

**A Gender Perspective of
Climate Change and Disaster Management Practices of
A Cyclone Affected Coastal Community**



A dissertation for the Degree of Masters in Disaster Management

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ACKNOWLEDGMENT

First & foremost of all, I would like to convey my heartiest gratitude and total devotion to almighty Allah for blessing me with the ability, strength, patience as well as keeping me active to complete this project work.

I would like to thank my supervisor, Professor Md. Humayun Kabir , Ph.D for his kind and incomparable support. I am grateful for the time he has spared given his extremely busy schedule to share his vast knowledge on the subject with me. I also like to show gratitude to my respectable faculty Md. Monirujjaman (Head, Center for Climate Change, Brac University) for continuous logistic support to the entire project.

I would like to convey sincere thanks and gratitude to ASRAY foundation, especially to their for the support in my research actions.

Moreover, I am grateful to the department of Postgraduate Programs in Disaster Management, And Center for Climate change, BRAC University, and my classmate's for their continuous guidance valued and constructive advices to the study work towards the successful completion of this dissertation paper.

Finally, my family and best friend Sonia, for bearing with me during my struggles; giving me the support whenever I needed and constantly pushing me to do better and further my work.

Thank you all.

Abstract

Men and women are, of course, not homogenous groups, and their experiences, lifestyles, and geographic and socioeconomic conditions shape their worldviews and proclivities; cognizance of these types of tendencies can be powerful knowledge when innovating solutions. Climate change is a threat that is both globally dispersed and intensely localized. It is a global challenge that burdens all of humanity, but not equally. The world's poor, the majority of whom are women, are encumbered disproportionately. In 2009, the United Nations Population Fund took a deep look at the relationship between women and climate change in its annual report, concluding that women “are among the most vulnerable to climate change, partly because in many countries, they make up the larger share of the agricultural work force and partly because they tend to have access to fewer income-earning opportunities.” Moreover, the brunt of housework and family-care often falls on women, limiting their ability to quickly adapt to extreme and sudden weather-related disasters—statistically, the report said, natural disasters tend to kill more women than men. The distinct impacts of climate change on men and women are exacerbated in settings that are also affected by violent conflict, political instability, and economic strife. As the world struggles to grapple with rapid onset disasters as well as respond to slower degradation caused by climate change, it is critical to ensure that the plight of women is firmly on the agenda of concerns, and that women – from different backgrounds – are able to lead in negotiations and participate in the design and implementation of programs.

Climate change efforts provide an important opportunity to engage women as active agents of resilience building rather than passive recipients of adaptation support. Women are disproportionately vulnerable to the impacts of extreme events, and this must be addressed when supporting communities' ability to adapt. Perhaps more importantly, however, climate change provides an opportunity for positive social transformation on gender equity. This research addresses the vital role of Women empowerment for building Climate resilient communities with the help of a case study carried out in a coastal village in Bangladesh

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Acronyms and Abbreviations

BCAS	Bangladesh Centre for Advanced Studies
CBA	Community Based Adaptation
CC	Climate Change
CCDB	Christian Commission for Development Bangladesh
DoE	Department of Environment
FGD	Focus Group Discussion
GO	Government Organization
HH	Household
MDG	Millennium Development Goal
NAPA	National Adaptation Programme of Action
NCA	Norwegian Church Aid
NGO	Non Government Organization
PRA	Participatory Rapid Appraisal
RDRS	Rangpur Dinajpur Rural Service
RVCC	Reducing Vulnerability to Climate Change
SEMP	Sustainable Environment Management Programme
TK	Taka (Bangladeshi currency)
TRM	Tidal River Management
COP	Conference of Parties 10 th
DFID	Department for International Development

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1.1 Introduction

Around the world, women tend to be marginalized from political and economic power and have limited access to financial and material resources - particularly in conflict-affected, post conflict, or less economically developed settings - which can intensify their vulnerability to the impacts of climate change. Women in developing countries are particularly vulnerable to climate change because they are highly dependent on local natural resources for their livelihood. Women charged with securing water, food and fuel for cooking and heating face the greatest challenges. A changing climate and scarce natural resources has consequences on family nutrition, child care and education. Women experience unequal access to resources and decision-making processes, with limited mobility in rural areas. Cultural norms related to gender roles may limit the ability of women to respond to and make quick decisions in the face of climatic events. For example, in some households where men are working off-farm in cities, women may lack the power to make timely farming decisions and to convince their husbands to agree to new practice. It is thus important to identify gender-sensitive strategies that respond to these crises for women. The inclusion and consideration of women and their needs is not simply a moral right, but also a smart and strategic approach to address climate change.

1.2 Background of the Study

Bangladesh is one of the largest deltas in the world which is highly vulnerable to Natural Disasters because of its Geographical location, Flat and low-lying landscape, Population density, Poverty, Illiteracy, Lack of Institutional setup etc. In other words, the Physical, Social as well as Economic conditions of Bangladesh are very typical to any of the most vulnerable countries to Natural Disasters in the world. The total land area is 147,570 sq. km. consists mostly of Floodplains (almost 80%) leaving major part of the country (with the exception of the north-western highlands) prone to flooding during the rainy season. Moreover, the adverse affects of Climate Change – especially High Temperature, Sea-level Rise, Cyclones and Storm Surges, Salinity Intrusion, Heavy Monsoon Downpours etc. has aggravated the overall Economic

Development scenario of the country to a great extent. Bangladesh having around 160 millions of people is highly vulnerable to climate change and sea level rise (Rabbani 2009).

Disasters affect women, girls, boys and men in different ways. Gender inequalities increase women's vulnerability and limit their access to the information and resources they need to reduce the risks posed by disasters. "More women than men died in the Indian Ocean Tsunami in 2004 because they were less likely to know how to swim and long clothing hampered their movement. In Bangladesh, of the 140,000 people who died from the flood-related effects of Cyclone Gorky in 1991, women outnumbered men by 14 to 1, partially due to insufficient access to information and early warnings," said Ms. Elena Manaenkova, Assistant Secretary-General of the World Meteorological Organization

This research is about the people of 'Purbo-Kaikhali', the village that had been affected the most after Cyclone Aila, It is a Coastal village under Shyamnagar Upazila of Satkhira district. Satkhira is one of the most vulnerable regions of Bangladesh. Geographical location and poor livelihoods are mainly responsible for the situation. Coastal areas of Bangladesh, mostly the southern west areas had been vulnerable to Cyclone like- Aila, Sidr etc. since 1998 and Purbo-Kaikhali has been affected by both of these. Yet, the people have used their local knowledge to cope with extreme circumstances. The most vital question that has to be answered is what role do the women play in those circumstances; when due to socio-economic conditions, cultural beliefs and traditional practices, women and girls are more likely to be affected if a hazard strikes, facing increased loss of livelihoods, gender-based violence, and even loss of life during, and in the aftermath of, disasters. These women, however play a pivotal role in natural resources management and in other productive and reproductive activities at the household and community levels. These put them in a position to contribute to livelihood strategies adapted to changing environmental realities. Their extensive knowledge and expertise that can also be used in climate change mitigation, disaster reduction and adaptation strategies make them effective actors and agents of change. There is a need of detailed analysis on Women's current involvement in DRR and on it's further improvement.

1.3 Profile of the Study Area

Study area **Purbo-Kaikhali** village is under Shyamnagar Upazila. Shyamnagar is regarded as the largest upazila of Satkhira district. Satkhira district is located in the south-west of Bangladesh along the border with the Indian state of West Bengal in the west. To its north lies the district of Jessore, to its east Khulna and to its south the Sundarban forest and beyond that the Bay of Bengal. Satkhira is criss-crossed by many rivers, the most important of which are the Morichap, Kolpotua, Betna, Raimongo, Horinbhanga, Kalindi and the Icchamati. This last river separates Satkhira from the West Bengali districts of the North and South 24 Parganas.

Total population of this Purbo-Kaikhali village is almost 6,000 and majority is female. The whole Purbo-kaikhali is covered by an embankment, which protects the village from the tidal force of river water. That embankment also works as a road because there is no transportation system. Walking is the only way to move one place to another. All the housing is placed beside the embankment, which work as the communication network for the village. The islands are basin-like and at high tide, they often lie below river level; this is why the islands of the region are surrounded by mud-walls called 'bunds'. Most roads are mud tracks and most people travel by foot or by boat.



Figure 1: Map of Koikhali

1.4 Geography the Study Area

The village Purbo-Kaikhali is situated at the bank of Mother River under Shyamnagar upazila of Satkhira district. The village is surrounded by Madar River on three sides. It is bounded by Jayakhali village on its north and other three sides by water of Madar River. Sundarban is situated on its south surface and Indian border is on its west surface. The village is in the polder-surrounding embankment and the west is surrounded by Kalinda River near Indian border.

The landscape of here is similar with that of the Sundarbans. Mostly it has muddy lowlands submerged in water most of the year and small natural channels running between these which mainly carry the river water. Purbo-kaikhali village does not have much options for agriculture due to high salinity content in water.



Figure 2: Google Map of Koikhali

1.5 General Objective

The general objective of the study is to assess, vulnerability and impacts of climate change and CBDRR through gender lens in the selected rural coastal community.

1.6 Specific Objective

The specific objectives include the following:

- I. Explore climate change vulnerability and impacts of climate change of the study area.
- II. To examine and document current existing disaster management strategies and practices at various levels of community through gender lens.

1.7 Research Questions

How are Disaster management strategies, differently practiced within community with respect to gender perspective?

1.8 Limitations of the Research

The limitations for this research would have to commence with the fact of inaccessibility to the case study area. The area was very remote as such it was not quite easy for neither visiting nor data collection. The reliability of data was questionable as well since, there were groups of people delivering different information. Since the research focused on women empowerment, it was important to gather data from the target group. But due to social norms followed in that area, the women were not willing to talk or give information in the absence of men in the house.

1.9 Research Methodology

Both primary and secondary sources of information will be used in writing this report. For this, a small settlement was selected of the southern coastal region as a typical study area with usual hazard pattern and to explore the implementations of the objective.

Primary Source of Data

For this report, data will be collected from different primary sources, primarily interviews with the village-dwellers would be conducted. The villages which will be selected for primary data are mostly disaster prone villages which are periodically affected by cyclone, flood, storm surge etc.

Secondary Sources of Data

To prepare this report, various secondary data, like articles, writings and journals from different websites, will be reviewed.

LITERATURE REVIEW:

- The first step contains collection of data of the selected study area through secondary sources to analyze the potential hazards and the effects, population, living pattern, livelihood, livestock population, settlement pattern, data concerning the existing built environment, transport routes, possible help sources during disaster, existing other resources etc.
- Reviewing case study of different houses, buildings/ strengthening activities, guidelines; and other infrastructural developments aiming at disaster risk reduction carried out by different authorities concerning similar hazards, economic and environmental backgrounds.
- Analyzing the studies in terms of merits and demerits with respect to the scope of further research in the related context.
- Studying rural settlement planning and relate it with the present situation and future development of the study area.

FIELD SURVEY

This field study was base on two sets of interrelated activities: quantitative data collection on a panel of a number of households (the quantitative panel survey) and qualitative studies that had

explored the same study objectives within selected settlements in the study area. The quantitative panel survey was used a cluster random sample. The further steps were as follows:

- Field survey of the study area through observation, interviews and questionnaire survey. The target group of the survey were the permanent settlers, who are familiar with the natural hazards and the coping techniques considering constructions, environmental protections etc. Interviews were open ended with structured questionnaire.
- A questionnaire was administered to collect information about the knowledge and awareness about disaster and importance of women empowerment and sustainable settlement. Also the reason behind the nonexistence of women empowerment in their household activities and their daily life were included and the preparedness activities for hazard, the previous history regarding disaster, and the causes why they could not manage the hazard, lastly their opinion about if, women empowerment was available, what and how they would have been benefitted. Settlement issues during hazardous situation as well as CBDM activities were also surveyed.
- Analysis was done of the settlement pattern and its dependency with nature (for example, livelihood, energy supply, communication, use of natural material for construction etc).
- The strengths, weaknesses, opportunities and threats of the settlement were identified.
- Local good practices that were followed there in terms of building construction, planning, orientation, afforestation etc were identified.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Introduction

This chapter looks at the concepts of Disaster, Climate Change, Disaster Risk Reduction (DDR) and Women empowerment theories. The main idea is to develop a conceptual frame work focusing on climate change theories and influential factors and outcomes of women empowerment. Also, a focus is made on the probable consequences of Community based disaster management and how to deal with it with the existing sustainable livelihood approaches.

2.2 What is a disaster?

We use the term disaster often in our everyday lives. It seems that anything from missing the bus to a lost football game can be a disaster. At the same time we constantly see and hear events such as earthquakes, nuclear accidents or environmental degradation being described as disasters. What then is a disaster? A disaster can be defined as an event that occurs when a disaster affects a vulnerable Population or area.

Disasters are often portrayed using the following equation:

$$\text{Disaster} = \text{disaster} * \text{vulnerability}$$

As this equation shows, the two key elements to a disaster: disaster and vulnerability.

2.3 Form of disaster

Disasters come in a number of forms:

- Natural disasters. These include hydro meteorological (Cyclones, floods), geological (Earthquakes, volcanoes) and biological (Epidemics, locust swarms).
- Technological disasters (Gas leaks, industrial accidents, bridge or building collapses).
- Environmental disasters (Sea level rise, desertification, and climate change).

A disaster alone will not cause a disaster. Disasters have to impact on a population or area before they can have disastrous effects. For example, a tsunami traveling over open-ocean is not a disaster, but when it strikes a population located on a coastline, the results can be disastrous (Rashid, 1995).

2.4 Climate Change: an Overview

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to other natural climate variability that has been observed over comparable time periods.” (UNFCCC 1992)

climate change is a process that manifests in a number of ways, including a rise in average temperatures; changes in rainfall patterns leading to floods, droughts, and, in some areas, desertification; extreme and unpredictable weather patterns leading to more numerous and intense natural disasters; and the melting of glaciers and the polar ice-caps, resulting in rising sea-levels and coastal erosion, leaving low-lying areas uninhabitable. (UNHCR, Aug. 14, 2009)

Climate change impacts, especially rapid-onset events, may result in death, injury, or damage to health through an increase in infectious diseases, physical and mental stress, and the loss of medicinal plants and biodiversity. The global effects of climate change will negatively impact communities at multiple levels, threatening the security, economic, and human rights conditions of people around the world. Women are disproportionately burdened by these processes, but they also have the capacity to lead adaptation and create more resilient communities

2.5 Climate Change impact on Bangladesh

Of all the countries in the world, Bangladesh is one of the most vulnerable to the effects of climate change. The regular and severe natural hazards that already batter the country – tropical cyclones, river erosion, flood, landslides and drought are all set to increase in intensity and frequency as a result of climate change. Rising sea levels will increasingly inundate Bangladesh’s coast, and dramatic coastal and river erosion will destroy land and homes. These

and the many other adverse effects of climate change will have profound repercussions for the economy and development of the country.

The geographical location and low-lying characteristics of the country makes it more vulnerable and susceptible to different natural and climate-induced disasters (Figure 1). It is the world's third most vulnerable country to sea-level rise in terms of the number of people, and among the top ten countries in terms of percentage of people living in low-lying coastal zones (Pender 2008). Currently, almost 40 million people live in the coastal areas of Bangladesh. Loss of coastal land to the sea, currently predicted to 3% by the 2030s and 6% in the 2050s, is likely to generate steady flow of displaced people (Tanner et al. 2007). Figure 2 shows the vulnerable coastal of Bangladesh exposed to cyclones and storm surges.

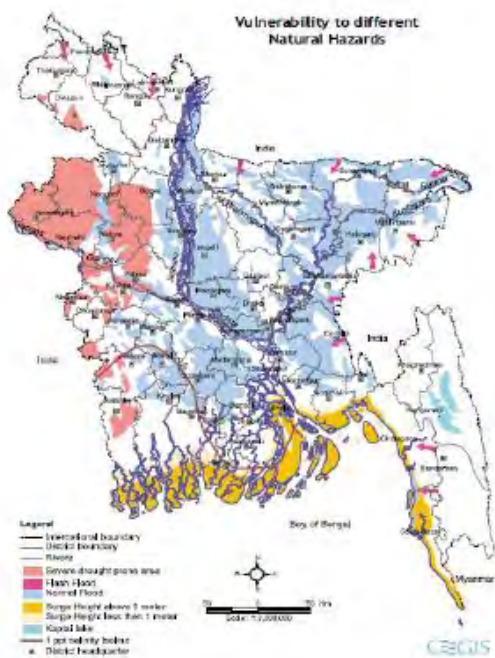


Figure 3: Vulnerability to different natural hazards (Source: CEGIS 2008)



Figure 4: Vulnerable coastal areas of Bangladesh (Source: Islam 2006)

Bangladesh experiences different types of Natural Disasters almost every year because of the Global Warming as well as Climate Change impacts, these are:

Floods / Flash Floods: Almost 80% of the total area of the country is prone to flooding).

Cyclones and Storm Surges: South and South-eastern Parts of the country were hit by Tropical Cyclones during the last few years).

Salinity Intrusion (Almost the whole Coastal Belt along the Bay of Bengal is experiencing Salinity problem).

Extreme Temperature and Drought (North and North-western regions of the country are suffering because of the Extreme Temperature problem).

Bangladesh is also highly vulnerable in terms of number of people killed in the past natural disasters . It is seen that in 1991 cyclonic storm, a total of 138,866 people were killed causing millions of injuries, huge loss of properties and infrastructure, socio-economic disruptions, etc. Among other extreme events, the super cyclone ‘Sidr’ in 2007 killed 4,236 people and caused huge damages in agriculture, fisheries, forestry, health, water supply and sanitation.

Millions of people of the coastal areas of Bangladesh are under threat of climate change and climate variability issues. According to a recent report, over 35 millions of people will be displaced from 19 coastal districts of Bangladesh in case of 1 meter sea level rise in this century *Rabbani 2009. IOM 2009*. Indicated in a study report that many people have already migrated to the urban slums from the coastal zones of Bangladesh due to frequent cyclones, storm surges, river erosion, etc.

The Cyclone Aila, which hit the coastal Bangladesh on 25 May 2009, caused huge loss of properties and infrastructure, and displaced a large number of people from their homes (DMB 2009). The coastal embankments damaged by the cyclone and tidal surges could not be repaired even after one year of the cyclone (Oxfam 2010). As of August 2010, a large number of displaced people have been living in the makeshift houses of the damaged embankments without adequate food, safe drinking water, proper sanitation facilities, etc.

2.6 Women Empowerment : Bangladesh Perspective

Empowerment means that people - both women and men – can take control over their lives: set their own agendas, gain skills (or have their own skills and knowledge recognized), increase self-confidence, solve problems, and develop self-reliance. It is both a process and an outcome. Women empowerment basically refers to the process in which women reflect upon their reality and question the reasons for their situation in society. It includes developing alternative options and taking opportunities to address existing inequalities. It enables them to live their lives in the fullness of their capabilities and their own choices in respect of their rights as human beings. *UN Population Division, 2010.*

Bangladesh is a disaster prone country. Here most of disaster responsive community can be characterized as a neighborhood with gender inequity and equality, where women are always suppressed in both decision making phases and earning phases. They always have to depend on the men, who are the only earning person for the family. Though women are capable and hard working too. In Bangladesh it is common that while the situation of homestead design issues came, women are ignored in decision making process, whereas, women's are the main users of their homestead, they pass their whole day working in the homestead, while men's are used to work outside. As in decision making process, women's are avoided, in most of the cases, the kitchen, livestock place, water storage space are located in more vulnerable location. That's why when a disaster happen they become more vulnerable, the kitchen , water storage, sanitation, livestock all are washed away during flood or heavy cyclone.

In most of the cases it was also found that women are keener to savings money than men. They use to save money for their family, thinking about any future disaster. As women are unemployed they save money from selling egg or milk of their livestock or making any handicrafts material. Sometimes many lady earned money through teaching Arabic to female children. But it is common in every case that the opportunity of earning money or saving money is hidden to their partner. The main reason behind this hide and seek attitude is the prejudice of religion and culture. Whereas when any emergency situation occurred the saved money by the lady of the house is used, additionally rather appreciating her saving attitude she is blamed for breaking the tradition, religious obstacles and cultural norms, most of them are spurious. From

many case study in disaster prone community it was found that, many women save money by doing something extra work as a preparedness of upcoming disaster. From their point of view, they felt that if their houses were stronger, then the effect of **Aila** or **sidr** was less hazardous. They planned to use the money to strengthening their houses before rainy season. To make a house stronger they need rope, pollythin, bamboo etc. As they are very poor and living mostly mouth to hand they have no extra saving for their family. So, the ladies started to save money for the preparedness of disaster risk. But unfortunately their husband has no idea about the saved money. As their husband and their in-laws are strongly against of female earning. That result high risk of disaster, failures in meeting the appropriate and vital humanitarian needs, disaster risk reduction, lengthy recovery period, unnecessary increase in requirement for external resources, and general dissatisfaction over performance despite the use of exceptional management measures. Recognizing these limitations, the Community Based Disaster Management (CBDM) approach promotes a bottom-up approach working in harmony with the top - down approach, to address the challenges and difficulties. To be effective, women empowerment is must be supported. Analyzing the hazardous conditions, the vulnerabilities and capacities of the people of Bangladesh hazardous community women empowerment is an imperative part of CBDM.

2.7 Understanding Resilience

In order to understand how women empowerment approach can help build resilience, it is first necessary to define resilience in a useful way and understand how it relates to climate change. While the concept of resilience is not new, it is experiencing resurgence in the humanitarian and development communities as agencies grapple with conceptualizing and measuring the resilience of communities in the face of climate change. Benson et al. (2012) presents a brief discussion on the evolution of resilience theory and offers a working definition of social resilience: "The ability to withstand, recover from, and reorganize in response to crises so that all members of society may develop or maintain the ability to thrive." This definition reflects the growing consensus among development and humanitarian partners that the definition of resilience needs to go beyond the definition traditionally used within the disaster risk management community that frames resilience as the ability to "cope or bounce back" from shocks or extreme events.

In addition to resisting and recovering from shocks, thriving despite crisis in a changing climate also requires the ability to reorganize, that is, to generate new ways of operating or new systemic relationships as necessary. While the starting point to understanding resilience is a clear understanding of existing levels of socioeconomic vulnerability and risk management capacity, climate change entails a number of characteristics that require a more dynamic view of vulnerability and new ways of supporting resilience—they are diverse, long-term, and unpredictable. Adapting to these traits is challenging because they require making decisions under high levels of uncertainty. The 2010 World Development Report: Development and Climate Change, echoes this by stating, “Climate change adds an additional source of unknowns for decision makers to manage” and that, “Accepting uncertainty [is] inherent to the climate change problem.”

In this context, it is useful to consider the critical characteristics of resilience and how resilience-building efforts facilitate or promote these characteristics. Martin-Breen and Anderies (2011) identify three core properties of resilience:

- Modularity (networks)
- Diversity and redundancy
- Responsive, regulatory feedbacks

While others have developed more detailed, nuanced lists of resilience characteristics (see, for example, Bahadur et al. 2010), these three core properties resonate throughout most compilations. Based on this, a few broad categories for action can be identified for resilience building:

- Support **bottom-up approaches** that make use of social networks and support autonomous adaptation based on the lived experience of poor communities
- Support communities to increase **diversity** and fallback options (e.g., diversification of livelihoods into activities less sensitive to climate-related or other forms of risk, such as through voluntary migration)
- Enhance **social learning** and sound governance as a form of regulatory feedback (e.g., building capacity in participatory approaches to scenario-based planning or measures to increase social accountability in the use of public finance for climate change response)

- Understand the gender dimensions of climate change and **empower women** as resilience champions.

2.8 Community Based Disaster Risk Management and its practices in Bangladesh

It involves activities, measures, projects and programs to reduce disaster risks which are designed and implemented by people living in at-risk communities with the goal of building safe, livable, disaster resilient and developed communities. The community and its most vulnerable groups are active actors in disaster risk management while the government, NGOs and other stakeholders take on enabling, facilitative, and supportive roles. *.Pandey and Kenji Okazaki, 1996.*

In Bangladesh the concept of CBDM is very popular, Over the last three decades, the Government has invested over \$10 billion (at constant 2007 prices) to make the country more climate resilient and less vulnerable to natural disasters. *Ahmad, 2005 Community Based Adaptation to Climate Change in Bangladesh: The Global Initiative at Local Level.*

A number of international NGOs are working with local communities in a few districts as a part of the community based adaptation to climate change, to develop ways that farmers can grow food on flooded land, using a process of community-led identification and prioritization of natural resource management options and technologies, *Rahman 2009.*

For example, the innovative technology of floating gardens, or hydroponics has been introduced to Gaibandha. Also many villages which were taken up in many other waterlogged and flooded areas of Bangladesh. A floating garden is built from a raft of water hyacinth typically about 8 meters long and 1 meter wide. The raft is covered with soil, compost, and manure, in which vegetable seeds are planted. The raft will last just one year but can be used as fertilizer during the dry season. To ensure sustainability of the program, training and input support was tailored to the particular profile of household members, and technologies were accompanied by a widespread climate change awareness program. *Ahmad, 2005 Community Based Adaptation to Climate Change in Bangladesh: The Global Initiative at Local Level.*

2.9 Why Women Empowerment?

Gender issue has always been in discussion on a broad scale, when comes to Bangladesh. The socio-cultural and power relations between men and women are core and transversal aspects of improving a community. The value and necessity of putting gender relations at the centre of the development issue and the fight against poverty could of course be questioned. We see it as an issue of human rights and yet, in our daily work, we regularly come up against national policies or even development programs which do not sufficiently take into consideration the relations of power between men and women.

It is therefore important to demonstrate how essential the notion of gender is in understanding how poverty is perpetuated and how it affects women differently. It is also crucial to understand the specific dynamics implemented by women, which sometimes fundamentally call into question the adopted development models. It is therefore important to highlight the role women play in development and how they invest in ways of coping. It is also necessary to show how they put strategies in place to increase their power and enter a genuine social relationship of power – in other words, how they achieve empowerment.

There is famous theory, AURA, 2002 based on women empowerment which describes the key aspects of women empowerment.

The 4 aspects of empowerment.

Assets (power to)

This concept refers to greater economic power in terms of material assets such as income, land, tools or technology. This being said, such economic power is not restricted to the possession of resources and wealth, but also includes better health, more time, access to certain services such as loans, information and training, health centers and markets etc.

Knowledge And Know-How (power to)

This means having more practical and intellectual knowledge or skills, enabling a person or a community to make the most of the opportunities that arise. It refers to management of people

(leadership), techniques or procedures, training (literacy) as well as the development of thought and reason as critical analysis skills.

Know-how highlights the importance of applying knowledge or the ability to translate one's knowledge into action or resources.

Will (internal power)

This refers to power within, psychological strength or spiritual power: one's values and fears, self-confidence and self-perception. It is the ability and will to make one's own choices for the future, the awareness of one's own life plans as well as the challenges facing one's community. The concept of "will" also includes the two elements of state of mind (being) and the ability to use it towards others (knowing how to be).

Capacity (internal power and power with)

This means having the opportunity to make decisions, take on responsibility, be free to act as one pleases and use one's resources (assets, knowledge, will). Decision-making encompasses several aspects:

- The ability to make one's own decisions; the ability to take part in decision-making; the ability to
- Influence decision-making and control those who make decisions on one's behalf;
- The ability to make decisions for others, and to show authority (in situations where someone has to make the final decision)

In the AURA approach, the different elements of power and the very dynamics of the empowerment process were visualized using circles of empowerment. This diagram highlights the link between the changes in individuals and groups or associations (inside the circles) and the changes in such institutions as the family, the State, religious establishments, educational establishments, the media, NGOs, etc. It is, in fact, the process of societal change.

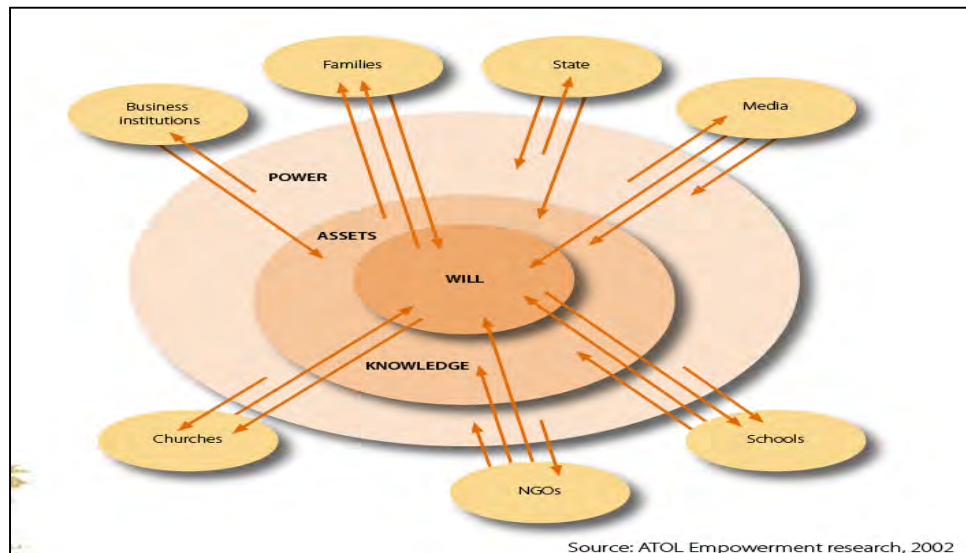


Chart 1 : Empowerment process

To identify the critical factors that are prompting women empowerment in Bangladesh, it is imperative to define women empowerment. The United Nations views women empowerment as having ‘five components: women's sense of self-worth; their right to have and to determine choices; their right to have access to opportunities and resources; their right to have the power to control their own lives, both within and outside the home; and their ability to influence the direction of social change to create a more just social and economic order, nationally and internationally..UN Population Division on 28 August 2010. Which all factors are mostly absences in the village community of Bangladesh. In our country access to opportunities and resources. The power of authority and scope of opportunity of women is a step against our religious motives and cultural norms.

To make a community sustainable it is necessary to participation of its all members. When the major portion of users of a settlement is the women and the children. So, for CBDM participation of women empowerment can enrich their concern about better living style, better healthcare issues and case of safety and security measures. Based on the available economic literature and anecdotal evidence, we show that women’s access to education played a key role in Bangladesh’s successful disaster risk reduction transition.

In Bangladesh, for every 100 females there are 102.3 male, *United Nations Secretariat, Accessed on 6 January 2011* so, for a country like Bangladesh where percentage of female population is

higher gender equity is very important for a sustainable settlement issue. Non-government organizations (NGOs) also played a large part in creating social awareness that eventually helped control Bangladesh's to reduce the disaster risk.

The role of microfinance in the process of women empowerment is well documented. With the help of micro credit women can contribute in their houses. It is observed that when women can have some money in her hand she used to expenses it for the betterment of her household living style and the health care work. Numerous studies have found a direct association between the two variables. Focusing on the impact of participation in microfinance by gender on labor supply, schooling, household expenditure and assets in Bangladeshi villages (*Pitt and Khandaker, 1998*)

It was found that women microcredit recipients (as opposed to men) are more successful in increasing women's non-land assets and children's education. Moreover, one of the key reasons behind the success of microcredit in Bangladesh is that women are found to be better than men in repaying loans. Because women are more conscious about saving money for her homestead and prepared about any future risk. But in case of poor country like others, it is quite difficult for the women to arrange the re payment of loan. So, if women are empowered in economical sector by providing the freedom of doing any work they can easily take the loan from the bank and use the money for the betterment of her settlement structure (*Bloom and Williamson, 1997*)

To sum up, the existing literature supports the fact that there is a direct nexus between gender balance and economic growth. This works through several mechanisms. The impact of gender balance through education has a notable impact on demography that eventually gives more space to households to allocate larger budgets on health and education, disaster preparedness, savings for disaster recovery, making the overall population economically productive. While the standard of living is upgraded the risk of disaster automatically reduced. So, Integration of women empowerment in CBDM is highly demanded. Also this could bring other societal benefits that may not be captured in economic numbers.

3.1 Introduction

The intensity and frequency of weather related extreme events like Cyclone Aila is increasing, due to lack of resources and infrastructures, coastal communities are sometimes not prepared to face them. During the cyclone, high tidal surges broke through many parts of poorly maintained embankments. Over the years, illegal and inappropriate use of public resources such as land, water bodies and forest has weakened structure of the embankments. Poor maintenance of embankments, illegal installation of pipes, tube wells and gates on these, and encroachment of land and water bodies in his area are the contributing factors for waterlogged communities. So day by day the risk of vulnerability is increasing.

3.2 History of Remarkable Natural Disasters

The main natural hazards of this Purbo Koikhali village are cyclone, salinity and water logging. According to the villagers the histories of natural disasters are:

3.2.1 1988 Cyclone and Storm Surge

The cyclone with storm-surge hit the village and its inhabitants during night time, from 09:00 pm to 11:00 pm. At that, time inhabitants of this remote area were not so aware of signal. Although there was no cyclone shelter at that time but people could take initiative to move to a safer place. They did not do so, rather they ignore the importance of the signal announced by the meteorological department through radio, TV and other means.

As a result, the whole community had to pay high price. 15% population of the village lost their lives, 100% crops was lost and 80% livestock were lost. Additionally, 90% houses were damaged fully or partially. As the people of the village lost almost everything, it became great misery for them.

Virtually, no relief program was being carried out after this cyclone and storm surge. Only, government provided few tin-made homes to some families whose house got damaged by the event.

3.2.2 Sidr (2007)

Cyclone Sidr hit the village- Purbo Koikhali in 2007. By this time, the people of this village could realize the importance of signal through their experience and they respond to the signal accordingly. Most of them moved to the shelter or to a safer place. Therefore, no life was lost during this event. Although 10% of their livestock was, lost and 5% of their houses got damaged. In addition, the embankment that was made to protect their village and agricultural land got damaged at some points. This allowed inundation of their land by saline water. Sidr brought radical change in life and life-style of the community. Previously they were dependent on agriculture but now have made fish farm (Shrimp Gher) to run their life and economy. After this event different NGO's got involved in relief & rehabilitation activities. Every household received 10 kg rice and some household received 3000 taka cash to repair their houses, though the fishing community of thirty families did not receive this money, with whom we talked. Every family was given 18 chickens (domestic bird) from a NGO, according to the villagers it was a great help.

3.2.3 Aila (2009)

The village got affected by *Aila* in 2009. The said cyclone continued from 09:00 am to 04:00 pm. As the cyclone occurred during day time, people got favor of sunlight which helps them to move to the shelter or to a safer place easily. Also, they had the privilege to secure their valuables, livestock and houses in better fashion. This time the villagers also were very responsive to signals announced by the meteorological department. As a result, no life was lost. But, 100% fish farm (*Shrimp Gher*), 100% domestic birds and 80% fishing boat and fishing net were lost. In addition, 70% household of the village, the embankment made by the government and fertility of land due to increased salinity in soil got damaged severely. Government and different NGO's like BRAC, Shusilon provided 10kg rice per household, ready food (*Khichuri*), dry food (biscuit, dal, gur), cooking oil, medicine, polythene paper, etc. After *Aila* because of introtion of saline water, getting drinking water has become a great problem.

From the F.G.D a real story from a woman (Sufia Khatun) which revealed that she-self rescued her parents from drowning. As the windy storm and water was increasing in the morning Sufia

was trying to bring her children and parents to a safer place. They all were going to cyclone center but as the wind was blowing first her parents were left down, Sabura Khatun went with her children to cyclone shelter. When she came back she saw a finger above water, she thought that somebody may be downing than she jumped into the water and caught the finger tried to pull & finally she found that the lady was her mother & when her mother body was come out it was found that her father was catching her mother's leg. Two bodies were under water & and were trying to save life catching one another.

3.4 Social and Economic Settings

3.4.1 Occupation

The earning sources of the people include fishing, bauali, mauali and day labour. Fishing is the main source of income to them and the fishermen catch fish in the river. They sell fishes in the local market and consume themselves. According to the information from the inhabitants, about 60% of population is engaged in fishing, about 30% in agriculture and the rest in collecting forest products.

Nevertheless, there are not abundant fishes in the river. Therefore, they are changing their profession. Therefore, leading life is getting tough day after day with limited income.

Basically the occupations depend on the seasons. The landless are engaged in agriculture in the harvesting season and fishing during the rainy season. The proximity of river that has both fresh water and sea fish makes fishing a major occupation. Shrimp cultivation is very popular in this village; many villagers are also work in shrimp field. During Aila, the polder embankment breached at different places and the total area was submerged with the saline water. After Aila, the villagers cannot cultivate crops due to severe salinity of soil. The rich people in the village cultivate gher fishery in the agricultural land. Therefore, the agricultural lands are totally converted into gher fishery. The gher fishers take river water in the gher during dry season through the drainage. The livestock population was greatly damaged in Aila cyclone. It was observed during the field visit that the increasing character of salinity effects in the food livestock.

The socio-economic condition of the people is very poor due to lack of income and job opportunity. For this reason, people are migrating to India, Khulna and Dhaka. Most of the migrated people are female. Majority of the female are doing work in the garments factory.

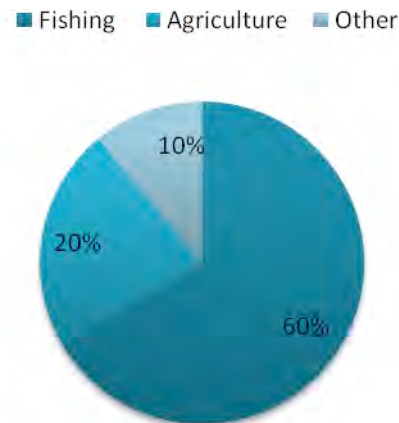


Figure 6: Statistics of Occupation

3.4.2 Earnings provision:

There is no social security in the village. The fishermen take money as dadon from the rich to catch fish in the river. Pirates are very active in the fishing area of the river and they are used to snatch all things (fish, net, money, boat etc) from the fishermen. For this reason, the fishermen cannot repay money to the borrowers. They face different problems by the borrowers especially their younger girls. They are raped by jodder and those jodder are taking their all-tangible resources.

Income erosion is one of the biggest problems for every earning person of this village. While collecting resources from Sundarban, they have to give money to the Bangladesh Forest Department in time of crossing the forest. In addition, often they caught by the pirates and then they have to give them money. As a result, after all those they have very small amount of money on their hand. Therefore, they are suffering through income erosion in their daily life. Sometimes, some of anglers or day labors like mowali or bowali get kidnapped on hand of pirates and then those victims need to fulfill a huge amount of money in term of their freedom. In

case of fishing, same level of income erosion is happened because whoever is using boat of Mohajon, they need to give a large portion of fish to the Mohajon. Therefore, those fishermen are not being able to enjoy the whole amount of income.

3.4.3 Concept of community:

Community of Purbo-Kaikhali is rich in working skill mainly in knowledge of doing fishing & other regular livelihood works. Besides men, women are also expert in different works like net making, chicken rearing, fishing etc.

There is no formal leadership system among the villagers. Leadership is mainly controlled by Mohajon. Fishermen are employer under that Mohajon. During fishing, there are some fishermen who share their boats. Other than that, there is no common leadership mechanism in the village.

3.4.4 Health

Moreover, population of Purbo-Kaikhali is living below average life. They are way behind of every facilities of normal life. Beside scarcity in livelihood assets, their physical health is also poor to fight against any natural disaster. Health service is another concerning issue in the village. Only one community clinic is in the village. But doctors are not available in the community clinic. The village/quack doctors are used to serve the patients and they refer complicated cases to the Shyamnagar hospital. Diarrhea, skin diseases, dysentery and other diseases are common diseases in the village occurred due to the scarcity of pure water.

In terms of medical facilities for villagers, there are only two medical shops in the village. As there is no hospital or trained doctor in the village, proper suggestion of nutrition is not available. In case of emergency pregnancy related problem, women have to go to Shyamnagar upazila for better treatment. Lacking in the accessibility of medical facilities, villagers are suffering through acidity, chronic dysentery etc.

3.4.5 Assets:

Fishing net and boat are their main equipment for the productive activities of the village. Generally, they use different types of fishing net like- jhaki, ben, tana, current etc. Sometimes, some of nets are made by themselves by buying the raw materials for the market of Shyamnagar

upazila. Some of the fishermen have their own fishing boat and rests are using boat on rent from their Mohajon.

They do not have any formal saving system of money. Most of them are day labor. So, they are not capable for saving money and also don't have any traditional saving mechanism in village.

3.4.6 Skills:

Community of Purbo-Kaikhali is rich in working skill mainly in knowledge of doing fishing & other regular livelihood works. Besides men, women are also expert in different works like net making, chicken rearing, fishing etc.

In every productive activities or regular livelihood activities, people of Purbo-kaikhali village are depended on traditional technologies. Such as- building houses, fishing, collecting honey or other resources from Sundarban or storing rain water they all doing those work by using traditional technologies.

3.4.7 External support:

There are some local NGOs like Asray, BRAC, Ganomukhi, ASA, and Caritas etc, who are giving loans to the women of this village. In loan system of BRAC, they give loan in a group basis and each group consists of minimum ten women.

3.4.8 Status of women empowerment in koikhali village:

Bangladesh experiences frequent natural disasters such as cyclones and floods as well as increasing salinity in soil and water. These are projected to increase due to expected changes in precipitation, recession of Himalayan glaciers and sea level rise. As large populations live in environmentally fragile areas such as coastal areas and islands which are devastated regularly by cyclone, tidal surge and river floods and are dependent on natural resources, these would become highly vulnerable due to climate change variability and climatic extremes.

Limited progress in poverty reduction and socio-economic development has been achieved the last decades in Bangladesh, but women still predominate among the poorest with limited mobility or little access to resources and information, which is reflected in the deaths of nearly

five times more females than males in recent floods and cyclones in Bangladesh. Widespread poverty has made Bangladesh extremely vulnerable to the effects of tropical storms and flooding. Almost 50% death from cyclones occurs in Bangladesh, even though it experiences only 1% of all cyclones world-wide (Amadore et al., 1996). This happens as thousands of people of Bangladesh lives in climate vulnerable areas.

As women's participation in paid work outside home is low in Bangladesh, changes and damages in crop, fishery, poultry and livestock production could severely impact the livelihood and well being of women and their children. Given the gender differential in vulnerability, it is important to have social assessments and institutional analyses that include gender based experiences in collective actions and support from local institutions and social networks for developing inclusive strategies for increased climate resilience. Gender-sensitive analysis is also important to direct aid and plan for full and equitable recovery in the case of frequent climatic events such as floods and cyclones, whose frequency and intensity are expected to rise with climate change. Furthermore, gender-sensitive analysis is important to ensure women's participation in long term climate change adaptation strategies, which might have been constrained due to the traditional social norms and values in Bangladesh.

There are some specific parameters through which empowerment can be judged. The parameters are:

- Access to knowledge
- Access to assets
- Access to will

And

- Access to power

(Source: ATOL empowerment research, 2002)

Considering these parameters some survey has been done in the Koikhali village focusing the gender issue.

Knowledge of sanitation	Male users%	Female users%
Sanitary/pucca	26	14
Kuccha/hole	54	62
Ring slab	12	16
Hanging	2	8
Open defecation	6	0
Total	100	100

Table 1: Percentage of Knowledge of using hygienic sanitation

Education status	Male %	Female %
Illiterate	34	65
Can sign only	38	31
Primary	14	4
Secondary	12	0
Higher secondary	1	0
Graduation and above	1	0
Total	100	100

Table 2: Percentage Education status

Types of houses	Male%	Female %
Pucca	86	0
Semi pucca	12	4
Tin shade	2	17
Thatched	0	79
Total	100	100

Table 3: Percentage of Types of houses villagers own

Sex	% of land ownership
Male	92
Female	7
Jointly	1
Total	100

Table 4: Percentage of land ownership

Insolvency on decision making	Male%	Female%	Total
For households	93	7	100
Children education	96	4	
Earning scope	100	0	
Preparing food	2	98	
Loan from bank	4	96	

Table 5: Percentage of the villagers Insolvency on decision making

Scope to work outside for livelihood earning	Male	Female	total
Fishing	96	4	100
Shrimp cultivation labor	95	5	
Agriculture	88	12	
Agriculture labor/bawali/mawali	97	3	
Day labor	92	8	
Livestock	2	98	
Rickshaw /van pulling	100	0	
Small business/enterprise	100	0	
Samabay samiti	97	3	

Table 6: Percentage of Scope to work outside for livelihood earning

Assets	Satkhira		
	Male	female	jointly
Nirani/kodal/kaste	73.1	11.5	15.4
Langal (Plough)	50.0	-	50.0
Power tiller	100.0	-	-
Tube well	100.0	-	-
Paddy husking machine	-	-	-
Rice mill	100.0	-	-
Spray machine	93.8	6.2	-
Sewing machine	33.3	50.0	16.7
Fishing gear	88.9	5.6	5.5
Non mechanized boat	84.9	5.5	9.6
Rickshaw/van	100.0	-	-
Trees	74.7	10.8	14.5
Paddy/jute/annual crops	100.0	-	-
Radio	57.1	3.6	39.3
Television	50.0	3.6	46.4
Ornaments	3.7	92.7	3.6
Cash money	72.7	27.3	-
Mobile phone	77.8	11.1	11.1
Others	55.9	8.8	35.3

Table 7: Percentage of assets ownership

Through this survey it was clear that the status of women empowerment is very poor in these villages, which also hinder the status of vulnerability during disaster. Because lack of empowerment causes lack of livelihood assets ownership and make them poor as well as vulnerable. If women's are empowered the level of livelihood assets will be increased and it will finally make the settlement sustainable and disaster resilient.

3.5 Built Environment

3.5.1 Overall planning of the dwellings

The settlement pattern of this village is strongly dominated by the embankment. Most of the homesteads are settle in besides embankments. Rest of the homesteads are found are middle of the village. But mainly the center of the village is covered by shrimp gher, and few agricultural land. The agricultural land, shrimp gher and the few homesteads are connected with the embankment through *kachha* narrow roads. Almost all of the centered housing clusters are separate with distance from one another with water logged cultivated or fallow lands between that.

Most of the houses share the common pond and courtyard. Few houses that are near each other do not share common spaces. The individual houses act as single units a as components of a larger group. This may be influenced from landscape with shallow low land or from environment to prevent wind pockets. It was observed in the F.G.D that the dwellers are concern about high speedy wind.

3.5.2 Homesteads

Each of the homesteads is settling beside the sides of embankments. The courtyard is higher ground or raised plinth from the surrounding. This plinth is made from carrying mud from the lowland; nothing is mixed to increase stability. The mud has a sticky character and gets quite hard when dry. Every year the plinth has to be repaired as the sides get damaged from rain and standing water.

Kitchens, chicken sheds and cow sheds are at the side or the back of houses. These have *dochala* roofs; the slope is high to let rain water slide down but not soak. The walls, roof and plinth are made more economically. The chicken sheds are rectangular as it requires more space, mud plinth is raised. But the kitchen, chicken sheds are found in low land than the main house. It was found that each of the houses have separate toilets at the back of the main house. But the toilets are not proper. Behind the kitchen most of the homesteads have a small pond, sometimes two homesteads share a common pond. But due to salinity they can't use the water of the pond for cooking or drinking.

3.5.3 Main house

Mostly the houses in Purbo-kaikhali village are made of mud and the roof made of golpata collected from the sundarban. The poles of the house are made of combination of sand, cement, rods and shurki to check natural calamities. The chala of the house is mad of wooden frame mainly from rain tree, keora, sunduri etc. During disaster, the houses are tied by ropes with trees. The houses are lapped with cow dung and mud due to the salinity problems. The villagers need polythin to harvest rainwater into the Motka for year round drinking purposes. It is an alternative option of the villagers.



Figure 5 : Typical Homestead

The combination of mud wall and golpata roof keeps the house cool and according to the villager's perspective, their houses are as cool as air-conditioned houses. They usually use small window because small aperture can slow down the forces of windstorm. Which uplift there roof during heavy storm.

3.5.4 Infrastructure

Communication especially in the rainy season is a big problem in the village. The major transport of the village is van, bicycle, motorcycle and boat. But most of the dwellers are very poor, mostly they have to move by walk, most of them can't afford van or bicycle. During the wet season, boat is the only travelling means to communicate from one place to another.

3.5.5 Other Components in the Built Environment

There is only one primary school in the village, two pacca mosques, one temples and one primary school are in the villages. Many children are deprived from education. They have been engaged with fishing activities from the very childhood.

In term of shelter centre, there are two buildings of primary school. Those buildings are using as cyclone shelter during disaster situation. Besides that, there is a mosque in the village, which is nowadays also use as shelter center. Recently, they started using microphone in mosque as a preparation of pre-disaster warning system. The capacity of the shelter is maximum 1000-1500 people. There are very little maintainers of this institution. The villagers cannot get legal support from the Government, elite and politicians.

3.6 Existing Utilities

3.6.1 Transport System

Communication especially in the rainy season is a big problem in the village. The major transport of the village is van, bicycle, motorcycle and boat. But most of the dwellers are very poor, mostly they have to move by walk, most of them can't afford van or bicycle. During the wet season, boat is the only travelling means to communicate from one place to another.

3.6.2 Power Supply

The houses do not have electricity connection. The inhabitants use *kupi* or hurricane lamp. Some use a kind of lamp made with rechargeable battery and small flash light bulbs. Some dwellers who can afford loan they use solar panel as a source of electricity.

3.6.3 Water Supply

Though the village is surrounded by river on its three sides but they can't drink or use the river water for cooking because of salinity. The main source of water is rain water. In this village there is only one pond so, during the dry season the inhabitants have to walk long distances to ponds to gather drinking water. As the underground water is saline, people store rain water for consumption. Basically they use local knowledge for reserve water.

3.6.4 Energy for Cooking

The inhabitants use firewood for cooking. They usually collect their firewood from Shundarban, but day by day collecting resources from Shundarban is becoming life risk.

3.6.5 Phone Network

The area has mobile phone connections. This was very useful after the cyclone Aila in news dissemination and relief distribution except for the short time when power supply got disrupted immediately after the cyclone. Majority of people do not own mobile phones, but they can get access to it in the bazaar and news is disseminated by word of mouth. Now a days they can get weather warning through mobile.

3.7 Dependency on Nature

The life and livelihood of the inhabitants are dependent and harmonized with the nature. The main livelihoods agriculture, fishery and *bawali* are dependent on the seasonal changes and availability of the harvests.



Figure 6: vegetation, solar panel, dependency on nature

Homestead pattern has evolved from the natural settings. Conditions that do not match with the surroundings are not imposed. People mostly use natural materials like *golpata*, *hogla*, palm leaf etc in house constructions. Use of wood as construction material is more compared to other places of the country. Firewood is the only mean of cooking fuel; kerosene, cow dung or jute sticks are not used. Rainwater is used for drinking and agriculture. This is the only mean of fresh water as river water is slightly saline. Rain water is stored for agriculture with small mud boundaries around the land to restrict saline water inflow. River water is also used through canals.

4.1 Introduction

Through this study the researcher has sought to find out the major vulnerabilities of community in their local context. The vulnerability assessment of the community is very much relevant and useful to prepare for future disaster management. At the same time it is also very necessary to know current existing disaster management practices of the community. Refer to the main two objectives of this thesis, this chapter has been organized under major two headings Vulnerability Assessment and Disaster Management Strategies: Through Gender Lens.

4.2 Vulnerability Assessment

People from different society and background are vulnerable to different given situations as because their level of vulnerability might be different but when any disaster strikes and takes place the general scenario is more or less the same to all and everybody is susceptible. In this thesis the people who were taken into consideration are very poor and are living in a place which is entirely damaged and is almost impossible to live in. during the disaster crisis of Aila which was the most devastating and caused most damage in 10 years. The people somehow manage during disaster but the after disaster crisis is still there after three years. Shardar 2007. When the study area was visited, there to assess the vulnerability of the local people the core idea was to assess their assets and livelihood pattern.

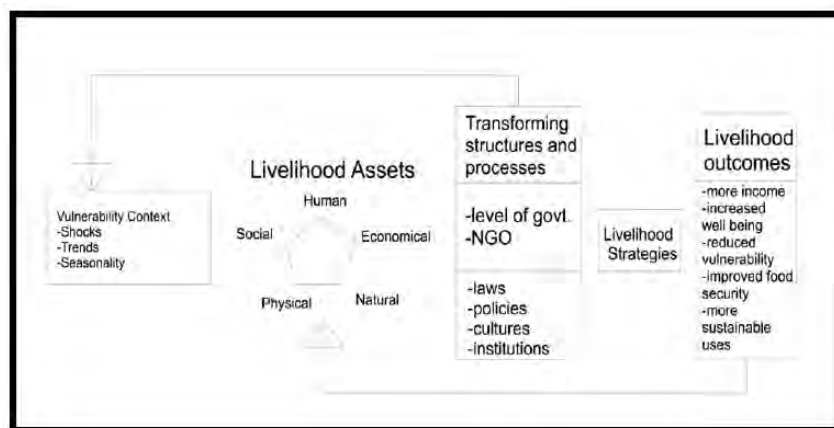


Chart 3: Livelihood Assets, Source: DFID, 2010

4.2.1 Types of vulnerability

There are five types of resources which are considered as vulnerable in any given situation under any disaster that takes place. The damage and loss that are carried away are based on the resources that are vulnerable when disaster takes place. The resources which vulnerable and causes vulnerability are:

4.2.1.1 Natural resource vulnerability

4.2.1.2 Physical resource vulnerability

4.2.1.3 Human resource vulnerability

4.2.1.4 Economic resource vulnerability

4.2.1.5 Social resource vulnerability

The local people are very much aware of natural disasters that might take place but the impact and sternness of Aila made them rethink and made the people suffer as they have never suffered before. People of the locality lost almost everything starting from assets to life during Aila 2009, which was the biggest hazard that took place and caused damages. The vulnerability of the villagers is assessed based on their social, economical and physical structures. The types of vulnerability are judged under human resources, natural resources, economic resources, physical resources and social resources.

4.2.1.1 Natural resource vulnerability and its effects on women

In last 10 years, Aila 2009 was the most devastating in this village and what are mostly affected by this are water and crop fields. The main problem was lack of fresh drinking water. There is no deep tube well and because of salinity in all the surface water, they did not get pure drinking water. Drinking this saline water people got ill, they faced the diseases like skin problems, diarrhea etc. After Aila, the crops were totally damaged. Therefore, they had no food to survive. In addition, because of salinity they were unable to cultivate the lands again. So it is effecting on their daily life. Fishes of the ponds were died due to saline water and were washed away. They could not start fishing for one year again because of salinity in ponds. So it is directly affected to

their economy. No fish were found in the ponds for one year. They are now completely depending on the 'Shrimp culture'. They also turned their crop fields to 'Shrimp culture' to survive. Domestic animals like cows, goats, hens, and ducks died and washed away during Aila 2009, and after Aila, again because of salinity the animals cannot survive in this village. Especially cows and goats can't endure anymore whoever is trying to keep the cows and goats in their home; they failed, because of unknown diseases and salinity. All the trees were dead due to Aila 2009 and to plant new trees is very difficult in this situation and salinity in the lands. Land fertility was totally damaged, so they could not start cultivation afterwards. Due to salinity in soil, it was impossible. Another problem is, specially who works in Sundarban, it's very dangerous to collect the honey and wood, because of tigers. Lot of people lost their family members because of this. The village people are facing these natural vulnerabilities.

Firewood is another material that the people are in short of. As because all the natural sources are washed away in the locality people are dependent on sundarban and sundarban is not accessible due to government restrictions. Electricity is the least demanding factor for the local people as because people are yet not benefitted with this modern facility by the government.

4.2.1.2 Physical resource vulnerability

The physical resources of the locality were completely washed away by Aila 2009. The devastating impact took all of a sudden and people failed to take actions as protection against the disaster. Houses are mostly located along the coast and are at the both sides of the embankment. During Aila the houses were all severely damaged and because drainage system was not adequate the water could not be drained out easily which lingered the suffering of the villagers. During Aila most of the fishing boats and nets (set) were washed away. A very few was found out afterwards but was broken into pieces. The embankment around the village was damaged in places and this caused the water inside to be contaminated with salt water that was carried in by Aila. The few radios that are present in the village were not able to serve all and convey the weather report in time. Poverty is the main reason behind their lack of awareness, due to the hardship of poverty they even can't buy a radio, so they can't get any warning related to weather. Also they are absent from any health service as well as any general knowledge. After Aila another disaster the villages are attacked by another disaster which was phenomenon of dirohea

and the reason behind this disaster is also poverty because poverty did not allow people to have hygienic toilets.

Housing material that the local people use is not in support of collecting rain water. This causes and causing people to suffer from shortage of drinking and safe water as because all other sources of are contaminated with salt.

The only cyclone shelter that is present and is used as the school is not at all adequate to accommodate all the village people in case of cyclone or massive disaster like Aila. This is due to negligence of authority itself.

4.2.1.3 Human resource vulnerability

Disaster statistics shows that the frequency and intensity of extreme natural events have been increased in recent years (UNDP 2004). Its impact on human resource is huge. We have seen the real time examples in the ‘Purbo-Kaikhali’ village. Aila (2009) was the most destructive event in this village in the last ten years. Just two years before of Alia, they have faced Sidr (2007). Death rate during disaster was much higher in SIDR comparing to Aila but after effect of Aila was very much precarious. Due to the high tide and water logging during Aila and Sidr all the source of natural fresh drinking water transform into saline water. For lack of fresh drinking water people got infected by different diseases. Many people died and lost their ability to work. Their crop field and other natural resources was also affected – food crisis and unemployment increase. The people have to leave the village just to make a living. Also there is another life risk in this village is tiger, 17 people were killed in 20 days by tiger attack (recent data), while people trying to earn their living from Sundarban.

4.2.1.4 Economic resource vulnerability

Aila caused huge damages in agriculture, fisheries, forestry, health, water supply, housing etc. Each item is directly related to economic resources. The group members of this FGD were telling that they did not received any kind of fund from government for rebuilding their livelihood assets. All of their livelihood assets were highly damaged. Sources of income decreased in rapid level. In the mean time, they got micro credit loan from NGOs & Mohajon. Instantly they got some help from this loan but day by day, they were trapped on this cycle. While they are

struggling for living, they have to pay interest for this loan. For paying one interest, they are taking another loan.

4.2.1.5 Social resource vulnerability

The people of the village were totally affected after Aila, as it was they were not use to this kind of disaster previously; it was a shock for the people living in this village. Because of government rules the main problem they are facing is lack of firewood, they have limited access to the natural resources. In this village, there is lack of unity. Some people, who have good connection to the upper class or chair, got proper reliefs after Aila. So the relief was not properly distributed to all. Mostly the poor people have suffered due to mismanagement of the system .the name of the villagers was not listed in the list of relief list. There was no proper miking system, so while Aila was happening, people were not aware of it. As they were not well educated and not always aware of the warning signals, they could not recognize the importance of the warning, which broadcasted in radio. Some of them have television, but not all of them can see this. So some people are getting the warning, some are not. There are some robbers and kidnapers in Sundarban, so the fishermen have the risk to fish near sundarban. The kidnapers ask for remittance to the families and take the fishermen, their boats, nets and other equipments. Sometimes they can pay by having loaned from property owners, sometimes they loss their life. While Aila affected, they went to the Cyclone shelter, but there was no relief for 3 days. As they were not aware of this kind of disasters, they were not prepared for this, even they have no training to face this kind of disasters. Mainly NGOs helped them to survive by giving them dry foods, small amount of money, just to overcome this situation. There was no government intrusion. Another problem is, some families lost their family members because of tiger attack, it's very hard for them to bear this loss and to overcome the situation, specially for the women. Due to lack of job opportunities and crisis people are now migrating towards the cities and urban sides. The villagers are facing these social vulnerabilities.

4.2.2 Livelihood assets vulnerability and its effects on women:

Both of the two key concepts in these guidelines - household livelihoods and institutions - are complex and difficult to “define”. The discussion of some of the key concepts below does not

aim to offer the “right” interpretations or definitions of these terms - even “experts” have difficulties in agreeing about what they mean. It aims to help investigators to understand some of the alternative ways of interpreting households, livelihoods and institutions and to enable them to come up with a definition that they feel comfortable with and that is appropriate in their circumstances.

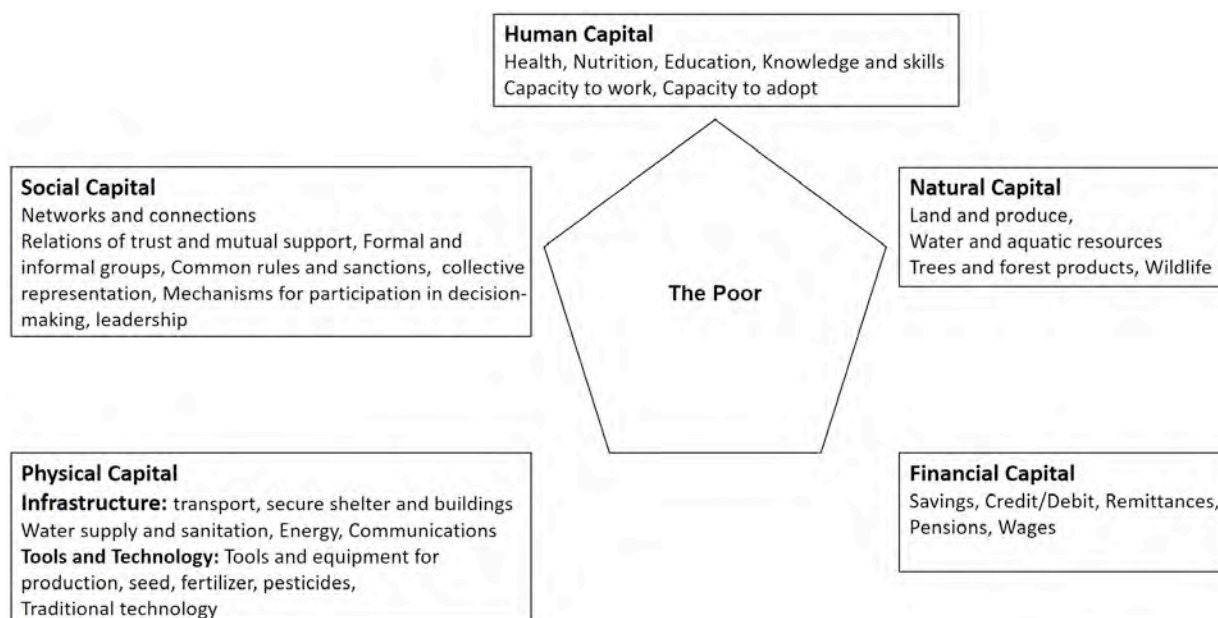


Figure 9: Livelihood Assets,

Households and livelihoods

Household livelihoods, and the strategies that people use to create them, are at the core of development. People may be involved in different social and economic activities as individuals, but it is at the level of the household that the real impacts of those activities are seen most clearly, and the well-being of the household is generally a key objective for most people, at least in rural societies.

How people define well-being varies. For poor households living in poor rural areas, “well-being” may mean just having enough to eat, shelter for the family and a basic level of security. For other groups, standards may be higher, but, whatever the definition, households will strive to

achieve that level and sustain it. A livelihood is basically the means that a household uses to achieve that well-being and sustain it. Just how sustainable a household's livelihood is will depend on many factors. For example, the activities that a household engages in to create its livelihood may degrade the resources on which it depends, making it unsustainable. But if a household has a diverse set of activities that does not damage the environment and ensures food and income throughout the year, that household's livelihood is likely to be more sustainable.

Poverty can be thought of as an "inadequate" livelihood outcome. It may be the result of the household having inadequate access to assets, like land, water, credit or social support. It may be caused by living in an area subject to acute vulnerability, where there is war, or drought or cyclones. It can also be caused by policies, institutions and processes that are not supportive of achieving an adequate livelihood. In some cases, the strategy that the household uses to combine the different livelihood elements at their disposal may not make the best use of them, leading to failure to provide an adequate livelihood.

In these guidelines, "livelihood" does not just mean the activities that people carry out to earn a living. It means all the different elements that contribute to, or affect, their ability to ensure a living for themselves and their household. This includes:

- The assets that the household owns or is able to gain access to- human, natural, social, financial and physical;
- The activities that allow the household to use those assets to satisfy basic needs.
- The different factors that the household itself may not be able to control directly, like the seasons, natural disasters or economic trends, that affect its vulnerability;
- Policies, institutions and processes that may help them, or make it more difficult for them, to achieve an adequate livelihood.

The livelihood strategies that households develop to ensure their livelihoods will depend on how they can combine their livelihood assets, take into account the vulnerability context in which they live, and the policies, institutions and processes that affect them. The livelihood outcomes that households achieve with their strategies can depend on any or all of these elements.

From this diagram below we can understand the effects on women during resources vulnerability. As households and women's are closely related to each other so, through this diagram we can clearly understand the vulnerability of women as well as settlements. If these problems can be sort out the settlements can be disaster resilient.

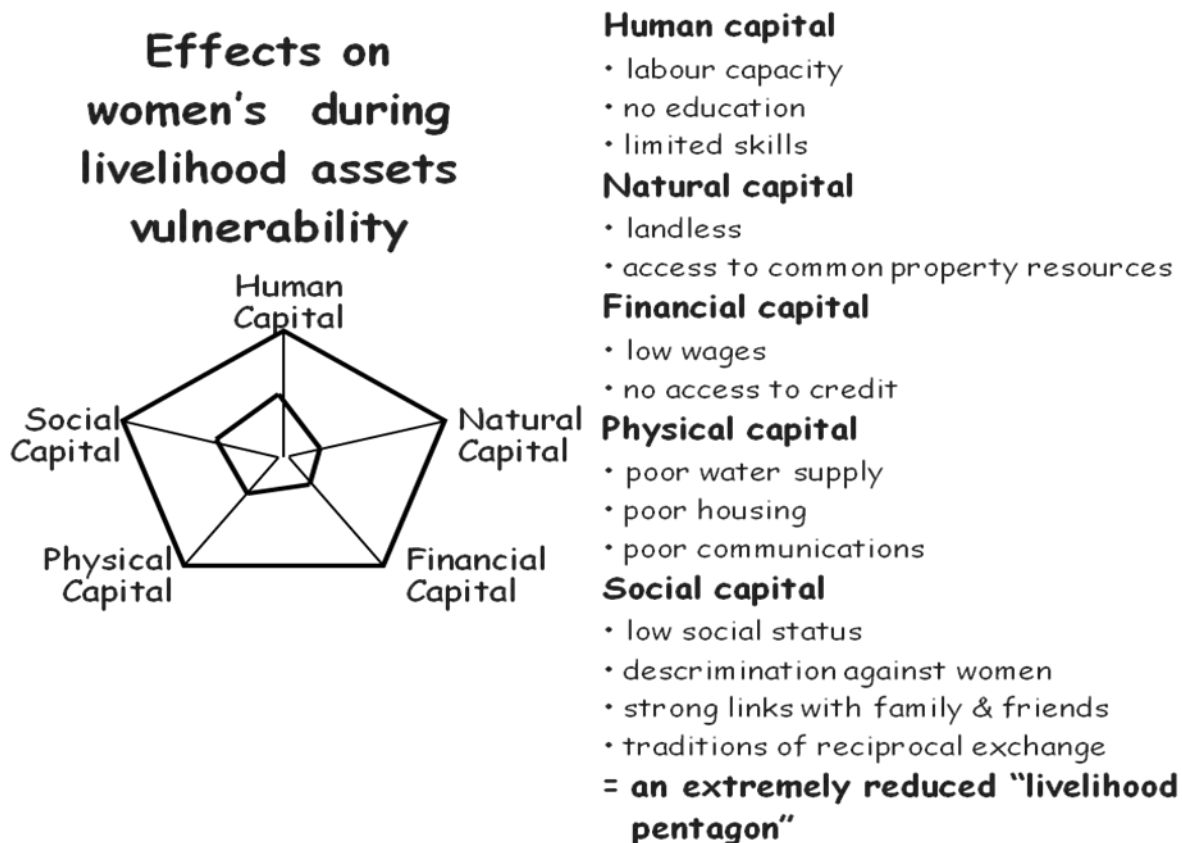


Figure 10: effects on women during livelihood assets vulnerability

4.3 Disaster Management Strategies: Through Gender Lens

In essence, gender relations in disasters reflect gender relations in society. Owing to different life experiences, women and men differ in how they experience, respond to, and recover from disasters. When disaster strikes, men and women have different abilities and ways of responding, and, in the end, the impacts are different.

4.3.1 Disaster Management Practices

From the discussion with the local people, we got to know that they are basically depended on local knowledge to manage any kind of disaster. As they are not getting any help from any organization and Government in terms of Pre and post disaster situation, they always try to survive by their own capacity. Some of their common disaster management practices are given below-

4.3.1.1 Preparedness:

During conversation with the people of fishing community it is found that they are well prepared to face cyclone, storm surge and other natural disasters with their limited resources. Always they are keeping drinking water, some dry foods and saving some money as part of preparation for disaster. In addition, they tie the roof of house with trees or poles so that it cannot be flown away by sudden storm. They use indigenous knowledge in the preparation stage, for example, they notice that behavior of domestic birds and cattle changed. A kind of agitation arises in the behavior of these birds and animals and they shows that they do not want to remain inside the case or in tie in situation.

4.3.1.2 Response:

Once they hear the warning from any means, they immediately share the information with others and start moving to the shelter or to a safer place. They help other people specially children, disabled and elderly people to move to the shelter or to a safer place. It is hard or in some cases impossible for them to move alone in the disaster situation. Besides these, they place their domestic birds and other valuable assets on the ceiling of home.

4.3.1.3 Relief & Rehabilitation:

Emergency Response: It is found that relief & rehabilitation arrangement by the government and NGOs after any disaster at that area is not at a satisfactory level. They only distribute some dry food, drinking water, medicine and cloth for few days that is very less than the actual demand. As a result, these distressed suffers much after a disaster. Also, found that government banks and NGO's postponed credit recovery for a certain period.

Short-term rehabilitation: In Koikhali, people get donation for house repairing by government and NGO. People get loan from microfinance sources and from local 'Mohajon' to re-start economic activities. Chicken are also provided chicken by a NGO. Also re-construct their household themselves.

Long-term activities: In the longer term, afforestation is very important to save the locality from the blaze of disaster. Side by side, construction of embankment/slucice gate and regular maintenance is very important. The numbers of cyclone shelters are not enough. Therefore, government should construct adequate number of shelters. As because of salinity local people cannot keep livestock, they better in need of domestic birds, which will help them, a lot. Also, people of this area are facing saline water problem, they need to have safe drinking water facility. Government and NGO's should arrange permanent solution for drinking water.

4.4 Perception and Knowledge of Climate Change: Gender Dimension

In Koikhali, according to the female participants the frequency of disaster has significantly increased in last twenty years. The nature of the seasons is changing significantly. Earlier northwester wind used to appear in the month of Baishakh and people used to be alert for this. But nowadays it occurs suddenly and periodically beyond people's assumption. The salinity in the water and soil has increased limitlessly. The level of the tidal water has increased and breaking all former records. The river erosion is also increasing alarmingly. People also reported that the river beds are filling up with silts. It was evident in their reporting that the temperature to growing higher compared to the past. Due to the increased warming in atmosphere depressions are created very often in the Bay of Bengal.

On the other hand, the male respondents stated earlier that they had six seasons but nowadays these are reduced to three seasons only. These are the Summer, Rainy season and Winter. They said that Winter appears too late and even in the month of Agrahayan (December). About 30 years back they used to wear a few warm clothes to survive in the winter. The temperature is rising above the previous record and it becomes unbearable in the Summer due to overheat. In the past the rain falls had followed a natural cycle and maintained a limit. Nowadays, it does not follow any rule. The rain falls pattern has been changed. If it begins to rain then it continues for longer period. Earlier northwester wind used to appear in the month of Baishakh and people used to be alert for this. But nowadays, it occurs suddenly beyond people's assumption. The cyclones were not so severe in early days but now they more frequently occur almost every year with tidal surge.

4.5 Disaster Impacts and Vulnerability of Female

4.5.1 Pre- Disaster Period

According to the women of Purbo-Koikhali their pre-disaster vulnerability includes low income which has been pointed out as one of the main problem related to their poor living condition. They are unable to earn their subsistence as far as livelihood is concerned. Even they are not able to cover the expenses for medication if they become sick. On the other hand, the male persons have described their situation during the pre disaster period as their income sources are inadequate. Many of them stated that they relied on the fish resources but due to the drastic decline in the fish population their income has deteriorated rapidly. Most of them have malnutrition as they have no access to proper and balance diet due to the low income.

4.5.2 During Disaster Period

It has been reported by most of the female respondent that woman become the main victims of natural disaster. Some of them stated that due to the weaker health condition they lose their senses and fail to take decision. As women are thought to be frightened because of lack of courage they are unable to priorities their necessary task in this emergency situation. Most of them said as they were struggling to forward against the current of tidal surge when they tried to reach the safe shelters.

They have mentioned that their major clothing like *shari* is one of the main constraint to survive against the current of tidal surge. Usually *shari* has been taken away by the current. Women are also washed away by the rising tide.

Women have the additional responsibility to nurture specially and take care of the kids and elderly members of the family which increases their vulnerability. Most of the female respondents stated that during the disaster they were trying to put the household goods in a safe place which is required in their everyday life. During post disaster time it is difficult to cook up the food due to the lack of cooking arrangement including fuel.

Often they cook once a day and eat in next two times. They have problem to take due to the lack of facilities in the shelter. On the other hand no availability of proper and safe water, clothing and privacy are also the reason for this.

This was evident in the experience of women that their major struggle is to collect safe drinking water during the post disaster period as they have to travel too far to find a drop of safe fresh water for themselves as well as for family members. The waterborne disease like diarrhea, itching, fever and cold are evident during this period. The participants among the women have stated that they do not report to any one if they encounter any problem concerning their security like physical harassment or any kind of abuse.. They are always annoyed to keep them away from all kind of physical abuse and hassle.

4.5.3 Post-disaster Period

In Koikhali, most of the women participants stated that they become anxious how they would reconstruct the house; how they would maintain the family life and how they would nurture and take care of the kids and elders in the family. They have become worried about fuel collection, toilet facilities and bathing place as of all these facilities were destroyed by the disaster. They are also worried about their male counter parts that do not have any work opportunities at the post disaster period. Due to the lack of work opportunity they struggle a lot. As they do not have any work in agriculture often they starve. The children always demand food to their mother. Women keep themselves busy to clean off the homestead when water recedes. Even if any of the women become sick she hides it for the sake of other members in the family. Male person searched for

money reconstructing the house. Women transplant new trees and begin to rear ducks and chicken. Women collect material to construct the cooking oven in the house. They also take care of the live-stock. Often they help their husband in the paddy field.

4.6 Individual Strategies of Men and Women to Survive Against The Disaster

The study also explored the information on the individual strategies by men and women that help them to survive during disaster.

The women of Koikhali stated that during the disaster period they take shelter. They take shelter on the house roof or tree during the disaster. Sometimes, they go to the relative's houses to take temporary shelter.

They can hardly take adequate food and mostly they take one meal a day due to the non-availability of food. They spend their savings to survive during the disaster by ensuring food. Some of them survive on the stored food in the houses. Often the women sell out their ornaments to support themselves. They borrow money from NGOs and rear Chicken or Duck to generate extra income. They preserve cleaned rain water in the pot during the disaster. They cultivate vegetables at the homestead which provides extra income. These also help them to survive during the disaster. They also go out for fishing in the river besides doing household work to provide more support to the family at that period.

According to the male respondent that they also take shelter during the disaster period. They take shelter in higher place, house roof and tree. Some of them try to make their village high to protect house from the flood water. Often they put soils on the embankment adjacent to their house to make it high as the water cannot enter through this part. The rich people do this practice as they employ laborers to make dam higher on their part by putting soils on this. Many others migrate to relatives' house if the water stays for the longer period.

Some of them survive on the stored food like rice, smashed rice etc. They then spend their savings to survive during the disaster by ensuring food. They also seek loan from the money lender to run the family. This was also stated that they go out for fishing in the river and sell out fish in the market work to provide more support to the family in the disaster period. Often it was reported that they sell out live stocks and lease out land to survive the effects of disaster.

According to women they tied up rope on the waist when Aila appeared to go to the upland through the current. The male tried to carry the children and old family members towards a safer place. Many families stay on the boat tied up with tree. After the disaster both the male and female work in road construction to survive.

4.7 Local Constraints for Men and Women to Protect From Disaster

The respondents also provided their feedback on the issues that highlight local constraints during the disaster. Both field research and literature review has also help to bring in a better understanding on the gender dimension related to this issue.

The women reported that they do not get the warning signal. Many of them do not guess the importance of the signals. Some of them do not have any faith on the signal. If they would get the signal earlier then they are able to take some precautions. Many of the people did not have preparation due the short time notice of the cyclone. Many people would have died if Aila was appearing in the night. People survived with their life only as Aila heated suddenly by the day. They would have saved other things if they had been timing.

The embankment is too weak and old. It could not protect them from the tidal surge anymore. So when the cyclone Aila attacked the embankment was eroded and surge water entered the village. Although they have sorted many strategies, none of them were worked out due to these weak and ineffective embankments.

Poor economic condition is also one main constraint. Many rich people have become poor by getting affected by disasters. Nowadays they have no money to buy food, boat and others. They do not have enough experience to fight such big disaster. They have not seen such big disaster earlier. So they could not guess what to do? Local government and NGOs haven't advised then in this regard. A few days ago NGO called Shushilon arranged the training for male on natural disaster health practice. No women were invited in this training.

Many of the people have problem to move as they have no boat. It is also difficult to take the old people to the shelter. Government's support to the disaster victims do not reach the affected people. The chairman wants bribe. He takes taka 200 from tk. 500's relief. Most of the houses remained, empty during the disaster period. The incidents of robbery have been increasing. Often

the robbers take away money and goods. Sometime they rape the women. Snakes used to move around during this period.

On the other hand, the male group said no one want to purchase the land because of the salinity in the soils. It is difficult to lease out the land too. It is not possible to get the proper price of good. Alternative works is not available in the area. The interest rates of loan are too high. It is also difficult to obtain loan when needed. NGOs do not provide loan during the disaster period. Livestock dies because of increased salinity in the water. There is a shortage of drinking water. No one could even catch fish in the pond due to increased salinity. Their vegetable garden destroys due to salty water. Government takes no steps to take any measures against disaster and the relief materials are not properly distributed. No roads and embankments remain above water level where they can stay.

4.8 Belief Related to Climatic Disaster

In site, according to the women flood water washes away the sins of people. The animal likes goat and cows destroy others plants and crop fields so they are washed away by the flood water. Some of the participants consider Ganges as water goddesses they think she increases the water in the ocean and river which causes flood. Many of them refer to a saying *kalir dhare bolir patha* ‘those who exist in the kali era are like praying to be slaughtered’. As *kali* is the ending era, they think disaster is a phenomenon that is related to this. Disasters occur so frequently due to this. A few of the participants believe that water goddess is angry with them so he creates disasters. So they try to make the lord of water regime happy by worshiping *Ganga devi*. They reported it that prepare offering and worship Narayan to save them from the disaster like Aila (cyclone). Some of them also arrange the *puja* called *horilut* to escape the danger.

They also arrange a cult called *Jharu thakur* ‘lord of cyclone’. The cult is followed by an act where women go out with indigenous implement called *shill pata* (spice crashing stone) and utter the words *jhuru thakur tumi amar khane asheye bosho/ tumi ar jhor diyona* “ the lord of cyclone come to sit here/ and do not produce any devastating cyclone”. They also offer rice-pudding and rice grain to the look make the ‘lord of cyclone’ happy. A few of the female participants said they seek assistance from the *Ali Mordo thakur* (it may refer to the Kaliph

Hazrat Ali (R), who is thought to be the symbol of power in the practices related to popular Islam in Bangladesh) and leave offering for him. Some participants think disaster appears so frequently as they think it is, end of kali era.

On the other hand, according to some male participants climatic disasters occur due to the will of the creator. Human beings have nothing to do with this. They pray to the Creator that people become less victimized during the disaster. There is a local belief that the Rhino or Hypo (gandar and jalohasti) hits on the cross dams and erodes. They believe a person call Yakub Fakir can help them in this regard. If he shoots into the river with his gun then the river erosion ceased. People used to pay tribute to the god and goddess earlier when they were becoming victims of natural calamities. Nowadays people do not call the god and goddess. According to them recent cyclones Aila had destructed the temple and it was washed away. They think if the god and goddess cannot help themselves how they save people from the disaster.

4.9 Problems Encountered only By Women

The experiences of women in different parts of the word suggest that some of the problem only encounter by women. It is stated that woman seek solutions to the lack of drinking water, access to health and education, reducing factors of vulnerability of their communities in the face of hydro meteorological events associated with CV, CC and other potential Hazards (Escobar 2008). They also establish networks with other women that increase their social capital. It is also observed in the study that in professional development or in their domestic activities, women are often in a better position to note certain environmental hazards. They are also found aware of the patterns of sicknesses in the children in the neighborhood, and they can quickly detect, changes in the water when they wash clothes or strange smells in the ground where their children play. At local levels, are the women who have greater clarity about what diverse social groups lose in the short term after a cyclone, who in the community are at risk and what is needed, and which native trees should be protected (ibid). Similar aspects are also observed in the present study areas. The information collected through qualitative and quantitative methods also emphasized on the gender perspectives in this regard.

The women describes Women are hesitant in terms decision making during this period as they consider themselves mentally weak. Many of the responded think that they also physically weak. So they do not want to leave the house. They think if the women leave the house its pillars become weak. So they are affected by disaster.

4.9.1 Problem with Shari during the Disaster Period

Women have to swim when everything washed away by tidal surge. *Shari* is a problem for women during the disaster period. They cannot manage this cloth while swimming through the tidal surge. Most of them lose their cloths. Then it is too tough to move from one place to another. During recent disaster (Aila) most of them lose their clothes and hold their kids on the chests. Those who have only one cloth they keep the wet cloth, all day.

4.9.2 Health Problems of Women

They have skin diseases as they work through the water usually and take bath in salty water. Moreover, they get diarrhea fever and other diseases. Many of the women have experienced their menstruation period during their stay in the shelter. It was difficult for them to manage, as there was a lack of cloths with them. They have borrowed cloths from others. Due to the lack of privacy they had problem to change cloths. Often the women hide if they become sick as they think it would create pressure on the family. Although they are sick they take, care of others. They cannot maintain personal hygiene all the time and it creates health problem for them. They were very anxious how to collect drinking water during the disaster. They have stated that the women collect water from the distant places during the disaster period.

4.9.3 Problem with Cooking

Women prepare food for their family members. Cooking was one of most difficult arrange at that time. They used to collect bricks to make an oven for cooking. They also queue up in front the only one available oven in the shelter. Often they collected food from their neighbors to feed the family members. They have problem to collect fuel and food in this period. Many women starve during the disaster period.

No incident occurs against women that can be related to insecurity of women during their stay in Shelter. Unmarried matured women were sent to the relatives' house in distant places. They heard of abusing people in other distant shelters. Women are anxious about the life after the disaster period. They worry how to take care of children and old people in the house.

4.9.4 Sanitation Problem during Disaster Period

Both male and female share the same space in the shelter. Women have no separate space. They cannot move around during the disaster. Both men and women share the same toilet in the shelter. Women encounter problems to respond to natural calls due to lack of toilet facilities. Their suffering in this regard is inexplicable. They cannot go to the toilet during the stay in the shelter by the day. Many of them suppress the requirement and go a far on the boat to respond by the night. If someone fails to control they become ashamed. Often the women defecate on the open space

4.9.5 Lack of special Care Facilities for Pregnant Women

There is no special care or place for the pregnant women in the shelter. Often they spend days without food. They become more vulnerable as there is no medication during this period. Sometimes they get the Doctors but medicine is not available.

4.9.6 Hardship in obtaining Livelihoods and Income

Women have to work very hard during the disaster period compared to the other time. The women who work as day laborer have no job during the disaster period. In those families where the male member go far away to work beside the household management work women take the children and livestock to the safe place. If they have no income sources they worry how to survive. If they work outside often there is a risk to be abused by the employer. Many of the husbands do not their wives to go out for work only therefore. Sometimes they have no other ways to survive. The male also agreed on many of the issues raised by the women

Furthermore, the women stated that not only in the disaster period in normal time have women also undertaken all hard work in the family. In all conditions they have to prepare the meal for family members. They have to cook up food with the wet fire wood although its tiresome.

Women cannot veil during the disaster period. Even they have problem to change the cloth. Often they go on boat to distant place to defecate due to the lack of toilets.

Women worried about the security of matured girls in the family. Even they are severely sick since they are capable of breathing, women have been providing service. Most of the period during the disaster women starve themselves but feed the other family members. They always keep an eye on the children. They collect firewood and drinking water.

As all people stay together during the disaster women have problem to change their cloth. As the pregnant women cannot move they have a lot of difficulties. If they have labor pains there are no doctors. Often they are carried on the door parts to the distant place. Often they die due to lack of medication. They have problems during menstrual period to maintain the cleanliness. According to the male as the toilet gets destroyed women encounter the problem. They go out on boat in a group during the night to do it. Often the women starve themselves when they feed the children and male members in the family.

In all disaster periods women undertake all household work. It becomes too difficult for them to collect firewood. Often they go far away to collect water from the tube well on the higher place. They go on boats or swimming. Before the flood they try to make their homestead higher. They also prepare floating platforms, dry up the paddy etc. Women always wear the wet cloth as they work through water during the flood period. Due to this they have fever and skin disease. The pregnant women have difficulties to move during the disaster period. If women become sick during the disaster they cannot even call in a physician.

4.10 Strategy To Reduce Disaster Risk

Peoples' experiences have been explored through qualitative and quantitative approaches to have an understanding about their effective strategies to reduce the disaster risk. The gender dimensions of the respective issues were also emphasized during the study.

The women at Satkhira say the cyclone Sidr and Aila hit suddenly so they were not able to take any measure. So they try to survive whatever they had in their hand. Usually to survive the flood and cyclone they prepare mobile ovens and often store dry food and firewood. As their house gets destroyed by the disaster very often they cannot reconstruct it in a proper manner.

They do not have enough money to rebuild them strongly. So it is reconstructed in a way that they can only keep a roof on their head. They can survive the minor storm as they construct the house beside the road in the low line area. So the strong wind hit on the road and their house remained protected. Often they construct the *vita* of their house high to escape the flood water. They also cover up the head of the tube well with plastic paper to protect it from polluted flood water.

Those who have money keep a boat to move to safe place. To save the boat from waves and wind they tie up the boat with trees. If they try to swim through the current of water there is a chance to wash away. They tie a piece of rope on their waist when swim across the current. Often people tie up rope on the tree as people can climb up.

The male groups too said that they keep their *vita* high before the rainy season. They preserve puffed and smashed rice on the higher places. They also keep *golpata* to use it as fuel. They cultivate vegetable by constructing a high platform on the homestead. Often they save rice in plastic bag underground. The ducks and chicken are also rare and kept for emergency.

They take that loan from NGO. NGOs also provide them training for disaster preparedness. They have started transplanting saline tolerant tree. The oven in the house constructed on the higher place. They also undertake many measures. They follow: Lease out land; purchasing land, saving money, store foods, to make house stead higher; keeping the length of house shorter, constructing temporary house etc.

Women informed that they made their house stead 5 feet higher. They also go under the bed with children when strong wind hits. They then spread, waters hyacinth on different sides of the house to protect it from the waves. They set the ducks and chicken free. They make a mobile oven to move with it. The paddy is boiled up and turns into rice for storage purpose. They also keep puffed and smash rice in the safe place. They collect firewood. They keep some savings for bad time. They construct floating bed for the domestic animal. Male members of the family Collect water and try to maintain the security of the family. Women usually cook food and help others to veil properly.

The male Groups told that they remove soils and put in the homestead to make it higher. They also keep that their house surrounded with floating bed. They collect logs, bamboo and ropes before the flood. The live stock and fodder kept on the floating bed during the flood. They preserve food to use it during the disaster period. The oven kept to use it during the flood.

Number of measures is taken and required by them during the disaster period. They are as follows:

- 1.** Often they purchase boat;
- 2.** Puff and smashed rice are kept in the house;
- 3.** Sometimes they cultivate vegetable on the home stead;
- 4.** Water purifying equipments are also collected by them;
- 5.** Maintaining good relationship with neighbors is also necessary to get adequate support;
- 6.** They also receive, loan from NGOs and money lenders;
- 7.** People construct floating bed in the pond;
- 8.** Ducks and chicken are kept in the house;
- 9.** Often they lease out land sell out surplus crop and livestock;
- 10.** People pray collectively to the God to get rid of the disaster;
- 11.** The oral saline is also collected;
- 12.** Repairing the house; and
- 13.** An engine boat in each ward.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The population of Purbo-Kaikhali is living below average life. They are way behind of every facilities of normal life. Beside scarcity in livelihood assets, their physical health is also poor to fight against any natural disaster. Based on their will power and indigenous knowledge, they are fighting against every natural calamity. Women play an active role in all aspects of disaster risk management & resilience building but these roles are mostly invisible, rarely acknowledged and not included into formal systems. The existing notion of considering women's situation more vulnerable compared to men in climatic disaster may need to be reshaped to certain extent. Due to extreme social mobility and of being the victims of poverty it has been evident in the coastal area of Bangladesh that the desperate women turned up as champions by overcoming socio-economic backdrops and climatic disaster through their most proactive role by not only protecting themselves but family members and all sorts of assets. Their knowledge and capabilities continually contribute to the climate change adaptation strategies.

Men and women are, of course, not homogenous groups, and their experiences, lifestyles, and geographic and socioeconomic conditions shape their worldviews and proclivities; cognizance of these types of tendencies can be powerful knowledge when innovating solutions. Therefore, more women are needed in high-level negotiations on climate change, but their mere presence is no panacea. Greater connectivity between the international climate change regime and civil society efforts to address climate change – including those led by women or focused on gender-based vulnerabilities – is essential. Women-led solutions – especially at the community level – need to be supported and validated through scientific research and financial resources.

Educating and empowering women and girls are central to enabling women's participation and leadership on climate change. Eleanor Blomstrom, head of Women's Environment and Development Organization, argues, "It's not enough to have women at the table and then hope that effects trickle down to the grassroots. Empowering the middle is critical, and connecting the international, national, and local is inseparable to creating change." Inclusivity and appreciation for differences in opinions and experiences can broaden the generation of ideas and design of

solutions. The ability of men and women to elevate their voices and exercise choices is critical to ensuring climate justice, and thereby facilitating a peaceful, secure, and prosperous planet. At the same time, leaders of national institutions and international bureaucracies also need to be better educated and held accountable for ensuring their priorities and approaches take into consideration women's vulnerabilities and productive potential.

Climate change is a global problem that manifests itself in a variety of ways, requiring responses from different groups at different levels. It is necessary to collect, organize, and analyze gender-disaggregated data, specifically on how men and women contribute to and are affected by climate change. This type of data needs to be disseminated much more robustly. Additionally, attention needs to increase at all levels to acknowledge and include women's voices and perspectives about harms suffered as well as examples of successful efforts related to climate change mitigation and adaptation.

Below is a set of targeted recommendations to concurrently reduce gender-based vulnerabilities, address climate change as an economic, human rights, and security issue, and to promote women's empowerment.

- **NGOs** : Local organizations, and international organizations that operate programs at the grassroots level, must include women in discussions about environmental protection, building resilience, energy poverty, land tenure, food insecurity, and water resources.
- **Private Sector** : Companies and social businesses should engage in ways that advance their business interest, while also reducing environmental degradation and promoting socio-economic resilience by engaging in programming that supports women. Private sector enterprises must go beyond approaching environmental sustainability and women's economic advancement as simply questions of corporate social responsibility, and, instead, do more to integrate environmentally-sound and gender-sensitive business practices into their core operations. Ethical investments along with reporting on outcomes of socially and ecologically conscious initiatives are critical to amplifying the positive potential of the business sector.

- **National Governments:** States should develop policies to address climate change that recognize gendered impacts, provide women with access to resources, and enable opportunities for them to participate in mitigation and adaptation processes.
- **International Organizations:** These recommendations are directed towards multilateral organizations engaged in addressing climate change such as UNFCCC , the World Bank, UNEP, the European Union (EU), the African Union (AU), and the Association of Southeast Asian Nations (ASEAN). International decision- makers, including delegates at COP21 and beyond, should engage with women who represent grassroots groups at every stage of negotiations, create protections within the international migration regime for environmental migrants, and open opportunities for women to participate in mitigation and adaptation processes.

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Appendix

Checklist: History of Disaster (group -4)

Name: _____; Date: _____
 Age: _____; Gender: M / F; Village- _____; Shyamnagar,
 Shatkhera, Bangladesh.

Sl.	Question	Answer/Comment
1.	How long are you leaving in this area?	
2.	What are the common disasters in this area?	
3.	How many times disasters occur in this area?	
4.	During which month disaster usually occur?	
5.	Which year was the most challenging to you & why?	
6.	What do you know about incident?	
7.	How many times you faced devastating cyclone? What are the years?	
8.	What were the effects of disaster in this area?	
9.	What types of support you got from GOB & NGO for emergency relief & rehabilitation?	
10.	Do you think those support are sufficient for you?	
11.	What are the area of improvement for relief & rehabilitation?	
12.	Do you have any preparedness to face these types of disasters?	
13.	Do you think community has any role to mitigate the impact of cyclone?	
14.	How your community can become a resilient to disaster?	

Checklists:

Social Mapping:

Name: _____ Date: _____ Occupation _____ Age: _____

Gender: M / F; Village- _____ ; Shyamnagar, Satkhira, Bangladesh.

Sl.	Question	Answer/Comment
1.	How long are you leaving in this area?	
2.	What is the social condition of the area?	
3.	What is the major secular of the area?	
4.	What is the main Resource of the area?	
5.	How much social Institution in this area?	
6.	How many Educational institution of this area?	
7.	How many Mosque, pagoda, (etc) in this area?	
8.	What is the cultural practice of the area?	
9.	What is the natural resource of the area?	
10.	Which is the common place of the area?	
11.	How is the condition of water sanitation?	
12.	How is the Transport system?	
13.	How is the health condition of the area?	
14.	Where is the Hospital and Health care center?	
15.	What is the main occupation of the people?	
16.	Is there any river or canal?	
17.	Which is the most challenge to you & why?	
18.	Is there any cyclone Salter/ high rise building?	
19.	Where is the Police station and administrative building?	
20.	What are the common Hazard/ disasters in this area?	

**CHECKLIST OF VULNERABLE ISSUES OF ELEMENTS UNDER
RESOURCE MAPPING**

Name of the Study Area: Purbo-Kaikhali, Shyamnagar, Satkhira.

Number of interviewed people: 15-20

Date: 27-07-2012

	Vulnerability Issues	Zone	Statistics(high/medium/low)
1	School & cyclone shelter		
2	Bridge/ Culvert		
3	Mosque/ Temple		
4	Pond/ Well		
5	Bank Erosion		
6	Rainfall		
7	Lack of Land		
8	Lack of Health		
9	Livestock/Poultry Disease		
10	Siltation		
11	Irrigation		
12	Salinity		
13	Declining Natural Resources		
14	Lack of Food		
15	PEST		
16	Land Use		
17	Lack of Agricultural Equipment		
18	Land Tenure		
19	Government Ban on Fishing		
20	Fishing Boat		
21	Net Drying area		
22	Shrimp Culture area		
23	Cold Storage		

Checklist of Vulnerability issues (group-3)

Vulnerability issues	zone			
Cyclone				
Storm				
Social attitude				
Bank erosion				
Rainfall				
Flood				
Drainage congestion				
Lack of money/capital				
Lack of land				
Lack of health				
Livestock/poultry disease				
Widow ship				
Debt				
Sanitation				
Housing				
Ligation				
Irrigation				
Siltation				
Employment				
Lack of electricity				
Domestic water availability				
Salinity				
Dowry				
Declining natural resources				
Law and order				
Lack of education				
Lack of food				

Draught				
Pest				
Falling salt price				
Ageing				
Political instability				
Education				
Land use				
Lack of medical facilities				
Lack of transportation facilities				
Lack of agricultural equipment				
Insufficient income				
Corruption in local administration				
Decline in income				
High dependency ration				
Land tenure				
Absence of influential kin				
Absence of school				
Lack of help from rich				
Government ban on fishing				
Accident				
Lack of embankment				
Loss in business				