

WOMEN'S LIVELIHOOD RESILIENCE AND ADAPTATION OPTIONS FOR CLIMATE CHANGE



A Dissertation for the Degree of Master in Disaster Management

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Abstract

Climate disaster, like flood puts a lot of pressure on women whose responsibility is still that of keeping families together and feeding them. Up until now, a gender perspective has been mainly lacking from the international debate on climate change. The main objective of my research is identifying the perception of women regarding their livelihood option and their capacity to cope to climate change and prioritize the adaptation option for reducing their vulnerability.

Saturia upazila in Manikganj district is selected as my research area due to flood proneness of the area and women's vulnerability to climate changes in agricultural and livestock sectors. A number of FGDs were carried out to elicit the perception of women regarding climate change and their preferred adaptation options.

The threat of climate change as perceived by women includes long term flooding, higher frequency of flooding and sudden flooding. Women are now facing threat of extreme poverty due to loss of income and damages to crops. As a result, their vulnerability is growing with alarming rate due to climate impacts on agricultural sector. Direct and indirect impact of current flooding is imposing negative effects on livestock sector also. The community resilience is to cope with flooding by changing food habits, diversion of income option and depending on credit loan from NGO or local money lenders. Adaptation options are urgently needed for the reducing women's vulnerability. The results of my research are highlighted to understand adverse impact of climate change on women's livelihood options and the draft adaptation menu is selected through bottom up approaches.

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Chapter one: Introduction

1.1 Background

Women's work is often socially invisible but in the great majority of households around the world their life-sustaining and income-generating activities of everyday life are essential. Economic rehabilitation and reconstruction planning must target economically active women of all ages and social groups. Climate change is affecting everybody, regardless of caste, ethnicity, sex, race or level of income. But it is women who are suffering the most, simply because they are women, and women are poorer. Women make up for 70% of the world's poor. They have less access to financial resources, land, education, health and other basic rights than men, and are seldom involved in decision making processes. Women are therefore less able to cope with the impact of climate change and are less able to adapt.

1.2 Problem statement

Women's unequal position in rural society means women have less access to money, land, food, protection from violence, education or healthcare. They are also more dependent on natural resources for their subsistence. Therefore they are more exposed to climate shocks and have fewer resources to protect their own lives, assets and livelihoods while looking after their families. There are many ways in which women are affected differently, and more severely, by climate change.

In Bangladesh various studies have been discussed about disaster on geographical perspective. However, some recent studies have been emphasized on women's vulnerability. It has been argued by many disaster researchers that women are the major victims of disasters due to their lower status than men in society. Thus attention should be given to special groups such as women and children.

1.3 Justification

Climate change is one of the greatest obstacles to ending poverty and one of the gravest equity challenges of our time. Not all poor people will be affected equally. Poor women also lack access to and control over natural resources, technologies, and credit. As a

result, they are more vulnerable for seasonal and episodic weather and natural disasters resulting from climate change. The women in the society are now consisting of the following groups:

- **Women as food producers and providers**
- **Women as guardians of health**
- **Women as agents of change**

Women are most socially visible as victims in Bangladesh, a naturally occurring event made all the more destructive by succeeding years of flood. Persistent poverty and economic insecurity, the gendered division of domestic labor, reproductive and health differences, exposure to violence, disparate educational and social opportunities, and secondary political status combine to put women at high risk, particularly those who support households alone, the aged and disabled, and women marginalized by caste or religion. Their long-term recovery from the compound effects of these disasters will certainly be complicated by this climate change context.

1.4. Broad objectives

The broad objective of this study is to understand of women's perspective related to their livelihoods subjected to climate change.

1.4.1. Specific objective

To identify the livelihood options of women in the research area

- To link the threat of climate change with their livelihood activities
- To identify mitigation and adaptation options related to of women's livelihood activities in the research area.

1.5. Significance of the research

This research will help to take adaptation action to reduce women's livelihood vulnerability in research area and invest in making development efforts climate proof.

1.6. Limitation of the research

- This research is not conducted with all specific villages in the study area.
- Only flood is considered but river erosion and other manmade hazards are not identified.
- The research is focused on agricultural livelihood options but in the study area other existing livelihood options.

Chapter 2: Literature review

The NAPA (Gaurang, *et al.* 2007) and the Initial National Communication revealed the fact that a weak economy and widespread poverty in Bangladesh have contributed to low adaptive capacity to withstand the adverse impacts of climate change. Results is highlighted to the high dependence on climate-sensitive sectors. such as agriculture, forestry and fisheries. coupled with poor infrastructure facilities, weak institutional mechanisms and lack of financial resources.

Many would say that global warming is the most serious environmental issue of the twenty first century. As a result of climate change, women have seen their workload increase in many activities which have traditionally been women's responsibilities. In times of climate disasters, like floods and a lot of pressure is put on women whose responsibility is still that of keeping families together and feeding them. Up until now, a gender perspective has been mainly lacking from the international debate on climate change. But the different ways in which women and men treat the environment and are affected by its changes must be taken into account in order for effective and sustainable climate change programmes (Daddy, .1. 2002)

2.1. Situation of Rural Women in Bangladesh

The majority of women belong to small cultivator or tenant households. Many work as wage laborers on a part time or seasonal basis, usually employed by large landowners and generally receive payment in less than their male counterparts and some times in kind. (Halim, 2001). In female -headed households (currently 5.9% in 1996, BUS) women have become the chief breadwinners in many families with children. In such situations of extreme poverty and need, cultural constraints became irrelevant for these women. The population of Bangladesh is comprised of 87% Muslims, 12% Hindus and 1% Christians,

Usually it is women who do all post-harvest processing and look after livestock. Poultry and kitchen gardening. Men generally own and manage family land and income. therefore, her contributions remains overlooked. In rural society women are classified as "dependent" of her husband's family rather than an active and equal partner in the process of production (World Bank, Bangladesh. 1990). Women tend to be evaluated in terms of their reproductive, rather than their productive capacities. Thus women's work is confined to the household, and her role in household production is taken for granted and unremunerated. The combination of remunerated and unremunerated work leads to a disproportionate burden for women. (I lalim.l., 2007). For women no access to property and other resources especially land is a major problem in terms of participation in economic activities. Policy makers assume that male members in the family would just allow women to use the land. Research findings (Agarwal, 1992, Halim. 2000) shows many women are handicapped in agricultural and forestry programmes where land is required to become participants. The other aspect is that the adverse impact of globalization and structural adjustment programmes has worsened the situation of women and aggravating the feminization of poverty. Negative consequences of structural adjustment programmes have continued to put a disproportionate burden on women (Illish .2001).

Women are among the poorest of the rural poor, especially when they are the sole heads of their households, such as widows or wives of men who have migrated in search of employment. They suffer discrimination because of their gender. they have scarce income earning opportunities and their nutritional intake is often inadequate. Among extremely poor people, there are a disproportionate number of households headed by women. Not all poor people will be affected equally. Women. who make up 70 percent of the world's poor. depend more than men on natural resources that are threatened by climate change. Poor women also lack access to and control over natural resources. technologies. and credit. As a result. they are more vulnerable to seasonal and episodic weather and to natural disasters resulting from climate change.

Rural non-farm activities in the form of micro enterprise development offer an indispensable alternative to reducing unemployment. This claim can be supported by the fact that during the 1990s the rural non-farm employment not only played a critical role in poverty reduction - it also made the major contribution to overall economic growth in Bangladesh (Osmany.G., *et al*, 2003). Therefore, it is quite evident that if massive micro enterprise development initiatives can be taken up involving poor who have potential entrepreneurial capacities and benefit from micro credit then there is every possibility that the existing rural unemployment would be reduced leading to economic growth and poverty alleviation at the grassroots level.

A vast majority of women in Bangladesh are small producers whose livelihoods depend on the income from selling their products. However, their livelihoods are strongly influenced by various factors, such as inadequate access to knowledge and information, unaffordable appropriate technologies and skills, physical and commercial isolation from markets, uneven competition with imported products in the domestic markets, price distortions due to national and international trade policies and decline in productivity as a result of environmental degradation and inequitable land distribution.

2.2. IPCC (2007) report focused on Women and Climate Change **in Bangladesh**

2.2.1. Women are involved with economic sector: In Bangladesh, Women are involved in economic activities mostly part-time. Only six percent of the women allocated more than six hours a day and hence can be considered fully employed in economic pursuits. This number is almost the same as the number obtained from the answers of the respondents when asked about the primary occupation of women. It appears that women allocate time to economic activities in the spare time after providing domestic labor and hence are only marginally involved in economic activities. About 38% of the women work for up to two hours a day, and another 19%, between two to six hours. Thus, almost 57% of the women are under-employed if economic activities are counted. Among men, 59% were fully employed and 28% under-employed.

2.2.2. Women as Agents of Change : IPCC notes that in Bangladesh, women(s) traditional knowledge and skills helped their family and community to cope with natural disaster in following ways:

- During water shortages, women's knowledge of managing and maintaining water sources becomes critical to communities' survival.
- Women's traditional knowledge about building wind-resistant housing, planting trees to mitigate erosion, preserving seeds, composting to improve soil quality, and conserving safe drinking water have protected generations of communities from the worst effects of flooding.
- In many communities, women hold the most reliable knowledge about promoting food security, preserving threatened food supplies, and ensuring their family's survival in the face of shortages. Women's knowledge of and experience in maintaining bio-diversity through the conservation and domestication of wild edible plant seeds and through food crop breeding is key to adapting to climate change more effectively.

2.3. Ongoing projects on livelihood adaptation

DFID (DFID,2007) aims to "mainstream' adaptation activities into its development assistance. Mainstreaming involves screening all development projects to assess and address climate risks. The screening prioritizes key planned and ongoing activities according to the extent to which they are at risk" from climate variability and climate change and the extent to which they present opportunities for reducing risk and vulnerability. Based on this assessment, recommendations are made for integrating disaster risk reduction and climate change adaptation within program activities. "These recommendations are then assessed for impact, cost-effectiveness, and feasibility. The pilot program for mainstreaming began in Bangladesh in 2006.

It is important to note that while the CDMP (DFID, 2007) takes steps to include minority and excluded groups in the community participation process, in practice, this does not equal village level participation. Rather, village representatives are invited to participate at workshops held at the level of local or district government. Although an early review

in 1997⁴ raised concerns that CDMP was not paying sufficient attention to gender issues. a more recent review suggests that this has since been addressed.

The Kyoto Protocol Adaptation Fund should become the main channel for future adaptation funding. This entity would be responsible for ensuring that women's leadership is central in decision-making around how funds are disbursed and used as well as by which projects are implemented, monitored and evaluated. It would also be responsible for ensuring that adaptation funds are meeting the needs of poor and marginalized women affected by climate change and should coordinate closely with the multi-stakeholder committee's in-country damaging effects of climate change. it will continue to be one component of adaptation funding. 't'herefore, it is critical that these bilateral and multilateral agencies climate-proof their work.

In Bangladesh (Unnayan Parishad, 2007) some pilot sites are selected to learn the practical measures and mitigation of flood risk for women as well as a message are

- Establish a conservation-integrated home garden development
- Establish a highland farm that contributes towards sustainable management of resources including biodiversity
- Develop the banks of the stream that runs through their land.
- Provision of homestead for reducing flood risk

IFAD's (IFAD, 2007) operations in Bangladesh over the next five years will support five separate Sub programmes. Project activities will improve income-generating opportunities for rural people living in severe poverty, who have low food security and lack basic assets such as land. The main aim of the IFAD program is:

- making agricultural technologies more readily available to small-scale farmers to boost rural growth and provide people with a secure and adequate food supply and with opportunities for income and employment
- improving access to markets and financial services for rural small entrepreneurs
- introducing innovations in infrastructure development, such as transport and access to markets and to water, to benefit the poorest areas

- improving rural poor people's access to common property resources such as inland fisheries and public land
- increasing women's access to economic opportunities. continuing the progress already made towards the empowerment of women in the country

IFAD supports reforms in key policy areas, including:

- improvements in agricultural extension and research
- regulations required for improved access to inland fisheries
- regulation of rural markets
- reforms in the regulatory framework for rural finance

CLP (DFID, 2007) program already targets vulnerability to a broad range of shocks and stresses and actively considers a range of current climate risks within its work. Their all stakeholder are Women. For example, livelihood promotion targets climate resilient activities, including poultry rearing to promote mobility. mobile identification cards. and flood compensation schemes. At household level, the project is facilitating the raising of homesteads onto mud banks above the 10 year flood level.

Impacts of climate change on food production and food security are global concerns, but they represent a particular threat for Bangladesh. Agriculture is already under pressure mainly due to an increase in demand for food. as well as to depletion of land and water resources. The prospects of global climate change make this problem a priority for Bangladesh.

By 2050. though monsoon rainfall is expected to increase by 28%, intermittent dry and wet spells can not be ruled out. High intense rainfall would result in increased flooding and sedimentation of floodplains, making them less productive. The Comprehensive Disaster Management Programme (CDMP) recognizes the risks associated with climate variability and change and the current lack of capacity in assessing and managing long-term climate risks in Bangladesh. Component 4b of the CDMP seeks to establish an integrated approach to managing climate risks at national and local levels. Under this Component. efforts were undertaken in partnership with the Food and Agriculture

Organization of the United Nations (FAO. 2006) to implement activities designed to promote livelihood adaptation and reduce vulnerability to climate change. particularly amongst women and poor communities who have the lowest capacity to adapt. But for particular women livelihood options strategy is still absent.

The core challenge is to prepare an adaptation options for the different govt and non govt sector and possible strategic interventions in and across sectors, so that a comprehensive action plan of adaptation to address the vulnerability to the impacts of' climate change, including variability can be developed which is under active consideration of the responsible authority. Despite the recognition of adverse climate change impact scenarios. women's livelihood adaptation has not been adequately addressed in the research area yet. There is no intervention towards implementing appropriate policies and programmes to integrate climate change concerns into development sector in the research area.

Chapter 3: Methodology

3.1. Process of the methodology

The methodology aims at a holistic analysis of the causes and impacts of climate variability and the local perceptions of climate related hazards. By the local adaptation practices identification will help to minimize the impact of flood through participatory rural appraisal approaches. The overall report writing is sequentially developed by following step

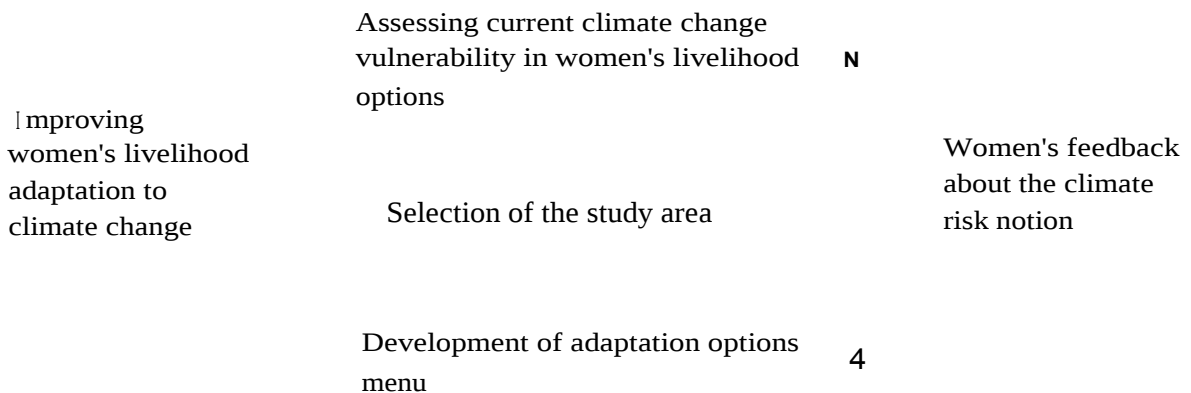


Fig 1: Assessing climate risk identification

Also it will be identified what will be perfect realization of adaptation approaches for the community with the current climate change condition. It may help for the institutions who are working in that community.

3.1.1. Select the study area

The flood -prone locations are primarily identified based on a secondary literature review and finally selected Manikganj districts in mid point of Bangladesh. The pilot study area is chosen because the area is:

Primarily flood prone (moderate to severe) and

Various profession of women's availability in the research area.

Then start the field observation of adaptation options to current vulnerability and future climate risks.

3.1. 2. Establish communication with the community and local institution

Go to the Upazila office for collecting the baseline map and other demographical information. Collect the general concept of hazard condition in the study area and livelihood options, institutional contribution in the research area. And finalize the specific area for study of the research.

3.1. 3. Method or tool used

PRA tool is used in field research. I was conducted with six PRA sessions in three villages. I have been facilitated these PRA sessions. Women of the respective village took part in the session. The core activities of PRA for building consensus among the different concerned stakeholders specially to women on identified actions (interventions) relevant to hazard management and mitigation.

3.1.4.. Using tools : FGD and Case study

3.1.5. Materials used in field period : Brown paper, Pen and pencil. Cork sheet etc

Tnhle I: Procedure of PRA session

Selection criteria	Profession	Participan is (8-12)	How many FGD conducted	Participant groups
Island and Char land is considered for survey area	House wives	2	Total two from	FGD is conducted with two types of families women:
	Day labor	2	each village (One	
	Seasonal worker	2	from male headed	Female headed household
	Agricultural	3	house hold members and other	
	industries		from female headed	
	worker		household member)	
	School going or	1		
	College going			
	female children			
	Credit group	2		Male headed household
	member			

Table 2: Methodology of the study area

Tools/Processes	Sub tools	Output
Literature review		An analyses of few literature with both qualitative and quantitative information about
		Trends of flooding in the research area. Impact of past flood on women's livelihood statistics involved damages and losses, support receives for coping, source of support and coverage area
		Various livelihood adaptation options in the context of Bangladesh
		Key barriers and opportunity in previous experience of other area of Bangladesh For adopting women's livelihood options.
Transect walk	Upazila level transect walk	Idea about flood affected area
Selection of study area	Statistical sorting	Select 2 villages from each union (Find out the worst affected hazard prone union in Upazila)
Provide checklist for FGD and case studies		
(1)	Livelihood impact analysis(2)	Criteria will be based on -
		Types of women livelihood options, what are the key element of resources in the study area for adoption such as access. resources, risk, marketing, diversity in women livelihood
		Trends of flood duration and frequency- how they overlap with livelihood cycle?
		Impact of flooding trend on the key elements that is production losses, access to resources, marketing etc of livelihood
	Coping analysis (^ 3)	Discussion issues will be on
		How many women can cope with flooding on their

		livelihood?
		What are the key problem. barriers and opportunities of the community experiences
		What aspect cannot be coped?
		Analysis should be in depth as possible
	Building	Question will be based on following criteria-
	Future scenario for future flood risk	What will be the future scenario, overlap frequency and duration of flood from women's perception"
	conception of local community (5)	
	Adaptation priority analysis (4)	Discussion on- How do each of livelihoods cropping. Homestead, livestock, micro credit and other sector be adapt with future scenario?
		What are the perceived problem, barriers and challenges for accessing, marketing, seeds, capital capacity etc'?
		What are the village and livelihood options
Transect walk		
FGD		Selection of homogeneity group like-
two FGD from each village on the basis of female headed and male headed household members)		- Mixture of age from 15 to 60+ ages female in each household groups - Micro credit groups - House wives who are not engaged with direct income options but indirectly involved - Fisheries community - Daily labor community - Seasonal Migrant women workers
		Outcome will be basis on-
		How their livelihoods are affected by flood, how they cope and what is their adaptation plan'?
		What change they want to look for the reducing of climate risk in the research area'?
Photographs	-	-

Analyze past climate vulnerability situation to understand the risks in relation to damage and losses of property and women's livelihood option. The analysis will be based on

Women's perception about flood impact on climate change

3.2.1. Development of an adaptation options menu

Participatory field testing with women's livelihood options (1)

Feedback from male
headed households
group (3)

Draft adaptation
menu (4)

Feedback from female headed households group (3)

NGO contribution
in research area

Local adaptation
practices or best
practices in the
community (5)

Local government contribution for the reduction of climate risk

Future climate risk

Future climate risk

Women's Livelihood systems & vulnerability profiles

ocal Communities (**With women**)

15

The adaptation option menu provides input and catalysts for field-level demonstrations of viable adaptation options with the potential to improve the adaptive capacity of women's livelihoods to climate change.

Finally prioritize the adaptation option in local community for reducing the climate change vulnerability. Selecting viable adaptation options requires criteria that include the type of problem and future expectations. Initially, environmental friendliness and cost effectiveness will be the only two criteria considered for documenting a draft menu of adaptation practice. However, in view of the diversity of climate change adaptation options, more than one method is required to review all of the choices. Thus, local women are prioritized according to:

- environmental friendliness and qualitative cost-benefit analysis

- evaluation of adaptation options for their socio economic suitability

- Multi sectoral criteria analysis includes livelihood option

Chapter 4: Study area

4.1. Study area

Saturia has a population of 140215. Males constitute are 49.84% of the population, and females 50.16%. This Upazila's eighteen up population is 73439. Saturia has an average literacy rate of 22% (7- years). and the **national** average of 32.4% literate. Saturia has 9 Unions/Wards, 165 Mauzas/Mahallas, and 215 villages. . It has 27174 units of house hold

and total area 140.12 km².

Table 3: The study area at a glance

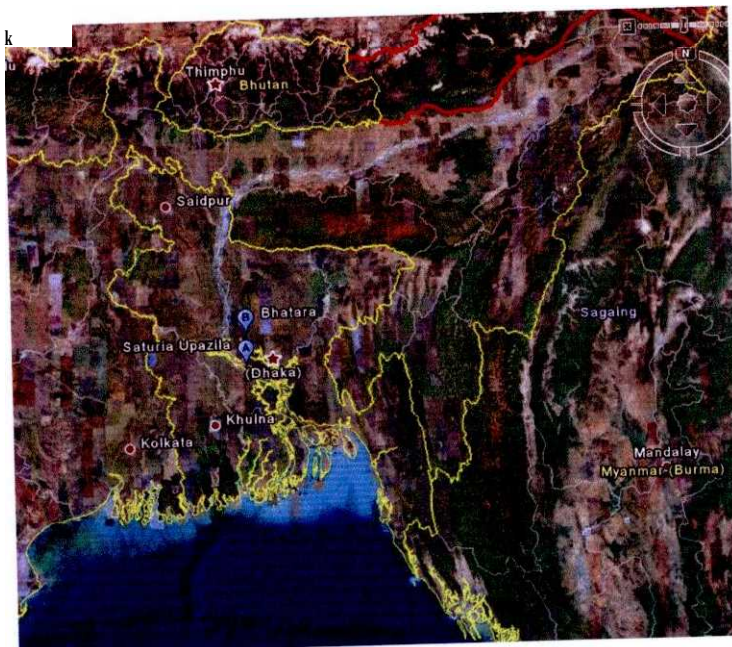
Saturia Upazila in Manik ganj district					
Baraid Union		Tala Union		Hazraz Union	
Total	1 in char			Total	1 in char
Villages	land and	Villages	land and	Villages	land and
	another in		another in		another in
	amin land		amin land		amin land
Population	800	Population	600	Population	720
household	95	Household	87	Household	108
Type of	Lnadless and	'type of	Lnadless	Type of	Landless and
community	Shelter	community	family	community	marginal
	project's				community
	family				
Educational	2 primary	Educational	One primary	Educational	One primary
Institution	school and	Institution	school	Institution	and one high
	one				school
	Madrassa				
NGO	BRAC.	NGO	BRAC.	NGO	BRAC
intervention	(;ono	intervention	GUK4	intervention	GUK
	Unnyon				
	Shangshta.				
	Grameen				
	Bnak				
Government		Government		Government	
institution		institution		institution	
type of	Paddy. ju te ,	Type of	In char land	Type of	Paddy, Corn.

In the research area female headed household who are landless take shelter in Government Khash land. The government give them house but income option is not exists. They are depended on labor works for sustain their life.

agricultural crops	Tobacco, Corn, Sugercan , Pulse	agricultural crops	onion, pulse	agricultural crops	Jute, Tobacco, Pulse
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NGO involves with credit operation, and facilitation of savings' habits. The village organizations are designed to mobilize the collective strength of the poor with a view to empowering them to be self-reliant. These women are provided with credit and training to carry out their activities. There are also some special programmes that have been introduced under the Income Generation for Vulnerable Group Development and Small Holder Livestock Development Programme initiatives. These too are implemented through Rural Development Programme.

The study area is selected in two villages from each flood prone union. Island and Char land is considered for research. The location of the study area is beside the Dhaleshari tributary. The river is going beside the villages and peoples main livelihood option is depend on the river diagram as it is river eroded area also. The study location is as follows:



Map 1: Map of Bnagladesh and indicate Sauria Upazila

In Bnagladesh is disaster prone area and Sauria upazila is the worst affected with flooding on an average 2 times in couple of years. Poor people are commonly hardest hit by climate shocks and stresses, and climate change is likely to alter and exacerbate existing hazards, potentially threatening progress on poverty reduction.

Risk in terms of potential impacts without risk management has to be estimated. This entails estimating and combining hazard(s) and vulnerability.

The changing pattern of hazards time and frequency is creating the women's vulnerability



Dhaleshari River.



Location of the villages

Map 2 : Location of the study area

4.2. Natural Hazard

The inhabitants of study area are vulnerable due to several natural hazards. Of these, the crucial ones are flood and erosion hazards. These hazards are discussed at some length in the following sub-sections.

4.2.1 Flood Hazard

The char peoples are affected by the flood in each year. In this time they live on boat. The cattle also are kept on boat but it is difficult and so they are



Photograph 1: Women identifying livelihood option and climate risk

obliged to sell them and sometimes they are died for movement. The agriculture sector also hampered and damages crops during flood season. During flood season people are drinking pollutes water because the tube well are sunk under water. In most homestead grains and other valuable commodities are kept on platform that they are provided for keep this. In the flood season the difficulties are also for obtaining food supply and cooking. So many household are goes to their relative's house or on the embankment. After flood they come back to the char.

4.2.2 Land Erosion

Land erosion is a big hazard for the char dwellers of research area. Many households are forced to move away from their homesteads due to such erosion. River erosion takes away the smiles and happiness of char dwellers of research area and creating unending misery. Though the char are formulated newly, but the people are afraid that any year it may be eroded. Already the land which is the western and southern side of the Char Baraid Para and Char Tilli Para are started to be erode.



Photograph 2: Land erosion

4.3. Coping Mechanism from Natural Hazard

The inhabitants of research area faces a number of natural hazards which are the crucial ones are Riverbank Erosion (RE) and Flooding. In both the disasters. there are five factors play a significant role to make coping mechanism to work, such as:

- 1 Food
- % Shelter
- % Saving Assets
- % Transportation facilities and
- % Existing level of disaster awareness and preparedness.

With considering these cases, from the household survey result and from Focused Group Discussion (FGD) findings, it is identified the following coping mechanisms which are adopted by the inhabitants of research area are shown by the following table.

Table 4: Coping Mechanisms due to flooding in the research area

Issues	In case of River Erosion	In case of Flood
Food	■ GOB and NGO relief only (very few can save any food for the whole family of the char). - Loan from money lender	■ GOB & NGO relief plus stocked food of the household. ■ Alga Chula which is made by soil is used for cooking purposes.
Shelter	• Take shelter in the School and road. ■ Few try to occupy the free spaces closest to river bank (e.g. Khas land). ■ Those who can send adolescent girls to relatives' house.	■ Increase the height of the bed. ■ Go to the relative's home. ■ Go off to road in extreme cases and go to back when water subsides. ■ Families may go to relatives' place and stay till the water subsides.
Saving asset(s)	• Try to sell trees beforehand. ■ Replace livestock to other places beforehand (e.g. mainland, relatives place, etc). ■ Sell or take with them the	■ Need to sell the trees - it may be the life saver. ■ Make higher platform for the livestock. ■ Does not sell or take them off.

			Same
	■ Try to safeguard the house till the end.		
Transportation	■ Wait for boats but the costs increases by 2 or 3 folds. However, there's no other way.	■ Make floaters from banana trees and sail off to the flood free area. ■ Boats are also used.	
Awareness & preparedness	■ No information about the extent and forecasted area of river erosion. ■ No preparedness awareness from government.	■ Information's are given both by GOB and NGO.	
		• Flood preparedness and awareness projects and programs of different GOB and NGO have been in practice.	
		<u>Source:</u> Field Survey, November 2008	

A key issue in conducting community based risk identification is the assessment of risk and impacts. Disaster risk is commonly defined as the probability of potential impacts affecting people, assets or the environment. Natural disasters may cause a variety of effects which are usually classified into social, economic, and environmental impacts as well as according to whether they are triggered directly by the event or occur over time as indirect or direct effects

Risk is commonly defined as the probability of a certain event and associated impacts occurring. Potentially, there are a large number of impacts, in actual practice however, only a limited amount of those can and is usually assessed.

The lives of the Char people are closely related to the dynamics of the river flows and the resultant formation and erosion of Chars. Thus, Char communities are extremely vulnerable to

erosion and flooding. With this background, the CLP aims to improve the livelihood of the poor in the Char areas by reducing vulnerability of dwellers, through targeted provision of,



Photograph 3: Women working in TAT production

in the Char areas by reducing vulnerability of dwellers, through targeted provision of. among others. infrastructures thereby improving the resilience of the community to environmental shocks. However. these people have the least resources to afford to build such infrastructures.

4.4. Institutional Framework

Local institutions are important local level organization which plays an important role in the planning and development not only in rural areas but also in urban areas. Local institution can easily motivate people about education. health. local security etc. by mosque. school. Club and cooperative and there by improved the literacy rate, health condition and improved the community security. There are various types of local institutions are generally found in the rural areas like

- Educational and religious Institutions
- Local Government Institutions (Union Parishad)
- Non-Government Organization (NGO)
- Community Based Organization (CBO)

Institutional framework of study area is not strongly established throughout the char. Char inhabitants are greatly deprived from the support of these institutions.

Chapter 5: Women's livelihood options in the study area

5.1. Women's livelihood options in the research area

The research areas women's livelihood is comprised nearly two-third of the total women's income option. Agro-processing enterprises accounted for 10 per cent of the units and employed similar proportion of capital. So its a big portion for women's livelihood options. This trend of climate change will in turn affect the food security. Overall the crop production is likely to decrease endangering food security.

Table 5: Women's Livelihood option in the research area

Livelihood options	Activity	Form of activity
Agricultural options	Crops Binding	Women are generally works in their own land and others land. (Seasonally they consisted with Jute, Rice, <i>Amo I'</i> , <i>Aush</i> Pulse etc). Women in the research area include total 3 months activity with crop bindings in each year. They are getting 40-50 tk per day for 6 hours working in each day. Women's who have some own land crops. are working in their courtyard and thus they save the labor cost of their Family.
	Giving fertilizer in the land	Women Collects fertilizer from market or create compost fertilizer. In house the dug their courtyard and preserve cow dung for producing compost fertilizer. They are using it in their field and sometimes sell it to the market. The price of the fertilizer is 30 tk per KG in the local market.
	Seed preservation	Keep seed into the bottle for the protection from insects and gives medicine which is home made medicine. This medicine is produced from <i>Vin</i> leave <u>which is</u> need to be <u>boiled and dry</u> . Several times

Aman is in late July' season crops. *Anion* paddy etc if high lands are available. Last year some high are cultivated by the people. They have mainly cultivated the jute and *Arson* paddy. They also cultivate *Dhoinchu* (as like jute) which leaves are used for cows eating grass. At that time, huge Catkins (*Kusltia*) are grown naturally.

This season starts from Mid Feb to mid June. *Paddy (Aush)*, jute and varied types of vegetables such as potato, papayas etc are grown in this season. After first season some portion is cultivated for *Che na. Kann* if land is available.

Nim is the tree which leaf is used for provide poison. It generally groves in the homestead yard.

		I sunlight is needed for drying the seeds and women regularly spread these seed into theis courtyard for drying and preserving. Pulse seed and other fruits Jr vegetable seed preservation save their money. For example Pumpkin seed price is 1 tk for 5 seeds. Pulse seed used again in their next season crops and <i>Amun</i> rice seeds help them for growing next crops. Thus they help their family by reducing the extra <u>cost</u>.
Crops preservation		Women regularly drying their crops like rice pulses etc.(Women preserve pulse, <i>Kalai'</i> seed and sometimes <i>Amun</i> seed also). They dry it for feeding and as a result reduced the extra cost of feeding in their family.
Work in crops field of near houses	Pick up of herbs from own or others crop land. And regularly maintain of crops field. For working in the other's crops field, women get 40 tk per day. On the other hand who are working in their own land reduced the labor cost of their family.	
Associated with the process of dry jute and handle of jute.	Women are engaged with the separation of fiber form jute stick. Then need to keep it under the water and then separate fiber from stick. After then they dry this fiber in their courtyard and preserve fiber for using as a materials. For each bundle separation women get 10 tk which is consisted with 30-40 sticks. And women who dried this jute is using for materials production and Used jute stick for roviding of fences in their houses.	
Work in jute field sometimes distribution seed into the crop filed.	Seed is preserved and distributed it into the field and thus women help for planting of jute. Jute seeds price is 60 tk per kg. As women have preserved it of from the previous season. expenditure for buying seed is reduced.	
Collect leaf for the feeding of cattle. It also use as a <u>firewood</u> .	In dry season women storage leaf from the tree. or Bamboo tree and it uses for feeding of cattle in flood season. Women also storage <i>Kher</i> for flood season cattle feeding. One kg <i>Kher</i> price is 30 tk. So women <u>are doing lots of household saving activity</u>	
Work for Vaccination	Women regularly go to the village doctor for vaccine oftheir cattle. For each vaccine village doctor claim <u>5 tk.</u>	
Homestead	Different types	Main ly <u>pumpkin</u> <u>Sirn</u> <u>Banana</u> <u>winter</u> vegetable,

At time of *Falgun*. *Caillra* these crops are taken from the land so some portion of the land can be cultivated for *Cheena*. *Kaun*, vegetables etc in the second season.

gardening of seasonal vegetable growing.		Chilli, etc. The male members of the houses collect it and sold it to the market. It meets the demand of family and good source of income earning. One kg Papaya have sold in 30 tk. Vegetable are sold in their village market through their children or husband. Thus they earn lot of money. Vegetable price is varying with season and access of market demand. If huge production is occurred in same vegetable then <u>automatically price</u> is lower.
	Production of compost fertilizer	It is produced from cow dung. Who cannot produce they buy from market. Create fertilizer for growing the vegetable in their courtyard. They dung some place in their courtyard and keep cow dung, leaf etc. And mud also keep upper portion. Finally the seed the vegetable on this place.
	Seed reservation	Firstly need to collect vegetable seed from their homestead garden. After then they dry it and keep it into the container. For each seed they have need extra money for buying. If it is reserved from <u>previous season then</u> they have no need to <u>buy this</u> .
	Maintain vegetable garden	Regularly maintain these vegetable from insect by using medicine which is home made. By maintenance of vegetable garden regularly they ensure better production. As a result the income from these product is increased.
	Growing fruit and wood trees in their homestead. Bamboo also is planted	Fruit is sold in their village market and bamboo also sold and using as fences. Wood tree is sold into the market. Fruit are sold in their nearest market or neighbored. Bamboo leaves are used cattle feeding and firewood. From bamboo they create mat and sold it into the market. For each mat they get 50-60 tk. Another important item is from Bamboo they provide tons and sold it into the <u>village fair</u> .
	For seeding fruit tree women need to several tasks	Women sometimes need to buy seed and cloning of fruit trees. Women sell their fruits among the neighborhood. By regular maintaining of fruit trees, they also ensure better production and ensure better income. They preserve Guava seed. Mango Jackfruit seed etc.
Livestock rearing	Rear livestock such as cow, goat, hen, duck, sheep, etc	Some women have own cattle but other have tenant or Barg cattle. For one Barg cattle women can get the kids from mother cattle which are equally divided into owner and tenant farmer. That is if from <u>mother cattle three children have horn</u> then one kid

BARGA is the process of land or cattle or other things ownership. By BARGA poor people can cultivate landowner fields and rear their cattle and after contact time they return original and interest.

		will be owner and other will be farmer. And another
		kid will be sold and 50% cost will be distributed
		between the farmer and owner. Mother cattle of
		course <u>returned to the owner.</u>
	Feeding of livestock	Collect feed and process it for the feeding to livestock. For collecting <i>Vushi</i> ¹⁰ they have need 1 10 tk per kg. Women also preserve of <i>kher</i> for cattle feeding <u>during flood season</u>
	Need to treatment of livestock	Need to go to the hospital for vaccination of cattle. Some times Village doctor came and charge for each vaccine about 5 tk per cattle. For treatment sometimes women send their cattle to nearer medical center which is around 5 kilometers far from their living places with their husband.
	Built the cattle houses	Regularly need to uplift their land and create fences for cattle living houses. The fences comes from .lute stick which is home made by women's.
	Collect grass from field.	During dry season women collect grass from char land for cattle feeding. But during flood season it would be impossible. They also sold grass to their neighbors. They sold 5 tk kg grasses in their markets and cattle farms.
	Sold livestock commodity	Women are generally sold milk, egg into their neighborhoods. Cow's milk also sold in the BRAC dairy firm. They earning amount is depend on demand of BRAC dairy milk and selected price range. Now on an average they are getting 30 tk for per litter of milk.
	Collect milk from Cattle and kids production	Need to prepare cattle for collecting milk. For kids collection needs to arrange suitable place for cattle. Also need to arrange fire and necessary commodity. The main task completed by women. For kid production they arrange oil, fire, firewood, preparation of places etc.
Work in TAT production	All women are generally involved in <i>Tat</i> production.	During flood season it is totally collapsed. The family which have own <i>Tat</i> are working in their industry and who have no <i>tat</i> are working as a labor. <u>Women get per day 25- 30 tk form this source.</u>
	Prepare the cotton by using rice water.	Need to collect boiled rice water and for each cotton preparation they are getting 10 tk. They collect this boiled rice <u>water from their daily meal.</u>
	Blinding of the raw materials	Women are generally involved in blending of the cotton by mixing of the boiled rice water. For

¹⁰ Vt JSHI is one kind of local food name for cattle feeding. It is made from husk of paddy.

FAT is the production process of cloth. In the research area many small TAT industry have present and under this basis many people are choose their livelihood option in this sector.

		boiling they involved with boiled water and save the labor <u>cost of their family.</u>
Need to dry of cotton		Women are generally kept cotton under the sunlight by bundle wise distribution of cotton in front of their houses or open field.. For one bundle drying they are getting 5-10 tk per day and for drying need at least 2 days.
Prepare the Bobbin		After drying the cotton, women keep it into the Bobbin by serially for the preparation of raw materials. For each bobbin women get 3 tk and in each day they can provide 5-6 bobbins. It is their extra income because they worked it in their leisure period.
	<i>Bozz Bana</i>	Keep them straightly and inside the drum need to keep them for round shape. Finally it is prepared for using raw materials. For <i>Bozz liana</i> they sometimes using big dram and worked together with their husbands and as a result they reduced the family expenditure.
Worked in Tobacco production	Act as a laborer	More than 90% women are involved with Tobacco industry. They are working for 6 hours in each day. Their worked is stable for two months in each year. They are getting 40 tk for each day.
	Collect Tobacco leaf	Collect each leaf' from fields and store into their houses generally consisted with 15 working days in each year. For each working days they are getting 40 tk
	Sewing this leaf and dried it	Use rope for swing leaf line wise and then they dried in their courtyard or field. They are consisted in 25 working days in each year. For each day they are getting 30 tk for 10 kg leaf swing.
	Collect this dry leaf and marketing it into the industry	Store dry leaf and get ready for marketing to the industry. From many tobaccos industry, employers are collects it and paid them locally.
Handicrafts worker	Embroidery, swing <i>Kalha</i> etc.	Try to market it in to the other area. From NGO here have some assistance for this opportunity. But it is very low and it is only for credit group. And in flood period it is totally stop. For each <i>Khalha</i> they are getting 200-300tk, for dress they are getting 40 tk per <u>pice.</u>
Credit group	Take loan for livestock	For small enterprises, for one dress sewing they are getting 80 tk. It takes 20-25 days for embroidery.

" It is one of the processes of cotton binding for the sowing of if it is not properly completed then quality of cloth is beyond question.

Kataha is the used by old cloth and poor people use it for protect from winter season.

	rearing. homestead gardening. small enterprises	Materials are given form NGO. For <i>Khathu</i> sewing women are getting 300 tk per Katha and sometime depend on design also. Women are using credit loan for generating of income. BRAC is giving loan with 10% interest rate and other NGO is giving loan with 10-15% interest rate. But in flood season they are unable to pay interest rate and sometimes it <u>seriously affect</u> on <u>their li vel ihood options</u> .
Small enterprises	Create (f'l 1 T1114 made from Bamboo.	This <i>Chutai</i> is used for fences, mat and many other purposes. During flood period it is totally collapsed because in that period due to water Bamboo cannot <u>cutoff</u> . For each <i>Chatai</i> they are getting 50-60 tk.
	Create toys for sold in village fair	In winter season village fair held on and some income are coming from business. For each toys they get at least 5-10 tk. If women use some color then they are getting higher prices.
Sweet maker family	Create raw materials from midland sold it, also sweet processing and boiling. Create hearth for <u>producing sweet</u>	During flood season hearth is damaged and in that period they take shelter on the road and made sweets in that place. Due to the increases of milk price they are now surviving. Per kg <i>Chanat'</i> is sold in their neighborhood at 40-45 tk.

The women's activities found are grouped into the following classes to study linkages with agricultural production activities in the research area:

- Agricultural inputs related: fertilizers, small agricultural implements
- Crop output related: Paddy and _jute stores, vegetable shops. fruit stalls, betel leaf and nut shops. rice and wheat stall, oilseeds and spices stores.
- Livestock related: Sweetmeat and curds, chicken & eggs. milk trading, butcher shop, cattle trading.
- Fisheries related: Fish trading. fish fingerlings trading during Flood season.
- Forestry related: Timber trading. fuel wood trading, bamboo-

" Mid October to mid February is the season of Chaitall% crops . this season are *onion*, *nut Kaun*, *Cheenu*, *chiller*, *till*, *Tishi*, *Shuji*. *Shaj. turmeric*, *Zeera*, *Dhonia*, *Jaun*. *Pulse (Meishuri)*, *Pulse (Mashkaluve)*, *Pulse (Keshari)*. *Pulse (Boot)*, *potato wheat* etc. These are grown in plenty in the study area. But the lack of irrigation facilities, the farmer can not produce much production of crops.

1' It is the pre stage commodity of sweets.

- Agro-processing: *Gur* (raw sugar) making. *cheery* and *muri* making, fish drying, handicrafts.
- Construction materials related: Working as day labor on the government road and bridge construction.

5.2. Trends of flooding in the study area

Climate change is likely to have wide-ranging and mostly adverse impacts on women's livelihood options.

Table 6: Trends of past flooding in the research area

Year	Characteristics of major past year floods in the research area		
	Predictability and color of water	Duration of flood	Damages and losses
1988	Water comes suddenly and color was not clear. Water was too cold	2-3 months	• Need to shelter in another place and relatives house • Lost of cattle • Increase of Diarrhea • Damages of houses and materials
1997	Water comes slowly and it was normal flood	18-22 days	• Lost of crop fields and houses
1998	Suddenly come and flood happened in two times. Water color was brown and water was warm	Three and half months	• Lost of roads and houses because time was too short for evacuation of houses • All crops were damaged • Create health problems. • Lack of fresh water • <u>Huge cattle was died</u>
2004	Water comes slowly and water was warmer.	One month	• Water was everywhere in the community • Destruction of fruit trees • Water was poisonous and creates health problems • Cattle were died and hens are generally fall in the water. From the road many hen have lost
2007	Water comes suddenly and occurred two times including flood. Temperature of water increases	Total three months flooding.	• Flood and river erosion was happening at the same moment • Huge destruction of houses and Cattle losses • <u>Due to second time flood</u> no

			household people was not able to
			cook for 5-7 days
			• Beside the diarrhea bronchitis,
			cold diseases have happened.
			• At first time flood all crops have
			damaged and in second time flood
			all seeds and plants have again
			destroyed and floating with flood
			water
			• <u>Destroy of TAT materials</u>

In addition to abrupt fall in employment and purchasing power in the aftermath of floods price hikes hit the poor in the worst way. An analysis of trends in rice prices illustrates that maximum deviations (above normal trend) occur in the aftermath of severe floods as a short-run effect. It is important to understand the benefits and limitations of all flood mitigation choices. In order to 'deal with' a natural hazard such as flood, it is imperative to generate a flood loss database so that a consistent, well-informed decision making is possible.

The projected increase in the duration and frequency of flooding is expected to increase food shortage as a result of malnutrition. Climate change is also expected to lead to increases in the potential transmission of many infectious diseases, including malaria and dengue, tuberculosis. Decreased availability of potable water will responsible for increased illness and death cases. All of these factors could lead to increased mortality rate, reduced maternal health, and undermine the nutritional health needed by Individuals women to attain healthy life for sustainable livelihood and coping strategy.

Chapter-6: Climate change threats in women's livelihood options

imate and livelihood option in the study area

research area peoples are observing the changing pattern of flood and duration also. As a result

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ith high temperature

women have diversified on labor related work like road construction under VGD program.

6.2.1. Agriculture

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depend on agricultur
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combined with climate change.

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v of jute

(Jute is needed to keep under water but in that season low lying land homestead are inundate during long time flooding.

80% women claimed that now they have need to jute processing by staying on the road.

ute

(Jute cannot proper time average two within 6 year:

Sometimes spreading of seed into the field

Collection of leaf for the feed g It so a use firev o

(For the lack of dry space women cannot collect leaf properly for feeding cattle)

(in 2 0 wash in the area women yes eat problem leaf collection)

(30% women some obstacle for processing)

(20% of jute production is reduced for this sudden flooding on average 4 years

Women claim 20% ed is not properly because in low lying and flood water comes earlier)

(Due to inundation of land women cannot collect poisonous leaf from field

It reduces 30% feeding access of

(Jute production will losses 30% if temperature will rise and it also effect on flood water)

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2.2. Livestock

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households involved in a significant quantity of mass rearing of cattle or commercial poultry. Every family have at least one recent temperature taken with unknown

Livelihood options	Long period of flooding	Sudden flooding	Flood frequent, or more t flooding σ)	Flood from Heavy rainfall	Temperature change
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(Cattle house need o take extra care.

Protlern of feeding will be in canger because all of

good and house fences (people have need to sold their cattle or need to evacuate)

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under water

Lack of grass seriously affected the cattle

Collection of Milk and

(Need to extra collecting (Women cannot prepare themselves for coping with this situation

Due to the lack of quantity of milk used due to lack of materials.

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of catt[^]

(Abnormal temperature will affect the production of milk and egg.

Cattle condition generally due to house is muddy and heavy. Recently it is affecting on breeding of the cattle and creates no interest on breeding).

Vaccination

(without treatment of many cattle is destroying)

y rainfall
 destroys the
 homes.

Fruit production

(Recently preservation is reduced due to the lack of production) (On an average years more than 10 years women cannot able to preserve seeds).

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Chapter-7: Assessing future vulnerability and climate risks

Adaptation priority must play a key role in promoting women's rights. Mitigation efforts will not be enough to secure social and economic progress in the face of climate change.

Table 1: Adaptation priority option in the research area

Livelihood options	Adaptation options	Rationale	Resources	Challenges	Role of institution
Agriculture	Crops land	Ensure of Crop production during flood season	Government Khash land	For pick up of crops and maintenance of crops women need suitable places	Govt should distribute Khash land properly Long distance will effect Ensure security for women Uplift of beside road side after every flooding.
	Seed preservation and storage	If seed can available during flood season then it will possible for women to work in other suitable places	Government should provide and government storage of seed	During flood season seed drying and storage is quite difficult	Govt should responsible for the provide of seed to poor people
	Raise homestead with courtyard Cattle for crops field	Easy for storage seed and crops reservation Create compost from cow dung and use as firewood.	Collect soil from beside Dhaleshari River Skill for proper maintenance	Need to distribute soil equally all of the villagers High price of cattle Environmentally suitable cattle in this area Proper treatment facility for reduce the health risk	Govt and NGO should take responsibility and action plan Government and NGO

Livestock	Need livestock	For crops land	Need to skill for rearing cattle properly	Need special skill for rearing cattle during flood season	NGO intervention is need to take this initiative
		For getting milk and marketing			
		Easily work with cow in other's field by taking <i>barga</i> land	Not aware about market price properly	Need rights for selling of got and sheep for poor women in the research area	
		After maturity for selling in <u>EID UL AZHA</u>			
	For cope with flooding need to create shelter for cattle	If there have some space for rearing cattle during flood season then it will be reduce low cost selling of cattle during flood season	Government <i>Kha.'Jh</i> land	Find <i>Khash</i> land without river eroded area because in river eroded area there have chance to spoil of this place in flood season.	Ensure the distribution of <i>Kba.s'h</i> land River darn provision
		Health risk will reduced			
		Veterinary doctor will provide treatment of all the cattle at same places and same moment			
	Need boat for the transportation of cattle	Easily evacuate of cattle during flood season	People can ride boat so no need extra cost	Problem of boat ownership Priority of boat user	Need a committee from NGO for taking of the responsibility of ownership and maintenance facility
		Ensure the marketing of milk	Women can preserve boat in their community		
		Easily evacuate of other housing			

Others	During flood period need alternative livelihood option	materials and people during <u>flood season</u> For recover with flood Changing option for reduce the damages and losses in flood period	women s facility and rights and opportunity from family have n obligation No obligation for labor works	40-50 ages women are concerned with health risk and they cannot do alternative works or labor. Lack of training Find out of proper alternative livelihood option Handicrafts marketing Women who have own land will not interest to expense this cost.	Government and NGO will take responsibility
Homestead gardeni 110	Need to uplift of the homestead yard at least 1-1.5 meter	Homestead yard go under water	Soil from river or beside the homes	Local NGO and Govt cannot provide all area and houses for the lack of money In day by day flood water level is increasing and it may impossible for poor people to uplift their house in each year.	NGO and Government contribution and Adaptation fund
	Provision of seed after immediate flooding without or low cost	New trees need to plant	Extra cost for buying plant	Recovery with large matured fruit trees Delay income	NGO can take initiatives
TAT workers	Need some extra common	TAT machine cannot worked during flood	Community places or <u>Khash</u> land	Extra Maintenance AT owner in the community may not agree	Government provision land for community

	place where all TAT will be located and the place must be uplift at least 3-4 meters than normal homestead yard.	period for inundation		Available government suitable places	awareness
				Distance of <i>Khash</i> land	For accumulation of all TAT in single places for NGO may provide awareness
Ghosh worker	Homestead rise	Loss of Chulli in flood season	No resources is available	Soil collection	Need to provide fund for the distribution of soil NGO initiatives.
	Marketing facility	Loss of customer	BRAG. milk dairy	The price of milk and quantity	

7.1. Building of future climate risk scenario

Women's economic activities depend on their socio-economic status, with women from landless households and female-headed households most likely to be engaged in economic activities. Non-crop sector suffered enormous losses, constituting 51 per cent of the total loss with agriculture crops suffering loss of 49% of total production. The range of previous and future income variation of women is as follows

Table 12: Women's livelihood option for future consequences

<u>Livelihood options</u>	<u>In the past</u>	<u>At present</u>	<u>Ranking</u>
<u>Household work as maid</u>	<u>Less common</u>	<u>More common</u>	
<u>Boiling addy and processing</u>	<u>More common</u>	<u>More common</u>	
<u>Working on Tobacco industry</u>	<u>Not working</u>	<u>More common</u>	
<u>Working on Tobacco field</u>	<u>Not working</u>	<u>More common</u>	
<u>Working as a day labor</u>	<u>Less common</u>	<u>More common</u>	2
<u>Rural road construction worker</u>	<u>Less common</u>	<u>More common</u>	2
<u>Craft manufacturing (rope, containers, hand fans, mats, etc.)</u>	<u>More common</u>	<u>More common</u>	2
<u>Irrigating homestead vegetable plots</u>	<u>Less common</u>	<u>More common</u>	
<u>Harvesting homestead vegetables</u>	<u>More common</u>	<u>More common</u>	
<u>Harvesting root crops</u>	<u>More common</u>	<u>More common</u>	
<u>Small-scale poultry hatching, raising and rearing</u>	<u>Less common</u>	<u>More common</u>	1
<u>Traditional poultry, goat rearing</u>	<u>More common</u>	<u>More common</u>	3
<u>Credit loan</u>	<u>Less common</u>	<u>More common</u>	2
<u>Micro credit group</u>	<u>Less common</u>	<u>More common</u>	

<u>Vending foods at markets</u>	<u>Less common</u>	<u>More common</u>	
<u>Running a small grocery store</u>	More common	More common	2
<u>Raising seedlings</u>	More common	More common	2
<u>Hand husking</u>	More common	More common	2
<u>Farming on own land</u>	More common	Less common	3
<u>Traditional ploughing</u>	More common	Less common	3
<u>Mechanized ploughing</u>	Less common	More common	
<u>Farming on rented land</u>	Less common	More common	
<u>On Farm (agri) day labour</u>	Less common	More common	2
<u>Non-farm (rickshaw/van pulling)</u>	Less common	More common	
<u>Non-agri (off-farm) day labour</u>	Less common	More common	
<u>Factory/industrial worker</u>	Less common	More common	2
<u>Bus/truck driving</u>	More common	Less common	7
<u>Fishing</u>	Less common	More common	
<u>Grocery shop in the village</u>	Less common	More common	
<u>Small business (vending)</u>			7
<u>Cattle rearing</u>	More common	More common	2
<u>Cattle fattening</u>	More common	More common	
<u>Commercial vegetable production</u>	Less common	More common	
<u>Cutting of trees for timber and fuel</u>	More common	Less common	3
<u>Nurseries (fruit trees)</u>	Less common	More common	
<u>Goat rearing</u>	More common	Less common	
<u>Dairy production</u>	Less common	More common	
<u>Crafts production</u>	Less common	More common	2
<u>Pottery & Begging</u>	Less common	More common	3

Finally, from my own perspective, I believe that the role of an organization like government and non government can be essential in forging such partnerships, particularly to bridge the gaps between the stakeholders concerned with women and those that are in the 'mainstream' of the sector whose tasks and priority needs to be raised significantly.

We can use our knowledge, experience and resources to help the consultative process in this research area and women-inclusive policies and legislation on climate change and disaster risk management. The role of institution is particularly essential in bringing the voice of women among the most vulnerable groups such as indigenous groups, poor, shelter project's area women and those most exposed to environmental and disaster risks.

Chapter 8: Conclusion and recommendation

One of the main causes of women poverty in research area is the erratic climate and the fact that the research area is low lying and vulnerable place live in areas where women who are assisted by the government for sheltering their crops, homes and livelihoods. subject to extreme annual flooding, which can destroy in order to rebuild their lives, which pushes them deeper into poverty. For the large numbers of rural poor who depends on agriculture, income and food security are highly precarious. As maximum Char women are landless or almost landless, the situation is even more severe. Almost all of the women in my research area fall into this category.

Women's perception of climate change impact on livelihood options is as follows

- Increase the damages of crops due to long period of flooding.
- High frequency of flood is reduced their livelihood option
- Unexpected flood is increasing recently
- Livelihood diversification is growing with alarming rate
- Increasing poverty

Coping strategies for these problem is as follows

- Change of food habits
- Depending on credit loan with higher rate. During flood period women are obliged to sell their cattle for survive of both their meal and cattle feeding.
- Temporary migration during flood season
- Influenced with different crops like Tobacco. Corn etc.

The main adaptation options in these area is as follows

- Priority on high land for preserve cattle and crops
- During flood season temporary incomes are needed
- Livestock rearing is properly preserved with proper policy adoption.

3.1. Recommendation

- Safer places are needed for relocation of community people in safer areas during flood period.
- Strong houses are needed to be built with a high plinth level for reducing inundation
- Shelters required for people, animals and agricultural inputs/ products
- Local awareness about climate change should be enhanced for generation of local people knowledge.
- Medical service should be accessed to all household in the community, such as doctors and veterinaries etc facility.
- Provide safe, reasonable and fair credit and insurance which will not be confined with credit group of respectable institution but also other vulnerable women during flood season.
- For better communications, through safer roads and access to boats need to be provided from different organization contribution.
- Develop knowledge and resources for crop diversification and adaptive agricultural practices like Tobacco already planted but need to proper wage rates.
- Through access to irrigation
- Need some available training which should emphasize on skill developments.
- For sweet makers need to ensure marketing and milk supply.

A more detailed assessment needs to be conducted on how local transport, education, health, and water and sanitation infrastructure is currently affected by river erosion. Dialogue with inhabitants, engineers and planners is necessary to devise appropriate design changes that limit anticipated impacts to an acceptable level. Future livelihoods and enterprise promotion will need to stress diversification of livelihoods strategies and be informed by participatory vulnerability assessment to develop locally appropriate responses that both reduce climate vulnerability and reduce poverty. And Materials should draw on local experiences of climate impacts and relate directly to char dwellers. Project shelter women and Inland women's livelihood, informed by a participatory vulnerability assessment.

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