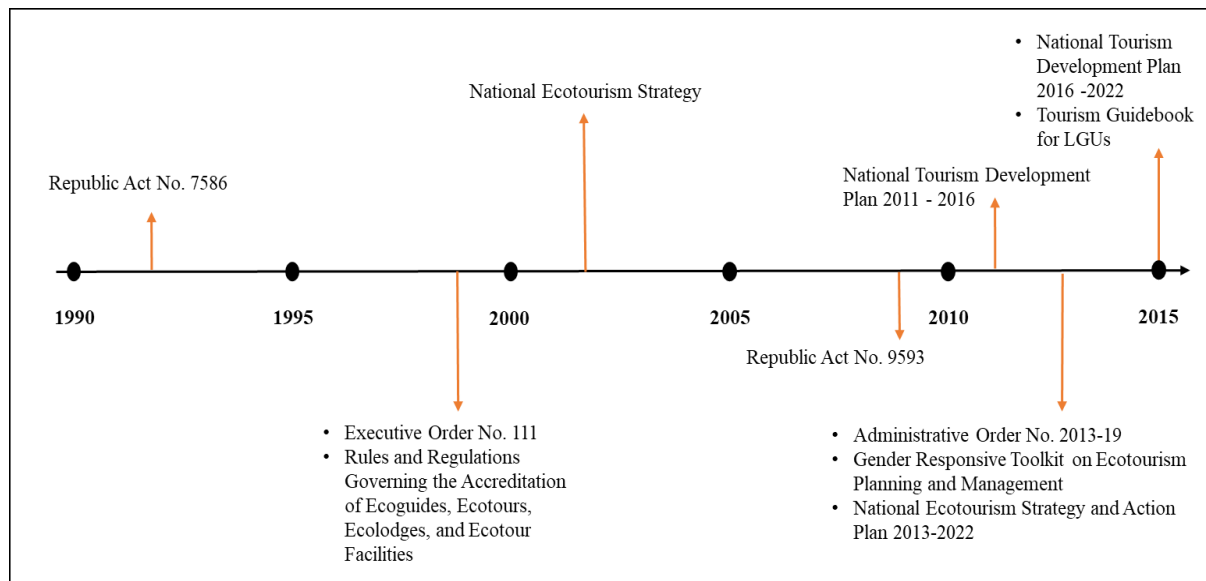
In 2014, Executive Order No. 174.s2014 has been mandated. The E.O. establishes the Philippine Greenhouse Gas Inventory, Management, and Reporting System (PGHGIMRS) institutionalizing the GHG inventory management and reporting system in different government agencies for the country to be able to transition towards a climate-resilient pathway for sustainable development. The system is responsible for providing guidance and direction in accounting and reporting of GHG emissions.

The Philippine government have developed a combination of 14 rules, regulations, and policies regarding climate change and disaster management since the 1970s. Recent policies in disaster management and climate change has been mainly inspired and adopted from international strategies or treaties as Agenda 21, the UNFCCC, and the HFA and the governments increasing concern in disaster management and climate change. In terms of coordinating disaster management in the country, the focal point is the NDRRMC where the Department of National Defense (DND) serves as the secretariat and the executive arm. In terms of the different phases of the disaster there are different governmental agencies which supports the NDRRMC. DOST leads the efforts in mitigation of disasters. DILG leads efforts in disaster preparedness. The Department of Social Welfare and Development (DSWD) leads in disaster response and NEDA leads in disaster rehabilitation and recovery. Apart from the national agencies, there are also existing regional and local DRRMCs.

### 2.3.2 Rules, Regulations, and Policies in Ecotourism in the Philippines

In the Philippines there are more than 160 rules, regulations, and policies concerning tourism listed in the portal of the Department of Tourism (DOT). However, there are very few ecotourism specific policies, rules and regulations. Figure 8 shows the development of ecotourism rules, regulations, and policies in the Philippines including the development of the national tourism plan.

**Figure 8. Development of Ecotourism Rules, Regulations, and Policies in the Philippines**



[Source: Created and Compiled by the Author]

The first mention of ecotourism is in the Republic Act No. 7586 or the National Integrated Protected Areas System (NIPAS) Act of 1992. Defined in the NIPAS act, protected areas are “identified portions of land and water set aside by reason of their unique physical and biological significance, managed to enhance biological diversity and protected against destructive human exploitation” (NIPAS Act, 1991). The act provides the establishment of the buffer and multiple use zones which includes zones for ecotourism in protected areas. NIPAS recognize that tourism can aid in protection, development and management of protected areas. In the different zones of a protected area, tourism activities are permitted in what is called, “recreational zones.” The mentioned zones are set mainly to provide benefits to residents of the zones and for visitors to be able to appreciate nature. The NIPAS Act also initiated the restructuring of the DENR

which resulted in the creation of the Protected Areas and Wildlife Bureau (PAWB) which is in-charge of formulating policies and guidelines in establishing and managing protected areas.

In 1999, the first policy focusing in ecotourism has been mandated, Executive Order No. 111. The E.O. establishes the guidelines for ecotourism development in the Philippines and states that “development and promotion of ecotourism in the Philippines are viable and sustainable activities that will promote the protection of our environment while contributing at the same time to the growth of the economy” (Executive Order No. 111, 1999). The E.O. includes a joint memorandum circular designating DOT and DENR to collaborate in developing the ecotourism industry in the Philippines.

Creation of the mentioned E.O. called for the creation of the National Ecotourism Development Council (NEDC) together with the National Ecotourism Steering Committee (NESC) and the Regional Ecotourism Committees (REC). The different committees are created to enable smooth implementation of different ecotourism program and activities. The NEDC is the policy-making body and is composed of secretaries from the DOT, DENR, DILG, DTI, DOF, NEDA, DepEd, and representatives from the private sector and NGOs. NEDC is chaired by the DOT and is co-chaired by DENR.

In the same year, E.O. No. 111 have been mandated, the rules and regulations governing the accreditation of eco-guides, ecotours, ecolodges, and ecotour facilities has been issued. DOT is the main organization responsible for issuing accreditation certificates. Accreditation calls for the submission of different requirements, a valid mayors permit or a business license from the local government, a valid DTI business name certificate in case of a single proprietorship, securities and exchange commission registration certificate and articles of incorporation and its by-laws in terms of corporation or partnerships, articles of cooperation and its by-laws in terms of cooperatives, and the notarized list of names of officials and employees with designation. In different cases, DOT might require other documents such as



working permit in cases there are foreign employees. The fees needed to be paid for accreditation can be seen in table 6. In terms of accreditation of an ecolodge, an ecotour operator, and an ecotour facility an initial payment of 1,000php ( $\approx 20$ usd) shall be made and upon approval of the accreditation an additional of 2,000php ( $\approx 40$ usd) shall be paid. An additional of 100php ( $\approx 2$ usd) shall be paid for the sticker showing the accreditation. In terms of an ecoguide accreditation, 500php ( $\approx 10$ usd) shall be paid initially and upon approval, a fee of 1,000php ( $\approx 20$ usd) shall be paid. An additional 50php ( $\approx 1$ usd) should also be paid for the id.

**Table 8. Fees for Ecotourism Accreditation**

Type of Ecotourism Enterprise	Accreditation Fee	Initial Payment (Upon Filling the Application)	Final Payment (Upon Approval of Accreditation)	
Ecolodge	3,000.00	1,000.00	2,000.00	100.00 (sticker fee)
Ecotour Operator	3,000.00	1,000.00	2,000.00	100.00 (sticker fee)
Ecotour Facility	3,000.00	1,000.00	2,000.00	100.00 (sticker fee)
Ecolodge	1,500.00	1,000.00	500.00	50.00 (ID fee)

Note: all amount is in Philippine Peso (50 peso  $\approx$  1 US dollar)

[Source: Department of Tourism, 1999]

Accreditation of ecotourism businesses or enterprises are not mandatory. However, in 2017, DOT listed seven benefits of the accreditation. The first benefit is the endorsement of the business to the different embassies and travel trade organizations. The second benefit is the eligibility of the business to participate in travel fairs headed and organized by DOT. The third benefit according to DOT is the invitation and prioritization of the tourism business management staff to training programs of the DOT. The fourth benefit is specifically for tour operators and accommodation establishments accredited for two years. They will be endorsed by the DOT to access pass on international airports. The fifth benefit is mainly for accommodation establishments and restaurants. DOT will endorse for exemption of the business from the liquor ban during election related activities and events. The sixth benefit according to the DOT is the free online and/or print advertising of the business in national

papers. The last benefit according to the DOT is the promotion of the business in different social media site of the DOT.

Apart from the benefits stated by the DOT for the business, accreditation could also benefit its different stakeholders and the environment. Stated in the rules and regulations governing the accreditation of eco-guides, ecotours, ecolodges, and ecotour facilities, the accreditations general advantage is the protection and management of environment, culture, indigenous knowledge, and practices. Specific advantages of accredited ecotour facilities and ecotour operators in the community and the environment are also identified in the rules and regulations of accreditations.

In the rules and regulations to govern the accreditation of eco-guides, ecotours, ecolodges and ecotour facilities, an accredited ecotour facility is said to provide benefits to the community and the environment. There are several benefits to the community and the main benefit is the employment of community members in the facility. Locally produced souvenirs and products would be made available in the facility. Furthermore, a representative from the ecotour facility would keep in touch with a representative of the community and will discuss the effects of the operation of the facility to the community. Environmental protection and conservation could also be achieved with an accredited ecotour facility. Rubbish and garbage of visitors would be removed. Rehabilitation of areas subjected to negative visitor impacts will be done. Facilities that reduce visitors' impact will be provided and monitoring environmental impacts will be done. Furthermore, research on visitor impacts will be provided. The ecotour facility and the ecotour operator accreditation also provide similar benefits to the environment.

An accredited ecotour operator would also provide certain benefits to the community and the environment. Within five years of operation, the ecotour operator shall hire at least fifty percent of its employees from the community and a number should occupy key management positions in the operation. Ecotourism impacts to the community would be regularly monitored.

Discount access will be offered to the community such as school or other special interest groups. One or more local resident should be given access to free training for better employment. Work experience for one or more local student should also be given along with more opportunities for women and marginalized groups within the community. A representative from the business will attend community meetings, workshops, seminars, and consultations, as well as participate in local events to show support to the community. A representative of the business would also join local advocacy groups or civic organizations and express support for community endeavors through letters or endorsements. Local network of suppliers will be developed which will stimulate the demand for local products expanding and creating local community enterprises.

E.O. no. 111 was followed by the ecotourism accreditation and later, in 2002, the formulation of the National Ecotourism Strategy (NES). The NES has a vision of advocating, fostering, coordinating, monitoring, and mobilizing support for the ecotourism industry. The NES also aims to identify key ecotourism destination entails a two-level evaluation. In the first level of evaluation, a scoring system is utilized, and scores are computed based on relative weights. Thirty five percent of the evaluation assesses the ecotourism products based on natural and/or cultural features. Another thirty five percent evaluates the availability of ecotourism products. The remaining thirty percent assesses the level of social/ political support.

The second level of evaluation also includes a scoring system using relative weights and is focused on priority-setting based on market demand and forecasted benefits to the community and visitor. The highest weight, thirty percent is given to the assessment of the current market demand from international and domestic visitors, including the potential appeal to these markets. Another thirty percent is the assessment of local benefits accruing to the community through livelihood and employment opportunities. Twenty five percent is given to the assessment of the availability of visitor facilities and services and ten percent is given on

the assessment of the accessibility of the site from major international and domestic gateways and tourism flows. The remaining five percent is given to the assessment of peace, order, security and safety. The selected sites, those that obtain scores higher than seventy percent are divided into four clusters representing four main groupings of regions that share a common major gateway.

In 2009, came R.A. no. 9593, the National Tourism Act of 2009. The R.A. designates the DOT as the primary government agency in planning, programming, coordinating, implementing, and promotion of the tourism industry. Under the R.A. is the creation and mandate of the Tourism Infrastructure and Enterprise Zone Authority (TIEZA) which is tasked in designating, regulating, and supervising the Tourism Enterprise Zones (TEZ) together with the development, management, and supervision of tourism infrastructure projects. TEZs are zones which are selected and designated to be centers of development in the country.

Following the National Tourism Act is the National Tourism Development Plan 2011-2016. The tourism plan is geared towards the improvement of the tourism industry, developing a highly competitive, environmentally responsible, and socially responsible producing income and employment opportunities. The vision of the tourism plan is for the country to become a fun and a must experience destination in Asia. The plan has three strategies. The first strategy is the development, marketing, and promotion of competitive tourist products and destinations. The second strategy is the improvement of the market access, connectivity, and destination infrastructure. The last strategy is the improvement of the institutional governance and human resources.

The guidelines on ecotourism planning and management in protected areas, Administrative Order No. 2013-19 have been developed in 2013. The A.O. revolves around the planning and management of ecotourism activities inside protected areas in the NIPAS Act. The A.O. is inspired by the number of protected areas (see Appendix 2 for the map and 3 for

the legend) in the Philippines of which, a number pursues development of ecotourism businesses and activities. The A.O. indicates four phases in the development of an ecotourism business, namely, site assessment, ecotourism planning, implementation, and monitoring and evaluation.

In 2013, the Philippine Commission on Women and PAWB showed interest in including gender in ecotourism development and thus have crafted the Gender Responsive Toolkit on Ecotourism Planning and Management. In creating a gender sensitive ecotourism business, five guidelines have been set by the Philippine Commission on Women and PAWB. The first guideline is to determine the role of women and men in the proposed ecotourism project. The second guideline is to make a gender analysis, identifying existing gender issues and related concerns that may arise. The third guideline is to design strategies that can address the issues relevant to a proposed/existing ecotourism project. The fourth guideline is the data collection of the demographics of women to help identify socio economic gaps. The last guideline is the establishment of an enabling mechanisms and support system to ensure mainstreaming gender responsiveness in local development planning.

In 2013, a new National Ecotourism Strategy and Action Plan has been released. The goal of the new action plan and strategy is for ecotourism development to be environmentally and socially responsible while visitors enjoy and get educated, and for local communities to have income and employment opportunities especially the vulnerable groups. The new NES outlines eight strategies. The first strategy is to develop and market diversified and competitive ecotourism products. The second strategy is to create a conducive environment for ecotourism investments. The third strategy is to maximize economic benefits for the host communities. The fourth strategy is to promote and develop a culture of ecotourism. The fifth strategy is to strengthen institutional capacity. The sixth strategy is to develop and strengthen partnerships.

The seventh strategy is to establish mechanisms for sustainable financing. The last strategy is to monitor outcomes and impacts.

In 2015, the new National Tourism Development Plan has been developed. The vision and guiding principle of the tourism development plan is to develop the Philippine tourism industry to be globally competitive, environmentally sustainable and socially responsible while promoting inclusive growth through generating employment. In 2015, the Tourism Guidebook for LGUs have also been published. The guidebook is a tool for LGUs to create their local tourism development plans. The guidebook provides concepts, methods, step-by-step processes and worksheets as well as examples and readings on tourism concepts and planning for LGUs. The guidebook is the result of the collaboration between DOT, Japan International Cooperation Agency (JICA), Department of Interior and Local Government (DILG) and the Development Academy of the Philippines (DAP), DENR, and the Embassy of Canada.

There are 11 rules, regulations, and policies that have been presented and discussed. The country has its own tourism strategic and action plans, however, one niche, ecotourism among others, has its own. However, it is noticeable how limited ecotourism has been mentioned or discussed in the national tourism strategic and action plans. There are several ecotourism destinations around the country as mentioned earlier in the chapter however, development of ecotourism sites which is mentioned in the regulations are mainly specific to protected areas and sites mentioned in the NIPAS Act. The principal agency in-charge of tourism is the DOT who is also in-charge of tourism accreditation. There is no national ecotourism department nor an arm of the DOT focusing on ecotourism. However, in managing ecotourism in protected areas, DOT and DENR share responsibility. Recent interest of the government in ecotourism is in guiding LGUs develop ecotourism businesses and incorporating gender studies.

## **2.4 Locating Resiliency in Disaster Management and Ecotourism Policies**

In the previous section of the chapter, tourism, specifically ecotourism and disaster management and climate change rules, regulations, and policies have been presented separately. Examining each rule, regulation, and policy for disaster management and climate change it has been found out that intersection between climate change, disaster management, tourism, and resilience is limited. In disaster management and climate change rules, regulations, and policies, tourism in general has only been mentioned three times, in two policies and in one action plan. Resilience on the other hand had been mentioned five times, four mentions in policies and one in an action plan.

Examining the general tourism rules, regulations, and policies ecotourism has been discussed briefly in the tourism act of 2006, NTDP 2011-2016, and NTDP 2016-2022. However, in the different rules, regulations, and policies of tourism disaster have only been mentioned once and the same for resilience.

### **Tourism in Disaster Management and Climate Change Policies**

The LGC of 1991 mentioned tourism twice in its chapter 2 section 17, basic services and facilities. In the general powers and attributes of local government units, it states that municipalities should provide basic services such as “tourism facilities and other tourism attractions including the acquisition of equipment, regulation and supervision of business concessions, and security services for such facilities while the province should provide “tourism development and promotion program” (LGC, 1991). This means that in case of a disaster, support from the local government can be received to develop tourism infrastructures.

In the Strategic National Action Plan (SNAP), tourism has been mentioned three times. The first mention of tourism is in the discussion of the national government expenditure for DRR. An instance where the government funds in DRR is used by the DOT is the acquisition of services

from the Crisis Management Institute to provide trainings. In the priority programs and projects under safety and well-being enhancement, tourism has also been mentioned. The key priority program where tourism is mentioned is the DRR capability building for key response and coordinating agencies of NDCC. The SNAP also mentioned integration of current DRR practices in several sectors including tourism. On the other hand, R.A. no. 10121 have only mentioned tourism briefly, that the secretary of DOT is a member of the NDRRMC.

In spite the number of disaster and climate change policies in the country, it is surprising how tourism has been barely mentioned and the tourism council having limited collaborations or involvement in disaster management and climate change initiatives. Although DOT is indicated as a member of the NDRRMC its task was not specified. It is however recognized in the SNAP that there is a need for the tourism sector to be more involved and aware in integrating DRR practices in tourism development and management.

### **Resilience in Disaster Management and Climate Change Policies**

Resilience have been a buzzword specially in the field of disaster management and climate change. In the rules, regulations, and policies in disaster management and climate change discussed earlier, resilience has only been mentioned in four.

In R.A. no. 9729, R.A. no. 10174, and R.A. no. 9729 resilience have been mentioned only once, all which is part of the policy declaration. The Philippines is a party of the HFA and the mentioned R.A.s resulted to its adoption. The nation will be adopting the strategic goals mentioned in the HFA to build resilience in the national and local level against climate change and other related disasters.

The NDRRMP 2011-2028 have mentioned resilience in its objective. The aim of the NDRRMP is to make a safe, adaptive, disaster resilient, and sustainable communities. Resilience have also been mentioned in two out of the four thematic areas that the NDRRMP



covers. In the first thematic area, prevention and mitigation, one of the listed outcomes is the increased resiliency of infrastructure systems. In the last thematic area, disaster rehabilitation and recovery also mentioned resilience in the outcome, that houses being rebuilt or repaired should be more resilient to hazard events and that disaster and climate change-resilient infrastructure should be constructed/reconstructed. In section one of E.O. no 174 resilience have also been mentioned. The E.O. establishes the PGHGIMRS which is a system towards the country in transitioning to a climate-resilient pathway for sustainable development.

Resilience have been used more popularly in the context of international disaster frameworks. The mentioned international frameworks however, have been used by the Philippine government as a basis for crafting their national disaster management and climate change rules, regulations, and policies. Whist the referencing on international disaster frameworks, it is only the NDRRMP which have included community resilience, however, it is more focused on creating, developing, and reconstruction of infrastructures resilient to disasters.

### **Ecotourism in Tourism Rules, Regulations, and Policies**

Though having its own strategic and action plan, ecotourism is still a subset of tourism. Locating ecotourism in the general tourism rules, regulation, and policies, it has been found out that it has been mentioned in the Tourism Act of 2009, NTDP 2011-2016, and NTDP 2016-2022.

In the Tourism Act of 2009, ecotourism has been mentioned as a part of its objectives, in helping determine ecotourism sites. The act also mentioned the overlapping authority of DENR and DOT in identifying areas in the NIPAS Act with ecotourism potentials. Furthermore, the act also mentioned the reservation of five percent of the travel tax collection to development of ecotourism sites with strong potentials.

The NTDP 2011-2016 have mentioned ecotourism multiple times. Furthermore, it is mentioned that the National Ecotourism strategy has been reviewed prior to creating the plan. NTDP 2011-2016 also mentioned the overlapping jurisdiction of DOT and DENR over protected areas. In the plan, ecotourism has been identified under the tourism category, nature-based tourism. Though being under the nature-based tourism category, ecotourism has been given emphasis as the plan states designing and implementation of product development programs targeting ecotourism in fifty key natural heritage sites.

Though it seems that ecotourism has been frequently mentioned in general tourism rules, regulations, and policies, there is no dedicated chapter or elaboration of the role or contribution of ecotourism in tourism development.

### **Disaster Management in Tourism Rules, Regulations, and Policies**

Among the tourism rules, regulations, and policies, disaster management has been mentioned in two, NES 2002 and the NTDP. In the NES 2002, disaster is mentioned several times. In terms of disaster management, the NES states that the NDCC spearheads rescue operations. Meanwhile, it is stated that the support programs including disaster/ emergency management should be strengthened for the ecotourism destinations to be more attractive and competitive in the market. Another mention of disaster management is in the program component of the NES. A desired outcome for education and advocacy is strengthening different programs including programs in disaster/emergency. In the NTDP 2011–2016 disaster have been mentioned however only once. It mentioned the recognition of disasters in the tourism sector as threat to development.

The country being vulnerable to natural hazards and continuously pursuing its tourism industry have recognized disasters as a threat to tourism development. However, the inclusion of disaster management in tourism rules, regulations, and policies have been limited.

## **Resilience in Tourism Rules, Regulations, and Policies**

The tourism sector is at risk specially in times of disasters. It is surprising that resilience has only been mentioned in one regulation. In the rules and regulations governing the accreditation of eco-guides, ecotours, ecolodges, and ecotour facilities resilience have been mentioned in the standard requirement for an ecolodge and an ecotour facility. In the requirements, the ecolodge and the ecotour facility should conduct an environmental planning and impact assessment addressing ecological risk which include conservation significance, regional or local values, integrity, sensitivity, resilience, and rehabilitation of resources.

## **2.5 Conclusion**

The Philippines have been paying attention in combating disasters since 1970s due to its high disaster vulnerability. Alongside the development of disaster and climate change policies is the popularity of the tourism industry. During 1990s tourism policies have begun to be developed and ecotourism became a popular tourism niche having its own national plan.

Throughout the years, tourism in general have become a valuable industry in the Philippines. In 2016, total travel and tourism contribution to the country's GDP reached to 19.7% and 10.3% of the total employment (World Travel and Tourism Council, 2017). In the Philippine Development Plan (PDP) of 2017-2022 tourism have also been mentioned. The focus of the PDP is "building a future where every Filipino enjoys a matatag, maginhawa, at panatag na buhay". In English, building a future where every Filipino enjoys a stable, comfortable, and peaceful life. In doing so, there are several plans mentioned and among is the involvement of the tourism sector. The Philippine government wants to promote tourism, in particular, ecotourism, and cultural sites to be able to promote Philippine culture and values, to

generate business and work opportunities, and increase the foreign direct investments. Promotion of tourism in the plan also meant development of sustainable-based industries.

In parallel with the development of the tourism industry is the increase in frequency of disasters in the country. In the PDP, disaster have been mentioned several times and along with the mention of resilience. It is mentioned in the PDP that as the nation needs to put emphasis on the promotion and building of climate resilient infrastructures, the assessment of national disaster vulnerability, building institutional responses to disasters, monitoring and evaluation of disaster and climate change actions, enhancing disaster resilience of businesses, and the improvement of adaptive capacities and resilience of ecosystems.

Though the PDP includes and mentions climate resilience and tourism there is no specific action mentioned for the tourism business to be used in increasing or developing resilience neither its involvement in disaster management actions. This holds true especially in looking further, analyzing and studying the different disaster, climate change, and tourism policies in the country. There is a lack of connection between the three different themes in terms of government initiatives.

First to be noted is the integration and presence of ecotourism in general tourism rules, regulations, and policies. Although there is a dedicated ecotourism policy, the National Ecotourism Strategy, general tourism policies, R.A. no. 9593, the NTDP 2011-2016, and the NTDP 2016-2022 have no dedicated chapter on ecotourism neither, the elaboration of the role or contribution of ecotourism in tourism development. It has been established that the country recognizes natural hazards as a threat in tourism development, however, there are still limited linkages between disaster and tourism policies, furthermore resilience. Tourism policies barely mentioned resiliency, though, disaster and emergency management measures are being developed and integrated in the tourism sector. Disaster management policies on the other hand

does not include and mention ecotourism and the ecotourism policies does not include the promotion of resiliency and the utilization of ecotourism as a strategy for DRRM. This situation may be related to the late establishment of the NDRRMC.

Future policies relating to tourism, especially ecotourism which is highly vulnerable to disasters should include not only a response component in events of disasters but also, a disaster management component. Furthermore, disaster management policies should pay attention on the value of the ecosystem as a tool for DRRM specially the role that ecotourism could play.

## **CHAPTER 3 INDIGENOUS PEOPLE (IP) MANAGING THE ECOTOURISM BUSINESS: A CASE STUDY OF THE PAMULAKLAKIN FOREST TRAIL (PFT) IN THE PHILIPPINES**

### **3.1 Introduction**

This chapter introduces the Pamulaklakin Forest Trail (PFT) and examines its ecotourism business. The term Pamulaklakin is of Filipino origin translating to herbal vine in English. PFT is in the province of Zambales, in the municipality of Subic, and it lies inside the area which is called the Subic Bay Freeport Zone (FPZ), a former American Naval Base. The zone is a result of the establishment of the Bases Conversion and Development Act of 1992. The PFT of 67,000 hectares of land is being managed and operated by the Subic Bay Metropolitan Authority (SBMA), a government owned and controlled corporation.

PFT is owned and managed by the Aeta tribe. It is located nearby the Pamulaklakin village, the home of 500 Aeta families constituting the community around the PFT. The Aeta tribe is an indigenous group of people, one of the hundred groups of indigenous people in the Philippines. It is a particularly special tribe being one of the first, if not the first, inhabitant of the Philippines. The native Aetas are characterized to be short, dark colored, and having kinky hair. The Aeta tribe is well known for their hunting and exceptional skills in jungle survival. There are numerous Aeta tribes in the northern part of the Philippines, however, in this study, the Aeta Ambala tribe living in Pamulaklakin Village and managing PFT will be discussed.

Among the unique characteristics of the PFT is its location inside the former United States Naval base which was the former training grounds of the naval forces. In 1991, the eruption of Mount Pinatubo in the province affected the base resulting in the exit of the naval forces. The Philippine government then had an increasing concern that the naval base facilities would be

looted and destroyed. The result of this concern is the development of, R.A. no. 7227 or the Bases Conversion and Development Act of 1992. The former base was converted into a PFZ, attracting several industries whilst developing as a self-sustained economic center. The development of the PFT inside the PFZ is not only due to R.A. no. 7227, but is also geared towards helping the community, in this case, the Aeta tribe to become more resilient, especially in the economic aspect, through development of an ecotourism business.

In this chapter, discussion and analysis of the community managed ecotourism business as well as the analysis of community resilience brought by the business has been done using the resilience indicators for disaster vulnerable communities engaging in ecotourism. Data collected and analyzed were from field visits, including site observations and interviews with the ecotourism management staff and staff from SBMA, mainly the ecology department (see Appendix 4 for the list of interviewees).

### **3.2 Background of the Case**

Understanding the case of the PFT entails discussion of the early land developments in Subic till the development of the PFT. The rich history of Subic Bay dates back to the time when Philippines was a colony of Spain in 1800s to when the Aeta tribe successfully claimed the land as their ancestral domain in 2009 and their management of the PFT in 2013.

Subic Bay has been since located in a very strategic location with a good harbor. Due to its natural characteristics the Spaniards developed the bay as a naval fortress. In 1898, the Treaty of Paris was signed which ceded the Philippines from Spain to America. This led to the Philippine-American war in 1899 where the Bay has been transformed from a fortress to one of the biggest American Naval Base overseas. The base was used as a supply and repair

depot of the American naval forces. The naval base covered a vast area of land reaching up to the home of the Aeta tribe forcing them to retreat deeper into the forest.

In 1946 the Philippines obtained its independence from the Americans and signed the Treaty of Manila. In the following year, the Philippines and the United States signed a “Military Base Agreement/ Military Assistance Agreement” establishing a “Joint United States Military Advisory Group” to advise and train Philippine armed forces in transferring aid and other materials.

The home of the Aetas became part of the agreed land area covered by the military base agreement and the training grounds for the soldiers. According to the PFT Aeta guides, the American forces surveyed areas deep in to the forest and discovered the presence of their tribe. The American forces wanted to know the tribe more, however, due to their foreignness, the tribe became hesitant to contact the Americans. As the Aeta guides described, over time, they have grown accustomed to the presence of the foreigners and later, have established a good relationship with the Americans. One of the oldest guides, Nana Rosa said, “natatakot nga kami sa mga Amerikano pero ayun pala mabait,” meaning they were afraid of the Americans at first but they are actually kind. The Naval forces shared their facilities with the tribe including the use of their hospital. Food and shoes were also given to the tribesmen. Both parties shared a feast every Christmas, and the Naval forces gives gifts to the tribe. Based on the stories of the PFT guides about the relationship of the tribe to the American Naval forces it can be said that they have a mutual relationship. The tribesmen benefit from the use of base facilities and some aid such as food and clothing while the American Naval forces buy fresh and native foods such as fruits and vegetables. The Naval forces also learns jungle survival techniques from the tribesmen.



In 1991, the Philippines suffered one of the biggest natural disasters in its history when Mt. Pinatubo erupted. The eruption damaged and killed crops in the surrounding area due to the 5cm thick ash deposits over a 4000 km<sup>2</sup> area of land. The eruption was followed by a typhoon, and then a series of earthquakes and aftershocks that caused roofs to collapse. The series of disaster caused the death of 700 people and 200,000 people became homeless. The US Naval base was also affected by the series of disasters and the base facilities were damaged.

During the eruption, negotiations were already in place to renew the treaty of Manila that was about to end in 1992, but the series of natural disasters caused the United States not to renew the agreement and abandon their base for 89 years. The Philippine government grew worried that the 8,000,000Php (160,000USD) worth of infrastructure left by the American Naval forces would be looted and totally destroyed. Thus, the base was converted into a FPZ. The base conversion was done in the virtue of R.A. no. 7227. Apart from the base conversion, the R.A. also established the SBMA to manage and operate on the zone.

The SBMA was established before the American Naval forces pulled out of their Subic Base. The American Naval forces have established a good relationship and was able to get a good grasp on the tribe according to the elder guides like Tata Kasuy. It have been mentioned by the guides as Nana Rosa that, before the Naval forces left, some officers from the force talked to the SBMA chairman who was in that time Mr. Richard Gordon. The officers, according to the guides requested the SBMA to help the tribe and not to relocate them. In the rehabilitation and reconstruction of the base, the PFT which was a former training ground of the naval forces has been developed and transformed into an ecotourism destination highlighting the natural environment and the life and interaction with the Aeta tribe.

The business operations of PFT began after two months later the exit of the American Naval forces in 1992 according to the former community officer Mr. Edmond de Jesus. In the

interview with the guides Nana Rosa said that “noong dinedebelop itong Pamulaklakin eh volunteer walang pera pasahod, magadadala lang ng pagkain gaya ng dalawang kilo ng bigas , sardinas at noodles dinadala araw-araw.” She is saying that development of Paamulaklakin is through volunteerism, there is no pay, in exchange of work is food, two kilograms of rice, sardines, and noodles is being brought to PFT every day. A more detailed management/operational plan couldn’t be found in the SBMA since it is now managed by the Aeta tribe. The DOT in SBMA who was one of the agencies in-charge of PFT before the Aeta tribe took over the management couldn’t also give records of PFT saying that the person in charge of the destination have already retired. During the development of the ecotourism business utility lines (electricity and phone) were installed, and a small one story administration office made of concrete and several cottages made of wood were constructed according to Nana Milagros, one of the guides. The PFT was managed mainly by SBMA with collaborations among their sub-departments such as the DOT and DENR of Subic. The Aeta’s mainly serves as guides and does maintenance work on the surrounding (mainly sweeping the grounds, keeping the entrance clean). In the interview with the Aeta guides, Nana Rosa said that “nung nadibelob na nagtaka naman kami eto yung makatwo months eto na ang mga bus nagfieldtrip na ang mga bata, sinabi samin ayan na ang mga bata, ibahagi nyo lahat ng kaalaman ninyo ang buhay ng mga Aeta,” meaning that in the development of Pamulaklakin after two months, buses came with small kids and people from SBMA on the spot instructed them, the Aetas to share their knowledge and the way they live. Other than being guides, the Aetas were tasked to maintain cleanliness in the area.

It is during 1992 to 2013 that PFT has been managed by the SBMA. Though the focus of the study is in the management of the tribe however, the management of the SBMA will be briefly discussed as background of this case. There is no concrete business plan found from the agencies visited during the data gathering, however, the management will be discussed and

described based on the interviews of staffs of the ecology and tourism department of SBMA and the focus group discussion with the staff of the PFT who are also a part of the community.

In terms of the general business operation during the management of the SBMA, there is an interagency management group consisting of the tourism department, ecology department, and the treasury department of SBMA. The tourism department is tasked to produce ads for PFT as well as market the destination along with other tourist destinations in Subic. Frequently, customers contact the tourism department in booking tours to PFT. The ecology department is tasked to give technical training and assistance to the guide especially in English translation and identification of biodiversity. The treasury department on the other hand manages the money from the PFT. There is a designated treasurer who collects the entrance fees and other service fees in PFT and forwards the money to the treasury department.

In terms of service delivery there is no specific customer group that is being targeted by PFT. Based on the tour guides, majority of the customers is composed of student groups and families. PFT offers their customers experience and learning on the natural environment. At the same time, customers are able to interact with the Aetas and learn about their way of life in the jungle. Different services/ tour offering, and their prices is shown in table 9. The tour packages is as low as 50php or 1 US dollar and all packages includes guide.

**Table 9. Package and Rates in PFT during the SBMA Management**

<b>PACKAGE</b>	<b>PRICE IN PHILIPPINE PESO (PHP)</b> <i>Note: 1USD ≈ 50PHP</i>	<b>ACTIVITY</b>
Sight Seeing	50 / adult and child (1 USD)	<ul style="list-style-type: none"> <li>• Visiting of vantage points in the area and taking pictures</li> <li>• Includes guide</li> </ul>
Mini Jungle tour	100 / adult and child (2 USD)	<ul style="list-style-type: none"> <li>• Trekking in the forest in Subic Bay</li> <li>• Jungle survival demonstration</li> <li>• Includes guide</li> </ul>
Ecology tour	250 / adult (5 USD) 250 / child (5 USD)	<ul style="list-style-type: none"> <li>• A two to three hour trek in the forest</li> <li>• Includes guide</li> </ul>
Overnight Jungle tour	500/adult and child (10 USD) Note: additional 50/head (1 USD) for succeeding nights	<ul style="list-style-type: none"> <li>• Venturing into the forest</li> <li>• Sleeping in the heart of the Forest</li> <li>• Learning jungle survival</li> </ul>

Picnic Table	150/ table (3 USD)	
Location shooting and team building	15,000 / day (300 USD)	

[Source: Old PFT leaflet from the SBMA Ecology Department]

The management of SBMA in PFT lasted for 21 years, from 1992 to 2013. However, in 1997, the Philippine government passed into law the Republic Act No. 8371. This is also called the Indigenous Peoples' Rights Act (IPRA). The rights of the indigenous people is protected and promoted through this R.A.. One of the reform processes of the IPRA is the awarding of ancestral domain and land titles to indigenous communities, while protecting them in their ancestral lands. Following the passing of the IPRA, the Aeta tribe claimed the area of Subic as their ancestral domain, and was subsequently granted 4,280 ha of land in 2009. This area not only covers PFT and Pamulaklakin village but also most of the FPZ. The land has been claimed by the tribe, however, it is still co-managed by the SBMA. In September 2011, the tribe chief-in, the SBMA chairman, and the director of the National Commission on Indigenous People (NCIP) signed a joint management agreement which authorizes SBMA to manage and develop the land of the Aetas for the advancement of the living conditions of the tribe base on programs implemented by the government. Despite the agreement, in 2013, the tribal council decided to take over the management of the PFT.

The management of the Aeta tribe is not far off the business offering and maintenance of PFT during the management of the SBMA. The big difference comes in the marketing and the promotion of the business. A more detailed management practice of the Aeta tribe in PFT would be discussed in the succeeding section.

### **3.3 Analysis**

In analyzing the case of PFT, the Resilience Indicators for Disaster Vulnerable Communities Engaging in Ecotourism has been used. This section discusses and analyze social developments that the ecotourism business brought and brings the community, the economic sustainability of the business, and the contribution of the ecotourism business to environmental sustainability during the Aeta tribe management.

#### **3.3.1 Sustainable Social Development**

The sustainable social development indicator presents the input of the ecotourism business to the community through its two sub-indicators. The indicators are secured livelihood options and stakeholder participation. The second sub-indicator is divided further into two, access to information and community technology, and social networks and integration.

##### **Secured Livelihood Options**

The community around PFT is composed of about 500 Aeta families. The families live in the Pamulaklakin village which is about 3km from PFT and in and around PFT. The ecotourism business in PFT affects the community not only due to its proximity to the village. All employees of PFT is a member of the community.

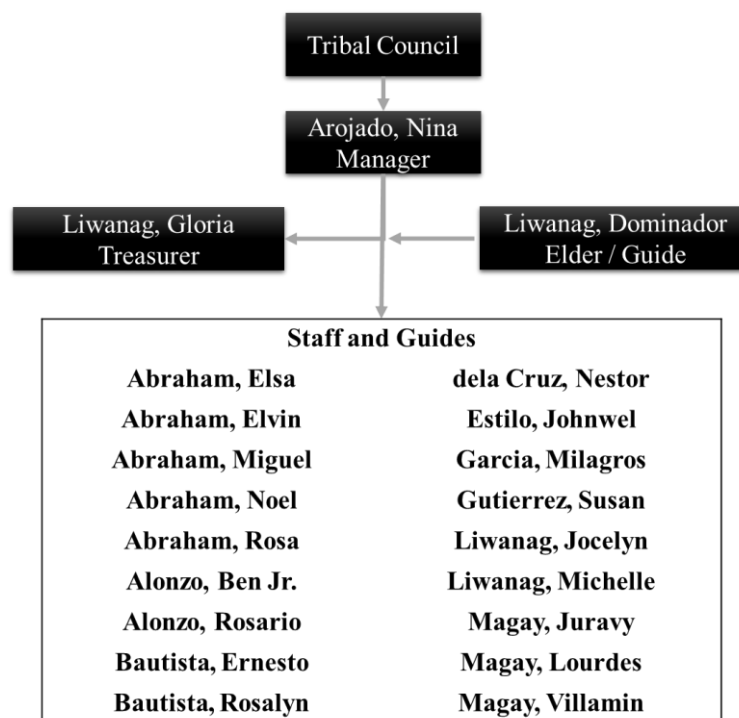
There are two kinds of livelihood opportunities offered by the business for the community members. The first livelihood option is becoming a tour guide and the other option is selling snacks, and souvenirs to the PFT customers. There are 24 community members who are employed in the PFT. The organizational chart of PFT can be seen in figure 9. The organization of the PFT will be discussed in the analysis part of the economic sustainability of ecotourism under the business plan. In figure 9, the surnames of the employees have great similarities, this is because most members of the org are related. For instance, the elder and the treasurer is

husband and wife. Employment in PFT does not consider its workers relationship thus allowing several members of the family to be employed within the business.

In terms of remuneration, there is no fixed cost. The manager, treasurer, elder and the staff/guides receives equal pay depending on the profit of the PFT. This means that salary is dependent on the number of visitors. If there are no visitors, there is no profit, and therefore, employees won't gain earnings. The computation of the remuneration will be elaborated in the analysis on the economic sustainability of ecotourism under financial management.

Through Nana Rosa, the guides expressed the difference and disadvantage of the new management affecting their livelihood. Nana Rosa said “noong SBMA po ang may hawak nito tuloy tuloy po ang sweldo naming.” She is saying that during the SBMA management, they have stable, continuous, and fixed salary. Though there is no salary, the employees are not exclusively bind to the business. There is no written work contract. Nevertheless, employees are asked to come in and work five days a week and they have two days off.

**Figure 9. Organizational Chart of PFT**



[Source: Interview with Ms. Gloria Liwana]

During working days, the staff/ guides all have their task which is to serve as tourist guide and to do regular maintenance of the venue which is sweeping the grounds and removing debris. During their two day off, the employees, as explained by the treasurer are free to work in other places. In case an employee finds a better job, he/she can ask to leave work in PFT.

In this arrangement, the employees in PFT can be said to have a secured livelihood option provided by the PFT. However, in this case, job security does not imply stable or secured salary. This only means employment. For the guides, if they are willing to work, do their jobs, and if the business is operating they can continue to work. Employees can remain working in PFT as there is no retirement age. On the other hand, unlike other companies, or work conditions, PFT does not offer retirement benefits, pension, and or insurance. Job security is not applied to one position however, the manager. The manager position is selected by the tribal council which is the governing body of a tribe and is composed of the chief-in and six counselors (see table 10). The council elects and votes for the person they deemed to be a fit for the position. The Aeta selected by the tribal council to manage the PFT is part of the tribal council, Ms. Nina Arojado.

**Table 10. Tribal Council Members**

<b>POSITION</b>	<b>NAME</b>
<b>Chief-in</b>	Conrado Frinilla
<b>Counselors</b>	Nina Arojado
	Ninita Ignacio
	Rony Nisina
	Marieta Pabayan
	Manuel Delusas
	Sony Boy Magay

[Source: Interview with Marieta Pabayan, tribal Counselor and SBMA Ecology Staff]

Alternatively, there is another livelihood opportunity that PFT provides the community, selling snacks and souvenirs. Though it is a livelihood opportunity, it is also a source of profit for the business. PFT allows community members to rent space for selling various souvenir items and snacks in front of the PFT entrance. Located near the entrance is a bungalow divided

into several sections (see figure 10) which is rented by community members for 300php (6 USD) a month.

**Figure 10. Souvenir Shop at PFT**



[Source: Photo taken by the author]

Briefly mention, during days off, the guides could accept or apply for other jobs. Example of these jobs fire making demonstration and teach jungle survival techniques in other areas in Subic. One of the guides who is frequently invited and given such opportunity is the elder, Dominador Liwanag, also known as Tata Kasuy (figure 11).

**Figure 11. Photo of the Elder, Dominador Liwanag or Tata Kasuy**



[Source: Photo taken by the Author]

There are cases as have been previously mentioned that PFT, in other days, does not gain profit. In this case, the guides/staff relies on their “gasak,” or small vegetable gardens inside PFT for food. One of the guides, Nana Rosa said that they usually have okra, cassava, and other



root crops and vegetables in their “gasak.” Furthermore, Nana Rosa mentioned, that they, do not usually eat meat.

Community members not working for PFT are employed in various industries in Subic, private, and public sectors. There are Aeta’s who are employed by different departments of SBMA. One Aeta employed by SBMA is one of the tribal counselors, Ms. Marietta Pabayan who is working for the ecology department. Other Aetas are hired based on contract, for instance, in the construction industry.

The development of PFT as an ecotourism destination brought about work opportunities to community members. All employees in the PFT is composed of community members. Though work opportunities are available, salary is unstable. There is no work contract and no retirement benefits. Nevertheless, the guides in PFT can find other jobs during their day offs, and they also have their small garden plots inside the PFT where they harvest vegetables for consumption.

### **Stakeholder Participation**

The other indicator for sustainable social development is the stakeholder participation. This indicator is further divided into two sub-indicators which is the access to information and community technology and social networks and integration. Though, the sub-indicators are similar sounding, access to information and technology describes the information and the technology that the community obtains from PFT and their partners. The social networks and integration on the other hand describes how the business is being integrated and their implications to the community.

In terms of access to information and community technology, PFT can only offer limited information to the community. PFT is composed of members of the community, thus, the level of information that PFT employees and non-employees belonging to the community is similar.

The community surrounding the PFT and the people working in the PFT belongs to one tribe which shares similar culture, beliefs, and knowledge.

Though there are limitations, PFT have partners which contributes to the access of information. PFTs employees learns some new knowledge which they share to the community. As a partner, the SBMA Ecology center aids PFT staff to identify flora and fauna found inside the PFT. Knowledge obtained from this partnership is transferred not only to the employees but to the community members. Another partner/stakeholder of PFT are universities and schools in Subic who does not only come as customers but also conducts activities and launch projects in PFT. One of the cases where a university conducted a project in PFT is the bread making project. According to the manger, Ms. Nina Arojado, the project targets women in the community. The university donated an oven which have been placed inside PFT, however, the problem was the sustainability of the project. Nana Mila, a guide explained that, the oven broke down and the current place it is stored is inhibited by wasps. Another program which targets the community is the “Read to Lead” which promotes reading to young members of the community. The program is organized by an NGO, the Subic Bay Photographers Society.

Part of the access to information and community technology is also PFT sharing its facilities to the community members for free. Community members are privileged to use the facilities in PFT for free. These facilities include the cottages for picnics and gatherings, and the use of electricity outlets for charging phones and powering entertainment devices such as speakers. Community members can also freely access the river and swim. According to the manager, Ms. Nina Arojado, in case there is a big group of customers that needs to use cottages while there are community members using the facility, community members are requested to transfer to different cottages to accommodate the groups and to be gathered in a more condensed area rather than being spread out.

In terms of social networks and integration the PFT integrates well with the community as it is managed by the community. The community, specifically the manager and the tribal council makes decision on the direction of the PFT. Moreover, according to the PFT guides, a reason for their tribe to take over management is self-resource management specifically in the land which is in and near their home. The community decides and oversees renovations and changes in PFT to limit changes in the natural environment and to protect their cultural heritage. Tata Kasuy explained that the community does not want PFT to be modernized like the other tourist destination in Subic, they want to preserve the natural environment in PFT.

Several photos inside PFT are shown in figure 12. The photo displays the natural environment in PFT. The two photos on the upper left shows a guide discussing their way of life in the jungle. The upper left most photo shows the guide showing the use of a leaf as an umbrella. The photo on the middle top shows a guide explaining the use of tree roots as their shelter. At present, roots are still used as shelters though, it is only during hunting. The photo in the upper right and lower left shows trails in PFT. The photo on the lower right is the picnic area in PFT and in the photo is Ms. Marieta Pabayan, one of the tribal counselors. These photos show how PFT easily integrates with the community by maintaining the natural environment in PFT.

The PFT management staff and stakeholders contributes to the community's access to information and community technology as well as the social network and integration. Limited information is brought by PFT to the community but is compensated by their partners/stakeholders. Social network and integration of PFT is easily achieved due to the community management.

Figure 12. Photos in PFT



[Source: Photo taken by the Author]

The PFT through the sustainable social development indicator contributes to the resiliency of the community through several means although not to its full potential. In the sub-indicator secured livelihood option it is discussed that PFT provides work opportunities to the community members, this opportunities increases the resiliency of the community members as they could be employed. However, community members employed in PFT cannot depend solely on their salary from PFT since the salary is dependent on the profit. No customers mean no salary. This is true for the spaces that is being leased by the community members as well. They would have no profit when there are no customers and/or if the customers do not purchase their goods. Nevertheless, inside PFT are small garden plots where the community members plant vegetables for self-consumption. Community resilience can be further increased if PFT could offer its employees fixed salary.

The other sub-indicator for sustainable social development is the stakeholder participation. The employees of PFT are all members of the community sharing the same culture and beliefs. This arrangement enables the business to be easily integrated to the community increasing the community resiliency. For incidence, in case of a disaster, communication between the manager of PFT, the employees, and the community members not working in PFT is easier. In terms of access to information, there are limitations to the knowledge which the PFT employees can bring to the community. However, this limitation in access to information is compensated by the stakeholders and partners of the business as PFT serves as a very attractive venue for different organizations to conduct projects expanding the knowledge of the community members.

### **3.3.2 Economic Sustainability of Ecotourism**

Another one of the three resilience indicators for disaster vulnerable communities engaging in ecotourism is the economic sustainability of ecotourism. The mentioned indicator has two sub-indicators, the business plan, and financial management.

#### **Business Plan**

The first sub-indicator of the economic sustainability of ecotourism is the business plan which is further divided into the business roadmap, organization and management, and business contingency. The business roadmap identifies the mission, vision, and goals of the PFT and management plans achieving the business goals. The operation and management identify the management structure of the PFT along with the operations conducted to run the business. Operation and management however, does not include the financial management of the business as it is a separate indicator for the economic sustainability of ecotourism. The business contingency is the action plan enforced by the manager in times of crisis or disasters.

The first sub-indicator of the business plan is the business roadmap. In the interview with the manager, it is confirmed that PFT does not have a written business plan. There is no clear mission and vision, as well as marketing and promotion strategies for the business. In Subic there are several ecotourism businesses aside from PFT. The Mangrove Park is where customers take small boats to observe the mangroves. The Jungle Environmental Survival Training (JEST) Camp offers their customers a selection of tourist activities including jungle training. Apaliin forest trail is a hiking path for tourists.

PFT is special as it showcases the natural environment. The trail is an off beaten track that leads deep into the jungle and the mountains of Subic. PFT showcases its clean natural rivers where

their customers can camp, picnic, and swim. PFT also enables their customers to take a closer look at the haven of the Aeta tribe and learn how the tribe lives and survive in the jungle. The jungle survival techniques as Tata Noel (See figure 13) explains is unique in PFT since it is being done by a native Aeta like him. In other destinations people presenting jungle survival techniques is not from the tribe or mixed Aeta (one parent is not an Aeta). These characteristics makes PFT special, and this is what the manager wants other people to experience. Whist PFT does not have a business plan, the manager has a mission in mind, to share this special environment in PFT to other people.

**Figure 13. Photo of Jungle Survival Training**



[Source: Photo taken by the author]

The organizational structure of PFT is simple top to bottom (see figure 9). At the top of the organization is the tribal council. The tribal council oversees the decisions made in PFT. The biggest decision by the tribal council in PFT is the change of management in 2013 from the SBMA to the community. The tribal council is also the deciding body which delegates the manager for PFT. The current manager, Ms. Nina Arojado is part of the tribal council. The elder, as seen in figure 9 is Mr. Dominador Liwanag or Tata Kasuy. He is a guide but all other guides give him more respect as he is the oldest, and can be considered as the leader of the guides. The treasurer in

PFT is Ms. Milagros Liwanag. Her role involves selling tickets, receiving payments, and issuing receipts to customers. For the purpose of providing a receipt to customers Ms. Milagros Liwanag explained that their tribe had to create an NGO which is called the “Tribong Ambala Aetas ng Pastolan Inc.” or TAAP. The guides/staffs as the name implies are the one who gives tour to the customers. The guides also function as the maintenance staff cleaning the grounds.

In terms of how the business is being managed, PFT offers services to their customers in exchange for certain prices and the profits are used to manage and run the business. As mentioned, financial management will be discussed later in the discussion. PFT offers different services. Table 11 enumerates the various packages and its corresponding prices that PFT offers its customers. There are four packages, sightseeing, mini jungle tour, ecology tour, and overnight jungle tour. The sightseeing tour is a short tour of the area near the entrance of the PFT. The mini jungle tour includes trekking in the forest and demonstration of some jungle survival techniques. The ecology tour is a two hour hike in the forest which includes introduction of some plants which the Aetas use for consumption or medicine. There is also an option for an overnight jungle tour which includes a longer trek and spending the night in the forest. All options are inclusive of a guide. There are special packages which is not included in table 11. In the previous management it can be observed that there is location shooting and team building offered in PFT (see table 9). Ms. Arojado mentioned that these services are still offered, however, the customers should directly approach her for inquiries. Addition to the services in PFT is the free use of the river for swimming, the use of changing rooms and shower rooms. Customers who want to cook on-site can bring food and cook themselves or ask the guides (for a fee) to cook their food in traditional way (cooking in bamboo).



**Table 11. Package and Rates in the PFT (Current Management)**

PACKAGE	PRICE IN PHILIPPINE PESO (PHP) <i>Note: 1USD ≈ 50PHP</i>	ACTIVITY
Sightseeing	100 / adult and kid (2 USD)	<ul style="list-style-type: none"><li>• Ocular inspection around the area and picture taking</li><li>• Includes a native guide</li></ul>
Mini Jungle tour	100 / adult and child (2 USD)	<ul style="list-style-type: none"><li>• Trekking in the forest in Subic Bay</li><li>• Includes a native guide</li><li>• Jungle survival demonstration</li></ul>
Ecology tour	250 / adult (5 USD) 250 / child (5 USD)	<ul style="list-style-type: none"><li>• A two to three hour trek in the Subic forest</li><li>• Includes an Aeta guide</li></ul>
Overnight Jungle tour	500/adult and child (10 USD) Note: additional 50/head (1 USD) for succeeding nights	<ul style="list-style-type: none"><li>• Venturing into the heart of the forest</li><li>• Sleeping in the forest</li><li>• Learning how natives survive in the forest</li></ul>

[Source: Package and rate signage at PFT]

PFT opens all year round, offers attractive rates and tour packages, and establishes personal relationship with their customers. However, there are only few customers as compared when it was handled by the SBMA. This difference in customer influx can be traced to the difference in network reach of PFT and SBMA. SBMA has a wider reach, they utilize their networks, have a wider knowledge on destination marketing and promotion, and the knowledge and capacity to utilize technology. Currently, there is no concrete marketing and promotion strategy for PFT. Furthermore, there aren't brochures distributed by PFT. The PFT management relies on word of mouth for the promotion of PFT. There is no official PFT webpage. Nevertheless, marketing and promotional materials can be found online made by past customers (see appendix 5). According to Ms. Planea, a staff in the tourism department in SBMA, all the tourism destinations management team in Subic are informed to forward their brochures or videos to SBMA for promotional purposes and they also offer equal opportunities to all tourism business within Subic to take part on tourism conventions. Ms. Arojado explained that PFT couldn't participate in the tourism fairs due to their lack in technical capacity to create brochures and furthermore, promotional videos.

Apart from the lack in technical capacity. PFTs management is very traditional. Instead of the use of computers, log books are used to record everything.

The business hasn't been attracting much customers as one reason is its insufficient marketing strategy. Declining number of customers leads to problems in business operations and maintenance and can eventually lead in closure. In this situation, as well in a disaster, the business ought to have business contingency plan. As what could be expected, there is no business contingency plan. The manager and guides do not seem worried about PFT closing due to natural disasters as well as economic reasons. The manager does not seem to worry too much about the low turn of customers and the possibility of the business to be in the red. This response can be contributed to the fact that they are operating on their property, if they are leasing the property there would be a big difference. It is also good to note that, part of the property/ ancestral domain of the tribe is being leased to companies and other organizations in Subic.

In early August 2014, the Aeta Ambala tribe where the Aetas of Pamulaklakin village belong received 14,791,440.51php ( $\approx$ 295,829 USD) as payment of the companies' lease of their ancestral land. The payment was from the lease during May of 2009 until December of 2013. The land, which is part of the free port zone, covers not only private companies but the Kalayaan and the Binictican housing in Subic and a number of tourism areas (Apaliin Falls, PFT, and El Kabayo, among others). This amount has been settled in line with the joint management agreement (JMA), stating that 5% of their gross income will be paid by the investors for the rent of the tribe's ancestral land. In addition, each Aeta family is paid 20,000php/year (500 USD/year) upon receiving the Certificate of Ancestral Domain (CATD).

In terms of disasters, according to the Subic Bay Disaster Risk Reduction and Management Council (SBDRRMC), there are no information and clear assessment of the threat of hazards in

the area (hazard maps). However, looking at the hazard vulnerability map of the Philippines by UNOCHA in Chapter 2 (Figure 5), Subic in general is both vulnerable to earthquake and typhoon. There are also areas in Subic which is vulnerable to tsunami and Mt. Pinatubo, a volcano is also neighboring PFT.

Disaster Consciousness Month is being celebrated in Subic and SBDRRMC hold activities such as earthquake drills in schools and clean up events, of which the tribes weren't included. This is unfortunate, because in terms of disasters, aside from children, elderly, and persons with disabilities, IPs such as the Aeta are among the most vulnerable groups. There is an early attempt by SBMA to teach the community how to prepare and face a disaster according to the former community affairs personnel in the SBMA ecology department. The community officer, Mr. Edmund de Jesus explained that the community members were not happy with the demonstration on how to put out fire since the outsiders (people not from their tribe) created fire in their land even though there in an intent to put it off. Mr. De Jesus said that the community members became upset and protested by starting to put on fire without putting it out. Ms. Marieta Pabayan explained that for their community and tribe it was an act of disrespecting nature, even the purpose is to educate. Ms. Pabayan have explained that the tribesmen are already equipped with their own traditional, and tribal knowledge to face natural hazards. These knowledges have been passed down from their ancestors.

The attitude of the tribesmen towards disaster management is simple according to Tata Kasuy. He said, “pag bagyo wag mo nang isipin yun, lilipas din yun,” if there are typhoons we don't mind it because it would just pass. He mentioned that there are typhoons which are strong, where people cannot even go outside, but still the typhoon just pass. In view of land erosion, Tata Kasuy said that, “wala naman ditong erosion hindi pinuputol ang puno kaya may haharap pa din, alam mo sa

mga lugar na nagkakaroon ng mga ganoon yung mga paghabas din nila ng mga kalikasan kasi kapag ang kalikasan nagalit talaga hindi mo mahahadlangan yan, yung galit ng tao pwede mo pakiusapan yan pero ang galit ng kalikasan di mo mapapakiusapan yan,” there is no erosion in the area because we do not just cut trees which serves as buffers to erosion, places experiencing erosion treats their environment carelessly and when the environment gets angry they cannot stop it unlike people that you can plea to stop.

There are infrastructures which are made of wood in PFT and in the community which can be less resilient in events of disasters. Tata Kasuy said that, “...may mga dasal yan at bulong yang mga bahay kapag may bagyo,” the houses have prayers and enchantments for typhoons. These traditions which the tribe has is not shared or shown to outsiders and is taught only to members of the tribe. The members of the tribe also believe that everyone should take good care of the environment and not make an enemy out of it or it would get back to you.

There is no concrete and written business plan including the business path, operations and management, and the business contingency for PFT. Based on the interviews and site observations, the mission of the business, the management style, and the contingency have been identified. The business is community based and the organizational structure of PFT is a simple top down management. PFT as a business has attractive product offering and pricing. However, there is insufficient marketing and promotional activities for the business mainly attributed to lack of technological knowhows which causes the low turn up of customers. Though there is a thread of being in the red the management seems not to worry as they have various income sources as the payment for the lease of their ancestral land.

In the case of PFT, not having a business plan does not equate to unproductive business. PFT proceeds easily in development and maintenance projects without the bureaucracy. At a glance,

the system of PFT makes the business look less resilient. However, PFT unlike other businesses has more flexibility to react to sudden changes in the environment. In terms of disasters, PFT, specifically the community has a different approach. For the community members, they believe that they wouldn't encounter major disasters if they take care of the environment.

### **Financial Management**

Like the business plan, there is no written financial management plan. In the interview with the treasurer however, it can be said that there is a system to manage finances in PFT. The finances are managed by the treasurer, Ms. Liwanag Gloria. She holds, sells, and record the tickets in PFT. There are no digital records of the finances as well as the tourist arrivals. PFT manage finances in an old fashion way, using a log book. The logbook does not only contain the names and attendance of the employees but also includes their salary and the customer log (see Appendix 6).

Based on the interview with the manager and the treasurer it was found out that the revenue of PFT is mainly dependent on fees paid by customers which is used to run the business. Certain cost includes utility fee and the Environmental and Tourism Administrative Fee (ETAF). The utility bills consist of electricity and the phone bills. The ETAF is a portion of the fee paid by the customers and is later remitted to the SBMA tourism department which would be discussed further in the environmental sustainability indicator. It is determined from the interview with the PFT manager and treasurer that the net income can be computed as follows:

$$f(g) = g - u - 0.1g - 0.2g$$

Where:

$$\text{Net income} = f(g) \quad \text{Gross income} = g$$

$$\text{Utility Bill} = u \quad \text{ETAF} = 0.1g$$

$$\text{Contingency Fund (trust Fund)} = 0.2g$$

The net income is the result of the gross income (which is mainly the fees collected from the customers) subtracted to the utility bills, ETAF, and contingency fund. The contingency fund is the savings of the business for the business which the treasurer describes as something like a trust fund. The money is placed in the bank account of their NGO, TAAP. The contingency fund is used for developments and renovations in PFT.

The formula presented does not include the variable of salary. In computation of employee salary, the net income is divided to the number of employees regardless of position or number of individual tours done. This implies that regardless of the position, everyone receives equal remuneration. Regarding the salary, Nana Rosa along with the other guides said that, “kung hindi nyo po naitatanong noong nasa turismo po kami kada isang araw 150 ngayon po pag walang kita wala po kaming paghahatian,” she explained that when they were under tourism (SBMA), everyday they receive 150 pesos ( $\approx 3\text{USD}$ ) but now if they don't have profit they don't receive any salary. In the usual businesses setting, net income is used for business operations as revolving capital but in the case of PFT, it is being used to pay the employees.

The economic sustainability of ecotourism has two sub-indicators which is the business plan and the financial management. The resiliency that can be brought by PFT to the community is affected by the economic sustainability of the business itself. In theory, a business to be economically sustainable should have a business plan and a good financial management scheme.

PFT not having both creates a question on its sustainability. The manager has a vision for PFT though there is no business plan and action plan to achieve it. This situation leads to issues in operations and management. PFT has a simple top down organization which makes decision making easy and more flexible. However, developments in operations and management is stagnant. There have been very few changes in the management and operations since the change in management. These changes include the product pricing, employee salary, and marketing and promotion schemes. There has been low turn of customers due to the customer reach of PFT. The financial model however makes the business sustainable and resilient. Not having to pay for the land and the salary of the employees makes the business going.

### **3.3.3 Environmental Sustainability**

The third indicator for measuring the resilience of disaster vulnerable communities engaging in ecotourism is the environmental sustainability. The indicator has two sub-indicators which is the environmental quality maintenance and resource efficiency in production and consumption systems.

#### **Environmental Quality Maintenance**

The biggest asset of an ecotourism business is its ecosystem and environment. Thus, the environment in and around PFT should have proper quality maintenance. The environmental quality maintenance is one of the sub indicators for the environmental sustainability and has two sub-indicators which is the quality and maintenance of ecosystems and the inclusion of environmental cost in pricing mechanisms.

Since the establishment of PFT, quality and maintenance of the ecosystem haven't changed. Maintenance is done through cleaning/ sweeping the grounds and collecting fallen branches and leaves. There are no biodiversity profiling or environmental impact assessment in the PFT. The DENR which is in-charge of overseeing the protected areas conducts biodiversity monitoring in selected areas in Subic which DENR has listed (see appendix 7). The entirety of PFT is not included in the list, however Ms. Mallari, the Sr. Forester Management Specialist in SBMA Ecology Center mentioned that there are small areas in PFT included in the list, a portion of the forest and river. The areas mentioned are evaluated using the biodiversity monitoring report form (see appendix 8) which is issued by the SBMA Ecology Center. In the one page report, the SBMA Ecology Officers conducts site monitoring and takes notes on the basic information on the site (name of the site and evaluation day), physical parameters (weather conditions during the evaluation), flora, fauna, ecological statistics, social issues, and assessment and recommendations. After evaluation the concerned stakeholders are advised on what actions should be done.

Environmental cost in pricing mechanisms is included in the product fees in PFT as well as other businesses in Subic. This fee is called the Environment and Tourism Administrative Fee or the ETAF. It is only in 2014 that the SBMA created a regulation to pay the ETAF. The regulation stipulates that all tourist facilities in Subic shall pay the ETAF which is either 20php (40¢ USD) per visitor or 10% of the fixed entrance rate of the facility. The ETAF is paid to the SBMA tourism department and according to Ms. Planea, a staff of the SBMA tourism office, ETAF is allocated to the maintenance, protection, and enhancement of the Subic Bay environment.

In businesses such as ecotourism, the environment serves as a very important asset. However, the management team of PFT does not conduct technical and thorough examination of its environment. Nevertheless, a stakeholder, the SBMA Ecology center conducts biodiversity



monitoring in certain areas of PFT. Environmental fee in the form of ETAF is incorporated in the product fee and is collected by the SBMA tourism office for the maintenance of the environment in Subic.

Though technical knowledge in environmental quality maintenance is needed there are two reasons why it isn't done in PFT. The first reason is the lack in technical capacity of the people in PFT. The second reason is the culture of the people. As Tata Kasuy mentioned, the tribe believes that disasters only come if people anger the environment and disturb it. Thus, the tribe have confidence that if the environment is well taken care off, it will take care of them.

### **Resource Efficiency in Production and Consumption Systems**

Members of the community follows certain rules and conduct certain rituals in going and living in the forest as part of their culture. These rules and rituals are only shared to members of the tribe/community. Despite having their own cultural beliefs towards the environment, the community members especially the employees of PFT are well-versed in the national environmental conservation laws specifically in the consumption of resources. The awareness of the community in this area is brought by a stakeholder, the SBMA ecology center. In the entrance of PFT, there is a sign informing their customers about Republic Act No. 9147 or the Wildlife Act which states several activities that is said to be unlawful. The activities includes, killing and destruction of wildlife species, damaging the reproductive system of wildlife species, damaging and destruction of critical habitats, introduce, re-introduce or restock wildlife products, wildlife trading, collecting, hunting and possession of wildlife, their by-products, and derivatives, and wildlife transport. In the signage, penalties have also been stated. Not abiding in the law can lead to imprisonment from 6 months to 12 years or payment of 10,000 php (200 USD) to 1,000,000

php (20 000 USD). This law enables the community to be aware of wildlife handling and also educates the customers of PFT.

Another law familiar to the community is the limitations of forest products use or Republic Act No. 3571. This law prohibits the destruction, cutting, and injuring of plants in public grounds. One of the guides, Nana Rosa said that “pwede kaming pumutol ng kahoy pero yung pang amin lamang, halimbawa, sa paggawa ng bahay pero kung mamumutol ka at idedeliber mo sa labas bawal yun,” they can cut trees but for their own consumption, for instance, making their houses but if cutting and delivering outside, it’s prohibited. Nana Rosa also clarified that trees they cut, and use are common trees, not endangered species. Furthermore, the community members inform and ask clearance for cutting trees from the Ecology Center.

The PFT employees are fully aware that it is prohibited to cut down trees, turn it into timber and sell it for profit. Logging, in the view of community members could cause landslides and loss of habitat for wildlife species in PFT such as pythons, deer, lizards, wild boar and monkeys. Tree felling can only be done with the permission of the ecology department and will only be used as materials for building infrastructures in PFT or in Pamulaklakin village.

In relation to the environmental sustainability indicator and resilience, PFT does not practice technical and careful maintenance of the environment including the conduct of environmental impact assessment. However, the quality maintenance of the environment in PFT exists and is based on tribal beliefs of paying respect to the environment. Furthermore, the community believes in minimal development of infrastructure and allowing the environment to grow and develop naturally. Maintaining the environment not only in the PFT but around the community increases resiliency. With a healthy ecosystem, the community can enjoy the provision services and climate

regulation services. In addition, the construction of the PFT, according to the SBMA ecology department and the guides lessened poachers and illegal loggers in the area.

### **3.4 Conclusion**

It has been twenty-five years after the eruption of Mt. Pinatubo. The Aeta tribe in the Philippines have acquired the land title for their ancestral land and now, they are managing the Pamulaklakin Forest Trail or the PFT. In determining the contribution of the ecotourism business to the community, the resilience indicators for disaster vulnerable communities engaging in ecotourism have been used. The framework has three main indicators, the sustainable social development indicator, economic sustainability of ecotourism, and the environmental sustainability.

Based on the analysis, it has been found out that PFT through the sustainable social development indicator contributes to community resiliency. One means of contribution is providing work to community members. The PFT management and employees comprises 100% community members. Community members are also given opportunities to rent spaces and sell snacks and souvenirs to PFT customers. PFT is well integrated to the community, sharing the same culture, values and beliefs. Community members working in PFT and its easy integration to the community increases the community resiliency through ease of their communication and sharing of similar culture. PFT likewise, is attractive to different NGOs and serves as a venue for their projects targeting community development which increases community resiliency.

There is a question in the economic sustainability of PFT. In basing sustainability with the presence of a business plan, PFT is not sustainable. However, with the unique financial

management scheme not including any property lease and employee salary, the business is being sustained. Furthermore, comparing to other ecotourism business an advantage of PFT is being able to create decision and actions fast.

Environmental sustainability entails environmental impact assessment. PFT does not conduct such assessment however, based on cultural beliefs, PFT employees and the community members try to maintain the natural environment. Maintaining the natural environment enables the community to enjoy the benefits of the ecosystem including provision of resources, and climate regulation.

Overall, the ecotourism business in PFT contributes to the resiliency of the community though not to its full potential. The PFT management and employees protects the environment based on their cultural traditions that enables them to enjoy the ecosystem services. PFT through the help of stakeholders serves as a venue for community development activities. PFT integrates well with the community as employees are from the community. However, resiliency of community members can be increased through changes and improvement in the management of PFT such as providing fixed income. Though this action might incur some problems on the sustainability of the business, this would increase the resilience of community members. In the current case, the income is dependent on the number of customers, no customers equates to zero salary. Thus, to overcome this obstacle, PFT to be able to maintain its business and offer fixed income, a viable marketing and promotional plan should be developed to increase customer turn up.

## **CHAPTER 4 GOVERNMENT MANAGED ECOTOURISM BUSINESS: A CASE STUDY OF THE MAYON VOLCANO NATURAL PARK (MVNP) IN THE PHILIPPINES**

### **4.1 Introduction**

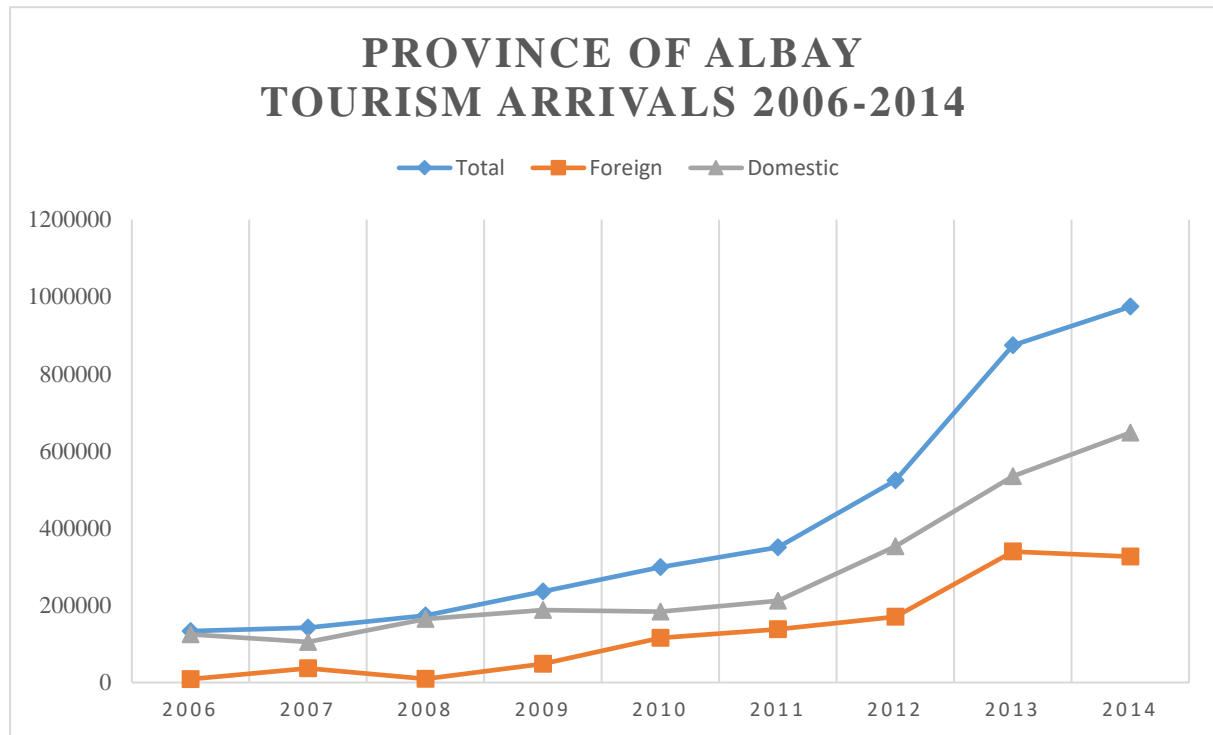
This chapter presents and examines the ecotourism business at the Mayon Volcano Natural Park (MVNP). Mayon Volcano is among the 81 ecotourism sites listed by the DOT in the Philippines which was discussed in Chapter 2. Among the 17 regions of the Philippines, Region I have the greatest number of ecotourism destinations counting to 15 seconded by Region XIII with 13 ecotourism destinations. Region V, which is the Bicol Region has only one ecotourism destination, located in the province of Albay, Mayon volcano.

The entirety of Albay's land area is 2,554.06km<sup>2</sup> (986.13m<sup>2</sup>) which is generally mountainous with scattered fertile plains and valleys. The province has a population of 1,315,000 in 2015 (POPCEN, 2015) and the main economic activity is agriculture (production of coconut, rice, sugar, and abaca). Other income generating activity includes forestry, cement making, and paper making. In rural areas in Albay, Abaca processing is a main source of income and communities along the shores of the province relies in the fishing industry.

This chapter will be discussing the ecotourism business conducted in MVNP. In the past, ecotourism/tourism haven't been mentioned as one of the main industries in the province like agriculture or fishing. However, now, ecotourism and tourism has been described as a sunshine industry. Additionally, it is expressed in the official provincial website that the province is now focusing in its tourism industry. The regional DOT office together with the LGUs conducted a survey determining the tourism arrivals in the province. In figure 14 it is shown that there is an increasing trend of tourist arrivals both for foreign and domestic tourist from 2006 to 2014.

Based on the survey, in 2006, there are 133,440 tourists composed of 8,765 foreign and 124,675 domestic tourists. In 2014 the number of tourists increased to 974,389 with 326, 550 foreign and 647,839 domestic visitors.

**Figure 14. Tourism Arrivals in Albay**



[Source: Data from DOT Albay office and plotted by the Author]

Tourist arrivals are attributed to the famous Mayon Volcano. The Mayon volcano is a unique and a popular destination not only in the province of Albay but in the Philippines. The name of the volcano is after a legendary heroine “Daragang Magayon,” which is translated in English as, the beautiful lady. Mayon is dubbed as a perfect cone volcano. It has a slope of 2462m (8,077ft) and rests in the three cities and five municipalities of Albay province. The cities and municipalities include, Legazpi, Daraga, Camalig, Guinobatan, Ligao, Tabaco, Malilipot, and Sto. Domingo.

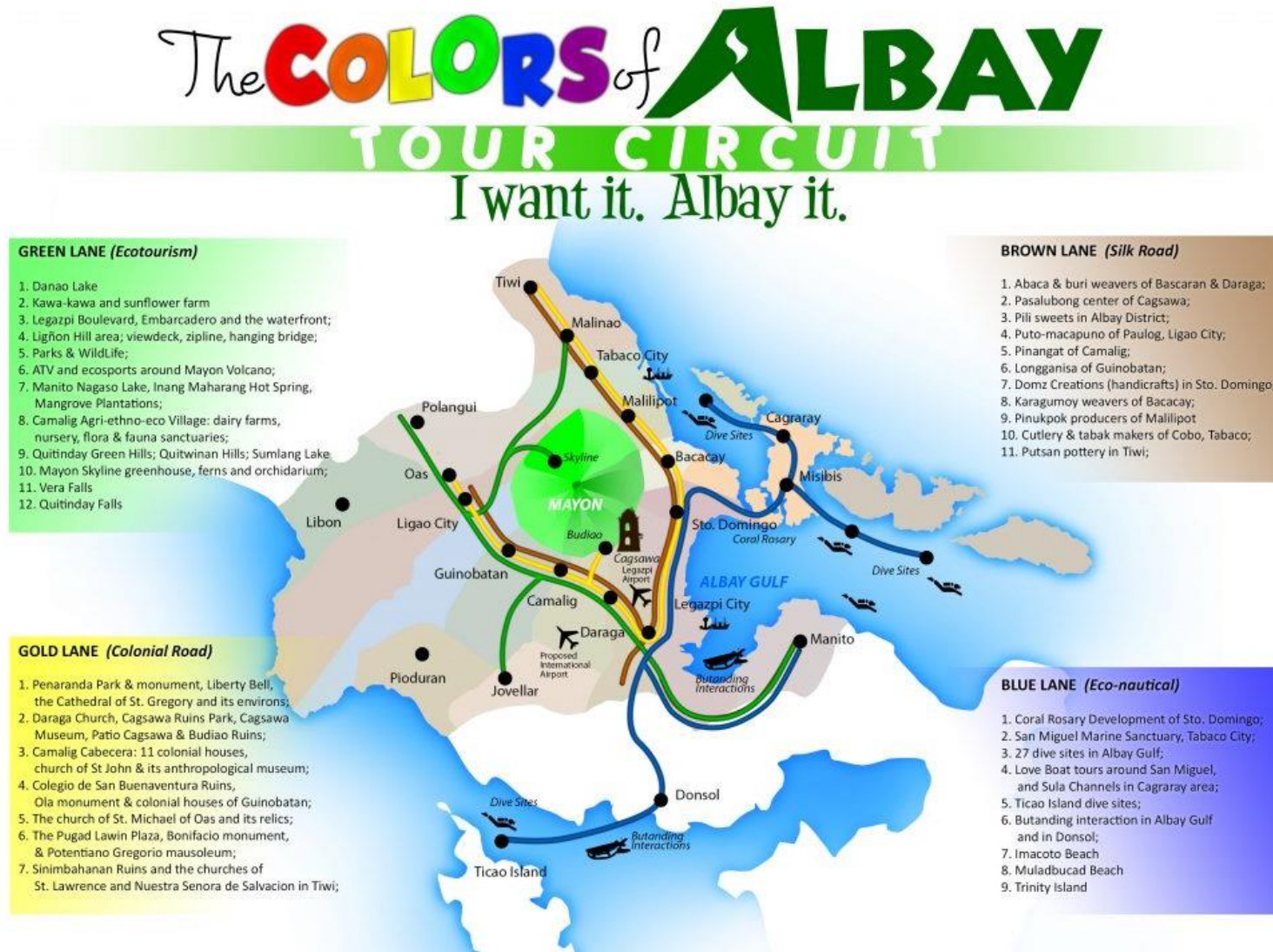
Though Mayon volcano is a popular site and is the point of interest of many tourists in Albay, there are other tourist destinations which has been developed and being promoted by the provincial DOT which also contributed to the increasing tourist arrivals. The tourism sited

mentioned can be seen in the “Colors of Albay” in figure 15. In the map, tourism activities in the province is divided into what is called lanes. The lanes consist of the green, brown, gold, and blue lanes.

The first lane is the green lane or the ecotourism lane which consists of 12 destinations highlighting the province’s natural resources and its nature formations (natural habitats, waterfalls, cavers and eco-parks). The brown lane is the Silk Road, a special lane which features 11 destinations showcasing indigenous products, processes and services (i.e. culinary and native products). The gold lane is the colonial road featuring 7 of Albay’s tangible and intangible heritage. Last is the blue lane which is the eco-nautical lane featuring 9 marine related tourism destinations (i.e. water sports, interaction with marine life, diving).

There is an increasing trend of tourist arrivals in the province for the past few years and a variety of tourist destinations is present. Despite the flourishing tourism industry, the province has been and is vulnerable to natural disasters. According to the Second National Communication on Climate Change (SNCCC) in 2009, the province was hit by 72 typhoons from 1948-2006. Mayon Volcano has been very active with a record of 51 eruptions for the past four centuries. In 1814, the most destructive eruption of Mayon volcano happened where the five towns in its periphery were destroyed. The towns of Camalig and Daraga, half of Albay and Guinobatan and Cagsawa have been damaged. The whole area of Cagsawa suffered the most bringing about complete destruction of the town. Other major natural disasters in the province of Albay in the past two decades includes- Typhoon Rosing (1995); Typhoon Loleng (2008); Mayon Eruption (2000, 2001, 2006); Typhoon Milenyo (2006); Typhoon Reming (2006); Typhoon Mina, Lando, and Nonoy (2007); Typhoon Dante, Ondoy, and Peping (2009); Mayon Eruption (2009, 2010); and Super Typhoon Yolanda (2013).

Figure 15. The Colors of Albay



[Source: <http://albay.gov.ph/colors-of-albay/>]



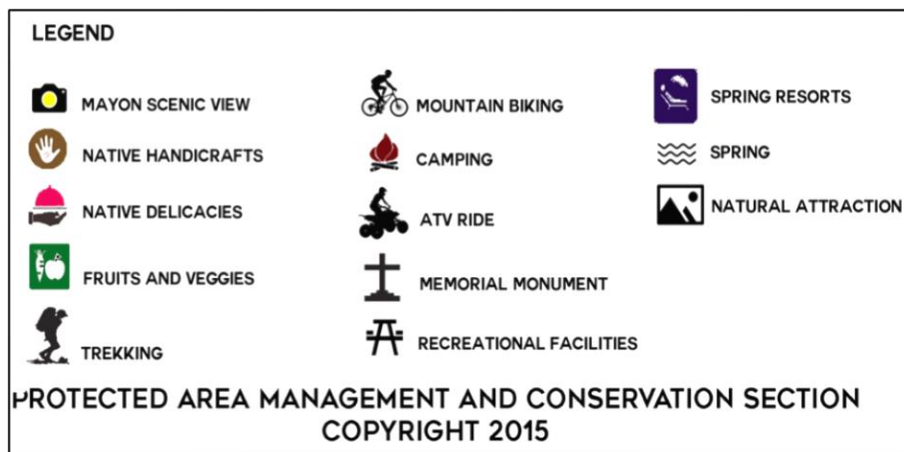
Various tourism activities are conducted in Albay. However, this case as have been mentioned will focus on the Mayon Volcano Natural Park (MVNP) which would be introduced in the next section of the chapter. Analysis and discussion of MVNP's management will be presented and the contribution of the ecotourism business to the resilience of the community is analyzed using the resilience indicators for disaster vulnerable communities engaging in ecotourism. Data collected and analyzed were from field visits, including site observations and interviews with employees of the DENR, the MVNP LGU staff, the local DOT, and the DRRMC (see appendix 9).

#### **4.2 Background of The Mayon Volcano Natural Park (MVNP)**

The government, as early as 1932 have already set its eye on Mayon volcano for its natural resources and beauty. In February of 1932 Mayon volcano was declared as a National Park under Republic Act No. 3915. In the same year, on the month of October, Mayon volcano was proclaimed as a Forest Reserve under the Presidential Proclamation No. 341. At the same time Mayon volcano was re-proclaimed as a national park under the Presidential Proclamation No. 292. In 1992, the NIPAS Act has been passed and Mayon volcano became one of its initial components making it to the list of protected areas in the country. In November 21, 2000, Mayon volcano has been declared as a Natural Park which changed its name to Mayon Volcano Natural Park (MVNP). The change from Mayon volcano to MVNP is in virtue of the Presidential Proclamation No. 413. MVNP as being classified as a protected area meant that it is an identified portion of land with a unique and biological significance. As a protected area, MVNP is managed by the DENR, this is via the Presidential Executive Order No. 192. DENR, managing MVNP, a protected area, is tasked to enhance its biological diversity as well as protect it from human exploitation.

MVNP covers a vast area of land where various ecotourism activities are being conducted. In the 2015 Ecotourism Management Plan of MVNP, a map of the ecotourism activities has been presented and can be seen in figure 16 and 17. Figure 17 shows the map of ecotourism activities while figure 16 serves as a map legend. In figure 16, it is seen that there are different ecotourism activities in MVNP which includes trekking, mountain biking, camping and ATV ride.

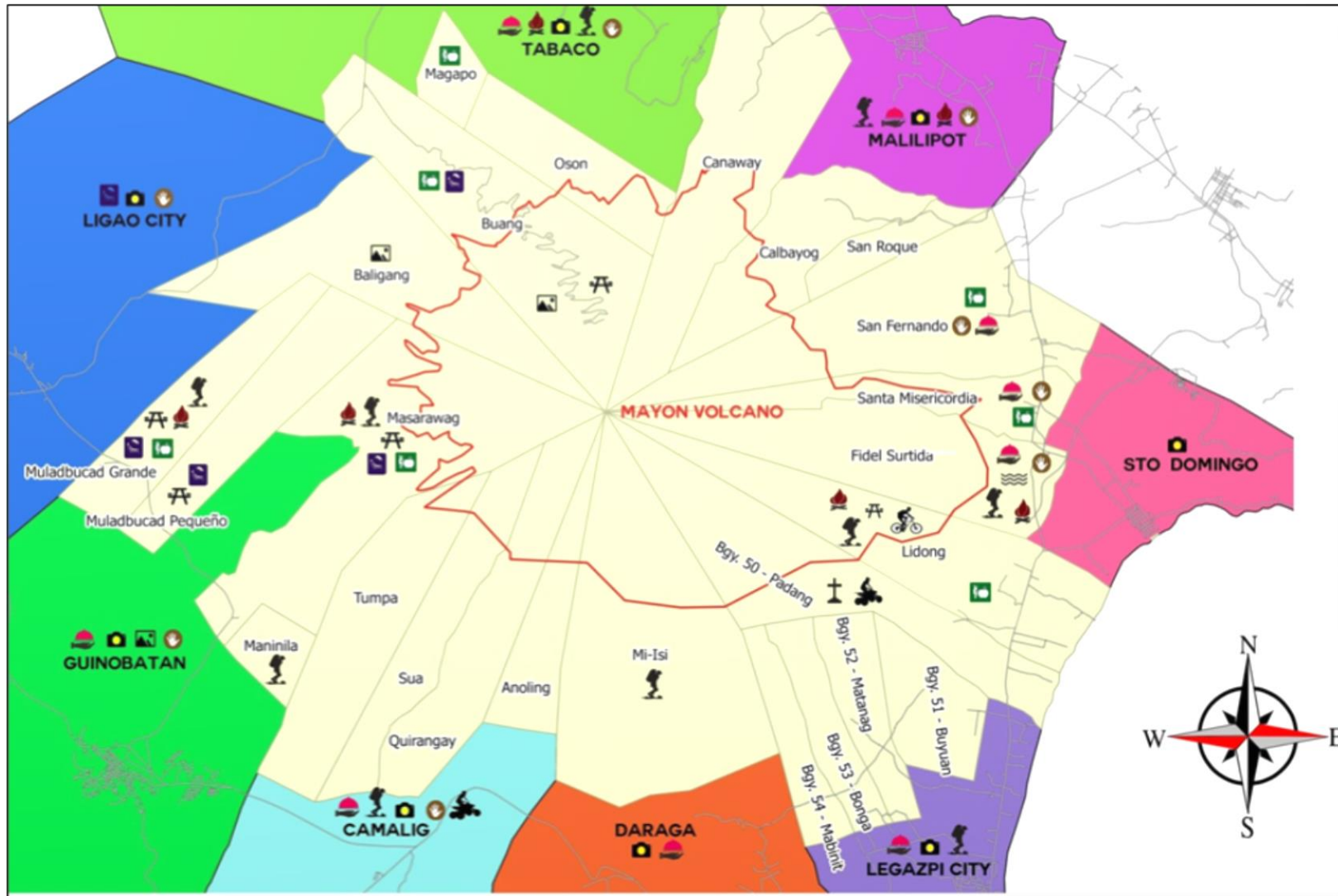
**Figure 16. MVNP Ecotourism Map Legend**



[Source: Ecotourism Management Plan Mayon Volcano Natural Park 2015]

In figure 17 it can be observed that ecotourism activities inside the MVNP can be found mainly in two specific areas which is Buang and Lidong. The two areas conduct ecotourism activities inside the MVNP since it represents its two entrance which is developed as ecotourism destination by the management/ the DENR. The ecotourism destination in Brgy. Lidong in Tabaco City is called the “Mayon Sky Line” where a recreational facility has been developed and features natural attractions. The other entrance of MVNP is called Lidong Park located in Brgy. Lidong, Sto. Domingo. The ecotourism activities in Lidong Park includes camping, mountain biking, trekking, and there are also some recreational facilities.

Figure 17. MVNP Ecotourism Map



[Source: Ecotourism Management Plan Mayon Volcano Natural Park 2015]

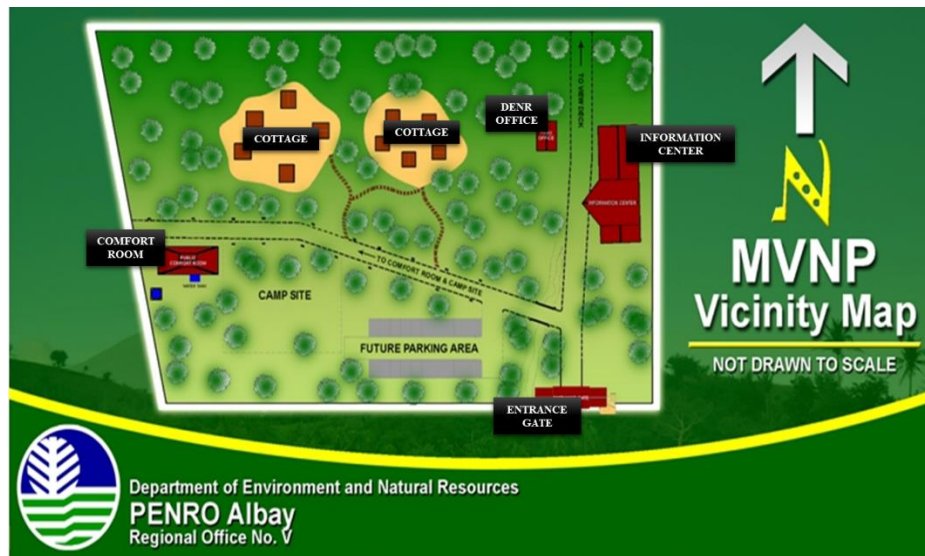
The Mayon Sky Line has recreational facilities where their customers can enjoy a closer view of the Mayon Volcano. The Mayon Sky Line has an elevation of 2,700ft from the ground and facilities includes a view deck, gazebos for picnics, hotel, planetarium, canteen, and convention center. Mayon Sky Line is frequented by groups especially families doing picnics while enjoying the view of the volcano, the province and the Pacific Ocean. The other peaks in the region, Mt. Masaraga and Mt. Malinao can also be seen from the Mayon Sky Line. Although Mayon Sky Line is an entry point of MVNP, the focus of this case will be Lidong Park. The park is more focused on ecotourism activities and the ecotourism management plans for MVNP only pertains to activities conducted in Lidong Park. Thus, from here on, the use of the term MVNP will be referring to the ecotourism business in Lidong Park. In the discussion and analysis, the community in MVNP will be referring to the people of Sto. Domingo.

MVNP can be accessed through three different modes of transportation. The first mode of transport is the use of a private vehicle. The second mode of transport is via a taxi which takes about the same time using a private vehicle, a 30-minute drive from the city. MVNP can also be accessed via a more local mode of transportation which is the jeepney. By making use of the jeepney, the customers will be dropped off the main road wherein they will be needing about 20 minutes more of walking before arriving to the destination.

MVNP as an ecotourism business welcomes all, there is no customer segmentation nor preference. However, it is being frequented mainly by families, students, and corporate groups. Currently, there are ongoing renovations in MVNP. Nevertheless, the business continues to offer different services such as camping, ecological tours, tree planting activities, and mountain climbing. The map in figure 18 shows the vicinity of MVNP. In the figure, several infrastructures can be seen which is developed and being developed. In the map it can be seen that there is an

information center, north east of the entrance. Located on the west side of the information center is a small office which is for the DENR officer in MVNP. Further west of the office are 10 cottages and a public toilet (comfort room). The map covers the area near the entrance however, at the moment, there is no existing map of the campsite, view deck, and the tree planting area of MVNP. The figure also shows a parking area which is still being developed.

**Figure 18. MVNP Vicinity Map**



[Source: PENRO Albay]

Figure 18 shows that there are two trails that can be selected for trekking. The trails consist of going to the campsite and to the view deck. In figure 19, some photos in MVNP is shown including the start of the two different trails. Figure 19 also presents the two different kinds of cottages that can be found in MVNP, the one used for overnight and an open air one which can be used for day trips and meetings. In the photo (figure 19), the DENR office in MVNP can also be found. Though it can be observed (based on figure 17) that ATV is very popular activity around MVNP it is not conducted inside PFT. According to the DENR officer in MVNP, it is not an activity offered in MVNP because one of the focus of the business is for the customers to appreciate nature through walking.

Figure 19. Photos in MVNP



[Source: Photos Taken by the Author]

It is previously mentioned that the trails lead to the camp site and the view deck. However, along the way there are several attractions that can be seen. In the first trail, going to the campsite, visitors would be passing through the lava trail. In the second trail which is leading to the view deck, a centennial tree would be found. It is not shown in the photo (figure 18), nonetheless, there is a hall attached to the information center where larger functions are being held. The whole area of the MVNP is being managed by the DENR with the help of the LGU of Sto. Domingo. Details on the management and operations in MVNP will be discussed in the succeeding section of the chapter.

### **4.3 Analysis**

In analyzing the case of MVNP, the Resilience Indicators for Disaster Vulnerable Communities Engaging in Ecotourism was used. This section will further discuss the sustainable social developments that the ecotourism business brings to the community followed by the economic sustainability of the business, and the contribution of the ecotourism business to environmental sustainability.

#### **4.3.1 Sustainable Social Development**

The sustainable social development indicator presents the input of the ecotourism business in MVNP to the community through its two sub-indicators. The indicators are secured livelihood options and stakeholder participation. The second sub-indicator is divided further into two, access to information and community technology, and social networks and integration.

## **Secured Livelihood Options**

MVNP's community is composed of about 35 000 people who reside in the municipality of Sto. Domingo (PSA, 2015). According to the Ecotourism Management Plan of MVNP in 2015 the unemployment rate in Sto. Domingo is relatively high. There is 7% to 10% of the population is unemployed and under employment is between 21% to 30% (Ecotourism Management Plan of MVNP, 2015). The income per capita is 20 000 PHP to 34 000 PHP ( $\approx$  400 USD to 680 USD) which is below the national average of 43 000 PHP ( $\approx$ 860 USD) and 26% to 35% of the population is living below the poverty line (Ecotourism Management Plan of MVNP, 2015).

The MVNP employed only four persons, three from the LGU of Sto. Domingo and one from DENR. This finding is surprising considering the long history of MVNP. However, employment of community members in MVNP has not been always the same. In the MVNP Ecotourism Plan of 2004 – 2005 it is written that the ecotourism business aims to integrate programs/ projects or various stakeholders for the development of ecotourism in MVNP, to develop an Integrated MVNP Ecotourism Development Plan, and to establish livelihood projects for the community. The objective includes the creation of livelihood projects for the community however, it was only in 2012 that part of the plan has been materialized. In 2012 jobs for community members have been offered through the creation of the Mayon Naturalist Eco-guide Association Incorporated (MANEGA). The group is composed of local mountaineering guides accredited and trained by the DOT. There were 17 guides and 27 porters. Unfortunately, in 2013, there has been an accident involving the death of five foreign mountaineers which led to the dissolution of the association. From thereon, trekking and mountaineering activities have been prohibited in certain areas of the MVNP.



The dissolution of MANEGA is not only attributed to the death of people trekking but the activities of Mayon volcano itself. Mayon volcano is one of the most active volcanos in the Philippines. Prohibiting trekking and mountaineering is a good strategy to ensure the safety of the visitors and the community members. Though safety concerns of people wanting to visit MVNP are being addressed there is no clear livelihood alternatives given to the community members. During the field visits, there are several foreign tourists found near MVNP taking their chances to find a local guide to take them up to the volcano. According to Mr. Al Ogayon, extension officer of DENR, there are some community members who despite the warnings still guides people to the volcano for a price.

Inside the MVNP there is an income generating activity that is being done by community members which is unmonitored by the government. There are community members inside MVNP conducting farming activities. In 2017, Mr. Miel Loria, an extension officer of the DENR was task to identify and talk to the farmers. In an interview with Mr. Loria, he mentioned that they do not have data on the community members farming inside MVNP furthermore the land area and the crops being planted. In the interview with Mr. Caesar Valderama, who was the Protected Area Superintendent (PASU), he mentioned that long time ago there were no human activities conducted in MVNP however as time passes by and the local officials changes the management and system becomes different and laxer making room for community members to be able to conduct farming activities. He mentioned that in one of his encounters with the farmers, the farmers exclaimed that they are not doing anything wrong and it is better than stealing or doing bad deeds to earn a living.

At present, there are no job opportunities offered in MVNP for community members. This situation with the dissolution of the MANEGA lead in the community members finding a different

means of livelihood including the guiding of tourist to the volcano which is unmonitored and illegal and farming inside MVNP. Though jobs are not open to the community members, there is a proposal forwarded by the local DENR to the province to develop new activities that would generate more jobs for community members.

### **Stakeholder Participation**

The second sub-indicator of the sustainable social development indicator is the stakeholder participation which is further divided into two sub-indicators, access to information and community technology and social networks and integration.

The MVNP is being managed by a government entity which is the DENR. The management of the department in MVNP is in virtue of the NIPAS Act. Managing MVNP, DENR partners with various government agencies enabling the community to access information. Specifically, the Philippine Institute of Volcanology and Seismology (PHIVOLCS) shares information of volcanic activities. MVNP is also utilized by local officials as a venue for community development planning.

In terms of social networks and integration, it could be said that MVNP is not well integrated to the community. There is limited community participation as discussed in the secured livelihood option. Apart from integration with the community, activities in MVNP can be classified as not being well integrated with the tourism activities in the province. In the DOT “Colors of Albay” which has been presented in figure 14, the ecotourism activities in MVNP is not mentioned/promoted. This finding is surprising since MVNP is in the list of ecotourism destinations by DOT in the national level. It should also be remembered that MVNP is a protected area and there should be institutional arrangements between DENR and MVNP in management. DENR and DOT should be collaborating in planning, ecotourism product development, marketing, and promotion of the

ecotourism business in MVNP which is unlikely given the current circumstances. Ms. Meg Lavilla, the Provincial Environment and Natural Officer (PENRO) chief mentioned that she just asked the local DOT to include MVNP in the promotion.

The government had set its eyes in MVNP and have created job opportunities for the community members. However, MVNP is within an area that is disaster vulnerable not only to the volcanic eruptions but to typhoons. The frequent eruption of Mayon volcano limited the work opportunities for community members resulting in MVNP not being able to integrate well with the community. This situation became the trigger for community members to look for other income generating opportunities, in this case, the use of the back door to guide tourist up to the volcano which is prohibited. Despite the situation, MVNP have some contribution to the community. MVNP partners closely with PHIVOLCS to monitor volcanic activities and share information to the community. MVNP also serves as a venue for local government agencies conducting community development planning.

#### **4.3.2 Economic Sustainability of Ecotourism**

The second indicator for the resilience indicator for disaster vulnerable communities engaging in ecotourism is the economic sustainability of the business. There are two sub-indicators under the economic sustainability of ecotourism, the business plan and the financial management.

##### **Business Plan**

The business plan has three sub-indicators which is the business roadmap, operations and management, and business contingency. The first indicator is the business roadmap, this indicator identifies the mission, vision, and goals of the MVNP along with the action plans to achieve its

goals. The second indicator is the operation and management which identifies the management structure of the MVNP together with the operations done to operate the business in MVNP. Operation and management does not include financial management as it is a separate indicator for the economic sustainability of ecotourism. The last indicator is the business contingency which contains the action plan that the manager will have to enforce once a crisis or a disaster happens.

In visiting the DENR office and interviewing Ms. Lavilla, it was revealed that there is a continuous reshuffling of officials in the DENR and she is new in the position. Previous officials who are in-charge of the MVNP has been appointed to other province or location. There is no turn-over of duties thus leaving her unfamiliar to some information and situation of protected areas and ecosystem in her jurisdiction. Due to this situation, most of the information on analyzing MVNPs have been based on the information from the reports which was filled by DENR in 2015.

MVNP as a protected area which conducts ecotourism business needs to follow rules and regulations according to the NIPAS Act. One requirement in conducting ecotourism activities in a protected area is the development, submission, and approval of a business plan to the national DENR office. MVNP has an ecotourism management plan approved in 2015. The plan indicates that MVNP aims to be a protected natural landmark of the country offering its sustained ecological integrity and beauty to the present and the future generations of mankind. The ecotourism management plan also included seven goals which the MVNP aims to achieve by 2019. The first goal is to develop and promote diversified and competitive products that offers opportunities to different fields of tourism markets. The second goal is to create conducive environment for MVNP ecotourism investments. The third goal is the development of a protected area and biodiversity protection, management, and conservation and ecotourism branding and marketing. The fourth goal is to strengthen the institutional capacity. The fifth goal is to develop and strengthen

partnerships. The sixth goal is to establish mechanisms for sustainable financing and the last goal is monitoring outcome and impacts. All goals are specific however, it is mostly pertaining to the environmental aspect and the management of the MVNP. There is mention of developing products and partnerships however, there is no mention about community development which was part of the mission of the preceding ecotourism management plan.

Mentioned previously, DENR manages MVNP in virtues of the NIPAS Act. However, the regional DENR partnered with the LGU of Sto. Domingo in managing MVNP. A Memorandum of Understanding (MOU) between DENR and the LGU have been signed in March 1, 2012. In the MOU, the role of DENR and the LGU has been identified. In the MOU, the DENR has six roles and responsibilities in the management of MVNP. The first role and responsibility of DENR is to identify and delimit the area covered by the agreement for the development of the ecological park and campsite with the assistance of DENR protected areas office. The second role and responsibility is to formulate and approve the MOA to facilitate the co-management and transfer functions and responsibilities to the LGU of Sto. Domingo. The third role and responsibility is to assume management of the covered area (the subject of the agreement) in case of abandonment, violation of and/or termination of the MOA, rescission and other valid/justifiable reasons subject to terms and conditions mutually agreeable between the two parties. The fourth role and responsibility is to review and approve development activities contained in the area management plan that will be undertaken by the LGU of Sto. Domingo. The fifth role and responsibility is to monitor through the protected area superintendent office the implementation of the plans. The last role and responsibility of the DENR stated in the MOA with the LGU of Sto. Domingo is for DENR to conduct annual evaluation of the plan implemented and make recommendations to enhance future plans.

The roles and responsibilities of the LGU of Sto. Domingo has also been identified. The LGU has nine roles. The first role and responsibility of the LGU is to prepare a strategic management plan for the submission to and approval by MVNP-Protected Areas Management Bureau (PAMB). The second role and responsibility is to prepare annual operation plan for submission to and approval by MVNP-PAMB. The third role and responsibility is to develop, protect, improve and maintain existing facilities within the covered area in coordination with the MVNP-PAMB. The fourth role and responsibility is to collect protected area fees and other necessary fees for the use of resources and facilities within the covered area of the MOU and remit the Integrated Protected Area Fund (IPAF) share to MVNP-PAMB. The fifth role and responsibility is to maintain peace and order within the covered area of the MOU and surrounding communities within the municipality of Sto. Domingo. The sixth role and responsibility is to protect and conserve the ecosystem and preserve the wildlife within the covered area. The seventh role and responsibility is to develop and market the MVNP as a sustainable and globally competitive ecotourism destination in collaboration with the DOT. The eight role and responsibility is to ensure the cleanliness and orderliness of the covered area using environmentally sustainable waste management systems and practices. The last role and responsibility of the LGU in the MVNP is to present/submit quarterly progress and financial reports to the MVNP-PAMB.

The NIPAS Act calls for the development, submission and approval of a business plan however, there is no mention of crafting a contingency plan. MVNP as an area vulnerable to several disasters needs development of a contingency plan. Natural disasters cause damages in facilities in MVNP incurring cost for repairs. Though there is no written contingency plan, a stakeholder of MVNP provides a very detailed map of natural disaster risk in MVNP specifically in Sto. Domingo. The maps are provided by the local NDRRMC. In the interview with Engr. Edgar

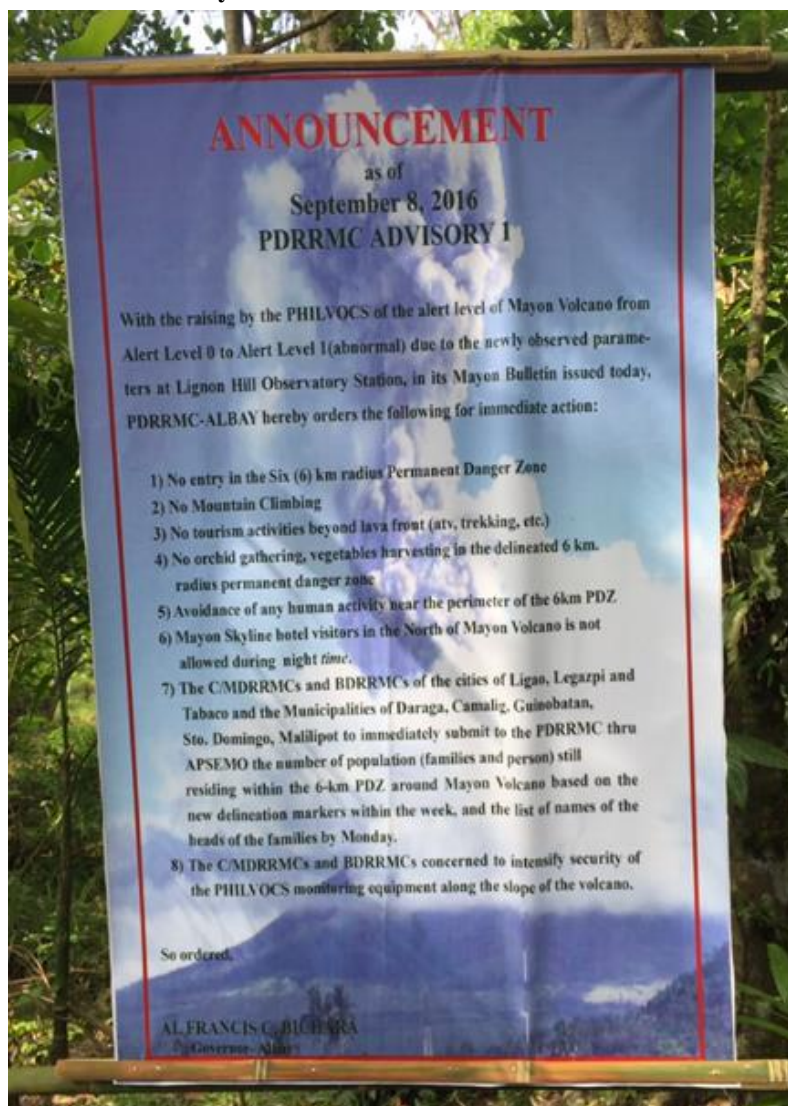
Balido, local DRRM Officer of Sto. Domingo he mentioned and shared the natural disaster vulnerability maps of Sto. Domingo. The maps includes: the fault line map (see Appendix 7), flood and storm surge hazard map (see Appendix 8), lahar hazard map (see Appendix 9), landslide hazard map (see Appendix 10), lava flow hazard map (see Appendix 11), ground fracture and liquefaction map (see Appendix 12), pyroclastic flow hazard map (see Appendix 13), tephra fall hazard map (see Appendix 14), and the tsunami hazard map (see Appendix 15).

The fault line map indicates that Sto. Domingo lies in two fault lines. The fault is a strike slip fault which point to rocks sliding past each other horizontally with little or no vertical movement. The fault situation implies the vulnerability of Sto. Domingo to earthquakes. In the flood and storm surge map it can be seen that Brgy. Lidong, where the entrance of MVNP is located covers the largest flood vulnerable area. The flooding in the area is noted to be occasional and rare. In addition, the map indicates that the area is additional vulnerable to flooding, overflow, and river bank erosion. Storm surge on the other hand is mostly a threat in the borders of the municipality of Sto. Domingo. Information on the vulnerabilities of the area makes it easy to identify the areas needed to vacate in any disaster situation even without a contingency plan. This helps in increasing the resilience of the community around MVNP.

Other than the vulnerability maps, the Provincial DRRMC provides public announcements on disasters specifically advisory on volcanic activities. An example of the advisory is posted inside the MVNP and can be seen in figure 20. In the photo of the announcement in figure 20 it is mentioned that the alert level in the volcano is raised from 0 to 1, this signifies the increase in alert level for the volcanic eruption. Together with the announcement is the responses expected and actions to be undertaken in and around MVNP ordered by the provincial governor. The actions listed in the announcement includes the closure of the volcanos 6 km permanent danger zone with

the limitations on the tourism activities especially ecotourism activities such as climbing, trekking, and hiking. In case of the near volcanic eruption and the alert level announcements, the local DRRM teams are requested to inform the provincial office on the information of the residing population within the 6 km permanent danger zone. Furthermore, the local DRRM teams are ordered to increase the security of PHIVOLCS equipment located in the slopes of the volcano.

**Figure 20. PDRRMC Disaster Advisory**



[Source: Taken by the author]

MVNP as a protected area conducting ecotourism activities calls for the development of a business plan. The mission, vision, and goals of MVNP are indicated in the business and



movement plan of the MVNP. The roles and responsibilities of the management, the DENR and the LGU of Sto. Domingo is clearly stated and is agreed upon by both parties. Despite the presence of the business plan, there is no definite contingency plan. Nevertheless, the disaster vulnerability maps of MVNP is complete making it easy to determine the areas which are highly vulnerable and requires more attention during disasters. The PDRRMS also release announcements on conditions of the volcano and is posted in MVNP. The provincial governor also gives orders /list of things to do and things that are prohibited to do during the disaster.

### **Financial Management**

The financial structure of MVNP is unlike any other ecotourism business. Uniqueness of the financial structure lies on the protected area status of the MVNP. The Integrated Protected Area Fund (IPAF) is the fund which keeps the ecotourism business of MVNP operating. The MVNP IPAF is composed of two financial sources, the fees paid by the customers for services and activities (see table 12) and funds from the central/national IPAF.

The fees collected in MVNP consists of entrance fees, use of facilities (picnic shed, kiosk, tent rental, sleeping bag, mat rental, and parking lot), and availing activities such as camping, eco-tour, tree planting, mountain climbing, and filming for movie production and TV commercial. The pricing for the entrance, and activities in MVNP was decided by the Protected Areas Management Bureau (PAMB) through the MVNP-PAMB Resolution no. 2006. The entrance fees are very minimal, ranging from 10-15 PHP (0.20-0.30 USD) as what can be seen in table 12.

**Table 12. MVNP Activities and Rates**

Types of Fees	Rates in Peso <i>Note: 1USD ≈ 50PHP</i>	Conditions
<u>Entrance Fee</u> <ul style="list-style-type: none"> <li>• Adult</li> </ul>	15	Per person

<ul style="list-style-type: none"> <li>Minor/Student/Senior Citizen</li> </ul>	10	Per person
<b><u>Facilities/ Infrastructure Use</u></b> <ul style="list-style-type: none"> <li>Picnic Shed</li> <li>Kiosk</li> <li>Comfort Room</li> <li>Tent rental <ul style="list-style-type: none"> <li>Single</li> <li>Double</li> <li>Family</li> </ul> </li> <li>Sleeping Bag and Mat rental</li> </ul>	20 50 Free 50 75 100 25	Per unit/day Per unit/ day Donation is accepted Per unit/day Per unit/day Per unit/day Per unit/day
<b><u>Activities</u></b> <ul style="list-style-type: none"> <li>Camping (overnight)</li> <li>Eco-tour</li> <li>Tree Planting (free seedlings and certificate)</li> <li>Mountain Climbing</li> <li>Filming for movie production and TV Commercials</li> </ul>	25 100 15 - 2,000	Per person Per tour group of ten Per person Per day or fraction thereof exclusive of the use of electric power and other facilities including acknowledgement of the area to promote the park
<b><u>Parking</u></b> <ul style="list-style-type: none"> <li>Motorcycle/tricycle and the likes</li> <li>Car/Jeepney/Van and other light vehicles</li> <li>Bus/Mini Bus</li> </ul>	5 10 20	Per day or fraction thereof Per day or fraction thereof Per day or fraction thereof

[Source: MVNP Protected Areas Management Bureau]

The fees collected from the entrance fees is divided into two portions, 25% is remitted to the central IPAF and 75% is accrued to the trust fund of the LGU. In the interview with the employees of MVNP who are hired by the LGU, it is found out that their salary comes from the LGU. Also, due to renovations and low turn of customers there is not much revenue thus, the staff wasn't able to provide a figure for the MVNP profits. The focus of MVNP at the moment is on renovation and not the promotion and attraction of customers. In acquiring additional funds the LGU at their own option may coordinate, deal, and solicit any form of financial assistance with other government offices, bureaus and instrumentalities including NGOs, POs, private persons, firms, and entities for the development, maintenance, and operations of facilities and activities of MVNP.

MVNP as a special location has to abide by the rules and regulations of a protected area. The rules includes creating a business plan for ecotourism activities to be done. A clear mission statement and objectives is indicated in the plan. However, the plans for the ecotourism business is geared towards the environmental aspect and the management of the MVNP and there is less emphasis on the community development. The management of the area is clear and there is a written MOU on the task of DENR and the local LGU.

Though MVNP has a clear business management plan/ecotourism plan which was crafted in 2015 delays in the implementation of activities is experienced. One reason for the delays is the changes in the PENRO and other officials in the DENR overseeing MVNP and the frequency of natural disasters in the area. Natural hazards are frequent in MVNP and though there is no contingency plan for the business, the NDRRMC of Sto. Domingo provides vulnerability maps and postings of volcanic activities is posted in MVNP which aids in the increase in resilience of the people in Sto. Domingo in general.

### **4.3.3 Environmental Sustainability**

The third indicator of the resilience indicator for disaster vulnerable communities engaging in ecotourism is the environmental sustainability. The indicator has two sub-indicators which is the environmental quality maintenance, and resource efficiency in production and consumption systems. The environmental quality maintenance indicator is further divided into two which is the quality and maintenance of ecosystems and the inclusion of environmental cost in pricing mechanisms.

## Environmental Quality Maintenance

MVNP is in the temporary list of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) as a World Heritage Centre. MVNP has been nominated by UNESCO Philippines during March 20, 2015. There are several categories in nomination of a world heritage centre and MVNP has been nominated under the natural category. Being under the category means that the MVNP is a site which has natural features having outstanding value either or both in aesthetic or scientific point of view. MVNP is also nominated in two of the eight selected criteria for the natural category. The first criteria where MVNP has been nominated is its characteristics of being an area with exceptional natural beauty and aesthetic importance. The second criteria where MVNP is nominated is its nature of being a haven to important and significant habitats.

Being in the list of UNESCO meant that MVNP must have environmental quality maintenance. The ecotourism management plan of 2015 mentions a role of the PASU to monitor customer impacts to MVNP. Table 13 outlines the tools widely used for resource monitoring that are supposed to be used by the PASU to assess visitor impact in the ecotourism destinations. The tools cover terrestrial, coastal, and marine ecosystems. The data that is supposed to be collected should be compared against the number and activities of visitors in MVNP for a certain time.

**Table 13. Resource Monitoring Tools**

RESOURCE/S	TOOL/S
<b>Terrestrial Resources</b>	
<ul style="list-style-type: none"> <li>• Flora and fauna</li> <li>• Trail</li> </ul>	Trail Resource Assessment and Monitoring (TRAM)
Inland waters (rivers & lakes)	Water quality test which may be requested from EMB or concerned academic institutions
<b>Coastal and Marine Resources</b>	
Seagrass, corals, other flora and fauna	Transect Swim Method, Point Intercept Method
Mangrove	Mangrove Habitat Assessment
Swimming Area	Water quality test which may be requested from EMB or concerned academic institution
<b>Both terrestrial, and coastal and marine resources</b>	
<ul style="list-style-type: none"> <li>• Flora and fauna</li> </ul>	Photo Documentation Method

<ul style="list-style-type: none"> <li>• Trail</li> <li>• Ecotourism Site</li> </ul>	
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[Source: MVNP Ecotourism Management Plan 2015]

There are prescribed resource monitoring tools which has been part of the ecotourism management plan of 2015, however, there is no proof that the monitoring has been done as there were no reports found. Apart from the monitoring tools, there are conservation strategies which are included in the ecotourism management plan of 2015. The plan includes the establishment of a nursery for endemic plant species, development of environmental conservation campaigns such as video, brochures, signage, and the development of an official MVNP website. Furthermore, the plan includes the formulation and enforcement of environmental laws and local ordinances, the establishment of a wildlife conservation and rescue center, and establishment of botanic gardens.

Despite the need to conserve the protected area, the status of MVNP as a world heritage center and the prescription of conservation and monitoring initiatives mentioned in the 2015 Ecotourism Management Plan, MVNP is maintained through minimal cleaning and facility maintenance. Moreover, there is a small conflict of interest in between the LGU and DENR in terms of MVNP maintenance. The LGU wants to clean the MVNP specially the entrance area to attract more visitors. However, as per the regulation of the DENR, since the area is considered as protected, it shouldn't be modified as much. When a typhoon hits MVNP and some trees and branches fall, it is natural for the LGU to clean the area and keep it attractive, however, DENR wants to maintain the scene from after the typhoon till it decays. In the end, what happens it that the LGU staff asks permission from DENR to remove the debris. When the request is approved, it is the only time when the LGU staff can remove the debris.

There is no mention of the inclusion of environmental cost in the pricing mechanism. In viewing the post of activities and pricing in MVNP there are no mention of environmental cost

furthermore, conservation costs. Nevertheless, MVNP as a protected area receives IPAF which is essentially from the national fund to conserve and protect the environment.

### **Resource Efficiency in Production and Consumption Systems**

MVNP has a rich diversity of flora and fauna which should be utilized properly. The place houses 156 floral species belonging to 36 families and 83 species of trees. Among this species is the *Hopea philippinensis* (dipterocarp) and the *Nepenthes ventricosa* (pitcher plant). MVNP also houses 104 species of land vertebrates. Among the animal species housed by MVNP is the Philippine Brown Deer, Philippine Warty Pig, and Giant Golden-Crowned Flying Fox which are considered vulnerable species. There are also animal species which can be found in MVNP like the Luzon Bleeding Heart, the Philippine Eagle-Owl and the Philippine Cockatoo which all belong to the red list of IUCN (endangered species). These animal species are housed by the MVNP and serves as their natural habitat. The development and the existence of MVNPs ecotourism business lessens the animal poachers and orchid poachers in the area according to the DENR officers.

MVNP is a protected area conducting ecotourism business. MVNP has a core area which is protected through the Presidential Proclamation No. 413. A buffer zone of 500-meter radius from MVNPs boundaries is also existing in virtue of the Regional Development Council of 2012. The area from the boundaries only permit activities which are parallel with the conservation objectives of the MVNP. Furthermore, the entirety of MVNP is regulated by Republic Act No. 7586. Despite the declarations and the proclamations, there is however, no clear map showing the land use and zoning of the MVNP.

The soil in MVNP is dominantly sandy associated with rocks and boulders, however some portion are loam and fertile and is suited for agriculture and portions of MVNP is tilled by the farmers. The farmers get their income from crops which they plant and harvest in MVNP. Though

there is no exact record of the number of people doing agriculture in MVNP. The farmers tilling the land are locals who have been farming in the MVNP for a long time, however, there is no record on how many are they and what area of the MVNP are they planting at. This situation can be related to the unclear land management and zoning of the MVNP. In the ecotourism management plan of 2015 there are mention of the different zones in MVNP yet there is no map which shows nor accounts which states the zones in MVNP.

#### **4.4 Conclusion**

MVNP encompasses a large number of different habitats which are unique, diverse and extremely important at the national and international levels specially in Southeast Asia. MVNP as a protected area shouldn't be thoroughly developed but thus protected however it is the government's decision to delignate a portion of land in MVNP for ecotourism activities. Development of an ecotourism business in MVNP called for the creation of an ecotourism management plan which guides the development of the business. The mission and vision of MVNP as an ecotourism destination has been clearly written in the plan and the roles of the DENR and the LGU in managing MVNP has been defined.

Though the business plan of MVNP is clear it is not successful in providing a secured livelihood option and it hasn't been successful in its integration with the community. A reason is that MVNP is gearing towards environmental sustainability and conservation rather than community development. Jobs opportunities offered by the MVNP is limited and there are community members who give tours through the back door which is illegal. This situation should be addressed as there is a plan to create more opportunities for community members more.

However, this current situation does not contribute to the resilience of the community and even puts some community member to be vulnerable accessing MVNP illegally.

MVNP, although, have been in the eye of the nation has yet to indicate a proper zoning of the MVNP. In the reports of the MVNP zoning has been mentioned however there is no map which is presented indicating locations where farmers can plant, or where ecotourism activities can be conducted. There is conflict in interest of DENR and the local LGU with regards to the maintenance of the site and changes in the local administration also slows down the developments in MVNP.

Though MVNP does not contribute to the community resilience in terms of generation of job opportunities, MVNP serves as a large buffer for the community specifically in terms of volcanic eruption. The MVNP is shut down once there is high level alert in the volcano and the community is informed of the situation increasing the resilience of the community and allowing them to have time to be able to evacuate. Announcement in conditions of the volcano is also posted in MVNP to inform visitors and community members.



## **CHAPTER 5 CONCLUSION AND RECOMMENDATIONS**

The study aims to identify the role of ecotourism in resilience building in disaster vulnerable communities in the Philippines. Fulfilling the objective, two research questions were raised. The first question was the way ecotourism business is managed, and the second was the contribution of the ecotourism business to community resiliency in disaster vulnerable areas.

In response to the first research question, there are different management types of ecotourism business. The first type of management is the community-managed ecotourism business, and the second is the government-managed ecotourism business. The government agencies managing the ecotourism business are the DENR and the DOT. The DENR manages ecotourism businesses specifically conducted in protected areas whilst the DOT manages ecotourism businesses in priority areas identified in the national ecotourism plan. Government-managed, and community-managed ecotourism businesses have different management structures and management styles.

In a government-managed ecotourism business, there are two main agencies involved, the DOT and the DENR. The management of DOT is site specific, there are no general guidelines and each ecotourism plan is tailored to specific sites mentioned in the NEP. The main goal of the DOT in development and management of the ecotourism businesses is to generate profit that will eventually contribute to the national economy. The DENR management, on the other hand, focuses on environmental conservation and preservation. The DENR manages ecotourism businesses in protected areas wherein detailed guidelines are set, from the site selection to the conduct of the business. In implementing the ecotourism plans, the DENR partners with the LGUs. Ecotourism business management by communities is far

apart from the government-managed ecotourism business in terms of structure. In a community- managed ecotourism business, there are no specific guidelines or plans for business development. Furthermore, the mission, vision, and goals of the business are not clearly identified. The community managing the ecotourism business is free to decide the direction and management style to be adapted in their business.

In response to the second research question, the ecotourism business contributes to the increase in community resiliency of disaster vulnerable communities in several ways. First, the ecotourism business provides job opportunities to community members. Having a job and earning money increases the resiliency of community members. In times of disasters, community members will have a regular source of income, enabling them to acquire resources to survive and be resilient against disasters. Second, the ecotourism site serves as venue for community- development activities which are sponsored and organized by different stakeholders. Different activities conducted in the sites help community members develop and gain new knowledge increasing their resiliency, for instance, conducting training on DRR. Third, the ecotourism management staff and other stakeholders disseminate information to the community. The ecotourism business, having a wide network, collects information and shares it with the community. Disaster information, warnings, and precautions, for instance, are shared by ecotourism management staff to the community. Fourth, the ecosystem in the ecotourism site provides the community with basic needs, such as food and building materials. Lastly, the ecosystem in the ecotourism site serves as a buffer to natural disasters. The ecosystem lessens the impact of disasters on the community.

Despite several contributions of the ecotourism business in community resiliency in disaster vulnerable areas, optimal contribution has not been obtained. There are factors hindering the receipt of optimal benefits from the ecotourism business to the resilience of communities in disaster vulnerable areas. The first limiting factor is the conflict of interest

between the stakeholders. For instance, in the partnership between DENR and LGU, both entities have different goals, one being conservation and protection of the environment and the other profit generation. The second limiting factor is the change in management officials. Frequent changes in officials threatens the continuity and development of the ecotourism business, especially if there is no turnover of position. There are also instances where newly appointed managers and/or personnel would have different priorities and approaches to the development and management of the business. The third limiting factor is limitation in job opportunities for community members. Protected areas conducting ecotourism business hire and need personnel that are highly knowledgeable in specific fields. This situation limits the job opportunities offered to the community members. The fifth limiting factor is the absence of a business plan. A business plan states the mission and vision of the business and the plan and strategies for the business to prosper. Without the business plan, the sustainability of the business is at risk. The sixth limiting factor is the financial structure. The financial structure of the business should be carefully considered. There can be cases where the salary of the employees is dependent on the profits of the business. This situation cannot help the employees be more resilient specially in times of disaster. The last limiting factor is the technical capacities of the management team.

There are ways to optimize the benefits obtained from the ecotourism business which contribute to the resiliency of communities in disaster-vulnerable areas. The first is the participation of the local community. Involving the local community in development of the business enables easy integration of the business in the community. This involvement enables easy and fast communication between the management staff of the business and the community. The second is the linkage with local agencies, NGOs, and private individuals/organizations. Collaboration or partnership with the mentioned organizations would enable the business to tap their network to improve, expand, promote, and market the business more efficiently.

However, in general, as an ecotourism business is being developed, there are factors that need to be considered: the sustainable social development; the business sustainability; and the environmental sustainability of the ecotourism business. These three factors are overlapping, interrelated, and crucial to the development of an ecotourism business. These factors go beyond the business as usual and the triple bottom line as it factors in sustainability. These factors, when considered in development of an ecotourism business, will ensure the sustainability of the business, the protection of its assets (the environment), and the benefits to the community.

### **Recommended Ecotourism Business Practices**

There are several recommended practices for the ecotourism business to be more resilient and to contribute more to the community. First is the improvement in the ecotourism business planning (especially by the CBOs) which considers the business risk factors. The second is that, hazard assessment should be done regularly. Furthermore, resulting assessment especially of the most probable and most severe incident should be addressed in planning and should be addressed proactively. The third is conducting assessment of the ecotourism business to multi-hazard vulnerability together with the scenario setting, assessing impacts and probable damages to the business facilities, goods, and services together with the assessment of the potential failure chain, and retrofitting the infrastructures and facilities to promote resiliency. The fourth is the assessment of the capacity of business continuity over various potential hazards. Fifth is the existence and provision of a “Rainy day fund,” contingency fund to handle post-disaster recovery. The sixth is the improvement on the awareness of the value of the environment and ecosystem for ecotourism and DRRM Protection of Ecosystems like sand dunes, wetlands, mangroves or reefs that protect ecotourism from storm surge and tsunamis; lakes and rivers that are a source of water supply; trees and greenery that help reduce flooding and other ecosystem services should be protected to support ecotourism. The seventh is the promotion of the use of green and blue infrastructure to support ecotourism and DRRM. Green

infrastructures include greening streets, facades, roofs and roadside while blue infrastructures include water corridors and wetlands which are all excellent strategies for ecotourism integration and DRRM. The eighth is public education and awareness on ecotourism and DRRM. The ninth is coordinated public relations and education campaign, including social media, and the last is community organization and networking, social connectedness and cohesion, which states the clear definition of roles and responsibilities of community organization and network on ecotourism and DRRM.

### **Policy Recommendation**

The Philippines, despite having a growing tourism industry and showcasing a number of ecotourism destinations to the world, has yet to incorporate the disaster -preparedness or disaster-resilience component to the business. The rules, regulations, and policies regarding disaster management does not discuss tourism, furthermore ecotourism. Resilience has not been mentioned in the general tourism act and it is observed that, in ecotourism policies, disaster and resilience component is missing. This is mainly due to the parallel development of disaster management and ecotourism policies without integration targeted at making ecotourism resilient.

At the national level, the government has been investing in protected areas and supporting its ecotourism developments. Furthermore, guidelines in ecotourism planning in protected areas have been issued. These developments have been brought about by many government departments and the treasury who thinks that protected areas are drain in the economy. If the protected areas are used for DRR, the cost of maintaining protected areas will appear more justifiable. According to IUCN, in virtually all cases, DRR from protected areas will be additional to other multiple benefits that protected areas bring to communities, such as from

tourism, jobs and other ecosystem services. The government is already investing in establishment and management of state-protected areas for biodiversity conservation, recreation and tourism. Additional incorporation within DRR strategies means that such state investment produces a wider range of benefits, which address the needs of more government departments, and is thus a more efficient use of tax revenue.

In a much broader sense, there are several ways to promote disaster-risk reduction and resiliency through ecotourism. The members of the National Disaster Risk Reduction and Management Council (NDRRMC) and the National Ecotourism Development Council (NEDC) are similar. Thus, they can issue a joint circular or guidelines, putting disaster risk reduction management into ecotourism and/or using ecotourism as a strategy to promote disaster risk reduction management in vulnerable but ecotourism potential areas, which would also lead in an increase of resilience in the surrounding community. An additional area of DRRM and ecotourism integration is planning. A planning guideline could be issued mixing DRRM in ecotourism planning (from site selection to design of amenities, even providing attractions on DRRM in the ecotourism areas). Another scheme is strengthening decentralization in the ecotourism and DRRM concerns. This means enabling (or even expanding the powers and responsibilities of) local government units to utilize their authority in promoting DRRM in ecotourism (or vice versa—utilizing ecotourism as a strategy in promoting DRRM and resiliency). In this regard, local chief executives (mayors and governors) as area managers in their respective jurisdiction can integrate these two concerns. Ecotourism and DRRM can also be integrated through regulatory measures. In formulating and implementing their comprehensive land use plan/ zoning ordinance and enforcing, the building code and other related regulations (that affect ecotourism), disaster-risk reduction and resiliency should be incorporated. This means building design, location, standards of construction, and materials

among others should be considered. The last measure is through market-based instruments—ecotourism that are ventures that promote disaster risk reduction and resiliency should get grants (matching and/or performance grants) or special funding from national or international organizations.

Overall, the ecotourism business contributes to the resilience of communities in disaster vulnerable areas regardless of management types. However, this possibility of ecotourism as part of DRRM strategy and contributing to community resiliency hasn't been explored in the Philippines. Policy recommendations have been mentioned and integration of ecotourism in DRRM strategies would yield benefits not only to the community but to the government as well. Though ecosystems have been used to combat climate change and disasters in the world, ecotourism hasn't gained popularity. The Philippines, integrating ecotourism as part of its DRRM strategy, can be a pioneer. Guidelines in developing ecotourism businesses in disaster-vulnerable communities yielding community resilience can be developed. In a regional scope, integration of ecotourism and disaster management can be incorporated in the ASEAN Roadmap for Strategic Development of Ecotourism Clusters.

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*What is DOT Accreditation?* Retrieved 18 February 2017, from <http://www.tourism.gov.ph/Downloadable%20Files/WhoMayApplyForAccreditation2017.pdf>.

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## Appendix 1

### Ecotourism Destinations in the Philippines

Name Code	Ecotourism Site	Location		Region
		Longitude	Latitude	
1	Ifugao Rice Terraces	121.056	16.924	CAR Region
2	Matangkib Cave	120.54	17.0754	CAR Region
3	Lumiyang Cave	120.904	17.069	CAR Region
4	Sumaging Cave	120.903	17.0657	CAR Region
5	Hanging Coffins	120.906	17.0818	CAR Region
6	Mt. Province Rice Terraces	121.08	17.1446	CAR Region
7	Balbalasang National Park	121.011	17.3861	CAR Region
8	Las Pinas/ Paranaque Critical Habitat and Ecotourism Area	120.978	14.4883	National Capital Region
9	La Mesa Eco-Park	121.073	14.713	National Capital Region
10	Ninoy Aquino Parks and Natures Center	121.044	14.6509	National Capital Region
11	Pasig Rainforest Park	121.098	14.5738	National Capital Region
12	Marikina River Park	121.094	14.635	National Capital Region
13	Laguna de Bay	121.194	14.3935	National Capital Region
14	Hundred Island National Park	120.041	16.204	Region I - Ilocos Region
15	Bangrine Marine Protected Area	119.926	16.2463	Region I - Ilocos Region
16	Villacorta/Bitmatya/Cacupangan Caves	119.959	16.0529	Region I - Ilocos Region
17	La Union Botanical Garden	120.366	16.5873	Region I - Ilocos Region
18	La Union Surfing	120.32	16.6571	Region I - Ilocos Region
19	Pagudpud Adventure	120.822	18.5875	Region I - Ilocos Region
20	Vigan Heritage Village	120.389	17.5726	Region I - Ilocos Region
21	Kapurpurawan Rock	120.654	18.5383	Region I - Ilocos Region
22	Caangrian Falls	150.392	34.3725	Region I - Ilocos Region
23	Balingasay River	119.865	16.3441	Region I - Ilocos Region
24	Arosip Ecotrail	120.205	16.4352	Region I - Ilocos Region
25	Tuddingan Falls	120.417	16.5752	Region I - Ilocos Region
26	Lon-oy Springs	120.302	16.401	Region I - Ilocos Region
27	Paoy Lake Natural Park	120.537	18.1211	Region I - Ilocos Region
28	Trekking Adams	120.919	18.4591	Region I - Ilocos Region
29	Mount Iraya	122.017	20.4674	Region II - Cagayan Valley
30	Nakabuang Beach	121.852	20.3499	Region II - Cagayan Valley
31	Anguib Beach	122.213	18.516	Region II - Cagayan Valley
32	Blue Water and Falls	121.998	18.0207	Region II - Cagayan Valley
33	Mt. Cetaceo	122.05	17.7	Region II - Cagayan Valley

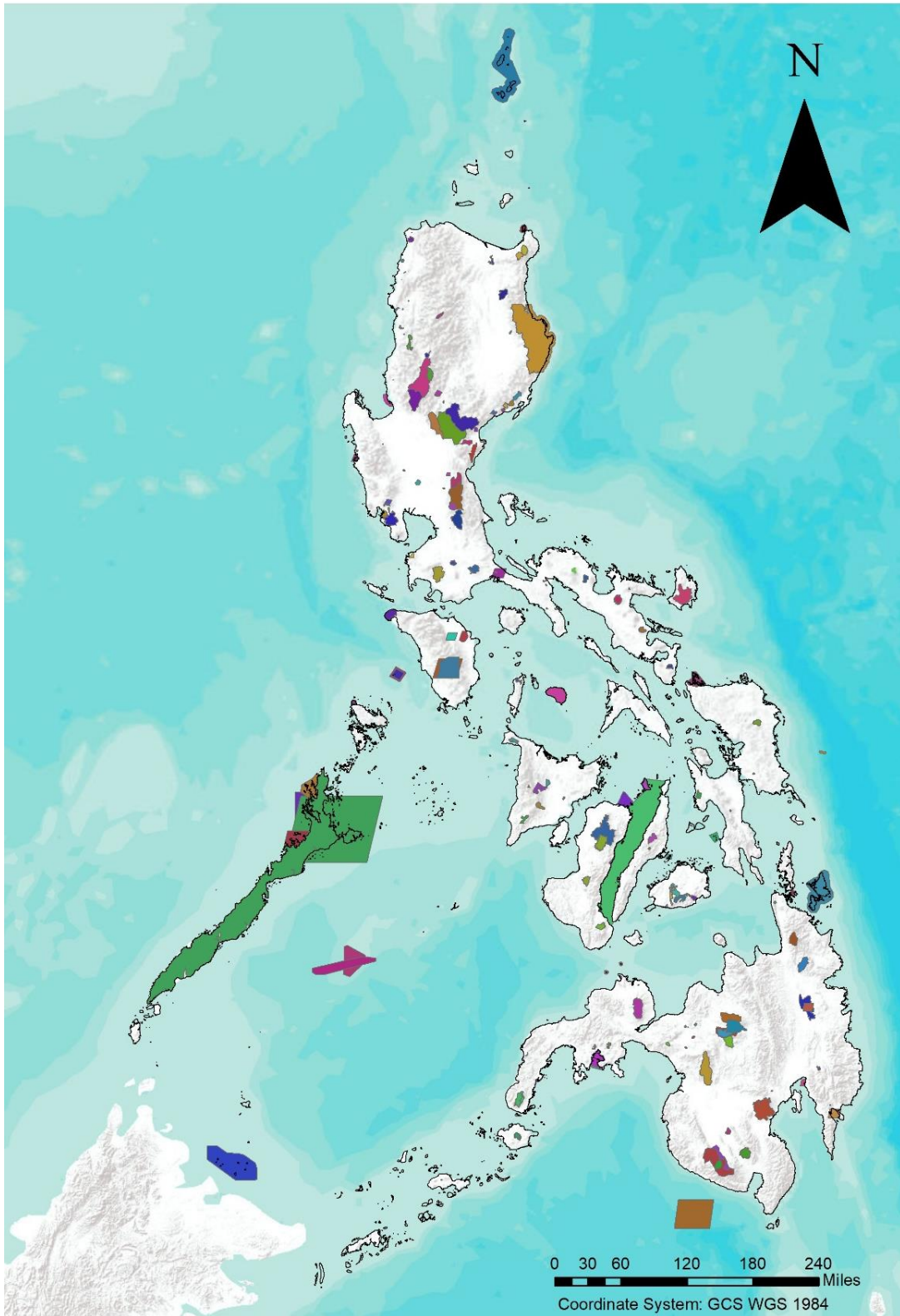
34	Aglipay Caves	121.618	16.479	Region II - Cagayan Valley
35	Governor Rapids	121.725	16.3683	Region II - Cagayan Valley
36	Capisaan Cave	121.195	16.2045	Region II - Cagayan Valley
37	Imugan Waterfalls	120.893	16.1558	Region II - Cagayan Valley
38	Mt. Pinatubo	120.35	15.143	Region III - Central Luzon
39	Taal Volcano Island	121.003	14.0044	Region IV-A - CALABARZON
40	Pamitinan Cave	121.19	14.7319	Region IV-A - CALABARZON
41	Wawa Dam Rizal	121.192	14.7278	Region IV-A - CALABARZON
42	Mt. Guiting Guiting Park	122.56	12.4128	Southwestern Tagalog Region - MIMAROPA Region
43	Puerto Princesa Subterranean River National Park	118.927	10.1926	Southwestern Tagalog Region - MIMAROPA Region
44	El Nido Marine Reserve	119.275	11.1234	Southwestern Tagalog Region - MIMAROPA Region
45	Mayon Volcano	123.686	13.2548	Region V - Bicol Region
46	Mt. Kanlaon Natural Park	123.133	10.4116	Region VI - Western Visayas
47	Olango Island Wildlife Sanctuary	124.056	10.2665	Region VII - Central Visayas
48	Cambuhat River and Village Tour	124.08	10.0359	Region VII - Central Visayas
49	Malapascua Island	124.116	11.3358	Region VII - Central Visayas
50	Simply Butterflies Conservation Center	124.099	9.69587	Region VII - Central Visayas
51	Abatan River Tour	123.874	9.71459	Region VII - Central Visayas
52	Calbiga Caves Protected Landscape	125.006	11.3804	Region VIII - Eastern Visayas
53	Biri Larosa Protected Landscape and Seascape	124.245	12.3637	Region VIII - Eastern Visayas
54	Lake danao Natural Park	124.701	11.0671	Region VIII - Eastern Visayas
55	Cuatro Islas Protected Landscape/Seascape	124.655	10.5258	Region VIII - Eastern Visayas
56	Ulot River	125.26	11.9036	Region VIII - Eastern Visayas
57	Garden of Malasag Eco Tourism Village	124.7	8.45833	Region X - Northern Mindanao
58	Macahambus Adventure Park	124.593	8.38138	Region X - Northern Mindanao
59	White River Rafting	124.634	8.28772	Region X - Northern Mindanao
60	Tubing	124.383	8.25578	Region X - Northern Mindanao
61	Canopy Walk	125.006	8.43038	Region X - Northern Mindanao
62	Misamis Occidental Aquamarine Park	123.849	8.26827	Region X - Northern Mindanao
63	Mt. Apo	125.271	6.98746	Region XI - Davao Region
64	New-Israel Eco-Park	125.193	6.92338	Region XII - SOCCSKSARGEN
65	Kiwa Adventure Park	124.342	7.124	Region XII - SOCCSKSARGEN
66	Lake Holon	124.883	6.0969	Region XII - SOCCSKSARGEN
67	Mt. Parker	124.896	6.10303	Region XII - SOCCSKSARGEN
68	Seven Waterfalls	124.728	6.2453	Region XII - SOCCSKSARGEN
69	Siargao Island	126.046	9.84819	Region XIII - CARAGA
70	Lake Mainit	125.511	9.45212	Region XIII - CARAGA
71	Agusan Marsh Wildlife Sanctuary	125.867	8.31667	Region XIII - CARAGA

72	Dinagat Islands	125.61	10.1282	Region XIII - CARAGA
73	Bucas Grande Island	125.937	9.61761	Region XIII - CARAGA
74	Tinuy-an Falls	126.228	8.17196	Region XIII - CARAGA
75	Basul Island	125.48	9.83714	Region XIII - CARAGA
76	Mabua Pebble Beach	125.439	9.81004	Region XIII - CARAGA
77	Day-asan Floating Beach	125.323	9.46096	Region XIII - CARAGA
78	Cagwait White Beach	126.291	8.93003	Region XIII - CARAGA
79	Britania Island	126.205	8.69532	Region XIII - CARAGA
80	Bat Islands	126.227	9.11528	Region XIII - CARAGA
81	Twin Linungao	125.487	10.0808	Region XIII - CARAGA

[Source: Created by the author based on the destination list of the Department of Tourism (DOT) from:<http://www.visitmyphilippines.com/index.php?title=EcotourismSitesbyRegion&func=all&p id=2519&tbl=>]

## Appendix 2

### Protected Areas Map



[Source: Philippine Geographic System (PHILGIS, 2013)]

































































### Appendix 3

#### Legend: Protected Areas in the Philippines
































































<b>Protected Areas</b>	
	Abasig - Matogdon - Mananap
	Agan-an
	Agoo - Damortis
	Agoo - Damortis Buffer Zone
	Agusan Marsh
	Agusan Marsh Wildlife Sanctuary
	Aklan River
	Alabat
	Alang-alang
	Albuquerque - Loay - Loboc
	Aliguay
	Aliguay Island Buffer Zone
	Alijaban
	Alijawan - Cansuhay - Anibongan
	Allah Valley
	Allah Valley Buffer Zone
	Amro River
	Anas
	Andanan River
	Angat
	Angat Pilot Project
	Anibong
	Antipolo
	Apalan
	Apo Island
	Apo Reef
	Apo Reef Buffer Zone
	Arbor
	Arthur's Rock
	Asinan Reef
	Biak - na - Bato
	Biasong
	Bicol
	Bigbiga
	Bil-isan
	Bilang-bilangan
	Bilangbilangan
	Binahaan River
	Binlanan
	Binlod
	Biri Larosa
	Bitoon
	Bogo
	Bolod
	Bonbon
	Bongsalay
	Botigues
	Buenavista
	Bulabog - Putian
	Bulasa
	Bulusan Volcano
	Bunga Mar
	Buntis
	Busin Island
	Busogon
	Buug
	Buug Buffer Zone
	Cabacongan
	Cabadbaran
	Cabantian
	Cabungan
	Cagawasan

 Aurora	 Calabgan River
 Aurora Memorial Park	 Calag-Calag
 Awaan	 Calatrava, San Andres San Agustir
 Babuyan	 Calauit Island
 Bacon	 Calbiga Caves
 Bacuit	 Camboang
 Baganga	 Campao Occidental
 Bagasawe	 Campuyo
 Bago	 Cangmating
 Balasinon	 Canhabagat
 Balbalasang - Balbalan	 Canlaon
 Baliangao	 Cantagay
 Balicasag Island	 Capalonga
 Balinsasayao Twin Lakes	 Capas Death March Monument
 Balud-Consolacion	 Caramoan
 Banacon Island	 Carot
 Banban	 Casay
 Bantayan Island	 Casecan
 Bantigue	 Cassamata Hill
 Barili	 Catanduanes
 Basdiot	 Catarman
 Basilan	 Cathedral Rock
 Basilan Buffer Zone	 Caticugan
 Bataan	 Central Cebu
 Batalang-Bato	 Chico Island
 Batanes	 Chocolate Hills
 Batasan	 Colase
 Bato	 Corte-Baud
 Bawa River	 Cuaming
 Baybay Kawas	 Cuatro Islas
 Bessang Pass	 Daan-Lungsod and Guiwang
 Bessang Pass Buffer Zone	 Dahican

 Dalanas River	 Loboc
 Dampalit Island (5-WA-02)	 Lomboy-Kahayag
 Danao	 Looc
 Dibalo - Pingit - Zabali - Malayat	 Lopez
 Dinadiawan River	 Lower Agno
 Dipaculao	 Lumayag Islet
 Doljo	 Luyang
 Doong	 Luyong-baybay
 Doña Remedios Trinidad - General Tinio	 Maasin
 Dumanquilas Bay	 Mabini
 Dumaquilas Buffer Zone	 Macaas
 Dupax	 Madangog
 El Nido	 Madrideojos
 Fuyot Spring	 Magapit
 Gasan Community	 Magkalagom
 Gilutongan Island	 Magnuang
 Great and Little Sta. Cruz Islands	 Magtongtong
 Great and Little Sta. Cruz Islands Buffer Zone	 Mahagnao Volcano
 Guadalupe Mabugnao - Mainit Hot Spring	 Mahoganao
 Gui-ob Reef	 Mainit Hot Spring
 Guinacot	 Mainit Hot Spring Buffer Zone
 Guiwanon	 Majigpit
 Hagonoy	 Malabungot
 Handumon	 Malagos
 Hayaan, Inanuran and Badlaan	 Malalag
 Hilaitan	 Malampaya Sound
 Hilantagaan	 Manalo
 Hinablan	 Manleluang
 Hinulugang Taktak	 Mantatao
 Hundred Islands	 Manupali
 Ilocos Notre Metropolitan	 Manyukos Island
 Ilog - Hilabangan	 Marikina

	Infanta		Mariveles
	Iniban		Masaplod Norte
	Initao		Masinloc and Oyon Bay
	Ipil		Maslog
	Island of Rasa		Mati
	Jagoliao		Matutinao
	Jalaur River		Maulawin Spring
	Jandayan Norte		Mayon Volcano
	Jandayan Sur		McArthur Landing
	Jicontol		Mimbilisan
	Jose Rizal Memorial		Minalungao
	Jose Rizal Memorial Buffer Zone		Mount Apo
	Kabangkalan		Mount Apo Natural Park
	Kinawahan		Mount Arayat
	Lagonoy		Mount Calavite
	Lajog		Mount Dajo
	Lake Buluan		Mount Data
	Lake Butig		Mount Guiting Guiting
	Lake Danao		Mount Iglit Baco
	Lake Dapao		Mount Isarog
	Lake Malimanga		Mount Kalatungan Range
	Lake Sebu		Mount Kalatungan Range Buffer Zone
	Lambog		Mount Kanlaon
	Langtad		Mount Kitanlad Range
	Larapan		Mount Makiling
	Lawis		Mount Malindang
	Legaspi		Mount Matutum
	Libmanan Cave		Mount Palay - Palay
	Liboron		Mount Timolan
	Libunao		Mount Timolan Buffer Zone
	Libungan		Mounts Banahaw - San Cristobal
	Lidlidda		Mounts Iglit - Baco



	Mounts Iglit-Baco National Park		Salinas
	Mulanay		San Isidro
	Muleta		San Salvador
	Murcielagos Island		Sandugan
	Murcielagos Island Buffer Zone		Santa
	Naatang		Sarangani Bay
	Nagolon Island		Selinog Island
	Naguilan		Selinog Island Buffer Zone
	Nahawan		Siargao
	Nalayag Point		Sibalom
	Nalusuan		Sibuyan Island
	Naro Island		Simbahan - Talagas
	Naujan Lake		Siocon
	Naujan Lake National Park		Siocon Buffer Zone
	Nausak		Sohoton Natural Bridge
	North Granada		Sta. Cruz
	Northern Luzon Heroes Hill		Sta. Filomena
	Northern Sierra Madre Mountain Range		Sta. Lucia
	Olang		Sto. Nino
	Olango Island Wildlife Sanctuary		Sto. Nino-Basiawan
	Olongapo		Subic
	PNOC Geothermal Site		Sudlon
	Padada		Sulangan
	Palaui Island		Sumilon Island
	Palawan		Surigao
	Palawan Parcel 1		Taal Volcano
	Palawan Parcel 2		Taklong Island
	Palompon		Takot Fish and Marine Sanctuary
	Pamilacan Island		Talaytay
	Pamitinan		Talevera
	Pan-ay River		Talibon
	Pandanon		Talima

 Pangdan	 Talisay
 Pantabangan - Carrangalan	 Talo-ot
 Pantudlan	 Tambobo
 Pantuwaraya Lake	 Tambongon
 Paoay Lake	 Tanap
 Pasil	 Tandayag
 Pasil Reef	 Tanon Strait
 Pasonanca	 Taongon Can-andam
 Pasonanca Buffer Zone	 Tarong
 Patao	 Tawala
 Peñablanca	 Tayong Occidental
 Pinamgo	 Tayong Oriental
 Poblacion	 Tibiang - Domagandong
 Poblacion District 1	 Tindog
 Polilio	 Tirad Pass
 Polo	 Torrijos
 Port Barton	 Tubbataha Reefs
 Puerto Galera	 Tubbataha Reefs Marine Park
 Puerto Princesa Subterranean River	 Tubbataha Reefs National Marine Park
 Puerto-Princesa Subterranean River National Park	 Tubod
 Pujada Bay	 Tubod Mar
 Pulag	 Tugas
 Pulang Yuta	 Tuka
 Pulong Bato	 Tulapos
 Quezon	 Tulic
 Rajah Sikatuna	 Turtle Islands
 Roosevelt	 Twin Rocks
 Rungkunan	 Upper Agno River Basin
 Saavedra	 Victoria
 Sacred Mountain	 Wangag
 Sagay	 Zone within Takot Fish and Marine Sanctuary
 Salikata	

[Source: Philippine Geographic Information System (PHILGIS), 2013]

#### Appendix 4

##### List of Interviewees in PFT

Office: SBMA Ecology Center

Name	Designation
Patrick Escusa	Chief, Social Development Division
Marieta Pabayan	Staff, Ecology Center and Tribal Councilor
Ms. Lilia Alcaraz	Protected Area Division Chief
Rhea Jane Pescador-Mallari	Sr. Forester Management Specialist
Edmund de Jesus	Community Development Officer III

Office: Department of Tourism (SBMA)

Name	Designation
Clarise Planea	DOT staff, research division

Office: Pamulaklakin Forest Trail (PFT)

Name	Designation
Nina Arojado	Manager and Tribal Councilor
Gloria Liwanag	Treasurer
Dominador Liwanag	Elder and Guide
Noel Abraham	Guide
Milagros Garcia	Guide
Rosario Alonzo	Guide
Rosa Abraham	Guide

## Appendix 5

### List of Marketing and Promotional Materials Online for PFT

- Facebook
  - Pamulaklakin Forest Trail, Subic Freeport Zone (tourist attraction) – An unofficial page of PFT. There is no information of the site but there is a rating.
  - Pamulaklakin Forest Trail (outdoors) – An unofficial page of the PFT. There is no information but there are few ratings with comments on PFT.
- Trip Advisor
  - Pamulaklakin Forest Trail – This contains reviews, photos, and contact details of PFT. The hyperlink for the page is <[https://www.tripadvisor.com/Attraction\\_Review-g4751237-d3694404-Reviews-Pamulaklakin\\_Forest\\_Trail-Subic\\_Bay\\_Freeport\\_Zone\\_Central\\_Luzon\\_Region\\_Luzon.html](https://www.tripadvisor.com/Attraction_Review-g4751237-d3694404-Reviews-Pamulaklakin_Forest_Trail-Subic_Bay_Freeport_Zone_Central_Luzon_Region_Luzon.html)>
  - Trip Report – Pamulaklakin Trail – Subic Bay – This contains directions on how to go to PFT, the cost and activities. The hyperlink for the page is <[https://www.tripadvisor.com/ShowTopic-g424959-i9205-k5960827-Trip\\_report\\_Pamulaklakin\\_trail\\_Subic\\_bay-Subic\\_Zambales\\_Province\\_Central\\_Luzon\\_Region\\_Luzon.html](https://www.tripadvisor.com/ShowTopic-g424959-i9205-k5960827-Trip_report_Pamulaklakin_trail_Subic_bay-Subic_Zambales_Province_Central_Luzon_Region_Luzon.html)>
- Blogs and Other Sources of Information
  - Pamulaklakin forest Trails/Pastolan Aeta Village – This page includes the address, ratings, and a brief description of the PFT. The hyperlink for the page is <<http://greatersubic.com/index.php/directory-listings/things-to-do/74-pamulaklakin-forest-trails-pastolan-aeta-village>>
  - Heart Warming Encounter at Pamulaklakin Village – This is a blog made in 2013 providing details of a project held in PFT. The hyperlink for the site is <<https://jackinetic.wordpress.com/2013/03/26/heart-warming-encounter-at-pamulaklakin-village/>>
  - Pamulaklakin Forest Trail – This is a blog created by a student which provides details of the tour package and rates, location of the PFT, and the contact information of the PFT. The hyperlink to the site is <<http://pamulak.tumblr.com/>>
  - Aeta Tribal Village – A Photographic Tour – Subic Bay – Luzon Island, Philippines – This page contains photographs by Joseph S. Palmer in PFT. Photos in the page contains those which are taken in PFT and Pamulaklakin village. The hyperlink for the page is <<http://backroadsamerica.blogspot.jp/2011/05/aeta-tribal-village-photographic-tour.html>>

**Appendix 6**  
PFT Log Book

Wednesday  
~~Tuesday~~  
March 01, 2017 In Out

Name	In	Out	Mo
Arojado Nina			
Liwanag Damador			
Abraham Elsa			
Abraham Elvin			
Abraham Miguel			
Abraham Noel			
Abraham Rosa			
Alonzo Ben Jr.			
Alonzo Rosario			
Bautista Ernesto			
Bautista Rosalyn			
Castro Marilyn			
Cruz de la Hilda			
Cruz de la Nestor			
Estilo vohawel			
Garcia Hilagros			
Gutierrez Susan			
Liwanag Gloria			
Liwanag Jocelyn			
Liwanag Michelle			
Magay Mervyn			
Magaly Lourdes			
Magay Villaminia			
Quintanilla Harilou			

**Attendance of Employees**

Date	Name	Activity	Qty	Amount	OR No.
Nov 29 2015	Mr. M. Garcia	Eco Tour	8	P1800.00	0790
Nov 23 2015	Ms. Rose	Picnic	20	P900.00	0991
Nov 9 2015				No Income	
Nov 26 2015	Ms. R. Abraham	arr. Distric	1	P1800.00	0992
Nov 9 2015	Mr. Johnson	Report	10	P1000.00	0793
	Mr. Ricky	Maidress	10	P400.00	0994
	Mr. Alex	Photo Shot	8	P720.00	0795
Nov 28 2015	Mr. Johnson	S/S	150	P7500.00	0996
	Mr. M. Garcia	S/S	5	P450.00	0797
	Mr. M. Garcia	Photo	20	P800.00	0798
Nov 20 2015	Mr. M. Garcia	Tour	4	P1920.00	0799

**Customer Information**

[Source: Photo taken by the Author]

## Appendix 7

### Biodiversity Monitoring Sites 2017

#### FOREST AREAS

1. Group 6 to Hill 394
2. Hospital Rd. to Hill 394
3. Group 6 to Minanga
4. Apaliin to Tangos to Triboa Mangrove Edge
5. Boton to STEP to El Kabayo
6. Pamulaklakin to El Kabayo
7. Pamulaklakin to Mahogany (exit Calumpit)
8. Boton (Hospital Rd) to Hill 282 to JEST
9. Boton (Hospital Rd) to STEP
10. Pastolan via Natutong to Mahogany
11. Holy Land to Golf Course (7 Steps)
12. Trillo's Trail
13. Familiar Peak to Kalayaan
14. Grande Island
15. Timac Road
16. Binictican Drive to Malawaan (new trail)
17. Morong Gate to Forest (new trail)

#### RIVER AREA

1. El Kabayo Downstream
2. El Kabayo Upstream
3. Boton Downstream
4. Boton Upstream
5. Binictican Upstream
6. Pamulaklakin Downstream
7. Pamulaklakin Upstream
8. Triboa Downstream
9. Triboa Upstream
10. Ilanin Downstream
11. Ilanin Upstream
12. Binanga Downstream
13. Binanga Upstream

#### MANGROVE AREA

1. Binictican
2. Malawaan
3. Boton

4. Enron
5. Triboa-A
6. Triboa-Potol
7. Camayan-Ilanin
8. Maritan
9. Nabasan

#### MARINE AREAS

1. Tago
2. Kalaslasan
3. Grande
4. All Hands
5. Kamana
6. Minanga
7. Ilanin
8. Nabasan

#### BUFFER AREAS

1. Central Business District (CBD)
2. Kalayaan Housing
3. Binictican Housing
4. Cubi Housing
5. Subic Gateway
6. Boton-STEP-Airport
7. Naval Magazine
8. Kalayaan Perimeter Fence
9. Binictican-Pamulaklakin Road

#### REFORESTATION AREAS

1. Batang's Area
2. Ate Ning's
3. Rosselle's
4. Al bert's
5. Benjamin's
6. Melda's
7. Charlie's

**Appendix 8**  
Biodiversity Monitoring Report

<b>I. Basic Information</b>	
Site Name:	Date:
<b>II. Physical Parameters:</b>	
<b>III. Flora</b>	
<b>IV. Fauna</b>	
<b>V. Ecological Statistics</b>	
<b>VI. Social Issues</b>	
<b>VII. Assessment and Recommendations</b>	
<b>Key Findings</b>	<b>Recommendations</b>
Prepared by:	
<b><i>For Ecology Manager's Action</i></b>	
<b>Recommendations:</b> <input type="checkbox"/> For Action <input type="checkbox"/> For Publication <input type="checkbox"/> For Validation <input type="checkbox"/> For Discussion Other Comments: _____  Recommended by:  <p style="text-align: center;">LILIA R. ALCAZAR Division Chief III</p>	<b>Approval:</b> <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved Other Comments: _____  Approved by:  <p style="text-align: center;">AMETHYA DELA LLANA-KOVAL Manager</p>
<b>Date Submitted to EC Manager:</b>	<b>Date Received from EC Manager:</b>

## Appendix 9

### List of Interviewees in MVNP

Office: Department of Environment and Natural Resources (DENR)

Name	Designation
Mark Harris Lim	Ecotourism Enterprise Development Officer II
Al Ogayon	Extension Officer
Engr. Gilbert Gonzalez	Regional Director (2016)
Crisanta Marlene Rodriguez	Regional Director (2017)
Miel Loria	DENR PENRO Albay Extension Officer
Marlene Francia	Asst. Conservation and Development Chief
Kieth Dimaranan	DENR R5 Officer
Meg Lavilla	PENRO Albay, Chief
Cesar Valderama	Protected Area Superintendent (PASU)

Office: Mayon Volcano Natural Park (MVNP)

Name	Designation
Robert Balimbing	LGU Staff
Edgar Batalla	LGU Staff
Salvador Balean	LGU Staff
Juan A. Arao Jr.	DENR Rep. (from PENRO, Albay)

Office: Department of Tourism (DOT) Albay

Name	Designation
Justin Bolanos	Tourism Officer

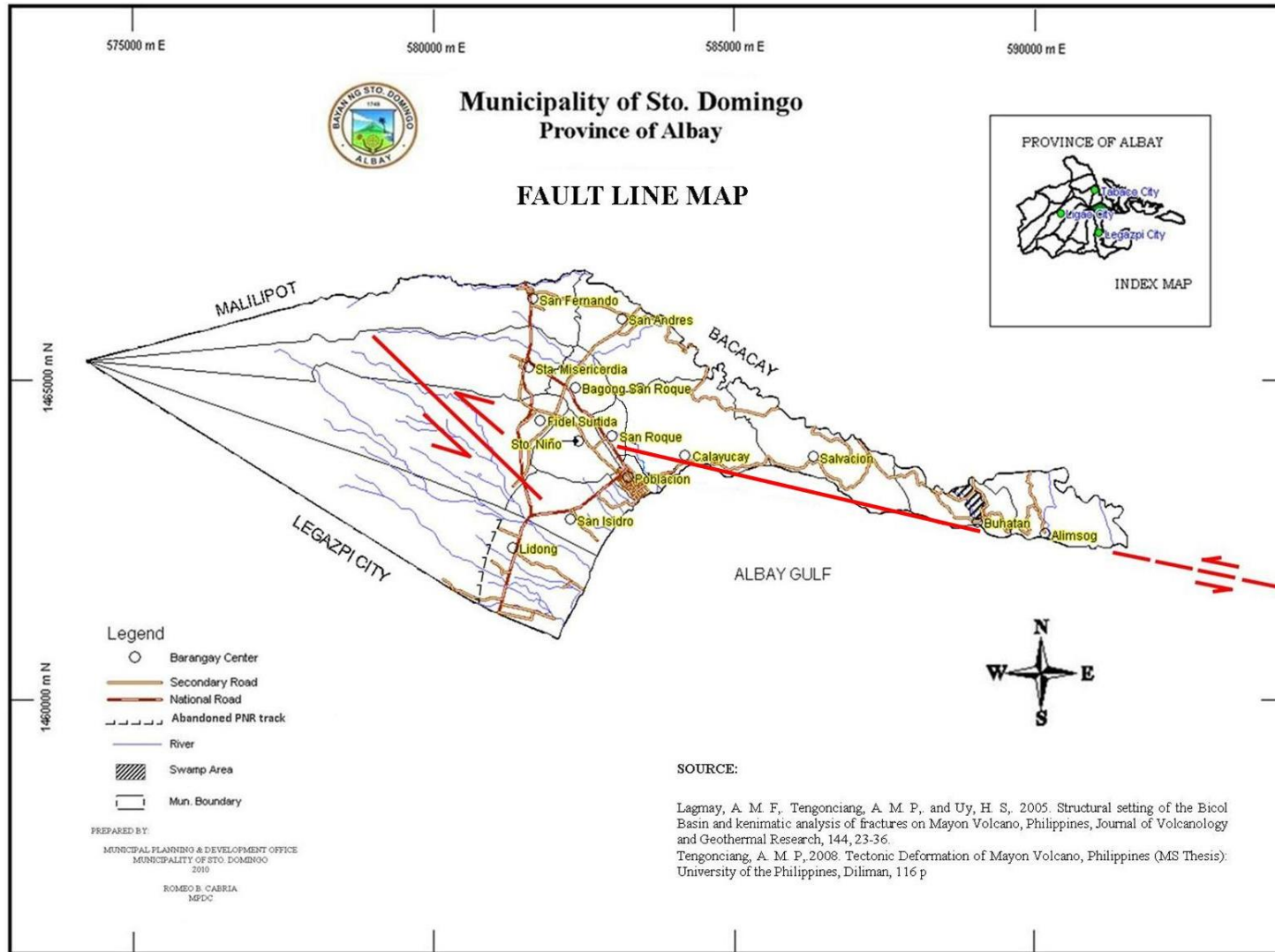
Office: Disaster Risk Reduction Management Council (DRRMC)

Name	Designation
Engr. Edgar B. Balidoy C.E.	Local DRRM Officer (Municipality of Sto. Domingo)



### Appendix 10

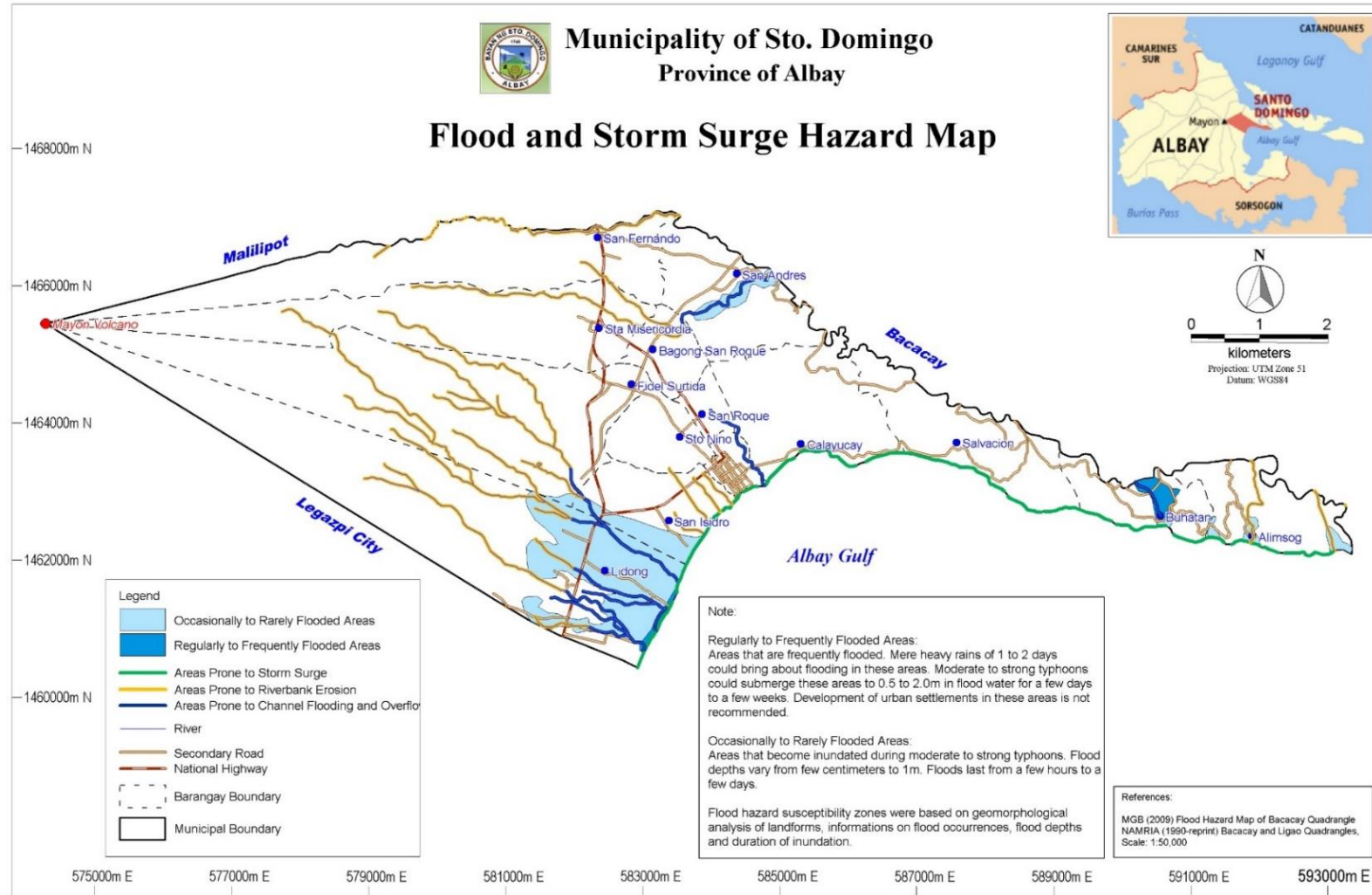
#### Sto. Domingo Fault Line Map



[Source: Municipality of Sto. Domingo, Province of Albay National Disaster Risk Reduction Management Council (NDRRMC), Fault Line Map, 2010]

## Appendix 11

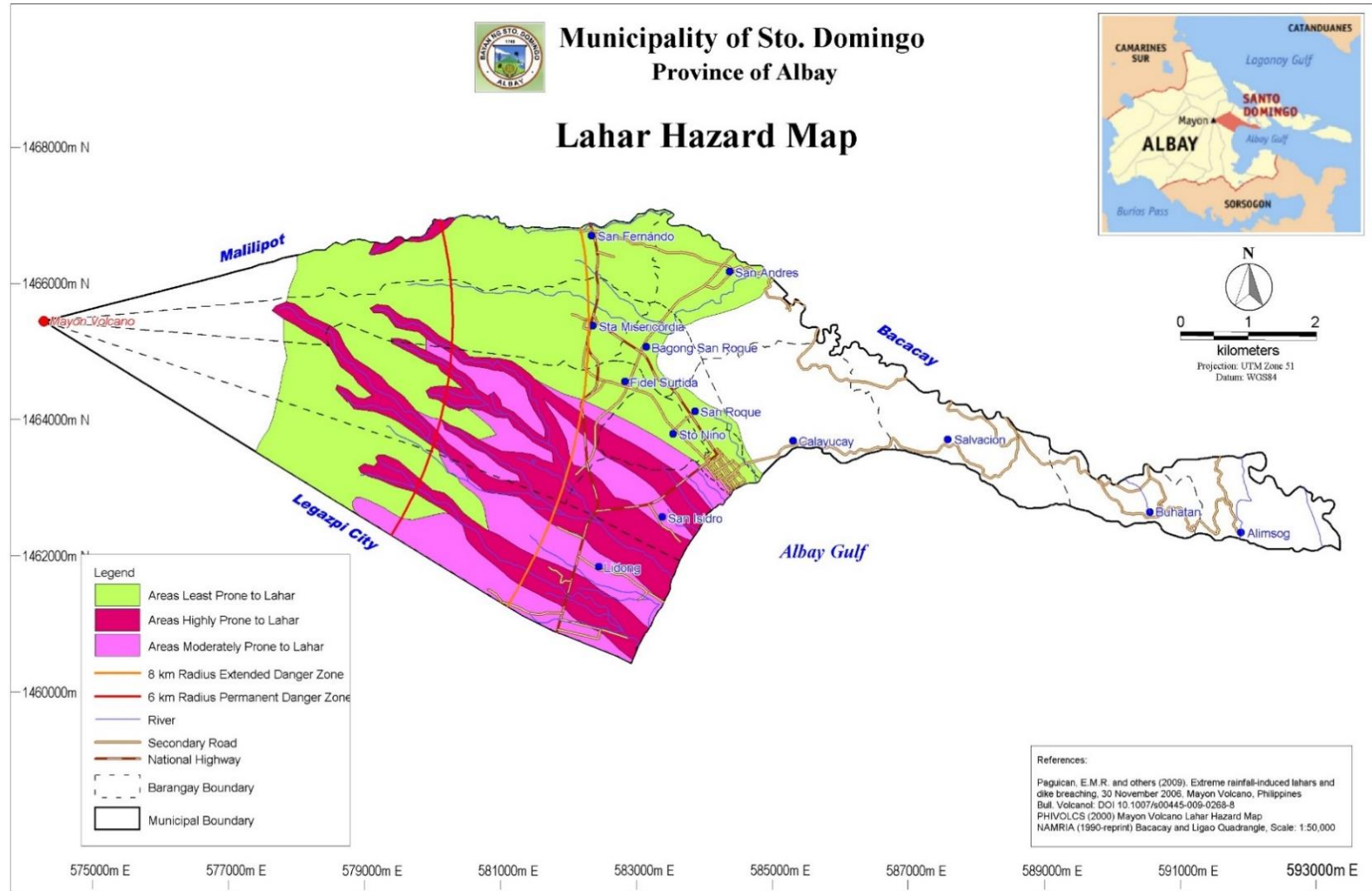
### Sto. Domingo Flood and Storm Surge Hazard Map



[Source: Municipality of Sto. Domingo, Province of Albay National Disaster Risk Reduction Management Council (NDRRMC), Flood and Storm Surge Hazard Map, 2010]

## Appendix 12

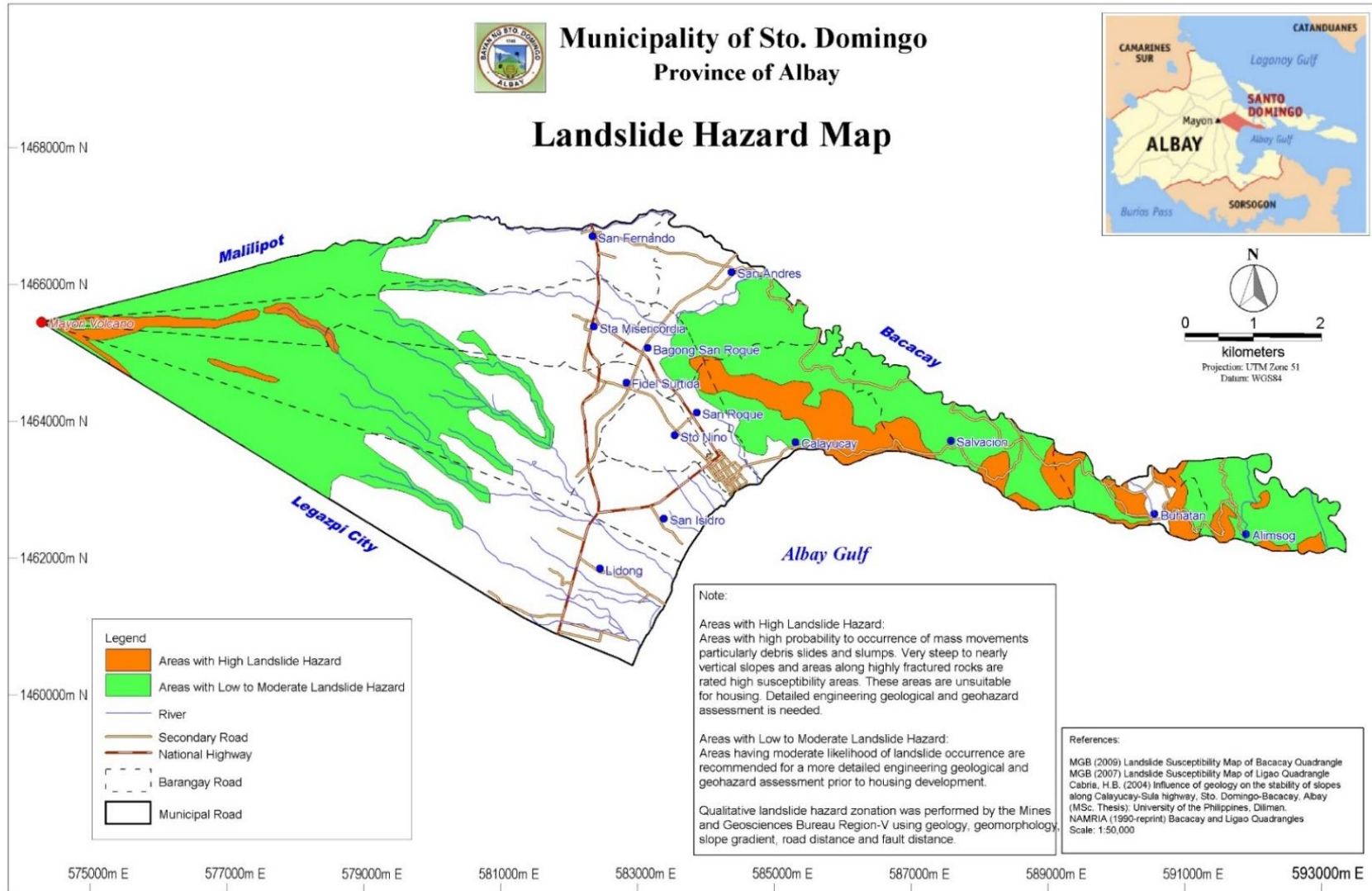
### Sto. Domingo Lahar Hazard Map



[Source: Municipality of Sto. Domingo, Province of Albay National Disaster Risk Reduction Management Council (NDRRMC), Lahar Hazard Map, 2010]

## Appendix 13

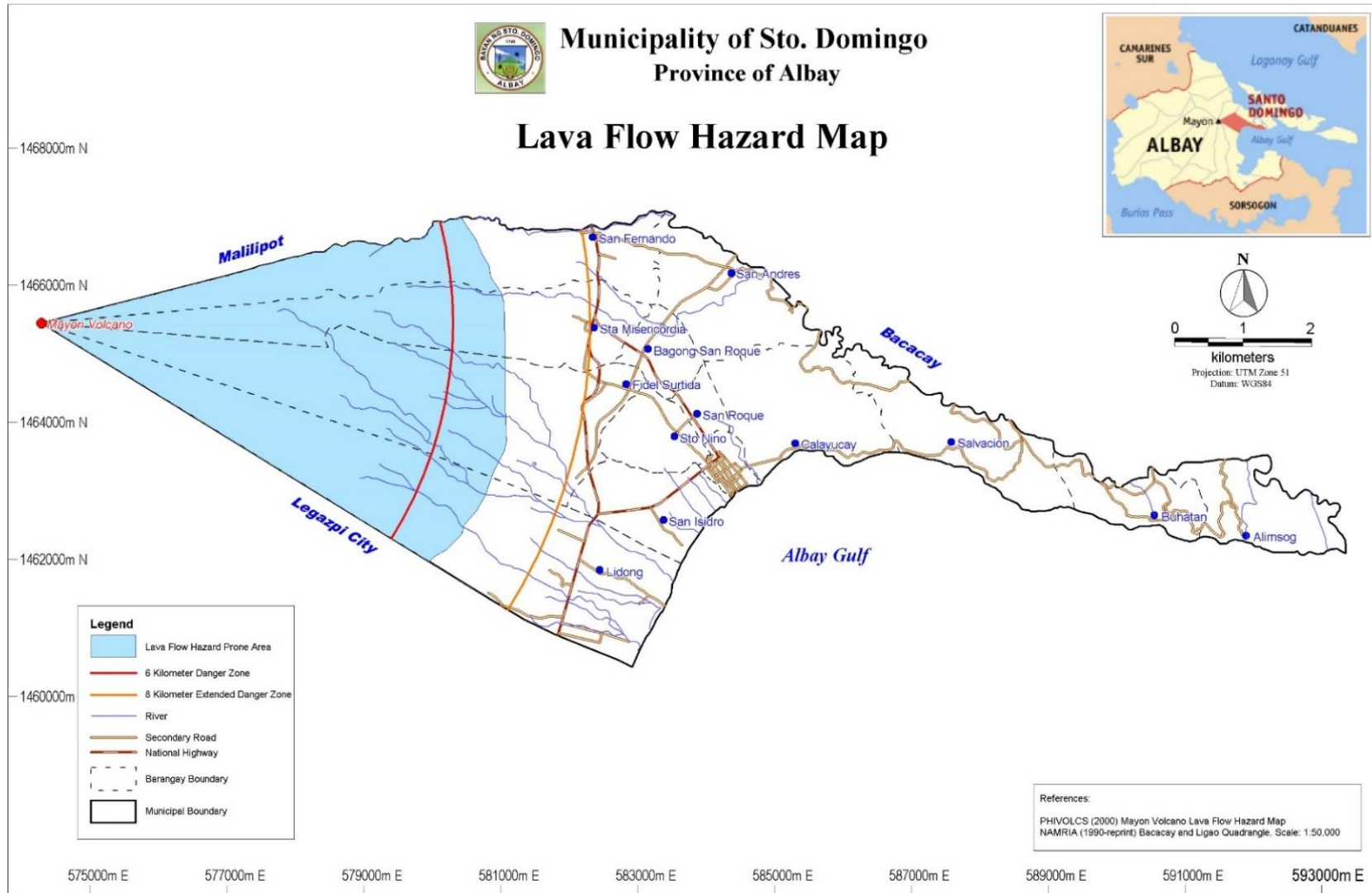
### Sto. Domingo Landslide Hazard Map



[Source: Municipality of Sto. Domingo, Province of Albay National Disaster Risk Reduction Management Council (NDRRMC), Land Slide Hazard Map, 2010]

## Appendix 14

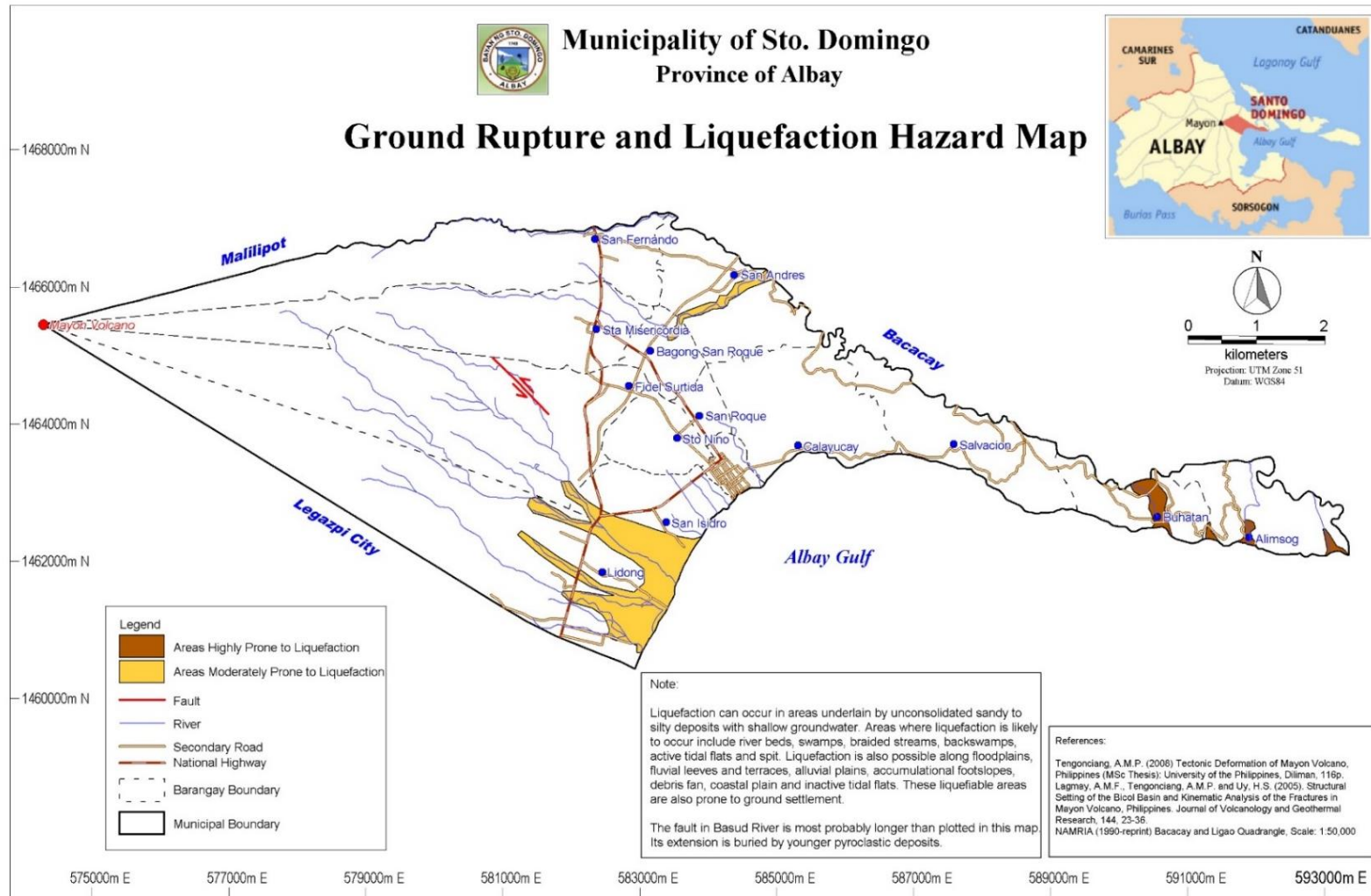
### Sto. Domingo Lava Flow Hazard Map



[Source: Municipality of Sto. Domingo, Province of Albay National Disaster Risk Reduction Management Council (NDRRMC), Lava Flow Hazard Map, 2010]

## Appendix 15

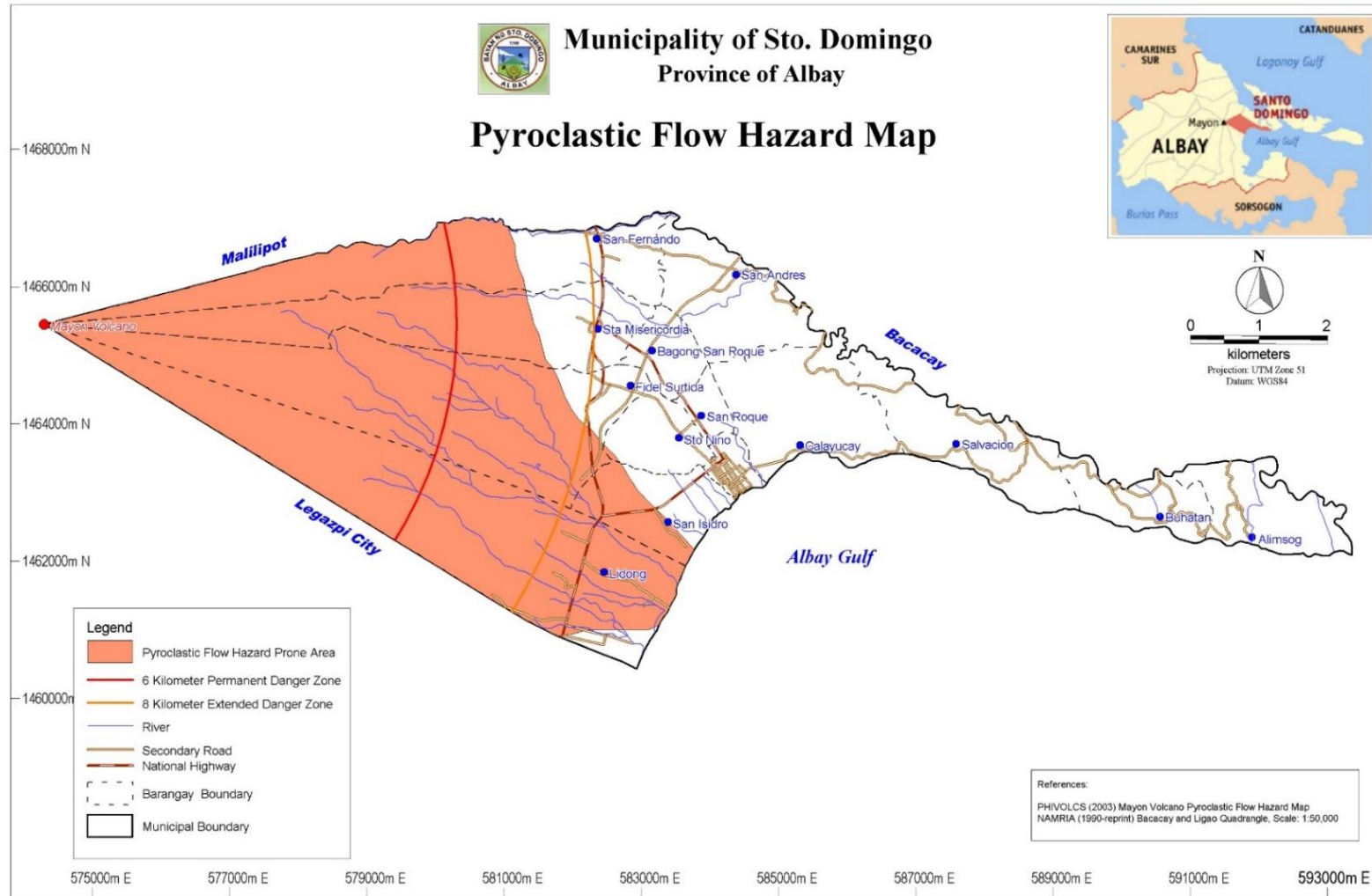
Sto. Domingo Ground Rupture and Liquefaction Hazard Map



[Source: Municipality of Sto. Domingo, Province of Albay National Disaster Risk Reduction Management Council (NDRRMC), Ground Rupture and Liquefaction Hazard Map, 2010]

## Appendix 16

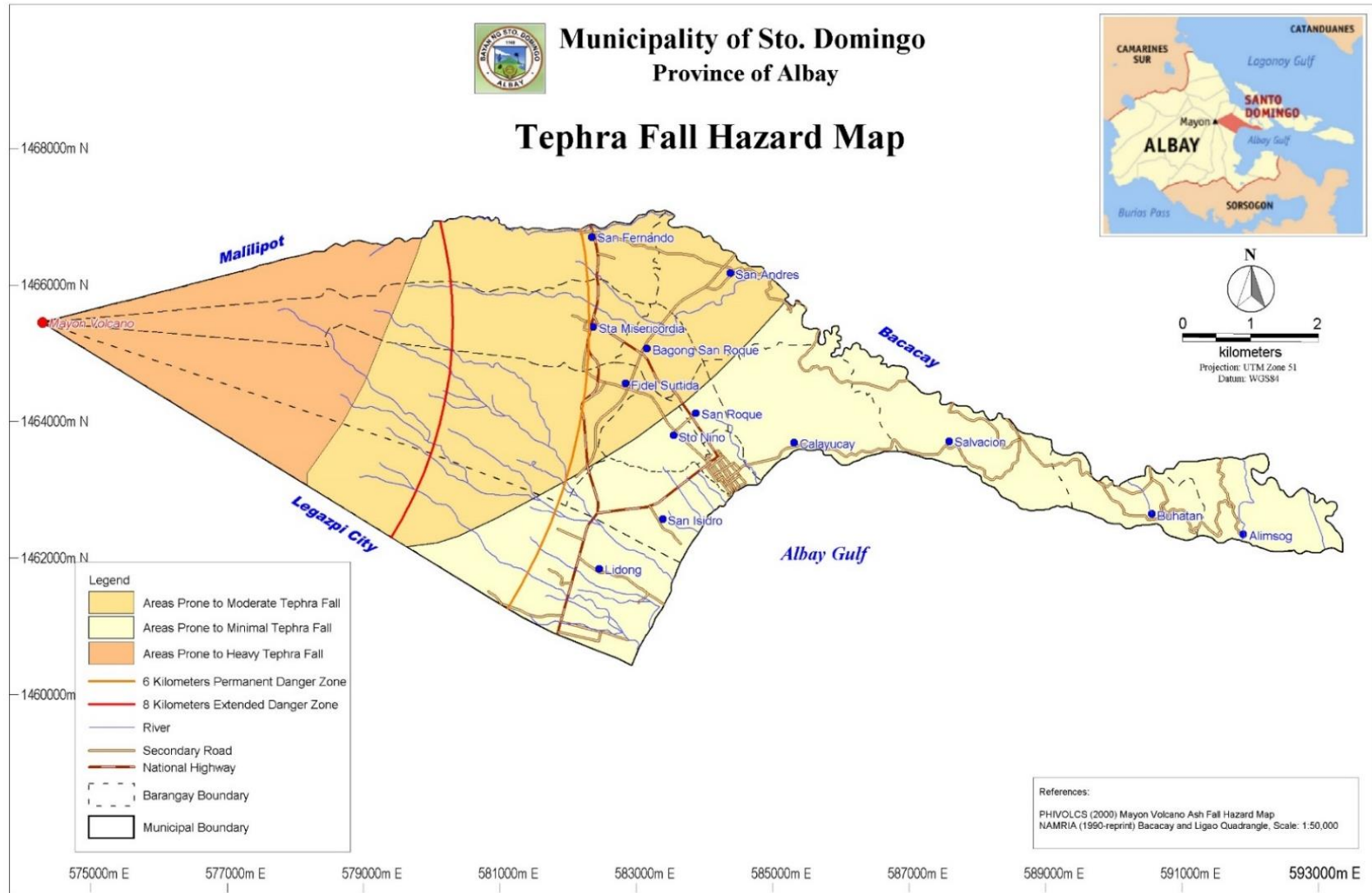
### Sto. Domingo Pyroclastic Flow Hazard Map



[Source: Municipality of Sto. Domingo, Province of Albay National Disaster Risk Reduction Management Council (NDRRMC), Pyroclastic Flow Hazard Map, 2010]

## Appendix 17

### Sto. Domingo Tephra Fall Hazard Map

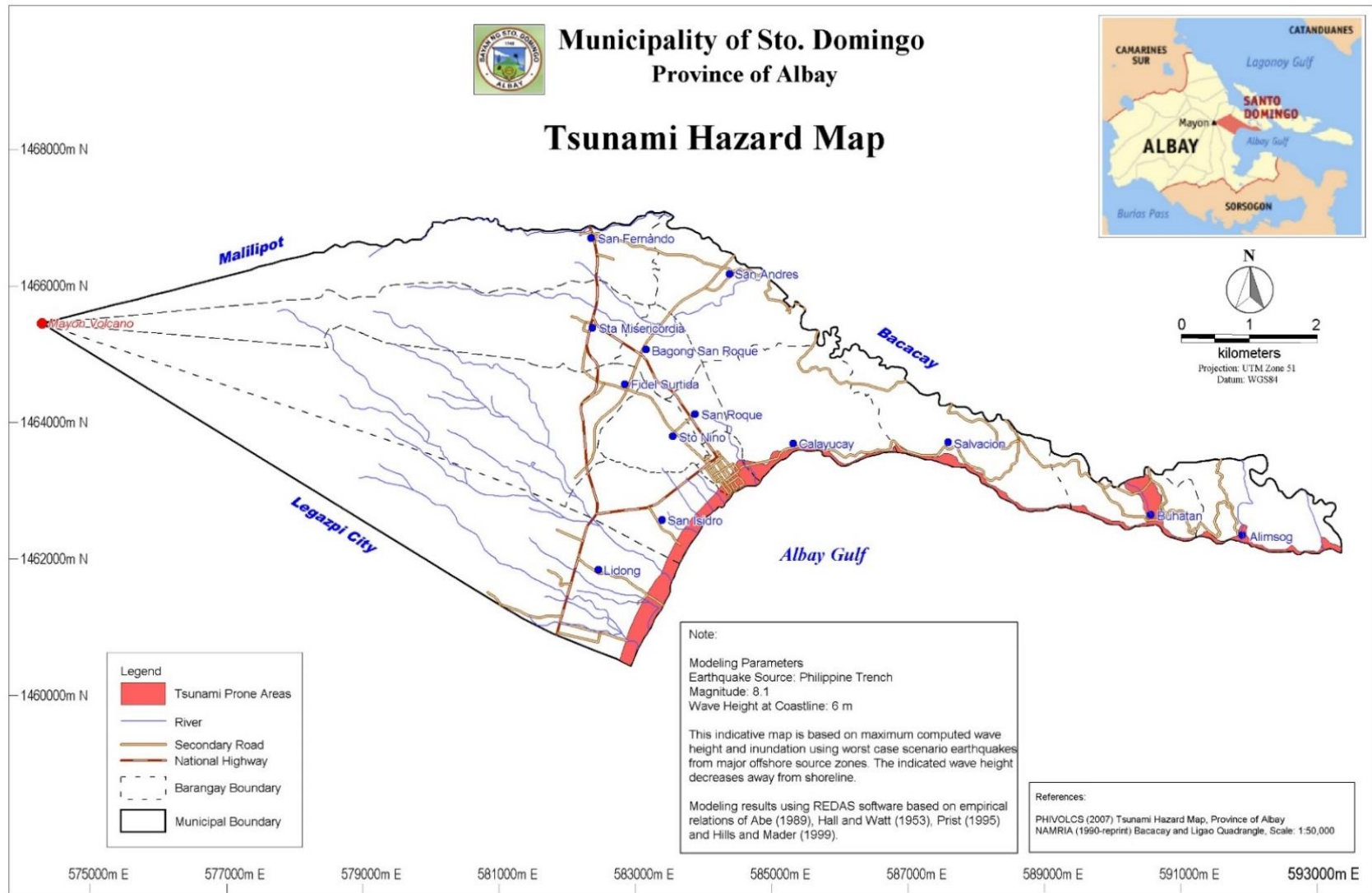


[Source: Municipality of Sto. Domingo, Province of Albay National Disaster Risk Reduction Management Council (NDRRMC), Tephra Fall Hazard Map, 2010]



## Appendix 18

### Sto. Domingo Tsunami Hazard Map



[Source: Municipality of Sto. Domingo, Province of Albay National Disaster Risk Reduction Management Council (NDRRMC), Tsunami Hazard Map, 2010]