

Adaptation and Coping Strategies of the *Mangyan* in Oriental Mindoro, Philippines Towards Climate Change-Related Occurrences

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INTRODUCTION

The Philippines is the third most disaster-prone country in the world, next to Tonga and Vanuatu. This is due to the country's high exposure to natural calamities (The World Disaster Report, 2012). Of the top three at risk however, the Philippines had the best rating on adaptation measures, with scores similar to Malaysia and Thailand (Philippines Daily Inquirer, 10/15/2012). This was evidenced by policies like the Climate Change Act of 2009 and the Philippines' Disaster Risk Reduction Management (DRRM) Act of 2010 and programs the government actively implement to strengthen the capacities of local government units to build resilient communities.

However, even with the enactment of these policies and implementation of these programs nationwide, a lot still needs to be done to ensure the survival of the most vulnerable groups, including the indigenous people. According to Fajardo, (2007) there are at least 700,000 indigenous people (IP) in Region IV alone and 100,000 of them are *Mangyan* who reside in the island of Mindoro. These belong to different sub-tribes like the *Iraya*, *Alangan*, *Tadyawan*, *Tau-buid*, *Bangon*, *Buhid*, *Hanunuo* and *Ratagnon*.

This study was conducted to determine the adaptation and coping strategies of the *Mangyan* in Oriental Mindoro, Philippines towards climate change-related occurrences.

Specifically, it aimed to:

1. characterize the respondents;
2. determine the respondents' perceived effects of climate change-related occurrences to them and their families;
3. discuss the internal and external factors affecting their resiliency to these occurrences; and
4. formulate recommendations to address the concerns of these occurrences to their communities.

ABSTRACT

The study was conducted to determine the adaptation and coping strategies of the Mangyan in Oriental Mindoro, Philippines towards climate change-related occurrences. Specifically, it aimed to: 1. characterize the respondents; 2. determine the respondents' perceived effects of climate change-related occurrences to them and their families; 3. discuss the internal and external factors affecting their resiliency to these occurrences; and 4. formulate recommendations to address the concerns of these occurrences to their communities. Adaptation and coping strategies of the Mangyan, local government interventions based on RA 9729 (Climate Change Act) and RA 1021 (Philippine Disaster Risk Reduction Management Plan Act), are considered internal and external factors that contribute to the Mangyan communities' resiliency to the occurrences.

The Mangyan have developed internal adaptation and coping strategies that would hopefully make them build resilient communities. This was evident in the way they wear their clothes, build their houses, find their source of livelihood, practice their ancestral faith and their decision to stay or not in their respective communities. However, some adaptation strategies became maladaptation since they resorted to logging, charcoal making and use of insecticides in their farms. While the efforts of the local governments units (LGUs) are commendable, more is expected of them especially, in arresting these maladaptation practices.

This is very important since these practices may lead to two possibilities. The Mangyan can either become resilient or vulnerable, depending on their future actions. The positive internal adaptations, coping strategies and support by the LGUs will continue to play a very crucial part in the Mangyan's pursuit for more resilient communities.

Key words: adaptation and coping strategies, Mangyan, resilient communities

It is hoped that the results of this study will help the local government of Gloria, Oriental Mindoro, the government and non-government organizations and civil society groups in the planning and implementation of programs towards more resilient indigenous communities.

In this study, it was assumed that the *Mangyan's* socio-cultural characteristics and the existing internal and external factors present in their area contribute to the resiliency of *Mangyan* communities. It was based on the findings of the Integrated Development Program for the Indigenous People in Southern Tagalog (IDPIP-ST) (2011) and Rivera (2011). Figure 1 shows the relationships of the *Mangyan's* socio-cultural characteristics and the existing internal and external factors that are assumed to contribute to their community's resiliency.

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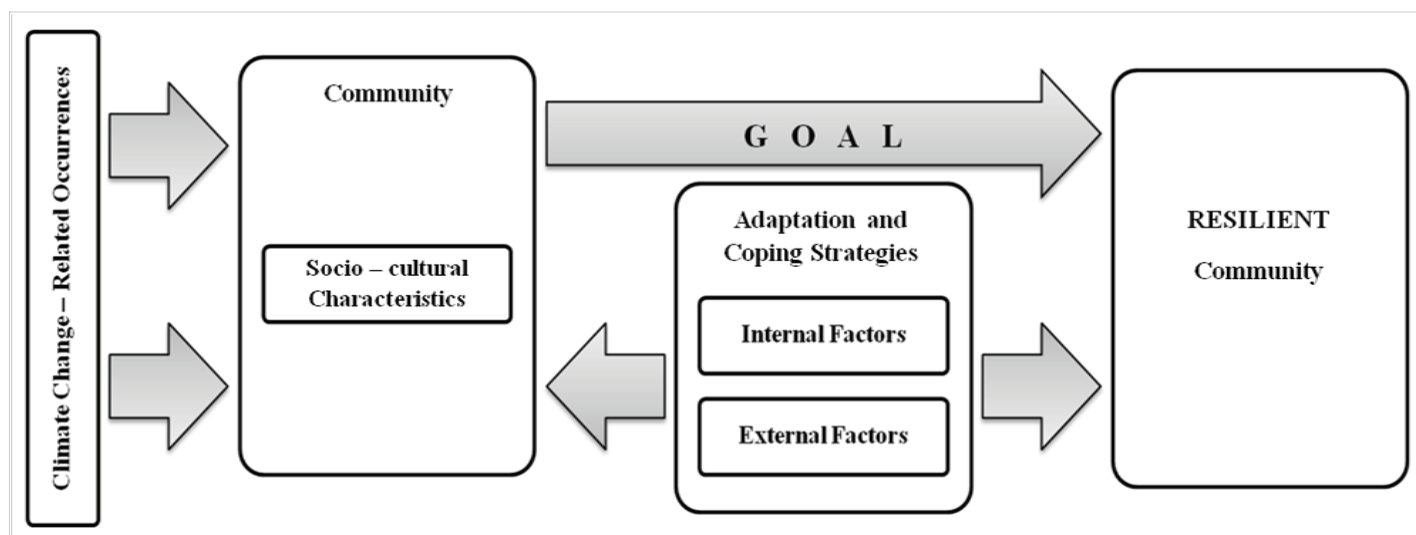


Figure 1. Conceptual framework of the study.

METHODOLOGY

The municipality of Gloria is the seventh largest municipality of Oriental Mindoro with a total land area of 28,029 ha and is located 76 km away from Calapan City, the province's capital. About 65% of the area is classified as forest and grassland areas while agricultural and built-up areas make up the rest of the municipality's total land area. The municipality has a population of 37,871 where 51% are male and 49% female (Development Forum Working on Poverty Monitoring in the Philippines: The Case for Community-Based Monitoring System 2010). It is currently a third class municipality with mainly an agriculture-based economy. It is bounded on the south by the Municipality of Bansud, on the north by the Municipality of Pinamalayan, on the east by Tablas Strait, and on the west by the Province of Occidental Mindoro (Figure 2).

Stratified random sampling method was used to select the respondents. Thirty respondents from the *Tau-Buhid Mangyan* in Barangay Malayong and another thirty from *Tadyawan Mangyan* in Barangay Manguyang, both in Gloria, Oriental Mindoro were selected. A survey conducted by the local government of Gloria in 2007 revealed that there are about 40 *Tadyawan Mangyan* families and 280 *Tau-Buhid Mangyan* families in the barangays where the study was conducted.

Aside from the *Mangyan* respondents, selected staff members of the municipality's Disaster Risk Reduction Management Office (DRRMO) were also interviewed. Frequencies, percentages, and means were used to analyze the data.

RESULTS AND DISCUSSION

A. Socio-demographic Characteristics of the *Mangyan* Respondents

The socio-demographic characteristics in the study include the respondents' age, sex, civil status, highest educational attainment, work, monthly income, religion, and dialect (Table 1). Most (82%) of the respondents are male, in their early and middle adulthood (26-45 years old) and married (90%). Almost all (92%) never attended school and are engaged in farming (68%) while 30% have no source of income. Those engaged in farming estimated their monthly income as PhP1,000 and above (40%) and less than PhP1,000 (30%).

In terms of religious affiliation, half of them (50%) are Protestant, 18% are Roman Catholic and 32% still practice their ancestral faith. All of them speak both Filipino (*Tagalog*) and their native (*Katutubo*) language.

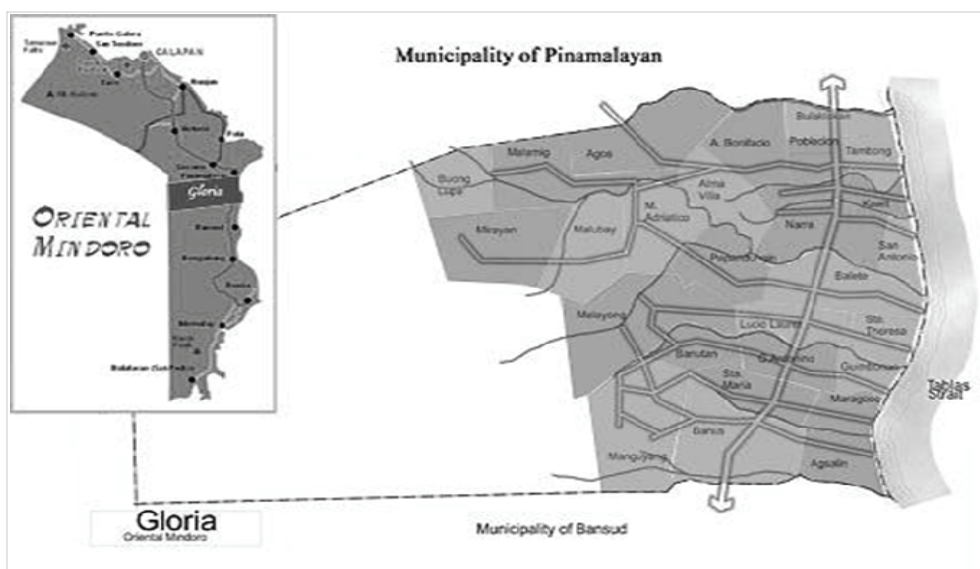


Figure 2. Map of Gloria, Oriental Mindoro.

Table 1. Socio-demographic characteristics of the respondents

Characteristics	Frequency (N=60)	Percentage (%)
A. Socio-demographic characteristics of the respondents		
<i>Tribe</i>		
Tau-Buhid Mangyan	30	50
Tadwayan Mangyan	30	50
<i>Sex</i>		
Male	49	82
Female	11	18
<i>Age Range</i>		
15-25	13	22
26-35	24	40
36-45	18	30
46-55	4	7
56-65	1	2
Average Range	31 16-57	
<i>Civil Status</i>		
Single	5	8
Married	54	90
Separated	1	2
<i>Highest Educational Attainment</i>		
No formal education	55	92
Elementary level	5	8
<i>Work</i>		
Farmer	41	68
No work	18	30
Pastor	1	2
<i>Monthly Income</i>		
No Income	18	30
Greater than P 1000.00	24	40
Less than P 1000.00	18	30
B. Religion		
Protestant	30	50
No Religion (Ancestral Faith)	19	32
Roman Catholic	11	18
C. Dialect		
Filipino (Tagalog)	60	100
Mangyan Dialect	60	100

B. Respondents' Perceived Effects of Climate Change-Related Occurrences on their Farming and Livestock Growing Activities

1. *Farming practices.* The Mangyan are mostly farmers (88%). Their customs and traditions are connected with their agricultural activities. Agriculture is essential for them to survive in the uplands. Since their lives revolve around the valuable natural resources, it has been their practice to grow their crops and raise their livestock in a natural way. With the observed changes of the climate however, these traditions could change.

Many (83%) of the respondents believed that climate change will have an effect on their planting and harvesting season, while the rest believed there will be crop damage (45%), pest invasion/infestation (55%), low crop yield (42%), food scarcity (36%), low income for the farmers (21%).

2. *Livestock growing.* Majority (62%) of the respondents grow their own livestock such as chicken, native boar, goats and carabaos. Except for the carabaos that are used mainly to help in farming activities, the livestock are raised for their own consumption with some sold in the market. Some (30%) of the respondents observed that there is a change in mating, pregnancy and giving birth/laying eggs of their livestock with climate change. Furthermore, there are a few (27%) who are concerned with the death of their animals for unknown reasons. Others (22%) claimed that there is a spread of new animal diseases that resulted to their livestock having difficulty in producing offspring or eggs. Table 2 summarizes the perceived effects of climate change-related occurrences on their farming practices and livestock growing activities.

Table 2. Perceived effects of climate change-related occurrences to the respondents' farming and livestock growing activities

Characteristics	Frequency (N = 60)	Percentage (%)
A Farming (n=53)*		
Planting and harvesting season	44	83
Crop damage	24	45
Pest invasion/infestation	29	55
Low crop yield	22	42
Food scarcity	19	36
Low income	11	21
B Livestock Growing (n=37)*		
Mating season, pregnancy and giving birth	11	30
Unexpected or untimely death	10	27
Difficult to produce offspring/eggs	8	22
Famine among animals	4	11
Attitude change (more aggressive or sickly)	6	16
Spread of new diseases	8	22

* multiple responses

C. External Adaptation and Coping Strategies of the Mangyan Towards Climate Change - Related Occurrences

1. Internal Adaptation and Coping Strategies of the Mangyan

1.1 Migration. Most (88%) of the respondents believed that migration is not their primary concern because they have already adjusted to their present communities where they have spent most of their lives. However, if the climate change-related occurrences continue to worsen making it dangerous or risky for them to stay, they are willing to resettle somewhere else. Many (93%) preferred to live and migrate in the plains or near the town proper. According to them, being near the town can assure them of a safer area to live in and establish a community. They also reiterated that they are not the same as the *Mangyan* before because they are now more civilized and also need commercial goods for their family. Through time, these *Mangyan* progressively changed their way of life and adjusted to the present living condition of lowlanders. Hence, they believed that living the same way as the lowlanders can provide them with more opportunities. Furthermore, they can receive immediate assistance from the LGU emergency action team in times of disaster or calamities.

On the other hand, some (38%) chose to stay in their current upland community. According to these respondents, their upland farms are already established and can provide them with the basic necessities like food and water. Also, in the event of floods, they believe that the uplands provide a safer place because it is located on higher grounds.

Others (32%) wanted to relocate near the rivers. Fishing is one of their activities that provide food for their family. They also fetch water from rivers for their basic consumption. In terms of safety during calamities, finding a higher relocation area near the river can be done if flood occurs.

1.2 House Type. Most (87%) of the respondents wanted to build concrete houses with floors and walls made from cement materials since these are not easily destroyed by climate change-related calamities. However, they are constrained from the construction of more permanent houses due to limited finances. Also, a major portion of their income goes to buying food for their family.

While majority (68%) of the *Mangyan* wanted to build semi-concrete houses, some 65% still want their houses made of *nipa* or *sawali*, as this is the type of house they are accustomed to. Constructing *nipa* houses is what the *Mangyan* know best and *nipa* is the only kind of house construction material they can afford to buy. To make their present houses withstand climate change-related occurrences, one of the adaptation and coping strategies

identified by the *Mangyan* is using nails instead of rattan ropes to build stronger *nipa* houses.

1.3 Clothing. Many of the respondents wear the same clothes worn by the lowlanders. According to them, only the old folks in their tribes still wear traditional clothes. Their lowlander clothes mainly come from relief goods and giveaways of the town people.

Wearing these kinds of clothes serves as their adaptation and coping strategies against the effects of climate change. The respondents believed that they need to wear appropriate clothes based on the weather. Very few (18%) chose to wear their traditional clothing.

1.4 Farming and Livestock Growing. Agriculture is one of the *Mangyan's* traditional activities. Engaging in farming, fishing and growing livestock is a means of providing food for their family. The *Mangyan* use traditional and natural methods in farming. They are dependent on what the environment can give them and do not rely on any commercial pesticides and feeds to manage their farms and raise their livestock.

Results show that the *Mangyan* are already aware and are doing something to combat the perceived effects of climate change-related occurrences. Since they know weather patterns have changed and that the intensity of weather disturbances has grown stronger, they established some adaptation and coping strategies to address these occurrences. This was shown by choosing crops and farm animals that they believe can withstand any kind of weather condition (80%). As they also observed the existence of crop pests in their farm, many (75%) of them believe that using commercial pesticides can help get rid of these pests and save their crops. A majority of them (63%) also chose crops that are not seasonal like root crops and bananas. They also planted native bananas, root crops, and rice. Although bananas can be easily destroyed during storms, the respondents still prefer to grow them. More than half (55%) of the respondents changed the planting season of rice, while some (45%) now use commercial feeds and avail of immunity shots (17%) for their livestock.

1.5 Jobs/Labor. Over the decades, some *Mangyan* have adjusted to the modern way of life and are not fully dependent on their traditions anymore. Some of them are now working as laborers to earn money for their family. There is now a gradual change in attitudes among the *Mangyan* which could be explained as their response to the effect of climate change. Their livelihood in the uplands is seriously deteriorating and they need additional sources of income to go on with their lives.

Many (72%) of the respondents are laborers or have alternative livelihood while a few (28%) have not. Men in the *Mangyan* families are likely to find jobs while some of the women work as house helpers. Traditionally, female

members of the family stay at home to do the household chores. But because of the perceived effects of climate change-related occurrences on their livelihood, some of them chose to work for other people to earn money.

1.6 Ancestral Faith. The Mangyan's religion and faith conform to their customs and traditions. But according to the respondents, a majority of them (84%) have converted to other religions while very few (10%) continue to perform rituals and offerings. Other respondents' adaptation and coping strategies on the perceived effects of climate change-related occurrences are summarized in Table 3.

1.7 Other Internal Adaptation and Coping Strategies. The Mangyan respondents included other internal adaptation and coping strategies relative to climate change. Some (40%) claimed that they avoid landslide areas while others (35%) store food and water in preparation for any disaster or calamity. Only a few (13%) of the respondents proposed the preparation of emergency evacuation plans for the community. Other adaptation and coping strategies include avoiding the practice of *kaingin* farming (12%), provision of emergency kit (10%), procurement of rescue tools and equipment (8%), and obtaining the LGU emergency hotline numbers (8%).

2. External Adaptation and Coping Strategies of the Mangyan

2.1 LGUs' IEC on Climate Change. The respondents identified some of the projects done by the LGUs in Gloria that are related to disaster risk reduction and management. Many

(78%) of them are aware that the LGU invited their tribe leaders and officials to attend seminars and meetings related to climate change. But not one of the respondents attended these meetings or seminars. However, they claimed that they participated in the LGU's tree planting activities in their communities (58%).

2.2 LGUs Emergency Response Operation During and After Calamities. During calamities, the LGU is responsible for securing its constituents from any harm and it provides appropriate assistance to enable them to cope with any kind of disaster. About 73% of the respondents said that LGU provided assistance in the form of relief goods like rice, instant noodles, canned goods, and other basic necessities during calamities while 52% mentioned that the LGU sent medical teams and provided free medicines.

After the calamities, the respondents claimed that the LGU again sent out medical teams to check their health conditions and provided free medicines (70%). Aside from these, free planting materials were distributed to replace their damaged crops according to 47% of the respondents. While a few (18%) also said that they have received relief goods, around 15% claimed they did not receive any assistance at all. Other external adaptation and coping strategies are summarized in Table 3.

CONCLUSION

The respondents are very much aware of the change in climate in their area. But even with the lack of scientific knowledge and information about climate change, their capability to adapt has

Table 3. Respondents' adaptation and coping strategies on the effects of climate change-related occurrences

Characteristics	Frequency (N = 60)	Percentage (%)
A. Internal Adaptation and Coping Strategies		
1. Migration		
a. Land Type*		
Plains	56	93
Uplands	23	38
Riverside	19	32
Coastal	11	18
b. House Type		
Concrete	52	87
Semi-concrete	41	68
Traditional (Nipa hut)	39	65
2. Clothing*		
Wear appropriate clothes based on weather	52	87
Still use traditional clothes	11	18

Table 3. Respondents' adaptation and coping strategies on the effects of climate change-related occurrences (*Continued*)

Characteristics		Frequency (N = 60)	Percentage (%)
3.	<i>Farming and Livestock growing*</i>		
	Choosing crops and farm animals with high survival rate in any kind of weather conditions	48	80
	Use of pesticides in farming	45	75
	All year round crops (not-seasonal)	38	63
	Adjust the planting and harvesting season on seasonal crops	33	55
	Feed the livestock with commercial livestock foods	27	45
	Use of immunity shots on livestock	10	17
4.	<i>Jobs/Labour</i>		
	Find alternative livelihood	43	72
5.	<i>Ancestral Faith</i>		
	Converted to other religious dominations	41	84
	Frequently perform rituals and offerings	5	10
	Does not perform any rituals and offerings	3	6
6.	<i>Others</i>		
	Avoid landslide and flood prone areas	24	40
	Storage for food and water	21	35
	Provide emergency evacuation plan	8	13
	Avoid <i>Kaingin</i> farming	7	12
	Provide emergency kit	6	10
	Procure emergency rescue tools and equipment	5	8
	Provide LGU emergency hotline	5	8
B. External Adaptation and Coping Strategies			
1.	<i>LGUs IEC on climate change</i>		
	Tribe leader or any tribe officials will be invited to attend in comprehensive seminars or meetings about climate change	47	78
	Tree planting in the upland areas	35	58
2.	<i>LGUs Emergency response operation during calamities</i>		
	Distribute relief goods (food, clothing, etc.)	44	73
	Provide medicines	39	65
	Send medical team to treat injured and ailing <i>Mangyan</i>	39	65
	Evacuate the affected <i>Mangyan</i>	36	60
	No assistance from the LGU	3	5
3.	<i>LGUs Emergency response operation after calamities</i>		
	Send medical team	42	70
	Provide medicines	39	65
	Provide crop seeds for re-farming	28	47
	Distribute relief goods (food, clothing, etc.)	11	18
	No assistance from the LGU	9	15

* multiple responses

been observed as evidenced in this study. The *Mangyan* are able to adapt and cope with the negative effects of climate change and reduce the risk of disasters, be it man-made or natural. Results showed that they already have plans if these occurrences persist.

The resiliency of indigenous people like the *Magyan* and others was confirmed by the study of Rivera (2011). He revealed that the *Ivatan* applied their traditional knowledge in their architectural designs to overcome strong weather disturbances. The *Mangyan* now build their houses with additional support such as nails replacing the ropes for the houses to withstand strong winds and typhoons.

The *Mangyan* are agriculture-dependent people. Farming is one of the activities seriously affected by calamities like typhoons and droughts. To adapt to these phenomena, the *Mangyan* adjusted their planting and harvesting seasons based on prevailing climatic conditions. This is similar to the coping strategies of the *Ifugao* in the Cordillera region as studied by Kwiatkowski (2013). Moreover, the *Mangyan* also chose farm crops with high survival rate when affected by natural calamities and crops that are easy to plant and faster to harvest. They have also adopted the use of commercial pesticides to prevent pests in their crops. Results showed that some of the *Mangyan* use commercial feeds for their livestock since the animals will get more nutrients from the commercial feeds unlike when they were fed with traditional left-over food and fruits.

In addition, the *Mangyan* look for contractual jobs outside the community to ensure steady income for their family. Results showed that some of the respondents are contractual farmers. As shown in the study of Salick and Byg (2007), the IPs often seek alternative livelihood for their survival and subsistence to combat the negative effects of climate change. The *Mangyan* now require their male family members to work outside the community to earn money not just for their family's food and other basic necessities but also for their needs in times of disasters or calamities.

The results further showed that religious beliefs or faith had also affected the *Mangyan's* decision-making with most of them opting to embrace other religious denominations. The *Tau-Buhid Mangyan* chose to be converted to the Protestant religion when missionaries came to their village to baptize them. The *Tau-Buhid Mangyan* believe that changing their ancestral beliefs enable them to cope with climate change affecting their lives. There are few left who still perform rituals and offerings for good harvest and planting season, good health, safety and protection.

Adaptation and coping strategies of the *Mangyan* towards climate change-related occurrences include accepting some changes for them to survive. These strategies could result in

negative or positive outcomes. Changing their customs and traditions could lead to negative consequences such as the loss of their cultural heritage, the preservation of which is vital to their existence.

Majority of the *Mangyan* already left their traditional wear in favor of lowlander clothes as an adaptation to the extremes in climate and temperature. The *Mangyan* nowadays want to have concrete houses instead of their traditional *nipa* huts which cannot withstand strong typhoons and cannot protect them from possible danger. These changes could alter the traditional way of life among the *Mangyan* who are known to have a simple lifestyle.

The climate change-related occurrences have led the *Mangyan* to seek for alternative livelihood outside the community since their farms and livestock, and environment have been drastically affected. Timber poaching and charcoal production are among the alternative livelihood that the *Mangyan* have gone into. This confirms the findings of the IDPIP-ST (2011) regarding the non-sustainable forest practices of *Hanunuo Mangyan* because of climate change effects. Others, however, opted to be employed by other people to earn money for their families. These adaptation strategies will eventually decrease the *Mangyan's* sole dependence on the natural resources in the uplands.

At present, the LGU has plans to enable all residents of Gloria to adapt and cope with climate change-related occurrences. The LGUs develop their plans based on the Climate Change Act of 2009 and the DRRMA of 2010 which enables government (in all levels) to address the effects of disasters and hazards brought about by climate change and to develop more resilient communities in the country. The LGU-Gloria treat the *Mangyan* as any resident in the area hence there are no specific strategies to address their concerns.

Thus, the *Mangyan's* resiliency towards climate change is a result of both internal and external factors working on their decisions to adapt and cope with the changing environment. While the adaptation and coping strategies have brought positive improvements such as making them more resilient, these also led to maladaptation practices that could erode the socio-cultural lifestyle and values of the *Mangyan*.

Thus, the LGUs in Gloria and other government and non-government organizations working with the *Mangyan* should continuously coordinate and work with tribe leaders to arrest these maladaptations. The positive adaptation and coping strategies practiced by the *Mangyan* with the support of LGUs should continue to ensure that the safety and livelihood of the *Mangyan* will make them resilient in the face of climate change-related disasters and risks.

REFERENCES CITED

- Ancog, R. 2011. Quantitative Vulnerability Analysis of Upland Agro-ecological Systems of the Mangyan Indigenous Communities in the Philippines. http://www.eaare2012.org/index.PHP?option=com_content&view=article&id=126 [Date accessed January 15, 2012].
- Development Forum Working on Poverty Monitoring in the Philippines: The Case for Community-Based Monitoring System. 2010. <http://www.pdf.ph>. [Date accessed December 12, 2012].
- Fajardo, R.R. 1997. Still Strangers in their Own Land. from <http://pcij.org/indigenouspeople>. [Date accessed December 15, 2012].
- Kwiatkowski, L. 2013. Globalization, Environmental Change and Coping Strategies Among the Ifugao of the Philippine Cordillera Mountains. Continuity and Change in Cultural Adaptation to Mt. Environments. Studies in Human Ecology and Adaptation. Vol. 7, 2013.
- IDPIP-ST. 2011. Climate Change Adaptation/Mitigation Practices: The Hanunuo's Experience, file:///C:/Users/gil%20andrei/Desktop/THESIS%20MATTER/Climate%20Change%20Adaptation%20Mitigation%20Practices%20%20The%20Hanunuo%E2%80%99s%20Experience%20%C2%AB%20IDPIP-ST.htm. [Date accessed December 18, 2011].
- Municipality of Gloria, Oriental Mindoro. 2010. Location. http://gloria.gov.ph/index.PHP?option=com_content&view=article&id=96&Itemid=118. [Date accessed December 18, 2011].
- Municipality of Gloria, Oriental Mindoro. 2010. Geo-Physical Characteristics. http://gloria.gov.ph/index.PHP?option=com_content&view=article&id=98:geography&catid=38:profile-articles. [Date accessed December 18, 2011]
- Rivera, R. 2011. Climate Change and the Indigenous People: Communicating Adaptation, Impact and Mitigation for Sustainable Sectoral Development*. <http://rodrigo75.wordpress.com/2011/09/22/climate-change-and-the-indigenous-people-communicating-adaptation-impact-and-mitigation-for-sustainable-sectoral-development/>. [Date accessed January 16, 2012]
- Salick, J. & Byg, A. 2007. Indigenous peoples and climate change. Oxford: Tyndall Centre for Climate Change Research.
- The Philippine Daily Inquirer. 2012. The Philippines is the third most disaster prone country in the world. 10/15/2012
- The World Disaster Report. 2013. <http://www.ifc.org>. [Date accessed March 15, 2013].



Typical Mangyan houses in the upland community in Gloria, Oriental Mindoro.