

# REPORT

## Participatory Assessment of Climate and Disaster Risks in Barangay Maasin - Palawan The Philippines



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Bread for all, January 2013

 **BREAD FOR ALL**

**Brot**  
für die Welt

### Text

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### Pictures

Bernadeta Sutrisnowati, climate trainer for Asia, *Bread for all*

Front page: farmer from barangay Tabon going to sell banana to a middle man in the main road. He has to walk a long distance to reach the main road.

***Bread for All*** ("*Brot für alle*") is the development organization of the Swiss Protestant Community of Churches. The organization supports 400 development projects and programs in 57 countries in Africa, Asia, and Latin America. In addition, its development policy has the goal of creating fairer international socioeconomic structures, maintaining creation, and bringing peace.

***Bread for the World*** ("*Brot für die Welt*") is a programme of help initiated by the protestant churches in Germany. It was set up in Berlin in 1959 and since then has been the responsibility of the "Diakonische Werk", the Social Service Agency of the Protestant Church in Germany (EKD). "Brot für die Welt" works jointly with local churches and partner organisations in Africa, Asia, Latin America and Eastern Europe on over 1,000 projects, all of which are aimed at helping people to help themselves. The motto behind our work is "justice for the poor".

## I. Executive Summary

Climate change is the most serious and most pervasive threat facing people today. Mainly affect to the marginalized and the poor people it will be difficult to increase their quality of life due to climate change. For example it will be more difficult for farmers and fisher folk to determine the time of planting and harvest and also time to go out fishing due to uncertain climate. Therefore, it is necessary starting now to undertake adaptation and mitigation measures to climate change impacts.

This assessment report is the result of a learning process analysis in climate change and disaster risk at Barangay Maasin, Quezon, Palawan, Philippines. Analyses were performed by using the tools of Participatory Climate and Disaster Risk Assessment (PACDR) designed by Bread for the World (BftW), HEKS/EPER and Bread for All (BFA). The analysed project is implemented by IDEAS and funded by BftW and the local government.

The analysis team had only 2 and a half day to conduct the whole analysis. The modules 2-4 were done during day one and two in and with the community Maasin while the last 2 modules could be done only with two representatives of IDEAS and not in the community. However during the training one working group has chosen the same Barangay to perform their exercises and the other working groups used nearby villages as their examples. Also the excursion during the training was done in nearby villages. By this, the analysis team could verify their findings.

The conclusion of the analysis shows a high vulnerability of the community to the Hazards of flood and Typhoons. The Habagat/Southwest monsoon brings strong winds during the rainy season that can result in flashfloods. During the last 5 years the community perceived an increase in the number and severity of the flood events. This is caused by higher precipitation and strong winds of the southwest monsoon during the rainy season.

Prevalent in the area is the practise of slash and burn to clear and open new fields. Also the vast use of vehicles and cooking with firewood and lighting with kerosene which all enhance greenhouse gas emissions. Adaptation and mitigation measures should tackle that issue and alternatives like energy saving stoves, reforestation and the use of renewable energies should be promoted to the community and the local government. IDEAS activities already largely contribute to reduce greenhouse gases in the atmosphere by using measures like forest management, agro-forestry, reforestation, promoting energy efficient stoves and promoting organic farming.

The analysis of risks caused by climate change and hazards, the vulnerability of the communities and adaptive capacities in Barangay Maasin showed that climate change impacts can already be noticed and people have to cope with hazards. Nevertheless in Barangay Maasin environmental conditions (forest, land and water resources) are still in a stable condition and there is no excessive exploitation yet. Communities and local governments try to maintain a stable nature. However, further adaptations will be necessary to keep these conditions. Capacity building seems necessary to make the communities more resilient to face the long term effects of climate change and hazard risks.

Further lessons were learned during the application of PACDR. The tool is simple and easy to understand by participants. The introduced exercises for these consultations allowed participants to engage themselves in the learning process.

## II. ABBREVIATIONS

BftW	Bread for the World
BFA	Bread for All
CRISTAL	The <b>C</b> ommunity-based <b>R</b> isk <b>S</b> creening <b>T</b> ool – <b>A</b> daptation and <b>L</b> ivelihoods
CSF	Civil Society Fund
CTI	Consulting Team, Inc
CO <sub>2</sub>	Carbon Dioxide
CC	Climate Change
DRR	Disaster Risk Reduction
ENSO	the El Nino-Southern Oscillation
FFI	Flora and Fauna International
GHG	Green House Gases
HEKS/EPER	Hilfswerk der Evangelischen Kirchen der Schweiz/ Entraide Protestante Suisse
IEC	Information, Education and Communication
IP	Indigenous People
IDEAS	Institute for the Development of Educational & Ecological Alternatives, Inc
LGU	Local Government Unit
LUCF	Land use Change and Forestry
MDRRMC	Municipal Disaster Risk Reduction Management Council
NGO	Non-Government Organization
NTFP	Non Timber Forest Product
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PACDR	Participatory Assessment Climate and Disaster Risk
PNRPS	Philippine National REDD+ strategy
REDD+	Reducing Emission from Deforestation and Forest Degradation

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## 1. Introduction

Climate change is one of the largest problems humanity faces today. Communities in the Philippines suffer already now and will in the future from the impacts of this global phenomenon, even though they have contributed little to causing climate change.

Bread for the World (BftW) supports community-level projects through local non-government organization (NGO) in poor countries around the world. Many beneficiaries and poor people are affected by climatic and disaster risks mainly because they are vulnerable and they don't have enough capacities and resources to adapt or mitigate the risks. To deal with those problems, Bread for the World has implemented climate and disaster risk projects in the Philippines. It is also important to ensure that these projects do not lead to excessive emissions of greenhouse gases.

The analysis was executed with the "Participatory Assessment of Climate and Disaster Risks (PACDR)", a tool developed by Bread for the World, HEKS and *Bread for All* on CRISTAL.

This report is organised as follows. First, the project and its context are briefly described. Then, the climate context in the Philippines is discussed. Third, the assessment results for the project will be presented, following the structure of PACDR. The last section discusses some lessons learned from the application PACDR.

## 2. Project and Context (Module 1 of PACDR)

The Institute for the Development of Educational & Ecological Alternatives, Inc (IDEAS) has a comprehensive project called «Strengthening Links of agriculture and enterprise to Resource Base Protection and Enhancement for Climate Change Resilient and Healthy Communities» financed by *Bread for the World* (BftW) Germany.

### 2.1. Project Area

Quezon is a municipality in the province of Palawan, Philippines. The municipality of Quezon has a total land area of 94,921 hectares. It is located between 117° 45' - 118° 15' 30" longitude and 8° 45' 4" - 9° 30' 15" latitude. Bounded in the North by the municipality of Aborlan, in the East by the municipality Narra, in the South by the municipality of Rizal and in the West by the West Philippine Sea. Quezon is politically subdivided into 14 barangays which referred to a village. Quezon town is located 155 kms south of the capital city of Palawan, Puerto Princessa.



Figure 1: Map of Palawan

Barangay Maasin is located a 20 minute drive from central Quezon. Barangay Maasin consists of 7 sub villages namely: Tumarbong, Salisi, Marinteb, Lasyap, Little Baguio, Ranao and Sapang. The total population is 1.085 people.

The community participants for the project consultation came from Marinteb.

The main income source in the area is farming which contributes to 49%. Other sources of income are livestock, handicraft, fishery, and other activities (owner of sari-sari/small stalls), driver of tricycles, etc).

The average household size is five people. To have many children is still considered as helpful for the family especially in field work.

### 2.2. Project Activities

**The overall project objective** is to improve the economic, health, and environmental security of men and women in the project communities and to improve climate change resiliency. The project period is from 2010 to 2012.

A total of 300 households in 8 barangays are expected as beneficiaries in the municipalities of Quezon and Rizal.

IDEAS as project implementer tries to achieve the following results:

**Result 1-** Measures to mitigate the effect of calamities and disasters are in place and implemented.

- Communal resource management measures are established for the protection of livelihood and food security, the target for year one on watershed establishment and ancestral domain claim were generally achieved.
- On the watershed establishment, a draft watershed management plan is already completed and needs only lobbying for local government adoption. In addition, the other forest management scheme in a protected landscape has been finished with on-going protection measures like a campaign against unplanned slash and burn farming as well as monitoring against poaching of timber and wildlife.
- On ancestral domain claim, one ancestral domain claim application has been filed already and the negotiation with the NCIP is continuing. Most documentary requirements as of proofs of claim have been prepared and compiled. Another nearby community of Indigenous People (IPs) is requesting that they (their ancestral domain claim) will be included in the application. Since there is no fund available for the survey mapping (which is very costly), IDEAS sought and continues to seek additional funds for the delineation survey.
- Women continue to actively participate not only in the meetings but in terms of participation in decision making and field operations like protection monitoring and tree planting activities and to some extent together with their children. This continued active involvement in the ancestral domain claim making activities and watershed management ensured that their ideas and concerns were mainstreamed in the claim making and management processes.

**Result 2-** Poor farmers, IPs especially the vulnerable and most at risk families are food secure and able to create marketable products for basic needs and cash requirements.

- 300 households were able to ensure the production of energy giving nutrition that can sustain for the annual needs of the families. A combination of bananas, root crops, and cereals in varying degrees is being produced in each household farm.
- All the 300 households have varying levels of crops added to the existing ones. These include the roots crops, bananas, coconuts, coffee, cacao, pili, and kalamansi.

**Result 3 –** Incidence of common illnesses reduced.

- In the last two years, resource accessing and local counterpart mobilization resulted in the installation of 125 toilets, of which 100 units of toilet bowls were accessed from the National government through the local government of Quezon.
- 5 types of foods plants are now maintained by 300 households both in their yard and/or in the farms as sources of food.
- From 30% when the project started, the current level of access to potable water is 50% through level 2 and level 1 water projects. It is expected that this outreach will increase to 60% once the project of one of the partners in Tagusao is completed.

### 2.3. Other projects or programs of IDEAS

- IDEAS gets support from the Canadafund for Local Initiatives, an agency of the Embassy of Canada in the Philippines that provided support for level 2 water project in Maasin and Aramaywan in the municipality of Quezon. Level 2 water project meaning the water can be access in the communal faucet.

- A small fund was donated by the World Bank through its Civil Society Fund (CSF) to enhance capacity of the federation.
- IDEAS joined Philippine Coffee Alliance, a national groups of stakeholders promoting non instant and local coffee production and consumption.
- IDEAS engagement collaboration with local forest governance in project of Reducing Emission from Deforestation and Forest Degradation (REDD+). The project sites are in 3 area of Luzon and 1 area in Mindanao. As far IDEAS already engage some of activities together with government and other NGOs such as:
  - Participate in the Bangkok intersession side event.
  - Philippine National REDD+ strategy (PNRPS) formulation.
  - ADVANCE REDD+ Project (Advancing the Development of Victoria Anepahan communities and Ecosystems through REDD)
    - Collaborative project of 6 partners (NTFP, ELAC, FFI, IDEAS, NATRIPAL, and LGU-Quezon.
    - To promote effective forest governance and sustainable upland development in Southern Palawan.
- One important project is done in collaboration with the local government of Quezon who is the financial counterpart to the fund donated by Bread for the World on disaster risk reduction. The collaborative work that covers the entire barangays of the municipality They form a Municipal Disaster Risk Reduction Management Council (MDRRMC). The project title is Improving Community Participation in the governance of Climate Change and Disaster Risk Reduction Program in the Municipality of Quezon. The project goal is to mainstream community participation in the governance of climate change and disaster risk reduction programme at the local level.

Project implementation involves four key activities:

1. Participatory community disaster risk assessment (PCDRA) in 14 barangays
2. Disaster risk reduction management planning which involves development as well as contingency measures where in these measures shall be integrated into local development plans of the local government unit (LGU)
3. Implementation of priority plan. Creation of PC-CC-DRR team. This is a composite team composed mainly of IDEAS and municipal DRR management office staff who will be assigned the task of facilitating community level assessment and planning.
4. Information, Education and Communication (IEC) and capacity building.

## 2.4. Project Context

### 2.4.1. Climate

The Climate of the Philippines is tropical and maritime. It is characterized by relatively high temperature, high humidity and abundant rainfall. Using temperature and rainfall as bases, the climate of the country can be divided into two major seasons: (1) the rainy season, from June to November; and (2) the dry season, from December to May. The dry season may be subdivided

further into (a) the cool dry season, from December to February; and (b) the hot dry season, from March to May. The mean annual rainfall of the Philippines varies from 965 to 4,064 millimetres annually.

Typhoons have a great influence on the climate and weather conditions of the Philippines. Palawan is generally typhoon-free and is away from any major earthquake lines. But in 2012 Palawan has experienced some extreme weather events including typhoons.

#### **2.4.2. Current Risks**

The main risk in Palawan is flooding. Flooding is caused by heavy precipitation and the southwest monsoon during the rainy season. The Monsoon can increase the intensity of rain and enhances the flood risk by strong winds. These events impact the livelihood of the people especially in Barangay Maasin. Broken bridges and blocked roads due to the fall of trees and other interferences of infrastructure. Agricultural land will be damaged and there is soil erosion due to the floods. This results in a threat of food security.

New and severe hazard are Typhoons. Although in former times no Typhoons hit the area the people made their first experiences in 2012. Thus adaptation and mitigation efforts undertaken by both the community and the government are necessary to avoid food insecurity and further poverty in the future.

### 3. Scientific information about Climate Change and Disaster Risks in the Philippines (Module 2 of PACDR)

#### 3.1. The Impacts of Climate Change and Disasters in the Philippines

Climate change is already taking place now, thus past and present changes help to indicate possible future changes. Over the last decades, the temperature in the Philippines increased at about 0.6° C per decade (1951-2006). Annual rainfall amounts and the number of rainy days during the wettest and driest years per decade increased as well. Sea level rise began in 1970, thereby Manila and Davao showed an increase of nearly 15 cm.

The El Nino-Southern Oscillation (ENSO), is a large-scale phenomena associated with a major warming (El Nino) or cooling (La Nina) respectively of the surface layer of the central eastern equatorial Pacific Ocean. The observations indicate that there have been more ENSO events, especially of El Nino, that were more frequent, persistent and intense since the early 1970.

There is no trend visible in the total number of annual tropical cyclones. In contrast, an increasing number of tropical cyclones in Visayas and a decreasing number in Mindanao were observed (1951-2000).

The projected climate change scenarios based on the downscaling made by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) are:

- **Temperature:** Significant warming will occur in the Philippines by the middle of the current century, especially a significant increase in the frequency of hot days and warm nights: The average annual mean temperature is projected to increase by 0.9°C-1.2°C by 2020 and 1.7°C-3.0°C by 2050. Warming will be worst in Mindanao.
- **Precipitation:** Changes in annual mean precipitation are varying largely. Increases in rainfall are particularly evident in most areas of Luzon and Visayas (2 to 17% by 2020 and 1 to 16% by 2050), while Mindanao is projected to undergo a drying trend (0.5 to 11% by 2020 and 2 to 11% in 2050). Projections of seasonal temporal rainfalls show that the dryer season (March to May) will become drier, while the wet season (June to August and September to November) will become wetter. Reduction of rainfall is seen in most areas for all seasons of Mindanao by 2050. Mainly a much active and stronger southwest monsoon season is projected with significant increases in rainfall in July to August.
- **Sea level** rise will increase the risk of flooding, storm damage, erosion of beaches and cliffs as well as changes in tides of rivers and bays. Projected impacts of one meter sea level rise show that a land loss of 129.144 ha could be expected and approximately 2 million people affected.
- **Rise in sea levels** reduces coastal areas productive for agriculture and fisheries and causes more flooding, and intrusion of salt water in the lowlands and aquifers used for irrigation and domestic consumption.
- **Extreme events:** there is no clear trend for extreme events e.g. typhoons.

Detrimental and beneficial impacts of the ongoing and projected climate change and variability are widespread in both socio-economic and natural systems. The Philippines has identified four priority areas for vulnerability and adaptation assessment: agriculture and food security; watershed (forestry and biodiversity); coastal zones, and human health. The impacts include:

**Agriculture, Food Security:** Agriculture represents 1/5 of the total economy and generates 1/3 of the country's total employment. Agricultural productivity will be constrained by the increasing temperatures, particularly by those in night-time, changes in rainfall patterns and the projected changes in frequency and intensity of tropical cyclones causing wind damages and yield losses. Simulation models have shown that rice yields vary from -14% to -6% for every 1°C rise in temperature. Outbreak and spread of pest and diseases in plants, crops and animals is mostly uncertain. Climate Change will weaken national food security and self-sufficiency and intensify problems of water allocation.

**Forestry and Biodiversity:** The Philippines are one of the critical biodiversity hotspots with more than 65% of the species found nowhere else. Thereof more than 800 of its plant and animal species are threatened with extinction. Increases in temperature will affect the survival of plants and animals. Changes in precipitation may also cause a re-composition and re-distribution of forest types: A decrease in soil moisture in drier areas may accelerate forest loss while an increase in precipitation could increase run-off resulting in soil erosion and flooding.

**Water resources:** Changes in rainfall and temperature will be critical to future inflow in two major reservoirs: Angat and Lake Lanao. Runoff is likely to decrease and be insufficient to meet future water demands. Other factors deemed as contributing to the impacts of climate change on water resources include degradation of water areas, unchecked extraction of groundwater, pollution due to industrialization, saltwater intrusion, and sedimentation of reservoirs. Saltwater intrusion has been reported to be evident in nearly 28 % of coastal municipalities in Luzon, 20 % in the Visayas, and almost 29 % in Mindanao.

**Coastal zones:** Extreme weather events (e.g. typhoons/storm surges), sea level rise and increased temperatures will lead to increased flooding of low-lying coastal areas, enhanced coastal erosion and negative agricultural impacts (e.g. loss of yield and employment) resulting from inundation, salinization and land loss. Besides that negative impacts are expected on coastal aquaculture and tourism because of coral bleaching and ocean acidification.

**Human health:** Frequency and severity of extreme weather events such as heat strokes and dehydration from increasing temperatures, heat waves and drought will increase. Indirect causes of climate sensitive infectious diseases such as vector or water borne will also increase: Diarrhoea and malaria are the two main diseases affected by climate change, especially temperature rise, in the region. Consequently the number of deaths will also increase.

**Infrastructure:** Frequent rainfall, strong winds, higher waves and temperatures variations will lead to accelerated structural fatigue and materials failure (e.g. power transmission structure, road pavements etc.)

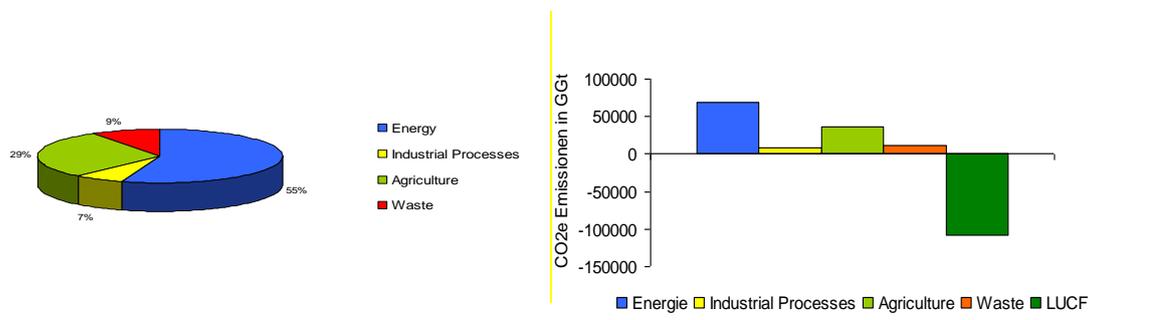
It is important to notice, however, that other factors threaten the livelihoods of Philippines communities as well. For example resource degradation and the overexploitation of natural resources such as unsustainable fishing practices in association with the environmental decline.

**Energy:** Energy technologies, particularly on power generation from renewable sources, rely greatly on the climate for its resource. With projected change in precipitation, humidity, wind speed and

cloudiness, energy technologies will be affected, resulting in changes in the quantity and timing of the renewable resources, in its operational performance and energy production. Changes in the mean potential and altered variance of renewable resources will result in the changes in the energy resources, with climate change seemingly enhancing seasonal differences. In general, the relationship between the renewable resource potential and the driving climate variable such as precipitation and wind speed will dictate the extent of changes.

### 3.2. Philippines’s Contribution to Climate Change

The total GHG emissions with Land use Change and Forestry (LUCF) are 19,491GT of carbon dioxide equivalents (CO<sub>2</sub>e) in the year 2000. Overall GHG emissions from non LUCF sectors amounted to 126,878.78GT CO<sub>2</sub>e.

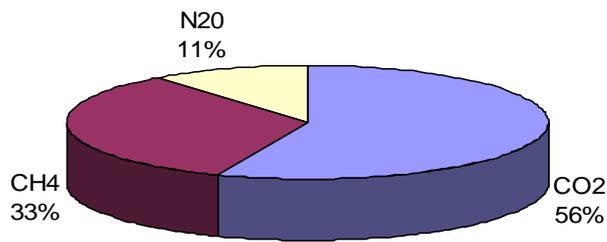


**Figure 2: Overall GHG emissions from Non-LUCF sectors (left) and all sectors (right) in the year 2000, (UNDP 2009)**

Sector wise, the Philippines’ GHG emissions are dominated by energy and agriculture, which contribute 55% (69,667.24 Ggt CO<sub>2</sub>e) or 29% (37,002.69 Ggt CO<sub>2</sub>e) of the total GHG emissions (refer to figure 2).

The energy sector contributes mainly with crude oil (76%) and coal (24%) as energy consumption to the GHG emissions. Biomass sources; kerosene and different gases are of minor importance.

The Land use and forestry sector reduces greenhouse gas emissions with 107,387.67 Ggt CO<sub>2</sub>e. Thus it is a significant carbon sink. This sink is mainly attributed to a low deforestation rate from 1990 to 2000 as well as an increasing carbon sequestration of various terrestrial ecosystems in the country (refer to figure 2).



**Figure 3: Relative contribution of individual greenhouse gases to aggregated emissions in 2000 (UNDP 2009)**

The GHG emission contribution of the agricultural sector is high mainly because of methane from rice cultivation (44%) and enteric fermentation in domestic livestock (18%), followed by nitrous oxide emission from agricultural soils (24%). The agricultural sector contributed 14% to the country's GDP in 2000 and 34% of the population are working in the agricultural sector.

## 4. Participatory Assessment of climate change vulnerability in Barangay Maasin

When starting the analysis the analysis team was well informed about the joint program of IDEAS and the local government of the municipality of Quezon to improving community participation in the governance of Climate Change and Disaster Risk Reduction. However, the team was not really aware of all the other activities of IDEAS in the region. These activities became only clear when doing modules 5 and 6 of the PACDR tool in the discussion with IDEAS.

Since the analysis team had only 2 days for working in the community the analysis-workshops were conducted in parallel but separate group for women (w) and men (m). On the first day both groups elaborated modules 2-4 of the PACDR tool. On the second day the results were presented to all participants.

The subsequent PACDR modules 5 and 6 could be done only with the two representatives of IDEAS during a half day session and could not be brought back to the community.

However during the training of BftW partners in the following week one working group has chosen the same Barangay to perform their exercises and two other working groups used nearby villages as their training examples. The excursion during the training week was done in nearby villages as well. By this, the analysis team could verify their findings and - together with IDEAS and the participants of the training - deepen its understanding of climate change vulnerability and resilience in the communities of the Municipality of Quezon. The suggestions on future project activities and project revision (PACDR Module 6) became then a bit more substantial. (See the separate report 'Highlights of Workshop Discussions' prepared by Consulting Team, Inc. (CTI).

The structure of this chapter follows the structure of the PACDR-Tool which was used for the analysis. First, the project specific climate and disaster risks, their impacts and the current coping strategies are identified.

Secondly, the most important livelihood resources and their vulnerability are analysed in the context of climate and disaster risks. Then, the project's impacts on adaptive capacities and on greenhouse gas emissions are evaluated. The last section looks at possible project revisions.

### 4.1. Climate and disaster risks in Barangay Maasin (Module 2, Part A)

The results of the consultations with project representatives and beneficiaries help to identify the impacts of climate change and disasters on a local scale.

#### 4.1.1. Results

Women and men groups completed two exercises for this module:

- Drawing a **hazard map** for Barangay Maasin: participants identified the main livelihood resources and community facilities (e.g. health centre, agriculture, land, forest, rice field, etc) and the main hazards that affect their daily life.

- **Seasonal calendar:** all main important events/activities that happen during a year.

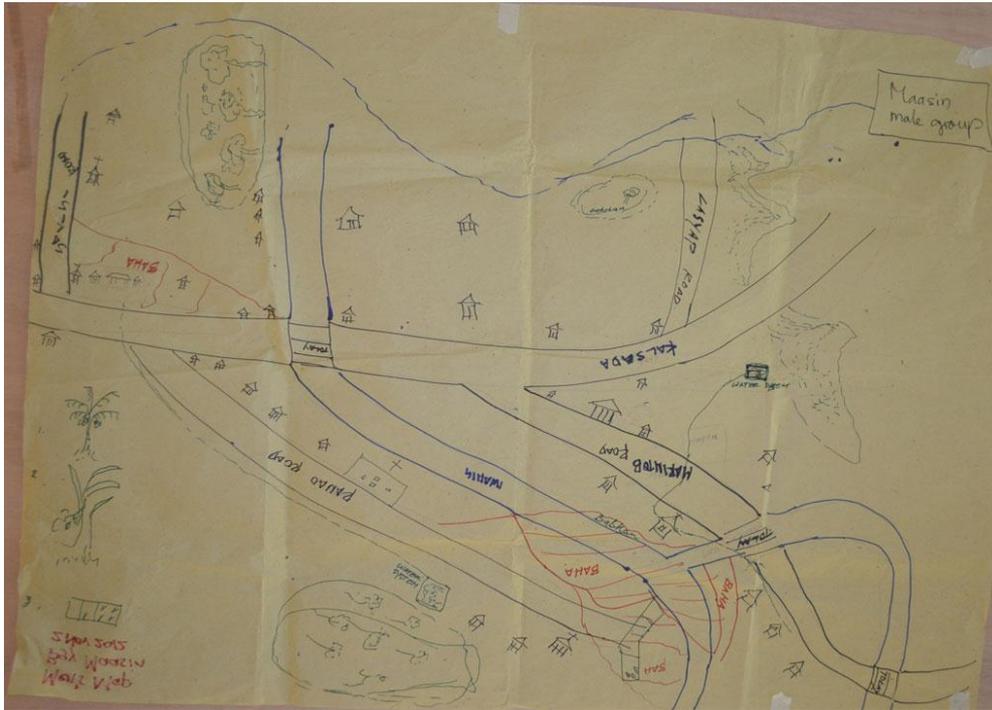


Figure 4: Hazard map drawn by the men group in Barangay Maasin<sup>1</sup>

<sup>1</sup> Notes: (1) There are 3 main hazards according to the men group: flooding, typhoon, and EL-Nino/drought. (2) A typhoon has occurred for the first time during 2012 (3) The bridge was impassable during the flood.



Seasonal calendar: all main important event/activities that happen during a year

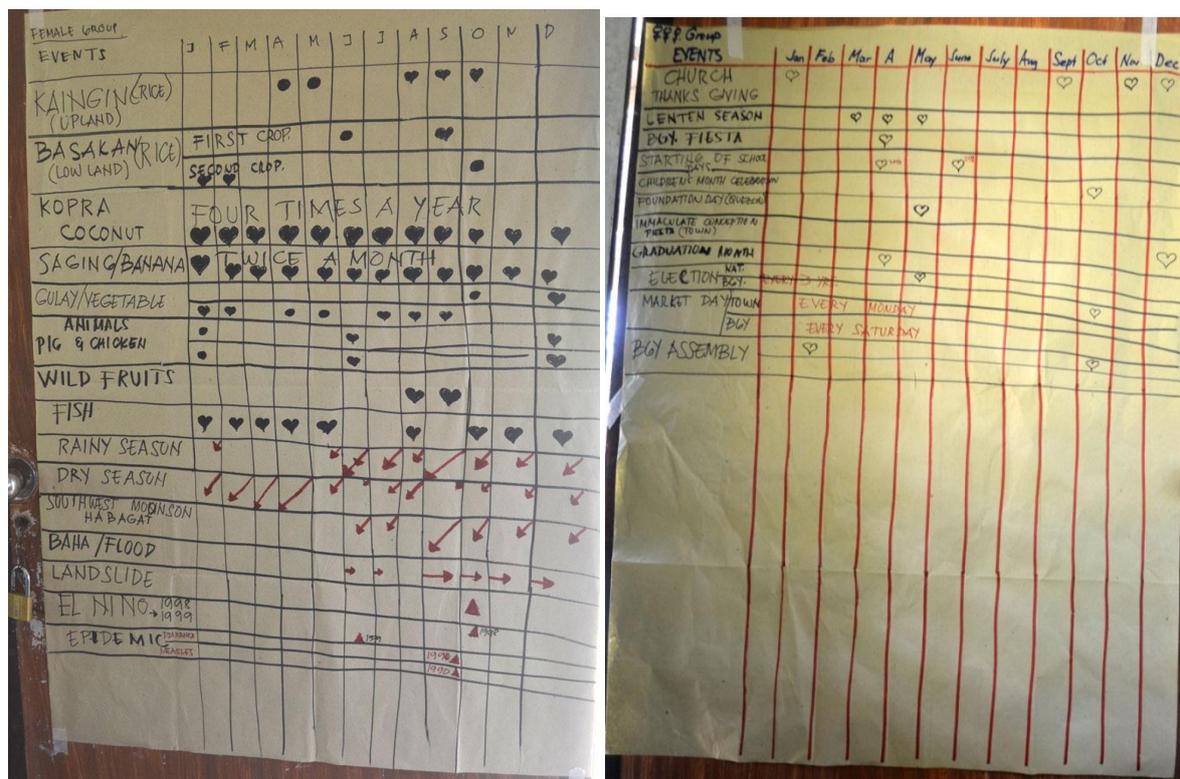


Figure 6: Seasonal calendar of the women group in Barangay Maasin<sup>3</sup>

<sup>3</sup> Note: (1) Kaingin is clearing or open land in slash and burn practise. (2) There are 2 different land types for rice, first is upland rice which is planted in April and May and harvested in August, September and October. Second is lowland rice which can be harvested twice a year: first planting in June and harvest in September, second planting in October and harvest January and February. (3) Copra is harvested four times a year but every farmer has a different time to sell it. (4) Landslides only happened once in October 2012 and in 1999 due to heavy rain. (5) El Nino affected the area in June 1998 and in October 1999. (6) The worse epidemic (diarrhoea) event occurred in 1990 due to flooding. (7) Women are more aware about political issues and education for children than men.

ALE GROUP

Molis Culpat  
Barangay Maasin  
21st 2012

EVENTS	J	F	M	A	M	J	J	A	S	O	N	D
1) KAINGIN	X			X								
PAGTATAMING ANIHAN				X								
2) BARANGAY FIESTA				X				X				
CHRISTMAS PARTY												X
NEW YEAR	X											X
THANKSGIVING												X
BINYAG								X		X		
SAN-JUAN								X				X
MAHAL NA ARAW				X		X						X
ARAW NG MGA PUSO FELLOWSHIP		X		X								
ARAW NG KABABAI & LALAKI					X							
YOUNG PEOPLE COMP.				X		X						X
TAGUTOM				X								
BAGYO AT BAHA						X	X					
TAG-INIT	X	X	X					X	X	X	X	X
PAGKAKASAKIT/MALARIA						X	X					
PAGTATAI AT PAGSUSUKA						X	X					
PANGINGISDA	X	X	X							X	X	
PAG AANI NG PROTAS						X	X	X	X	X	X	
NIPA PANG ATIP						X	X	X	X	X	X	
PANGANGASO NG BAROT DMO						X	X	X	X	X	X	
HONEY BEE	X	X	X									
PAGTUTUBLI NG ISDANG TAGANG KULAT				X								

Figure 7: Seasonal calendar of men group in Barangay Maasin<sup>4</sup>

Hazards mentioned by participants in Barangay Maasin:

- Flooding (m, w)
- Epidemic sickness (w)
- Habagat (Southwest Monsoon) (w)
- Typhoon (m)
- El Nino/Drought (m,w)
- Landslides (w)

<sup>4</sup> Notes: (1) The hunger season according to the men group happens in June and July while according to the women it occurs in August and September. Women argued that this is based on their experience in this year. (2) Malaria comes together with diarrhoea in June and July when flooding is more frequent. (3) Men collect mangrove leaves for making the roof in June, July, August.

#### 4.1.2. *Observed changes by men (m) and women (w) over the last 5 years:*

In general both groups did not mention any changes in temperature or rainfall patterns during the first day. On the other hand the groups mentioned already that they have changed to harvest rice earlier than before. This can be an indicator for changing weather patterns which they are not aware of. During the consultation meeting in day-2 the facilitator did clarify this issue and based on both group discussions the participants felt a change in precipitation and temperature especially in the past 3 years.

The rainy season begins to shift and starts at least one month later than usual, causing problems with the rice cultivation. During the rainy season weather also feels hotter than usual.

##### Temperature

- (w,m) The number and intensity of hot days increased during the last 3 years. Even during the rainy season they experienced hotter days.
- (w) Hot temperatures are likely to become more frequent in the future.

##### Precipitation

- (w) Heavy Rainfall is more frequent now especially in September due to the Southwest Monsoon.
- (w) The intensity of daily heavy precipitation is already being experienced in Barangay Maasin. That might continue in the future.
- (w) La Nina that caused floods happened every 5, 8, 10 years based on their experience and it seems that it occurs more frequent now.

##### Drought/El Nino

- (w) They have experienced drought events in 1998 and 1999 which caused shortages of food. Now they have additional food sources like root crops (cassava, sweet potato, etc.).

##### Southwest Monsoon

- (w) During the Southwest monsoon season (June-August), a larger increase in rainfall is observed in Barangay Maasin often leading to floods.

##### Epidemics/diseases

- (m) Malaria is getting more frequent in the last 3 years.
- (w) Epidemics such as diarrhoea are getting more frequent due to flooding and temperature rising. Malaria is not seen as a main hazard for the women group because they have the knowledge how to cure malaria with traditional medicine. Also IDEAS has a campaign about malaria prevention. As they can manage the malaria diseases women do not classify malaria as main hazard.

#### 4.1.3. *Comments on results*

The main hazards identified in the workshop were flooding (m,w), El Nino/Drought (m,w), Typhoon (m), Southwest Monsoon/habagat (w), and human diseases (w). In general women and men identified

similar hazards occurring in Barangay Maasin. The women group also mentioned landslides as a hazard but it's not seen as a high risk because it occurred only twice in 1999 and recently in 2012.

In the beginning some confusion came up because the community concerning changes of weather patterns did not respond clearly and they mentioned no changes within rainfall patterns and temperature, only the women group mentioned the intensity and frequency of hot temperature raised in the last 3 years. On the second day of the workshop both groups agreed that there was a change in rainfall patterns and an increase in temperature. Usually the dry season starts from January up to March but in the last 3 years the dry season continued until April so that the farmers have to harvest rice earlier and plant early maturing varieties.

Another interesting observation was made regarding political activities (e.g. elections at Barangay and national level, Barangay assembly) where women were more aware of than men. Men focused more on celebrations during a year including Valentine's day than they did on the elections. Normally in other place men are more concerned about political issues than women.

Generally most of the observed changes by the community are in line with scientific observations and forecasts on impacts of climate change in the Philippines.

- **Rainfall:** The observations by the community are more or less consistent with observations by scientists for higher and more frequent precipitation during the year. During the southwest monsoon season in September (according to the women group) an increase in rainfall is also projected in Barangay Maasin which can cause flooding. According to scientists precipitation increases in most areas of Luzon (Palawan belongs to Luzon) and Visayas. During the southwest monsoon season or Habagat (June, July, August), higher precipitation is projected in the province of Luzon (0.9% to 63%) with a potential for enhanced flooding events.
- **Temperature:** The community observed an increase in temperature during the dry and also the rainy season. This is according to observations and predictions by scientists for all areas of the Philippines particularly for the hot summer months.
- **Extreme weather events** like typhoons might be more frequent. Even though until this year Palawan was typhoon-free area.
- **Human Diseases:** Malaria might continue due to temperature rising. Diarrhoea will continue due to a lack of clean water supply during emergency situations.

#### 4.2. Participatory Vulnerability and Capacity Analysis (Module 3)

With the exercise "vulnerability matrix" the community identified their most important livelihood resources in Barangay Maasin. In a second step, the impact for the most important climate and disaster risks on the livelihood resources is rated, and in a third step, their importance for the current coping strategies is evaluated.

4.2.1. Result of the vulnerability Matrix

LIVELIHOODS		Baha Flooding	EL NINO Drought	Typhoon	
Natural	- Agricultural crops (Mountain)	3	2	3	7
	- Forest (gather)	1	2	1	4
	- Fish (sea)	1	0	1	2
	- Mangroves	0	0	1	1
Financial	- selling livestock	1	1	1	3
	- hired labour	0	0	1	1
	- selling copra	1	0	1	2
	- handicraft	1	0	1	2
Human	- Leadership	0	0	0	0
	- Skills	0	0	0	0
	- attitude/behaviour	1	1	1	3
Social	- Bayanihan	1	0	1	2
	- peoples organization	0	0	0	0
	- Lending institutions	2	1	1	4
Physical	- Farm tools	0	0	0	0
	- Road	2	0	2	4
	- Transport/Tricycle	1	0	1	2
	- Health Center	0	0	0	0
		14	7	16	

Live Livelihood		Flood	Habagat/Strong wind	EL NINO	Sum
Natural	Water	2	2	3	7
	Farm Production	3	3	3	9
	Forest	0	1	1	2
	Live Stock	0	2	2	4
Financial	Marketing/Agricultural Products	1	1	1	3
	Loans/Savings	1	1	1	3
	Handicraft selling	1	1	1	3
	Copra processing	1	1	1	3
Human	Handicraft making	1	1	1	3
	Carpenter	1	1	1	3
	Driver	1	1	1	3
	Professional (Teacher)	1	1	1	3
Social	Health	1	1	1	3
	People Organization	2	2	1	5
	Tribal Association	2	2	1	5
	Boys Council	2	2	1	5
Physical	P.T.C.A (Parent Teacher Comm Assn)	2	1	1	4
	Bridge	3	3	3	9
	Road	3	3	3	9
	School	3	3	3	9
Physical	Health Center	2	2	2	6
	Water System	3	2	2	7
		52	50	40	142

Figure 8. vulnerability matrix of the men group in Barangay Maasin

	Live Livelihoods	Flood	Habagat/ Strong wind	EL- NINO	Sum
Natural	Water	2	2	3	7
	Farm Production	3	3	3	9
	Forest	0	1	2	3
Material	Live stock	2	2	3	7
	Marketing/Agricultural Products	3	3	3	9
	Loans/Savings	3	2	3	8
Financial	Handicraft selling	3	3	1	7
	Copra processing	3	3	3	9
	Handicraft making	3	3	3	9
Human	Carpenter	2	2	2	6
	Driver	2	2	2	6
	Professional (Teacher)	2	2	1	5
	Health worker	2	2	2	6
Social	People Organization	2	2	1	5
	Tribal Association	2	2	1	5
	Bay. Council	2	2	1	5
	P.T.C.A (Parent Teacher Comm. Assn.)	2	1	1	4
Physical	Bridge	3	3	1	7
	Road	3	3	1	7
	School	3	3	1	7
	Health Center	2	2	1	5
	Water System	3	2	3	8
		52	50	40	142

Figure .8: Vulnerability matrix of the female group in Barangay Maasin<sup>5</sup>

#### 4.2.2. Conclusion of the Participatory Vulnerability and Capacity Analysis

Men and women had different ways to analyse the vulnerability matrix above. The women analysed the vulnerability matrix based on the short term impact to their lives. For instance flooding will have a high impact on financial resources because they are not able to pass the bridge or roads and the disposal of any goods is affected. The men group focused more on the long term impact. The emergency situation does not only affect directly during the time it occurs but they also considered the aftermath for their livelihood. For instance, the financial resource «handicraft selling» is not affected by a flood because they are able to sell the handicraft after the floods receded.

<sup>5</sup> Notes: (1) the women group rated the impacts of hazards to their livelihood by a more short-term view. During emergencies like flooding or Habagat they are not able to sell their products (agriculture, handicraft) → high impact. (2) human resources-high impact: during disaster they are not able to process the copra and handicraft.

In general men and women mentioned the same natural and physical resources, and more or less similar financial and social resources. They differed in their perception of human resources. Whereas women listed copra processing, handicraft making, carpentry, driving, professional worker (teacher) and the health, the men mentioned leadership, skills, attitude/behaviour and health.

The differences resulted in a different scoring for each resource. Where women gave high scores at almost every livelihood resource the men ranked it with low or medium score. For instance concerning the natural resource forest, the men focused on collecting forestry products and hunting, what is normally their job.

Rating of the hazards:

- **Typhoon (m)** is the hazard with the highest impact on community’s livelihoods affecting natural, social and physical resources according to the men.
- **Flooding (w)** is the hazard with the highest impact on community’s livelihood affecting almost all resources according to the women. The men ranked flooding as second hazard with a high impact on community’s livelihoods.
- Other hazards affecting their livelihoods are **southwest monsoon/habagat (w)**, and **El Nino/drought (m,w)**.

The most vulnerable resources according to the male group are natural, financial and physical resources, while the female group rated natural, financial, human, and physical resources as most vulnerable.

### 4.3. Hazard – Impact – Coping Strategies

In this exercise men and women identified the main impacts on their lives for Typhoon, Flood, Southwest Monsoon, El Nino/Drought and their respective coping strategies.

Risks	Impacts	Coping strategies
Typhoon (m)	<ul style="list-style-type: none"> <li>• (m) Rice halms lodge (no harvest possible → loss of income)</li> <li>• (m) trees/fruit fall down (no harvest possible-&gt; loss of income)</li> <li>• (m) roofs from houses removed</li> <li>• (m) planting schedule disrupted</li> <li>• (m) cannot go fishing (loss of income and food insecurity)</li> <li>• (m) children catch a cold (because of cold wind)</li> <li>• (m) livestock gets sick (because of rain)</li> <li>• (m) delayed sales of agricultural products/livestock</li> <li>• (m) traders don't come (crops rotten)</li> <li>• (m) Roads blocked/not passable (rain)</li> </ul>	<ul style="list-style-type: none"> <li>• (m) Harvest rice earlier</li> <li>• (m) vegetables: no strategy</li> <li>• (m) adjust planting period</li> <li>• (m) fishing near the shores</li> <li>• (m) children stay at home</li> <li>• (m) bring cattle to higher places (less exposure to flood)</li> <li>• (m) Use products for family consumption/feed animals/ barter trade.</li> <li>• (m) Built small shelter houses</li> <li>• (m) store food</li> <li>• (m) plant root crops (in advance) / cut stems of crop</li> </ul>
Flood (m,w)	<ul style="list-style-type: none"> <li>• (w) destroys crops</li> <li>• (w) no income</li> <li>• (w) stranded vehicles/road is flooded (students, workers, vehicles)</li> <li>• (w,m) destruction of roads + bridges</li> <li>• (w) cannot catch crabs, shell, fish</li> <li>• (w) cannot go to work</li> </ul>	<ul style="list-style-type: none"> <li>• (w) save/harvest recoverable crops (short term)</li> <li>• (w) Re-planting (long term)</li> <li>• (w) Bayanihan (working together) to clear waterways (short term)</li> <li>• (w) makeshift barge/bridge (short term)</li> <li>• (w) stay at home (short term)</li> </ul>

	<ul style="list-style-type: none"> <li>• (m) Rice get submerged ==&gt; harvest loss &amp; vegetables (eggplant, sweet potatoes, casava) washed away &amp; coconut trees (planted along the rivers) and other wild plants washed away (harvest loss)</li> <li>• (m) trees near the rivers washed away</li> <li>• (m) chance to fetch fish from private operators but overall less fish available as boats couldn't go out as rivers are blocked</li> <li>• (m) loans couldn't paid</li> <li>• (m) bayanihan (community work) spirit not affected but less people involved</li> </ul>	<ul style="list-style-type: none"> <li>• (w) evacuate to other house/safe place (short term)</li> <li>• (m) Early harvesting</li> <li>• (m) early maturing varieties planted</li> <li>• (m) reforestation</li> <li>• (m) shell, shellfish &amp; crabs to substitute fish and exotic food e.g. worms</li> <li>• (m) need to accept higher interest</li> <li>• (m) work done according available resources</li> <li>• (m) To fix drainage canals along the roads</li> </ul>
Habagat/ south west monsoon/strong wind (w)	<ul style="list-style-type: none"> <li>• (w) Flood</li> <li>• (w) destroys houses</li> <li>• (w) destroys crops</li> <li>• (w) destroys trees in the forest</li> <li>• (w) cannot go fishing</li> <li>• (w) cannot go to work (no income)</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• (w) Evacuate animals in safe place (short term)</li> <li>• (w) making a temporary shelter (short term)</li> <li>• (w) refitting the houses (short term)</li> <li>• (w) Stay at home for security issues (short term)</li> </ul>
El-Nino / Drought (w,m)	<ul style="list-style-type: none"> <li>• (w) Reduce of water supply</li> <li>• (w) destruction of crops</li> <li>• (w) lack of livestock fodder</li> <li>• (w) forest and grass fire</li> <li>• (w) some houses are affected by fire</li> <li>• (w) sickness e.g. sore-eye, measles, mumps, chicken pox, asthma</li> </ul>	<ul style="list-style-type: none"> <li>• (w) Planting of roof crops (long term)</li> <li>• (w) planting drought resistant – ex banana, casava, gabi, yam (long term)</li> <li>• (w) Kaingin fireline/making circle in the farm to protect from fire (long term)</li> <li>• (w) evacuate animals close to water</li> <li>• (w) take a bath daily</li> </ul>

In a discussion about the efficiency and sustainability of the coping strategies the communities mentioned:

- (w) Most of the strategies are short term strategies. Some of them are efficient and sustainable. But most strategies are unsustainable and long-term strategies are missing.
- (w) They have a request list already. Mostly they propose for infrastructure and general facilities sector such as:
  - Concrete roads and bridges
  - Sustainable livelihood (i.e. poverty reduction in holistic approach (social, economic, human, physical, natural resources)
  - High school building and facilities
  - Electricity
  - Continuing health education
  - Potable water

Due to time constraints the discussion was not going into further details.

#### 4.3.1. *Comments on results for impact and coping strategies*

Generally both groups mentioned similar impacts on natural, social and physical assets. The men instead focused more on impacts on the farming sector while women focused more on physical damages and interferences of their income generating during an emergency situation.

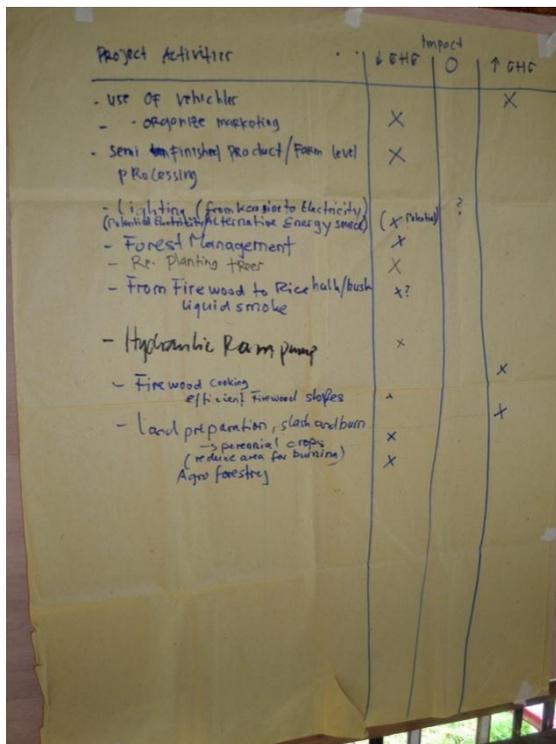
In general the coping strategies mentioned in both groups applied mostly for a short term period. Concerning the farming sector the men’s coping strategy applied mostly for a long term period (e.g. early maturing varieties planted, adjust planting period).

Nevertheless, the community lacks still sufficient long-term and preventive adaptation strategies, particularly when considering further changes that the Southwest Monsoon can cause in the area.

The combination of climate change with a high dependence on fishing, agriculture and livestock, can cause an increase in the vulnerability of the people in the area.

#### 4.4. The Project Mitigation Capacities (Module 5 of PACR)

This section deals with the project’s impact on greenhouse gas emissions, and essentially looks at some potential sources or sinks for greenhouse gases (GHG). The analysis has been conducted through a meeting with the executive director of IDEAS and the program officer of CTI.



Project Activities	Impact		
	↓ GHG	○	↑ GHG
- Use of vehicles			X
- appropriate marketing	X		
- Semi finished product/Farm level processing	X		
- Lighting (from kerosene to electricity) (reduced electricity/Alternative energy source)	(X Mitig)	?	
- Forest Management	X		
- Re-Planting trees	X		
- From Fire wood to Rice hull/bush liquid smoke	X?		
- Hydroponic Rice pump	X		
- Fire wood cooking efficient firewood stoves	X		X
- Land preparation, slash and burn → perennial crops (reduce area for burning) Agro forestry	X X		X

Figure 9: Project impact on greenhouse gases (GHG)

From the figure above, the project does not lead to a significant increase of GHG emissions. The use of vehicles releases CO<sub>2</sub> and other climate relevant gases. In general the project has some negative impacts on GHG emissions which are unavoidable but as long as the activities are still in small scale it will be manageable. The use of firewood for cooking and the slash and burn practice to clean the land has a negative impact and contributes to GHG emissions. Several activities of the project try to address these issues like switching from firewood to energy efficient stoves for cooking and might therefore reduce GHG emissions.

From the project side it is also essential to take more action particularly to lobby the government to finding possible solutions for some activities which contribute to mitigation, such as using solar panel

energy to generate electricity rather than using coal energy. Some mitigation strategies were identified during the discussion:

1. Use of renewable energies (solar-, wind-, hydropower, Biomass) supported by the government
2. Energy efficient stoves
3. Reforestation (forest management)
4. Conversion from slash and burn to agro-forestry
5. Use more organic fertilizer
6. Advocacy (towards government/companies) on CC and DRR
7. Being member of official monitoring teams particularly for on-going projects in climate change and disaster risk reduction from the government

#### **4.5. Project Revision (Module 6 of PACDR)**

Due to limitation of time the assessment team couldn't finish the module on project revision. The assessment team was therefore only able to give some preliminary hints on the project revision.

During the training workshop the following points were mentioned when the assessment team talked about the experience of the project analysis:

1. Barangay Maasin is a resilient community with a relatively stable environment where its people have a coherent view of their own situation, of their risks and own strengths. There is active women participation.
2. The impact of IDEAS' activities can be seen (in the aspects of health, food security, highly-aware/conscious community members, good leadership and governance, good priority setting).
3. There is a good relation between the community, IDEAS and the local government, especially on DRR advocacy.
4. The community is not really aware of general climate impacts and slow changing weather patterns. Here the project should put more emphasis in future.

## 5. 5. Lessons Learnt from the Assessment Process

The climate change and disaster risk reduction analysis in Barangay Maasin – lessons learnt:

- Due to the limitation of time (assessment duration was only 1.5 days) the assessment team was not able to visit the on-going project in Barangay Maasin. On the first day group consultations took place in parallel meetings for female and male groups. On the second day the results were presented to both groups. This strategy is very helpful when time is limited.
- Not all IDEAS activities have been known from the beginning, but using the PACDR tool allowed getting quickly a good overall picture. Secondary data is very important for collecting more detailed data and information regarding the project context.
- The project consultation was held during the preparations for the first November celebrations - a national holiday - thus only a few communities were participating.
- It is a resilient community with a coherent view of its own situation, of risks and own strengths. The women were especially active in participating during the workshop.
  - The community is not really aware of general climate impacts and slow changing weather patterns. Although they have experienced climate impacts such as changing patterns in precipitation.
  - They have mostly short term coping strategies to cope with impacts from extreme weather events.
  - There exist good relations between the community, IDEAS, and the local government particularly on DRR advocacy.
  - The environment is relatively stable. They have a good system to protect their environment, and keep their forest green.
  - Impact of IDEAS activities can be seen (Health, food security, conscious community members, good leadership and governance, good priority setting).
- The executive director from IDEAS was very interested in this tool. This tool is able to help him to identify in detail what people organizations need and it helps to mainstream the existing project with specific related climate change issues.

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## VI. Annex: Seasonal Calendar men group translated into English

Events	J	F	M	A	M	J	J	A	S	O	N	D
Slash and burn	X			X								
Planting in the upland land				X								
Harvesting in the upland land				x								
Barangay Fiesta								X				
Christmas party												X
New year	X											
Thanksgiving								x		x		
Baptism								x				X
San-Juan						x						
Holly week				x								
Valentine's day		X										
Fellowship (Church member meeting)					x							
Woman & men day					x						x	
Young people camp				x								
Hunger season						x	x					
Typhoon & Flood								x	x	x	x	
Dry season	x	x	x									
Malaria						x	x					
Diarrhoea / vomiting						x	x			x	x	
Fishing	x	x	x									
Harvesting of fruits								x	x	x		
Mangrove (Palm leave)						x	x	x				
Hunting wild pig						x	x	x				
Honey bee	x	x	x									
Fresh water fish			X									
Wild mushroom								x				