



## Climate Change and Disaster Risk Reduction Management in Banacon Island, Philippines

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**Abstract** The research was conducted to determine the socio-economic and environmental condition of the island, to understand the problems and needs of the people of a climate change vulnerable island, to determine the level of awareness of villagers on climate change, find out the community initiatives on climate change adaptation and mitigation and find out if disaster risk reduction management is in place in the community. Banacon Island, the research site, has 318 households sporadically spread in a 15 hectare dry land of the village. It has a population of 1514 (2010 data), majority (93%) has a family income of less than P3,000 (\$67) a month or less than P100 (\$2.2) per day. The source of electric power is a portable electric generator which is enjoyed by only 8% of the households and the majority (92%) are still using kerosene lamp at night. There is no potable water in the island. Majority of the households (85%) has no toilet, 12% has their own and 3% of the households shared their toilet. The leading causes of infant mortality are diarrhea, malnutrition and pneumonia. Only 3% of the residents are well-off while majority (87%) are in the average level which is below the poverty line. A significant number (3%) lived in a miserable condition. Fishing is the main source of livelihood. Fifty percent (50%) of the residents are involved in seaweeds culture and business. Community problems are directly related to health, sanitation, livelihood, education, source of power for electricity, peace and order and problems with the children. Community members are aware of the changing pattern of climate with increased temperature, extensive rainfall and sea level rise as their indicators. Disaster risk reduction management mechanism is already in place in their locality through the village officials.

**Keywords** climate change, disaster risk reduction, mitigation, adaptation, empowerment

### INTRODUCTION

The Intergovernmental Panel on Climate Change predicts that the pace of climate change is very likely to accelerate with continued greenhouse gases emission at or above current rates with globally averaged surface temperatures estimated to rise by 1.8 °C to 4.0 °C by the end of 21<sup>st</sup> century (Simpson, et al 2008). It is also projected that there will be an increase in globally averaged surface temperature of 1.4 °C to 5.8 °C over the period of 1990 to 2100 and global mean sea level is projected to rise by 0.09 to 0.88 meter between the years 1990 and 2100 (Amadore, 2005). This will translate to a sea level rise which is expected to threaten small islands in the Philippines and in Bohol in particular.

It is believed that if one key aspect such as the average global temperature is altered, other climate elements may likewise change (Amadore, 2005). Being an archipelago, the Philippines has one of the vast irregular coastlines in Asia. Recognizing the vulnerability of the Philippine and its small island communities, particularly the poor, women and children to potential dangerous

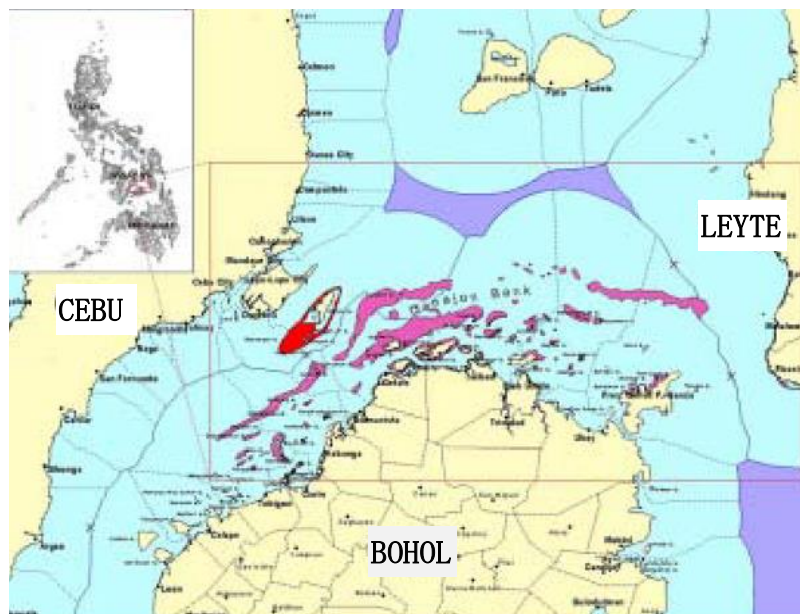
consequences of climate change (RA 9729), it is imperative for us to get the perception of the local communities with regards to climate change. Hence, there is a dire need for us to look into the community's perception on climate change and document their mitigation and adaptation measures.

On the other hand, it is stipulated in the Climate Change Law of the Philippines that disaster risk reduction shall be integrated into climate change programs and initiatives (RA 9729) as it is recognized that climate change and disaster risk reduction are closely interrelated and it is considered that effective disaster risk reduction will enhance climate change adaptive capacity of the community.

Assessing the impact and vulnerability to climate change and subsequently working out adaptive needs requires good information (UNFCC, 2007). The local knowledge and information that are gathered in this study shall be a good input in planning a climate change resilient community.

### **Project Location**

The site of this project is in an island village of Banacon which is one of the 40 small islands within the 300 square kilometer Danajon Double Barrier Reef, the only barrier reef in the Philippines and one of only three in the Indo-Pacific Region. Banacon is in the coastal municipality of Getafe, north of Bohol. The island has a vast yet diverse and beautiful seascape sprawling along a double barrier reef which is known for its mangrove forest, the largest man-made mangrove forest in Asia. This mangrove has an approximate area of 425 hectares which acts as the breeding ground for fishes and other coral reef animals. It also protects the islands from the impacts of typhoons and storms.



**Fig. 1 Location map of the research site**

### **OBJECTIVES**

This research was conducted with the following objectives:

1. To determine the socio-economic and environmental condition of the island;
2. To understand the problems and needs of a climate change vulnerable village;
3. To determine the level of awareness about climate change and find out their indicators of climate change;
4. To find out the community initiatives on climate change mitigation and adaptation; and
5. To find out if Disaster Risk Reduction Management is in place in their community.

## **METHODOLOGY**

This research was done through a participatory approach. This project is part of a long term program called Socio-economic and Environmental Education in the island of Banacon, Bohol, Philippines. This was done in 2011 to 2012. The tools used include the focus group discussion, ranking, mapping, diagramming, time lining, seasonal calendar and a questionnaire-aided interview. Preliminary visit was done to identify the key persons who can facilitate the conduct of the activity and to get the needed secondary data. The usual protocol with the village officials was done. There were 32 participants of the research process who were mostly women, health workers, fisher folks and basic education teachers. The focus group discussion was done at the barangay hall and at the elementary school building. The interview was done in a house-to-house visit. For result validation, the data gathered were presented back to the community particularly to the teachers of the Department of Education and the barangay officials.

## **RESULTS AND DISCUSSION**

### **Current Socio-Economic Realities of Banacon**

A participatory resource appraisal (PRA) was conducted in the island community of Banacon to validate the available secondary information about the village. This was done through a focus group discussion (FGD) using resource mapping, time lining, seasonal calendar, well-being ranking and diagramming to capture the vital information of the community. The PRA was done to assess the current problems and needs for possible interventions.

It was found out that Banacon Island has 318 households sporadically spread in a 15 hectare dry land of the village. It has a population of 1514 (2010 data), majority (93%) has a family income of less than P3,000 (\$67) a month or less than P100 (\$2.2) per day. The source of electric power is a portable electric generator which is used by only 8% of the households and the majority (92%) are still using kerosene lamp at night. The electric generator will operate only from 6:00 until 10:00 o'clock in the evening. There is no potable water in the island. There are seven (7) households who own a rainwater collector and there are four (4) public rainwater collectors installed in public buildings like the school and village hall. Majority of the households (85%) has no toilet, 12% has their own and 3% of the households shared their toilet. The leading causes of infant mortality are diarrhea, malnutrition and pneumonia. As far as the socioeconomic status of the community, it was revealed in the Focus Group Discussion that only 3% of the residents are well-off while majority (87%) are in the average level which is below the poverty line. A significant number (3%) living in a miserable condition.

### **Current State of Their Environment**

The Coastal Conservation and Education Foundation reported that due to illegal fishing activities and coral extraction, among other harmful practices, the double reef where Banacon Island is located is now vastly degraded. On an ocular observation of the mangrove plantations, we noticed that there are portions of the mangroves that are illegally cut. In the FGD that we conducted, it was revealed by the community residents that they also have to address the issue of solid waste management.

Being an island village, fishing is the main source of livelihood. Fifty percent (50%) of the residents are involved in seaweeds culture and business. Very few are into buying and selling of seashells which are harvested by the villagers from the mangroves shorelines and shallow waters of the island.

### **Problems, Needs and Potential Interventions**

During the FGD session, villagers identified their problems, needs and potential solutions based on

their perception. It came out that the problems that they identified are those that are directly related to their daily activities like health, sanitation, livelihood, education, source of power, peace and order and problems with the children. Issues like protecting the mangroves, protecting the marine resources; climate change adaptation and disaster management are not their immediate concern.

**Table 1 List of community needs, problems and their suggested interventions**

<b>Needs</b>	<b>Problems</b>	<b>Potential Interventions</b>
Sanitation	Toilet; Solid Waste management	Sanitation Education, Public Awareness on the Health impact of unsanitary environment
Health	No potable water; No Immediate access of medical assistance/services ; prevalence of malnutrition; absence of food supply like vegetables and root crops	Local Medical Service providers; Public Awareness on Preventive Measures on Climate Change Related health problems; Disaster Risk reduction and management of water-borne related diseases
Discipline	Juvenile delinquency problems	Values formation education among parents
Education	Many out-of-school youths	Alternative Learning System
Livelihood	No livelihood program	Livelihood trainings/courses
Light	No power	Install non-conventional source of power
Peace and order	Stealing in Seaweed farms	Strengthen local police

### **Seasonal Calendar of the Community**

During the FGD, island residents have identified major activities which happened on a regular basis every year. These include social and economic activities which are of critical importance in their daily survival. The seasonal calendar also indicated the time of the year where their household income and expenses goes high or down. It also indicates the trend of disease occurrence especially among children.

### **Community Social Mobility**

Islanders indicated during the FGD the mobility of the residents. The main reason of moving out from the island is economic in nature. Residents have to seek employment in the nearby urban community or outside the country like in Hongkong, Kuwait, Singapore and United States. Parents with economic capacity to send their children to college and high school will send their children to the city. Hence, young people also have to go out from the island for education purposes.

### **Climate Change Awareness**

With a questionnaire-aided interview, island residents were asked about their knowledge on climate change. It was found out that all the respondents are already aware of the changing pattern of climate with the following as their perceived indicators: increased temperature, extensive rainfall and sea level rise. All respondents indicated that they observed an increase of sea level in their island where majority said that sea water has encroached their dryland area by almost ten (10) meters from the coastline. Some of them, however, said that the sea water reached up to five (5) meters beyond the coastline.

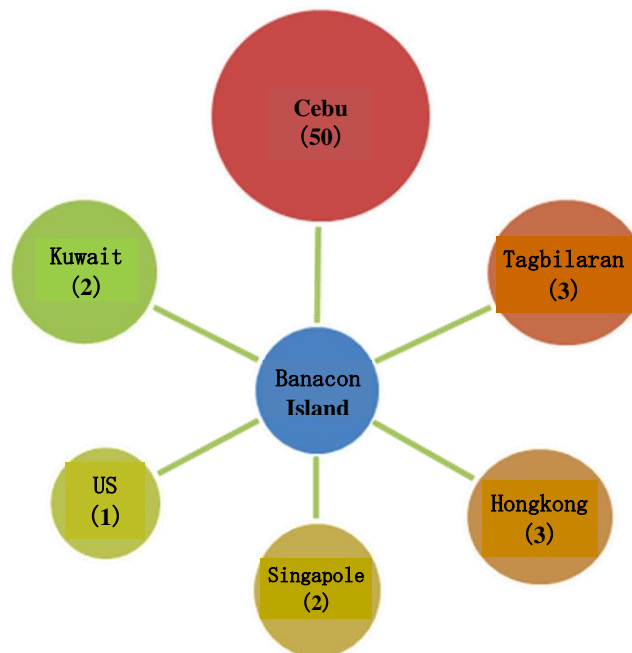
When asked if there was an initiative of the village on climate change awareness, thirty percent (30%) said that they learned about climate change issues in a village community meeting called by the local officials and ten percent (10%) said that they got the information from an Information, Education and Communication (IEC) materials. The rest of the islanders do not have access of any information about climate change and disaster risk management.

IMPORTANT ACTIVITES/ EVENTS	J	F	M	A	M	J	J	A	S	O	N	D
GUSO FARMING	harvesting								planting	planting	harvesting	harvesting
FISHING												
SOCIAL ACTIVITES		1			2	3	4		5	6	7	8
EXPENSE TREND	↑	↓	↑	↓	↑	↓	↓	↓	↓	↓	↓	↑
INCOME TRENDS	↑ 9	↓	↓	↓	↓	↓	↓	↓	↑	↑	↑	↑
DISEASE OCCURRENCE	10		11	12								10

1=Fiesta SantoNino-Purok 5, Fiesta sa Lourdes-Kapilia Centro, Ist Comunion of Children  
 2=Fiesta Sta. Crruz-Tibook Banacon  
 3=Fiesta Mother of Perpetual Help-Centro and Purok 3  
 4=Visita sa Birhen  
 5=Fiesta Sta. Cruz-Purok 1 and 2  
 6=Fiesta Corazon de Jesus-Purok 6; Fiesta Berhin sa Berangay-Purok 3 and 5  
 7=Fiesta San Vicente Ferrer-Purok 7

8=Fiesta Sta. Teresita/Banacon Youth Day (Banacon Catholic Organization Youth Organization [BCYO])  
 9=High income attributed to “high catch-saeson” for fish, shellfish, crabs, s Shrimps  
 10=Ting-tipdas [sagolflu moragpamiangan ang lutahan]  
 11=Diarrhea  
 12=Mumps [2012]

**Fig. 2 Seasonal calendar of the community**



**Fig. 3 Mobility map of the island residents**

**Climate Change Mitigation and Adaptation**

The villagers knew (90%) that they will continue planting mangrove trees to mitigate climate change and the same number said that they will adapt the changing climate by doing alternative livelihood in the island especially non-fishing economic activities or livelihood skills like dressmaking for women and shellcraft, mechanic and computer skills for out-of-school youth.

**Disaster Risk Reduction Management (DRRM)**

Disaster risk reduction management is a mandate of the local government units as provided in the Philippine Disaster Risk Reduction Management (DRRM) Law. There is in every village a Local Disaster Risk Reduction Management Council with appropriate funds to support DRRM activities. The DRRM council of Banacon Island has already put in place the mechanism to respond all types of disaster in the island. Village officials who were given the DRRM tasks were given basic equipment like emergency lamps and even a mobile phone for them to quickly respond any form of disaster.

## **CONCLUSION**

It is concluded that fishing is the main source of livelihood. Majority of the villagers has an income of less than P100 (\$2.2) per day. Only 3% are considered well-off and the rest are living below the poverty line. There is an observed degradation of the reef as perceived by the residents and there are some issues on mangrove management. The community is also aware of the existing solid waste management problems in the village.

Villagers identified the following areas as their problems: sanitation, livelihood, source of power, peace and order and problems with children. Residents are aware of the changing pattern of climate with increased temperature, extensive rainfall and sea level rise as their indicators. Majority of the villagers does not have access on information about climate change. However, they knew that to mitigate climate change, they have to continue planting mangrove trees in the island. On the aspect of climate change adaptation, the community suggested to have alternative livelihood especially non-fishing activities.

It is recommended that the existing knowledge and preparedness of the villagers about climate change and disaster risk management shall be scaled-up through environmental and climate change education and by installing alternative non-fishing livelihood to augment their income. Having another source of income will lessen the social pressures that will affect adversely the surrounding coastal and marine resources of the island. It is also recommended that the potential interventions identified by the villagers shall be addressed by the concerned government agencies for community empowerment and prosperity.

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