

Report on

**Gender and Climate Change Issues in the South
Central and South West Coastal Regions of
Bangladesh**



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Prepared by



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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

1. Introduction

Climate change is now recognized as a major development challenge with significant long-term economic and social effects. It will also amplify the existing problems caused by poverty and exclusion; lack of voice of the vulnerable groups, weak governance and dysfunctional institutions, and limited capacity of community and governments in developing countries to cope with climate shocks, variability and change. The impact will be felt globally and locally. The Impacts will be disproportionate across and within developing countries – particularly on vulnerable and poor communities, especially women.

Climate change impacts are not gender-neutral. The greater proportion of women victims in cyclones, floods and other climate change related natural disasters, clearly reflects the unequal risk and exposure across genders. Women are more vulnerable both to the short term recurring climatic events and long term climate induced changes because of gender differences in socially constructed roles and responsibilities that affect mobility, social networks and access to information and local institutions, as well as access to, control and ownership of assets. There are also significant gender differences in knowledge, use, and conservation of natural resources. Women are often the keepers of seeds and the gatherers of wild resources, giving them a wealth of environmental knowledge. Lacking secure access to natural resources, employment, assets and markets, women are less likely to be able to cope with the impacts of climate change.

Although women as a group are impacted more than men by climatic events, the impacts differ among women as well. Factors such as age, poverty, ethnicity and health status interact with gender in shaping the vulnerability of females to climate change.

Despite women's greater vulnerability to the impacts of climate change, they generally play an active role in adapting to these impacts to secure food and a livelihood for their households. Gender often determines who receives technology, training and information from adaptation projects, generally bypassing women. Inclusive collective actions can play a significant role in enhancing community

adaptive capacity to changing climate by strengthening local voice and promoting accountable and efficient local governance.

Assessments on disaster management also indicate that communities with social cohesion and effective interface with local government are better prepared to cope with climate events and they also recover quickly from disasters.

Until recently, international climate change policy makers have neglected the gender dimension of climate change, as well as other social and political factors. The focus has been on technical solution rather than on men and women in particular, who have different needs, knowledge, management practices and strategies to cope with the manifestations of climatic change. Even though vulnerability to environmental degradation and natural hazards have been linked to poverty, gender and other social dimensions, there has been little analysis on positive and negative impacts of climate change on gender and social relations (eg. increased conflict and increased gender inequality versus greater collective action). A gender-disaggregated approach is thus required in order to shed more light on the levels and types of vulnerability as well as potential in order to identify appropriate adaptation mechanisms.

The study considers how culturally constructed gender inequality disadvantage women when they are affected by climatic disasters. It also examines the aspects of gender inequalities as social phenomenon that doubly jeopardizes women by contributing to natural phenomenon like climatic disaster.

1.1 History of Partnership

Partnership between Bangladesh Centre for Advanced Studies (BCAS) and the Norwegian Church Aid (NCA) began in 2007 with an annual support (September-December 2007) to formulate “Strategies to deal with Climate related Problems, particularly Flood and Water logging Areas in the South Central Floodplain in

Bangladesh”*. It is to be noted that the Norwegian Church Aid has different types of partners to carry out activities. Bangladesh Centre for Advanced Studies (BCAS) is a resource partner of NCA on climate change and environment in Bangladesh.

1.2 Context of the Study

Bangladesh is one of the poor developing countries most vulnerable to climate change Impacts. The country has high population density, endemic poverty and degradation of ecological system and these make it more vulnerable to climate change, which again threatens the development potentials of the country. The increasing risks from climate change, including sea level rise, natural and man-made hazards, such as cyclone, flooding, land erosion, water logging, salinity intrusion in soil and water have adversely affected livelihoods of people living in environmentally fragile areas. A one meter rise in sea level is estimated to inundate 18% of the total land in Bangladesh, directly threatening about 11% of the population. In addition, the backwater effect and increased river flow from sea level rise could have a large impact on the population, with disproportionate impacts on the rural poor. Crop simulation models illustrate the likelihood of substantial losses in production of rain-fed crop in South and Southeast Asia. Even under the most conservative climate change scenario, **the net cereal production in South Asian countries is projected to decline in the near future. The region is already characterized** by a high degree of climate variability which has shaped much of life, investments, opportunities, and risks in the region.

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.

* Since then, the partnership between BCAs and NCA has been further broadened and strengthened through implementing several other activities on climate change.

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 live 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.

1.3 Conceptual Framework

A social equity, right and justice approach has been used combined with a sustainable livelihoods framework and a gender lens in this study. The central role of institutions in mediating the relationships between social actors and the environment has been highlighted. How differently positioned social actors command different amounts of environmental goods and services, that are instrumental to their well being, were explored. It has also identified the capacity of institutions to manage the adverse effects of climate change so that it does not become a security problem.

A sustainable livelihoods approach with a gender lens is a multi-sectoral approach that places people at the centre, examining their assets (social, physical, human, natural, financial); markets, risks and vulnerabilities, knowledge, information and organization. Recognizing gender inequalities in these factors, the study examines: gender asymmetries in access to and control over assets, participation in decision making, power in land, labor, financial and product markets, market information, extension services, skill and training required, participation and leadership in rural organizations, rights, empowerment and political voice, household composition and labor availability.

1.4 Overall Goal of the Study

1. To document gender and other social differences in accessing to environmental and institutional resources and adaptation to changes in those resources in response to increased frequency and intensity of flooding, water logging, cyclones, storms, coastal erosion, sea level rise, salinization and drought;
2. to produce a gender analysis on the collective action, social capital and interface with local institutions – both formal and informal in disaster preparedness and rehabilitation in areas vulnerable to climate change;
3. to create an understanding about adaptation based on capacity building strategies and frameworks within a package inclusive of gender-sensitive tools to facilitate effective adaptation to the effects of climate change for vulnerable groups and local institutions.

1.5 The Study Area

Four villages were selected from two different ecosystems for the study. One of them is an area affected by flood and water-logging and another one is from coastal area which is impacted by cyclone, salinity, river erosion, and sea level rise. The selected unions are Nanikhir and Kasalia in Muksudpur Upazila in the District of Gopalganj in the south-central floodplain. The study area in Satkhira District includes Munshiganj Union in Shyamnagar Upazila (recently cyclone 'Aila' affected area) from the coastal region..

1.6 Profile of Four Villages

The village of Goalgram is situated within the territory of *Chanda Beel* (seasonal water body) in *Nanikhir* Union in *Muksodpur Upazila* under the District of Gopalganj. The village has 525 households of which 85% are Hindu and 15% are Christians by religion. The village is always affected by flood. This village has two parts - *Uttar Para* and *Patla Goalgram*. *Patla Goalgram* is mainly situated at the low-lying part of *Chanda Beel*. Most of the households depend on agriculture, wage labour, share cropping and fishing for their livelihoods.

The village of Nayakandi is also located within the territory of *Chanda Beel* in Uzani Union of *Muksodpur Upazila* under the Gopalganj District. The village has 215 households of which 10% are Hindu and 90% are Christians by religion. It is also affected by flood. This village has three parts - *Dakhin Para*, *Madha para* and *Uttar para*. *Nayakandi* is situated at the low-lying parts of *Chanda Beel*. Livelihood strategies followed by most of the households are agriculture, wage labour, share cropping and fishing.

The village of **Singhertali** is situated in the south-west coastal region of Bangladesh. The river 'Singhertaly' surrounds the eastern and southern side of the village. The other side of the river belongs to the Sundarban (the world largest mangrove forest). The village of Harinagar is situated to the north and the village Mirgang village to the west of the Singhertali. On the bank of the river an embankment was constructed in 1960s to protect the peoples' settlement, crops, infrastructure etc, from tidal surge and from saline water inundation. The village is under Munshiganj Union in Shaymnagar Upazila in Satkhira district. There were 301 households in 2006 in the village of which 61% are Hindu and 39% are Muslim (BCAS field survey in 2007).

The village of Mathurapur is also situated in the south-west coastal region in Bangladesh. Southern side of the village is surrounded by the same river called 'Singhertaly Nadi'. The other side of the river belongs to the Sundarban (the world largest mangrove forest). *Dakhin Kadamtala* and *Kachukhali* villages are to the of Harinagar village is to the west and *Kachukhali* village to the north of the Mathurapur village. An embankment was constructed on the bank of the Singhertaly Nadi in 1960s to protect the peoples' settlement, crops, infrastructure etc, from tidal surge and from saline water inundation. The village is under Munshiganj Union in Shaymnagar Upazila in Satkhira district. There were 403 households in 2006, of which 68% are Hindu and 32% are Muslim by religion (BCAS field survey).

2. Climate Change and Gender Issues in Existing Literature

The existing literature on climate change and gender issues is diversified. Besides academic writing, there are strategy papers and documents developed by different donor organizations addressing the policy issues and bring in experiences from the different parts of the world. One of the resource guide addressing climate change and gender issue firstly, emphasizes on the climate change phenomenon, its causes, characteristics, affects and implications for the environment and human societies, particularly in relation to the quest for sustainable development (UNDP 2009). Secondly, it has analyzed, from a gender approach, how climate change may affect the achievement of the MDGs. Thirdly, it has reviewed the international framework related to gender equity, the environment, and climate change, and highlights recent global efforts to link both themes.

Finally, it shows the link between climate change mitigation and adaptation strategies to gender equality and women's empowerment strategies, and presents experiences and initiatives that have pioneered integrating actions. It describes how men and women face their social, economic and environmental reality in different ways; how they participate is varying and is closely depending on age, socio-economic class and culture. The paper offers a gender approach which attempts to take this fact into account while striving to provide an understanding of how gender identities and relations in specific social contexts have evolved historically. The importance of analyzing these factors needs to be considered to enable the formulation of social transformation proposals that help to build more equitable societies. The approach that tends to dissolve social inequality addresses two key issues: firstly, it recognizes that man and women due to their gender differences encounter different situations that oblige them to acquire different capacities and knowledge. Secondly, it is stated that gender inequality can be corrected if the rights, responsibilities, and opportunities of women and men are recognized and their interests, needs and priorities are considered.

The study also emphasized, when it incorporated in analyses of climate change, the gender approach promotes understanding of how the identities of women and men determine different vulnerabilities and capacities to deal with climate change; such

an approach can also help to attenuate the causes of climate change. Integrating the gender approach is also helpful in designing and implementing policies, programmes and projects that lead to greater equity and equality. In particular, it may contribute to build more capacity of adaptation to and mitigation to climate change. When incorporated in discussions about development, the gender approach strives to analyze and understand the different roles and responsibilities of men and women, the extent and quality of their participation in decision-making, and their needs and views (ibid).

The study by UNDP in 2008, emphasizes on gender-sensitive in different sectors such as agriculture, forestry, economy, health, education and the environment and has shown that man and women experience poverty and development differently. At the same time, an understanding of the relations between gender and sustainable development requires an exhaustive analysis of patterns of knowledge and skills related to management, using and conservation of natural resources.

In other studies it is thought that women are engaged in more climate change related activities than what is recognized and valued in the community (Escobar 2008). The same study highlights important role of women in the adaptation and search for safer communities, which leads them to understand better the causes and consequences of changes in climatic conditions. The study has concluded that women have important knowledge and skills for orienting the adaptation processes, a product of their roles in society (productive, reproductive and community). The importance of gender equity in these processes has been recognized.

Besides this generalized understanding of gender role in climate change impacts, some area specific issues were raised in different studies. The study by DOE 2008 summarized the hydro-geophysical situation specific vulnerability contexts for the women in Bangladesh. The capacity of the cyclone shelters in the costal area were described in the same study as inadequate and gradually falling short with increasing population. The inadequacy of shelter capacity is translated into self-denial to save lives for those who decide against taking shelter. It was reported by the study that this has caused occasional abortion and miscarriages while advanced stage pregnant mothers are cramped into a crowded shelter. It has been reported by the women that there are cases of sexual harassment on the way to shelters. They were

also concerned about the design of the shelter that does not often provide minimum gender-friendly sanitation facility. The study has also focused on women's experiences during post cyclone period and how intra-household food insecurity and sanitation become the major concerns for the women. The study also highlights prolonged exposure to filthy water during post disaster period that cause severe skin diseases and gynecological problems to women. Collection of fuel and potable water become extremely hazardous for them. It has been also observed that male often leave their families back home in search of employment, leaving the responsibility to 'take care' of the family members on the shoulder of women, thereby adding to their vulnerability. Female headed households are common in water logging affected areas.

More concerns are evident in another study which has revealed that present climate change variability and salinity ingression become major hydro-geophysical as well as social problems in the south western region of Bangladesh (CCAR 2008). During the dry season, salinity is more intense and lack of suitable drinking water becomes an acute problem for affected communities. Women and adolescent girls are usually required to fetch drinking water from distant sources, even 5-6 kilometers each day in some southern areas. Young girls often sacrifice their academic activities in a bid to fetch non-saline water. Even during their pregnancy women are forced to fetch water irrespective of the distance between the source and their dwellings. Women and girls suffer from various gynecological problems in the long run for taking over extra hurdle of work in their daily life and by using saline water during menstruation. Premature birth, abortion and still birth (blue-baby syndrome) are reported in alarmingly high numbers in these areas.

The study also focused on the floodplain experiences, as part of the country becomes inundated in every peak monsoon. For the same hydro-geophysical hazard, however, women face flood differently than males. Among those affected by flood and related problems, women and children are usually the most helpless and disadvantaged. Flood related deaths are often caused by drowning and snake bites, which, tend to occur in increasing numbers for children, following by adult women.

The study further highlights on women's privacy that seems to be completely challenged during the flood. Sanitation also becomes worse especially in case of

pregnant women. In absence of freshwater, adolescent girls cannot maintain hygienic reproductive health care and often report perinea rashes and urinary tract infections. Moving on the embankments or road side high lands often put the adult and young women in constant dangers of sexual harassment and assault. Women headed household in flood affected areas are increasing in numbers as the male counter parts leave the flooded area for employment opportunities elsewhere and often they never come back to the family. In case of flash floods, food insecurity and sanitation are considered to be major issues for the affected women (Ibid).

It was pointed out that disaster affect both women and men but that the burden of coping with disasters falls heavily on women's shoulders in Bangladesh (Mahbuba; 2008). It has been also observed although women suffer more than men from poverty, hunger, malnutrition, economic crises, environmental degradation, health related problems, insecurity, they become victims of violence and political crises. The study places emphasis on the gendered division of labour that is thought to become critical as gender roles often reinforced and even intensified as additional work and changes in the environment brought on by a disaster. The presentation also focused on violations of women's rights that become more acute during disasters. It was observed that relief action do not reach the people who need it most, and that women's own initiatives become crucial for their families' survival.

Moreover, It was observed that since being female is strongly linked to being poor, unless poverty is reduced, the increase in disasters and extreme climate events linked with climate change is likely to affect women more than men (Cannon; 2002). There are some specific gender attributes which increase women's vulnerability in some respects. The author suggests that these gendered vulnerabilities may, however, be reduced by social changes.

The concerns are also reflected in global policy. Although, it is agreed that vulnerability and adaptation are largely social issues (as opposed to purely biophysical or technological), it is surprising that the issue of gender is not yet playing a more explicit role in adaptation studies, projects and policy (COP-10,. 2004). It is also stated that due to the feminization of poverty, other existing gender inequalities, and men's and women's gendered roles in society and in the division of labour, there are gender differences in Climate Change impacts and in adaptive

capacities. There is a growing urge that differences should be acknowledged in the adaptation process to avoid further increases in gender inequality and to ensure the success of adaptation policies and measures.

Recently the gender and vulnerability issue were also discussed widely. It is acknowledged that the negative effects of Climate Change are likely to hit the poorest people in the poorest countries hardest. In other words: the poor are most vulnerable to climate change. The emphasis was given on the situation following the cyclone of 1991 in Bangladesh as it was evident that the death rate was almost five times as high for women as for men. Warning information was transmitted by men to men in public spaces, but rarely communicated to the rest of the family and as many women are not allowed to leave the house without a male relative, they therefore perished waiting at their relatives to return home and take them to a safe place. Moreover, as in many other Asian countries, most Bengali women have never learned to swim which significantly reduces their survival chances during high floods. Another clear illustration of the different vulnerabilities women and men face is offered by the fact that more men died than women during Hurricane Mitch. It has been suggested that this was due to existing gender norms in which ideas about masculinity encouraged risky 'heroic' action in a disaster.

The concerns were also evident in another study regarding the dimension of gender inequality ([Gender and Climate Change 2008](#)). It is stated that women's and men's differential access to social and physical goods or resources is one key dimension of gender inequality. Women's social positioning often means that the roles they are expected to take on are often supportive and reproductive, centered on the home and local community rather than the public sphere. This does not mean that women do not play crucial roles in agricultural production or other activities crucial to sustainable livelihoods and national economies. But the roles they play are generally less visible and attract less public recognition than the work men are engaged in.

In the previous study it was also recognized that typically, women – particularly those in poor, rural locations – are expected to assume primary responsibility for their families' subsistence. Yet they often do not earn a wage, women are frequently excluded from decisions about spending or about their children's education. The expectation that girls will help their mothers with household tasks and with caring for

younger siblings means that they are more likely to be excluded from opportunities to gain the education than boys, although these gaps are gradually closing. Women earning a wage typically earn less than men, leaving them more vulnerable to changes in their working environment caused by external phenomena, including climate change. This study considers some of the ways in which these inequalities are exacerbated by climate change, and explores how gender inequality prevents the effective mitigation of these impacts (Ibid).

Neelormi *et al* (2009) emphasize that women being the primary care giver of the family are compelled to live within the waterlogged premise, shouldering all the burden of managing and cooking food, collecting drinking water, taking care of the family members and their livestock as well. It has been observed that the numbers of women headed households are increasing in an alarming rate in this disaster prone areas, as male counterparts often do not come back, and take the responsibilities of the families in this dire situation. It was revealed that in their absence, women are easy victims to social vices. It was also evident that water logging severely affects health condition of women in the affected community. Since local sanitation is ineffective under waist-high water, the entire water body is found to be contaminated with human excreta and household wastes. Women are often forced to stay close to the community and sometimes drink the unhygienic water, as tube wells have also become polluted. Pregnant women cannot continue movement in marooned and slippery conditions and hence they are forced to stay back inside the houses and ultimately fall victim to unhygienic reproductive health condition.

Furthermore, Neelormi *et al* discusses the coping practices of women in waterlogged Condition. It is stated that women in waterlogged areas, as elsewhere in Bangladesh, have been trying to cope with the dire strait condition. Living in that condition for years, women too have developed unique coping mechanisms for their own survival. They are generally given the responsibility of safeguard virtually everything valuable as well as perishable in moist conditions. They take care of themselves, maintain household physical security, ensure the well-being of the children and elderly people, nurse young children, prepare food and still do everything psychologically possible to maintain household harmony.

Taking all the issues into consideration, the current study examines most of the issues in the field and contextualizes more specific experiences of women with facts and in-depth related to climate change impacts, women vulnerabilities and understanding adaptation strategies in two climate affected ecosystems.

3. Methodology

The project followed a participatory and interactive process to engage the climate scientists, community development actors, community people, women and stakeholders for capturing the level of risks and vulnerability of the community as well as to develop adaptation strategies and options to be implemented by the community and various actors. The key steps of the study conducted are the following:

In the initial stage, the study carried out an inventory of existing literature and data sources on climate change impacts, especially on women and adaptation in Bangladesh as well as on the existing adaptation tools, strategies and indicators with, and without the consideration of gender dimensions. The key research activities were:

- a) Literature review was carried out to upgrade the understanding about the issues and trends and identification of salinity intrusion, cyclone, tidal inundation, erosion and sea level rise in Satkhira coastal region and Gopalganj flood affected region;
- b) Household survey was conducted covering 400 sample households which selected randomly. Survey was conducted with semi-structured questionnaire;
- c) Key informant interview (16 from each site) for selection of project villages;
- d. 16 FGDs sessions were conducted in the respective two study areas;
- e) Three participatory vulnerability assessment (PVA) exercises have been conducted;
- f) Analysis and synthesise of information for preparation of report;
- g) Local stakeholder workshop to share preliminary findings and get feedback on the finding which were incorporated in the final report .

Primary data have been collected using a composite method/ approach, combining quantitative and qualitative methodologies, e.g. household and community surveys, along with institutional analyses and participatory rapid appraisal to capture details of impacts of past climatic events, perceptions of both livelihoods and well-being related risks and vulnerabilities, local adaptation strategies including collective action and interface with local institutions. Institutional adaptation capability has been assessed through community survey, focused group discussions and institutional analyses and participatory vulnerability analysis (PVA). Data analysis was done by integrating quantitative and qualitative data.

The research design included the following elements:

- a. A gender analysis in the context of the collective action and interface with local institutions for disaster preparedness and rehabilitation of areas vulnerable to climate change;
- b. Assessment of the ways in which climate change endangers the livelihoods of women and men;
- c. Assessment of differential impacts on men and women. Men and women cannot be considered two homogenous groups. Not all men, for that matter, all women, get affected in the same manner. It differs considerably depending on one's access to assets, education, and institutions;
- d. Development of livelihood options profiles of the selected vulnerable communities;
- e. Assessment of institutional adaptation capability; and
- f. Identification of adaptation strategies and frameworks for developing the capacity of women and men and their local formal and informal institutions for comprehensive adaptation to climate change.

3.1 Research Questions

A different set of questions have been attempted to answer through this study. These include:

- a) How do men and women perceive and experience climate change impacts? What knowledge do women and men have of climate variations? What

perceptions, knowledge and experiences do they share? How the perceptions, knowledge and experiences are different? What is the source of their knowledge? What affects their perception? How do these findings relate to men's and women's different roles and entitlements in society? How do they differ among different socio-economic groups and in the two ecological contexts?

- b) What voice does women and men have in the household related to resource management; what access and voice do women and men have in the community and local institutions that address natural resource management, disaster risk management and adaptation to climate change?
- c) How do the contexts of vulnerability to climate variability and change compare for women and men? How does men's and women's vulnerability differ by climate change in the two ecologically different conditions? How are men and women from different socio-cultural groups impacted by climate change within these two areas?
- d) What kinds of individual, collective action, and interface with local institutions is involved in adaptation to climate change by women and by men? What is the capacity of local non-governmental (community based and other) organizations to facilitate community adaptation to climate change? What is the capacity of local government to assist in adaptation to climate change? What other kinds of local institutions assist in adaptation to climate change? What is their capacity?
- e) How do different adaptation measures impact women and men? What impacts are the same? What impacts differ?
- f) When is it necessary to develop gender specific measures and mechanisms to facilitate adaptation to climate change adaptation? What kinds of gender specific adaptations are effective under what types of conditions?
- g) What are the barriers to adaptation measures at the community level for women and men? What is needed to overcome these barriers for women and for men?
- h) Are there parts of the population (eg, disabled, elderly, pregnant women and children) that are particularly vulnerable to climate change impacts?
- i) What kinds of measures and mechanisms have been developed to assist different types of vulnerable groups in adapting to climate change? What

kinds of adaptation measures have they developed themselves? How do these measures differ amongst groups? Are additional measures needed?

j) Has cultural restrains on mobility of women eased overtime?

3.2 Process of Data Collection

The study followed multiple stages which include participatory approaches of data collection, interpretation and sharing the study findings with project components and stakeholders. The study followed the following steps:

- a) Core Team mobilization;
- b) Development of method and tools for data collection;
- c) Orientation of field team members;
- d) Testing and administrating of tools and formats for data collection;
- e) Field data collection, cleaning, processing and analysis;
- f) Organize consultation workshop for sharing results and getting feedback; and
- g) Writing study documents, internal review and finalization.

3.3 Household Survey, FGDs and KIIs

The survey covered four villages. Among them two of the study villages were selected from South-central region affected by flood and water logging. Other two villages were selected from South-west coastal region. The area is affected by salinity intrusion, sea level rise, cyclone and tidal surge.

A total of 400 hundred households were randomly selected from the four study villages. Each sample household was interviewed by a Field Investigator using a questionnaire.

Table 1: Village wise Distribution of Households surveyed

Villages	Regions	No. of total Households	Number of Sampled HHs
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Goalgram, Gopalganj	South-central region of Bangladesh, flood and water logging affected area	525	100
Nayakandi, Gopalganj	South-central region of Bangladesh, flood and water logging affected area	215	100
Mathurapur, Satkhira	South-west coastal region of Bangladesh, salinity intrusion, sea level rise, cyclone and tidal surge affected area.	301	100
Singhretali, Satkhira	South-west coastal region of Bangladesh, salinity intrusion, sea level rise, cyclone and tidal surge affected area.	403	100
Total		1443	400

All 400 sampled Households were surveyed using a questionnaire designed for collecting demographic, socioeconomic and other relevant data/information (please see the questionnaire in the appendix-1).

3.4 Data Validation

Different strategies have been employed to collect data. Triangulation method that included interview, participatory exercise and sharing findings with stakeholders have been applied to validate the data.

3.5 Data Input and Analysis

The survey data have been edited and coded manually and processed through data management computer software (SPSS). Qualitative data have been manually compiled according to diverse issues considering the research sites.

4. The Key Findings: Socio-economic Condition

The socio-economic conditions of the population in the study areas were explored to have an understanding of their social and economic strength. The gender specific information regarding the socio economic status of the populace also opened scopes to view the roles of men and women in the climatic disaster.

4.1 Occupational Pattern

The occupational pattern of population in the study areas have been discussed in this section. The survey aimed to highlight the gender dimension of occupation which discriminate women against given social setting. According to table 2, the status of primary occupation of the household heads largely varies in two sites. Percentage of people involved in agriculture (29%) agricultural laborer (20%) is higher at Gopalganj than in Satkhira. Moreover, 20% people are involved in fishing in Gopalganj. Fishing is the second dominant livelihood strategy like the agriculture labor. Percentage of Businessman (8%), non agriculture laborer (7%) and household workers are also mentionable (5%) in Gopalganj. People are also involved in fish business (3%) rickshaw pulling (2%) and other occupations (2%). In contrast, the Satkhira site exhibits a different scenario. Fishing is predominant livelihood strategy at Satkhira site as 26% population are involved in this occupation. Only 7% of the population chose agriculture as their occupation. The percentage of agriculture labor is 7% when percentage of non agriculture laborer is much higher in Satkhira site (17%) compared to Gopalganj. Percentage of people involved in shrimp culture (9%) and shrimp fry collection (10%) are mentionable in Satkhira when these occupations are not evident in Gopalganj. Due to the differences between agro-ecological features occupations are much diversified at Satkhira site. It is also evident that people at Satkhira site have less access to cultivable land compared to Gopalganj. The occupational pattern of population in the study area is emphasized in this section. The survey aimed to highlight the gender dimension of occupation which discriminate women against given social setting.

Table -2: Primary Occupation of Household Heads

Main Occupation	Percentage	
	Gopalganj	Satkhira
Agriculture	29.6	6.5
Agric labor	20.4	6.5
Non-agric labor	6.8	16.7
Share cropper	1.5	-
Household work	5.3	5.0
Service	1.0	2.0
Business	10.7	9
Fishing	20.4	25.8
Shrimp fry collection	-	9.5
Shrimp/fish culture	-	9.0
Others (Bee keeping and Rickshaw van pulling)	4.3	10
Total	100.0	100.0

Source: BCAS Household Survey 2009

The survey data reveals that agricultural labor is predominant as secondary occupation in Gopalganj (37%). This is followed by agriculture 20%, fishing 16% and non agricultural labor 13%. In contrast, non agricultural labor as secondary occupation dominates in Satkhira (30%). On the other hand, it is, noteworthy that many families have undertaken fishing, agriculture laboring, shrimp fry collection, shrimp and fish culture, bee keeping, small enterprises as the secondary occupation at the respective field area.

4.2 Livelihood and Capital Assets

In this section, attempts have been made to examine livelihood and capital assets ownership patterns with a focus on gender dimension. The following findings may indicate the context of differentiated economic and social vulnerability of women.

4.2.1 Land Ownership Pattern in the Study Areas

Table 3 shows that at Gopalganj site, 91% of households have been owning homestead land, 66% have agriculture land and 20% households have been owning

pond where they cultivate the fish. On the other hand at Satkhira site, only 62% households have Homestead land and 39% of the households do not have been owning homestead land. Only 15% households possess own agriculture land when 21% have shrimp gher and 27% households have been owning pond where they do the fish culture. The table also illustrates land use pattern. It reveals that the number of shrimps *gher* and fish pond owner are much higher in Satkhira compared to the owner of agricultural land. It means shrimp and fish culture practices are higher than agriculture in Satkhira. On the other hand, shrimp culture is not practiced in Gopalganj site and the numbers of agriculture land owners are much higher. The survey data clearly indicates that many households at Satkhira do not have homestead land compared to Gopalganj.

Table 3: Distribution of Households according to Land Ownership

Type of Land	Study Site (% of households)	
	Gopalganj	Satkhira
Homestead	91.3	61.8
Agriculture	65.5	15.1
Share out	3.9	6.5
Shrimp gher	-	21.6
Pond/fish culture pond	20.4	26.6
Fallow	2.4	2.0
Others	1.9	1.5

According to Bangladesh government classification of households by land holding size, owners of below 50 decimals of land is considered as functionally landless. Table-4 shows that percentage of landless people is quite high at both Gopalganj (54%) and Satkhira (73%) sites, although it is much higher in Satkhira. Moreover, in Satkhira the size of the landless population indicates extreme condition of the poverty. Percentage of Marginal group is much higher in Gopalganj (28%) compared to Satkhira (13%). Percentage of small (10%) and medium land holding families are also higher in Gopalganj (8%) compared to Satkhira which are 6.5% and 5 % respectively. The existence of large land holding category (3%) is evident only in Satkhira whereas this group is missing at Gopalganj site. The people living with

extreme condition of poverty in terms of land ownership was higher in the Satkhira site.

Table 4: Distribution of Households according to Landholding Size

Land (decimal)	Study Site (% of households)	
	Gopalganj (%)	Satkhira (%)
Land less (up to 50)	54	73
Marginal (51-149)	28	13.1
Small (150-249)	10.2	6.5
Medium (250-749)	8.2	5.0
Large (750+)	-	2.5
Total	100.0	100.0

The total land ownership patterns of male & female at both sites is almost similar. In Satkhira 98% and Gopalganj 93% of the male is owner of most of the land. The number of females land owners is higher in Satkhira (7%) compared to Gopalganj (2%) although both the percentage are not very significant. Joint ownerships at both sites (1%) are evident in an insignificant way. The total land ownership patterns also suggest gender inequality at both of the sites (table 5).

Table 5: Distribution of Total Land Ownership according to Male and Female

Sex	Study Site (% of households)		
	Gopalganj	Satkhira	All
Male	98.1	92.8	95.3
Female	1.8	7.1	4.6
Jointly	0.1	0.1	0.1
Total	100.0	100.0	100.0

4.2.2 Education Status of Households

The education status of the household heads was explored through survey.

Table 6 shows that in Gopalganj 31% percent of the Heads of the Household are non literate. About 32% of the household heads (HH) know only to make signature. It

was also evident that 22% HHs have got only primary education when 13% HH managed to complete the secondary school certificate level. Only 2% HHs have obtained higher secondary certificate. The bachelors or above level of education have been obtained only 1%. in Gopalganj. In contrast, educational status of HHs at Satkhira site is slightly better than the Gopalganj area. The secondary levels has been crossed by 19% HHs. The higher secondary levels has been obtained by 3% HHs. The bachelor's level has been achieved only by 1% HH. The percentage of primary education holders is lower than the Gopalganj site. At Satkhira site, percentage of non literate are higher and number of people know only to make signature are also lower than the Gopalganj site. Although status of education varied in two sites, overall education situation is higher (about 68%) in the project village compared to national literacy rate 52% (BBS 2008).

Table 6: Household Heads' Education Status

Educational Status	Study Site (% of households)	
	Gopalganj	Satkhira
Illiterate (non literate)	30.6	32.2
Can sign only	31.6	26.1
Primary	22.3	18.6
Secondary	13.1	19.1
Higher secondary	1.9	3.0
Bachelor and above	0.5	1.0
Total	100.0	100.0

4.2.3 Ownership Patterns of Houses: Types of House own by Male and Female

Male and female's house ownership pattern in the study area reveals a significance difference. The survey data reveal that in Gopalganj the majority of houses' (65%) roofs are made of corrugated iron sheet. About 29% of the houses' roof is made of thatched materials, when 6% of the houses have semi pucca structure and percentage of pucca houses is very low (1%). On the other hand, in Satkhira about 30% houses' roof are made of corrugated iron sheet, 62% made of thatched materials, 4% semi pucca and 4% are pucca houses. In comparison, it was found that in Stakhira more houses are built with thatched materials (low quality) than the houses at Gopalganj (table 7)

Table 7: Types of Houses

Type of House	Study Site (% of households)		
	Gopalganj	Satkhira	All
Pucca	0.7	3.8	2.0
Semi pucca	6.0	3.8	5.0
Tin shed	64.8	30.0	49.9
Thatched	28.5	62.4	43.1
Total	100.0	100.0	100.0

According to the table 8 ownership pattern of the houses at both sites significantly shows the discrimination against women. Almost all of the *pucca* houses of surveyed households at both sites are owned by the male (100%) where no single ownership of pucca house of female was evident. Ownership of semi pucca house by women at Gopalganj is 6%. On the other hand 94% of the male own the semi-pucca houses in the area. In contrast, at Satkhira male have the 100% ownership of the semi-pucca houses. Other houses like tin-shed and thatched are mostly owned by men in both of the areas. In Gopalganj, tin-shed house owners among the male is 96% and 4% of the female have the ownership on such kind of houses. In Gopalganj, 96% of the thatched houses are owned by male when 4% of the houses are owned by female. In Satkhira site 88% of the male are the owner of the thatched house when 8% of the thatched house owners are female. The joint ownership of tin-shed house in Gopalganj is 1% but in Satkhira it is 8%. Joint ownership thatched house only evident in Gopalganj (4%). In other cases joint ownership is evident at both sites. Percentage of women house owner in all categories is not significant. The total land ownership pattern and house ownership patterns indicates women's lack of ownership these assets. This may have contributed to their higher level of social vulnerability.

Table 8: Ownership Pattern of different Types of Houses

Type of House	Percentage of households					
	Gopalganj			Satkhira		
	male	female	jointly	Male	Female	jointly
Pucca	100.0	-	-	100.0	-	-
Semi pucca	94.1	5.9	-	100.0	-	-
Tin shed	95.7	3.8	0.5	89.4	3.0	7.6
Thatched	96.3	3.7	-	88.0	8.3	3.7

4.2.4 Households' Livestock Assets

Livestock is an important property and its ownership patterns cross culture have some significance as far as rights and social status is concerned. The survey data reveals that in Gopalganj site 85 % HHs have livestock and 15% households do not have any livestock. In Satkhira site, about 77% HHs have livestock and 23% households do not rear any livestock. It means that most of the Households in Gopalganj villages have livestock compare to Satkhira site. Table 9 shows that households having poultry and goats are more evident in Satkhira site. But cow rearing households are more evident in Gopalganj. As the cow price is much higher than poultry and goat, it means more valuable livestock assets are owned by households in Gopalganj area compared to Satkhira site.

Table 9: Household's Ownership Pattern of Livestock

Type of Livestock	Percentage of households	
	Gopalganj	Satkhira
Cow	47.8	6.3
Buffalo	0.4	-
Goat/sheep	1.1	26.3
Poultry	50.7	67.4
Total	100.0	100.0

4.2.4.1 Gender Dimension of HH's Ownership of Livestock

According to table 10, the ownership of livestock of households by male and female reveals a different scenario at both of the sites. The animal like cattle predominantly own by male at both sites (Gopalganj 68% and Satkhira 54%). Although female owners of cattle are significantly found in Gopalganj (24%), the percentage of female ownership of cattle is much higher (39%) in Satkhira sites. The animal like buffalo is completely owned by male (100%) at both Satkhira and Gopalganj. In contrast, the small animal like goats are completely own by females (100%) in Gopalganj. In Satkhira, 39% male and 51% female possess the goat or sheeps. Although slightly varied in number the poultries are predominantly belonging to women at both sites. In Gopalganj 85% of female own the poultry and the male owners are 12%. In Satkhira 74% of the female own the poultry when male possess only 8%. The ownership of cattle do not necessarily implies the workload of male and female in terms of taking care of the livestock's. Although owning by male, women take most of the care of the cattle. On the other hand, whatever women own in the family it is always captured by the male. It means household's most valuable livestock assets are mainly owned by male members.

Table 10: Ownership Pattern of Livestock according to Gender

Type of Livestock	Gopalganj			Satkhira		
	male	Female	jointly	Male	female	jointly
Cow	67.7	24.4	7.9	53.8	38.5	7.7
Buffalo		-	-	-	-	-
Goat/sheep	-		-	38.9	51.9	9.2
Poultry	11.7	84.7	3.6	8.0	73.9	18.1

4.2.5 Asset Ownership Pattern of Male and Female

The table 11 exhibits overall asset ownership of male and female in the study area. Assets like agriculture tools including nirani kasti are owned 80% by male, 9% by female and joint ownership has been found only 11%. The *langol (plough)* is owned by 73% male. Female ownership is nil. Joint ownership on *langal* by male and female is 27%. Male's ownership of spray machine is 94% and the owners among the females are 6%. Other significant assets like sewing machine is owned by 33%

males and female owners are 56%. The joint ownership in this regard is 11%. Fishing gear is owned by 94% male when an insignificant number of women are fishing gear owner (only 3%). The trees are owned by 82% male when female ownership is 7%. Paddy or other crops are owned by male in 97% cases. Women's ownership in this regard is only 3%. All other assets like cash money, mobile phone (71%), television (61%), radio (65%) are predominantly possessed by males. Asset likes ornaments are predominantly owned by female (93%). Male's ownership was evident only 4%. Again it was evident that most of the assets of the households are owned by male members.

Table 11: Assets Ownership Pattern of the Households according to Gender

Assets	Gopalganj			Satkhira		
	Male	female	jointly	Male	female	jointly
Nirani/kodal/kaste	85.0	7.5	7.5	73.1	11.5	15.4
Langal (Plough)	100.0	-	-	50.0	-	50.0
Power tiller	-	-	-	100.0	-	-
Tube well	100.0	-	-	100.0	-	-
Paddy husking machine	100.0	-	-	-	-	-
Rice mill	100.0	-	-	100.0	-	-
Spray machine	-	-	-	93.8	6.2	-
Sewing machine	33.3	66.7	-	33.3	50.0	16.7
Fishing gear	100.0	-	-	88.9	5.6	5.5
Non mechanized boat	98.4	1.6	-	84.9	5.5	9.6
Rickshaw/van	100.0	-	-	100.0	-	-
Trees	89.2	4.3	6.5	74.7	10.8	14.5
Paddy/jute/annual crops	96.6	3.4	-	100.0	-	-
Radio	100.0	-	-	57.1	3.6	39.3
Television	68.4	10.5	21.1	50.0	3.6	46.4
Ornaments	4.0	94.0	2.0	3.7	92.7	3.6
Cash money	50.0	16.7	33.3	72.7	27.3	-
Mobile phone	68.0	16.0	16.0	77.8	11.1	11.1
Others	100.0	-	-	55.9	8.8	35.3

4.2.6 Household Categories by Wealth Class

Table 12, shows that most of the people are very poor in the project villages. About 81% of the households are poor and among them, 35% are extreme poor, who do not have adequate income to maintain the cost of minimum demands of survival. The villages in Satkhira have the highest percentage of extreme poor (47%). About 34% are moderately poor. In Gopalganj site the percentage of the poor is highest (57%) which is followed by 24% of extreme poor. Middle class in Gopalganj is constitute 18% of the households and in Satkhira it constitute about 16%. About 3% of the families can be considered as rich in Satkhira at project villages. There are no evidences of very rich families in Gopalganj.

Table 12 Social Status of Households

Social and wealth class	Percentage of households	
	Gopalganj	Satkhira
Very rich	-	0.5
Rich	0.4	3.0
Medium	18.0	16.1
Poor	57.3	33.7
Very poor/extreme poor	24.3	46.7
Total	100.0	100.0

4.2.7 Household Sources of Drinking Water

The drinking water facilities at the field site have been shown in Table 13. About 90% of the HH in Gopalganj have access to tube well water and similarly 85% HH in Satkhira have access to this source of water. Water from deep tube wells is fetched for drinking by 9% HH in Gopalganj and 2% HH in Satkhira. Pond water is reached by 13% HH in Satkhira. The Gopalganj people do not drink pond water at all.

Table 13: Households' access to the Sources of Drinking Water

Source	Study Site	
	Gopalganj	Satkhira
Tube well	90.3	85.4
Deep tube well	8.7	1.5
Pond	-	12.6
Others	1.0	0.5
Total	100.0	100.0

4.2.8 Water Sources for the Household Work (Cooking and Washing)

Survey data shows that 17% of the population have been gaining access to tube well water in Gopalganj when 44% in Satkhira. Deep tube wells water is used by 2% Gopalganj and 1% Satkhira. In Gopalganj 70% of the population depend on the pond water. In Satkhira 52% of the population depend on pond water. The river and khal is used as water sources by 11% in Gopalganj. In Satkhira, only 2% of the population use water from the same sources. Other source of water is used by an insignificant number of people.

4.2.9 Sanitation Facilities

Pucca or sanitary toilet is available for 26.7% HH in Gopalganj when 26% HHs used the pucca latrine in Satkhira. Pit latrines are being used by 31.1% HHs in Gopalganj and 49.2% in Satkhira. Ring slab was found 30.1% in Gopalganj and 10.6% in Satkhira. The hanging latrine is less evident at the sites (Gopalganj 6.3% and Satkhira 2.5%). Open defecation was reported by 5.8% in Gopalganj and 11.6% in Satkhira (table 14).

Table 14: Sanitation Facilities of Households

Sanitation Facilities	Percentage of households		
	Gopalganj	Satkhira	All
Sanitary/pucca	26.7	26.1	26.5
Kuccha/hole	31.1	49.2	40.0
Ring slab	30.1	10.6	20.5
Hanging	6.3	2.5	4.4

Open defecation	5.8	11.6	8.6
Total	100.0	100.0	100.0

4.3 Household Income

According to table 15, the source of household's income varied in both Gopalganj and Satkhira. Agriculture is the main source of income of 24% HHs in Gopalganj when the percentage is only 6% in Satkhira. Income from agric labor is higher (19%) at Gopalganj when at Satkhira percentage of agro-labor is pretty low (5%). The nonagricultural sources are predominant in Satkhira (20%) and in Gopalganj the percentage is lower (11%). Fishing and shrimp fry collection as an income source is also significant at both sites (16% in Gopalganj and 19% in Satkhira). These are the major income sources of people at the field sites.

Table 15: Percentage of Households by Sources of Income

Source of Income	Gopalganj	Satkhira
Agriculture	24.2	5.9
Agriculture labor	18.9	5.1
Non agric labor	11.1	20.4
Fishing/shrimp fry collection	15.6	18.8
Fish/Shrimp/Crab culture	0.3	10.6
Business	6.0	7.3
Service	1.8	3.3
All type of mistri	1.3	0.2
Livestock	6.8	4.5
Poultry	9.1	11.4
Leased out gher/land	-	1.0
Owned Trees	0.7	1.4
Crab catching	-	2.0
Bees culture/honey collection	-	2.5
Rickshaw/van pulling	1.2	0.4
Remittance	0.8	0.2
Others	2.2	5.0
Total	100.0	100.0

The distribution of household by income is showing table 16. About 15% people in Gopalganj earn Tk 25,000 or less yearly compared to 24% households who earn the same level of income in Satkhira. About 43% HHs in Gopalganj earn Tk. 25,000 to Tk 50,000 and in Satkhira the same amount is earned by 39% HHs. Tk 50,000-75,000 is the yearly income of 25% HH in Gopalganj and 17% in Satkhira. Annual income tk. 100,000-125,000 is earned by 7% of HH in Gopalganj and 10% HH in Satkhira. The percentages of HH's earning an income above Tk. 150,000 are 2.4% in Gopalganj and 4.5% in Satkhira.

Table 16: Yearly Income of the Households

Yearly Income (Taka)	Gopalganj	Satkhira	All
Up to 25000	14.6	23.6	19.0
25000-50000	43.2	38.8	41.0
50000-75000	25.2	17.6	21.5
75000-100000	7.3	9.5	8.4
100000-125000	3.9	3.5	3.7
125000-150000	3.4	2.5	3.0
150000+	2.4	4.5	3.4
Total	100.0	100.0	100.0

4.4 Household Expenditure

According to the table 17 up to Tk. 25,000 yearly expenditure of the HHs in Gopalganj is 7% when it is 16% Satkhira. The percentage of households having yearly expenditure of Tk. 25,000-50,000 are 50% in Gopalganj and 42% in Satkhira site. About Tk. 50,000-75,000 is spent by 25% HHs in Gopalganj and 22% in Satkhira in a year. Moreover, Tk 75,000-100,000 is the yearly expenditure of 8% HHs at in both Gopalganj and Satkhira sites. Yearly HH expenditure above Tk. 100,000 is incurred by 10.1% households in Gopalganj and 12 % households in Satkhira.

Table 17: Yearly Expenditure of the Households

Yearly Expenditure (Taka)	Gopalganj	Satkhira	All
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Up to 25000	6.8	15.6	11.1
25000-50000	50.0	42.3	46.2
50000-75000	24.8	22.1	23.5
75000-100000	8.3	8.0	8.1
100000-125000	4.4	5.0	4.7
125000-150000	1.8	4.0	3.0
150000+	3.9	3.0	3.4
Total	100.0	100.0	100.0

Survey data show that yearly income is higher than the yearly expenditure for 23% households at both sites. Income and expenditure are almost equal of 15% HH in Gopalganj and 7% in Satkhira. The survey has revealed that at both sites average deficit in yearly income and expenditure per household are about Tk. 4,400 in Gopalganj and Tk 2,046 in Satkhira site.

The deficit amounts in income and expenditure has been covered by the HHs at both sites in a variety of ways. Table 18 shows about 87% in Gopalganj and 84% in Satkhira seek loan from Bank, NGO and local mohajan in Gopalganj and 84% HHs in Satkhira to cover their income deficit. About 1% HHs in Gopalganj purchase material for daily consumption on credit when the percentage of HHs in Satkhira is higher (9%). Through daily laboring about 4% people try to cover this deficit when same efforts are evident in 2% HHs in Satkhira. Some people starve and take only one meal a day to cover this deficit at the sites. In Gopalganj 1% HHs members take one meal a day and 2% HHs do the same thing at Satkhira. Other strategies are undertaken by people to meet up the deficit are: mortgaging land (1% in both Gopalganj and Satkhira site), selling paddy/crops/milk (4% in Gopalganj and 2% in Satkhira) etc/

Table 18: Strategies to overcome Deficit of Money in the Households

Overcome	Gopalganj	Satkhira	All
Loan from bank, NGO, neighbor, mohajan relatives, etc.)	87.4	84.0	85.8
Purchase daily things in credit	1.4	8.7	5.1
Work as daily labor, agro labor and others	3.5	2.0	2.7
Take meal one time in a day	0.7	2.0	1.4

Mortgaged land	1.4	0.7	1.0
Sale paddy/crops and milk	3.5	-	1.7
Others	2.1	2.6	2.3
Total	100.0	100.0	100.0

5 Findings on Knowledge, Impacts and Vulnerability

5.1 Perception and Knowledge of Climate Change: Gender Dimension

The perception about climate change differs accors male and female and their ages. The experiences of men and women show the differences in this regard. It was described in many studies how men and women face their social, economic and environmental reality in different ways; how they participate is varying and is closely depending on age, socio-economic class and culture (UNDP 2009). The differences of experiences are drawn according to site specific qualitative and quantitative information in Bangladesh in the following sections..

In Satkhira, 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 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 ware a few clothes to survive the winter. The temperature is rising above the previous record and it

becomes unbearable in the Summer due to over 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 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 are more frequently occurring almost every year with tidal surge.

In Gopalganj, many of the women participants experienced, changes in the weather and climate to certain extent. The winter is shorter compared to the past. Winter is only covering the month of Poush and Magh. The intensity of heat has increased. They also stated that rainfall increased a lot. Frequency of climatic disaster has increased. The environment has changed in all respects. The male thinks in earlier time that they were able to predict about the nearest disaster and were able to take measures as part of disaster preparedness and to reduce the disaster risk. Nowadays, the cyclones appear suddenly with higher intensity. They appear so quickly that they do not get any scopes to take any precaution measures to save the life.

The losses in the disasters are much heavier than the past. During the past they were able to assume regarding the forthcoming floods, the rise of flood level and its duration. It is impossible now. The flood waters level used to recede in the month of Bhadro in the past, but now it does not move down from the door stead even in the month of Ashin. The impacts of flood have increased. The severe flood likes 1988 and 1998 were not experienced by them in the past. They have also reported the changes in the seasonality. Length of Winter has become shorter nowadays but intensity of cold has increased. It doesn't rain when it is supposed to. As this continues for longer period often it turns into drought. But it rains untimely. Frequency and intensity of cyclones have increased. The temperature has also increased. The northwester used to occur in the month of Baishakh, but nowadays it is uncertain.

5.2 Perception of the Impacts of Climate Change

The perception regarding the impacts of climate change has been also explored in the present study through qualitative and quantitative approach. In many cases, they do have common practice. But the information collected as part of the study reveals

that the perception of the impacts of CC varied between men and women at both sites. People can relate the signs of impacts with their everyday life.

The women in Gopalganj think that due to the excessive misty weather paddy is destroyed in the winter. It creates problems in agricultural activities. [On the other hand, excessive rain fall in monsoon submerges the houses. The situation is inexplicable. As it rains every year they put mud and soils on the house plinth](#) to make it higher than the flood level. But soils are not available. Furthermore, it was reported by women that pest and insects attacks is on rise in their crop fields and which damages both grains and vegetables.

Due the increases in the frequency of cyclones and storms, everyday life of people is badly affected. Their food and social security become fragile because of the disasters. As the disasters appear rapidly without any notice they cannot take preparation to face it and experience huge loss. They have observed the changes in seasonal cycles. It does not rain in the monsoon, or the winter does not appear when they supposed to be turn up. They do not follow a uniform sequence. It rains when unexpected and does not rain when it is expected. So people cannot predict anything. As a result bad impacts are evident on agriculture and fisheries.

On the other hand, the male members stated that in the present higher level of flooding damages the crop. Their house and toilets are destroyed. They construct platforms inside the house to live on this. Children are affected by different diseases like dysentery, jaundice, skin disease, cold and fever. They have stated that in the past it used to rain sufficiently. At that period they applied less fertilizer in the land and it worked properly. The yield was satisfactory.

Nowadays it rains very little. As a result land is becoming unfertile. They apply excessive fertilizer to cover up the lacking. This increases cost of rice cultivation. In the past they used to get 200 mounds of rice without applying fertilizer in the land. But nowadays the same amount land yield hardly 80-100 mounds of rice even with excessive fertilizer. They think all these are happening due to impacts of climate change and decline of rainfall. But nowadays, the range damage of crops and livelihood assets has increased.

The water of tidal surges in the recent time washes away the houses as it was stated by males in Satkhira. This was not evident earlier. This would have caused due to the changes in the climate. This river was full of different fish species in the past but nowadays many of them have become extinct. It would have happened due to the increase in salinity in the river. As it is not expectedly get cold in the winter the seasonal vegetable are not growing properly. So vegetables supply is sufficient in the market. As there is no sufficient rain on time the farmer do not get expected yield in the field. In the post disaster period, the salinity increases in the soil. They cannot grow any crop even in the homestead due to this problem.

The disasters appear unusually so it causes damages of life and properties. Nowadays it becomes too warm so people are having cold and fever very often. Some participants reported that in the past they had observed appearances of storm in the month of baishakh. However nowadays it can appear any time. They cannot predict anything so this cause more damages compared to the past.

According to them no seasons have its previous characteristics. They are always annoyed when the cyclone appears and washes them away. They are noticed that the level of tide water used to remain low in the winter. But at the present level of tide water rise higher even in the winter. The incidents of flood have been increasing in the recent days and banks of rivers are eroding due to this. So the rivers are becoming wider and embankments are at risks.

According to the Response of the female in Satkhira the nature of seasonality has changed a lot. There were six seasons a year. At the present they only feel, the present of three seasons (Winter, Rainy season and Summer). It does not rain sufficiently in the rainy season. Winter is not also intensified in the present. Depressions are created very often because of too warming. The hailstorm damages the plants and crop. As the pray of tigers has declined in the forest nowadays they turn up in the village very often and attack on people. They had used pond water for drinking and cooking purposes earlier. Pond waters has no use due to increase of salinity in it due to the cyclone and tidal surges.

The women of Mothurapur use to go to the distant places in search of water. They have reported that incident of disasters have increased in last 20 years. The river

was less wide in the past. Nowadays it has been expanding due to erosion. The homestead has been affected by salinity due to this and they cannot cultivate any vegetable. On the other hand, they have lost their land into the river. Many of them have started dwellings on the embankments. The fish population declined due to increases in salinity in the ponds. Fish are not available in the river like past. If they wash the dish in the pond water it is destroyed quickly due to high level salinity in water.

The survey data shows how many of the populations acknowledge the signs of climate change according to their perception. According to Table 19 about 21% of the population in Gopalganj and 19% in Satkhira recognized increased temperature as one of the sign of climate change. About 5% people in Gopalganj and 13% in Satkhira pointed out increased frequency of cyclone and storms. On the other hand, decrease in storm and cyclone has been addressed by 10% people in Gopalganj and 0.8% in Satkhira. Increase in floods depth has been pointed out by 3% in Gopalganj and 7% in Satkhira. Increase salinity has been addressed by only Satkhira people and the percentage is 4. Increase surges is also raised by the only 3% of Satkhira's respondents. Increase drought as a common feature of CC addressed by very insignificant number of people (0.7% in Gopalganj and 2.1% in Satkhira). Water levels increases only in satkhira as it was supported by 3% people. Water logging ha been recognized as CC impacts by 1.5% people only in Gopalganj. About 7% population in Gopalganj and 2% people in Satkhira recognized increase rain fall as one criterion to assess the climate change. In contrast decreases in rainfall has been mentioned by one of the major sign of CC by 29% of the population in Gopalganj and 5% in satkhira. The mild and heavy cold has been addressed as CC change signs by 14\$ people in Gopalganj and 11% in satkhira. Other signs of CC have been addressed by insignificant number of the people at both study sites.

Table 19: Perception of Climate Change

Perception	Percentage	
	Gopalganj	Satkhira
Increased in temperature	21.0	18.9
Increased storm/cyclone	5.6	13.0
Increased flood	3.0	6.6
Increased salinity	-	3.7
Increased tidal surge	-	3.2
Increased drought	0.7	2.1
Increased water level of river	-	2.6
Increase of water logging	1.3	-

Perception	Percentage	
	Gopalganj	Satkhira
Increase rainfall	1.7	6.8
Increase river erosion	-	1.1
Erratic rainfall	5.0	8.0
Little and heavy cool in winter	14.0	10.9
Two or three seasons in Bangladesh	5.0	2.4
Decrease rainfall	28.7	4.8
Decrease paddy, vegetables and fish production	0.6	4.5
Decrease storm/cyclone	9.3	0.8
Others	4.1	9.6
Total	100.0	100.0

According to surveys data, the respondents viewed that there had been increase in temperature, cyclone and flood, uncertainty of rainfall (e.g., erratic rainfall and heavy rainfall and decrease of rainfall). They also mentioned that increased salinity, tidal surge and increasing level of water in the coastal river are the indicators of climate change.

The respondents of KII, participants of FGDs and PVA also gave their views about climate change. The perceptions of all KII, FGDs and PVAs are given below:

In Satkhira according to the female participants the frequency of disaster has been significantly increased in last twenty years. The nature of the seasons are changing significantly. Earlier northwester used to appear in the month of Baishakh and people used to be alerted for this. Nevertheless nowadays it occurs suddenly periodically beyond people's assumption. The salinity in the water and soil has been increased limitlessly. The level of the tidal water has been increasing beyond the previous record. 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 has been growing higher compared to the past. Due to the warming depressions are created very often.

On the other hand, the male responded stated that they had six seasons in the past but nowadays these are reduced to three seasons. These are the Summer, Rainy and Winter seasons. They said that winter appear too late and even in the month of Agrahayan (December) they frequent around without worm cloth. About 30 years back they used to ware a few clothes to survive the winter. The temperature rising above the previous record and it becomes unbearable in the summer due to over worming.

The rain falls had followed a natural cycle and maintained a limit. Nowadays it does not follow any rule. The rain falls pattern has changed. If it begins to rain then it continues for longer period. Earlier northwester used to appear in the month of Baishakh and people used to be alerted for this. But nowadays it occurs suddenly periodically beyond people's assumption. The cyclones were not so severe in early days but now they are more frequently occur almost every year with tidal surge.

In Gopalganj, Many of the women participants experienced, changes in the climate to certain extent. The winter is shorter compared to the past. Winter only evident in the month of Poush and Magh. The intensity of warm has been increasing. They also stated that rainfall has increased a lot. Frequency of climatic disaster has been increased. The environment has changed in all respects.

The male thinks in earlier time they were able to predict about the nearest disaster and were able to take measures as part of disaster preparedness and to reduce the disaster risk. Nowadays the cyclones appear suddenly with higher intensity. They appear so quickly that they do not get any scopes to take any precaution measures to save the life. The losses in the disasters are much heavier than the past. During the past they were able to assume regarding the forthcoming floods, the rise of flood level and its duration. It is impossible now.

The flood waters level used to recede in the month of Bhadro in the past, but now it does not move down from the door stead even in the month of Ashin. The impacts of flood have increased. The severe flood likes 1988 and 1998 were not experienced by them in the past. They have also reported regarding the changes in the seasonality's. Length of winter has become shorter nowadays but intensity of cold has increased. It doesn't rain when it is supposed to. As this continues for longer period often it turns into drought. But it rains untimely. Frequency and intensity of cyclones have increased. The temperature has also increased. The northwester used to occur in the month of Baishakh, but nowadays it is uncertain.

The community people perception about climate change is not similar to the definition mentioned in IPCC document. Nevertheless, local community people observe some change over the period in climatic element and seasons in the year

and they call the changing pattern is climate change. Interestingly the main issues here is the increasing temperature and erratic rainfall are common in both scientific literatures and peoples' perception. Peoples' perception here also included their observed climatic disaster frequency and impacts are as climate change.

5.3 Gender Dimension of Disaster Experience

5.3.1 Climate Change Impacts and Vulnerability of Male, Female and Children

The existing literature focusing on the vulnerability context of male and female in climatic disaster have some limitations. For example, according to ELIAMEP (2008) case study has revealed woman undertake a diverse range of work during the disaster period. They follow: a.) Safety of family members, b.) Ensuring food security, c.) Protecting assets d.) Household work, e.) Managing finance by borrowing credit, selling and mortgaging assets and f.) Migration and alternative employment. This has only focused on the situation at the period of disaster, but pre and post disaster responsibilities were not taken into consideration. Moreover, the current study tried to reveal the differentiated experience of male and female through qualitative and quantitative approach considering the acts of both male and female.

5.3.1.1 Pre- Disaster Period

According to the women of Satkhira 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.

In Gopalganj vulnerability context varies due to its major geophysical and agro-ecological differences with Satkhira. During the pre disaster period, women are very busy to prepare the floating bed, platforms; repairing house, putting soil on the

homestead etc. They also harvest, the paddy and process the rice by boiling and drying. They work very hard. Besides taking care of children, cooking and managing the family women also undertake the works mentioned above. This has increases workload on women's shoulders.

On the other hand, according to the male the uneven weather during the pre-disaster period decrease the fish in the *beel*. The fish gathers in the middle and bottom of the beel due to the bad weather. Often the male go to the neighboring villages in search of work. The work pressures increase in the field as the farmers tries to harvest the paddy before the arrival of flood water. They work very hard at that time. Women repair their house before the disaster. They get involved in post harvest work e.g. husking rice.

The households that hold enough land women in those houses work very hard in this regard. Before the disaster they borrow money to purchase food. They also borrow money to meet up the cost in agriculture field. The pregnant women cannot obtain proper mother-health care due to bad communication and lack of health service.

5.3.1.2 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 serge 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. This is difficult to cook up the food due to the lack of cooking arrangement including fuel.

Often they cook once a day and receive it different 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 experiences of women that their major struggle is to collect safe drinking water during the disaster period as they travel too far to find a drop of safe fresh water for themselves as well as for family members. The waterborne disease likes 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. They are always annoyed to keep them away from all kind of physical abuse and hassle.

In contrast the description of the male group in Satkhira reveals the similar features, but elicits view according to gender dimension. The male participants stated regarding the problem they encounter during the disaster. Most of them reported that their crop has been destroyed by the *Aila*. Most of fish resources were destroyed during this period. The shrimp farms have been washed away by the tidal surge and it has created unemployment for them. Even no one want to purchase fish from them during the disaster period. They cannot undertake fishing activities on the river as fish fled away towards deep water areas.

On the other hand many fish dies during the disaster period. They have been lacking of food due to the insufficient income. Often they starve. The tidal surge hit on the houses and even when the water recedes it destroyed their houses and rice paddy. Then they go on the roads or embankments. Many of them went to take shelter in Munsiganj. The tube-well went under the flood water and the ponds were filled up with salty water so they had to go a far to collect drinking water. Toilets on their homestead are eroded by the tidal surge so they go to respond to natural calls on open spaces. During the Ails disaster period incidents of burgling, hijacking has been increased in the rich man's home. Most of the plants died and lands became uncultivable due increase of salinity. As the chicken, ducks and other live-stocks washed away by the serge water, it affects the women. Most of the children suffer from fever, cold, diarrhea and other water borne diseases. The elderly people suffered from skin problems and they need to be taken to the physicians at Shayamnagar.

In Gopalganj according to the female respondents they encounter problems to cook the food during the disaster period as there is a lack of firewood and dry material to set fire in the oven. So they cook once a day and split them in three times meal. Women take care of the livestock. Crisis of fodder is also evident during this period. Women go to other villages on boat to collect drinking water and often the boat capsized in the water. If women fail to collect safe drinking water they drink polluted water and as a result disease like diarrhea as well as other waterborne diseases spread rapidly.

Women also take care of the young children and elderly people during the disaster period. One of the main problem faces by women during the disaster is, lack of toilet facilities. They travel away from the shelter on boat to respond the natural call. Women's income activities are ceased during the disaster period. When their houses destroyed they reside on boat, road and platform constructed above water. Women have no bathing facilities, even they are not able keep privacies when change their cloths. Due to increase in the incidents like burgling and robbery women do not feel socially secured. As most of the families have shortage of hard cash women have to sell out their labor to earn their livelihood support.

On the other hand, according to the male respondents when the paddy field inundated by flood water a food crisis is created in the area. They cannot survive only working in agricultural field. Due to over flooding their stored crops damaged. They sell out their food grains with low prices. They usually starve if no one cook due to the flooding. Often the waves of flood water erode their house stead then they construct platforms stay on it. At that time they do not receive drinkable water as all tube wells go under water. Often they purify the water or drink the contaminated water from the beel. Disease like Diarrhea and dysentery spreads in the village.

Often the pirates attack in the houses. They take away valuable goods of households. Sometimes they kill people or rape the women. They encounter crises of fodder at that period. It is also difficult for them to manage the livestock due to lack of space. Many of them die or sold with low price during this period. They then need to borrow money. They receive goods in credits from the shop owners to maintain the life. During the flood period most of the women spend all day wearing wet cloth.

Plants and vegetables are damaged at the housestead due to the flood. Although the beel become full of fish they are not able to go out for fishing in the beel by leaving their house. They are unable able to take any measure to save their house from the disaster due to financial problem. As the toilet facilities destroyed by the flood they have to defecate into the water.

5.3.1.3 Post-disaster Period

In Satkhira, 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 fuel collection, toilet facilities and bathing place as all these facilities were destroyed by the disaster. They are also worried about their male counter parts who 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.

On the other hand, the male participants described that day laborer become unemployed during the post disaster period. They reconstruct their house by borrowing money from others. Often they use *golpata* collected from Sundarban to make the roof of the house. They are caught by different waterborne disease during the post disaster period. They try to obtain fresh loans to re construct the shrimp farms. The land yields very low after the disaster period. Food crisis emerges in the area. Often they borrow money from the money lenders with high interests.

In Gopalganj, according women they put more efforts to repair the houses instead of conducting other income activities. It results in low income for them. As there is no health centers at the locality the children suffers from diarrhea, dysentery, fever etc. Most of the male leave their houses for distant places in search of work. Absence of

male in the household at that increase work pressure of women as often women also repair the house. On the other hand, according to the male they put more efforts to repair the house instead of conducting other income activities. It results in low income for them.

The survey data also confirms the depth of women's suffering compared to man during pre and post disaster periods.

The pre disaster period's experiences of people in Gopalganj suggest that about in 21% of the households women specific problems are to reduce family food crisis. The women put efforts to cover the food shortages. They also undertake activities for food preparation. These responses of women respectively followed by keeping households clothes, ornaments and useful items in a safe place. They also arrange a secured shelter for the livestock often by repairing shed for livestock. The women collect and increase the storage of fuel. They keep cooking stove in a safe place, collect safe drinking water; prepare floating bed for vegetable cultivation and boil paddy and dry them before husk to get rice. In Satkhira, highest number of women is involved in (29%) keeping clothes, ornaments and useful items in safe places. Other responsibilities of the women are managing safe place for livestock, collect safe water for households members, cover the food deficit and resolve its storage related problems. They have solved financial problem in the households, try to collect fuel and take care if someone become sick during normal period or, before disaster.

Table 20: Problems of Woman before Disaster

Before disaster problems	Gopalganj	Satkhira
To keep clothes, ornaments, useful things and documents in safe place	15.4	28.8
Food problem (lack of food, to store seed/ crops, food and dry food)	21.2	10.8
To manage safe place for people and livestock/poultry	6.6	13.4
Fuel wood problem (lack of fuel wood, to store fuel wood)	13.9	8.3
Cooking problem (to keep and make portable stove, to make kitchen, to manage cooking things)	15.1	-
To make strong and repair/re-arrange house and livestock shed	5.0	-
Financial problem	0.9	8.3
To manage safe drinking water	2.5	11.2
Latrine problem (to make latrine)	0.3	1.2
To make dhap and rack	12.6	-
To dry boiling paddy/to boil paddy	3.8	-
Disease	-	2.9
Do not get signal timely	-	5.8

Before disaster problems	Gopalganj	Satkhira
Others	2.7	8.5

During disaster, in Gopalganj, women specific problems are preparation of food as their cooking stoves are inundated by flood and they lack of fuel to use for cooking. This problem followed by latrine, collection of safe water to drink by family members and lack of communication. Besides taking care of children, old age people, arrange safe place for livestock, bathing etc. In Satkhira, more number of women face shortage of latrine problem for defecation and cooking places, cooking stove and fuel shortage problem, and disrupt communication making women more vulnerable. They also face problems in taking care of children, old age people, bathing problem and keeping their livestock and family assets in safe places.

Table 21: Specific Types of Problems face by Woman during Disaster

During disaster problems	Gopalganj	Satkhira
To keep clothes, ornaments, useful things and documents in safe place	1.6	2.5
Food problem (lack of food, to store seed/ crops, food and dry food)	2.6	7.6
To manage safe place for people and livestock/poultry	4.9	8.0
Fuel wood problem (lack of fuel wood, to store fuel wood)	3.8	6.4
Cooking problem (to keep and make portable stove, to make kitchen, to manage cooking things)	23.3	13.0
Financial problem	0.3	1.7
To manage safe drinking water	10.2	8.5
Latrine problem (to make latrine)	20.0	15.7
Communication problem	15.3	10.7
To look after children, old people and livestock	6.5	6.0
Bathing place problem	3.4	8.5
To make dhap and rack	1.4	-
Lack of job	0.8	1.2
Disease	2.9	2.9
Others	3.0	7.3

In both Gopalganj and Satkhira, after disaster women face problem mostly to repair their living houses and cow sheds. They need to work very hard to clean their houses off, remove all debris and dirty things from houses and homestead. Spread of diseases are

more evident in the post disaster period than the disaster period. Preparation of food and collection of drinking water for family members are also common.

Table 22: Specific Types of Problems face by Woman after Disaster

After disaster problems	Gopalganj	Satkhira
Food problem (lack of food, to store seed/crops, food and dry food)	1.0	4.6
To manage safe place for people and livestock/poultry	0.2	2.3
Fuel wood problem (lack of fuel wood, to store fuel wood)	2.4	8.3
Cooking problem (to keep and make portable stove, to make kitchen, to manage cooking things)	6.4	5.1
To make strong and repair/re-arrange house and livestock shed	44.0	34.5
Financial problem	1.2	6.3
To manage safe drinking water	0.7	3.4
Latrine problem (to make latrine)	0.5	2.0
Communication problem	1.9	0.3
Lack of job	0.7	3.2
To work hard (clean house, to remove hyacinth and soil)	18.3	10.6
Disease	15.9	7.7
Others	6.8	11.7

The study has conducted an exercise that allowed the participants to assessed their vulnerability in general and rank them according to gender. They drew on vulnerability by male/female/children and old aged groups. The participants also showed the level of the vulnerability by the social and wealth ranking.

5.4 Decision Making Process

The qualitative and quantitative data shows that woman take most vital decisions on the immediate needs compared to male which is related to the survival of the family during the pre-disaster, during disaster and post disaster periods. In general women take decision about food preparation, fuel collection and food distribution while male members take decision for collection and purchasing of food grain, agriculture and seeds for early crops after flood. Table 23 shows that 91% in Gopalganj and 77% in Satkhira select the food cooking in this three periods when males' involvement is only 2% Gopalganj and Satkhira. Women roles are predominant in making dictions on food distribution 97%gopalganj and 86% in Satkhira. According to the survey data men's roles are predominant at both field sites in decision making on other issues like receiving loan, house repairing and other works.

Table 23: Decision Making Process in the Households on different Activities

Activities of Food	Percentage								
	Normal			During disaster			After disaster		
	female	male	jointly	female	Male	jointly	female	male	jointly
Cooking food	90.6	2.2	7.2	76.5	1.7	21.8	88.1	2.0	9.9
Food distribution	96.3	1.5	2.2	88.5	2.2	9.3	96.3	1.4	2.3
Full fill food deficit	32.1	41.0	26.9	21.7	36.9	41.4	28.4	39.6	32.0
To sale food grains	1.3	70.3	28.4	1.6	75.0	23.4	1.4	70.4	28.2
To sale seed	-	100.0	-	-	100.0	-	-	100.0	-
To buy food grains	4.1	51.4	44.5	4.0	57.1	38.9	4.1	49.3	46.6
To buy seed	2.9	80.9	16.2	3.6	83.7	12.7	3.1	80.0	16.9

Shelter/home stead, food, drinking water, sanitation, health, livelihood, social security, movements domestic animals are most vulnerable sources for women as these are ranked on the highest order. Sources of male vulnerability only ranked at the hugest level when it refers to drinkable water, livelihood income social security and domestic animal. The males vulnerability in this respect is less compared to the female. According to the ranking the second vulnerable position is occupied by children and old people. However the ranking of the sources of the vulnerability is high among women in all these stages of disasters.

5.5 Ranking of the Sources of Vulnerability.

Table 24: Sources to Vulnerability according to Gender

Source of Vulnerability	Female	Male	Children	Old
Shelter/Homestead	10	5	10	10
Food	10	5	10	10
Drinking Water	10	10	10	10
Sanitation	10	5	5	10
Health	10	5	10	10
Livelihood/Income Sources (agric /fisheries/business etc.)	10	10	[N/V]	5
Social Security	10	10	[N/V]	5
Movement	10	5	10	5
Domestic Animal (Die/Washed Away)	10	10	[N/V]	[N/V]

10 = Highest Vulnerable
 5 = Moderate Vulnerable
 [N/V] = Not Vulnerable

5.6 Who are the most Vulnerable and Why?

The current studies attempted to find out who are the most vulnerable and why according to the experiences of both male and female. Both qualitative and quantitative information has been collected to answer the question why women are most vulnerable against the impacts of climate change.

According to women of Satkhira disabled people are one of the most vulnerable groups in the climatic disaster. During the disaster period they have to depend on others to a safe place. Some of them often try to save their own lives and split from the group. They are washed away by the current. In the shelter place, there is no facilities for the disabled people. So they suffer a lot to get the meal. They also have problem due to the lack of toilet facilities. (The male respondents at both sites have not mentioned the name of the disabled groups.)

According to the response of female in Gopalganj disabled and old people cannot move quickly to the shelter during the disaster period. They need others' help to move to the shelter. They cannot move properly in every day life. They become sick very often. They also have problem to take bath and use the toilet. They cannot eat food properly. Often they die as they get scared. Often the other members in the family consider them as burdens.

According to the female respondent at Satkhira old people also belong to another most vulnerable group as they encounter problems during the time of disaster. They cannot move towards the safe shelter without others' help. It is often observed that all members of the family move to the shelter leaving old members of their family in the house. They only show, their concern about their own life. The old people then die. Most of the old people die during the disaster period because they get scared receive wounds. The male persons also think old people cannot move during the disaster period. They cannot move towards the safe shelter without others' help. Often they spent all day starving. Most of the old people break their limbs during the disaster when they try to move. Many of them spend days without treatment. Many of them have died without any medication. In Gopalganj site the male think old people often experience accident when they try to move without others help during the flood period. They then spend days in the bed as they become wounded. As

there is no doctors in the area many of them dies without proper treatment during this period.

The women in Satkhira think pregnant women are also one of the most vulnerable group.

Pregnant women too depend on others to move towards the shelter. They often do not get proper medication at that period so many of them become severely sick during this period. The male respondents think the pregnant women have to stay in the shelter during the disaster. There is no special treatment or facilities for the pregnant women in the shelter. They do not get proper medication at that period. If they get the doctors then no medicine is found so the pregnant women die. As the pregnant women do not get proper food during the disaster they suffer from anemia and malnutrition in Gopalganj, both male and female have not mentioned the name of this group.

The women at Satkhira reported that children are washed away by the tidal surge. The get scared during the disaster period and do not behave in a normal manner. The children under five years cry all day. Most of the kids get, fever, cold, diarrhea, pneumonia and skin disease. The male stated that children die when they fell into the water during the disaster period. Children are also washed away by the tidal surge. The salty water affected them. Many of them die as they drink excessive saline water of the surge.

Most of the kids get diarrhea, jaundice and dysentery. They kids have malnutrition during the disaster period as they have no food during disaster period. In Gopalganj, women reported that children fell into the water during the flood period. They also become happy to view the flood water. Most of the children get disease like diarrhea, cold and fever. The children fell into the water from the boat when they go far to defecate. They also get scared by the night on boat so become sick. Most young kids are not able to go on boat if they want to respond to natural call. The children cannot move alone.

The male has also observed that the children cannot guess about the flood. They become happy when view the water. They want to get into the water and play

around. Many children die in such a way. Many of the children do not get proper meal during the flood period. Often they drink dirty water and suffer from water borne disease like diarrhea.

The female groups at Satkhira acknowledged that woman encounter the major problems as they do not have a place to bath and toilet facilities. Often they have to response to natural call in an open place in the night. They lose their Shari when try to swim against the tidal surge. They have to remain themselves without cloths for ages. Women encounter problems with their period. They cannot maintain the privacy when all male and female stay together in the shelter. Most of the women get disease like diarrhea and skin disease. Women do not get proper medication during the disaster period.

They are also verbally abused by people when collect, water from their sources. Often they send their young girls to the relatives in distant places if these girls are considered as matured enough to be a probable bride. As the lights in the shelter remain on during the night they cannot sleep. Men and women stay in the same place. Often the women starve all day. Often the women swim across the polluted and dirty water to get the tube well water from the marketplace.

The male groups also agreed that woman encounter the major problems as they do not have toilet facilities. Often they have to response to natural call in an open place. Most of the women get, skin diseases as they stay in the water for a longer period. The *Shari* creates problem when women try to swim so they cannot go the shelter quickly. According to the female participants at Gopalganj as women are physically and mentally weaker than men so the get confused to move to the shelter quickly. Women cannot involve in income activities. Most of the women abstain themselves to respond to the natural call by the day. They have all sorts problem to cook, bath and respond to the natural call. If they are not able to go far for water often they try to make dirtying water useable.

The pregnant women also encounter many problems. They suffer from complex diseases. They also have problem to visit the doctors. The male also stated that woman undertake most of the domestic work like cooking, raring the children, constructing platform with bamboo, taking care of livestock, collecting, drinking water

etc. At that time if the male members leave the house situation become more critical for the women.

Box-1: Findings of participatory vulnerability assessment

The exercise of PVA has been conducted in Village Singhertali, Union Munshiganj, Upazila Shyamnagar in Satkhira District. Findings of the exercise are mentioned below which also have matched with FGD and survey data.

Problems during Aila as follows:

- a) Homestead damage by tidal surge
- b) Educational materials of the students are damaged and flown away
- c) Lack of communication system for movement. Huge water current on the roads embankment making difficult traveling for shelter
- d) Only thinking was how to survive
- e) After arrival at the shelter we search for our family members
- f) We've thinking about saving our business shop but we couldn't do anything
- g) Most of the domestic livestock was damaged and washed away by the Aila
- h) There were acute problems in sanitation facility. A single toilet in the school was for 5000 people in the shelter
- i) There was acute scarcity of drinking water (all fresh water sources were inundated & damaged by salt water)
- j) Suffocating environment in the shelter due to over population
- k) Food supply was once a day in the shelter
- l) There was no plates for taking food in the shelter, so we received Khichuri (Hotchpotch) with bare hands or on clothes for eating
- m) Many women's Sharee were washed away with the current, so they moved to shelter without Sharee only wearing Petticoat and Blouse
- n) There was no livelihood income
- o) We have to depend on relief only as there was no alternative income
- p) Lack of fuel for cooking food
- q) We prayed to god only to survive
- r) Fishing boats and nets were washed away
- s) Swimming was impossible due to strong current. It seemed that the Tidal Surge water was touching the sky
- t) Children and old peoples are mostly faced trouble in traveling to shelter. They had to beg for others help in that condition
- u) Theft and robbery activities increased during Aila. Solar module and costly furniture were robbed
- v) Many lost there memory by observing the devastating nature of Aila
- w) There was no space for even standing in the shelter due to over crowd.
- x) Many had to do the natural call on the standing condition. Many had to take shelter on trees (both male/female) when failed to reach the shelter. Snake was seen at the same tree coming from Sundarban
- y) A 78 years old person stated that, in 1951 there was a devastating tidal surge in that area when there was no tidal surge protection embankment. This year's tidal surge has much higher water level than 1951.

5.7 Problems Encountered only by Women

The experiences of women in different parts of the world suggest that some of the problems only encountered by women. It is stated that women seek solutions to the lack of drinking water, access to health and education, reducing factors of vulnerability of their communities in the face of hydrometeorological 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 or an earthquake, 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 of the Satkhira describes Women are hesitant in terms decision making during this period as they consider themselves mentally weak. Many of the respondents 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.

5.7.1 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.

5.7.2 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.

5.7.3 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.

5.7.4 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

5.7.5 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.

5.7.6 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 of the Gopalganj focused on the similar aspects as 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 the go on boat to distant place to defecate due the lack of toilets. Women worried about the security matured girls in the family. Even they are severely sick since they capable of breathing women have been providing service. Most of 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 lot of difficulties. If they have

labor pains there is 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 get 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 feed the children and male members in the family.

In all disasters period women undertake the all household work. Its become too difficult for them to collect fire wood. 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 platform, dry up the paddy etc. Women always ware the wet cloth as 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.

5.8 Belief related to Climatic Disaster

The socio-cultural belief and values related to climatic disaster is also one of the interesting features of the study. This also clearly reveals the gender dimension. In *Gopalganj*, according to the female participants the air get polluted when it rains. Then the *Satan* with influence of its bad soul create tidal surge. Some of the women think natural disaster occurs as people commit, sins. They think if people cross the limit of sins it results in cyclone and floods. The weather (*abhawa*) influences by the new moon and full moon. They also believe, storms are followed by the *kalipuja*. As if *kali* appears as a storm. In the month of *Kartik* it rains for 6-7 day which is termed *kaitan*. In contrast the male respondents stated that if people talk a lot about flood and disaster then it appears in drastic form. They think if people ignore this event no flood occurs.

In *Satkhira* 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 refers to a saying *kalir dhare bolir pataha* '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 which 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 worshipping *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 *jhuru 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 hen 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.

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5.9 Socio-cultural Belief and Values that Restricting Women

The study has revealed that some beliefs and values often restrict particularly women's movement during the disaster period. The women of the Gopalganj study area stated that not only in the disaster period it is not even taken for granted usually in the society if women go outside for work or anything else. It defames the family in the society. Most of the resistance derived from the mothers-in-law and other elderly people. In absence of husband if women want to visit the marketplace the mother-in-law's always objects. To put on flip-flop or sitting on a chair by the housewives is not allowed by the mother-in-law. Sometimes if someone have cold or breathing problem they need to put on flip-flops and then criticized by mother-in-law. If the women take, birth control pills then in-laws do not encourage.

There are different Christian's sects in the Nayakandi and other areas. Members of the one sect do not attend others' religious functions. They only attend their own religious programs. They cannot attend any *puja* outside the village without male members. They cannot go alone. If they go outside they need to finish the work first. If anyone attend the *puja* in other areas very often then elderly women blame them. If any one serve food to elderly people by putting on a pair of flip flop it is thought to invite misfortune in the family. Women cannot go to the market alone. They go with their family.

Things are being gradually changing nowadays. The mother-in-laws consider the current days as the era of Kali. It is not like the past according to them. Daughter-in-laws do not obey their words so they are free. All this happened due to Kali era. The male respondent only mentioned a few issues. There is no restriction for women in the area to attend any *puja* or cultural programs. Only when the children have exams women are not allowed to go to the cultural functions. Sometimes if there are any elderly women in the family they do not allow their daughter-in-law's going

outside. Otherwise, participation of women in different festivals are evident. Women are also running shops in the area.

The women of Satkhira stated that they have no problem to work outside. Due to poverty they are able to work anywhere outside the family. They can work in the market, Land River anywhere they want. Earning of both the male and female members in the family help them eat food everyday. They often participate in the *puja* in the neighboring places. Only for economic reason they cannot participate sometimes. Wearing shoes inside the house were not allowed earlier, but those days are gone. Nowadays people do not care elderly people.

According to the male, in the past, there were some restrictions in women's movement. Nowadays they are gone. Women are more empowered and they can move more freely. Women of most of the families work outside. They are also working in the man world which was done only by the men earlier. Both male and female members have to earn if they want to run a family. Otherwise it is very difficult for them to survive.

5.10 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 qualitative and quantitative has also help to bring in a better understanding on the gender dimension related to this issue.

The women Satkhira 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 donot 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 gardens 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.

In Gopalganj, women say as there is no shelter for the affected people they have to stay on the road during the flood. There is a lack of safe drinking water. Women have no toilet facilities during the disaster.

This territory is part of the low line area so inundated by flood water. Only boat is the main transportation for people. If someone has no boat he suffers a lot. The canals have silted up so water cannot recede from the *beel*. It creates, water logging.

There is no health centre for support. They cannot go to the doctor due to lack of communication. There is a lack of infrastructural support in communication.

They do not have savings so encounter various problems. If people do not stay on the road they are deprived from the relief. It is also very inconvenient to stay on the road. It is also difficult to maintain the safety of live stock. Women can move around smoothly and caught by different disease. There is a want of fire wood during this period.

Due to the lack of water hyacinth they cannot take care of the floating vegetable bed. It also affects on the fodder supply for the cattle and goat. The member is biased to his own sects people. So people with other religious identity do not get any support. There is a lack of job opportunities during the period of flood. They cannot take medication due to financial crisis. Often their oven get destroyed what the build during the disaster. It is also difficult to call in a doctor or to reach him if someone become sick at that time.

The view of the male reveals the worry as they do not get the exact price when sell out the live stock or plant during the disaster period. They do not have enough crop to save for the emergency need.

People do not have much savings. They have also problem to obtain loan. They borrow money from money lenders with high interest rate. It is difficult to pay the installments of NGOs during the disaster. NGOs only provide credit support to women rather than men. The engine boats are not available at that period.

They do not have enough money to construct platform inside the house to reside on this during the disaster. They cannot stay in the shelter due to lack of space.

After the flood it is difficult to get seeds and fertilizer for agriculture. They cannot make floating bed as there is scarcity of water hyacinth.

5.11 Individual Strategies for 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 Satkhira 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 relatives houses to take temporary shelter.

They can hardly take adequate food and mostly they take one meal a day due 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 to rare cow and goat to generate extra income.

They preserve cleaned rain water on the pot during the disaster. They cultivate vegetable at the homestead which provides extra income. This also help them who 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 vita 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 stay 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. Drinking waters is collected from the tube well during disaster period. 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 affects 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.

In Gopalganj site the male respondent stated about a few measures they undertake. They are:

- a) make the homestead higher by putting soils on it.
- b) put water hyacinth and bamboo around the vita.
- c) preserve bamboo and other stuff.
- d) move to higher places before the flood.
- e) sell out their household items.
- f) repair their house
- g) keep the tube well higher than the flood water level.
- h) preserve food and cooking material.
- i) construct a platform inside the house.
- j) prepare small mobile oven.
- k) make floating bed for animals.
- l) move to the road or on the high land.
- m) collectively pray in the church.
- n) material to purify water.
- o) store rice to run the family.
- p) cook the vegetable collected from the homestead.
- q) sell out duck's egg and often receive themselves.
- r) run the family by receiving loans from NGOs and money lenders.
- s) undertake fishing as an alternate occupation during the flood to maintain the family expenses.

According to the women of respective field site diverse activities are undertaken by them individually. They are:

- a) make separate oven, collect straws, preserve puffed rice and rice.

- b) male members put, soils on the house stead to make it higher.
- c) stick the tree branches on the homestead.
- d) jointly collect the livestock.
- e) males go to the distant place in search of work.
- f) they tie up the roof with rope.
- g) they put bamboo surroundings the house and support it with water hyacinth.
- h) take care of old members and children.
- i) make floating bed with water hyacinth.

5.12 Assumptions Regarding the Vulnerability to Climate Change

The respondents in the study area also reflected on the issue related to the losses encountered Bangladesh compared to other country due to its climate vulnerability.

The male at Satkhira think Bangladesh is a country which is attached with coast line. It is also surrounded by water. If the ice started melting in the polar zone Bangladesh would shrink into the water before other countries. Bangladesh government does not have enough economy capacity of encounter such devastating cyclone sydore aila or floods. Evidently the water level during tide period has been rising compared to the past. It somehow associated with the ice melting at the polar zones. If this trend goes on they think Munshiganj will be badly affected. There is no embankment constructed which can protect the land from flood or tidal surge created by aila like cyclone.

According to them Sundarban protects them from flood and cyclone. On the other hand, Bangladesh is not full of tree. If the trees were abounds in the country they would have been protecting the land from strong wind. Due to the lack of threes the country get badly affected by disaster.

The government and local administration donot have enough disaster preparedness. According to the information disseminated by radio and television Bangladesh will be the most badly affected country in the world. As Bangladesh cannot produce sufficient food according the demand so it will be the most badly affected country

during the disaster. Not only has the economic strength Bangladesh been also technologically inadequate to overcome the losses caused by disasters.

The women group stated that they frequently visit India. They are able to compare Bangladesh with India as they think Bangladesh will be the most badly affected country due to the climate change. The people in India get Tk 30 thousand each with cloths and foods if they are affected by flood. Bangladesh government is poor, so they do not get enough support to survive. So they think Bangladesh will be the most badly effected country. Bengali people are poor. People in other countries can overcome the loss as they have enough money. Bangladeshi poor people cannot do this.

They think bigger cyclones mostly hits Bangladesh compared to other countries. So this is most loser country by the disaster. The relief is distributed through UP chairman. Due to the corruption they donot get the proper allocated relief for each person.

According to the male respondents of Gopalganj site although they are not aware about the situation in other countries, they think Bangladesh is the most affected country in the world. The government of Bangladesh is not economically strong enough to overcome such a big loss. Bangladesh may become part of the ocean due to climate change. Bangladesh does not have enough trees and plants to protect it from cyclone and floods. This country is highly populated and majority of the people are poor so they are not able overcome the bad impacts of climate change.

The female respondents say this area is part of beel so it is inundated by flood water. The tin on the roof of the house is blown away by the storm. So they become affected. It floods here when India opens Farraka barrage. As they live in this country so they think this is the most affected country.

6. Strategy to reduce Disaster Risk

Peoples' experiences have been explored through qualitative and quantitative approach to have an understanding about their effective strategies to reduce the

disaster risk. The gender dimensions of the respective issues was also emphasized during the study.

The women at satkhira say the cyclone Sydore and Aila heated suddenly so they were so 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 oven and often store dry food and fire wood. As their house get 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 the 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 hose 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.

In gopalganj 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, fire wood. 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.

6.1 Way to overcome the Barrier

The respondents at both sites suggested criteria how to overcome constraints to face the disaster. Number of measures was suggested by the women of Satkhira to overcome the constraints. These are:

- i) construct embankments to protect locality from Cyclone, tidal surge and salinity;
- ii) arrange money to construct house after disaster;
- iii) need deep tube well;
- iv) The rivers need to re excavated to stop the river erosion;
- v) Measure should be taken to protect people from tiger;
- vi) The forest pants need to be protected;
- vii) A handicraft industry needs to be established;
- viii) Fisheries based interventions need to be taken;
- ix) Boat building industry need to be established;
- x) Economic supports in post disaster period need to be ensured;
- xi) The shelter needs to be establish in the nearest place;
- xii) Separate space should be allocated for male and female in shelters;
- xiii) There should have safe toilet facilities in shelters;
- xiv) Loan should be arranged with low interest rate;
- xv) The warning signals need to be improved;
- xvi) The shrimp farming should be stopped;
- xvii) Equal distribution of relief needs to be ensured;
- xviii) People should be protected from the robbers during the disaster and post disaster period.

Similarly the male group in the same area suggested some measures. They are as follows:

- The BWDD's embankment needs to be strongly reconstructed. It should be made ten feet higher than the current height. Channels to drain in shrimp farm. Sluice gates must be constructed. The road on the embankment need to be concretized as people can move through this.

The steel piling should be introduced besides the embankment then the erosion can be ceased.

- The government could create alternative work scopes for people. The Munshiganj area can be industrialized. Separate work facilities for man and women can be created. Each family should be supplied with saline tolerant plants without cost. A measure should be taken to storage food in proper place.
- It needs to be ensured by proper relief distribution management that the real victims get the support. To make people aware that they do not make hole on the embankment to drain water in the shrimp farm.
- Initiatives are required to protect the plants of Sundarban from illegal loggers. Trees need to be transplanted on the embankments.
- NGOs should also provide credits to the male.
- Farmers should be encouraged to cultivate rice rather than shrimp. Then many day laborers will get back their job.
- Deep tube wells may be constructed on higher platform to provide save drinking water.
- People can take shelter on the roads if those are concretized.
- Each family should be provided with safe toilets.
- People should be made aware of birth control,

The suggested measures by the women group in Gopalganj are listed bellow:

- The homestead should be made higher to protect it from water
- Shelter should be created in the nearest places
- Women need training to get involve in income generating activities
- The homestead needs to be constructed on 5 ft higher than the land level
- Deep tube wells is needed to be installed to ensure safe water
- Roads should be made higher

- A high school is demanded by people in the village that children will experience any study break during the disaster period
- Employment should be created for male and female in the post disaster period
- A hospital should be constructed in the nearest distance
- Road should be made much wider as rikshaw van a move and
- Disaster awareness raising activities need to be enhanced.

On the other hand the male respondents suggests following measures:

- The canal should excavated to confirm the regular water flow in it. Water would also recede from the area if is done
- Boat should be arranged during the disaster to move people to the safe place
- A higher field should construct for the live stock and fodder should be kept to feed them
- Sufficient number of shelter needs to be provided
- Hospital should be situated in the nearest place
- Government should support people to make their house stead higher
- Toilet should be erected higher for proper management
- Infrastructure development is required in the area
- Government should provide fertilizer and seeds for agriculture during the post disaster period
- Micro credit should be provided with low interest
- The relief should be given to the real victims of disaster
- Each family should be given a toilet and boat
- Separate space should be created for women in the shelter
- An engine boat should be given to each of the ward and
- Like women man should be provided micro credit.

7. Conclusion:

The study on gender and climate change issues have revealed some vital aspects of the problem which should have been considered and they can put forwarded by the development practitioners, government and other stakeholders. The current studies has tried to cover various aspects of life of the people according to gender differences in the most disaster prone areas in the country. Specific evidences of women's perception and knowledge and their everyday practical experiences in the pre, post and during disaster period play an important role to contribute to the climatic disaster risk reduction activities. Informal rules and customs, role of the government and its functions at the very local level, inadequate policy support at both national and international level have discriminated women as far as their role in climate change adaptation is concerned. Specific problem encountered by women and solutions to such problems were not worked out by the respective agencies. The study also has emphasized on the adequate role of men in some respective matters, but in contrast their statement highlights the significance of women's role. Although women as mother, daughter, sister and wife with economic and social vulnerabilities struggle to survive, they take the major responsibilities of the family. The significant role of the women in this regard is rarely recognized in all spheres of the society even by the state. The vulnerability of women and their 'social responsibilities' determined by mothering could not restrict their adequate responses to the activities contributing to the adaptation strategies to climatic disaster collectively by the community.

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 costal 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.

The study only helped in generating knowledge through a small scale research effort on the gender perspectives which reveals the proactive ness of women compared to

men in coping and adapting with the climatic disaster impacts. The conventional views of unwillingness of women to be straightforward was missing in the respective study areas. The proactive appearances and activities of women in the public spaces undoubtedly prove that they are equally capable like men to deal with the public issues. Although it has carried messages to the researchers, these findings may have very little implication to contribute to the gender equity. Nevertheless its importance at the knowledge level is crucial which may enhance the future directives to establish gender equity through proper communication and dissemination.

8. Recommendations:

Some specific and general recommendations have been drawn in line with the above findings and discussions on gender, climate change issues. They are as follows:

1. More areas specific socio-cultural conditionality supported climate change adaptation strategies need to be prepared;
2. Proper and detail documentation of climate change adaptive strategies of male and female need to be considered to ensure the ownership;
3. The strategies should be framed considering gender equity and poverty eradication issues;
4. Both formal and informal institutions should focus on the cultural ideology of gender to get rid of existing notion of viewing women that reflects the patriarchal;
5. Government mechanism to support both male and female disaster victims in the cyclone shelter should be developed to create a favorable condition for all in the disasters shelters with all required facilities;
6. Priority should be given in pre post and disaster period on the disable old and pregnant women by ensuring the all supports including medication facilities particularly during the post disaster situation;
7. The strategies should define separately to address the gender specific problem emerged as short-term basis. On the other hand, gender specific measures should be taken to support long term adaptation to CC;
8. Local Strategies and action plans are to be implemented considering risk Vulnerability and state of male and female;
9. The issues should be addressed to reduce the social and economic vulnerability of women and help creating an environment that all

responsibilities in the respective action to the climatic disaster related action can be equally shared by male and female;

10. Capacity building activities should be undertaken to make both male and female mentally stronger as they can overcome socio-political constraints to respond properly to CC issue; and
11. The existing resource constraints of local people need to be addressed as they can properly address the CC issue.

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Appendix –I: Household Survey Questionnaire

Household Survey Questionnaire on “Gender and Climate Change”

BCAS –NCA

1. Household Identification no.: ..., Village:....., Union:, Upazila:District:
2. Name of Respondent:, 3. Father’s/Husband’s Name:, 4. Religion:
5. Age (years);, 6. Sex (✓): Male =1, Female =2, 7. Education level (Write Code):, (8) Relationship with Household Head (Write Code):.....

9. Household Socio-Economic Information:

9 (a) Population and Occupation

Sl. No.	Name of the family members (Write Household Head's name first)	Sex Male=1 Female=2	Age (years)	Relationship with Household Head (Write Code)	Education Level (Write Code)	Marital Status (Write Code)	Primary Occupation	Secondary Occupation

Education Code:

1. Illiterate
2. Can sign only
3. Primary

Relationship Code:

0. Household Head
1. Father
2. Mother
7. Brother
8. Sister
9. Father in law

Marital status Code:

1. Married
2. Unmarried
3. Widow
1. Agriculture
3. Non-agric Labour
5. Household work

Occupation Code:

2. Agric/wage labour
4. Sharecropper
6. Service

4. SSC 3. Husband 10. Mother in-law 4. Divorced 7. Business 8. Rickshaw/Van Puller
5. HSC 4. Wife 11. Grand Father Other (specify) 9. Fishing 10. Harvest Shrimp Fry
6. Degree & above 5. Son 12. Grand Mother 11. Fish/Shrimp Culture 12. Fish Business
Others (specify) 6. Daughter Others (specify) 13. Poultry/Duck Rearing Others (specify)

9 b. Land Ownership Pattern in Decimals by Gender

Ownership pattern/ Amount of land/Total value	Amount of Land by Ownership and by Land Types							Total
	Homestaed	Agric. land	Sharecropper out land	Shrimp Gher	Pond/Fish Culture Pond	Fallow Land	Other (specify)	
Male members								
Female members								
Male and Female Jointly								
Total amount of land (decimals)								
Total Current value of Land (Tk)								

9 (c) Ownership of Other Household Assets according to Gender

Code no.	Name of Assets (class-wise)	Quantity/number	Current vale (Tk)	Ownership patter (tick)		
				Female	Male	Both
01	Pucca House					
02	Semi Pacca House					
03	Corrogated Iron Sheet Kancha House					
04	Straw mad Roof Kancha House					
05	Cattle					
06	Water buffalw					
07	Goat/Sheep					
08	Duck					
09	Chicken					
10	Spade/Wider/Hoc					
11	Plough					
12	Power tiller					
13	Shallow tube well					
14	Paddy husking machine					
15	Rich Mill					
16	Spray machine					
17	Swing machine					

18	Fishing net					
19	Country boat					
20	Push cart/ Rickshaw Van					
21	Trees (in number)					
22	Annual crop (rice/jute) in monds					
23	Radio					
24	Television					
25	Gold (Jewllary)					
	Hard Cash					
	Other (specify)					

10. Wealth-wise Household Class (tick): Very poor=1, Poor=2, Middle=3, Rich=4, Very Rich=5

11. Sources of drinking water (tick): 1. Deep Tube well; 2. Tube well; 3. Pond; 4. Shallow Tube well; Other (specify).....

12. Sources of water for domestic use (tick): 1. Deep Tube well; 2. Tube well; 3. Pond; 4. Shallow Tube well; Other (specify).....

13. Types of latrine used (tick): 1. Pucca/healthy; 2. Kancha-hole; 3. Hanging; 4. Open; Other (specify).....

14. Does your house has electricity (tick)? 1. Yes 2. No

15 (a) Family's Annual Income and the Main Sources :

Sources of Income	Annual Income (Tk)
1. Agriculture crops	
2. Agriculture wage labour	
3. Non-agric wages	
4. Fishing	
5. Fish culture	
6. Business	
7. Service	
8. Livestock	

Sources of Income	Annual Income (Tk)
9. Poultry-ducks (checken , ducks)	
10. Trees	
11. Rickshaw/van pulling	
12. Sewing works	
13. Cottage industries	
14. Remittance from abroad	
Other (specify)	
Total Annual Income (Tk)	

15 (b) Family Expenditure in last 12 months (approximately)

Taka.....

15 (c) Family receive amount of credit/loan in last 12 months by sources. Sources Amount

.....Taka.....

.....Taka.....

.....Taka.....

.....Taka.....

Total

15(d) Balance of Income and Expenditure (tick): 1.Income more than Expenditure

2.Income and Expenditure are equal 3. Income less than Expenditure and there is deficit

15 (e) How do you meet your deficit?

16 (a) Are of your family sources of income or family assets affect by any climatic/ natural disasturs? (tick) 1. yes 2. no

16 (b) If yes, identify the causes of affect with level of damages (write code)

Flood	Drought/ Lack of Rain	Cyclone	Salinity	Sea level/ tide level rise	Excessive Rainfall	Increase Temperat ure	River bank erosion	Water- logging	Tidal Surge	Other (specify)

Damage level code: Severe damage=1, Moderate damage=2 , Not much damage = 3

17 . Which of the causes do you identify as weatehr /climate related? (tick)

Flood	Drought/ Lack of Rain	Cyclone	Salinity	Sea level/ tide level rise	Excessive Rainfall	Increase Temperat ure	River bank erosion	Water- logging	Tidal Surge	Other (specify)

18. What do you mean by weather?

19. What do you mean by Climate?

20 (A) Do you notice any change in the weather/climate? (tick) 1. Yes 2. No

20 (B) If yes, how do you notice that the weather/climate is changing?

21. Which of your family assets and production input are being affected by the natural disaster/ climatic and what is the level of damage?

Family main assets/and production sectors	Damage level										
	Flood	Drought/ Lack of Rain	Cyclone	Salinity	Sea level/ tide level rise	Excessive Rainfall	Increase Tempera- ture	River bank erosion	Water- logging	Tidal Surge	Other (specify)
1. Homestead and houses											
2. Trees											
3. Livestocks, poultry and ducks											
4. Crop fields											
5. Crops and Vegetables											
6. Fish farms/ Shrimp gher											
Other (specify)											

Damage level code: Severe damage=1, Moderate damage=2, Not much damage = 3

22. Which of the natural disaster /climatic hazards damage your family income sources and what is the level of damage?

Income sources	Flood	Drought/ Lack of Rain	Cyclone	Salinity	Sea level/ tide level rise	Excessive Rainfall	Increase Tempera- ture	River bank erosion	Water- logging	Tidal Surge	Other (specify)
1. Agriculture crops											
2. Agriculture wage labour											
3. No-agric wages											
4. Fishing											
5. Fish culture											
6. Business											
7. Service											
8. Livestock											
9. Poultry-ducks											
10. Trees											
11. Rickshaw/van pulling											
12. Swing											
13. Cottage industries											
14. Remittance											

Income sources	Flood	Drought/ Lack of Rain	Cyclone	Salinity	Sea level/ tide level rise	Excessive Rainfall	Increase Tempera- ture	River bank erosion	Water- logging	Tidal Surge	Other (specify)
from abroad											
Other (specify)											

Damage level code: Severe damage=1, Moderate damage=2 , Not much damage = 3

23. Which of the following natural disaster/ climatic hazards affect your family well-being and at what level?

Family well-being sectors	Flood	Drought/ Lack of Rain	Cyclone	Salinity	Sea level/ tide level rise	Excessive Rainfall	Increase Tempera- ture	River bank erosion	Water- logging	Tidal Surge	Other (specify)
1. Food security											
2. Health											
3. Education											
4. Safe water											
5. Sanitation											

Impact level code: Severe impact=1, Moderately impact=2 , Less impact = 3

24 (a) Do you think Male, Female and Children are equally vulnerable by the above mentioned causes? (tick) 1. Yes 2. No

24 (b) If no, mention the variation in the vulnerability by the type/pattern and level of vulnerability

Family well-being sectors	Female	Male	Children
1. Income Sources	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:
2. Homestead	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:
3. Food Security	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:
4. Health	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:

Family well-being sectors	Female	Male	Children
	Level:	Level:	Level:
5. Education	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:
6. Sources of Water	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:
7. Sanitation	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:
8. Social security	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:	Pattern of Vulnerability: Level:

Vulnerability level code: Severe vulnerable=1, Moderate vulnerable=2 , Not much vulnerable = 3

25. Which of the following activities are your family members associated with by gender?
(write gender code)

Activity	During Normal time	During a disaster	After a disaster
1. Meal preparation			
2. Collect water			
3. Livestock rearing			
4. Taking care of Children			
5. Agricultural work			
6. Non-agric. Wages labour			
7. Agric. Wages labour			
8. Small busness			
9. Shrimp culture			
10. Fish culture			
11. Shrinm fry collection			
12. Fishing			
13. Service			

Gender code: Female = 1, Male = 2, Both = 3

26. Describe the decision making process of your family by gender (write gender code)

Decision making	Normal time	During disaster	After disaster
1. Meal preparation			
2. Food distribution			
3. Meet up food deficit			
4.1 Sell the Family assets : Livestock			
4.2 Sell food crops			
4.3 Sell seeds			
4.4 Sell ornament			
4.5 Sell trees			
4.6 Sell houses			
4.7 Sell land			
5.1 Buying Family Assets: Livestock			
5.2 Buy food crops			
5.3 Buy seeds			
5.4 Buy jewelleries			
5.5 Buy trees			
5.6 Buy house			
5.7 Buy land			
6.1 Receive credit form Mohajon			
6.2 Receive credit from relatives			
6.3 Receive credit from Bank			
7. Alternate livelihood activities			
8. Mortgage out land			
9. Use saving			
10. VGD/ VGF			
11. Engage in new income generating activity			
12. Give marraige			
13. Conceiving a baby			
14. Female going outside the homestead (far away)			
15. Female going to work			
16. Male go to work			
17. Education of children			
18. Household work			
19. Collection of Water			
20. Going to a shelter place			
21. 1. Migration (temporary)			
21.2 Migration (parmanent)			
Other (Specify)			

Gender code: Female = 1, Male = 2, Both = 3

27. Individually engagement in social work in out side the homestead by gender

Activities	Female			Male		
	None	Less	High	None	Less	High
1. Visiting Relatives						
2. Going to market						
3. Collecting Water						
4. Working outside						
5. Going to a Fair						
6. Going to Health Care centre						
7. Going to the Bank						
8. Going to Parents-Teacher meeting in School						
9. Participating in the Village arbitration						
10. Participation in NGO activities						

28. What are the specific problems that women have to face?

29 (a) During Normal Period:

29 (b) During Disaster Period:

29 (c) After Disaster Period:

30. Who is doing which of the activities to cope with disaster by gender?

Activities	Disaster preparedness (write code)	Disaster coping mechanism (write code)	
		During disaster	After disaster
1. Meeting food deficit			
2. Sell assets			
2.1 Livestock			
2.2 Sell food			
2.3 Sell seeds			
2.4 Sell ornamet			
2.5 Sell Trees			
2.6 Sell Houses			
2.7 Sell land			

Activities	Disaster preparedness (write code)	Disaster coping mechanism (write code)	
		During disaster	After disaster
3.1 Receive credit from relatives			
3.2 Receive credit from Mohajon			
3.3 Receive credit from Bank			
4. Alternate livelihood activities			
5. Mortgage out land			
6. Use saving			
7. VGD/VGF			
8. 1 Migration (Parmnent)			
8.2 Migration (Temporary)			
9. Disaster-tolerant alternate crop cultivation			
10. Duck rearing			
11. Homestead vegetable gardening			
12. Shrimp cultivation			
13. Floating Gardening			
14. Crabe fattening			
Other (Secify)			

Gender code: Female = 1; Male = 2, Both_ = 3

31. What are the limitations / barriers to your existing coping mechanism?

32. What new activities do you suggest in order to overcome those limitations/barriers?

33 (a) Do you think there is any need special initiatives for women to cope with disaster? 1. Yes 2. No

33 (b) If yes, describe the coping options ?

34 (a) Is there any difference between the male and female roles in the local government and NGOs initiatives to cope with a disaster?

1. yes 2. no

34 (b) If yes , describe the difference between male and female activities

34 (c) Disaster Preparedness:

34 (d) During Disaster Period:

34 (e) After Disaster period:

Name of Investigator:....., Signature:, date:

Appendix –II: Checklist of Key Informants Interview

Study on Gender and Climate Change; BCAS-NCA

Name of the Respondent:....., Designation:....., Department/.....

Interviewer Name:, Date of Interview:..... Signature:

1. How the vulnerability contexts of climate variability and change compared between women and men?
2. Why women are more vulnerable during disasters?
3. How women got health risks during post disaster period?
4. Is there any reflection of existing social or cultural ideology among the people who deal with both pre and post disaster support activities for women?
5. Has cultural values restrained on the mobility of women ?
6. Do you think of any cultural values that (women's sphere is defined as private and men as public) restricts women's communication with the outside world?
7. What kind of individual and collective actions can play a significant role in enhancing community in adaptation to climate change by women and men?
8. How do different adaptation measures impact on women and men?
9. What do you think why and how Bangladesh is more vulnerable than any other countries
10. What are the factors with gender in shaping the vulnerability of females to climate change
11. When is it necessary to develop gender specific measures and mechanisms to facilitate the adaptation to climate change?
12. What kinds of gender specific adaptations are effective?
13. What is needed to overcome these barriers for women and men?
14. Who is more vulnerable- men or women? If women, why are they vulnerable?
15. How and when are they vulnerable?
16. Are disabled, elderly, pregnant women and children are particularly vulnerable to climate change impacts?

17. What kinds of measurement and mechanisms have been developed to assist different types of vulnerable groups in adapting to climate change?
18. What kinds of adaptation measurement have they developed for themselves?
19. Are any additional measurement needed?

Appendix III: Guideline and Checklist of FGD

Study on Gender and Climate Change; BCAS-NCA

Prepare a list of all FGD Participants with their age, sex, main occupation and signature.

Facilitator should try to involve everybody in discussion and keep notes upon agreement and disagreement points clearly.

Four focus group discussions (FGDs) in each study village (Homogenous groups 8-12 persons in each discussion session e.g., wage labour, small farm holders, medium and large farm holders and women group).

Discussion points:

1. Men and women's differentiated role and opinion keeping perspective of household resource management;
2. Men and women's perception and experience on climate change and its impacts;
3. Context wise climate change related disasters and externalities variability and vulnerability of women and men- Before Disaster, During Disaster and After Disaster (according to Household well being in terms of:)Livelihood, Food, Clothing, Shelter, Safe Water, Health, Sanitation, Social Security, Land, Trees, Agriculture, Fisheries Resources and Livestock
4. Describe the differences if found in case of the above mentioned criteria in terms of the extent of vulnerability faced by men and women;
5. Identify the most vulnerable groups and the causes of their being the most vulnerable;
6. Describe the climate change related vulnerabilities for the disabled /the elderly /pregnant women/ children;
7. Describe the cultural and social values restrictions on the mobility of women.
8. What are the cultural codes (women's sphere is defined as private and men's as public) that women need to follow in their communication with the outside world;
9. What Men and Women's traditional beliefs about climate change related impacts?
10. What are the specific problems that women have to compact?
11. Why do you think and what extent Bangladesh is more vulnerable in terms of climate change compared to other countries in the world?;
12. Identify existing coping mechanisms for combating disasters individually or collectively by women and men;
- 13 How would you evaluate different coping mechanisms in combating disasters by women and men?

- 14 Identify necessary the impact of the gender specific coping mechanisms in combating disasters.
- 15 Identify the implementing coping mechanisms in combating disasters which they developed for themselves and how these measures differ between men and women;
- 16 What are the limitations / barriers of men and women to these implementing coping mechanisms at the local level?
- 17 What activities do you suggest in order to overcome those limitations/barriers?
- 18 Describe male and female roles in the local government initiatives to combating a disaster in case of:
 - Disaster preparedness
 - During disaster
 - Post disaster period
19. Describe male and female roles in NGO initiatives to combating a disaster in case of:
 - Disaster preparedness
 - During disaster
 - Post disaster period

Appendix IV: Guideline and Checklist of PVA

Study on Gender and Climate Change; BCAS-NCA

1. Physical Vulnerability Mapping (Preparation of Hazard Map & Resources map of the study Village)
2. Variation of Climate Variability Mapping through time series analysis and seasonal diagram
3. Vulnerability Mapping on Natural resources and livelihood assets through seasonal diagram
4. Social Vulnerability Mapping
5. Perceptions, knowledge and experiences on Climate Change by men and women?
6. Why women are more vulnerable during disasters?
7. How women got health risks after happening disasters?
8. Has cultural restrains on mobility of women eased overtime?
9. Opinion about cultural codes (women's sphere is defined as private and men as public) about women restricted on their communication from the outside world?
10. What kinds of individual and collective actions can play a significant role in enhancing community in adaptation to climate change by women and men?
11. How do different adaptation measures impact on women and men?
12. What impacts are the same? What impacts do differ?
13. What do you think why and how Bangladesh is more vulnerable than any other countries?
14. What are the factors with gender in shaping the vulnerability of females to climate change
15. When is it necessary to develop gender specific measures and mechanisms to facilitate the adaptation to climate change?
16. What kinds of gender specific adaptations are effective?
17. What are the barriers to adaptation measures at the community level for women and men?
18. What is needed to overcome these barriers for women and men?
19. Who is more vulnerable- men or women? If women, why are they vulnerable?
20. How and when are they vulnerable?

21. Are disabled, elderly, pregnant women and children are particularly vulnerable to climate change impacts?
22. What kinds of measurement and mechanisms have been developed to assist different types of vulnerable groups in adapting to climate change?
23. What kinds of adaptation measurement have they developed for themselves?
24. Are any additional measurement needed?

Appendix V: (Pictures)



Water logging in dry season in Satkhira district
(in south-west coastal region in Bangladesh)



Local community people participation in Participatory
Vulnerability Assessment (PVA) at Shinghertali
village in Shyamnager Upazila, Satkhira district



Female members are participating in Focus Group Discussion at Goalgram village in Muksudpur Upazila, Goaplganj district

Male members are participating in Focus Group Discussion at Goalgram village in Muksudpur Upazila, Goaplganj district

