

INDIGENOUS COPING MECHANISMS IN COMBATING FLOOD



A Dissertation for the Degree in Master in Disaster Management

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CHAPTER 1: SCOPE OF THE STUDY

1.1 Background:

Many people in the disaster prone areas of Bangladesh depend on indigenous knowledge to cope with the extreme climate such as flood, cyclone and drought. In this digital world, although disaster related news is disseminated very fast but in most of the cases, disaster affected people did not receive humanitarian assistance immediately. Until government or non government assistances reach to a disaster affected area, disaster affected people find out their own ways in doing things, survive on their own mechanisms. Historical records tell that the people of Bangladesh have faced disastrous situations through extending their mutual cooperation with their indigenous knowledge from time immemorial. So there are ample scopes to identify indigenous coping mechanism against disaster from rural Bangladesh societies.

Bangladesh is vulnerable to various hazards. Flood is a common hazard that happens almost every year in different magnitude. People in the flood prone areas have knowledge and techniques in combating negative effects of floods. So far, not much work has been done to map out information on copying mechanisms in combating floods. It is important to undertake such research so that relevant information is available for future reference. I therefore have chosen "Indigenous Coping Mechanisms in Combating Floods" as my subject for dissertation.

1.2 Introduction:

The United Nations Conference on Environment and Development at Rio in 1992 stressed the need for enhancement of capacity building for indigenous communities, based on the adaptation and exchange of traditional experience, knowledge and resource-management practices, to ensure their sustainable development. Furthermore the 2005 Hyogo Framework for Action seeks to ensure that disaster risk reduction is a national and a local priority through using both national platforms and community

Implementing at least two priorities in the participation. This knowledge is critical in adopted in the World Conference on Hyogo Framework for Action 2005-2015, assess and monitor disaster risks in 2005: a). Identify, Reduce the underlying risk factors' as one of the and enhance early warning and b). Considering the above mentioned frameworks it is very five priorities for action. a significant role to important to recognize that indigenous coping mechanisms Play reduce disaster vulnerability of people and such knowledge builds disaster resilience in a community.

Indigenous knowledge is the knowledge held collectively by a defined community.

The term 'indigenous' is synonymous with 'traditional' and 'local', differentiating this knowledge from that developed by formal science in institutions such as universities and government research centres. Warren and Cashman (1988) define 'indigenous



knowledge' as "the sum of knowledge of a given ethnic group that forms the basis for decision experience and of familiar and unfamiliar problems and challenges". In the face making in the face the community management there is wide use of indigenous knowledge, disaster practiced those from generation to generation. According to the definition of Asian Disaster Preparedness Centre (ADPC) 'Coping Mechanisms are the means unities, without assistance from external sources, meet relief and individual and comet needs and adjust to future disaster risks". This means these recovery Vulnerable communities naturally learnt from family members and community.

Reduction was held at Kobe City of Japan's Hyogo Prefecture from 18 to 22 January 2005. The World Conference on Disaster with General Assembly resolution 59/191 adopted a guideline to reduce vulnerabilities to natural hazards, called the Hyogo Framework for Action (Yogon Framework). Tonal Lessons Learned Workshop on 24-26 2 Asian Disaster Preparedness Center, Thailand publication on Reg September 2002 in Bali, Indonesia

and its members individually develop their own ways to deal with exceptional circumstances caused by disasters, which is generally called coping mechanism or strategy. Coping is the manner in which people act within the limits of existing resources and range of expectations to achieve various ends. Coping with disaster means the way in which people or organizations use available resources and abilities to mitigate adverse consequences that could lead to a disaster. Coping mechanism/strategy is a dynamic process, which adapts to external changes and can be weakened or strengthened by wider policy and institutional action. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards (UNISDR).

Indigenous Coping Mechanisms largely depends on Indigenous Coping Knowledge approach to reveal the body

of knowledge built up through observation and hand-on-experience by people living in close contact with nature which, **in turn,** is transmitted from one generation to the next



through oral tradition. Indigenous coping mechanisms are the part and parcel of indigenous knowledge. Coping strategies are very specific to culture and are governed by a range of available resources, experiences and value system. The relation between vulnerability and coping mechanisms is as follows:

Lower
Vulnerability

Lower
Problems

Higher capacity
for coping
mechanisms

While there are specific forms of collective strategies constructed by leadership, skills, available resources, knowledge and power and value system of the community, not all individual or households follow similar strategy. Individuals fit into the collective strategy based on their ability, knowledge and experience. The key question that remains as a knowledge gap is whether such collective strategies acknowledge,

consider and address specific needs of the vulnerable groups such as people with disabilities. For example, while planning a rescue by boat or increase of plinth level of tube-wells or houses, the community may or may not consider mobility and accessibility constraints of people with disabilities.

Distinction between coping mechanism and adaptation in relation to overall life and livelihood strategy of a community is an important issue to factor into a coping study. In a given disaster context, community's regular life and livelihood strategy may or may not be effective to deal with the existing or likely disasters; they may need new or revised strategy to deal with such context. Coping is the temporary form of strategy used by the community until disaster circumstances become normal. When recurrent nature of disasters' impact cannot be withstood by existing coping mechanism and community or individual needs to change their regular life and livelihood strategy for a longer term; we call it adaptation. However, this study does not separate 'adaptation' from coping rather combines them under the 'coping strategy' conceptual framework.

A coping mechanism may affect overall livelihood system. For example, shifting houses to cope with flood may cost in terms of increased distance for child education. Such cost can vary for different groups of vulnerable people, such as People with disabilities. Therefore, they also develop and apply various other mechanisms to deal with such effect, which can be understood as direct, indirect and opportunity cost of coping.



To sum it up, Community Coping Strategy (CCS) refers **to a set of actions** that the community adapts to;

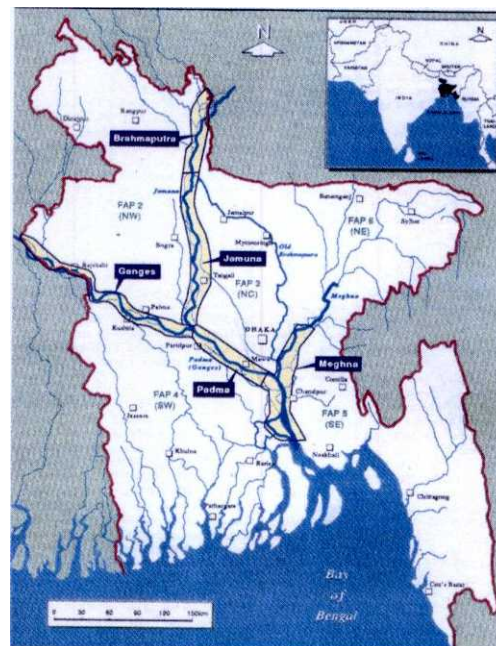
- avoid (an anticipated) disaster: these actions are mostly related with preparedness and mitigation measures
- manage an exceptional circumstance and
- bring about a normalcy in life and livelihoods (after a disaster).

Many people in the disaster prone areas of Bangladesh depend on indigenous knowledge to cope with the extreme climate such as flood, cyclone and drought etc. Nowadays, in this digital world, disaster related news are disseminated very fast or prediction related to any disaster portrayed using state of



the art technology. Disaster affected population receive humanitarian assistance from humanitarian communities including the government. Humanitarian assistance process was initiated in the last half of the twentieth century and it has improved over time since then. Anyone may raise some legitimate questions- what happened before this practice? Is it possible to provide humanitarian assistance to all disaster-affected areas? How would the disaster affected population survive if assistance takes a few hours/days to reach to them?

Bangladesh is vulnerable to various hazards. Flood is a common hazard that happens almost every year in different magnitude. The general trend of flooding in Bangladesh shows that the frequency of flood continues to grow; serious flood causing extensive crop damage occurs every 3-5 years on average. Catastrophic flood, in the scale of those that occurred in 1974, 1987, 1988, 1998, 2004 and 2007 occur on an average of



every 10-20 years³. Disaster practitioners in Bangladesh agree that catastrophic flood is likely to increase its occurrence period to every 6 years. Flood has not only become much more unpredictable than before, both in terms of onset and scale, but also lasts longer than it used to earlier. Historical records tell that the people of Bangladesh have faced disastrous situations through extending their mutual cooperation and with their indigenous knowledge from time immemorial. So there are ample scopes to identify indigenous coping mechanism against disaster from rural Bangladesh societies.

1.3 General Objective of the study:

The present study was envisaged to examine the flood lore and knowledge which the vulnerable or risk exposed people mentally possess and store so that they can retrieve it as needed. To this end, the flood affected people of the study area were selected to learn about their way of perceiving and predicting the onset of calamities, including local terminology used as and when warranted.

1.4 Specific Objectives of the study:

The specific objectives are:

- to reveal the indigenous perception and prediction capacity,
- to identify options for living with floods
- to identify the learning avenues about the coping mechanisms that they are practicing
- to assess the ability to understand the recovery needs and future risks.

³ Disaster Management Bureau (DMB) database

CHAPTER 2: METHODOLOGY AND APPROACH

2.1 Methodology:

The study intends to form an overall understanding on indigenous coping mechanisms of flood-affected areas. Primarily investigation was done in Sirajganj and Gaibandha areas using both qualitative and quantitative approaches:

- a) **Primary Sources:** Data collected from flood-affected people under the study area of both the location Gaibandha and Sirajganj. They are villagers, civil society representatives and different government and non-government officials of the study locations.

- b) **Secondary Sources:** The secondary data were collected through documents survey from various reports, booklets, planning documents and journals of respective Government organizations like Water Development Board, Metrological Bulletin and publications of different disaster based non government organizations.

Following steps were considered to carry out the study:

2.2 Conceptualization:

Vulnerability aspects from different dimensions like natural events, human induced events; social dimensions have jeopardized the livelihood of the people of the country especially in frequent flooding. Flood is the most regular disaster in Bangladesh. Due to the strong coping mechanism practiced by the community and continuous interventions of the Government and NGOs to flood preparedness, the death rate has been tremendously reduced. As a secondary hazard environmental degradation takes place in flood-affected region of the country as a result health situation of flood-affected zone worsen. Due to deposition of excess silt and debris carried by the river

with floodwater are hindered arable land future initiatives of recovery phase of flood. Moreover there are multi dimensional effects of flood like social, psychological, communication, law and order situation and public security systems. Historical records tell that people of the country cope with the flood in diversified manners, which help to recover from the situation significantly. Practically it is found that before taking institutional initiatives, flood victims take a lot of initiatives locally for combating flood, which are called indigenous coping mechanisms. All these coping strategies are very much important and valuable for combating flood. So it is required to assess the present flood vulnerability and capacity of people, needs of different occupational groups in flooding situation and their present adaptation strategies or coping strategies. So the study is very much relevant in the country context and time worthy effort.

2.3 Reconnaissance Survey:

Reconnaissance survey or primary visit to the study area was done for realizing the study environment through observation and conversation with the concerned persons. It helped to understand the possibility of carrying out the study in that area and also helped to design the questionnaires. A four daylong reconnaissance survey was carried out in the two districts. The questionnaire for semi-structured interview was finalized with the help of findings of this survey.

2.4 Sampling:

In a sample survey, a portion of the target population is selected as a sample for research, and the results are used to make inferences on the characteristics of the population. However, the selected sample should be representative of the population so that valid inferences will be made. The population is usually considered as the totality of items or things under consideration. Sample is the portion of the population that is selected for analysis. Statistically, when the shape of the population distribution is not known, the size of the sample is a factor and needs to be at least 30 for any rapid assessment. It is statistically recommended to use samples of no smaller than 30 for each group of the experiment. Many common statistics are based on sample sizes of a minimum of 30. In the present study selected villages and key informants, who

are linked with the different Upazila of selected districts, are identified as "population". The present study follows "Cluster Sampling" approach to devise the sampling framework for data collection. It is mentioned here that cluster sampling is a commonly used probability method that is superior to random sampling because it reduces sampling error.

In order to carry out the study the first task is to explore the vulnerable aspects of flood hazard with respect to study area selection and next is to identify the coping strategies of people considering phases of disaster management.

Vulnerability aspects vary with geographical location, livelihood pattern, transportation facilities, public service facilities, social, gender dimensions and common attitude of people in an area. Coping mechanisms depends degree of flood severity with respect to local context. Therefore, with view to have variability of vulnerability as well as coping mechanism, these criteria for village selection were adopted.

2.5 Data Collection **Instruments:**

Questionnaires and checklists (Annex-1) were prepared for collecting data through interview of flood affected people. The instruments contain open-ended questions to solicit valuable opinions from the flood victims.

A checklist (Annex-2) was developed for conducting Focus Group Discussion (FGD).

2.6: Pre-Testing of **Instruments:**

Instruments were pre-tested in two locations. Based on the lesson learned from pre-testing, the instruments were finalized and used for data collection.

2.7: Approaches of Data Collection:

Data were collected through

- Semi Structured interview
- Using available data at Union Parishad, Municipality, Upazila and District Level respective departments of Government and NGOs working in the study area.
- Observations and study of local environment
- Focus Group Discussion

2.8: Orientation on Questionnaires to Field Investigators:

Field Investigators were selected from the two local NGOs. **Before starting data collection to Field Investigators were trained on:**

- Background and objectives of the study
- Methodology of the study
- Interview techniques
- Establishing rapport with peoples representatives, civil society and households
- Details of questionnaires, checklist and observation guidelines
- Drawing samples

2.9 Data Collection:

A well trained and gender balanced team was put together for the fieldwork. Data was collected through the application of Rapid Assessment Methodology. The rapid assessment methodology included review of literature and records, interview of key informants, observation, process documentation and semi-structured questionnaire as the instruments of data collection. Data collection through literature review generally helps to compile the secondary sources of data. The key informants were requested to provide information on flood coping **mechanism** at selected locations to the research **team** to verify the local knowledge base through semi structured interview methods.

These interviews were carried out to collect more collective information from local knowledgeable persons such as school teachers, community leaders, members of Union Parishad etc. Observations were made for understanding the nature and extend of flood coping mechanisms at field level and documented accordingly. Focus group discussions were conducted at the village level with the help of pre assigned checklist with a view to find out indigenous coping mechanism to combat flood. An average number of 10-12 people participated in each of the FGDs. Cause effect analysis was part of the FGDs, which made an entry point to the discussion on household and community level coping mechanism. It may be mentioned here that the questionnaire and checklists were focused on specific issues and pre tested accordingly.

Careful attention was given so that conclusions represent as many perspectives as possible of different categories of flood prone people desegregated by gender, generation, ability, occupation and identity. The category of people who where identified by previous studies as most vulnerable such as small holder farmers, female headed households, families with members with older people, children disability were particularly chosen for FGDs and interviews. The study did not intend to generalize the findings to wider flood prone areas. So people living in the selected areas were chosen as the primary source of information.

The required data has been collected completely through field visit. Field visits were made during the months of February and March '08 in both the location simultaneously. Equal importance has been provided into above-mentioned criteria in village selection for focus group discussion. A total of 22 focus group discussions were conducted with male participants and 22 with female participants in the selected villages with the pre designed checklist. On the other hand 50 questionnaires were filled in with semi structured interview technique with 50 key informants under two districts.

2.10 Data Quality and Validation:

Triangulation procedures were followed in order to ensure quality of these qualitative data. Comparison was made between the focus group discussion findings and semi structured interview findings and filtered accordingly. Necessary assistance was taken

from the local key informants in data filtering process. Again these filtered data were compared with the study finding reports at national level.

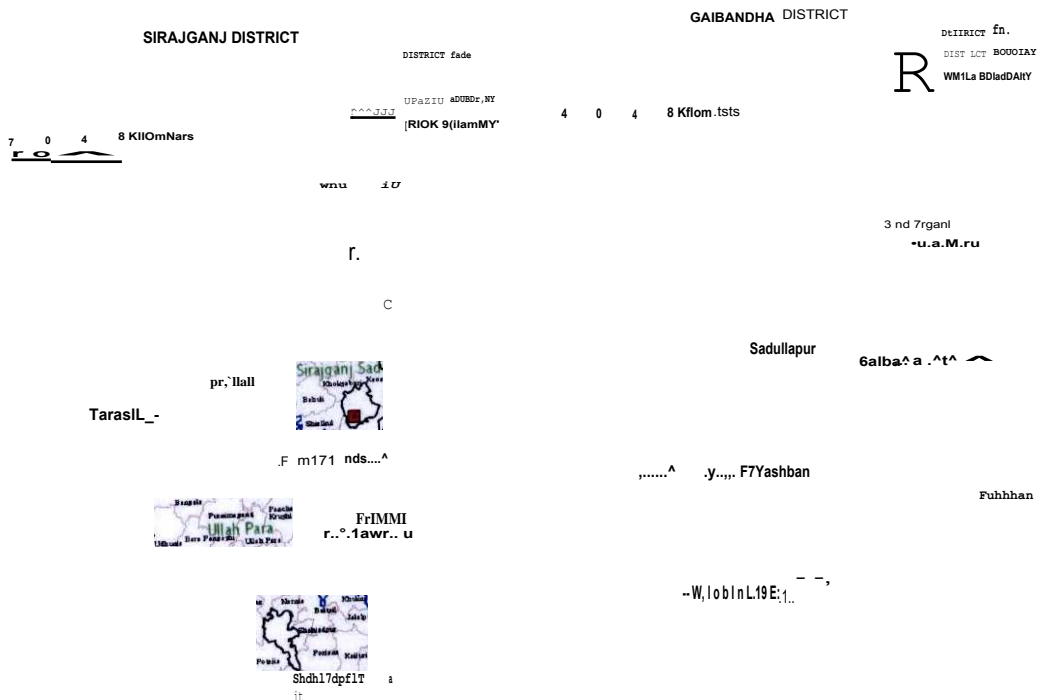
2.11 Data Processing and Presentation:

Collected data have been processed according to objectives of the study. Therefore the collected data were processed according to sequence like vulnerability-coping mechanisms.

CHAPTER 3 : STUDY AREA

3.1 Coping Strategy Index in the Study Area:

Though coping mechanisms have common characteristics, the study revealed that most of them were specific to the local environment and hazards that each community has to cope with. No easy generalization and replication is therefore possible. One cannot apply a standard set of responses for all communities. The findings in the surveyed villages also showed that it is too easy to idealize the virtues of "local" techniques and methods when it comes to meeting the challenges posed by reoccurring hazards among poor communities. Furthermore, the "local" solutions to new hazards arising from a rapidly changing external environment can inadvertently cause harm to the villagers' own local environment and contribute to increased long-term vulnerability. Local mechanisms shouldn't be viewed as a universal remedy but analyzed with the communities in term of their sustainability.



Households in rural Bangladesh employ a variety of strategies to cope with shocks, including economic, political and socio-cultural shocks as well as natural disasters such as flooding and cyclones. Not surprisingly, the poorest households tend to employ adaptive coping strategies far more frequently than do non-vulnerable households. The basic premise in implementing the coping strategies index (CSI), essentially, a series of questions about how households manage shortfalls in food supply, is to measure the frequency and severity of consumption or adaptation coping behaviors in order to monitor coping trends based on the calculation of an indexed severity x frequency of a set of coping behaviors and discover a potential problem before households ever begin to engage in more severe forms of divestment coping strategies. In other words the CSI is the product of severity x frequency of a set of coping strategies.

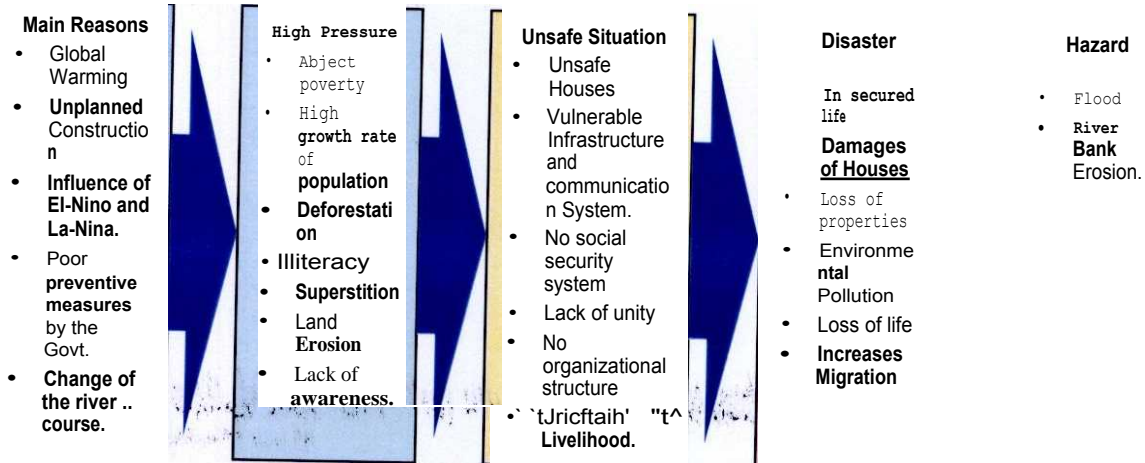
Most households employ a few common coping strategies during difficult periods of time of the year, or in response to a shock or abnormal event. The most commonly employed coping strategies include:

- Limiting portions at meal time;
- Relying on cheaper and less preferred foods;
- Borrowing food;
- Purchasing food on credit; and
- Reducing adult consumption to allow children to have adequate food.
- Distress sale

The CSI correlates closely with three measures of food security - dietary diversity, number of meals eaten in 24 hours, and access to adequate food. This result suggests that the CSI can be used as a proxy indicator to measure food insecurity.

3.2 Characteristics of the Study Sites:

Both Gaibandha and Sirajganj are situated on the western bank of Brahmanputra/Jamuna. On the basis Crunch and Release Model of disaster management a pen picture is drawn below regarding flood vulnerability of two locations:



3.3 Food and Livelihood Security:

- Somebody may have meal with insufficient quantity. Based on the economic status of the households, some of them have meal one time or more than one time instead of 3 times per day.
- They change food habit with low cost diversified items, such as rice gruel and other cereal gruel.
- Stop or reduce expenditure in some essential issues like health, clothing, education and house reconstruction etc.
- Somebody use savings and lead life.
- Day labors migrate to other economic sound regions of the country for earning and send money for other households members for their food security.
- Somebody lead life with distress sale like sale of poultry, trees, plant, cattle, ornaments and advance crop sale before harvesting, advance labor sale in low wages for next crop seasons.
- Marginal and small farmers mortgage their land to the local moneylenders for recovering crisis situation.

- h. Somebody borrow loan with high interest rate from the local moneylenders.
- i. Low paid employees' sale in advance their bank check of salary in advance to the local moneylenders.
- j. Diet diversity, a proxy for nutritional adequacy and an essential aspect of food security, is clearly problematic for the poorest households.

3.4 Early Warning:

In order to begin the preparedness process, people need to understand that a flood is coming and how intense it might be in terms of areas that will be affected as well as the depth of inundation and the estimated duration of the flood event. People have been traditionally doing their own flood forecast by looking at the behavior of the rainfall, water levels in rivers, or the behavior of snakes, frogs, ducks and other animals. These methods are empirically weak but quite often effective in areas where no technically sound flood forecasting and warning activities are in place. But, even though such activities are in place in many places now, quite often flood-forecasting messages do not reach the affected population in time and in technical terms and language they understand. Therefore, they still have to combine their traditional knowledge with the information they receive from the bulletins aired by media, radio in particular, from time to time during flood **seasons**. Such bulletins are often in technical-speak and cannot be fully grasped by the ordinary rural people. People often seek information from the chairmen or the members of the local elected bodies; local knowledgeable persons and officials but do not often receive satisfactory information. In the light of these circumstances a considerable degree of uncertainty **remains**. People are, therefore, constrained to rely more on empirical methods as indicated above. The conclusions have sometimes been right; but not so at other times regarding both timing and intensity of floods. Lack of timely and effective flood forecasting and warning, disseminated in local language, remains a major problem. Community action starts with the community mobilization to strengthen the organizational bases for local flood mitigation initiatives. In the past, most of the activities were carried out by people themselves during a flood and were based on individual initiatives. People were hastily organized, if at all, and that too primarily for the construction of physical facilities or often-unplanned evacuation and rescue activities. If these activities are carried out in a community-based organized **manner** at community level, vulnerability

and risks due to flood can be substantially reduced. For that to happen, community institutions are needed for collective action-planning, implementation, monitoring and evaluation.

3.5 Flood Responses:

During a flood, one may choose from the following two options (a) enduring flood by staying inside the house or compound, or (b) leaving the house and taking shelter either in non-flooded areas or in nearby flood shelters, if available. Enduring flood is indeed difficult. Many poor families tend to stay back in their marooned dwellings, often in raised platforms inside the dwelling or on rooftops to avoid moving out and risk the theft of valuables. In doing so, they sometimes fall victim to snakebites, even drowning. Escaping floodwaters and taking shelter elsewhere also depend on the availability of flood shelter or high places to move. Living within the marooned homestead or opting to relocate to a neighbor's or a kin's house during a flood is a family-level response while opting for relocating temporarily in a flood shelter is largely a community response.

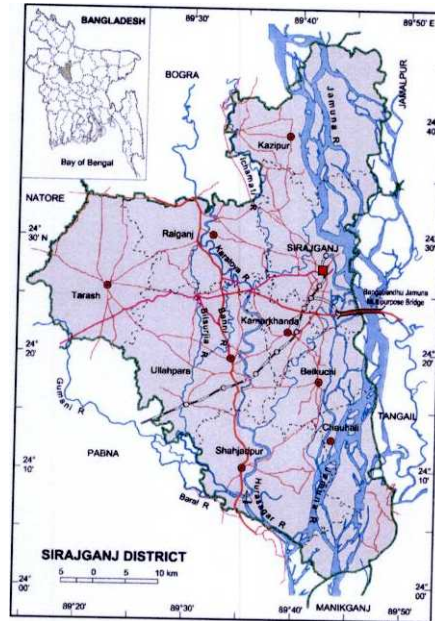
3.6 Recovery and Rehabilitation:

Flood affected people are keen to get back to normal life. After suffering losses in terms of crops, livestock, and property, they often find themselves in extremely difficult situations and cannot rehabilitate themselves without assistance from the government, rich benefactors, or NGOs/CBOs. Sometimes, neighbors help one another towards getting back to 'normal life'. Interpersonal relationship and kinship also play vital roles in helping some flood affected people to find their feet again. Community effort can be useful in repairing partially damaged houses, often by means of collective free labor supporting one another. Well-to-do people sometimes employ poor neighbors in restoration activities, thereby offering temporary employment. In the case of large-scale flood devastation, government's role in relief and rehabilitation becomes crucial.

CHAPTER 4: VULNERABILITY AND COPING MECHANISMS IN THE STUDY AREA

4.1 Study Findings in Sirajganj:

The area of Sirajganj district is 249,792 sq. km with a population of 2,707,011. The district is consisted of 9 Upazila. Besides the river Jamuna, other rivers of the district are Baral, Ichamati, Karatoa and Phuljuri. Being the flood plain of these rivers, the major hazards of the district are flood and riverbank erosions.



4.1.1 Hazard Matrix:

Flood affects Sirajganj almost every year and sometimes the period of flood prolonged causing immense sufferings to the people. Floods and water logging are the major disasters of this area. Nonetheless followings are the hazards of Sirajganj district, which has furnished in the following matrix:

No	Name of the District	Major disasters
1	Sirajganj	Nor'wester, flood, draught, water logging, tornado and cold waves

4.1.2 Mobility:

Flood victims move for taking shelter in highland. In context of Sirajganj people take shelter in the following places.

N	of the district	Places that are used as shelter
	ajganj	Various government and non-government high buildings, roads and embankment.

4.1.3 Geographical Vulnerabilities and Capacities:

Being situated on the bank of the Jamuna it is affected by flood and riverbank erosion. Maximum areas are low lying. Maximum canals are silted up and the lands on both the sides are sandy and no crops grow well. On the other hand capacities are most of the lands are two cropped. A lot of trees are there along with many old trees. Maximum roads are paved.

4.1.4 Environmental Vulnerabilities and Capacities:

The sanitation system is unhygienic. Many areas get water logged during rainy season and makes harm to environment. People make environment stinking by throwing dirt and garbage in the dead canal. Maximum area is densely populated which casts negative impact on the environment. Snakes are seen a lot during flood. On the other hand capacities are, some people use sanitary latrine and pure water is available. There are a lot of trees, which keep the environment cool.

4.1.5 Socio-Economic Capacities and Vulnerabilities:

Almost half of the people do not own any house or farming land. More than half of the people are day laborers and poor. Most of the people do not have the habit of saving and they do not have domestic animals. The families of the disabled persons are poor. Financial condition does not permit them to raise the foundation of their houses or installation of tube well. As for capacities are, some of the people are hawkers, small businessmen some are weavers. There are ample scopes to develop small business in the area.

4.1.6 Livelihood Vulnerabilities and Capacities:

There is no earning opportunity for disabled persons. Many earn their livelihood serving as day laborers and many of them have to sell labor in advance due to poverty. Many people are compelled to sell their essential household items during and after flood. As for capacities, some NGOs are operating with micro credit facilities, so

landless and marginal farmers, small traders borrow and invest in both on and off farm activities. Many people are rickshaw pullers.

4.1.7 Infrastructure Vulnerabilities and Capacities:

Vulnerabilities are not having adequate flood shelter in the area. No suitable shelter specifically for the disabled persons. Most of the houses are mud built. Water cannot drain out quickly as there are inadequate number of bridges and culverts. On the other hand, there are long embankments in west bank of the Jamuna River. There are a few high and pucca roads. There are government hospitals and non-government clinics and schools on high land.

4.1.8 Vulnerabilities and Capacities of Skilled Human Resources:

Not enough trained volunteer for disaster management are available in the area to assist the affected community during flood. No regular functional and responsive disaster management committees at union and Upazila level. The number of midwife is inadequate. There is no veterinary surgeon in Upazila level. On the other hand capacities are- there are hospitals and family well fare centers and many village doctors in the area.

4.1.9 Vulnerabilities and Capacities in regard to services by the Government and Non Government Agencies:

Vulnerabilities are, there is lack of credible flood warning disseminations system. Warnings received through media are very technical and not easily understandable to the local communities specifically how the situation is going to impact his life and livelihoods. In general, vulnerable community gets very minimal lead time to evacuate or to safeguard their belongings. Water supply and sanitation facilities are inadequate comparing to the need. There are eclectic power supply lines in most of the areas but power cuts are regular thus often remain without power. Government extension services are insignificant in the areas and often do not reach to the extremely vulnerable communities living in the remotest/isolated chars. Flood shelters

are not adequate. On the other hand **capacities** are: health and family welfare office **and limited** services available at **union level.**

4.1.10 Vulnerabilities and Capacities related to Women, Children and Elderly people:

Vulnerabilities include early marriage and dowry systems that prevail at society level. Most of the girls are deprived from education. Some orthodox village elders create obstacles on the way of females' participation in the development activities. During winter, poor, aged persons and children of poor family suffer biting cool. Most of the poor old people do not get old age pension. There is no separate sanitation system for women in temporary flood shelters and they feel insecure. On the other hand capacities are; women make portable oven, preserve bamboos, ropes etc as flood preparedness.

4.1.11 Vulnerabilities and Capacities due to Disability:

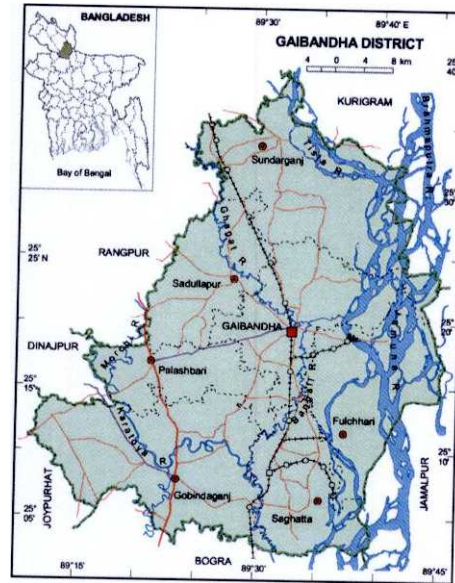
Most of the disabled persons are unable to buy assistive devices. There is no opportunity for their entertainment, education and shelter. During disaster they face great problems in respect of movement, sanitation and food. And they suffer from mental depression. There is no suitable employment for them. On the other hand capacities are some disable persons are engaged in weaving and farming. Some of them know how to read and write. A few of them have assistive devices.

4.1.12 Vulnerabilities and Capacities in regard to Habits and Behavior:

Most of the people do not have the habit of savings for bad days. Despite having ability they do not raise the plinth of their houses above the highest flood level. They do not preserve medicine and drinking saline as flood preparedness. On the other hand capacities are some people preserve food for flood, take household preparedness to manage cattle, poultry etc.

4.2 Study Findings in Gaibandha:

Gaibandha district is 2179.27 sq. kilometer with a population of 2,11,959. The main rivers of the district are the Ghagot, Karatoa, Bangali and Tista. The district consists of seven Upazilas. Most of the land in the district are sandy and unfertile. Flood and riverbank erosion are the major hazards of the district being the flood plain of the above-mentioned rivers.



4.2.1 Hazard Matrix:

Geographical location made these areas flood prone and flood is the main disaster of the area. Besides, seasonal calamities such as Kalboishakhi (nor'wester), hailstorm, river bank erosion, draught and cold waves, Monga are amongst other disasters.

No	Name of the district	Major Disasters
1	Gaibandha	Kalboisakhi (nor'wester), flood, riverbank erosion, hailstorm, draught, Monga and cold wave.

4.2.2 Mobility:

It was mentioned earlier that flood is the main disaster of this area. Lives and livelihood of the inhabitants are closely related with flood. Generally people take shelter in the following area:

No	Name of the district	Social Resources
1	Gaibandha	Roads, Railway line, public and government buildings,
		Primary and secondary schools and colleges of the area.

4.2.3 Geographical Vulnerabilities and Capacities:

Gaibandha is situated on the west bank of Brahmaputra and the river Teesta crosses over the district. In rainy season river flood occurs almost in every year. During rainy season river water submerge the locality and caused flood. Most of the houses are located in low laying areas. On the other hand capacities are: There are some fertile two cropped lands. Embankment and some roads are above highest flood level. In char areas, some people have boats those are used in rescue and evacuation during flood. Bamboo clumps and banana trees surround most houses.

4.2.4 Environmental Vulnerabilities and Capacities:

Water logging is one of the problems in the area. The area is densely populated and houses constructed in unplanned way. Due to water logging the area is a breeding place for flies and mosquitoes. Most of the houses have open latrine and platform of tube wells are not pucca. On the other hand capacities are; each house is surrounded by many trees, trees are planted on both sides of the roads which pass through villages. Some families have tube wells as a source of safe water with pucca platform. Many people use sanitary latrine.

4.2.5 Socio-Economic Vulnerabilities and Capacities:

Most of the people are marginal and landless farmers. Most landless people do not have own land for homestead and they live in other persons' land or khas land. Literacy rate is very low. There is discrimination of wages between male and female. People do not get year round employment opportunities. On the other hand capacities are: a significant number of people are migrant workers having income sources.

4.2.6 Livelihood Vulnerabilities and Capacities:

There is no year round income opportunity in the areas resulted distress sale as a means of livelihoods. Women get fewer wage than men. Disabled persons are dependent on others' earnings. On the other hand capacities are; alternate livelihoods

skills among the population created opportunities to be a migrate worker as rickshaw puller, transport workers etc. Many families have domestic animals.

4.2.7 Infrastructure Vulnerabilities and Capacities:

There are unplanned houses in the area, shortage of flood shelters have also been reported. There are lots of low lying water retention areas. Disabled persons do not have houses suitable for them. There are some dilapidated embankments, which have been breached during last floods. On the other hand capacities are; there are some multi storied houses and pucca roads above highest flood level in the area. There is a flood protection embankment in the municipality area. There are some social resources like schools, colleges and madrasas, which are generally used as shelter in flooding time.

4.2.8 Vulnerabilities and Capacities due to Skilled Human Resources:

Inadequate numbers of physicians midwife are posted in the rural areas. There is no trained volunteer in the flood prone areas to rescue and evacuate at the time of need. There are no regular capacity building initiatives for the disaster management committees at union and Upazila level. On the other hand capacities are; there are family health welfare workers and agriculture extension workers in the rural areas. People practice indigenous coping mechanism to confront flood.

4.2.9 Vulnerabilities and Capacities in regard to Services by the Government and Non Government Agencies:

There is no community based early warning system for flood. People have no easy access to health and other services provided by the government. NGOs have poor awareness program on health, hygiene and sanitation program. On the other hand capacities are: there are some private health clinics in the area, government hospitals, mobile phone and telecommunications networks. Some NGOs are operating non formal education in the area. Government and non government organizations distribute relief during disaster.

4.2.10 Vulnerabilities and Capacities related to Women, Children and Elderly people:

Women's participation is very low in development activities. Most of the children in rural area are malnourished. Often children sell their labor to support their families. Most of the female children do not go to school. Incidents of child marriage and cases of torture of women are reported. Pension for elderly people is inadequate. On the other hand capacities are: women cooperate men in daily household work. Women have the habit of savings.

4.2.11 Vulnerabilities and Capacities due to Disability:

Disabled persons are not fully aware of their rights. They have very little education and medication facilities. Most of the disabled persons are very poor and they have no helping equipments and appropriate roads for them. Disabled persons are more vulnerable during flood and suffer most comparing to a normal person. On the other hand capacities are; some local NGOs have program specifically focused on disability. Some disabled persons get financial supports from the govt. where as few of them have helping equipment to move. Family members are sympathized to disabled persons.

4.2.12 Vulnerabilities and Capacities in regard to Habits and Behavior:

Most of the people do not preserve food for flood. Lack of adequate sanitary latrines has been noticed. Habit of tree plantation is not up to the mark. People prefer to take ready relief rather than facing the challenges at their own. Many household did not raise plinth level of their home despite financial capacity. On the other hand capacities are; good team harmony among the community and assist each other during emergency or crisis. They have good "we" feeling.

4.3 Summary of Coping Mechanisms in both Sirajganj and Gaibandha Districts:

There are much commonality among the understanding and approach of the interviewed communities in both the locations. Summary of overall observations are furnished in below table:

Local Coping Mechanisms	Weakness	Strength	Areas of Improvement
Flood Proofing Raising of land/ homestead Graveyards Market places Education Institute Roads Playgrounds etc.	<ul style="list-style-type: none"> - Land ownership - Relevant cost - Technical support - Women's privacy/Security 	Local knowledge Social Integration Effective Participation	<ul style="list-style-type: none"> - Gender Sensitivity - Awareness of loss vs benefits in vesting flood proofing
Food and Assets <ul style="list-style-type: none"> - Skipping/reduce frequency of meals - Change eating habits - Storage of food - Acquire potable house and household belongings 	Inadequate flood shelters Inadequate cattle shelters Limited lead time Animal feed are not secured	Savings practice for bad days specifically by women Backyard garden in flood proof homestead Flood proof water sources	develop community storage facilities in safer place promote appropriate technology e.g. preserving fodders Accelerate government nations building services
: Cattle/Poultry etc. Rescue/Evacuation Making of boat banana raft platform Planting of trees, bush Houses on pole Cutting road/small embankment for water passage Local volunteer	Shortage of appropriate boats Early warning dissemination in peoples language Unplanned road/embankment construction	Popular knowledge Locally acceptance Mobilization of local expertise, skills, resources Commitment	Awareness raising Enough Preparedness Bringing changes in discriminatory values/attitudes Improve/ Introduce appropriate technology

4.4 Variations **of understanding and knowledge on coping mechanisms in both Sirajganj and Gaibandha** Districts:

There are no significant differences of findings between the two research locations in terms of coping mechanisms practiced. Both the districts are extremely vulnerable to flood disaster, and getting major portion of their flood waters from one source the river Jamuna. The topography, culture, poverty level, flooding characteristics and flood early warning dissemination are same in both the study areas.

Although there are much commonality in understanding and approaches of the coping mechanisms in the study areas, this understanding and approaches are disproportionately distributed in case age and gender. Humanitarian community need to work together in coming days to improve this disproportionate distribution. Major three observations are furnished below:

Access to information: Male mobility is very high in both the study areas, even in many cases males are migrated to different districts for income opportunities. Culturally men are gathered in a location for gossiping, listening radio etc. when they do not have much work to do specifically in the flood season. Due to their collective engagement in this type of activities they are the first recipient of the information related to early warning, rescue and/or humanitarian assistance. Contrary, women are busy with household work and/or children caring and get information later.

Access to food: Most of the poor household members also cope with this situation adjusting meals through reducing times and quantity, selling household assets, borrowing from relatives, etc. Whatever the household can manage, first they try to feed the children then the male and finally female if any.

Access to water and sanitation: Traditionally women are responsible to collect water even from a distance place using Banana tree raft. This exposes them to significant risk on their life and sexual harassment. Privacy for women are not common in most of the places for bathing, toilet and breast feeding. Although male are able to secure place for gossiping, listening radio and playing cards.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

Indigenous knowledge is the knowledge held collectively by a defined community. Through this study the researcher has sought to bring out the wisdom of community in combating flood in their local context. The wisdom of the community is very much relevant and useful to reduce sufferings from flood. Due to its geographic characteristics, Bangladesh is a flood prone country and every year the country has been experiencing flood of different magnitudes. So community people practice their traditional wisdom to reduce severity of flood as well as their suffering. Through this study it has been tried to identify these sort of knowledge in the two flood prone districts Sirajganj and Gaibandha.

A questionnaire for semi structured interview and checklist for focus group discussion were developed as part of study tools. Considering the objectives of the study appropriate methodologies were applied for field survey. Based on the need felt and request from the researcher some local NGO officials extended their support voluntarily for data collection and validity checking of data. Reliability and validity of data has been ensured through funnel analysis process of participatory rapid appraisal techniques. Data were compiled, analyzed and made interpretation by the researcher through repeated discussion with the supervisor of the study. The findings of the study have been furnished carefully following the above mentioned processes. On the basis of experience data collection, compilation and interpretation the researcher have been drawn some recommendations.

Theme of the study is very much time worthy. There is ample scope to undertake this sort of study on flood hazard in other part of the country. It is necessary and the demand of the time to enrich storage of knowledge in this arena. Many local indigenous knowledge on different hazards remain spread among our community people. In the impending future it is hoped that more study will be conducted on this theme, the study will be put light to the new comers.

This study has further identified flood as the major disaster in the Sirajganj and Gaibandha districts. Based on the study following recommendations are made;

1. Disaster risk management needs to be mainstreamed in development activities on priority basis.
2. Need further awareness raising focusing. investment in community and household level preparedness
3. Credible long and medium range flood early warning generation and dissemination using local language so that flood vulnerable people can take benefit of this warning.
4. Community based coping mechanisms should be incorporated for strengthening the mitigation measures.
5. Risk may reduce to build the capacity of people including their coping mechanism based on their local vulnerability.
6. Further strengthening of local government support mechanisms needs to be in place. Local government should be given mandate and resources to act upon any crisis in collaboration with local organization that had local knowledge and expertise.
7. Institutions and agencies both the Government and NGOs should be sufficiently capacitated to handle the disaster management challenge.
8. Many agencies are still not aware of what they should do in extreme situations. This is a result of delinking process analysis from disasters. A classic example is the role of micro-finance agencies during disaster which developed a negative image as a "money collector" just before the disaster became massive and subsequently as an inadequately capacitated money lender in the post-flood scenario. Appropriate policy is required for credit supply and collection during and after disaster. This should be a major issue of the Micro Finance Regulatory Commission.
9. Traditionally most of the poor people in the study area believe that flood and other hazards are given by The Almighty "Allah". The government, NGOs and civil society need to work together to eliminate such misconception. We need to educate them, in most of the cases human to blame for flooding and negative effects of the flood hazard can minimized through proper planning, management and early warning.

10. Due to scarcity of fire wood during flood, traditionally families prepare their **meals once** in a day **and consume** at different **times**. This practice is one of the **reasons** for higher diarrhea rate in flood **season in these** two districts. Disaster **management agencies and practitioners needs to educate** the flood vulnerable people how to reduce **this case and** promote fuel efficient stove, pre-positioning of fire wood for rainy days etc.
11. Traditionally extreme poor people in the research **areas** wait until last moment to **evacuate** to a safer **place during** flooding. This type of practice increases their risk level significantly **and even during evacuation** they leave behind their livestock and poultry. **Disaster management agencies and practitioners needs** to educate the **flood vulnerable** people better **planning** for selling **this assets** before flood seasons that will **also ensure** cash transfer to the family and fair price of the poultry and livestock.

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Indigenous Coping Mechanisms in Combating Flood**Semi Structured Questionnaire for Interview**

(Interviewee: Key Informants like UDMC Members Local Elite Local School Teachers etc.)

A. Basic Information of the Area:	
A1.	Interview date:
A2.	Name of Union:
A3.	Name of Upazila:
A4.	Name of District:
AS.	Name of the person interviewed:
A6.	Profession of the person interviewed:
AT	Area of the Union in Square KM
A8.	Population in the Union:
A9.	Literacy rate in the Union:
A 10.	Main profession in the Union in % of total population:

B. Hazard Matrix:						
Sl.	Name of hazards in the area	Period of Occurrence (months)	Numbers of occurrence during last 5 years	Area Affected (%)	Population Affected (%)	Remarks
1.						
2.						
3.						
4.						
5.						
6.						
7.						

C. Flood Hazard Analysis According Crunch Release Model in location context :			
1. Root Causes of Flood	2. Dynamic Pressures :	3. Unsafe Conditions	4. Consequences of Flood Hazard
1.1:	2.1:	3.1:	4.1:
1.2:	2.2:	3.2:	4.2:
1.3:	2.3:	3.3:	4.3:
1.4:	2.4:	3.4:	4.4:
		3.5:	4.5:

D. Mobility of People during Flood			
Ward No	Name of Vulnerable Villages	Where people take shelter in inside or outside of the Union	Do the families decide alone or in group?
1.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

E. Capacities and Vulnerabilities of people of the Area Considering Flood Hazard:				
Sl.	Issues	Vulnerabilities	Capacity	Coping Strategies
		1).	1).	1).
		2).	2).	2).
1	Geographical	3).	3).	3).
		4).	4).	4).
		5).	5).	5).
		1).	1).	1).
		2).	2).	2).
2	Environmental	3).	3).	3).
		4).	4).	4).
		5).	5).	5).
		1).	1).	1).
		2).	2).	2).
3	Food	3).	3).	3).
		4).	4).	4).
		5).	5).	5).
4	Health	1).	1).	1).
		2).	2).	2).
		3).	3).	3).

E. Capacities and Vulnerabilities of people of the Area Considering Flood Hazard:				
Sl.	Issues	Vulnerabilities	Capacity	Co ing Strategies
		4).	4).	4).
		5).	5).	5).
		1).	1).	1).
		2).	2).	2).
5	Mobility/ Movement	3)	3)	3)
		4).	4).	4).
		5).	5).	5).
		1).	1).	1).
		2).	2).	2).
6	Infrastructure	3),	3).	3).
		4).	4).	4).
		5).	5).	5).
		1).	1).	1).
		2).	2).	2).
7	Communication Means	3).	3)	3).
		4).	4).	4).
		5).	5).	5).
		1).	1).	1).
		2).	2).	2).
8	Income opportunities	3).	3)	3).
		4).	4).	4).
		5).	5).	5).
		1).	1).	1).
		2).	2).	2).
9	Agriculture/ Business	3)	3)	3).
		4).	4).	4).
		5).	5).	5).
10	Women, Children, Elderly	1).	1).	1).
	Persons & Disable Persons.	2).	2).	2).
		3).	3).	3).

E. Capacities and Vulnerabilities of people of the Area Considering Flood Hazard:				
Sl.	Issues	Vulnerabilities	Capacity	Coping Strategies
		4).	4).	4).
		5).	5).	5).

F. Overall Comments by the interviewee:

Interviewer: Name:

Signature:

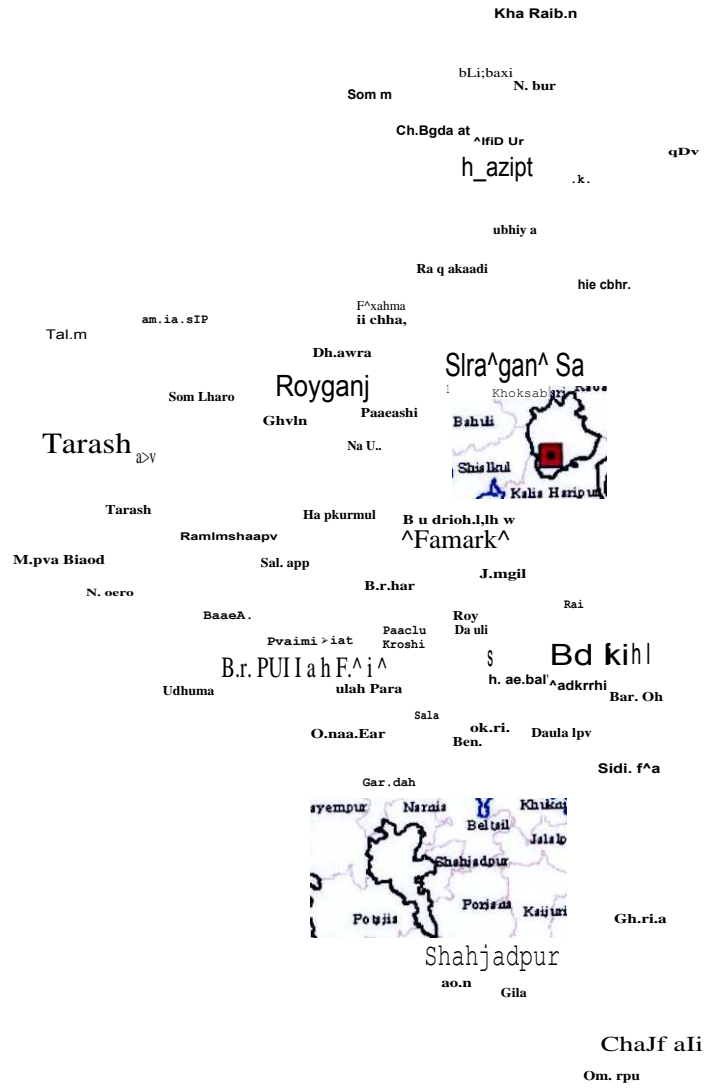
Study on Coping Mechanisms
Checklist for Focus Group **Discussion**

(Interviewee: Villagers)

- 1) Flood Prediction: (e.g.- wind direction, temperature and rainfall, color of cloud, appearance of rainbow, lunar characteristics & lunar calendar, insects/animal behavior, abnormal sound of river wave, crop production & fishing potentials).
- 2) Preparedness:
 - 2.1 Household
 - 2.2 Community
- 3) Mitigation Techniques
 - 3.1 Structural
 - 3.2 **Semi Structural**
 - 3.3 Non Structural
- 4) Flood Shelters
 - 4.1 Management
 - 4.2 Coping procedures **in shelter**
- 5) Food, Nutrition & Health **issues in crisis** situation & coping techniques
- 6) Water, Sanitation & Defecation System in crisis situation & coping practices
- 7) Problem with women, children, elderly persons and disable persons & solving means
- 8) Environmental problems and probable **solutions**
- 9) Future measures against safety
- 10) Communication problems & overcoming techniques.

Annex-3: Map of Sirajganj District and Study Area

SIRAJGANJ DISTRICT



Annex-4: Map of Gaibandha District and Study Area

GAIBANDHA DISTRICT

