

INDIGENOUS COPING MECHANISM FOR COMBATING DISASTER IN BANGLADESH

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Session: 2009-2010
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Abbreviation and Acronyms

CPD	: Center for Policy Dialogue
GoB	: Government of Bangladesh
LGD	: Local Government Body
SOD	: Standing Orders on Disasters
DMB	: Disaster Management Bureau
MOFDM	: Ministry of Food And Disaster Management
CBA	: Community Based Approach
EEZ	: Exclusive Economic Zone
ERD	: Economic Research Division
TDRM	: Total Disaster Risk Management Approach
CBDM	: Community Based Disaster Management
CSI	: Coping Strategies Index
MoWR	: Ministry of Water And Resource
DRMC	: Disaster Risk Management Cycle
LRP	: Land Reclamation Program
BNBC	: Bangladesh National Building Code
NDMC	: National Disaster Management Committee
IMDMCC	: Inter Ministerial Disaster Coordination Committee
NDMAC	: National Disaster Management Advisory Committee
EPAC	: Earthquake Preparedness and Awareness Committee
CPP	: Cyclone Preparedness Program
DMC	: Disaster Management Committee
DDMC	: District Disaster Management Committee
UZDMC	: Upazila Disaster Management Committee
PDMC	: Pauroshova Disaster Management Committee
CCDMC	: City Corporation Disaster Management Committee
CBO	: Community Based Organization
DDMP	: District Disaster Management Plan
NGO	: Non Government Organisation
CPC	: Cyclone Preparedness Center
VDPC	: Village Disaster Preparedness Committee

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Executive Summary

The study was conducted based on broad objective of exploring indigenous coping mechanisms for combating disaster at Koyra upazila of Khulna and Patharghata upazila of Barguna district. For attaining broad objective the study has been conducted with some important objectives (a) to know the socio demographic information of the respondents (b) to reveal the indigenous perception about disaster (c) to explore the indigenous coping mechanisms for combating disaster (d) to reveal the Governmental and NGOs mechanisms for combating disaster and (e) to draw some suggestions for improving the coping system with disaster. The study has been employed qualitative research method and selected 10 respondents for case study through using purposive sampling method and two FGDs were conducted in the study areas with community people. The findings of the study show that most of the respondents are not well educated. Most of the respondents live in house with less secured. The study reveals that almost every year disaster like flood, river bank erosion, cyclone and tidal surge hit in study areas. Disaster causes loss of property, environmental imbalance, damage of infrastructures, in word, people lead miserable life during or after disaster. Community people adopt different indigenous mechanisms for combating disastrous impact. The study indicates that people adopt these mechanisms before and after disaster. they take structural (repairing embankment, raising homestead platform, construction of road etc) and non structural (making people aware, tying houses with strong trees, planting disaster resilient trees, taking shelter in cyclone center during disaster, preserving food for future and dissemination of news about imminent disaster etc). The study also reveals that early warning system play crucial role in minimizing the consequences of disaster. The study found that community participation helps to lessen the negative effects of disaster. The Government and NGOs take initiative for recovering the catastrophic situation. The Government of Bangladesh take both structural and non structural mechanisms for combating disaster whereas NGOs take non structural mechanisms (making people aware, providing material services, providing training) only. The Government of Bangladesh has formulated disaster management act, policy and plan but people in the study area don't have any idea regarding this issues. To combat or minimize the tragic circumstance of coastal belt, Government should formulate the coastal belt policy as well as implement the policy. The coastal belt should be made disaster resilient.

Chapter One

Introduction

- 1.1 Introduction
- 1.2 Statement of the Problem
- 1.3 Rationale of the Study
- 1.4 Objectives of the Study
- 1.5 Structure of the Report
- 1.6 Limitations of the Study

1.1 Introduction

Bangladesh is a low-lying, riverine country with a largely marshy jungle coastline of 710 km (441 mi) on the northern littoral of the Bay of Bengal. Formed by a delta plain at the confluence of the Ganges (Padma), Brahmaputra (Jamuna), and Meghna Rivers and their distributaries and tributaries, Bangladesh's alluvial soil is highly fertile, but vulnerable to natural disasters (Islam, 2013). Bangladesh has special geographical feature. It is located at the lowest end of the Ganges, Brahmaputra and Meghna Basin (Roy et al, 2009) It has the Himalayan range to the north, the Bay of Bengal to the south with its funneling towards Meghna estuary and the vast stretch of Indian land to the west. These special geographical features have significant impact on the weather system of Bangladesh. Due to this weather system, Bangladesh is the worst victimized country of natural disasters which causes loss of lives and properties (Nizamuddin, 2001).

Due to climate change, most of the coastal areas of the world are at risk from natural disasters and meteorological disturbances. The coastal areas of Bangladesh are not in different situation from it. These areas are ecologically sensitive and climatically vulnerable because a process of erosion and accretion is continued. The coastal areas of Bangladesh are facing the Bay of Bengal with an area of 472,201 sq. km where 19 districts are included and that is the reason which has made the country one of the most disaster prone country (CPD, 2000). As the Bay of Bengal is a perfect breeding ground for tropical cyclones, the coastal areas have been facing one or two severe disaster every year. For example, cyclones, SIDR and AILA can be mentioned which is badly affecting the livelihood of our citizens especially in the coastal zone (Alam, 2005).

1.2 Statement of the Problem

Bangladesh is beset with a myriad of natural disasters. Tropical cyclones, tornadoes, tidal surges, flood, drought, earthquake and large scale of riverbank erosion all wreak havoc on the live and livelihoods of the population. The country's propensity to natural disasters is due to various environmental factors and its geographical location. Recent estimates suggest that about 4 percent world cyclones hit Bangladesh and that

damage and losses to the country amount to about 96 percent of the global total. In November, 1970 the Bangladesh coastal regions were devastated by a cyclone that killed more than 300,000 people and damaged the property cost of \$2.4 billion. More recently Cyclone Aila hit the Bangladesh on Monday 25 May 2009 and has produced substantial damage across areas of southern Bangladesh. It caused 190 immediate deaths, injuries to 7,103 people and more than 500,000 people to become homeless. The total damage was \$ 1.7 billion. Cyclone Sidr hit the coastal areas on 15 November 2007. It affected 87,000 people, killed 3,363 and injured 55,282 and 564,000 homes have been destroyed, 8,85,280 houses have been damaged. Total damage and losses were (in USD) 23 billion (Country Report, 2013). Agricultural production was disrupted and the country's economy was severely affected. Bangladeshis and their government are doing their best to prevent the natural disaster but there is an overwhelming need to strengthen the country's disaster preparedness and management capabilities.

There is probably a little scope to live in a risk-free society as in every moment, anywhere in the world, natural or man-made problems may result in humanitarian crises. Disasters whether natural or manmade are very common in Bangladesh. Almost every year, the country faces floods, cyclones, storms, tornadoes, drought, river erosion, earthquakes, arsenic contamination of ground water sources and environmental pollution. The situation hinders the development of the nation.

The GoB has taken a number of significant steps during the last few years for building up institutional arrangements from national to the union levels for effective and systematic disaster management facilitating mitigation to the sufferings of disaster victims in Bangladesh. To maintain proper coordination amongst the concerned ministries, departments, line agencies, local government body (LGD) and community people, and also to ensure their proper functioning to mitigate sufferings of the people, the GoB has formulated a set of mechanisms for council and committees from national down to the grass-root levels. For the mechanisms to be best operative, the Standing Orders on Disaster (SOD) act as a guidebook. Major approaches have switched from technology-based hazard control to community-based disaster risk management, which aims to reduce human vulnerability and build resilient

communities (MoFDM, 2009). For this purpose, disaster management committees are set up within each union. The committee prepares a disaster action plan and maps, showing hazard risks and available resources in the union. Members of the community take part in this process utilizing PRA methods (DMB, 2008). It is the committee's responsibility to disseminate warning signals, carry out evacuation, search and rescue, distribute relief and operate shelter centers, based on the disaster action plan. Community-Based Approach (CBA) which emphasizes the total participation of all people facing any hazard or disaster and makes sure to render all possible services to the community. The existing system for disaster management in the country covers activities at normal times for important disaster management aspects like mitigation/prevention, preparedness, response and recovery (Shafie, 2009).

Collaborating with the Bangladesh government, Some NGOs are working for disaster risk reduction. The most influential NGOs are USAID, Action Aid, CARE and Oxfam Bangladesh. USAID directly supports in disaster planning, preparedness and mitigation activities. When disaster's damage is beyond the country's ability and resources to respond, USAID provides relief and rehabilitation assistance. AAB acknowledges and actively promotes that protection against disaster is a fundamental right of vulnerable citizens. Oxfam is working at community, district and national levels to mainstream disaster risk reduction in every sphere of life. Oxfam believes the key to disaster risk is to reduce disaster vulnerability factors and create a culture of disaster preparedness. GoB is committed to respond to any disaster situation anywhere in Bangladesh.

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.

1.3 Rationale of the Study

Natural disasters, whether they occur in advanced or developing nations, can destroy people's livelihoods. Extreme natural and man-made events have recently hit both developed and developing countries particularly in coastal area. Bangladesh has a 711 km long coastline (Hossain, 2011).

The coast of Bangladesh consists of 19 districts, covers 32% of the country and accommodates more than 35 million people (Huq and Rabbani, 2012). This zone is highly potential with diverse natural resources. The Sundarban, the largest mangrove delta in the world situated in this coastal belt provides potential and resourceful for the livelihoods of the local communities and tourism sectors (Rabbani et. al, 2013). 20% of land area and 30% of cultivable area, the coastal belt covers (Abdullah, 2014). It is anticipated that the coastal population will be growing to about 41.8 million in 2015 and 57.9 million in 2050 (Falguni, 2009). The coastal zone of Bangladesh, an area covering 19 districts facing the Bay of Bengal of having proximity to the Bay, and the exclusive economic zone (EEZ) in the Bay, is generally perceived to be a zone of multiple vulnerabilities. The government of Bangladesh has already identified the zone as vulnerable to adverse ecological processes (ERD, 2003) and as one of the three neglected regions (MoF, 2003).

People of coastal areas are more vulnerable, because they live in an extremely dynamic estuarine environment facing many natural threats. Besides, there are threats of climate change and upstream land and water uses. These threats affect almost every aspect of life and limit livelihood choices of the people (Mallick et al, 2009).

Bangladesh is vulnerable to various hazards. Disaster is a common that happens almost every year in different magnitude. People in the disaster prone areas have knowledge and techniques in combating negative effects of disasters. So far, not much work has been done to map out information on coping mechanisms in combating disasters. It is important to undertake such research so that relevant information is available for future reference. This thesis will help the policy maker, new researcher to conduct study in relevant field. This thesis will encourage the government and non government organizations to undertake the services to combat the disaster. NGOs and GoB will be helped to know their service gap. The researcher therefore have *chosen*

"Indigenous Coping Mechanism for combating Disaster in Bangladesh" as thesis topic.

1.4 Objectives of the Study

The general objective of the study is to know the indigenous coping mechanisms for combating disaster in the study area. To this end, the specific objectives are:

- i) To know the socio demographic information of the respondents;
- ii) To reveal the indigenous perception about disaster;
- iii) To explore the indigenous coping mechanisms for combating disaster;
- iv) To reveal the Governmental and NGOs mechanisms for combating disaster;
and
- v) To draw some suggestions for improving the coping system with disaster;

1.5 Structure of the Report

The report is constructed into ten chapters. Chapter one discusses need, rationality, and objective of the thesis. Researcher elaborately demonstrated relevant of study objective.

In chapter two is considered the soul of present study. In this chapter is developed how the study is conducted and which methodology of thesis is used to collect and analysis of data to fulfill the objective of the study.

The Chapter three demonstrated theoretical part and models of relevant study. Which theories and models are relevant to this study is decorated sequence to this chapter and tried to find out the gist of theories and models.

It has been tried in chapter four to mention earlier research findings, Articles, Books, PHD reports, journals in relevant study and tried to find out gap in existing study which is very helpful for the study.

The chapter five demonstrates a brief description of study areas. An attempt has been made here to mention the geographical location, demographic information and natural disaster, hit in study areas.

The chapter six is formulated with a view to indicate conceptual framework of the study. Here some concepts related to disaster management are also discussed. Operational definitions of the key terms are also mentioned.

The chapter seven is discussed the findings of study. In this chapter is developed with qualitative analysis formats and thematically presented all of major findings of the study. Both FGD and Case study result are enlisted here.

The chapter eight is presented major findings of the study and discussion with previous study, summing up the results and suggestion for the future research are integrated to this chapter and also tried to intermingle with study funding and generalize ability of study.

The final chapter of report (Chapter nine) wrote concluding remarks and recommendations of study. At last National Disaster Management Policy is included.

1.6 Limitations of the Study

The study is an academic study. Through this study I have tried to find out indigenous coping mechanisms in two selected coastal areas of Bangladesh. During the data collection time, the researcher had some limitations. Such as:

- ✚ During the interview, it appeared that the respondents had very little knowledge and understanding of the topic and therefore, little to contribute on defining good indigenous mitigation measures.
- ✚ Communication system was very unfavorable;
- ✚ The researcher didn't get enough time to observe respondents accurately and testing their given data is match with their actual situation or not.

Chapter Two

Methodology of the Study

- 2.1 Introduction
- 2.2 Methodology
- 2.3 Area of the study
- 2.4 Population and Unit of Analysis
- 2.5 Sample and Sampling Procedures
- 2.6 Semi-Structured Interview Guide
- 2.7 Sources and Techniques of Data Collection
- 2.8 Analysis and Interpretation of Data
- 2.9 Validity, reliability and generalize ability
- 2.10 Ethical Issues of the Study
- 2.11 Conclusion

2.1 Introduction

This chapter describes the methodology are used in this study. Methodology is very important in any research, research fully depends on methodology. Researcher designed this methodology in proposal. The data collection and analysis procedures are discussed along with other important facets of the research; including ethical considerations.

2.2 Methodology

“Methodology” implies more than simply the methods can be intended to use to collect data. It is often necessary to include a consideration of the concepts and theories which underlie the methods. There are two research styles in social research— one is Qualitative and other is Quantitative. Although both styles share basic principles of science, the two approaches differ in significant ways. Each has its strengths and limitations, topics or issues where it glitters, and classic studies that provide remarkable insights into social life (Neuman & Kreuger, 2003, p.16). At the present time various researcher conducted their research by the use both qualitative and quantitative research method. King, Keohane and Verba (1994, cited in Neuman & Kruger, 2003) whose stated that the best research often the combines the features of each. The present study conducted through qualitative research style.

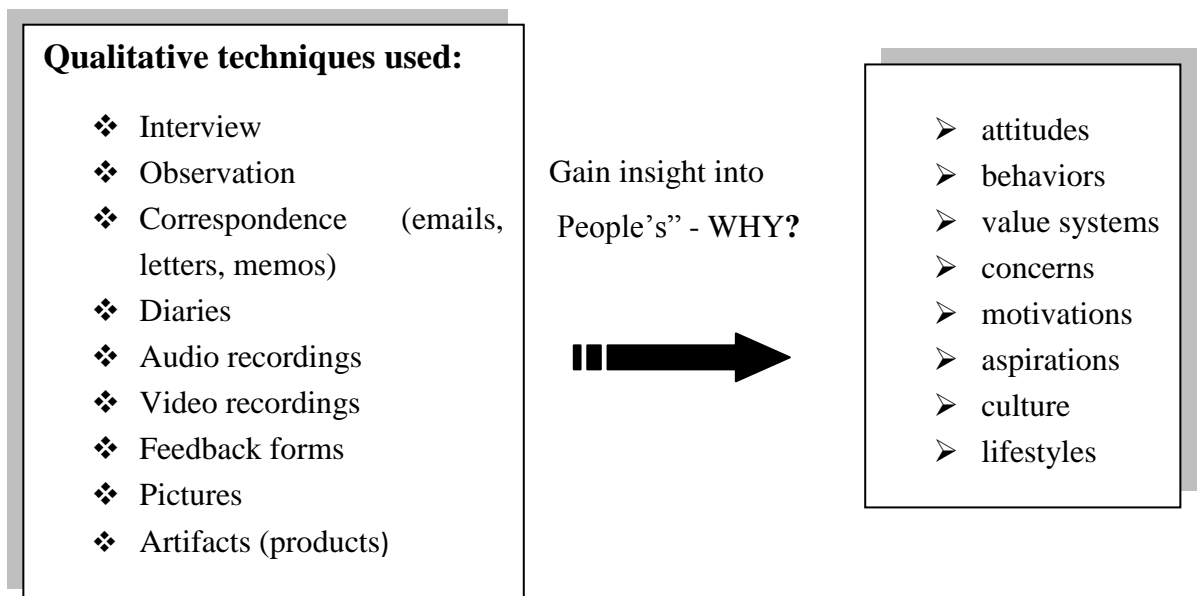
Just like all research, qualitative research is a type of research that seeks answers to a question; is systematically conducted and involves the collection of evidence. However, the uniqueness of qualitative research is that you may produce findings that were not determined in advance and also the findings may be applicable beyond the immediate boundaries of the study. It is especially effective to obtain culturally specific information about the subjects involved; i.e. the values, behaviours, and opinions of a particular population. However, the term qualitative research is a general definition that includes many different methods used in understanding and explaining social phenomena. The following are some definitions by prominent scholars in the field:

- According to Denzin and Lincoln (1994), qualitative research focuses on interpretation of phenomena in their natural settings to make sense in terms of

the meanings people bring to these settings. Qualitative research involves collecting information about personal experiences, introspection, life story, interviews, observations, historical, interactions and visual text which are significant moments and meaningful in peoples' lives.

- According to Pope and Mays (1995), qualitative researchers study things in their natural settings in an effort to discover the meanings seen by those who are being researched (or subjects) rather than that of the researcher.
- Qualitative research seeks to provide understanding of human experience, perceptions, motivations, intentions, and behaviors based on description and observation and utilizing a naturalistic interpretative approach to a subject and its contextual setting (Encyclopedia, 2009).
- Qualitative research is a process of naturalistic inquiry that seeks in-depth understanding of social phenomena within their natural setting. It focuses on the "why" rather than the "what" of social phenomena. (University of Utah, College of Health, 2009).

Figure- 2.1 : Qualitative Research Seeks to Gain Insight into “WHY”



The study is qualitative in nature. **Case study and FGD** method have been used to conduct the study because qualitative methods are often regarded as providing reach data about people's real life and situations and being more able to make sense of behavior within its wider context. Under this study researcher emphasizes on qualitative method to obtain information regarding the indigenous coping mechanisms for combating disaster from the most informative respondents.

2.3 Area of the Study

The study has been carried out in Koyra of Khulna and Patharghata of Barguna district. The researcher is well acquainted with the life-style and the culture of the people in the study area. It helped the researcher to get access to the community easily and conduct study.

2.4 Population and Unit of Analysis

The people aged (18-60) years living in coastal area with victim of disaster are considered as the population of this study and every person with victim of disaster is considered as the unit of the study.

2.5 Sample and Sampling Procedures

In qualitative research researchers' focus less on samples representativeness or on detailed techniques for drawing a probability sample. Instead they focus on how the sample or small collection of respondents, units, or activities illuminates social life. Basically qualitative researchers tend to use non probability or nonrandom samples. This means they rarely determine the sample size in advance and have limited knowledge about the larger group or population from which the sample is taken (Neuman and Krueger, 2003, p. 209). In the study the researcher considered purposive sampling method for selecting sample. Purposive sampling is an acceptable kind of sampling for special situation. Because it uses the judgment of an expert in selecting cases or it selects cases with specific purpose in mind. Neuman and Krueger (2003, p.211) mention that purposive sampling is appropriate in three situations. First, a

researcher uses it to select unique cases that are especially informative. Second, a researcher may use purposive sampling to select members of a difficult-to-reach, specialized population. Third another situation for purposive sampling occurs when a researcher wants to identify particular types of cases for in – depth- investigation. In terms of three situations thinking on mind ten (10) persons with victim of disaster has been selected considering their educational status as a total sample through purposive sampling method has been used for the study. Among them 5 sample from Koyra Sadar Union and 5 samples from different Unions of Patharghata area has been taken. It is noted that two FGD were conducted, one in Koyra Sadar and the other is in Kalmegha Union of Patharghata Upazila.

2.6 Semi-Structured Interview Guide

For present research work the researcher have made a semi-structured interview guide in relation to the research questions and approach that the researcher has chosen as guide. By following the semi structured interview guide, the researcher has collected more information from interviewee and the interviewees have understood more about the significant of the study. As for the language side, most of the respondents were not so good in English that's why the researcher had to make semi-structured interview guide which allows the interviewer to ask extra questions and make it much clear. As Fielding and Thomas (2008, p.246) postulated that, using semi-structured interview guide the interviewer ask major questions the same way each time but is free to alter their sequence and probe for more information. Semi- structured interview guide covered all the themes of respondent about their life style, thinking, and perception etcetera.

2.7 Sources and Techniques of Data Collection

Both primary and secondary source of data has been considered as the sources of data to this study.

- The primary source of data is the people (aged 18-60) living in coastal area at Koyra Upazila and Patharghata Upazila.

- Secondary data comprised in different published as well as unpublished available materials on this subject mostly in Books , journal ,Website, reports etc.

Different types of techniques (**Interview, Observation,**) are used in qualitative study. **Interviews, Observation and FGD** have been used to the study. The researcher used a semi structured interview guide to conduct interview. Researcher physically observed and contacted with selected respondents and collected required data to fulfill the objectives of the study.

2.8 Analysis and Interpretation of Data

The information was collected through the in-depth interview has been compiled for qualitative analysis. After conducting interviews researcher have transcribed these later on verbatim to understand the real theme of our respondent's information and experiences. Qualitative data have been condensed through classification or categorization and coding. Because qualitative coding is an integral part of data analysis. In the perspective of qualitative data analysis we know that it is differ from quantitative analysis and less abstract than statistical analysis and closer to raw data. Neuman and Kreuger (2003, p.434) mentioned that –“qualitative analysis does not draw on a large, well-established body of formal knowledge from mathematics and statistics .The data are in the form of words, which are relatively imprecise, diffuse, and context-based, and can have more than one meaning. So researcher conducted analyzes data by organizing it into categories on the basis of themes, concepts, or similar features and develops new concepts, formulates conceptual definitions, and examines the relationships among concepts.”

2.9 Validity, Reliability and Generalize ability

Validity means truthfulness. It refers to the bridge between a construct and the data. Validity in field research is the confidence placed in a researcher's analysis and data as accurately representing the social world in the field (Neuman & Kreuger, 2003, p.381). This is about the reliability of your research and the accuracy of the procedures and research techniques. Will the same results be repeated if the research

is repeated? Are the measurements of the research methods accurate and consistent? Could they be used in other similar contexts with equivalent results? Would the same results be achieved by another researcher using the same instruments? Is the research free from error or bias on the part of the researcher, or the participants? (E.g. do the participants say what they believe the management, or the researcher, wants? For example, in a survey done on some course material, that on a mathematical module received glowing reports - which led the researcher to wonder whether this was anything to do with the author being the Head of Department!)

On the other hand reliability means dependability or consistency. The researcher tried to ensure and maintain the accuracy of data and use proper data collection technique and analysis method. In terms of four kinds of validity or tests of research accuracy such as –ecological validity, natural history, member validation, and competent insider performance of study and its findings are valid and reliable. How successfully has the research actually achieved what it set out to achieve? Can the results of the study be transferred to other situations? Does x really cause y, in other words is the researcher correct in maintaining a causal link between these two variables? Is the research design sufficiently rigorous, have alternative explanations been considered? Have the findings really been accurately interpreted? Have other events intervened which might impact on the study, e.g. a large scale redundancy programme? (For example, in an evaluation of the use of CDs for self study with a world-wide group of students, it was established that some groups had not had sufficient explanation from the tutors as to how to use the CD. This could have affected their rather negative views.)

In the perspective qualitative research the researcher tried to ensure diversity of data but sample size was small which are inadequate in terms of big population. However in a qualitative research sample size is not a matter of concern to ensure the accuracy and maintain generalize ability. So it can be predicted that the study is reliable and valid and the findings which are also generalized. Are the findings applicable in other research settings? Can a theory be developed that can apply to other populations? For example, can a particular study about dissatisfaction amongst lecturers in a particular university be applied generally? This is particularly applicable to research which has a

relatively wide sample, as in a questionnaire, or which adopts a scientific technique, as with the experiment.

2.10 Ethical Issues of the Study

Research ethics is an important part of modern research. According to NDA, “Ethical research practice requires that participants be treated with respect at all times during the research process and that anonymity, privacy and confidentiality be ensured. Disaster research is no different from other research in this regard and standard ethical guidelines for social research.

In qualitative studies, researchers rely heavily on collecting data through interviews, observations, written materials, and audiovisual material. While in the field, researchers should negotiate access to participants to collect data; thus the quality of social interactions between researchers and the participants may facilitate or inhibit access to information (Dresser, 1998). Ramos (1989) described three types of problems that may affect qualitative studies: the researcher/participant relationship, the researcher’s subjective interpretations of data, and the design itself.

Ethical issues are an integral part of social research process. As a student of social welfare the researcher followed the code of ethics of social worker during the research time. Interviewer’s interest, willingness and fruitfulness are very essential for accomplishing the study. The informed consent, confidentiality, and anonymity of respondent’s personal profile are the basic consideration to conduct the research. The researcher conducted the interview with respondents according to their favorable time, place and willingness and didn’t force anybody to participate in the study. Before participate respondents in study a brief description was given on the purpose and procedures of the research and getting permission to take interview their suitable place and time. In the analysis of respondent’s data I gave the respondent’s pseudonym as like A, B, C, D; also maintain confidentiality throughout the study. In the part of building conceptual framework through the using of literature review and secondary sources of data in study, there have some limitation in terms of ethical consideration. The researcher didn’t able to get permission from the main author for using his or her

book and works as a reference but tried to give proper credit by using citation of their name through *Harvard Referencing Style*.

2.11 Conclusion

In summary, this study has been used qualitative technique i.e., interview, observation and Focus Group Discussion (FGD) have been used. Through this chapter data has been collected in different ways, at the same time this chapter has provided a description of data gathering procedures utilized in this study and procedures that have been used for data analysis. Validity and reliability were addressed through triangulation of data.

Chapter Three

Theoretical Framework of the Study

3.1 Introduction

3.2 Theoretical Framework of the Study

3.2.1 Community Based Approach for Disaster Mitigation

3.3 Conclusion

3.1 Introduction

Disaster management is the range of activities designed to maintain control over disaster and emergency situations and to provide a framework for helping at risk persons to avoid or recover from the impact of the disaster (Diwan, 2010). For disaster management different models and approaches have been developed. Different strategies have been mentioned in different theories and models. The approach, has been followed in this study, is described below.

3.2 Theoretical Framework of the Study

3.2.1 Community Based Approach for Disaster Mitigation

"The local community is taken as the primary focus of attention (in disaster reduction) since that is the common unit which is affected by disaster and, more importantly, responds to deal with the event." –

Russell Dynes

Whether a disaster is major or minor, of national or local proportion, it is the people at the community or village level who suffer its adverse effects. They use coping and survival strategies to face and respond to the situation long before outside help from NGOs or the government arrives. They are interested protect themselves from the damage and harm.

Community based disaster management (CBDM) is anchored in the disaster risk reduction framework. CBDM covers a broad range of interventions, measures, activities, projects and programs to reduce disaster risks, which are primarily designed by people in at-risk localities and are based on their urgent needs and capacities. Simply put, the aim of CBDM is to

- 1) Reduce vulnerabilities and increase capacities of vulnerable groups and communities to cope with, prevent or minimize loss and damage to life, property, and the environment,
- 2) Minimize human suffering, and
- 3) Hasten recovery.

Through CBDM vulnerable groups and communities can be transformed to disaster resilient communities, which can withstand and recover from stresses and shocks from the natural/physical and socio-economic political environment. While resilience is a relatively new concept in CBDM, it is easily grasped and appreciated by communities when illustrated by the example of the bamboo, which sways with the battering of strong winds but stays rooted and weathers the typhoon. Key indicators are safety, livelihood security and sustainable economic, social and physical development (general wellbeing, health, education, amenities, natural and physical environment, etc.)

With the shifting of paradigms from reactive emergency management to disaster risk reduction, there is more stress on proactive pre-disaster interventions, which are usually categorized as prevention, mitigation, and preparedness. While natural hazards may not be prevented, human-induced hazards such as those associated with industries, technological failures, pollution, and civil strife can be prevented.

Prevention covers measures to provide permanent protection from disasters or reduce the intensity/frequency of a hazardous event so that it does not become a disaster. These include safety standards in industries, poverty alleviation and assets redistribution schemes, and provision of basic needs and services such as preventive health care and education. Mitigation reduces and limits the destructive and disruptive effects of hazards on the elements at risk. Measures range from the physical such as engineering works like bridges, protective dikes, embankments, and safe building design to the non-structural interventions such as community risk assessment, community risk reduction planning, public awareness, food security programs, group savings, cooperatives, crop insurance, strengthening community disaster management organizations and advocacy on disasters and development issues, legislation and land use zoning. Mitigation and prevention interventions are directly linked to development planning. "Disaster mitigation is intrinsic to sustainable development" (Twigg et al, 2000).

Preparedness involves measures taken in anticipation of a disaster to ensure that appropriate and effective actions are taken during the emergency such as setting up the systems for early warning, coordinative and institutional arrangements, evacuation

and emergency operations management, public awareness, disaster and evacuation drills, and stockpiling. Emergency responses are measures undertaken to ensure survival and prevent further deterioration of the situation. These include search and rescue, immediate repair and restoration of critical facilities and utilities, conduct of damage needs and capacity assessment, food and non-food relief assistance, medical assistance, evacuation center management, and networking. Recovery covers rehabilitation and reconstruction and can be undertaken within the framework of mitigation and vulnerability reduction, and not just bringing back the situation to pre-disaster levels.

Basic Elements and Features of CBDM

“Development is the process through which people increase their capacities for producing things they need and for managing their political and social lives as they desire, and at the same time (especially in disaster-prone areas) reduce their immediate and long-term vulnerabilities to events which threaten their economic and socio-political existence”-- Anderson and Woodrow.

This view of development expresses succinctly the local and community aspirations in participation in disaster mitigation and risk reduction. The following basic elements and features of CBDM apply as well to the community-based approaches to mitigation:

- *People's participation* - community members are the main actors and propellers; they also directly share in the benefits of disaster risk reduction and development.
- *Priority for the most vulnerable groups, families, and people in the community* – in the urban areas the vulnerable sectors are generally the urban poor and informal sector while in the rural areas, these are the subsistence farmers, fisher folk and indigenous people; also vulnerable are the elderly, the differently abled, children and women (because of their care giving and social function roles).

- *Risk reduction measures are community-specific* and are identified after an analysis of the community's disaster risk (hazards, vulnerabilities and capacities and perceptions of disaster risk).
- *Existing capacities and coping mechanisms are recognized* – CBDM builds upon and strengthens existing capacities and coping strategies.
- *The aim is to reduce vulnerabilities by strengthening capacities; the goal is building disaster resilient communities.*
- *Links disaster risk reduction with development* - addresses vulnerable conditions and causes of Vulnerabilities.
- *Outsiders have supporting and facilitating role*

Principles of CBDM

Closely related to the elements and features cited above are the principles of CBDM and CBDM it activities and programs. These also serve as overall targets to work for and parameters/indicators to keep track of.

Participatory process and content

Involvement of community members, particularly the most vulnerable sectors and groups in the whole process of risk assessment, identification of mitigation & preparedness measures, decision making, implementation; the community directly benefits from the risk reduction and development process.

Responsive

Based on the community's felt and urgent needs; considers the community's perception and prioritization of disaster risks and risk reduction measures so the community can claim ownership.

Integrated

pre-, during and post-disaster measures are planned and implemented as necessary by the community; there is linkage of the community with other communities, organizations and government units/agencies at various levels especially for vulnerabilities which the local community can not address by itself.

Proactive

It stress on pre-disaster measures of prevention, mitigation and preparedness.

Comprehensive

Structural (hard, physical) and non-structural (soft, health, education, livelihood, organization, advocacy, etc) mitigation measures are undertaken; short-, medium term and long-term measures to address vulnerabilities.

Multi-sectoral and multi-disciplinary

Considers roles and participation of all stakeholders in the community; combines indigenous/local knowledge and resources with science and technology and support from outsiders; addresses concerns of various stakeholders while upholding the basic interest of the most vulnerable sectors and groups.

Empowering

People's options and capacities are increased; more access to and control of resources and basic social services through concerted action; more meaningful participation in decision making which affects their lives; more control over the natural and physical environment; participation in disaster mitigation and risk reduction develops the confidence of community members to participate in other development endeavors.

Developmental

It contributes to addressing and reducing the complex relation of conditions, factors and processes of vulnerabilities present in society.

How to Transform at-risk Communities to Disaster Resilient Communities?

Before the community can be mobilized for disaster mitigation, they have to be organized first. Steps followed for the disaster management/mitigation are patterned after the basic methodology in community organizing for community development. This methodology covers consciousness raising, organization building and mobilization. Detailed steps are as follows:

- 1. Site Entry and Rapport Building** - process whereby the facilitator establishes rapport and constructive relationship with the people. Mutual respect and trust are the key elements that characterize effective integration.

2. **Community Situational Analysis** - the process of gathering all relevant data about the community such as physical characteristics, demographic features, economic and socio-political aspects of the community.
3. **Identification of Priority Sector** – the process of identifying the target groups or sector of the project or the most in need/most at risk.
4. **Identification of Natural Leaders or “Progressive Members”** – the process of selecting natural leader or “progressive members” of the identified priority group(s) or tapping existing structure/organization in the community. The core group serves as catalyst or prime mover in the formation of the group.
5. **Feedback/Validation of Results of Community Situation Analysis** - the purpose is to inform the people about the whole situation of the community and to fill in the gaps.
6. **Further Analysis of Priority Problem/Need/Aspiration** – the process whereby the community discuss and analyze their problem and transform it into community goals or aspirations.
7. **Planning of the Solution/Action** - the process whereby the community plan how to solve their problems.
8. **Organization of the Group** – the role and responsibility of each member vis-à-vis the community activities and tasks are identified and agreed upon. Skills improvement is provided to the community organization and they are encouraged to forge links with other institutions.

In general, the goal of CBDM is to transform vulnerable or at-risk communities to disaster resilient communities, specifically through CBDM. Although steps may vary from community contexts and organizational mandates. The process and requisites for disaster risk reduction can be generalized as follows:

1. Initiating the process - linkage and building rapport with community.
2. Community Profiling - initial understanding of disaster situation and orientation on CBDM.
3. Community Risk Assessment – participatory assessment of hazards, vulnerabilities, capacities and people’s perception of risks.

4. Formulation of Initial Disaster Risk Reduction Plan - identification of appropriate mitigation and preparedness measures including public awareness, training and education.
5. Formation of Community Disaster Response Organization - community organizing and mobilization, capability building in CBDM and preparedness.
6. Implementation of short-, medium-, and long-term risk reduction measures, activities, projects and programs - implementation strategies and mechanisms; organizational/institutional strengthening.
7. Monitoring and Evaluation - continuous improvement of disaster risk reduction plan, documentation and dissemination of good practices for replication.

Notwithstanding the order, the community volunteers, disaster management committee, and disaster response organization are the necessary interface or the channel for outsiders such as NGOs or government agencies to assist/support the community at-large. The community groups and organizations in disaster management are essential in sustaining the risk reduction process for the community to meet intended aims and targets.

Within this 7-step process, the formation and strengthening of community disaster response organization or community disaster management volunteers' team is the key to mobilizing communities for sustainable disaster risk reduction. In many of the experiences of the AUDMP projects, this step comes even before the risk assessment/mapping and identification of mitigation solutions/action planning.

Who Initiates? Who Sustains?

Since many disaster management agencies are by now influenced by the shift in paradigms to the disaster risk management framework, they usually initiate the CBDM process with community project partners. On the other end, growing public awareness of disaster risks and the gains achieved in the CBDM approaches have spurred communities to seek out other communities and/or NGOs to assist them.

Where the initiative comes from is not so important. What matters is that after initiating the process, the community participates in the study of their disaster risks,

action planning and decision making on mitigation and preparedness solutions and in the implementation stage. Community participation can be sustained if the risk reduction project responds to their immediate needs and they are involved in the study and decision process to identify relevant, realistic and do-able mitigation and preparedness solutions. Relevance and community participation then create ownership, and with even small successes achieved, sustainability of the CBDM process can be ensured.

Why the Community Based Approaches?

Within the last decade, growing recognition of the necessity of community participation for sustainable disaster reduction was translated into actions to realize community based disaster management. Parallel efforts in various regions worldwide called for a shift in perspective from the prevailing emergency management framework to disaster risk management to reverse the trend of exponential increase in disaster occurrence of and loss from small- and medium-scale disasters. These highlighted the need for proactive disaster management activities and the significant role of local communities. The community based approach also corrected the defects of the top-down approach in development planning and disaster management which failed to address local needs, ignored the potential of indigenous resources and capacities, and may have even increased people's vulnerabilities. Experiences in developing regions and countries now affirm the gains of community based disaster management. Although varying in contexts, the results of the commitment to undertake and the actual initiatives taken at the regional, country and local levels all point to the viability of the community based approaches in managing and reducing disaster risk.

The thesis has been guided by the community based disaster management approach. Because this approach acknowledge the indigenous coping strategies of the community. CBDM approach emphasizes on coping strategies to protect themselves from harmful effects of disaster. This approach covers a broad range of intervention, measures and activities which are primarily designed by the people in at risk localities

and are based on their urgent needs and capacities. This approach emphasizes on making the community resilient.

This approach acknowledges the community peoples strengths and weakness. It stresses more on needy community. CBDM approach equally stresses on pre disaster and after disaster prevention. This approach encourages the people's participation. It's an empowering, comprehensive approach. CBDM approach emphasizes on the measures (structural and non structural) taken at the different stages of disaster. That's why the researcher has chosen this approach as guide.

3.3 Conclusion

The researcher has used community based disaster management approach to disaster management as guide, the reason behind this is, the thesis title is related to these approaches. In the study, an attempt has been made to explore the indigenous coping mechanisms consistent with followed approach.

Chapter Four

Review of Relevant Literature

- 4.1 Introduction
- 4.2 Review of Relevant Literature
 - 4.2.1 Disaster related Literature
 - 4.2.2 Literature related to Coping Mechanisms
 - 4.2.3 Literature related to Community Disaster Recovery and Resiliency
- 4.3 Conclusion

4.1 Introduction

Review of literature on indigenous coping mechanisms for combating disaster in order to explore the strategies are taken by different communities and countries. There are several research articles, books, journals, PhD papers throughout this bibliography; however, this brief listing includes articles that address coping mechanisms in the thesis process. All research articles and journals are not directly related to the thesis topic. In spite of this the researcher has tried to review the related books, journals, research and PhD papers to reveal the disaster management mechanisms. Some review of literatures is delineated as follows:

4.2 Review of Relevant Literature

For any of research, review of literature is very necessary. It is an important, essential and integrated part to find out the knowledge gap. To endorse the rationality of the proposed study, the researcher tried to find out knowledge gap in this regard through study of related literatures, which includes the books, journals, reports and internet resources. It has been found that literature with specific focus on this issue is not sufficient. However, a brief review of literature is given below.

4.2.1 Disaster related Literature

Bangladesh is one of the most vulnerable areas to natural disasters in the world. Almost every year different types of natural disasters occur in Bangladesh and destroy many lives and resources of people. Bangladesh is crisscrossed by a strong river network of three major rivers – the Padma, the Brahmaputra, and the Meghna – and their tributaries, numbering about 230. Climatically it is situated in humid tropical zone. Although the country is a beauty of nature with cultural heritage, it is highly vulnerable to natural hazards such as flood, cyclone, drought, tidal surge, cold wave, earthquake, river-bank erosion, arsenic contamination of ground water, water and soil salinity and various forms of pollution due to her geographical location, land characteristics, multiplicity of rivers and monsoon climate (Disaster Management Bureau, 2008, p. 3). Since the independence in 1971, the country has experienced 200

natural disasters causing loss of more than 600,000 lives, millions of livestock and leaving prolonged damage to property, quality of life and livelihoods (Ministry of Foreign Affairs, 2006, p. 7).

Hossain, Md.Anwar wrote about major natural disaster in his paper titled, *‘Community Participation in Disaster Management: Role of Social Work to Enhance Participation’*. He mentioned that Bangladesh, a low-lying deltaic country formed by the major river (the Padma, the Brahmaputra, and the Meghna) system with long coastline, is highly exposed to different types of natural disasters. Since the independence in 1971, the country has experienced 200 natural disasters causing loss of more than 600,000 lives. He mentioned that flood, cyclone, tornado are the main natural disaster hit in coastal area.

The above study stresses on only community participation for disaster management. It is believed that community participation is paramount mechanism for disaster management. This study acknowledges it but this study’s intention is to explore other indigenous mechanisms simultaneously with community participation.

Beck, Tony conducted a study on *Learning Lessons from Disaster Recovery: The Case of Bangladesh* with the assistance of World Bank. Bangladesh was selected as a case study as a predominantly agricultural developing country with high levels of rural poverty, which is extremely susceptible to natural hazards, in particular floods. He identified here flood, typhoon, drought, famine as the major natural disaster in Bangladesh.

This study is a case study, takes a country as a case. But in the current study, the researcher has tried to conduct the research in two selected coastal areas so that specific coping mechanisms can be explored.

Reza et.al conducted a study on **Management Approach to Disaster Scenario in Bangladesh: An overview** based on secondary information. This paper focuses on an overview of disaster scenario in Bangladesh. The relevant secondary data were collected from various institutes such as Disaster Management Bureau, Bangladesh Meteorological Department and agencies working on disaster management directly or indirectly. The sources includes relevant government report, online databases,

literature, books, journal and other document analysis in order to know the overall picture of disaster scenario in Bangladesh where the study was carried out.

Bangladesh is a natural disaster prone country of an area about 1, 47, 570 sq. km with population about 140 million (BBS, 2012). Bangladesh is facing various types of natural disaster due to its geographic and geologic setting (Carter, 1991). Bangladesh suffers regularly and frequently from disasters like flood, cyclone, drought, earthquake and landslide etc. Disasters are annual event in Bangladesh (Nasreen, 2004). From time immemorial, the geographical location, land characteristics, multiplicity of rivers, monsoon climate and coastal morphology of Bangladesh have been a mixed blessing (Sabur, 2012).

Disasters are gigantic in nature and paralyze human life activities which need to strengthen and coordination of different organization that are responsible and cope with them (Shafiq, 2013). Natural disaster in Bangladesh including cyclone, flood, earthquake, drought, landslide while manmade disaster like as fires, political unrest, terrorism, epidemics, transport and industrial accident (Nizamuddin, 2001). Natural and manmade disasters have been affected people and their livelihood throughout the history of human kind of Bangladesh, causing enormous losses of human lives and material destruction (Haen, 2006). Both losses of life and property are unbearable and direct impact of this type of disastrous event on social and economic life of Bangladeshi people is overstraining (Sabur, 2012).

He mentioned in his papers result that Bangladesh is highly vulnerable to floods, cyclone, landslide and tornado etc. Ten biggest disasters were occurred in the history of Bangladesh since 1988 to 2013. Major disasters have adversely impacted upon millions of lives and uncountable damage of property in Bangladesh. Mainly flood and cyclone have occurred frequently in our country and caused a heavy disastrous effect. Flooding in Bangladesh is very common disaster because of low lying deltaic region. Strong cyclone is responsible for producing unexpected flood (Mirza, 2011).

He also listed some major natural disaster which occurred since 1980-2013. A table has given below in this regard

Table No: 4.1 Major Disasters in Bangladesh

No	Date	Disaster	Total killed	Total affected
1	20 August 1988	Flood	1517	73000000
2	29 April 1991	Cyclone	138866	15,438,849
3	13 May 1996	Tornado	545	34000
4	8 July 1998	Flood	1050	15,000,050
5	12 August 2004	Flood	747	36,000,000
6	1 September 2007	Flood	1110	13,771380
7	15 Nov,2007	Cyclone	4234	89,23259
8	25 May 2009	Cyclone	330	50,000
9	27 June 2012	Landslide	122	3,62465
10	13 May 2013	Cyclone	17	1,28550

Source: “EM-DAT”: The OFDA/CRED International Disaster Database, Universite catholique de Louvain, Brussels, Belgium. <http://www.cre.be/emdat/intro.htm>

The paper mostly based on secondary data. But in the study the researcher has tried integrate primary and secondary data. Besides the study is not fully related to thesis topic.

4.2.2 Literature related to Coping Mechanisms

Coping strategies or mechanisms are remedial actions undertaken by people whose survival and livelihood are compromised or threatened. Coping mechanisms can save lives but they have human and social costs. Coping mechanisms are a spectrum of activities: one end of the spectrum represents the best example of solidarity, i.e. community self-help initiatives, etc, but the other end can also be called misery and/or low life, i.e. migration, begging, child labor, violence, prostitution, even selling organs can be a coping mechanism (WHO, 1998).

WHO identified that there are three stages of coping. The first is called ‘**no erosive**’, because it leaves behind little or no permanent damage. One step further down is **erosive** coping: permanent harm is done. In the last stage, coping has **failed**, and the door is open for destitution.

WHO has identified some specific coping mechanisms under three categories:

- **Non-erosive Coping:** insurance, risk-minimizing, loss management. Loans, reduction in dietary intake, cheaper foods, reduction of meals, sale of small stock and non-productive assets.
- **Erosive coping:** disposal of productive assets. Shark loans, sale of large livestock, land and tools, bonded labor arrangements, Child labor.
- **Failed coping:** destitution, Dependency on charity, out-migration, Prostitution, sale of children.

WHO (1998) shown some other coping mechanisms in the paper named “*Emergency Health Training Program for Africa*” are Cooperatives (farming, saving, etc) Loans, Foraging of crisis food (roots, berries, etc), Sale of household assets, Migration, Sales of Relief goods, Child labor, Prostitution, Theft, Violence etc(WHO,1998). The study had been conducted outside of the country. So the culture, mechanisms, identified in this study, are not consistent with this country’s mechanism.

Another research was conducted by Islam, Md. Rabiul (2010) named “*Vulnerability and Coping Strategies of Women in Disaster: A Study on Coastal Areas of Bangladesh*”. He conducted the study in a descriptive manner on women living in coastal area (Khulna, Satkhira, Bagerhat, Barguna and Chandpur).

He mentioned in his study that Women in coastal areas try to cope with disasters with their traditional knowledge and arts. He also mentioned that this traditional strategy becomes a little help due to change of the nature of disasters. He shown in his study that at the time of flood or cyclone season, women try to make their houses more resilient to disasters with locally available resources likely strong pole, straw, increasing the height of foundation of the households and the level of cow sheds. This indigenous technique is often used to protect goats and poultry from flood water.

He showed in his study that during disasters, women look after children, elderly and disabled family members. In flood-prone areas, women prepare elevated platforms for family members with disabilities, using the *chouki* (traditional bed) with bamboo and wood. In coastal areas, women control homestead-based livelihoods, livestock, fisheries, trees, seeds and animal fodder. Despite the limited resources in coastal areas

women play a significant role in food preservation to combat the adverse situation. Women preserve dry food (such as rice, onion, garlic, puffed rice, *gur* etc.), fuels, candle, matches, ropes and medicine at home and prepare portable mud stoves for future use. They often collect firewood to store in dry places and store fodder for domestic animals. Women of coastal land are also engaged in drying fish. By drying fish they can earn more money as well as meet the protein deficiency. Women on coastal lands are engaged in the entire process of crop production. They are very skillful in this process by using indigenous knowledge and available resources. In post disaster period, women are also engaged in homestead gardening. They use rooftops and backward spaces to grow various vegetables and fruits. In coastal areas, rearing and sale of livestock and poultry are important economic activities almost entirely conducted by women. Women's scientific knowledge, innovations and adaptations are demonstrated in their care of livestock. They know what kind of fodder will keep livestock healthy and will produce more milk. In coastal areas, women prefer to rear chickens because they stay around the homestead, unlike ducks, which swim away and get lost. Land mortgaging, selling, or borrowing from neighbors are the common strategies for survival. In many cases, women are compelled to migrate to other places as an adaptation strategy. Female migrants mostly engage in the informal urban labor market. The major activities that employ women in urban areas include serving as domestic helps, brick breaking, hotel workers, day laborers and working in the garments industry. Many women are engaged in begging for survival. In coastal areas, women are now part of microfinance organizations, using their memberships to access loans (Islam, 2010).

The above mentioned study was conducted in four coastal areas throughout the country whereas the current study is conducted on two coastal areas. Islam conducted his study, following quantitative method of study, on women. The current study is intended to explore the strategies for combating disaster on men and women. The study is qualitative in nature.

Morshed, M conducted a study in 2007 on the subject of *“Indigenous Coping Mechanisms in Combating Flood”* on two areas named Sirajgonj and Gaibandha. He

wrote in his study that 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.

He also mentioned that 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.

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.

The findings also showed that 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.

The study also revealed that the 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;
- Distress sale
- Purchasing food on credit; and
- Reducing adult consumption to allow children to have adequate food (Morshed, 2007).

The study, mentioned above, was conducted on indigenous coping mechanisms, is absolutely right. But the study was conducted only on flood. This study was intended to explore flood management techniques. But the current study is conducted considering various natural disasters, hit in coastal belt of Bangladesh.

Emphasizing on the people's reaction and responses during cyclone Sidr 2007 at Baniasanta union of Dacope Upazila in Bangladesh **Mallick et al** conducted a study on "*Local Adaptation Strategies of a Coastal Community during Cyclone Sidr and Their Vulnerability Analysis for Sustainable Disaster Mitigation Planning in Bangladesh*".

He mentioned in his study that the People of coastal areas are more vulnerable, because they live in an extremely dynamic estuarine environment facing many natural threats. Besides, there are threats of climate change and upstream land and water uses. These threats affect almost every aspect of life and limit livelihood choices of the people.

This study focuses on an indicator based qualitative and quantitative description of social, economic and infrastructural vulnerability and resilience of household level, community level and institutional level in order to derive a generic instrument that assists risk mitigation, adaptation and management.

He showed in his study that people try to combat disaster at three levels:

Household Level

It had been showed in the study that every population at risks design and plan their own strategies to cope, to response and finally to overcome the difficulties of a disaster. Every steps of managing risk is introduced by the earliest way as having information. Radio frequency is available all over Bangladesh, thus radio (50 percent) was the main sources of having information regarding Sidr, following with the information from relatives or neighbors (29 percent), community volunteer (17 percent) and television (4 percent). It seems that the information flow by the neighbors, relatives and community volunteer is mostly sustainable for a poor country like Bangladesh, where the poor people are not capable to buy a radio or a television. They (73 percent) took decision alone immediately after having the information, whereas 25 percent discussed with their neighbors regarding the problems and tried to repair their own houses and made own residence safer. Around 86 percent decided to stay at own house to protect their own family. Only 11 percent planned to take their old members and children to other safer places, like neighbors' or relatives' houses; and only 3 percent had plan to take their family in cyclone center. However, during Sidr, around 80 percent of them tried to stay in their own houses, whereas only 15 percent had left their own houses and took shelter in cyclone centers or neighbors' houses, amongst them only 5 percent took shelter in cyclone center and the rest 95 percent were in neighbors' house. It was easy to reach to their neighbors' houses, when they felt insecure in own houses, as because they tried to stay in their own houses as long as they could.

On the other hand, one can reach to the cyclone center during the normal period by an average time of 15 minutes from any corner of the village. Thus one can reach in cyclone center at least before cyclone starts, if he/she receives early warning in time and also has the intention to take shelter in a cyclone center. It mostly depends on their motivation and knowledge to handle the crisis and also on their culture, norms, religion and social strata.

Community Level

Study shows that the community level efforts were not too satisfactory as the respondents waited for more initiatives from the community volunteers. The messengers, local volunteers, were shouting through loud speakers or megaphones to warn the people about the impending cyclone and let them to bring people to cyclone shelters. Many of the affected people, who had mobile phones, maintained contact with the rest of the country. About 25 percent of the respondents replied that they received support from their community initiative, in information distribution, rescue and relief work. However, there were few rooms in the cyclone shelter and were hardly accessible for all the people and as a result, a majority of people didn't leave their own houses. It was very common in the coastal belt that people did not want to leave their houses. They tried to reconstruct their houses or shelter and wanted to preserve their food and other resources; but most of them never wanted to take shelter in a cyclone center.

Institutional Level

The study also found that only 19 per cent of the total respondents had left their houses and taken shelter in safer places, like cyclone centers (only 16 percent of the 19 percent). This result raises not only the question of providing adequate institutional support, but also the question of their socio-cultural motivation to leave their houses in an emergency (Mallick et al, 2009).

The above mentioned literature intended to explore the vulnerability of coastal area people. The study was conducted in coastal area after Sidr and Aila. The study considered only sidr and aila. The current study is conducted considering various disasters. The mentioned literature reviewed the mechanisms in three levels but the current study explore structural and non structural mechanisms separately.

Fletcher et al conducted a qualitative study with Pacific Island Countries (PICs) across four countries, Cook Islands, Fiji, Samoa, and Vanuatu on “*Traditional Coping Strategies and Disaster Response: Examples from the South Pacific Region*”.

He identified five areas of traditional coping strategies to disaster and climate change:

Recognition of traditional coping strategies:

- Secretariat of the Pacific Community's (SPC) list of crops from the climate ready collection.
- Glossaries of traditional climate change terms in some Pacific countries.
- Pacific Red Cross societies Toolkit to assess natural disasters vulnerability and response capacity.

Faith and Religious beliefs:

- Faith-based systems and their interventions are entrenched in the social system and can build resilience.
- Recognition of churches, their role in community life, including use as emergency centres or disaster shelters; provision of post disaster counseling.
- Churches may be a source of resources, volunteers, welfare programs for the poor, and needy including non-members.

Traditional governance and leadership:

- Indication of some integration of political and traditional governance systems for disaster management.
- Active involvement of traditional governance structures in village life, disaster management, and climate change adaptation.
- Use of traditional leadership networks to share information and communicate in times of disasters.
- Involvement of schools, churches, and the community in disaster preparedness and response.

Family and Community Involvement:

- Extended family system and kinship ties provide a critical support structures in times of disaster.
- Movement of families from high risk areas to less vulnerable areas inland during disasters.
- Fostering of relationships improves coordination of response teams and helps develop good coping skills.

Agriculture and food security:

- Traditional agricultural disaster-preparation techniques to preserve seedlings and seeds.
- Documenting food preservation techniques and consideration of inclusion in school curricula.
- Integrated farming system approach that incorporates the planting of fruit trees with root crops.
- Introducing less common foods and reintroducing some forgotten foods from traditional diets.
- Using organic agricultural practices pesticide free and no chemicals (Fletcher et al,2013).

The study had been conducted in outside of the country. So the mechanisms, identified in this study will not be consistent with the current study.

Another qualitative study was conducted by **Adams et al (2011)** on *“Coping through a Disaster: Lessons from Hurricane Katrina”*. The purpose of this study was to gain an understanding of the coping strategies utilized by a group of first responders who worked during a major disaster.

He identified in his study that the most frequently cited coping mechanisms were: (1) support from co-workers/communication with other officers; (2) detachment; (3) spiritual practices; (4) communication with significant others; (5) use of vices; (6) physical activity; and (7) recollection of prior military training.

Most of the coping strategies cited by the study participants are illustrative of the patterns of behavior cited in the literature. Prior scholarship (e.g., Lazarus & Folkman, 1984; Compas & Epping, 1993) has indicated that problem-focused and emotion-focused coping strategies are the most common reactions to extreme stress. The study participants indicated that they employed the use of both as they performed their professional duties in spite of the enormous obstacles they faced.

While the study participants cited the use of a variety of coping strategies during the height of the Katrina disaster, the majority of the officers indicated more of a reliance on emotion-focused coping strategies (e.g., sharing of feelings, minimization of the

situation, distraction) in the midst of the crisis rather than problem-focused strategies (e.g., planning, direct action). The predominant strategy - reliance on communication with others (e.g., co-workers, significant others) - is related to the expression of emotion and the need for emotional support from others in the midst of a crisis. Hence, this study's findings lend support to the thesis that emotional expression during traumatic events is a beneficial coping mechanism (Stanton, Danoff-Burg, Cameron, & Ellis, 1994).

The second most commonly cited coping method – detachment is also an emotion-focused coping strategy. It should be noted that reliance on a spiritual practice was the third most commonly cited coping practice. This was not surprising, as a growing body of literature reflects the importance of using religion to help people understand and cope with stressful and traumatic life events (Pargament et al., 1988).

The study's findings indicate more of a reliance on emotion-focused coping practices. The importance of emotion-focused coping strategies over problem focused coping strategies for the study participants may be a function of the unpredictable and massive nature of the Katrina disaster. This hurricane left massive destruction in its wake, including damage to the infrastructure of the city and the police department. This damage rendered the normal operational functions and practices impossible, and caused a great deal of chaos and confusion among the officers (Brinkley, 2006). As illustrated by one officer's description of his experience, "...everything was in chaos. I could not locate my supervisor.... Basically, it was every man for him."

It is possible that the erratic and dynamic nature of the disaster hindered the ability of officers to rely on problem-focused coping practices because the officers did not have the luxury of relying on standard equipment and protocols. Problem-focused coping involves elements of planned problem solving and the vision of a possible solution. The inability to use normal modes of communication, coupled with the absence of functional equipment and the inability to use normal operational protocols may have diminished the officers' ability to rely on problem-focused coping strategies during the disaster. This is not to imply that the officers did not engage in problem-focused coping strategies, but the data reveal that emotion-focused coping strategies were most important to these officers during the height of the disaster. It should be noted that

most of these officers were very proactive in their approach to dealing with the disaster, but their resilience was largely rooted in their use of emotion-focused coping strategies. Thus, the findings indicate that emotion-focused coping strategies can be vital to the cultivation of resilience among first responders during a critical incident.

Brahmi & Pounphone (2002) Study on “Local Coping Mechanisms in Disaster Management: Case studies from the Lao PDR” This study was carried out in nine villages in five different provinces of the Lao PDR; ranging from Champassak in the south, The focus of the study is on how indigenous coping mechanisms of the rural poor in Laos function in response to shocks to the livelihood systems brought about by disasters.

Coping strategies are often transmitted from generation to generation within communities and households. They depend on the assumption that reoccurring disasters “will follow a familiar pattern, and that people's earlier actions will be a reasonable guide for similar events”⁵². However, coping strategies are not static and linear. Under the change of their internal and external environment, communities and households have developed progressively different livelihood patterns and subsequently the community coping methods evolve over periods of time to suit the local socioeconomic, cultural and political environment best. “Strong external influence may act, often inadvertently, to break up internal coping mechanisms and their effectiveness⁵³”. Over time strategies which formerly served people well come under a variety of pressures, which reduce their range and efficacy (reduced family ties, population pressure, change in agricultural modes of production, negative influences of the market, etc.). Eventually indigenous coping mechanisms may be undermined or weakened, increasing vulnerability

The study shows that there are a variety of different conceptual frameworks which have been used to categorize and analyze coping strategies.

Structural Mechanisms

In order to cope prior, during and after an adverse event, individuals and groups call on a variety of formal and non-formal structures and relationships to mobilize resources and to help them through the difficult time. Coping mechanisms seen in this way have been classified by Margaret Kieffer (1977) as either internal or external and include social units, religious institutions, political organizations and economic systems (Brahmi & Poupphone, 2002).

Functional Mechanisms

Although a variety of strategies are adopted, sometimes simultaneously to cope before, during and after a disaster, disaster management literature generally attempts to categorize different strategies according to broad function:

- Preventive strategies, or **mitigation strategies**, which aim to reduce the adverse effect of a hazard on a community or to avoid disaster from happening (by avoiding hazardous locations and time, evading seasonal disease vectors, choosing a safe location for a house).
- Impact-minimizing strategies, or **preparedness strategies**, which seek to minimize loss and facilitate recovery (i.e., improve access to a minimum level of food, shelter, diversification of access to resources such as non-agricultural income sources, strengthening a social support network)
- Post event strategies or response, are the mechanisms put into practice to address the immediate needs of the family.
- Recovery strategies will ensure temporary and permanent reconstruction and rehabilitation.

Sequential Mechanisms

Based on their experiences and their level of vulnerabilities and capacities, communities mobilize diverse resources to face disasters following a set of sequences. They tend to adopt strategies in the first instance, which secure the sustainability of their livelihood as much as possible. People would rather eat less than to be forced to sell their assets (livestock, tools, etc.), which undermine their livelihood on the long

term. However, when the magnitude of a hazard impact is beyond the capacity of the community to cope, some mechanisms become inadequate. The real crisis emerges when vulnerable communities shift from reversible to non-reversible strategies which cut into their long-term options and future ability to respond to hazard.

Another qualitative study was conducted by **Fakhruddin (2005)** on the subject of *“Gender differentiated coping Vulnerabilities in the coastal zone of Bangladesh”*. The objective of the paper is to identify the gender differentiated coping mechanisms during disaster. The findings provides a list of ten coping mechanisms enacted by all the livelihood groups in the coastal zone of Bangladesh.

The findings show that people are more rely on exogenous support or means of livelihood activities to deal with the vulnerabilities.the findings show that people rely on the NGOs and informal money lenders for their support.people seasinally out migrate to other places.the result also show that women have less capacity thus more vulnerable than man.But they are more resilience with coping mechanisms and took more responsibilities in the disaster(Fakhruddin, 2005).

Fakruddin conducted this study considering gender differences. He wanted to show how male and female adopt mechanisms during disaster. But the current study does not recognise this issue.

Review of literature enhances the quality of research, in which the researcher read different types of books, journals, articles, and reports. After reading, researchers find out what type of study he/she will operate. So it is very important for the researcher to conduct a good research.

4.2.3 Literature related to Community Disaster Recovery and Resiliency

Disasters have been a natural reoccurring fact of life on earth as long as we know. Of course, life today and the impact of contemporary disasters are very different. So community disaster recovery and resiliency is needed to minimize the impact of disaster whether natural or manmade.

Liesel Ritchie, Kathleen Tierney and Brandi Gibert conducted a study on *Disaster Preparedness among Community Based Organization and in the city and county of San Francisco*. He identified here how CBOs take disaster preparedness actions. He wrote that an organization can rapidly resume operations in the event of a disaster. Approximately 47.1% of the organizations reported that they developed a continuity of operations plan in case of disaster. Approximately 60.2% of the organizations indicated that they developed a notification system for staff members and volunteers that can be activated in case of disaster.

Ross Prizzia conducted a study titled *“The Role of Coordination in Disaster Management”*. He stated in his report that effective disaster preparedness and management require coordination and collaboration among public and private agencies. The massive potential and actual loss of life and property due to natural and man-made disaster compel emergency planners and managers to improve upon existing disaster readiness and response plans and actions to minimize the devastating consequences.

He noted in his report that the technical, resource, political and bureaucratic problems that surfaced seemed to be eclipsed by the woeful lack of coordination and collaboration among key elements in the emergency response systems.

He showed in his study that coordination is a major mechanism in combating disaster whereas the current study considers coordination as a mechanism with other mechanisms taken by the community.

Dhameja, Alka wrote in his paper titled *Disaster Rehabilitation: Towards a New Perspective* that disaster rehabilitation is an integral part of disaster management. He mentioned five stages of disaster rehabilitation in his paper. Five stages are given below:

- Disaster preparedness and mitigation
- Disaster response
- Disaster relief
- Disaster rehabilitation and reconstruction
- Disaster recovery

He noted that all the five stages are well integrated into disaster management cycle. He mentioned in his paper some dimensions of disaster rehabilitation. He emphasizes on community participation is crucial for disaster management. He also added his paper that the media can play an important role in strengthening disaster rehabilitation and building strong communities. It is noticed in his paper that the rehabilitation plan must be clear, transparent, structured, objective, accessible, accountable and responsive.

Ganapati, N. Emel conducted study on ***“Disaster Management Structure in Turkey.”*** He wrote in his paper about the disaster management in turkey. How turkey government handle their disastrous situation. Turkey is threatened by a variety of disasters like earthquake, floods, landslides and rock falls. He mentioned in his paper that several governmental units at the central, provincial, district and local levels are involved in different aspects of disaster management. These units include disaster related departments of certain ministries, the prime minister office, provincial and district governments, local governments, the Turkish Red Crescent Society, and the Turkish armed forces. There is no single national office with the authority and resources to coordinate disaster management activities of all these units. Instead a number of governmental units at the central level have coordinative functions- sometimes with overlapping responsibilities- in different phases of disaster. He wrote that Turkey is quite hierarchical and centralized, with much of onus going to the central rather than to local governments.

It is very much effective to build disaster resilient communities to combat disaster. Emphasizing on this issue Medury, Uma conducted a study titled ***“Towards Disaster Resilient Communities: A New Approach for South Asia and Africa.”*** He noted that disaster may not be prevented but through specifically designed measures, its impact on people and property can be lessened. He identified some major strategies for strengthening Community Resilience. He wrote that building local capacities is essential for combating disaster properly. He identified that there are several such initiatives that are taken in India and other south Asian countries to support the

resilience of communities to prepare, mitigate, respond and recover from the disaster impact- in such a manner that leaves communities less at risk than before. He identified here also some steps for making communities resilient.

The study had been carried out in South Asia and Africa. He emphasized on making the community disaster resilient. The current study acknowledges this issue but simultaneously emphasizes on other structural and nonstructural mechanisms for combating disaster.

4.3 Conclusion

Review of literature enhances the quality of research, in which the researcher read different types of books, journals, articles, and reports. After reading, researchers find out what type of study he/she will operate. So it is very important for the researcher to conduct a good research.

Chapter Five

A Brief Description of Study Areas

- 5.1 Introduction
- 5.2 Koyra Sadar Union
 - 5.2.1 Socio-demographic Condition
 - 5.2.2 Livelihood and Assets
 - 5.2.3 Information on Communication and
Basic Infrastructure
 - 5.2.4 The Union's History of Disaster:
- 5.3 Patharghata Upazila of Barguna
 - 5.3.1 Socio-demographic Information
 - 5.3.2 Livelihood
 - 5.3.3 Infrastructure and Institutional Network
 - 5.3.4 Transportation facilities
 - 5.3.5 Natural Hazards
 - 5.3.6 Coping Mechanism
- 5.4 Conclusion

5.1 Introduction

The thesis has been conducted in two selected coastal areas of Bangladesh. The coastal area is vulnerable to various natural hazards. Considering the extent of natural disaster the Koyra Upazilla of Khulna and Patharghata Upazilla of Barguna have been chosen as area of the study. The natural hazards are common in these areas particularly SIDR and AILA affected these area severely. The brief description of the study area is as delineated for knowing the area well.

5.2 Koyra Sadar Union

Koyra Union is located in Koyra Upazila Sadar. The area of this Union is 33.38 square kilometres. The Union is surrounded by Maharajpur on the North, North Bedhkashi Union and the Kapatakkha River and across the river there is Padmapukur Union of Shyamnagar Upazila of Sathkhira District. On its East, the Shakbaria River, adjacent to Sundarban is located. The Kapatakkha River is on its West and across the river; there is Shyamnagar Upazila of Sathkhira District.

5.2.1 Socio-demographic Condition

According to the Census 2011, the population of the Union is about 45,296, out of which 23,090 are men and 22,206 women. The total number of families of this Union is 8,256. Among the population of this Union, there are Muslims, Hindus, and a tribal community called Munda. The literacy rate of this Union is 47.31%, out of which 50.42% male and 43.20% female. The Union constitutes of 13 villages, under 2 Mouzas. The villages are: North Modinabad, South Modinabad, Gobra, Ghatakhali, Horinkhola, 1 no. Koyra, 2 no. Koyra, 3 no. Koyra, 4 no. Koyra, Gholpara Ait, 5 no. Koyra, 6 no. Koyra, and Holudbunia (CRA and RRAP Report, 2014).

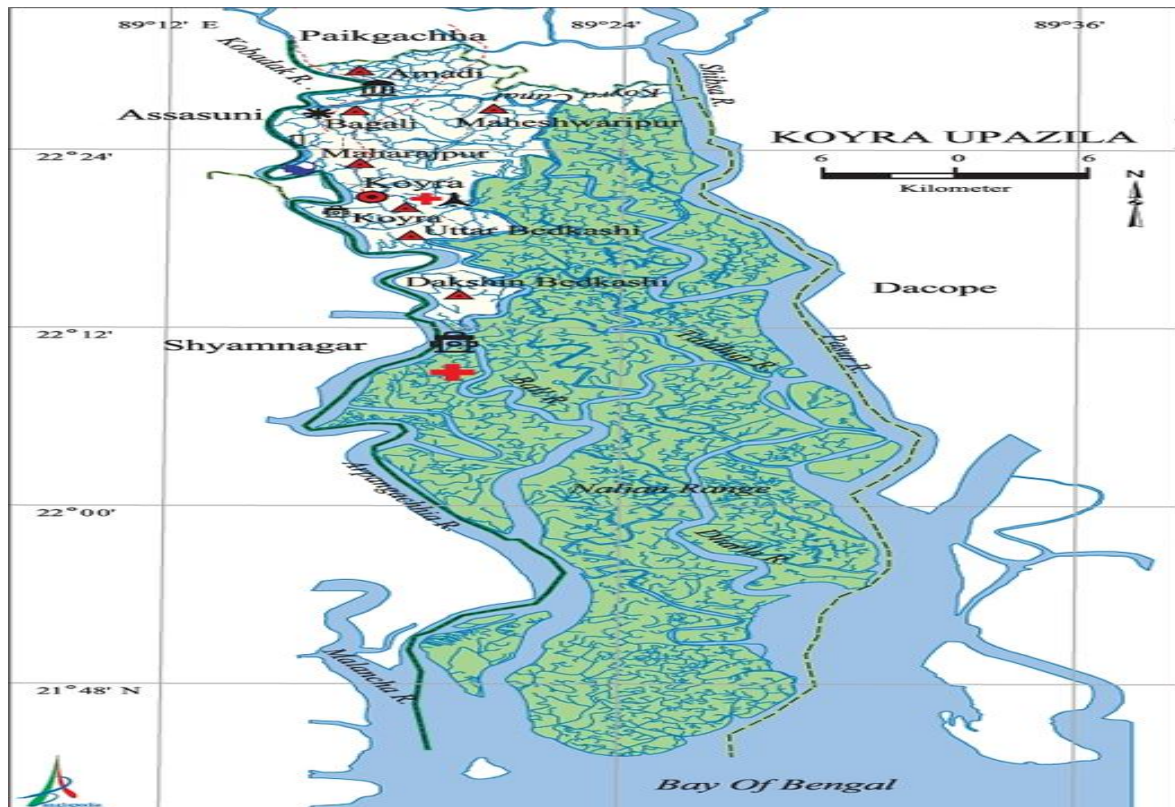
5.2.2 Livelihood and Assets

There are people from various profession lives in the Union, including service holders, fishermen, small and medium entrepreneurs, farmers, three wheeler vans, motorbike,

and motor-driven van driving. Besides, a large number of its population works as a daily laborer throughout the year.

Due to the cyclone Aila, the Union faced damage of both wild and domestic animals and birds. However, in recent times, with assistance from the Government and NGOs and people's own initiative, the number of domestic animals and birds is increasing, which includes, various duck species, chicken, cuckoo, pigeon, cow, goat, sheep, and so on. Besides the domestic animals and birds, in this area fox, khatasa, mongoose, squirrel, kota, and so on are also seen. Among the local birds, various species, like, stork, house myna, sparrow, crow, dove, weaver bird, bank myna, kingfisher, drongo, tailor-bird, cuckoo, woodpecker, pigeon, magpie robin of Bengal, and so on are also seen. Among the reptiles, apart from various species of snakes, there are gecko and fish-eating crocodiles also found drongo, tailor - bird, cuckoo, woodpecker, pigeon, magpie robin of Bengal, and so on are also seen. Among the reptiles, apart from various species of snakes, there are geck and fish-eating crocodiles also found.

The biodiversity of the Union had been severely affected due to the cyclone Aila in recent past. The damage of the trees and plant due to the cyclone has not yet recovered completely. However, tree-plantation is being started in some of the high and homestead lands, which is bringing back the greenery. A large greenery of the Union has been damaged prior to Aila, where crops used to grow, but due to salinity, as they became inappropriate for cultivation of crops, people started to use these lands for shrimp cultivation and fisheries. Apart from community forestry, naturally grown fruit-trees and forest-grown trees are also seen in the area, such as, mango, sapodilla, papaya, banana, jujube, rose-apple, palmyra, date, coconut, betel-nut, mahogany, gregarious tree, rain tree, deodar, cambala, flowering shrub, gamari, garjan, and so on. Among the floral plants, in the courtyards, collection of various colours and species, such as, ghasaphula, roses, *Mimusops elengi*, Chinaroses, night jasmine, Indian marigold, Arabian Jasmin, ethanol, and so on are seen. Among the herbal plants, emblica, black myrobalan, margosa, basil, grass, and so on are seen as well.

Figure-5.1: Map of Koyra Upazila

Source: https://www.wikimedia.org%252Fwiki%252FFile%253ALocMap_Bangladesh_koyra.png%3B247%3B337

5.2.3 Information on Communication and Basic Infrastructure

The communication system of Koyra Union is very delicate. In the Union there are about 80 kilometres roads, including pacca, semi-pacca, kancha, and embankment (48kilometres kancha road, 9 kilometres pacca road, 11 kilometres brick-soled, and 12 kilometres embankment). The river way, which is the main means of communication in the rainy season, can be used throughout the year. The Union has 5 launch terminals, from where launch service is available to Khulna, including other boat services.

The main transportation means of the area are: motor bike, three-wheeler van, votvoti/nosimon, bicycle, launch, boat, and so on. There are 3 colleges, 3 secondary and junior secondary schools, 6 madrasas, 14 Government primary schools, 5 satellite and community schools, and 2 kindergartens. Among the Government establishments,

there is an Upazila Parishad building, an Union Parishad building, two banks, two post offices, a revenue collection office, two forest petrol outposts, and a police outpost. Besides, the number of mosques and temples are 44 and 22 respectively, including 13 cyclone shelters. Moreover, the Union has 11 market places, 27 Eidgah, and 17 clubs/samitis. Even though river water is used for common purposes widely, there are two government-owned ponds and 142 shallow tubewells as the sources of drinking water.

There are a number of NGOs operating in the Union, out of which Islamin Relief Bangladesh, Pradipan, Uttoron, Rupantor, Brac, Sushilon, JJS, and Relief International are mentionable. These NGOs are implementing various development works. Here, people are mostly dependant on farming, fishing, and daily labour. Among the natural disasters, the riverbank erosion, tidal surge, and salinity are the most common. Due to various needs and wants, the propensity of child labour, early marriage, polygamy, divorce and dowry is very high within the Union. Most of the year, the people of this area needs to stay in other districts to look for jobs.

5.2.4 The Union's History of Disaster

After analysing the history of disaster of Koyra Union, it was found that the devastating cyclone in 1988 and cyclone Aila in 2009 were the two most devastating disasters that the Union has ever faced. Besides, there were significant damage and losses during Sidr in 2007. About 24,000 people were affected by the cyclone Aila and a few thousand people were injured. Moreover, thousands of people, mostly children and women, were affected by diarrhoea. Due to the cyclone Aila, the Koyra Union's 80% houses (4550 houses) and 95% of crops, trees and plants were fully damaged. Besides, hundreds of various infrastructures and establishments, such as, educational institutes, praying places, bridges, embankments, culverts were damaged. Sixty five kilometres road of the area was also vanished. Due to the cyclone Aila, 8000 bigha of fisheries drowned, which caused a few crore taka loss. Besides, crops of 7000 bigha were damaged (CRA and RRAP Report, 2014).

Due to the entrance of saline water because of tidal surge, the damaged agricultural land has not yet been fully recovered for cultivation. The trees and plants died due to

salinity, which made the area green-less. Thousands of houses were partially or fully damaged. Plenty of livestock died, which caused large financial loss of people. The unemployment rate increased due to lack of employment opportunities. On the one hand, poverty increased, and on the other, lack of health and nutrition increased. The people of this area became more dependants on relief. Many people left the area in search of work.

5.3 Patharghata Upazila of Barguna

Barguna District, having an area of 1831.31 sq km and population of 179968, is bounded by Payra River, Bishkhali River and Baleshwar River (BBS, 2006). Barguna is divided into 5 upazilas (Amtali, Betagi, Bamna, Barguna Sadar and Patharghata), 38 unions, 238 mouzas and 560 villages (Banglapedia, 2006). Patharghata Upazilla of Barguna district was chosen as the study area, because it is always affected by storm surge, coastal flooding, and other hazards associated with cyclone.

5.3.1 Socio-demographic Information

Patharghata has a population of 134635. Males constitute 50.56% of the population, and females 49.44%. This Upazila's eighteen up population is 68751. Patharghata has an average literacy rate of 46.4% (7+ years), and the national average of 32.4% literate. Patharghata has 7 Unions/Wards, 43 Mauzas/Mahallas, and 67 villages. It is near Bay of Bengal. The study area has been directly threatened numerous times by cyclone and tropical storms, although few have made landfall in this area. The historic dataset (1877-2003) of land falling storm track in Bangladesh, developed by Islam (2008) applying Global Tropical Cyclone Climatic Atlas (GTCCA) revealed that thirty-five depressions, storms and cyclones hit Barguna district during the last 130 years. Among them, seven storms were significant due to their magnitude. The most severe events include SIDR (2007) and cyclone in 1970.

5.3.2 Livelihood

In general, rice is the major crops grown in the surveyed areas. People mostly depend on agriculture for their livelihood. Some people in the study area are fisherman as the locality is situated on the bank of river. The minor crops grown in the study area are vegetable, grass pea, sunflower, maize, potato, green gram, sweet potato, chili etc. In some areas, sunflower is the newly introduced crop during Rabi season for overcoming the salinity effect. Farmers can do nothing but to grow rice because of prevailing agro- ecological conditions in that locality. There are limited scopes to grow crops in winter season because of shortage of fresh water. They want to produce more crops to make the farming a profitable enterprise by developing facility of sweet water in dry period.

5.3.3 Infrastructure and Institutional Network

The road communication networks between district and upazila are developed but within the the blocks the communication facilities are under developed. Flood protection polder played a vital role for road communication in this area, but they are not well managed. Other institutional service like post office, health care centre, primary agricultural cooperatives, like integrated crop management (IM) and integrated pest management (IPM) clubs, schools are also remarkable in the study area.

5.3.4 Transport facilities

The mode of transport is bus, van, votvoti (a local made engine driven vehicle), motor cycle and bicycles. People use bus for long distance travel only in the main road. But for local communication they use van, votvoti, motor cycle and bicycles. Due to poor development of road communication and during wet season they faced a major problem in communication. At that time they commute on foot only. Local market status is very poor. Only one bigger market existed in the surveyed areas; but no warehouse and processing facilities. Bigger market is situated in between 5-16 km from their locality. A hospital facility lies in between 2 to 16 km distance. District

town is situated at 20-50 km apart from their locality. But to reach the hospital at the district headquarters, it takes more time due to poor road communication and lack of bridges over some big rivers.

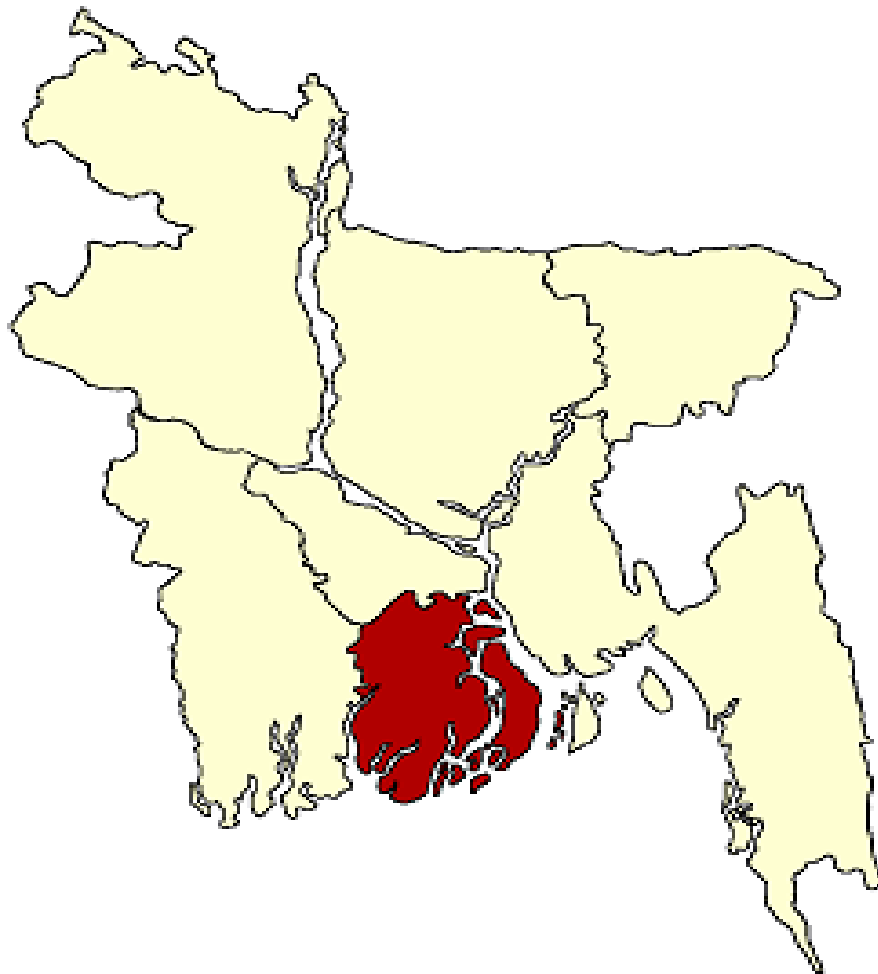
5.3.5 Natural Hazards

The people all in the study area are vulnerable to natural disasters. Due their geographic location and the topographic composition of the areas in which they live, almost all respondents in the survey areas are exposed to cyclone and strong winds and storm surge that accompany or result from the cyclone and tidal surge have the greatest impact on homes, farms, fishing activities and small business resulting in damages to property and assets and loss in income. River bank erosion, earthquake are also common natural hazards in the study area.

5.3.6 Coping Mechanisms

Most of the people in the study area receive disaster warning information from their radio, neighbor & kin and Disaster Management Committee (DMC). The main source of warning for disaster come from radio, neighbor & kin, and the Disaster Management Committee respectively (Ahamed, 2011). A few proportions knew early warning from television and mobile phone. However, it is important to note that, in the study area, most of the households do not own personal television and mobile phone. People in study area adopt different coping mechanism like personal savings, borrow money from friend/ relative/ bank, aid from Government/ NGOs, reduction of expenses on food, children stop schooling and temporary migration.

Figure-5.2: Map of Patharghata Upazila



Source: https://www.wikimedia.org/wiki/File:LocMap_Bangladesh_Barisal.png

5.4 Conclusion

The study areas were selected considering the vulnerability of natural disasters. As Koyra Sadar and Patharghata were devastated due to cyclone Sidr and Aila, the researcher selected those two coastal areas as study area. Data was collected from Koyra Sadar Union and different Unions of Patharghata Upazila like Kalmegha and Patharghata Union.

Chapter Six

Conceptual Clarification of the Study

- 6.1 Introduction
- 6.2 Conceptual Clarification of the study
 - 6.2.1 Disaster
 - 6.2.2 Disaster Management
 - 6.2.3 Indigenous Coping Mechanism
 - 6.2.4 Coastal Area
 - 6.2.5 Hazard
 - 6.2.6 Vulnerability
 - 6.2.7 Capacity
 - 6.2.8 Risk
 - 6.2.9 Disaster Management Cycle
- 6.3 Conclusion

6.1 Introduction

Conceptual framework, for any kind of research either qualitative or quantitative, is important. It specifies the study area which helps the researcher to conduct research in a right way. In this section an attempt has been made to conceptualize the key terms, the terms related to disaster and disaster management also.

6.2 Conceptual Clarification of the Study

The exact meanings of key terms used in this thesis are delineated as follows:

6.2.1 Disaster

A disaster is a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources (UNISDR, 2004). Community's ability in the definition refers to many societal aspects including financial resources, equipment, infrastructure, skills and awareness, leadership, systems and structures.

A disaster situation refers to a progressive or sudden, widespread or localized, natural or Manmade occurrence which:

- a) Causes or threatens to cause; 1) death, injury or disease, 2) damage to property, infrastructure or the environment, 3) disruption of the life of a community b) is of a magnitude that exceeds the ability of those affected by the disaster to cope with its effects using only their own resources (Government of South Africa- Disaster Management Act 57, 2002).

'Disaster refers to catastrophe, mishap, calamity of grave occurrence from natural or manmade causes which is beyond the capacity of the affected community.'
...Brig B.K. Khanna

Disaster is a situation resulting from an environmental phenomena or armed conflict that produces stress, personal injury, physical damage, and economic disruption of great magnitude (Diwan, 2010, p-2.)

Disaster is any incident which threatens human safety or damages, or threatens to damage [or destroy], a library's buildings, collections, contents, facilities or services. (Matthews and Eden, 1996 p.4).

Disasters can result from a range of causes, man-made and natural, including: arson, burst pipe, electrical fault, leaking roof, poor maintenance, earthquake, hurricane, flooding, terrorism, war. They vary in scale and impact. Some may cause minor inconvenience; others can have enormous consequences for the library and its parent organization, with catastrophic damage to stock, equipment, buildings and disruption to services, with considerable financial implications. If the incident is major and/or region wide and life threatening, emergency services will give priority to human safety and re-establishing the local infrastructure.

Consequently, a disaster as measured in terms of loss of lives, number of people affected, economic and environmental losses is therefore, the outcome of a specific hazard (or hazards) that is mediated with properties of human systems that are exposed to and affected by the hazard.

6.2.2 Disaster Management

Disaster management means managing resources and various responsibilities to deal with all humanitarian aspects of emergencies. This may include preparedness, response and recovery. The purpose of this is to lessen the impact of disasters.

The term disaster management encompasses the complete realm of disaster related activities. Traditionally people tend to think of disaster management only in terms of the post disaster actions taken by relief and reconstruction officials yet disaster management covers a much broader scope, and many modern disaster activities than in post disaster response. This is because many persons who work in the development field, or who plan routine economic, urban, regional, or agricultural development projects, have disaster management responsibilities. For example housing specialists planning a low income housing project in a disaster prone area have the opportunity to mitigate the impact of a disaster if the houses incorporate disaster resistant construction technologies (Diwan,2010, p-1).

Under the study disaster management means as the range of activities or actions designed to maintain control over disaster and emergency situations to avoid or recover from the impact of the disaster that occur prior to, during and after the disaster.

Disaster management as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters”.- The Red Cross and Red Crescent societies

6.2.3 Indigenous Coping Mechanism

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 centers. Warren and Cashman define 'indigenous(1988) 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".

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.

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.

Under the study indigenous coping mechanism in disaster management means a set of actions or activities by which community people try to survive in disasters, recover their situation and develop their conditions during prior to, during and after disaster.

6.2.4 Coastal Area

Coastal area means the places situated beside the Bay of Bengal and many rivers of Bangladesh. The coastline of Bangladesh broadly divided into three regions: the deltaic eastern region (Pacific type), deltaic central region and the stable deltaic western region (Atlantic type). A set of connections of rivers originated from the Himalayas flow over the country carries sediments. The river release on the Bangladesh coastline is heavily loaded with sediments consisting of estuary (Banglapedia, 2006).

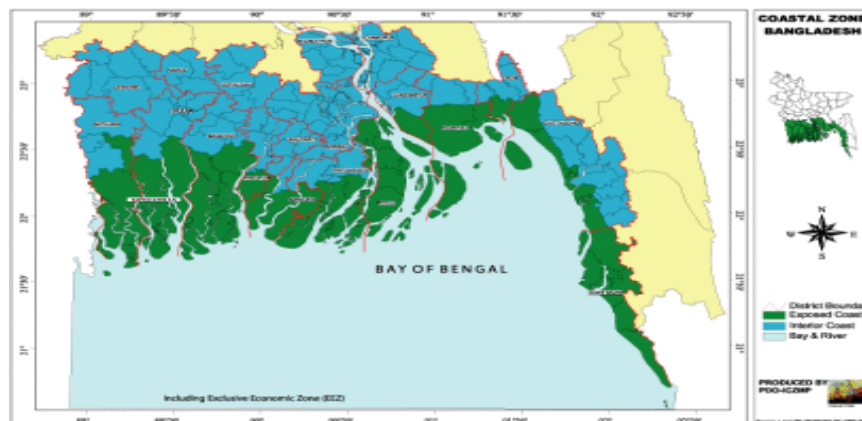
The coastal areas of Bangladesh are facing the Bay of Bengal with an area of 47,201 sq. km. covering 19 districts: Bagerhat, Barguna, Barishal, Bhola, Chandpur, Chittagong, Cox's Bazar, Feni, Gopalganj, Jessore, Jhalokati, Khulna, Lakshmipur, Narail, Noakhali, Potuakhali, Pirojpur, Satkhira and Shariatpur (CPD, 2000).

The coastal zone covers 19 out of 64 districts facing, or in proximity to, the Bay of Bengal, encompassing 153 *thanas* (sub districts, formerly called *upazilas*) and the EEZ (MoWR, 2005). The zone constitutes 32 percent of the area and 28 percent of the population of Bangladesh (Islam, 2004). In 12 of these districts, 51 *thanas* face a combination of cyclone risk, salinity and tidal water movement above critical levels and are designated as “exposed coast” (Figure, green areas). The coastal zone covers an area from the shore of 37 to 195 kilometres, whereas the exposed coast is limited to a distance of 37 to 57 kilometres (Islam *et al.*, 2006).

The coastal zone of Bangladesh forms the lowest landmass and is part of the delta of the extended Himalayan drainage ecosystem. The Ganges–Brahmaputra–Meghna Delta, covering most of Bangladesh, is also one of the largest and youngest deltas in the world, and is still very active. Sixty-two percent of the land of the coastal zone has an elevation of up to three meters and 86 percent up to five meters (Islam *et al.*, 2006).

Under the study coastal area means the Koyra Sadar of Khulna and Patharghata Upazila of Barguna district.

Figure-6.1: The coastal zone of Bangladesh



6.2.5 Hazard

Hazard may be defined as “a dangerous condition or event, that threat or have the potential for causing injury to life or damage to property or the environment.” Hazards can be grouped into two broad categories namely natural and manmade.

Natural hazards are hazards which are caused because of natural phenomena (hazards with meteorological, geological or even biological origin). Examples of natural hazards are cyclones, tsunamis, earthquake and volcanic eruptions which are exclusively of natural origin. Landslides, floods, drought, fires are socio-natural hazards since their causes are both natural and man-made. For example flooding may be caused because of heavy rains, landslide or blocking of drains with human waste.

Manmade hazards are hazards which are due to human negligence. Manmade hazards are associated with industries or energy generation facilities and include explosions, leakage of toxic waste, pollution, dam failure, wars or civil strife, etc. The list of hazards is very long. Many occur frequently while others take place occasionally.

6.2.6 Vulnerability

Vulnerability may be defined as “The extent to which a community, structure, services or geographic area is likely to be damaged or disrupted by the impact of particular hazard, on account of their nature, construction and proximity to hazardous terrains or a disaster prone area.”

Vulnerabilities can be categorized into physical and socio-economic vulnerability. Physical Vulnerability: It includes notions of whom and what may be damaged or destroyed by natural hazard such as earthquakes or floods. It is based on the physical condition of people and elements at risk, such as buildings, infrastructure etc; and their proximity, location and nature of the hazard. It also relates to the technical capability of building and structures to resist the forces acting upon them during a hazard event.

Socio-economic Vulnerability

The degree to which a population is affected by a hazard will not merely lie in the physical components of vulnerability but also on the socioeconomic conditions. The

socioeconomic conditions of the people also determine the intensity of the impact. For example, people who are poor and living in the sea coast don't have the money to construct strong concrete houses. They are generally at risk and lose their shelters whenever there is strong wind or cyclone. Because of their poverty they too.

6.2.7 Capacity

Capacity can be defined as “resources, means and strengths which exist in households and communities and which enable them to cope with, withstand, prepare for, prevent, mitigate or quickly recover from a disaster”. People's capacity can also be taken into account. Capacities could be classified into physical and socio-economic capacities.

- **Physical Capacity:** People whose houses have been destroyed by the cyclone or crops have been destroyed by the flood can salvage things from their homes and from their farms. Some family members have skills, which enable them to find employment if they migrate, either temporarily or permanently.
- **Socio-economic Capacity:** In most of the disasters, people suffer their greatest losses in the physical and material realm. Rich people have the capacity to recover soon because of their wealth. In fact, they are seldom hit by disasters because they live in safe areas and their houses are built with stronger materials. However, even when everything is destroyed they have the capacity to cope up with it. Hazards are always prevalent, but the hazard becomes a disaster only when the frequency or likelihood of a hazard and the vulnerability of the community increases the risk of being severely affected.

6.2.8 Risk

Risk is a “measure of the expected losses due to a hazard event occurring in a given area over a specific time period. Risk is a function of the probability of particular hazardous event and the losses it would cause.” The level of risk depends upon:

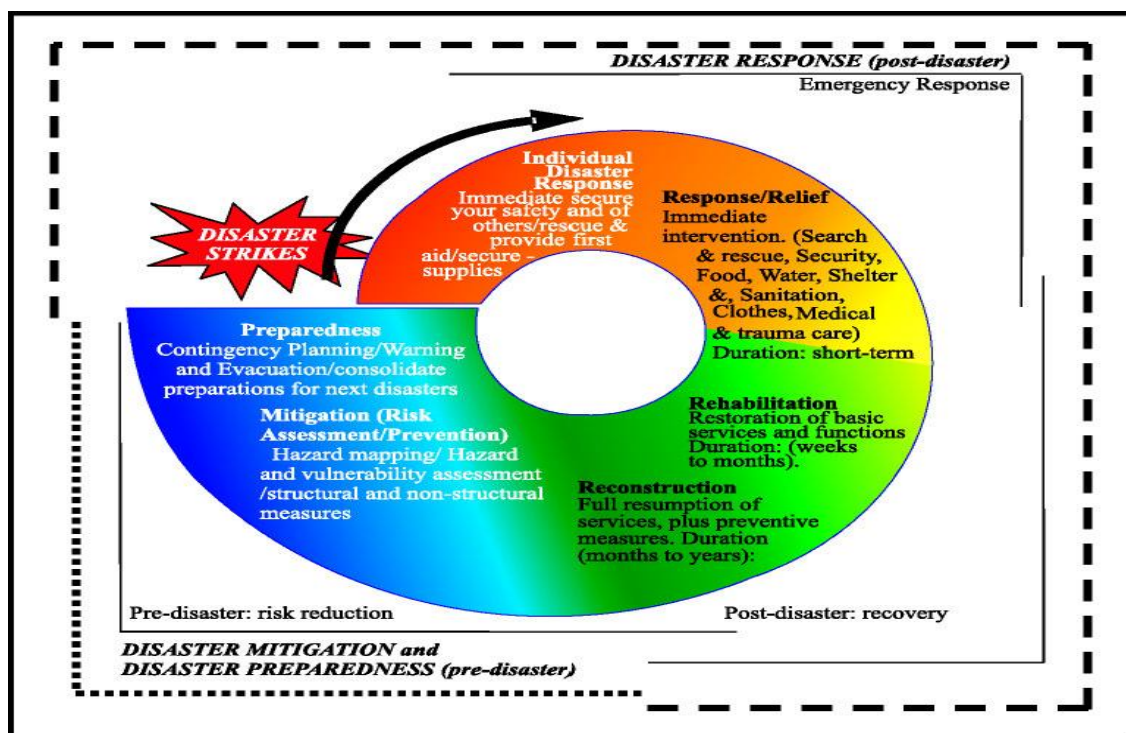
- Nature of the hazard;
- Vulnerability of the elements which are affected;
- Economic value of those elements.

A community/locality is said to be at 'risk' when it is exposed to hazards and is likely to be adversely affected by its impact. Whenever we discuss 'disaster management' it is basically 'disaster risk management'. Disaster risk management includes all measures which reduce disaster related losses of life, property or assets by either reducing the hazard or vulnerability of the elements at risk.

6.2.9 Disaster Management Cycle

Disaster Risk Management includes sum total of all activities, programmes and measures which can be taken up before, during and after a disaster with the purpose to avoid a disaster, reduce its impact or recover from its losses. The three key stages of activities that are taken up within disaster risk management are as follows (See Figure-05):

Figure-6.2: Disaster Management



- 1. Before a Disaster (pre-disaster).** Pre-disaster activities those which are taken to reduce human and property losses caused by a potential hazard. For example, carrying out awareness campaigns, strengthening the existing weak structures, preparation of the disaster management plans at household and community level, etc. Such risk reduction measures taken under this stage are termed as mitigation and preparedness activities.

- 2. During a Disaster (disaster occurrence).** These include initiatives taken to ensure that the needs and provisions of victims are met and suffering is minimized. Activities taken under this stage are called emergency response activities.

- 3. After a Disaster (post-disaster).** There are initiatives taken in response to a disaster with a purpose to achieve early recovery and rehabilitation of affected communities, immediately after a disaster strikes. These are called as response and recovery activities. The Disaster risk management cycle diagram (DRMC) highlights the range of initiatives which normally occur during both the Emergency response and Recovery stages of a disaster. Some of these cut across both stages (such things as coordination and the provision of ongoing assistance); whilst other activities are unique to each stage (e.g. Early Warning and Evacuation during Emergency Response; and Reconstruction and Economic and Social Recovery as part of Recovery).

The DRMC also highlights the role of the media, where there is a strong relationship between this and funding opportunities. This diagram works best for relatively sudden-onset disasters, such as floods, earthquakes, bushfires, tsunamis, cyclones etc, but is less reflective of slow-onset disasters, such as drought, where there is no obviously recognizable single event which triggers the movement into the Emergency Response stage. According to Warfield (2008) disaster management aims to reduce, or avoid the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery.

The disaster management cycle illustrates the ongoing process by which governments, businesses, and civil society plan for and reduce the impact of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred. Appropriate actions at all points in the cycle lead to greater preparedness, better warnings, reduced vulnerability or the prevention of disasters during the next iteration of the cycle. The complete disaster management cycle includes the shaping of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure.

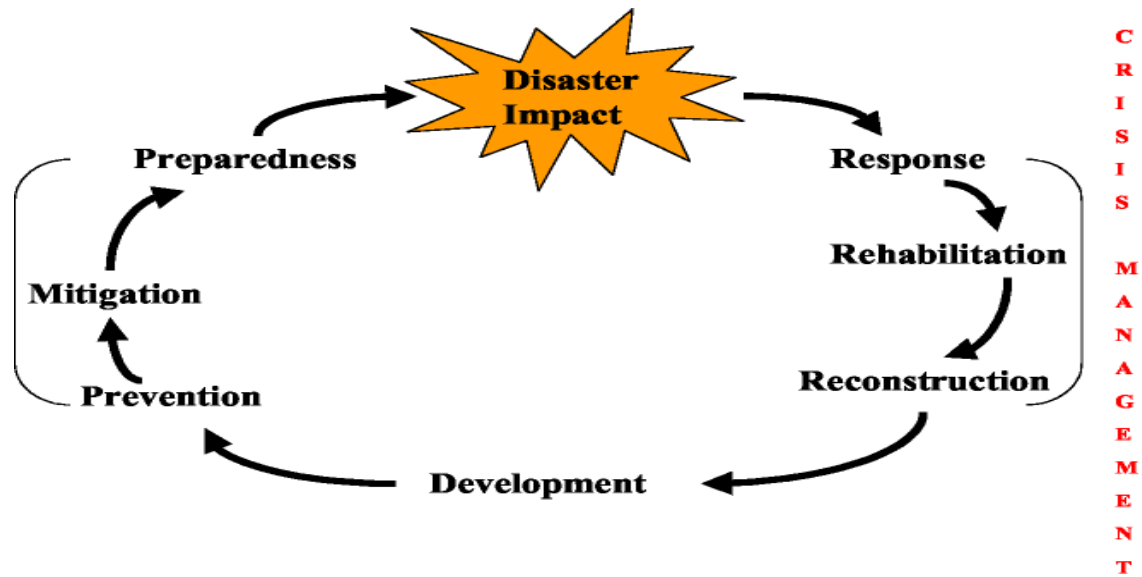
The mitigation and preparedness phases occur as disaster management improvements are made in anticipation of a disaster event. Developmental considerations play a key role in contributing to the mitigation and preparation of a community to effectively confront a disaster. As a disaster occurs, disaster management actors, in particular humanitarian organizations become involved in the immediate response and long-term recovery phases.

The four disaster management phases illustrated here do not always, or even generally, occur in isolation or in this precise order. Often phases of the cycle overlap and the length of each phase greatly depends on the severity of the disaster.

- **Mitigation** - Minimizing the effects of disaster. Examples: building codes and zoning; vulnerability analyses; public education.
- **Preparedness** - Planning how to respond. Examples: preparedness plans; emergency exercises/training; warning systems.
- **Response** - Efforts to minimize the hazards created by a disaster. Examples: search and rescue; emergency relief.
- **Recovery** - Returning the community to normal. Examples: temporary housing; grants; medical care.

To analyze the scope of disaster management in the revised context, it should be studied the cycle of the phenomenon (Figure-13)

Figure-6.3: Disaster Management Cycle



6.3 Conclusion

Disaster management encompasses different stages. The success of one stage fully depends on the success of previous stage. So it is need to complete every stage of disaster management cycle. If disaster management cycle is properly used by certain communities, the impact of disaster can be lessened to a great extent.

Chapter Seven

Findings and Analysis of the Study

7.1 Introduction

Bangladesh is crisscrossed by a strong river network of three major rivers– the Padma, the Brahmaputra, and the Meghna – and their tributaries, numbering about 230. Climatically it is situated in humid tropical zone. Although the country is a beauty of nature with cultural heritage, it is highly vulnerable to natural hazards such as flood, cyclone, drought, tidal surge, cold wave, earthquake, river-bank erosion, arsenic contamination of ground water, water and soil salinity and various forms of pollution due to her geographical location, land characteristics, multiplicity of rivers and monsoon climate. Since the independence in 1971, the country has experienced 200 natural disasters causing loss of more than 600,000 lives, millions of livestock and leaving prolonged damage to property, quality of life and livelihoods (Ministry of Foreign Affairs, 2006).

Although it is not possible to prevent the occurrence of disasters influenced by natural causes, adopting indigenous coping mechanisms may reduce the damages of property, and shorten the pains and sufferings of people as well as enhance the sustainable development process.

This chapter presents the demographic profile, housing condition of the respondents, indigenous perception regarding disaster, causes of disaster, structural or non structural mechanisms for minimizing the losses, the importance of participation, and Government and NGO services for disaster management and draw some recommendations. To conduct this study data was collected from ten in-depth interviews considering their various factors like age, marriage, job, and educational status. They are two students age 20 and 23 years, two school teachers age 36 and 48 years, two rickshaw pullers age 35 and 37 years, two fishermen age 45 and 40 years, one shopkeeper age 35 years and a business man age 33 years from Koyra Sadar Union of Khulna and Pathargha Upazilla of Barguna district in Bangladesh. The study was analyzed with primary sources of data in qualitative way and tried to intermingle with secondary sources of data and to build up theoretical knowledge through the secondary source of data. Triangulation approach was applied to discuss the study findings descriptively and decorated here following the check list in this chapter. Maintaining the research ethics, anonymity and confidentiality, I gave the

respondent's pseudonym as like A, B, C, D, E, F, G, H, I, J. For analysis I gave some subheading like:

1. Relatively no secured living environment;
2. Disaster is hazardous event;
3. Cyclone, flood and river erosion are common in coastal area;
4. Cutting trees, breach of embankment and intrusion of saline water are main reasons of disaster;
5. Disaster severely damages household, trees and property;
6. Indigenous coping mechanisms are the activities what community adopts;
7. Government and NGOs take mechanisms more than community;
8. Construction of Embankment, raising homestead platform and raised platform for preservation of food for livestock are major structural mechanisms for disaster management;
9. Awareness, planting trees, saving food and money are important non structural mechanisms;
10. Community participation helps to handle disastrous situation effectively;
11. Warning system is paramount mechanism for lessening the losses of sufferings.
12. Community leaders and NGOs initiate mechanisms;
13. Effectiveness varies from structural to non structural mechanisms Government imparts material, structural and non structural support to combat disaster;
14. Government imparts material, structural and non structural support to combat disaster;
15. NGOs spotlight on non structural mechanisms;
16. Both structural and non structural mechanisms can improve the vulnerable situation of people in coastal area;

7.2 Relatively no secured living environment

Housing characteristics and consumption structure of household represents the characteristics of the society and economic condition of family. It is found that living conditions of the respondents are not so good; their houses are constructed by common materials bamboo, thatch, jute sticks, mud, natural materials or tin/wood. There have some toilet facilities but most of the households' do not have access to sanitary latrines. Most of the respondents live on the bank of embankment or beside it. So they are affected when little wind comes. Respondent (J) referred that,

“My house is on the bank of embankment. If little cyclonic wind hits we are affected of that. During SIDR I went out from house and took shelter in safe place. When disastrous situation was stopped, going to the place of my house, I found nothing sign of my house. We live always at risk.”

Respondent (B) told,

“I live in the side of river where flood occurs occasionally if slight winds come, suffer from severe damages. Sometimes it is seen that trees fall on our house during disaster. As a result our houses are damaged.”

Most of the residential place of respondents far from modern facilities. Some people live in village area with no electricity and far from modern facilities. Respondent (G) noted that,

“My residential place is constructed with mud and thatch, have no electricity, no security. Everyone can enter easily without any barriers so at night I don't sleep freely. My house is on the east side of river. In rainy session water of rain walk up to my room then I cannot sleep, all-time remind my room is destroying. So it can be said my residential place is not fully secured”

Analysis of living environment of the respondents

Disaster affected people always want to stay free from risk of disaster. To this study it shown that most of the respondents do not get modern living facilities. It is observed that their house is constructed with mud, thatch, jute sticks, natural materials or tin/wood. They never try to secure their living environment. Because they think that it will be broken if further disaster hit in their area. Though in the constitution of Bangladesh has been indicated for equal opportunities and fundamental rights for all, but they do not get their live condition secured by government.

7.3 Disaster is hazardous event

Disaster is a sudden adverse or unfortunate extreme event which causes great damage to human beings as well as plants and animals. Disasters occur rapidly, instantaneously and indiscriminately. These extreme events either natural or man-induced exceed the tolerable magnitude within or beyond certain time limits, make adjustment difficult, result in catastrophic losses of property and income and life is paralyzed. To this study most of the respondents mentioned disaster as a disruptive event. Respondent (A) described that,

“Disaster is a negative event. If this affect, many social problems are created. It hampers our daily activities. It creates our food crisis. Disaster is a great problem for food. If this happens in our society, many diseases break out.”

Disaster is hazardous event. It is needed much assistance from outside for combating disaster. Respondent (B) said,

“Disaster is a condition in which different animals with man and natural environment are at stake. For which mass help is needed. It destructs not only our lives but also damages the road and other constructions.”

Any kind of disaster can be natural or man-made. Respondent(C) is a college teacher. He stresses on this issue. He said,

“Disaster is a condition which destructs people’s property and natural environment and that can be natural or human induced which solution is not so easy.”

When disaster affects in any area, it hampers the normal functioning of general people. It damages the road, school, college and the crops. Emphasizing on this point Respondent (D) mentioned that,

“Disaster affects the property of people. Man and other animals are under danger. It damages the school, college. For which students cannot continue their study. In time of Aila our road, school, college and shops were under water. So we could not lead the normal life. Road damage was mostly noticeable.”

Almost all respondents answered that disaster is a negative effect. One respondent answered in different manner. Respondent (I) described,

“People die because of disaster. Destructions occur in different sectors. It becomes a problem for us. Our toilet, property and houses are dismissed. After all we live in a hazardous situation.”

Analysis of Disaster is hazardous event

A disaster is a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own resources. Though often caused by nature, disasters can have human origins. To this study found that most of the respondents answered that disaster is a negative event that disrupts the normal functioning and destructs their property and damages the different structural side like bridge, road, culvert etc as observation found it. So it is proved that disaster is a hazardous event.

7.4 Cyclone, flood and river erosion are common in coastal area

Bangladesh is exposed to natural hazards, such as, floods, river erosion, cyclones, droughts, tornadoes, cold waves, earthquakes, drainage congestion/water logging, arsenic contamination, salinity intrusion etc. But the nature of such occurrences, the seasons and extent of effects of the hazards are not the same in all places.

Bangladesh is most vulnerable to several natural disasters and every year natural calamities upset people's lives in some part of the country. The major disasters concerned here are the occurrences of flood, cyclone and storm surge, flash flood, drought, tornado, riverbank erosion, and landslide. In response to the question “what type of natural disaster hit in your area?” Respondent (D) said,

“Generally river erosion always exist in our area as it is situated on the bank of river. For that many cultivable lands are being lost every year. Without these, Aila damages in our area most.”

In this study the researcher found that river erosion, cyclone and flood are common in coastal area. As respondent (A) said,

“In our area cyclone is common but occasionally disaster like Sidr and Aila hit in our area.”

In response to the question that is above mentioned respondent(C) described that,

“The disaster most hit here is flood, tidal surge etc. But destruction happened as result of Aila. Aila has destructed our road, school, college and other construction also.”

Respondent (H) explained about natural disaster in below manner,

“Flood occurs occasionally in our area as result of damaging our embankment. Sometimes saline water enters in our cultivable area. As a result we cannot cultivate our land and consequently we suffer in the long run. Many of our land become victim of river erosion. Cyclone hit as our area is coastal.”

Respondent (B) said,

“In our area the disaster are common are flood, river erosion. But sometimes major destructive disaster hit in our area like Sidr and Aila.”

Analysis of cyclone, flood and river erosion are common in coastal areas

Bangladesh alone accounted for nearly 60 percent of the deaths caused by cyclones worldwide. Due to the effects of climate change, an increase in the frequency and severity of cyclones and other natural disasters is likely, making it essential for Bangladesh to adapt to increased uncertainty and be prepared to ride out even the worst storms. The longitudinal position of Bangladesh, its proximity to the Bay of Bengal and the Indian Ocean, create a tropical monsoon-type climate, which is prone to cyclones, flooding and droughts. Nearly 40 million people living in the 710 km long coast in Bangladesh are exposed to cyclones and other natural disasters. Cyclones accompanied by powerful storm surges hit the coastal areas and often causes inundation over a vast area (Building Resiliency of the Coastal Population to Natural Disaster, 2015). From the respondents answers it is proved that flood, cyclone, river erosion, sidr and aila are the common natural disasters in coastal area.

7.5 Cutting trees, breach of embankment and saline water are main reasons of disaster

Historical statistics would suggest that Bangladesh is one of the most disaster prone countries in the world with great negative consequences being associated with various natural and human induced hazards. The geophysical location, land characteristics, multiplicity of rivers and the monsoon climate render Bangladesh highly vulnerable to natural hazards. The coastal morphology of Bangladesh influences the impact of natural hazards on the area. Especially in the south eastern area, natural hazards increase the vulnerability of the coastal dwellers. People have no control over natural disaster but they can minimize the effects of natural disaster. Natural disaster comes naturally but sometimes human are responsible for disaster. Here the researcher tried

to identify the human induced causes of disaster. In response to the question “what are the causes of disaster?” respondent (B) referred,

“Generally disaster occurs naturally. But sometimes it can be occurred due to cutting trees. Due to breaking of embankment (bheri so called) flood can be occurred. However disaster like aila, it is occurred naturally.”

In the study area embankment is a common concept. They mostly think that embankment is the main reason for occurring disaster. As respondent (C) described,

“Timely not giving soil on the embankment (bheribad so called) is one of the important reasons of disaster. Besides, people cut the road in time of making Gher. They also break the embankment so disaster like flood is seen.”

Respondent (D) said in this regard,

“Many people here make Bagda (shrimp fish) with the help of saline water. Bagda is not made without saline water. So they place pipe under embankment and help enter water into their gher and it is most important reason for disaster.”

Tree is one of the important resistant of disaster. It is known to all that deforestation is responsible for occurring disaster. Emphasizing in this issue respondent (A) told,

“Cutting trees is major cause behind occurring disaster. If people plant tree instead of cutting, disaster will not occurred. People have to be encouraged to plant tree and we should also plant tree. Then disaster will not create any problem. If we plant tree and stop cutting tree, disaster will not harm us.”

Analysis of cutting trees, breach of embankment and saline water are main reasons of disaster

Study area is located on the bank of river. Shakbaria River and sundarban is situated in the east of this area and kopotakkho river on the south and north. So it can be said that it is a disaster prone area. River erosion is common here. Sometimes flood occurs. It is found in the observation that the area is beset with bheri which is about 12 km long and about 5-6 feet high. When bheri is too weak to tolerate the pressure of water and then disaster like flood occurs in that area. It is also found in the observation of researcher that trees are not sufficient in this area as Aila affected here in 2009. So it will not be illogical to say that cutting trees and breach of embankment are main reasons of disaster in study area.

7.6 Disaster severely damages household, trees and property

Natural disasters have a tremendous impact on the overall economy of the country. Apart from the instant impacts, natural disasters can also leave long term impacts. Almost every year due to natural disasters and climatic hazards, Bangladesh is subject to colossal loss of life and damage of property. Respondent (D) Mentioned,

“The common impact of disaster is the damages of road. During Sidr and Aila our road were inundated and we had no way to move without boat. People led miserable life then. It will be wrong to tell about only the damage of road but also our domestic animals were died and other daily usable things were lost.”

When Aila and Sidr affected the study area, the damages of everything were vast. As respondent (C) described,

“After hitting Aila in this area, our schools, colleges, households, road all were inundated under water. As a result boys and girls did not go to school and colleges. The shops were locked as there was no way to open. People were busy with their own work.”

The respondent (G) expresses almost the same thing in different manner. He said,

“Our households were mostly damaged. The most of tree plants were broken by Sidr and Aila. The human being also was harmed. Many people died. Suppose, during Sidr many people were died. I had a house that was inundated under water. In the time of Mohashen my two- three tree plants are broken.”

Respondent (H) was eye witness of Sidr and Aila. He lives on the riverbank. He expresses about the devastating impact of these disasters. He indicated,

“The road is damaged severely. The tree plants are damaged due to the entrance of saline water. Coconut tree is broken. The trees by which the houses are made are damaged due to natural disaster. We cultivate our land with the help of cow. But cows are died if major disaster occurred.”

Respondent (F) said about the negative impact of natural disaster in below manner,

“If disaster hits, we cannot cultivate our land. Without this, the lack of employment is seen. We generally live on daily work. If disaster occurs, we cannot work. My family members suffer in the long run. We went to others house when Aila occurred. Many people become victim of serious diseases. We face the problem of transportation if we get them to take to doctor.”

Analysis of disaster severely damages household, trees and property

Disaster affects the lives and livelihood of people. It hampers the normal functioning of people. It has tremendous impact on not only people but also trees, animals, properties. It damages the biodiversity. It is found in the study area that most of the localities have no sufficient trees. As disaster hit in this area severely. Lands remain without cultivation because saline water enters occasionally in these areas. Most of the households are kacha or semi- pacca and the houses on the riverbank is made with

wood is found in the observation. So it can be summed that disaster damages the property, trees and household.

7.7 Indigenous coping mechanisms are the activities what community takes

Indigenous coping mechanism in disaster management means a set of actions or activities by which community people try to survive in disasters, recover their situation and develop their conditions during prior to, during and after disaster. 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. Coping mechanism/strategy is a dynamic process, which adapts to external changes and can be weakened or strengthened by wider policy and institutional action. Indigenous coping mechanisms are inevitable for the people of study area. Because it saves many lives and lessens the tremendous impact of disaster. Some respondents expressed the idea about indigenous coping mechanism. Respondent (C) said,

“What the people do for tackling the negative impacts of disaster is termed as indigenous mechanisms. Such as: my house is made 5-6 feet high from soil so that tornado or cyclone cannot damage.”

Respondent (B) delivered the same thing. He said,

“People perform some tasks during disaster to combat or minimize the loss of disaster. Their tasks are called indigenous mechanisms.”

People live in depressing situation during disaster. So many people cannot perform activities as respondent (F) described,

“During disaster people live in such a situation that they cannot take any initiative because they lose everything during disaster. If disaster occurs here, we cannot get any crops if not happens, we get crops that year.”

The educated, aware people take indigenous coping mechanisms but sometimes the general people take the measures. In the study area, some NGOs are working for disaster or tackling the negative effects of disaster. It is pointed in the language of respondent (G). He told,

“The NGOs working here generally take such activities. They make the people aware about the imminent disaster. They make the people understand what is to done during disaster by arranging people together.”

Respondent (A) said in this regard,

“We together with member, chairman take some initiative to help the people live better. We make them aware about the disaster. We make them understand that during disaster, you should go to cyclone center if disaster occurs or pre-disaster. We plant the tree, mending our house before disaster.”

Analysis of indigenous coping mechanisms is the activities what community takes

Disaster affects the study area occasionally. So people become aware about disaster before occurring. The researcher’s observation in the study area found that people make the house high from the level. They plant chamble tree, rain

tree, shishu tree as it is found in patharghata. They raised homestead platform, raised platform for preservation of livestock food. In Koyra people also plant different kinds of tree. They bridge the embankment so that flood cannot be occurred. So it can be understood that the activities taken by community or individual are called indigenous mechanisms.

7.8 Government and NGOs take mechanisms more than community

People take the mechanisms to survive during disaster, before disaster or after disaster. Some people coping mechanisms to lessen the disastrous impact but delivered that govt and NGOs working in study area take these mechanisms for combating disaster. Government more emphasizes on long term mechanisms but NGOs on short term. Respondent (E) told,

“The government has a department to take these mechanisms. Such as: We have union disaster management committee. They do these activities. When disaster hit, they and those who are on responsibility mend the embankment. They also plant the tree so that disaster impacts can be minimized.”

Cyclone center plays vital role in minimizing the effect of disaster as people in coastal areas take shelter during disaster. Constructing road high is an important mechanism. People face great problem of communicating during disaster. In this regard, high road is important in coastal area. The activities are done by Government. As respondent (A) said,

“We have union disaster management committee. They mend the road as well as other infrastructures when disaster hit or before disaster. Without this government provide tree plants to sow Government make cyclone center so that people can stay safely during disaster. The committee makes the people aware before disaster through miking by using hand mike. The NGOs

also provide the material services after affecting disaster. They also assist in making embankment strong. They also provide tree seeds.”

Respondent (G) told,

“The NGOs working here generally take such activities. They make the people aware about the imminent disaster. They make the people understand what is to be done during disaster by arranging people together.”

Respondent (J) said about the activities or mechanisms,

“Government has made good road so that we can communicate safely. Government also repaired the embankment, planted trees. We get taka from Pauroshava and get blanket.”

Analysis of Government and NGOs take mechanisms more than community

From the respondents view it is clear that government takes some activities to tackle the problem. NGOs also work in coastal area with helping hand of the government. It is found in the observation that most renowned NGOs work in the study area. BRAC, ASA, Prodiapon, Shushilon, Islamic Relief and so called NGOs run their activities for the welfare of the disaster affected people. Government also provided material and immaterial services during Sidr and Aila. It was provided both in Koyra and Patharghata as it is known from the respondent's answer. So it can be noted that Government and NGOs take mechanisms more than the community.

7.9 Construction of embankment, raising homestead platform and raised platform for preservation of food for livestock are major structural mechanisms for disaster management

“Indigenous mitigation measures” are therefore defined as effective and empirically tested practices or measures that are applied by individual households or the whole community based on the basis of their own perceptions and mechanisms for reducing the risk of natural disasters. The study area is situated on the bank of river. There is an embankment which helps to protect the community from repeatedly occurred flood. When the embankment is broken, the saline water enters into the community. As a result the community people become victim of flood. They more emphasize on constructing or repairing embankment. Respondent (F) said,

“We all go to repair the embankment. If embankment is made high, saline water will not be entered and the possibility of occurring flood will be lessened. We also make our homestead platform high and make our home durable.”

Some respondents say that disaster will not harm if our house is made high. Respondent (D) mentioned,

“We make our home high for combating disaster. Without this we keep our home dragged with tree so that house is not broken.”

In spite of risk many people do not make their home high. But those who are more concern about disaster surely do this. As a result they cannot enter into his or her house. Respondent (K) described,

“All people do not make their make their home high. But many people do it. My house is high about 5 feet from the soil level. Not only our house but also our tube well and toilet is built high.”

Respondent (E) emphasizes on constructing embankment. He told,

“Before disaster, we go to construct embankment. I personally went to repair. Occasionally it is to be repaired. Without this we go to repair before disaster with union disaster management committee. We also make our house disaster resilient.”

People who have capability to build their home disaster resilient do but who don't have that capability do not make their home resilient. But during disaster they take the shelter in neighboring house or in cyclone center. Respondent (G) said,

“We do not make our house high from the soil level. For the lack of finance, we cannot do it. If I had money, I would not have pulled rickshaw.”

Respondent (H) mentioned the same thing. He mentioned that,

“My house is made of wood. I have no capability to make new house. So how will I make my house disaster resilient? The NGOs are working here give loan to those persons who have 50-60 bigha land. They give me 5000 taka only. It is not sufficient for making my house disaster resilient.”

Analysis of Construction of embankment, raising homestead platform , raised platform and preservation of food for livestock are major structural mechanisms for disaster management

Embankment is an important issue for resisting disaster. If it is highly strong to tackle the water pressure then the study area will remain safe from different disaster like flood. Most of the respondents answered that repairing embankment has no alternative to combat disaster.

Traditional houses in study area are rectangular structures built on the top of the homestead platform. According to the interviewees, the absence of deep-rooted pillars is the main reason for damage or destruction of houses during cyclones or tidal surges

that can easily wash away the platforms. This was verified during Sidr and Aila where a majority of traditional houses were damaged or destroyed. Only few houses that are now recognized as well structured houses resisted: these are traditional houses with deep-rooted pillars, and/or tied with rope to highly resistant trees (e.g. date tree, palmyra tree etc). Few families have been able to incorporate this learning when rebuilding their houses after Sidr and Aila due to economic constraints, but most families are willing to do so provided that they receive adequate support.

According to their observation, the height of water level was two feet higher outside of the embankment than it was inside. The average water level was eight to nine feet study area. Before the two cyclones, the height of the platforms was lower than these water levels, which is considered by the local communities as one of the major factors for loss of life, cattle and assets during the cyclones. Only those few families who had high enough platforms had time to gather their assets and cattle before moving to safe places. It is found in the observation that Raised platforms for preserving the livestock food (dry straw or grass) from natural disasters are widely used in the study areas. The raised platform can take two forms:

- A five to seven feet platform made of soil with a bamboo or wooden stick in the middle that can be tied to a surrounding tree.
- A “matcha” or bamboo-made scaffold.

According to the interviewees, most of the cattle did not survive during Sidr in particular or for the few families who were able to put their cattle to safety, this was followed by a severe food crisis for the animals. It is noticed in the study area that some families have introduced the practice of raised platform for livestock food. So it can be mentioned that Construction of embankment, raising homestead platform and raised platform for preservation of food for livestock are major structural mechanisms for disaster management.

7.10 Awareness, planting trees, saving food and money are effective non structural mechanisms

It can be reported that the important role played by mangrove forests, coastal plantations and other natural ecosystems in weakening the impact of the tidal waves. These ecosystems not only helped reduce the magnitude and strength of the incoming tidal waves, but also collected the marine debris that can be even more damaging to populated areas than the gushing seawater. Throughout the region, coastal areas with dense mangrove forests, mature shelterbelt plantations and other substantial vegetative cover fewer human losses and less damage to infrastructure than those areas where coastal forest ecosystems had been degraded or converted to other land uses. According to the interviewee not only tree or forest but also saving food and money is crucial for minimizing the effects of disaster. Respondent (H) said,

“We sow tree, save money, tie our house with strong tree. We plant the tree so that disaster cannot hit. Those trees are disaster resilient or stronger than the general trees are planted.”

Respondent (I) expresses the same thing. He mentioned,

“We plant the tree beside our embankment. Forester the governmental people also plant tree here. We plant the tree are given by NGOs such as chamble tree, rain tree, different vegetative tree which resist the disaster.”

Planting tree is not the solution of disaster as many respondents think it. They told that awareness is very important before disaster. If they got proper signal for imminent disaster, they would be prepared. Respondent (C) said,

“Before disaster, we became aware. After that we save rice so that we cannot face problem in future or post disaster period.”

Respondent (A) said in this regard,

“After getting warning for disaster, we keep our furniture away from our house where we think safe. Finance also is

saved so that we can lead the normal life in spite of hitting disaster. If we see the scale of disaster will be intensified, we together with our neighbors go to cyclone center.”

Taking shelter in cyclone center is an important non structural mechanism for tackling disastrous situation. During or before disaster people find it more safe than staying in own house. Respondent (B) said,

“People go to cyclone center during major disaster. Although the centers are not sufficient, people here stay together. All people do not go to cyclone center. The people whose homes are at risk go there. Many people take shelter in neighbor’s house. The rich people stay in their own house. The cyclone center is not enough than the demand of public.”

Analysis of Awareness, planting trees, saving food and money are important non structural mechanisms

It can be understood during taking interview that people who are affected by disaster use non structural mechanism more than structural. They think that cost varies for taking the mechanisms. It is found in the study area that they plant tree beside their house so that their house can remain protected during disaster. For the purpose of protecting their house from cyclone or like other disasters, they tie it with resistant trees by using rope. Some respondents said that they use chira, gur (so called), dry food, pure water etc during disaster. A respondent said during interviewing that he has no television, radio or mobile, for this reason he cannot be aware. If they did aware, they would have save food, money etc for future. Respondents who have no financial capability do not take these mechanisms. But as per they can, they do for minimizing the impact of disaster.

7.11 Community participation helps to handle disastrous situation effectively

Community participation, generally, refers to the involvement of people in any project to solve their own problems or to develop their socio-economic conditions. They participate in setting goals, and preparing, implementing and evaluating plans and programs. Community participation is the exercise of ‘voices and choices’ of the community and the development of human, organizational and management capacity to solve problems as they arise in order to sustain the improvements made over the time. Community participation is the process of people’s involvement in setting goals, and preparing, implementing and evaluating plans and programs in every phases of disaster management program. It is found in the study that people participate in different program during disaster, before disaster and after disaster. Respondent (B) said about the importance of community participation,

“Any work during easy if people together participate in. suppose one person works the one if ten person work then it will be ten in same time. So the work will be easier.”

Community participation helps people to protect from different kinds of unwanted situation. Respondent (A) said,

“If everyone comes to work then it will be helpful to perform the particular task. It is known that many a little makes a mickle. Community participation helps us to better live. We are human being. So we have live and work together. If we go to repair the embankment together, it will be completed quickly. As a result before occurring disaster, we will remain safe from danger. Otherwise flood will severely hit in our area.”

Respondent (J) mentioned how community participation helps. He mentioned that,

“There is such work cannot be done alone is possible through many. Suppose a hand of one man is broken during disaster, it is not impossible to recover him but will take time to recover. If more two people remained, then it will be quicker. When disaster hit, we go to neighbor’s house and tell them to go to observe the situation. We together resize the broken trees, repair the road. If houses are damaged, we together help him to repair that.”

If everyone participates in post disaster management activities is a matter of joy is delivered by a respondent. Respondent (G) said,

“Ten families live as neighboring. If we work together, it will become a matter of joy and eagerness. Without this the work will be easier. If one man plant one tree then five men will sow five trees. If we work alone it looks like fool.”

Analysis of Community participation helps to tackle disastrous situation effectively

Involvement of community members, particularly the most vulnerable sectors and groups in the whole process of risk assessment, identification of mitigation & preparedness measures, decision making, implementation; the community directly benefits from the risk reduction and development process. Under the study community participation means the involvement of community members in different disaster’s impact mitigation during, before or post disaster period. Community people perform repairing embankment is found in both Koyra and Patharghata. According to respondents view, they together with local leaders sow different kinds of disaster resilient trees with a view to minimizing the negative impacts of occurred disaster. Any work is may be difficult to do by one but easier by many. They want to mitigate the disastrous situation or human sufferings in post disaster although some cannot for

their ability. So it is proved that community participation helps to reduce the disastrous situation effectively.

7.12 Warning system is paramount mechanism for lessening the losses of property and human sufferings

Natural disasters are deadly events caused by natural phenomena and bring damage to human societies. They are inevitable and difficult to predict. Increasing human habitation in areas vulnerable to natural hazards is perhaps leading to greater damage to property and human life. Although it is difficult to say whether the number of disasters has increased over the years, number of disasters of higher intensity has increased. While an earthquake may destroy a very large area in a few seconds, landslides may damage a small area in a few minutes, floods may affect a very large area in a few hours to days and drought shall affect a large region in a few weeks to months. Any Early Warning System should comprise four major components, i.e. risk knowledge, development of monitoring and predicting systems, quick dissemination of information and efficient response strategies. In the study area, cyclone, landslides, earthquake and flood are frequently occurred disasters. If early warning had been got available, the sufferings of people and animal would have curtailed. Respondent (A) said,

“We know signals through radio and television. Whenever got, the news is disseminated through the mike of mosque in order to make the people conscious. If it is possible people are asked to go to the safe place away from affected area.”

Respondent (D) mentioned the same thing. He emphasized on the importance of warning. He described,

“Before Aila, people were known it. I can still remember that 20-25 days of people were dead between 2-3 days of Aila. If we were warned about this, there would not be such huge incident.”

Respondent (C) said in this regard,

“Getting signals before disasters we go to safe place as much as possible. We got less opportunity of doing so during Aila. There was sudden attack of Aila for which the loss was severe.”

Early signal is crucial for minimizing the losses of life and property is delivered during interview with the respondent. But most of the respondents are not rich enough to buy radio or television even mobile. So they depend on the indigenous mechanism like mike. Respondent (F) said,

“I have no capacity to buy television. I have no mobile. So I cannot know the warning before disaster. Besides, I get least time to watch television. The scope of this is very less. I can know when the news is disseminated through mike. The union disaster committee spread the news of imminent disaster through hand mike. Not only committee but also NGOs do this task.”

The act of disseminating information about imminent disaster is generally done by the union disaster management committee. Highlighting on this issue respondent (H) told,

“When we hear the news that disaster will be in next week or any particular day, we are asked to go our cyclone centre made by the government. Our disaster management committee spread the news through hand mike and tells that major disaster may hit in our locality. After hearing the news, we go to centre with dry food. If we did not get information, severe damages of everything might be occurred.”

Analysis of Warning system is paramount mechanism for lessening the losses of sufferings

It is found in the observation during discussing with respondents that there are cyclone centers in both Patharghata and Koyra where the community people take shelter

during gigantic disaster like SIDR. But it is not possible to go there without knowing the news of forthcoming disaster. Many people have not yet television or radio as they live in more pastoral area. They don't get the signal if the local disaster management committee tells. One respondent expresses that he cannot go to cyclone center in spite of getting information of forthcoming disaster as he has old parents. From the findings it can be noted that early warning reduces the damage of property and minimize the suffering of people.

7.13 Community leaders and NGOs initiate the disaster management program

Community is simply an aggregation of individual persons, that is, a population. As individuals, they have only limited capacity to act effectively or make decisions for themselves, and they are strongly subject to administrative decisions that authorities impose on them. On the other hand, community is an autonomous actor, with its own interests, preferences, resources, and capabilities. People of the study area are lagging behind from education or other facilities comparatively. Many NGOs work there for awakening awareness among the community people regarding education, disaster and so on issues. In response to the question "who initiates the disaster management activities?" respondent (A) said,

"We the young generation take different activities to tackle the disastrous situation. We have disaster management committee in our union. The head of the committee is UP chairman. The committee spread the news of disaster through mike. If we know and tell each other that disaster is coming."

Respondent (B) expressed about this issue same thing. He said,

"We together sit and discuss about the issue. What should be done is fixed by Union Disaster Management committee."

Respondent (C) expressed the same thing. He mentioned,

“Firstly we perform some task as much as we can. Then we inform the union member and chairman about the situation. Then we discuss what have to be done. Then the responsibility goes on the committee to perform tasks like: planting tree, resizing broken tree after disaster, repair the household, repairing the embankment and so on activities.”

Some respondents told during discussing about their problem. As respondent (I) said,

“We have no ability to take these mechanisms. But sometimes we plant tree for the hope of future. Occasionally we repair the embankment with our own initiative.”

Analysis of Community leaders and NGOs initiate the disaster management program

Bangladesh is one of the poor and thickly populated third world countries. Due to the geographical situation, various natural disasters, such as, flood, drought, cyclone, excess rainfall, fog, salinity, riverbank erosion, and so on, are seen as normal events. As a result, each year, thousands of people are becoming homeless and facing various devastating epidemic, including scarcity of food. Koyra Upazila of Khulna District and Patharghata Upazilla of Barguna district are no exception. Each year, the areas are affected by various natural disasters, like, flood, drought, cyclone, excess rainfall, hailstorm, fog, and so on, and as a result, its population faces severe financial losses due to the loss of crops, damage of houses, loss of lives, and epidemics. So, even before coping with one, people are stricken by another disaster, and consequently, people are losing the capability to fight disasters day by day and becoming poorer and poorer.

Non-Government Organizations are implementing various plans by giving importance in the risk reduction process in their activities and projects, based on the participation

of the local community people, and are encouraging the disaster risk reduction process in the study area. There are a number of NGOs operating in the study areas, out of which Islamic Relief – Bangladesh, Pradipan, Uttoron, Rupantor, Brac, Sushilon, JJS, and Relief International are mentionable. These NGOs are implementing various development works. It is also cleared from the respondents view that community leaders play an important role in mitigating disastrous impact as they are the incumbment of disaster management committee.

7.14 Effectiveness varies from structural to non structural mechanisms

Disaster makes the coastal belt people vulnerable. To improve their situation, both GoB and NGOs take different mechanisms. The GOB has given equal importance to both structural as well as non-structural² mitigation measures keeping in view the aspect of better coordination within overall disaster management system. It is rather strongly believed by the GOB that non-structural mitigation measures need to be complemented by structural mitigation measures in order to modify or reduce some disaster effects. The programs on disaster management in Bangladesh focus equally on structural and non-structural practices meant for disaster mitigation. But GoB cannot always take those mechanisms during disaster. So community people take indigenous coping mechanisms for combating disastrous impact. They delivered the effectiveness of these mechanisms in different manner. Respondent (A) said about the effectiveness of non structural mechanisms in below way,

“Planting tree is an important measure to protect the houses from cyclonic winds, and it creates an opportunity to tie and therefore reinforce the houses. The measure is cost effective in terms of its long term benefits. This is not only a measure for protection of houses but also useful for securing lives in emergency situation.”

Respondent (J) described about the importance of reinforcement of homestead structure as non structural mechanisms. He said,

“This measure is effective against cyclonic winds as well as tidal surges. This measure is cost effective as it only requires the upgrading of the traditional houses, which is possible to realize within a budget of 5,000 BDT (Pillars: 8x400BDT=3200 BDT; screw/nuts: 550 BDT; and rope: 5kgx250 BDT=1250 BDT).This is an important measure for both sides of the embankment.”

He mentioned that all people cannot build such house though cost effective because of their financial insolvency. He said,

“This is recognized by the local community as a good measure and families from both sides of the embankment expressed that they were willing to contribute resources for the construction of such houses, but it still requires external assistance for replication amongst the extra poor.”

Tying of houses with tree is an important non structural mechanism to protect the houses from cyclonic winds. As respondent (E) described,

“This is an effective measure against cyclonic winds. The measure is recognised as an important step in reducing the risk of destruction of houses, especially for vulnerable families.”

Respondent (I) told about the importance of road construction in below way,

“Road construction is very effective for protection against tidal surges and saline intrusion as well as rehabilitation and livelihoods. This measure is only applicable measure where the local people can act together as opposed to being dependent on external assistance.”

Analysis of Effectiveness varies from structural to non structural mechanisms

It is observed in the study area that people adopt different mechanisms to combat disaster or to lessen the consequences of disastrous situation. Structural mechanisms in the study area include: road construction, resilient house building. Non structural mechanisms include: planting disaster resilient tree, tying houses with trees. Both structural and non structural mechanism helps protect the community people from imminent disaster. But the effectiveness of both mechanisms varies from each other though they are same in their purpose.

7.15 Government imparts material, structural and non structural support to combat disaster

The Government of Bangladesh has adopted draft National Plan for Disaster Management (2007-2015) in 2007 and finalized it in 2010 as National Plan for Disaster Management 2010-2015 emphasizing on disaster management activities. It is a strategic document as well as an umbrella plan which provides the overall guideline for the relevant sectors and the disaster management committees at all levels to prepare and implement their area of roles specific plans. The Ministry of Food and Disaster Management being the focal ministry for disaster risk reduction and emergency management takes the leading role in disaster risk reduction and emergency management planning. In addition, there are a few hazards specific management plans, such as Flood Management Plan, Cyclone and Storm Surge and Tsunami Management Plan, Earthquake Management Plan, Drought Management Plan, River Erosion Management Plan, etc. Moreover, there is a detailed Disaster Management Plan for each district, *upazila*, union, and *paurashava* and City Corporation of the country. Government of Bangladesh not only preparing institutional work but also provides material, structural or non structural support in disaster affected area. The disaster related institution is paramount way to provide these services.

Respondent (J) said about the nature of government activities,

“Government sows tree and continuing this trend. Government works for all whereas NGOs work for particular section of community. To keep us under security government is repairing WAPDA. Besides we get financial services from pouroshava.”

Generally Government runs activities with a view to sustaining the community. For long term benefit the government reform river, plant tree, repairing road and so on are doing. For the purpose of making the coastal area disaster resilient government of Bangladesh is running different development project. Government provides services for the affected people but there is a problem of bureaucratic complexity. As respondent (H) said,

“Government gives relief during disaster. But sometimes it is noticed that the actual people get it less as there creates nepotism problem. If government gives relief amount of five crores taka, the community leader will give us the relief amount of two crores taka. We get blanket after disaster. If government did not provide these services after disaster, we would lead in miserable life as we lose everything during disaster.”

Respondent (D) described the same expression. He said,

“Government takes steps as much as it can. For example for building a house, government gave five thousands taka. Here the union chairman gets the money. He sends the money to a member to distribute. The member gives it to a village leader. At last we get one thousand taka instead of five thousands.”

Government generally provide material service to disaster affected during post disaster period so that the community people can recover the losses and sufferings slightly. Emphasizing on this issue respondent (B) said,

“Government constructs the cyclone center, road as well as repairing embankment. Besides food is provided after disaster. If that season is winter, government provide blanket, cloths as well as other services are provided so that people can overcome their sufferings.”

Respondent (A) said,

“Government gives us food, relief. It also provides cloths. Besides if embankment is broken, government repairs it.”

Analysis of Government imparts material, structural and non structural support to combat disaster

Disaster management program in Bangladesh is the combination of both the development of physical infrastructure and non-structural practices. Development of physical infrastructure covers the activities such as construction of cyclone and flood shelters for emergency resort, and erection of flood protection embankments, drainage channel, sluice gates and regulators as safety measures against inundation by tidal waves, storm-surges and flooding, and establishment of emergency operation center are noticed in the study area. On the other hand, non-structural practices include preparedness action and strategies, and coordination among the actors involved (GoB, voluntary agencies, civil society, and affected community). Broadly it is concerned with adoption of disaster management legislation, national disaster management policy, disaster management plan; arrangement of training program and workshop, and introduction of institutional framework of disaster management with the establishment of Disaster Management Bureau, establishment of councils and committees at the national, district, *upazila* and union levels. It is found during interview with community people that they have union disaster management committee and they are active in the study area according to the respondents. The notable actions of GoB in the study area are construction of cyclone and flood

shelters, erection of flood protection embankments, adoption of disaster management plan, development of institutional framework, development of strong, simple and understandable warning system that is linked to local, regional and national information system, awareness raising campaign, training program in disaster preparedness, community first aid, and cyclone shelter maintenance, installation of drinking water and food storage facilities.

7.16 NGO's spotlight on non structural mechanisms

The NGOs constitute a vibrant sector in Bangladesh, and have been acclaimed worldwide. NGOs are actively involved, among others, in disaster management, micro-credits, family planning, and human rights protection. As a matter of fact, the advent of NGO activities in Bangladesh owes its origin to the rehabilitation works immediately after the devastating war of independence in 1971. Currently, about a quarter of foreign assistance to Bangladesh is channeled through the NGOs. Therefore, their contributions, particularly to disaster mitigation in coastal area. NGOs provide different unique services such as awakening awareness among the disaster people to minimize the losses and develop the lives and livelihood of targeted people. Respondent (J) mentioned,

“NGOs give rice. They cannot sow tree. They take actions in short term. They work for a short period of time. Moreover they give the tree seeds to plant. For example BRAC has given some tree and I have been told to plant those beside my house provided that availability of space.”

NGOs play crucial role in disaster management particularly in post disaster period. They impart different material services. As respondent (I) said,

“NGOs provide blanket, food, dry food during major disaster like SIDR and AILA. They assist us instantly whereas government does that in late. They give different types of trees like Rain tree, Korai tree, Series tree as well as fruit tree which resist disaster.”

Awareness is major tonic to lessen the negative impact of disaster. NGOs provide this tonic to the affected people and those who are likely to be affected. As respondent (A) said,

“They make us aware about the forthcoming disaster. they provide training to the community people with their full support. They also help us to understand the signals of disaster.”

Respondent (H) described elaborately the activities of NGO. He mentioned,

“We get blanket, cloths, as well as the tools for cooking from non government organizations though it cannot give rice (Vat). It also gives dry food by visiting home. We use these foods during disaster period when we cannot go out. It also assesses the community situation before disaster. It has no work in disaster free time. When disaster hit, it provides different facilities which makes us benefitted.”

Respondent (C) mentioned the same thing,

“They give us financial assistance to the affected. They also assist to make cyclone center. Basically what NGOs do is awakening awareness among people.”

Some respondents answered in different manner. They think that NGOs run their activities in different manner. Respondent (G) said,

“NGOs run for money. They have opened it for their own interest. I never get loan from them. They do not repair the embankment but they plant tree which is of course a good sign.”

Analysis of NGO's spotlight on non structural mechanisms

In Bangladesh, a large part of population lives in coastal areas and the coastal community becomes most vulnerable due to different hazards in different times. Therefore, sustainable development is possible through developing capacities of local vulnerable community people for risk reduction and small alleviating activities. In order to reduce risks of families and communities, it is necessary to increase capabilities and reduce vulnerabilities. This is why Non-Government Organizations are implementing various plans by giving importance in the risk reduction process in their activities based on the participation of the local community people, and is encouraging the disaster risk reduction process.

It is observed in the study area that there are a number of NGOs operating both in Patharghata and Koyra out of which Islamic Relief – Bangladesh, Pradipan, Uttoron, Rupantor, Brac, Sushilon, JJS, and Relief International are mentionable. These NGOs are implementing various development works. From the respondents view regarding NGOs activities and the observation of researcher proves that NGOss spotlight on non structural (awareness, tree plantation, material services) mechanisms.

7.17 Both structural and non structural mechanisms can improve the vulnerable situation of people in coastal area

Bangladesh is geographically vulnerable to natural disaster. Almost every year disaster hit in coastal belt in Bangladesh which causes severe damages of lives and livelihood, makes the environment imbalance. Infrastructural flaws and deforestation can be mentioned paramount causes of this kind of disaster. People have no control over natural disaster but they can minimize the negative consequences. So the community takes some mechanisms to tackle the disastrous situation. In spite of this they have demand and urges to improve their situation. Respondent (J) said,

“Cyclonic wind will decrease if government plants tree beside river. The level of our sufferings will be lessened if the embankment is constructed as high. Government does not

construct or repair the full embankment, it only repair the broken part. As a result water enters during slight disaster.”

In the study area the one of the major problem is the intrusion of saline water. Some wicked people cut the embankment (WAPDA so called) so that they can cultivate the Bagda fish. It severely affects ultimately the general people. Respondent (D) mentioned,

“Illegal intrusion of saline water should be stopped. The warning system should be improved as well as awareness must be created among the people about forthcoming disaster. Government should execute the regional policy as well as construct the embankment.”

Some people emphasizes on nonstructural mechanism like planting tree, relief and early warning system. Respondent (A) described,

“Relief and other facilities should be reached at disaster affected area on time. Deforestation is one of the major causes of disaster. So government should take proper steps to stop cutting trees and plant more disaster resilient tree.”

Structural mechanism play vital role in combating disaster. Stressing on this issue respondent (I) elaborately said,

“Road should be made high from the soil level. Embankment will be constructed in such manner that water pressure cannot damage it. Awareness should be created among the community people. Government will provide relief after disaster. Sluice gate should be built so that water can be logged.”

Respondent (H) mentioned the same thing. He said,

“If government construct or repair embankment, it will be good. If plants tree, the area will be resilient. As a result the embankment will be able to resist the water pressure. Ultimately the flood and landslide will not be occurred.”

Respondent (G) said,

“Government will sow tree in our area, develop cyclone center. Government is always committed to ensure public security. It will be better if government construct good school and colleges in our area.”

Analysis of both structural and non structural mechanisms can improve the vulnerable situation of people in coastal area

The communication system of study area both in Koyra and Patharghata is very delicate. In Koyra Sadar Union there are about 80 kilometres roads, including pacca, semi-pacca, kancha, and embankment (48 kilometres kancha road, 9 kilometres pacca road, 11 kilometres brick-soled, and 12 kilometres embankment). The river way, which is the main means of communication in the rainy season, can be used throughout the year. The Union has 5 launch terminals, from where launch service is available to Khulna, including other boat services. The main transportation means of the study area are: motor bike, three-wheeler van, votvoti/nosimon, bi-cycle, launch, boat, and so on. It is observed that there is embankment in study area. According to the respondents interview it is cleared that the embankment is one of the major sources of deriving disaster. it is also observed that deforestation is common in study area. Respondents cleared that people cut the tree of sundarbon recklessly. So they think that planting tree and constructing embankment are key tonic to combat disaster.

7.18 FGD Findings

FGD-1 at Koyra Sadar Union

Venue: Koyra Sadar

Date: 11/02/2015

After finishing name, age of the participants. We started discussion about the topic. Most of the respondent's disaster is a negative event that causes huge damages of property, trees, animals and infrastructures of the area. **"The whole Koyra area was inundated under saline water. The communication system was seriously disrupted. Animals were died. I witness of 30-35 people died during Aila."** - First respondent said. The 2nd respondent referred same thing with added that, **"it will wrong to say only damage but everything was damaged then."**

Most of the respondents said that if disaster hit in the area, severe sufferings come to people. It is cleared from the respondent's view that flood, cyclone, tornado, tidal surge and earthquake are common in the study area. First respondent said that, damages took place due to cyclone. Due to increase of water pressure, embankment breaks occasionally. 3rd respondent indicated that the study area sometimes is affected with cyclonic wind. He said, **"Everything is damaged due to the intrusion of saline water. Trees are damaged, the cultivation is hampered."** It is understood from the answer of the respondents that the trees are damaged, communication system is paralyzed, and construction is broken due to disaster.

The most devastating disaster was attacked in study area is Sidr. They mentioned different causes of disaster. most of the respondent indicated, illegal intrusion of saline water, breach of embankment, cutting trees as the main human induced causes in the study area. Respondents in the study area mentioned, they don't take indigenous coping mechanisms during disaster due to the lack of resources. But sometimes they take the mechanisms like tying house with resilient trees, raised homestead platform, food preservation for future day. Occasionally they go to repair their embankment. 3rd respondent indicated, **"People make Gher (So called) without permission of proper authority. They cut the embankment during making gher and cut the road also."**

For this reason, embankment is broken.” most of the respondent told that they have disaster management committee. They make the people aware about forthcoming disaster to combat the disastrous impact. Community uses their own knowledge, experiences during disaster. People took shelter in safe place during disaster that would be neighbor’s house or taking shelter in cyclone center. People in the study area plant tree beside their house so that wind cannot hit their houses. It is observed that people in the study area save preserve food for animal on Matcha. In response to the question whether they repair embankment or not, most of the respondents said that Government has WABDA department to repair the embankment. Sometimes they leaded by UP chairman and UP member, go to repair. But it is rare. Some respondents said that embankment is not repaired properly. 3rd respondent said, **“When embankment was constructed during Pakistan period, the height was 6-7 feet. Now after 40 years, the height is unchanged. But water level is increasing day by day. It has been losing its capacity to resist water pressure. Sometimes broken and flood occurred in our area.”** 6th respondent said, “Government take initiative but it is not adequate with our demand.” NGO also work for the recovery of disaster situation of study area Koyra. 5th respondent told, “There were only two or three NGOs worked before Aila. But after Aila, there are about 50 NGOs are working in our area like Prodigon, Shushilon, Islamic Relief, Rupantor with BRAC, ASA and Proshika.” They make the people aware about how to survive during disaster. They also provide trees for plantation, assist in repairing embankment, material service like blanket, rice, oil during disaster period. They also impart loan to the poor so that they can build resilient house. The group recommended some points to improve their area,

- ✚ Should stop the illegal intrusion of saline water.
- ✚ Government should build embankment or repair properly.
- ✚ Early warning should be provided before disaster.
- ✚ Awareness should be created among general people.
- ✚ The road, bridge should be constructed as high from soil level.

FGD-2 at Patharghata

Venue: Kalmegha Union

Date: 20/02/2015

Here most of the respondents are illiterate but they talk to us spontaneously. Most of the respondents in the study area think that the situation is beyond their control and the assistance of external sources is needed to tackle referred as disaster. First respondent referred, **“people are cutting trees recklessly which make them vulnerable. They told that floods occur because some wicked people places pipe under embankment for the purpose of entering into their pond to cultivate fish. As a result flood occurs in their area.”** 3rd Respondent indicated same speech whereas 5th respondent mentioned it in a different way, **“Humans are also liable for occurring landslides as they cut tree sowed beside river.”**

Majority of respondents said that riverbank erosion, cyclone and flood are common in that area. It can be understand clearly during discussion with the respondents that they take some indigenous coping mechanisms for recovering the negative situation of disaster. **“Taking shelters in cyclone center, dissemination of information about disaster are some mechanisms for combating disastrous situation.”**- said by 4th respondent.

It is found that the disaster management committee spread the news of imminent disaster through hand mike. Raising awareness is crucial mechanism for minimizing the disastrous impact. It is also found in the study that people keep dry food before disaster. They save money for future, save pure drinking water so that they can utilize it after disaster.

Some people preserve food for cattle for imminent disaster. **“Most of the cattle did not survive during Sidr in particular or for the few families who were able to put their cattle to safety, this was followed by a severe food crisis for the animals”**- said 4th respondent.

The villagers of some specific areas take initiative jointly to repair and raise roads with a view to make movement possible along with protecting their village from further adverse impact of tidal surges.

Some respondents think that community participation is effective for disaster management. **“Any work is may be difficult to do by one but easier by many”**- 6th respondent mentioned. They want to mitigate the disastrous situation or human sufferings in post disaster although some cannot for their ability. 5th Respondent indicated, **“When people get the news, they become aware. If it is possible people are asked to go to the safe place away from affected area.”**

According to the respondents Govt. and NGOs play a vital role to overcome the disastrous situation of people living in coastal belt of Bangladesh. They mentioned slightly regarding the issue. Some respondents said that they get different material services from government but it is not enough. They recommended some issues on basis of which disastrous impact could be mitigated,

- ✚ Government should response immediately to combat disaster effects in coastal area.
- ✚ It should take sustainable initiative like construction of embankment, road
- ✚ Government should plant disaster resilient tree beside river and road.
- ✚ Government should repair sluice gate so that people coastal belt can be safe from disastrous impact.
- ✚ The embankment should be high.
- ✚ NGO should provide more service.

7.19 Conclusion

A disaster is a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope using its own resources. It is a sudden overwhelming and unforeseen event. At the household level, a disaster could result in a major illness, death, a substantial economic or social misfortune. At the community level, it could be a flood, a fire, a collapse of buildings in an earthquake, the destruction of livelihoods. When occurring, a large number of people can be affected. Most disasters result in the inability of those affected to cope with outside assistance. Moreover community people embrace indigenous coping mechanism for the purpose of minimizing the loss of occurred disaster and resisting forthcoming disaster in particular area.(Building Resiliency of the Coastal Population to Natural Disaster, 2015).

Chapter Eight

Discussion

8.1 Introduction

8.2 Discussion

8.3 Summing up the Results

8.4 Suggestions for the Future Research

8.5 Conclusion

8.1 Introduction

In this section, an attempt has been made to present the major summing up of the study. Here are placed the major findings of indigenous coping mechanisms for combating disaster. Details of the main points emerging from the preceding chapters have been provided in the form of discussion. In discussion there have been shown the real scenario of the respondents.

8.2 Discussion

Disaster management is concerned with preparing for, ameliorating of the impact and reducing the risk of disasters occurred. It involves both the emergency operation in a disaster as well as the rebuilding the society in aftermath of disaster (Tan, 2009). It is connected with multifarious factors. Over a decade there has been a profound discussion of social and economic issues related to disaster. During this period some important concepts and terms have been introduced to the field or issue that leads to what is commonly understood as disaster. Disaster is, generally, described as combination of hazard and vulnerability. Ariyabandu (2003) explains these concepts distinctly in the following way:

“Hazard is defined as the probability of the occurrence of a dangerous phenomenon at a given place within a given period of time. ... On the other hand, vulnerability is defined as the degree of susceptibility to a hazard, or the lack of capacity to absorb the impact of a hazard and recover from it.”

Vulnerability also refers to a set of prevailing and consequential conditions which adversely affect the ability of a person, group or community to prevent, mitigate, prepare for and respond to hazardous events and recover from impact of natural hazards (Bhatti, 2003, O'Brien, et al., 2006). It is related not only to physical factors, but also to a range of social, economic, cultural and political factors (Ariyabandu, 2003). Some contemporary studies suggest that hazards might have their origin in nature but these turn into disasters through societal process. For example, climatic hazards like flood, cyclone, drought, tidal wave etc. are meteorological risk but these turn into disasters when the structural and non-structural infrastructures of affected

area are too shabby to cope with these risks (Bhatti, 2003). Therefore, a disaster is an outcome of a hazard impacting on vulnerable populations. In this situation hazard by itself is not a disaster unless there are vulnerable populations who do not have the capability to combat it and who are unable to cope with it. UNDP (2007) analyzes this issue more substantially. It defines disaster as a function of the risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk. Natural hazards become disasters if they induce a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses, which exceed the ability of the affected community or society to cope using its own resources.'

Therefore, managing disaster entails managing vulnerabilities that include five basic phases: prevention, preparedness, emergency response, recovery and mitigation (Bhatti, 2003). Prevention includes the measures taken to impede the occurrence of a disaster. But it is not possible to prevent the occurrence of natural disasters fully, though the extent of its damages can be reduced (Ahmed, 1994). Preparedness covers the activities designed in anticipation of a disaster to ensure that appropriate and effective action is taken earlier. These actions include the disaster plans, the training of responders, the maintenance of human, material and financial resources and the establishment of public education and information system (Kreps, et al., 2006). Emergency response covers the indispensable services and activities that are undertaken during the initial impact or in the aftermath of a disaster including those to save lives and to prevent further damage to property (Bhatti, 2003; Kreps, et al., 2006). Recovery is the action or process of getting back something that has been lost (Hornby, 2000). Recovery, in disaster management, refers to the activities that are taken after the initial impact to develop socio-economic and environmental conditions that are destroyed by disaster aimed at achieving return to normality (Kapucu, 2008), that is, disaster recovery activities are related to the reestablishment of pre-disaster social and economic routine provision of financial and other services to the victims, as well as repair of destroyed properties (Kreps, et al., 2006). Mitigation involves the measures that can be adopted to minimize the destructive effects of hazards and to

lessen the magnitude of disaster. These activities can occur before, during and aftermath of disaster and overlap of all phases of disaster management (Fernando, 2001). In this paper, therefore, flood, cyclone, drought, tidal surge, tornado, cold wave, river erosion, arsenic contamination of ground water are considered as disaster when it turns into hazardous event and affects a given place and the vulnerable people of that area who are not able to cope with it. On the other hand, disaster management is considered as an approach combination of prevention, preparedness, mitigation, emergency response and recovery to cope with hazardous situation created by above-mentioned natural hazards.

(a) Status of respondents in the study area

The coastal belt of Bangladesh is vulnerable to natural disaster. Every year natural disasters like flood, earthquake, landslides, and cyclone and so on hit the coastal belt of the country. Their education status is not so standard. Housing conditions is very poor. Their house is not disaster resilient. Whereas it is observed that in the study area, some people have disaster resistant home having trees beside house so that disaster cannot damage their property. The most of the respondents in Patharghata have house having no electricity, recreational facility but in Koyra some respondents have radio and television as recreational source. According to the respondents and observation of researcher, most of the houses in Koyra and Patharghata are relatively less secured during disaster. Houses of the many respondents are situated on the bank of embankment. So they always live with the risk of disaster.

(b) Perception about disaster

A disaster is a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources (UN/ISDR, 2004). Community's ability in the definition refers to many societal aspects including financial resources, equipment, infrastructure, skills and awareness, leadership, systems and structures. Disaster is negative event that causes huge damages of households, property, infrastructure is viewed from the respondents of the

study area. Most of the respondents in the study area think that the situation is beyond their control and the assistance of external sources is needed to tackle referred as disaster. They think that if it is happened they will fall in great trouble.

(c) Human induced causes of Natural disaster

Disasters occur rapidly, instantaneously and indiscriminately. These extreme events either natural or man-induced exceed the tolerable magnitude within or beyond certain time limits, make adjustment difficult, result in catastrophic losses of property and income and life is paralyzed. Although humans can do little or nothing to change the incidence or intensity of most natural phenomena, they have an important role in ensuring that natural events are not converted into disasters by their own actions. Most of the respondents in the study area mentioned that natural disasters occur naturally having no control over it. But they also indicated that they are responsible for occurring disaster. They referred that people are cutting trees recklessly which make them vulnerable. They told that floods occur because some wicked people places pipe under embankment for the purpose of entering into their pond to cultivate fish. As a result flood occurs in their area. Humans are also liable for occurring landslides as they cut tree sowed beside river.

(d) Some indigenous mechanisms for combating disaster

Indigenous coping mechanisms play crucial role particularly aftermath of disaster to lessen the negative impacts of disaster. It also helps to make the community resilient so that their losses can be minimized if disaster hits again in that particular area. Here mentioned some of the indigenous disaster mitigation measures (structural and non-structural) in use in the study areas, and which have been adopted or applied by the community as a whole or by individual households in order to decrease the negative impacts of cyclones and tidal surges. According to the respondents in the study areas, repairing embankment, construction of road, raising homestead platform, making their home as disaster resilient are major structural mechanisms in use. Awareness raising, saving food for both them and domestic animal, planting disaster resilient tree such as: Mehegoni, Chamble, Rain tree etc, tying their houses with strong tree, taking shelter

in cyclone center, dissemination of information about disaster are some non structural mechanisms used in study areas.

(e) Government and NGO's mechanisms

Ministry of Disaster Management of Bangladesh Government has brought changes in their plans, which is not only relief-centered. Assessing risks, preparing plans, removal of risks and participatory process begins at the field level to aim for sustainable development. Generally government wants to ensure long term development of coastal belt of Bangladesh. To this end, various governmental organizations are working simultaneously with Ministry of Disaster Management. Government also imparts short term assistance in disaster affected area. According to the respondents in the study areas, government imparts relief, repairs embankment, construct road and plants disaster resilient tree beside river and embankment.

Bangladesh is one of the poor and thickly populated third world countries. Due to the geographical situation, various natural disasters, such as, flood, drought, cyclone, excess rainfall, fog, salinity, riverbank erosion, and so on, are seen as normal events. As a result, each year, thousands of people are becoming homeless and facing various devastating epidemic, including scarcity of food (CRA and RRAP Report 2014).

(f) Some recommendations and take some opinions how to change the overall attitude towards them

It should be noted that both govt. and NGOs don't play a vital role to overcome the disastrous situation of people living in coastal belt of Bangladesh. A series of inter-related institutions, at both national and sub-national levels have been created for disaster management. As per the Rules of Business of the Government of Bangladesh, the Ministry of Disaster Management and Relief (MoDMR) is mandated to formulate policies, prepare plans, and monitor and coordinate all aspects of disaster activities. The field level activities of MoDMR are carried out by two subordinate offices e.g. the Department of Disaster Management and Cyclone Preparedness Centre (CPP), While DDM is responsible for dissemination of all information on natural disasters, including flood information at community level, flood preparedness, awareness

raising and capacity building activities, and also is responsible for conducting relief and rehabilitating operations with the help of district and upazila administrations (Country Report, 2013). In addition, there are a few hazards specific management plans, such as Flood Management Plan, Cyclone and Storm Surge and Tsunami Management Plan, Earthquake Management Plan, Drought Management Plan, River Erosion Management Plan, etc. Moreover, there is a detailed Disaster Management Plan for each district, *upazila*, union, and *paurashava* and City Corporation of the country.

But it appears that these plans are totally inactive in study areas. So Government should execute these plans properly simultaneously NGO should provide more services considering the demand of coastal belt people.

8.3 Summing up the Results

This study is an attempt to explore the indigenous mechanisms for combating disaster. To this end the study has been conducted with several specific purposes. In this section an attempt has been made to sum up the detailed result of the study. It is noted that the study has been conducted in two selected coastal areas.

The observation found that in study areas most of the respondents are illiterate. Education is important for every human being. It facilitates both material and spiritual development. On the other hand, it is also a tool through which well-being could be ensured. The respondents who received education mentioned that a number of enabling factors facilitated their education. Most of them mentioned that they could get education because of their parents' encouragement. But most of the family members don't encourage them.

The study found that coastal belt people always live in risk. Disaster affected people always want to stay free from risk of disaster. To this study it is shown that most of the respondents do not get modern living facilities. It is observed that their house is constructed with mud, thatch, jute sticks, natural materials or tin/wood. They never try

to secure their living environment. Because they think that it will be broken if further disaster hit in their area.

The study found that almost every year disaster hit in the coastal belt of Bangladesh either serious or not. The study found that flood is common disaster in study areas and it is severe in Koyra than Patharghata. The people live on bank of embankment. Cyclone, tidal surges, earthquake, landslide, river erosion also hit in those areas with flood. The study found that people are responsible for reoccurring flood. They cut the trees recklessly. It is also found in study that some wicked people break the embankment for their own interest. As a result the community suffers in the long run. Disaster affects the lives and livelihood of people. It hampers the normal functioning of people. It has tremendous impact on not only people but also trees, animals, properties. It is found in the observation that the study areas are underdeveloped.

The study found some indigenous coping mechanisms for combating disaster. In this section an attempt has been made to identify structural and nonstructural mechanisms.

Structural Mechanism

It was found in the observation that the typical homestead construction does not include deep rooted pillars at the base of the house. According to the interviewees, the absence of deep-rooted pillars is the main reason for damage or destruction of houses during cyclones or tidal surges that can easily wash away the platforms. This was verified during Sidr and Aila where a majority of traditional houses were damaged or destroyed. Only few houses that are now recognized as well structured houses resisted: these are traditional houses with deep-rooted pillars, and/or tied with rope to highly resistant trees. Few families have been able to incorporate this learning when rebuilding their houses after Sidr and Aila due to economic constraints, but most families are willing to do so provided that they receive adequate support.

Raised platforms for preserving the livestock food (dry straw or grass) from natural disasters are widely used in the study areas areas. According to the interviewees, most

of the cattle did not survive during Sidr in particular or for the few families who were able to put their cattle to safety, this was followed by a severe food crisis for the animals.

The villagers of some specific areas have taken initiative jointly to repair and raise roads with a view to make movement possible along with protecting their village from further adverse impact of tidal surges.

People sometimes repair the embankment with the help of UP chairman and UP member. In Patharghata most of the Sluice Gates in the project areas were broken due to pressure of rising water at the time of cyclones Sidr and Aila. The inflow of saline water from the damaged Sluice Gate in Balleshar River caused the flooding of the whole area within few minutes. The surge of water (eight to nine feet high) destroyed houses, assets, and claimed lives. In spite of severe damage to the Sluice Gates, no initiative has been taken by the government for its reconstruction. According to local people, they communicated with the local administration (UNO), UP and WDB on several occasions, but never received a positive response. Faced with this situation, the people in some specific areas of Kalmegha and Katakali Unions have taken initiatives to repair the broken Sluice Gate with wooden door-panels to protect the inflow of saline water.

Non-structural Mechanisms

It is observed that some specific types of trees broke and fell down during cyclones Sidr and Aila, destroying houses and causing death and injuries.

People of Patharghata pointed out that some houses resisted during Sidr because they had been tied to surrounding Date and Palmyra trees as these trees are strong enough to endure the cyclonic wind speed. The study found that the people of Koyra upazilla plant more tree whereas in patharghata most respondents said that government takes this initiative but occasionally they sow tree.

Traditional houses are not strong enough to face the strong cyclonic winds. During cyclones Sidr and Aila, only few families in the study areas had taken the initiative to tie the four top corners of their house (with rope) to the nearest date trees or Palmyra trees. For those who had taken this precautionary measure, even though the roofs were taken away by the pressure of cyclonic wind, the structure resisted without destruction of the homestead platform.

Without these, non structural mechanism, people go to cyclone center when they are informed about the imminent disaster. It is also found that the disaster management committee spread the news of imminent disaster through hand mike. Raising awareness is crucial mechanism for minimizing the disastrous impact. It is also found in the study that people keep dry food before disaster. They save money for future, save pure drinking water so that they can utilize it after disaster.

It is found that Government and NGO initiate the disaster management activities than the community. It is found that the community has less ability to take these initiatives.

Community participation plays a crucial role in minimizing the negative effects of disaster. It is found that community participation helps the work to make easier. Community people perform repairing embankment is found in both Koyra and Patharghata. According to respondents view, they together with local leaders sow different kinds of disaster resilient trees with a view to minimizing the negative impacts of occurred disaster. Any work is may be difficult to do by one but easier by many.

It is found in the observation there are cyclone centers in both Patharghata and Koyra where the community people take shelter during gigantic disaster like SIDR.

The notable actions of GoB in the study area are construction of cyclone and flood shelters, erection of flood protection embankments, adoption of disaster management plan, development of institutional framework, development of strong, simple and

understandable warning system that is linked to local, regional and national information system, awareness raising campaign, training program in disaster preparedness, community first aid, and cyclone shelter maintenance, installation of drinking water and food storage facilities.

It is observed in the study areas that there are a number of NGOs operating both in Patharghata and Koyra out of which Islamic Relief – Bangladesh, Pradipan, Uttoron, Rupantor, Brac, Sushilon, JJS, and Relief International are mentionable. These NGOs are implementing various development works like raising awareness, tree plantation, providing material services.

It is clear that respondents have no idea about the policy, legislation related to disaster management adopted by People's Republic of Bangladesh. It is totally not possible to tackle the natural disaster but construction of road, embankment, planting tree can minimize the sufferings of coastal belt population.

8.4 Suggestions for the Future Research

This study has hinted at a number of themes and questions which could help direct about future research on indigenous coping mechanisms. It questions the adequacy of traditional methods of conducting study in near future and it has also pointed to the need for a broader conceptualization of the issue. The study has demonstrated that quantitative studies should be conducted for measuring the actual need of them with statistical data. The findings of the study indicate the demand for further research on issues related to indigenous coping mechanisms for combating disaster.

- ✚ This study was carried out in two selected coastal areas. So, a further study can be done on indigenous coping mechanisms in another area of Bangladesh;
- ✚ Separate study can be undertaken to unveil the perceptions of mechanisms people adopt during disaster;
- ✚ Another area of research is on the situation of coastal belt population;

- ✚ Research can also be carried out to explore the potentials and skills that can be used to combat disaster properly;
- ✚ On the basis of findings, a research on the conditions of human sufferings during disaster and their need and demand can be done;
- ✚ An in-depth anthropological research can be conducted on this subject;
- ✚ A quantitative research can be conducted to reveal the real scenario of coastal belt population statistically;

8.5 Conclusion

This study has examined the perception of disaster, major disasters in coastal area, indigenous coping mechanisms, their effectiveness and the recommendations to improve coastal area. It is clear from the study that people take indigenous coping mechanisms for combating disaster but it appears that most of the people cannot take these mitigation measures due to lack of resources. For example: For example, many vulnerable households shared that following the destruction of their houses by cyclone Sidr; they would have wanted to rebuild reinforced structure houses with deep-rooted pillars but could not for lack of funds. Only the relatively wealthy households or the communities in which a strong solidarity system exists were able to invest time and resources into innovative and effective mitigation measures.

As a result, a large section of the disaster affected populations in the project area still require capacity, information and support for the replication of indigenous good practices on mitigation.

Chapter Nine

Conclusion and Recommendations

Conclusion and Recommendations

Bangladesh, a low-lying deltaic country formed by the major river (the Padma, the Brahmaputra, and the Meghna) system with long coastline, is highly exposed to different types of natural disasters. Since the independence in 1971, the country has experienced 200 natural disasters causing loss of more than 600,000 lives, millions of livestock and leaving prolonged damage to property, quality of life and livelihoods (MoFA, 2006). Recently Cyclone Aila hit the Bangladesh on Monday 25 May 2009 and has produced substantial damage across areas of southern Bangladesh. It caused 190 immediate deaths, injuries to 7,103 people and more than 500,000 people to become homeless (Country Report, 2013). The total damage was \$ 1.7 billion. Cyclone Sidr hit the coastal areas on 15 November 2007. It affected 87,000 people, killed 3,363 and injured 55,282 and 564,000 homes have been destroyed, 8,85,280 houses have been damaged. Total damage and losses were (in USD) 23 billion.

The GoB has already taken initiatives for the development of physical infrastructure and non-structural practices. The notable actions of GoB are construction of cyclone and flood shelters, erection of flood protection embankments, adoption of disaster management plan, development of institutional framework, development of strong, simple and understandable warning system that is linked to local, regional and national information system, awareness raising campaign, training program in disaster preparedness, community first aid, and cyclone shelter maintenance, installation of drinking water and food storage facilities. The GoB also operates social safety net program to combat disaster situation (MoFDM, 2007).

Apart from these government policies, strategies and actions, voluntary agencies play pivotal role in disaster management in Bangladesh. For example, Bangladesh Red Crescent Society (BRCS) operates community-based disaster preparedness program in Cox's Bazar district, a natural disaster-prone area of Bangladesh, of which coastal areas and off-shore islands are frequently affected by cyclone and tidal bore.

CARE-Bangladesh also operates community-based disaster management programs. Microfinance Institutions (MFIs) such as Grameen Bank, Proshika, Bangladesh Rural Advancement Committee (BRAC), Association for Social Advancement (ASA) etc. also operate microcredit program that act as social safety net during disaster. It is observed that Prodiapon, Islamic Relief, Rupantor , Sushilon and so called NGOs are working in study areas.

The strategies of these NGOs in coastal area are: the formation of Village Disaster Preparedness Committees (VDPCs), development of awareness raising campaign, training program in disaster preparedness, community first aid, cyclone warning signals, and cyclone shelter maintenance, installation of drinking water and food storage facilities and construction of raised poultry sheds.

It is found in the study that apart from GoB and NGO initiatives People of coastal belt in Bangladesh use their indigenous knowledge, methods and strategy to cope with disaster for long days. They try to combat disaster situation with the help of their own resources, knowledge and experiences. However, In the light of the findings and observation, the followings recommendations should be made.

- A particular national organization should be created work for the benefit of disaster affected people in coastal area. The main focus of such organization should provide different kinds of disaster related services to coastal belt population. For sustainability such national organization should maintain transparency, ensure accountability and develop strategic network, capacity and needs to be a client oriented and not donor oriented organization.
- For mass awareness development on the issue, the media should play a much more affirmative role. For this purpose, the organizations, both government and non government, working in the area of disaster should network and enter into a social responsibility partnership with print and electronic media.
- Different types of organizations working to minimize the disastrous consequences. They should formulate policy, programs and strategies

consistent with the values, norms and culture of particular area. They should develop their programs considering the community needs.

- Cyclone centers play pivotal role in lessening the negative effects of disaster. Considering this issue, Government and NGOs should develop more cyclone center in study areas.
- Early warning system should be available to the community people. Government should take proper initiative to ensure this service to study areas. To this end Government may develop such organization which will work only for providing signals to people.
- Government should response immediately to combat disaster effects in coastal area. It should take sustainable initiative like construction of embankment, road, planting disaster resilient tree beside river and road, repairing sluice gate so that people coastal belt can be safe from disastrous impact as well as should develop particular regional policy of disaster management.
- Training program should be arranged on how to take indigenous coping mechanisms by both Government and NGO and the instrument, need for disaster mitigation should be available in coastal area.
- Government should punish those wicked people who cut trees recklessly and makes the environment vulnerable. It should impart material services so that poor people can build disaster resilient home.
- Ensuring that risk-prone households understand the benefits of the measures in reducing their vulnerability to natural disasters in the future.
- Encouraging households to invest their self-labor and efforts rather than relying on external support for the implementation of good mitigation measures.
- Local leaders like UP chairman and UP member should be trained on disaster management as well as the members of Union Disaster Management Committee also so that they can make understand the community, the effectiveness of taking indigenous mechanisms and the leaders can initiate the disaster management activities properly.

- The community people should be aware about the importance of indigenous taking mechanisms to combat disaster. A particular committee should be formed with participation of community people. The responsibility of such committee will be to make the people aware.
- Electricity should be available to the coastal area so that they can be informed about the imminent disaster and can make them prepare to combat.

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Appendix I- Semi-Structured Interview Guide

Indigenous Coping Mechanisms for Combating Disaster in Bangladesh

A. To Know the Socio Demographic Information of the Respondents

1. Say something about yourself.

- + Name
- + Age
- + Educational status
- + Occupation
- + Marital status
- + Types of family
- + Income(monthly)
- + Family income source

2. Say About your Residential place.

- + Types of dwelling place
- + Sanitation facility
- + Source of recreation

B. To Reveal the Indigenous Perception about Disaster

3. How do you perceive about disaster?
4. What types of natural disaster hit in your area?
5. What kind of disaster hit in your area most?
6. Describe about recent two disasters.
7. Mention the causes behind the disaster.
8. Mention the impacts of disaster in your area.

C. To Explore the Indigenous Coping Mechanisms for Combating Disaster

9. What do you mean by indigenous coping mechanism?

10. Do you adopt indigenous coping mechanism to combat disastrous impact?

11. Mention the mechanism types.

12. Do you emphasize on pre-disaster intervention?

13. What does it mean by pre-disaster intervention?

- ✚ Prevention

- ✚ Mitigation and

- ✚ Preparedness

14. What steps do you take for preventing the negative effects of disaster?

- ✚ Education,

- ✚ Asset redistribution

- ✚ Preventive health care and

- ✚ Safety standards

15. Do you take structural mechanisms for combating disaster?

- ✚ Bridges,

- ✚ Protective dikes,

- ✚ Embankments and

- ✚ Safe building design etc

16. Do you take non structural mechanisms for reducing the disruptive effects of disaster?

- ✚ Savings

- ✚ Group insurance

- ✚ Co operatives

- ✚ Public awareness and

- ✚ Food security programs

17. Is community participation necessary for combating disaster and how?

18. Do you think that outsiders have great role in combating disaster and how?

19. Who initiate the mechanisms for combating disaster and how much effective is his or initiative?

D. To Reveal the Governmental and NGOs Mechanisms for Combating Disaster

20. Mention the effectiveness of adopting coping mechanisms.
21. What are the mechanisms the government has taken in your area?
22. Are these mechanisms sufficient for disaster management?
23. Mention the associated failure fear with this disaster management program.
24. Mention the Government programs for disaster management.
25. Does NGO take any mechanisms in this regard?
26. Mention the mechanisms taken by NGOs. Are these really conducive to your community?

E. To Draw Some Suggestions for Improving the Coping System with Disaster

27. Do you have any idea about disaster related laws, policies, and provisions.
28. Mention some recommendations about how to combat disaster in coastal belt of Bangladesh.

Appendix II-The Inform Consent

To Whom It May Concern

It is my pleasure to certify that a student of masters (session-2013-2014) of the Institute of Social Welfare and Research, University of Dhaka, is conducting thesis on “*Indigenous Coping Mechanisms for Combating Disaster in Bangladesh*” under my supervision and guidance. It is an academic work. In order to complete his thesis, he needs to collect relevant literature and information from the concerned institutions.

In this regard, you are requested to extend your helping hand, cooperation to him in doing his work more accurately and perfectly.

Thanking you in anticipation

Institute of Social Welfare and Research

University of Dhaka

Dhaka- 1205

Appendix- III

National Disaster Management Policy

1. Introduction

Bangladesh is a low-lying deltaic country situated in between 20° 34' and 26° 38' latitude and between 88° 01' and 92° 41' east longitude and formed by the Ganges, the Brahmaputra and the Meghna rivers. The geographical location, land characteristics, multiplicity of rivers and the monsoon climate render Bangladesh highly vulnerable to natural hazards such as floods, cyclones, droughts, tidal surges, tornadoes, cold waves, earthquakes, river erosion, fire, drainage congestion/ water logging, infrastructure collapse, the high arsenic contents of ground water, water and soil salinity, epidemic, and various forms of pollution.

Significant country features are:

- ✚ A vast network of rivers and channels
- ✚ An enormous discharge of water heavily laden with sediments
- ✚ A large number of islands in between the channels
- ✚ A shallow northern Bay of Bengal and funnelling to the coastal area of Bangladesh and
- ✚ Strong tidal and wind action

Floods are annual phenomena with the most severe occurring during the months of July and August. Regular river floods affect 20% of the country increasing up to 68% in extreme years. The floods of 1988, 1998, 2004 and 2007 were particularly catastrophic, resulting in large-scale destruction and loss of lives. The country is one of the worst sufferers of all Tropical cyclones from the Bay of Bengal accompanied by storm surges in the world. On average 1.3 cyclones per annum hits Bangladesh coast. The worst affecting cyclones were the 1970 and 1991 causing death of about 438,882 people (BMD, 2007). Annually, the country losses about 8,700 hectares of land due to

river erosion displacing around 180-200 thousands of people. Bangladesh remains in the list of one of the seismically active regions of the world although there were no large scale earthquakes experienced in the last hundred years

Climate change adds a new dimension to community risks and vulnerabilities. Although the magnitude of these changes may appear to be small, they could substantially increase the frequency and intensity of existing climatic events (floods, droughts, cyclones etc).

Current indications are that not only will floods and cyclones become more severe, they will also start to occur outside of their “established seasons”. Events, such as drought, may not have previously occurred in some areas and may now be experienced.

The damages by and impacts of flood is huge

- ✚ 1987 floods loss - US\$ 1,000 million
- ✚ 1988 floods loss - US\$ 1,200 million, 1,517 killed, livestock 350 thousand
- ✚ 1998 floods loss - US\$ 2,800 million, <1,000 killed, livestock 26,564, embankment damage 4,500 km. road damage 16,000 km, crop damage 500 thousand ha.
- ✚ 2004 floods loss - US\$ 2 billion, >500 killed, embankment damage 2,500 km
 - affected people 35 million
- ✚ 2007 floods loss – US\$ 1.16 billion, 639 killed, livestock 2590, embankment fully damaged 261 km, partially damaged 1814 km.

1970 Cyclone – 300,000 dead

1991 Cyclone – 138,868 dead

1997 Cyclone – 550 dead

2007 Cyclone – 3363, missing 871, people affected 8,545,470. Houses Damaged:

1449157, Crops Damaged: 2,077,228 acre, Trees Destroyed: 4,065,316

2. Bangladesh Disaster Management Mission, Vision and Objectives

The **Disaster Management Vision** of the Government of Bangladesh is to reduce the risk of people, especially the poor and the disadvantaged, from the effects of natural, environmental and human induced hazards, to a manageable and acceptable humanitarian level, and to have in place an efficient emergency response system capable of handling large scale disasters.

The **Mission** is to bring a paradigm shift in disaster management from conventional response and relief practice to a more comprehensive risk reduction culture.

The **Overall Objective** is to strengthen the capacity of the Bangladesh disaster management system to reduce unacceptable risk and improve response and recovery management at all levels.

3. Purpose and objectives of the Policy

The National Disaster Management Policy defines the national policy on disaster risk reduction and emergency response management, and describes the strategic policy framework, and national principles of disaster management in Bangladesh. The overall national objectives in this regard are

- ✚ To reduce the underlying risks by
 - integrating disaster risk reduction approaches and climate change adaptation in all ongoing and future development plans, programmes and policies;
 - Enhancing professional skills and knowledge of key personnel on risk reduction, preparedness, warning and forecasting system, climate change risk reduction and post-disaster activities;
 - Strengthening mechanisms to build capacities for the Community and Institutions at all levels;
 - Community based Programming for risk reduction;
 - Promote and facilitate the incorporation of longer term disaster risk reduction due to climate change into disaster management;

- Promote livelihood strategies and options for poor that incorporates disaster management and risk reduction practices ;
 - Strengthen capacities for risk assessment for flood, cyclone, drought, river bank erosion, pest attacks, earthquake, epidemics , including assessment of climate change risk;
- ✚ To establish and strengthen the systems and procedures for effective response management through
- Creating a legal and institutional framework for effective response management;
 - Strengthening national capacity for response management with emphasis on preparedness and support to disaster management committees at district, upazila and union levels;
 - Improving the early warning and community alerting system;
 - Strengthening search and rescue capabilities of relevant agencies ;
 - Introducing an effective response management coordination mechanism including a relief management logistic system to handle different levels of emergency response;
 - Establishing an electronic based information management system ;

4. Strategic Goals of the Policy

The strategic goals of the policy are drawn from the SAARC Disaster Management Framework

Goal 1: Professionalizing the Disaster Management System

Goal 2: Mainstreaming Risk Reduction

Goal3: Strengthening Institutional Mechanisms

Goal 4: Empowering At Risk Communities

Goal 5: Expanding Risk Reduction Programming

Goal 6: Strengthening Emergency Response Systems

Goal 7: Developing And Strengthening Networks

5. Disaster Development Linkages

Although Bangladesh made commendable success in social development indicators namely maternal and child health, water and sanitation and education, the rate of poverty reduction.

is only 0.5-1% per annum. Natural hazard impacts that result in a disaster situation are the primary causes and results of the slow rate of poverty reduction. Between 1991 and 2007, 95 major disasters were recorded in Bangladesh, resulting in nearly 200,000 deaths and causing an estimated US \$ 5.9 billion in damages. The highest losses were felt in the agriculture and infrastructure sectors which are the two major contributors to economic growth and GDP. According to the World Bank interim report the most recent floods had a major bearing on the country Balance of Payments and will result in large amounts of future development funds being channeled into reconstruction of damaged infrastructure.

About 75% of all disasters are originated by weather-climate extremes and because of global warming and climate change Bangladesh has already experienced some significant impacts especially in terms of coastal inundation and erosion, saline intrusion, deforestation, loss of bio-diversity and agriculture, and large scale migration, It is estimated that about 830,000 million hectares of arable land is affected by varying degrees of soil salinity. During the period 1973–1987 about 2.18 million tons of rice was damaged due to drought and 2.38 million tons due to flood. Drought affects annually about 2.32 million hectares and 1.2 million hectares of cropped land during the Kharif (summer) (November to June) and Rabi (winter) (July to October) seasons respectively, while soil salinity, water logging and acidification affect 3.05 million hectares, 0.7 million hectares and 0.6 million hectare of crop land, respectively in the country.

In addition to crop losses, Bangladesh is experiencing other adverse impacts of global warming and climate change with summers becoming hotter, monsoon becoming irregular, untimely rainfall, heavy rainfall over short period causing water logging and landslides, very little rainfall in dry period, increased river flow and inundation during monsoon, increased frequency, intensity and recurrence of floods, crop damage due to flash floods and monsoon floods, crop failure due to drought, prolonged cold spell,

salinity intrusion along the coast leading to scarcity of potable water and redundancy of prevailing crop practices, coastal erosion, riverbank erosion, deaths due to extreme heat and extreme cold, increasing mortality, morbidity, prevalence and outbreak of dengue, malaria, cholera and diarrhea. All of these impacts either independently or collectively are adding significant stress to our physical and environmental resources, our human ability, and economic activities.

The OECD and the World Bank estimate that 40% of overseas development assistance to Bangladesh may be climate sensitive or at risk owing to the impact of natural hazards such as floods. Additionally, funding for humanitarian response to disasters (majority of which are climate related), which now cost the government and development partners millions of dollars per year, may result in the reallocation of funding from on-going development activities. This can set back the development process for decades. PRSP made a reference.

To make the changing risk profiles and stronger mitigation demands as an integral part of Bangladesh poverty reduction strategy. The challenges here as mentioned in PRSP is to include profiling of risks, both old and new, careful balancing of needs and expectations, streamlining implementation and exploring net-and ladder options in programme design.

6. Principles for Disaster Management

Disaster management is the responsibility of all sectors, all organisations and all agencies that may be potentially affected by a disaster. The key principles consistent with internationally accepted best practices that will guide the development and implementation of the DM policy in Bangladesh are designed to provide guidance during all phases of disaster management and are as follows:

- a) Bangladesh recognizes that disasters can either be human induced, natural or even arising out of technological causes. The DM policy is to provide guidance, plan and prepare for all types of hazards and disasters.
- b) Disaster risk reduction should be an integral element of every national and sectoral policies at all levels to sub-serve the overall goal relating to economic

- and social development. Hence, policies on sustainable development should seek to reduce possible losses from disasters, as a matter of course.
- c) Risk is dynamic and always changing. Hence both scientific and community analysis is essential for defining and redefining risks. Risk analysis must be comprehensive and follow all hazards, all sectors and all risk approach. Need to consider both existing and future risks including climate change impacts analysis.
 - d) Effective response must be designed utilizing risk information and revised through lessons learned
 - e) Bangladesh DM Policy will be an ongoing and continuous activity to be reviewed and revised within a certain interval.
 - f) Disaster management activities in Bangladesh will be designed around a DM Model comprising of 2 elements namely Risk Reduction and Emergency Response Management. The former again divided into two elements: *Defining and redefining the risk environment and Managing the risk environment.*
 - g) Disaster Management in Bangladesh will be guided by national and international drivers such as Poverty Reduction Strategy Paper, Hyogo Framework for Action, SAARC Framework for Comprehensive Disaster Management, Millennium Development Goals, UNFCCC and so on.
 - h) Mainstreaming risk reduction efforts within government, NGOs and private sector is viewed as being the key to achieving sustainable all hazards risk reduction interventions across the whole country.
 - i) Disaster Management in Bangladesh will be enriched through applied research and knowledge management. Hence efforts will be made to strengthen research capability and institutionalize knowledge management across academia.
 - j) Women, children, elderly, the disable and other socially marginalized groups will be primary beneficiaries of all disaster management efforts.

7. Disaster Management System in Bangladesh

The Government of Bangladesh through the Standing Orders on Disaster issued in January 1997 created a well-defined disaster management institutional mechanism.

The Ministry of Food and Disaster Management (MoFDM) of the Government of Bangladesh is overall responsible for coordinating national disaster management efforts across all agencies. Under SoD a series of inter-related committees, at both national and sub-national levels have been created to ensure effective planning and coordination of disaster risk reduction and emergency response management at all levels.

At the National Level

- i. National Disaster Management Council (NDMC)** headed by the Hon'ble Prime Minister to formulate and review the disaster management policies and issue directives to all concerns.
- ii. Inter-Ministerial Disaster Management Co-ordination Committee (IMDMCC)** headed by the Hon'ble Minister in charge of the Ministry of Food and Disaster Management (MoFDM) to implement disaster management policies and decisions of NDMC / Government.
- iii. National Disaster Management Advisory Committee (NDMAC)** headed by an experienced person having been nominated by the Hon'ble Prime Minister.
- iv. Cyclone Preparedness Program Implementation Board (CPPIB)** headed by the Secretary, Ministry of Food and Disaster Management to review the preparedness activities in the face of initial stage of an impending cyclone.
- v. Disaster Management Training and Public Awareness Building Task Force (DMTATF)** headed by the Director General of Disaster Management Bureau (DMB) to co-ordinate the disaster related training and public awareness activities of the Government, NGOs and other organizations.
- vi. Focal Point Operation Coordination Group of Disaster Management (FPOCG)** headed by the Director General of DMB to review and co-ordinate the activities of various departments/agencies related to disaster management and also to review the Contingency Plan prepared by concerned departments.
- vii. NGO Coordination Committee on Disaster Management (NGOCC)** headed by the Director General of DMB to review and co-ordinate the activities of concerned NGOs in the country.

- viii. Committee for Speedy Dissemination of Disaster Related Warning/ Signals (CSDDWS)** headed by the Director General of DMB to examine, ensure and find out the ways and means for the speedy dissemination of warning/ signals among the people.

At sub-national levels

- i. District Disaster Management Committee (DDMC)** headed by the Deputy Commissioner (DC) to co-ordinate and review the disaster management activities at the district level.
- ii. Upazila Disaster Management Committee (UZDMC)** headed by the Upazila Nirbahi Officer (UNO) to co-ordinate and review the disaster management activities at the Upazila level.
- iii. Union Disaster Management Committee (UDMC)** headed by the Chairman of the Union Parishad to co-ordinate, review and implement the disaster management activities of the concerned union.
- iv. Pourashava Disaster Management Committee (PDMC)** headed by Chairman of Pourashava (municipality) to co-ordinate, review and implement the disaster management activities within its area of jurisdiction.
- v. City Corporation Disaster Management Committee (CCDMC)** headed by the Mayor of City Corporations to co-ordinate, review and implement the disaster management activities within its area of jurisdiction.

Besides the above, committees included in the SOD and any other committees formed by the government from time to time will be part of disaster management institutional mechanism.

8. Disaster Management Regulative Framework

Bangladesh's regulative framework for disaster management provides for the relevant Legislative, policy and best practice framework under which the activity of Disaster Risk Reduction and Emergency Management in Bangladesh is managed and implemented. The framework includes:

8.1. Disaster Management Act

The Bangladesh Disaster Management Act forms the legislative basis for the protection of life and property and to manage long term risks from the effect of hazards natural, technological and human induced, and to respond to and recover from a disaster event. It aimed at

- a) Helping communities to: (i) mitigate the potential adverse effects of hazard events, (ii) prepare for managing the effects of a disaster event, (iii) effectively respond to and recover from a disaster or an emergency situation, and (iv) adapt to adverse effects of climate change.
- b) Providing for effective disaster management for Bangladesh.
- c) Establishing an institutional framework for disaster management.
- d) Establishing risk reduction as a core element of disaster management.

8.3. Disaster Management Plans

The Bangladesh National Plan for Disaster Management shall provide the overall guideline for the relevant sectors and the disaster management committees at all levels to prepare and implement their area of roles specific plans. The plan identifies the key sectoral policy agenda for disaster management. Additionally, there will be a few hazard specific management plans, such as Flood Management Plan, Cyclone and Storm Surge and Tsunami Management Plan, Earthquake Management Plan, Drought Management Plan, River Erosion Management Plan, etc. Moreover, there will be a detailed Disaster Management Plan for each District, Upazila, Union and Paurashava and City Corporation of the country. A District Disaster Management Plan will be the compilation of the Upa-zila Disaster Management Plans of the district. Similarly a Upa-zila Disaster Management Plan will be the compilation of the union disaster management plans of that Upazila prepared by the Union DMCs. So DMCs at Union and Paurashava levels will be mainly responsible for conducting the risk assessments and prepare the ground level plans. Once developed those will be sent to the DMCs at one level higher – Upazila DMCs, whose role will be to verify and compile the union plans and identify the resource requirements for the Upazila. Ministry of Food and

Disaster Management (MoFDM) will be overall responsible to provide the guidance for disaster risk reduction and emergency management planning.

8.4. Standing Orders on Disaster

The Standing Orders on Disaster provides a detailed institutional framework for disaster risk reduction and emergency management. It outlines detailed roles and responsibilities of Ministries, divisions, departments, various committees at different levels, and other organizations involved in disaster risk reduction and emergency management.

8.5. Guidelines for Government at all Levels (Best Practice Models)

The National Plan for Disaster Management makes a reference to develop the following guidelines for Government at all levels to assist Ministries, NGOs, disaster management committees and civil society in implementing disaster risk management

- Disaster Impact and Risk Assessment Guideline
- Local Disaster Risk Reduction Fund Management Guidelines
- Emergency Fund Management Guidelines
- Indigenous Coping Mechanism Guidebook
- Community Risk Assessment Guidelines
- Damage and Needs Assessment Methodology
- Hazard Specific Risk Assessment Guidelines
- Emergency Response and Information Management Guideline
- Contingency Planning Template
- Sectoral Disaster Risk Reduction Planning Template
- Local Level Planning Template
- National Risk Reduction Fund Management Guideline
- National Disaster Reduction and Emergency Fund Management Guideline
- Local Disaster Management Fund Guideline
- Guideline for road and water safety
- Guideline for industrial safety

- Guideline for Disaster Shelter Management
- Monitoring and Evaluation Guideline for the Implementation of the Plan
- Guideline for international Assistance in disaster emergency

9. Policy Direction

The overall responsibility for policy direction and co-ordination shall rest with the Inter-Ministerial Disaster Management Coordination Committee as set out in the Standing Orders on Disasters.

10. Financial Arrangements

For response and recovery Government will constitute a fund called the “**National Disaster Response and Recovery Fund**” from its own resources and donations from home and abroad. The allocation and utilization of the fund shall be governed as per rules and guidelines laid down by the Government. Ministry of Food and Disaster Management, in consultation with Ministry of Finance, will take initiative to establish the fund by consolidating the existing relief funds.

For risk reduction Government will constitute another fund called the “**National Risk Reduction Fund**” for projects which are designed for the purpose of prevention, mitigation and preparedness. The allocation and utilization of the fund shall be governed as per rules and guidelines laid down by the Government. Ministry of Food and Disaster Management, in consultation with Ministry of Finance, will take initiative to establish the fund by consolidating the existing risk reduction funds.

Relevant Ministries/ Divisions/ Directorates and departments will make provisions in its annual budget to fund the activities and programmes set out in the Disaster Risk Reduction component of its Sectoral Development Plans.

Disaster Management Committees at the district, upazila, union, city corporation and paurashava levels will constitute its **Disaster Management Fund** to implement programmes and activities as set out in Disaster Management Plans. This fund will make up of the following: a) contribution from the government, b) contribution from local government and c) local donation. The government will formulate guideline for operating the fund.

11. Implementation of National Policy

Disaster Management Bureau (DMB) in association with the Directorate of relief and rehabilitation will facilitate implementation of the Bangladesh DM policy under the administrative control of the Ministry of Food and Disaster Management. DMB will prepare and submit status report to NDMC through IMDMCC on an annual basis.