ROLE OF BANGLADESH BETAR IN REDUCING RISK ARISING FROM NATURAL CALAMITIES: A CASE STUDY IN MAHESHKHALI UPAZILA OF COX'S BAZAR DISTRICT IN BANGLADESH

A Dissertation

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DECLARATION

I hereby declare that this dissertation entitled "ROLE OF BANGLADESH BETAR IN REDUCING RISK ARISING FROM NATURAL CALAMITIES ESPECIALLY IN THE COASTAL BELT OF BANGLADESH: A study on the people living in Maheshkhali Upazila of Cox's Bazaar district" is the result of my own research, under the supervision of Professor Akhter Hussain Ph.D. Professor, Department of Public Administration, University of Dhaka, Bangladesh.

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The Author.

Executive Summary

Bangladesh is a disaster prone country. It is vulnerable to cyclone, tidal surge or tsunami as the Bay of Bengal has been tapered to the shape of a funnel towards the landmass of Bangladesh. Recently cyclone Cidr in 2007, Aila in 2009 and Mahasen in 2013 have left devastating track of destruction in the coastal area of Bangladesh but with comparatively little death toll and loss of property than that of in 1991, 1997 or in 1998. Fewer death tolls and less loss of property were attributable to successful disaster management activities carried out by the government of Bangladesh in close cooperation with CPP and other stakeholders.
This study has found out that, along with other stakeholders, Bangladesh Betar has played a tremendous role in disseminating early warning messages along with other information which was helpful in capacity building with regards to withstand the fury of devastating cyclone or tidal surge in Moheshkhali Upazila of Cox's Bazaar district in Bangladesh.

The study showed that 89% people listen to Bangladesh Betar in time of emergency like cyclone or tidal surge. Side by side they also listen to other television channels and private radios or read news papers or take help from volunteers such as Bangladesh Red Crescent Society or CPP and/or try to reach to UNO office or to local government offices for information about cyclone. They said that they rely on Bangladesh Betar for the information about the present position of the cyclone and its landfall timing. They also resort to Bangladesh Betar to know about dos and don'ts during cyclone time.
They study also picked up some reasons for using Bangladesh Betar in time of cyclone or tidal surge. These, as they mentioned, are low cost of radio sets, almost costless maintenance of radio sets, easy to use, during cyclone non-availability of electricity does not allow other media like television to be used other then radio, Bangladesh Betar's reliability and last but not the least is that it is handy. Another reason for using radios is that it can be reached through mobile and mobile is now a common gadget and its talk time is so cheap that many people use it for communication as well as entertainment like listening to music or FM radio-programs.

It is seen during the study that Bangladesh Betar is not directly involved in the process of rehabilitation or disaster management, neither is it a member of any committee related to disaster management committee. For better and efficient management of disaster related work, media, opined by some respondents, could be embedded with CPP or Upazila Disaster Management Committee.

Risk is always associated with knowledge related to specific disaster. Here knowledge refers to information and early warning messages. In this case it was evident from the study that Bangladesh Betar played a vital role in reducing risk arising from natural calamities like cyclone in the coastal belt of Bangladesh by disseminating necessary information and early warning messages and thus building capacities of the people of the coastal belt to withstand the fury of the cyclone.

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LIST OF ABBREVIATIONS

ADRC	Asian Disaster Reduction Center
AMDI	Asian Management and Development Institute
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BNBC	Bangladesh National Building Code
BPATC	Bangladesh Public Administration Training Center
BWDB	Bangladesh Water Development Board
CCDMC	City Corporation Disaster Management Committee
CCDR	Cabinet Committee on Disaster Response
CCFSC	Central Committee for Flood and Storm Control
CDMP	Comprehensive Disaster Management Programme
CDO	Chief District Officer
CDRC	Central Disaster Relief Committee
CPP	Cyclone Preparedness Programme
CPPIB	Cyclone Preparedness Program Implementation Board
CRA	Community Risk Assessment
DDMA	District Disaster Management Authority
DDMC	District Disaster Management Committees

DDRC	District Disaster Relief Committees
DM	Disaster Management
DMB	Disaster Management Bureau
DMC	Disaster Management Center
DMCs	Disaster Management Committees
DMIN	Disaster Management Information Network
DMRD	Disaster Management and Relief Division
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction/Directorate of Relief and Rehabilitation
EPAC	Earthquake Preparedness and Awareness Committee
FFWC	Flood Forecasting and Warning Centre
FGN	Federal Government of Nigeria
FPOCG	Focal Point Operation Coordination Group of Disaster Management
GEJE	Great East Japan Earthquake
GIS	Geographic Information Systems
GoB	Government of Bangladesh
GSN	Geological Survey of Bangladesh
GMS	Geostationary Meteorological Satellite
HSC	Higher Secondary Certificate
HFA	Hyogo Framework for Action
ICCR	International Cooperation for Child Rights
ICT	Information and Communication Technology
IDNDR	Information Decade for Natural Disaster Reduction
IFRC	International Federation of Red Cross
IGCDM	Intergovernmental Committee on Disaster Management
IMDMCC	Inter-Ministerial Disaster Management Coordination Committee

LDO	Local Development Officer
LEMA	Local Emergency Management Authority
MoFDM	Ministry of Food and Disaster Management
NASA	National Aeronautics And Space Administration
NCDA	National Civil Defense Administration
NCDM	National Council for Disaster Management
NDCC	National Disaster Coordination Council
NDMAC	National Disaster Management Advisory Committee
NDMA	National Disaster Management Authority
NDMC	National Disaster Management Council
NEC	National Executive Committee
NERA	National Emergency Relief Agency
NIDM	National Institute of Disaster Management
NGOs	Non-Government Organization
NGOCC	NGO Coordination Committee on Disaster Management
NOAA	National Ocenic and Atmsopheric Adunistration, USA
NPDM	National Plan of Disaster Management
NPDRR	National Platform for Disaster Risk Reduction
OCD	Office of Civil Defense
ONS	Office of National Security
PIO	Project Implementation Officer
PDMA	Provincial Disaster Management Authority
PDMC	Provincial Disaster Management Commission
PDMC	Pourashava Disaster Management Committee
SAARC	South Asian Association for Regional Cooperation
SPARO	Space Research And Remote Sensing Organization, Bangladash

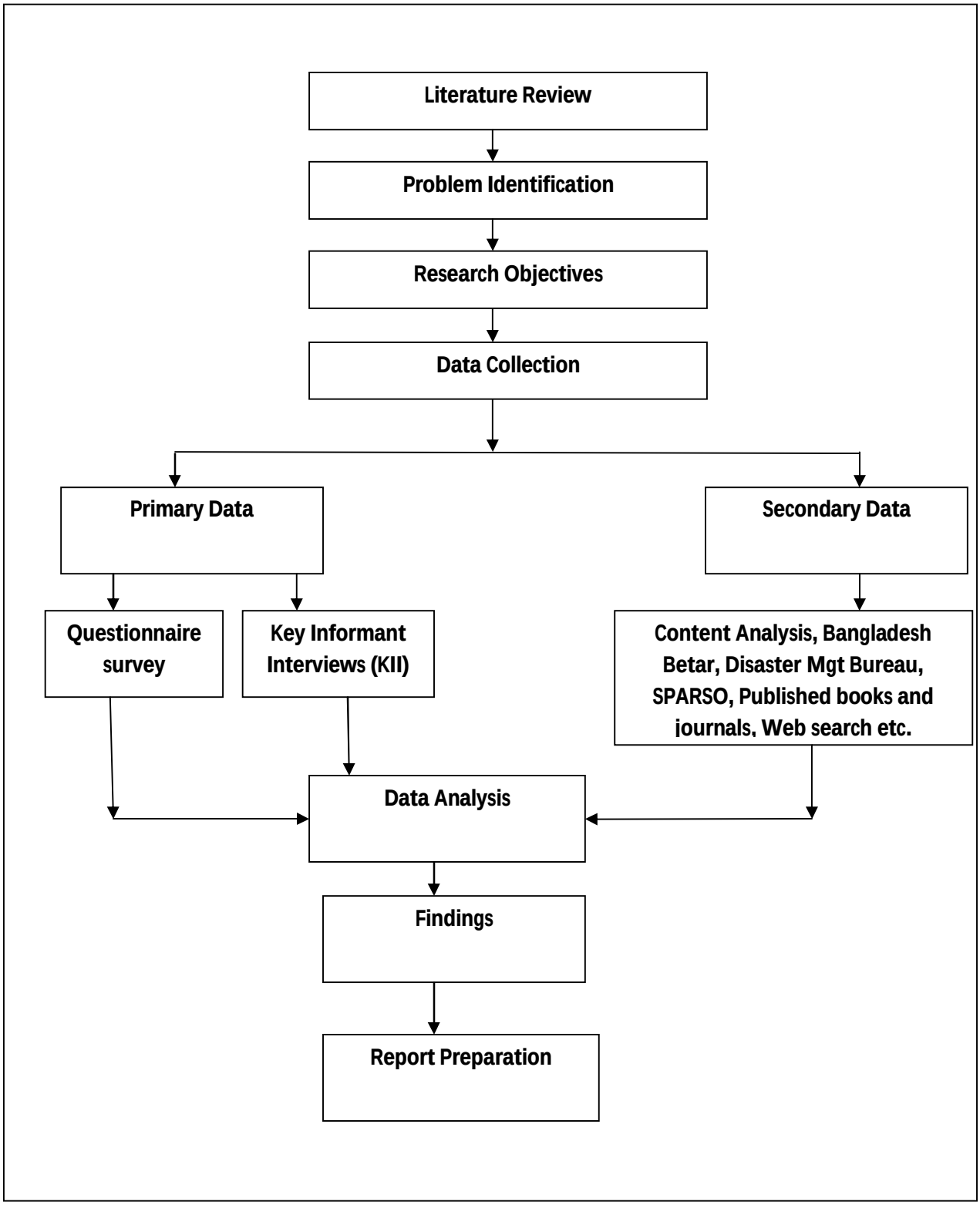
SDMA	State Disaster Management Authority
SEC	State Executive Committee
SEMA	State Emergency Management Agency
SOD	Standing Orders on Disaster
SPSS	Statistical Package for Social Science
SSC	Secondary School Certificate
UDMCs	Union Disaster Management Committee
UEWIC	Union Early Warning Information Center
UISC	Union Information Service Center
UN	United Nations
UNO	Upazilla Nirbahi Offcer
UP	Union Parishad
UzDMC	Upazila Disaster Management Committee

GLOSSARY AND OPERATIONAL DEFINATION

Char	Land newly formed by accretion of sediments in rivers
Parishad	Council
Pourashava	Municipality
Taka	Currency of Bangladesh
Union	Smallest Administrative unit of local government
Upazila	Administrative unit under district administration
Killa	Elevated earthen platform usually above the level of tidal surge
Warning	Precautionary signal for any imminent natural disaster
Disaster	A serious disruption to a community caused by the impact of any event that requires a significant coordinated response.
Capacity Building	Increased ability to reduce risk arising from natural calamities.

Disaster Management	Arrangement for managing the potential adverse risk arising from disaster.
Preparedness	Having the knowledge and understanding of any risk that enable to better cope with potential hazards.
Risk	The measure of the likelyhood of harmful consequence arising from the interaction of hazards, vulnerability and the community. (SOD,2010)
Standing Order on Disaster	Refers to standing orders issued by the National Disaster Management Council under the direction of the Government (SOD,2010)
Vulnerability	A measure of community elements at risk that are exposed to specific hazards (SOD,2010)
Bangladesh Betar	Government owned and run radio station
Relief	Includes money, food, medicine, shelter, clothes or any other public or private assistance to people and community in time of disaster.
Recovery	System that are designed to support affected people and ommunities in the reconstruction of physical infrastructure and restoration of emotional, economic and physical well beings (SOD,2010)

Research Design



ROLE OF BANGLADESH BETAR IN REDUCING RISK ARISING FROM NATURAL CALAMITIES: A CASE STUDY IN MAHESHKHALI UPAZILA OF COX'S BAZAR DISTRICT IN BANGLADESH

CHAPTER ONE

INTRODUCTION

1.1 Background

Bangladesh Betar is a state-owned audio broadcasting media of Bangladesh. Radio transmission in Indian sub-continent started on December 16, 1939 from many places including Dhaka, an important city in undivided Bengal, now is the capital of independent Bangladesh. It played a catalyst role for encouraging freedom fighters during the Bangladesh liberation war of 1971 (Betar, n.d). During liberation war, it was known as *Shwadhin Bangla Betar Kendro* (Independent Bengal Radio Station**).** Swadhin Bangla Betar Kendra usually broadcast patriotic songs and programs based on facts and anecdotes about the battle ground that immensely inspired freedom fighters and the whole broadcast could be termed as an intellectual war against the occupational forces of Pakistan. It was so successful that many termed it as organized second front of the war of liberation. Along with its glorious role in the war of liberation, Bangladesh Betar also **p**layed and is playing very important role in many nation building activities in agriculture, population control, health, education and importantly in disaster management. As Bangladesh is a disaster prone area, several deadly cyclones have made its landfall in 1822, 1876, 1961, 1965, 1970, and 1991 with enormous loss of lives and property of the people of costal belt (Wisner et al. 2004; Dube et al. 2004; GoB 2008). In early days Betar played a vital role in disseminating danger signals during tidal surge and cyclone as the people of the coastal belt at that time had limited access to other media than radio, in fact there was no electronic media until 1970. Though many electronic media have made their way in course of time still Bangladesh Betar plays an important role in this effect. Radio is cheap and portable and that is why it is the main source of the coastal belt people to get advance information about any forthcoming danger like cyclone or tidal surge. It was quite evident from the interviews of the victim of the cyclones published in the daily news papers or aired on electronic media that many lives were saved as they received early warnings about the danger of eminent tidal surge or deadly cyclone. This is especially true for the fishermen fishing in the sea. They have literally nothing, not even, their friends to inform them about the cyclone. They only have a radio set with them, their only friend in need. Thus radio is playing a vital role in saving life and property of the coastal area.

1.2 Context

Bangladesh is situated in between 21^0 and 27^o North latitude and 88^o and 92.5^o East longitude. The coastal land of Bangladesh is extended from Teknaf in the West to Sunderban in the East and is of 710 km long. Our coastal area has been formed by the process of sedimentation and is of recent origin. Most parts of the area are, therefore, shallow which can be subject to inundation even under normal circumstances of tidal surge (Miyan, 2005). A tidal surge accompanied by a cyclonic storm makes situation worsening which is further exuberated by the funnel shape which is tapered down to the main land side of the Bay of Bengal. The wide shallow continental shelf is suitable for amplification of surge causing wide spread flooding and great loss to lives and property of the people living along the coast line.

Severe cyclones and storm surges are not uncommon phenomena in Bangladesh. Geographic location, the unique natural setting and tropical monsoon climate of Bangladesh modify and regulate the climatic condition and make the country more vulnerable to cyclones and storm surges. Physical and meteorological conditions necessary for brewing up tropical cyclones are present in the Bay of Bengal which is considered to be one of the ideal grounds for cyclone formation as it has 6–10 % of tropical cyclones of the world (Gray 1985; Haque 1997; Murty and El-Sabh 1992; Paul 2009). On an average, twelve to thirteen depressions are formed annually in the bay and at least one powerful cyclone strikes Bangladesh each year (Mooley 1980; Haque 1997; Paul 2009). Additionally global warming is thought to be an important cause of more cyclone events in the Bay of Bengal (IPCC 2001; Emanuel 2005; Ahmed 2005). A growing body of studies is increasingly drawing attention to the potential negative impacts of climate change on lives and property of the people living in coastal area. This population is quite vulnerable to various natural catastrophes. The Intergovernmental Panel on Climate Change says that cyclone tracts is likely to remain unchanged, with the possibility of increasing peak intensities by 5–10 % under current climate change conditions. This will have severe implications for Bangladesh, which is already vulnerable to several disasters in the form of cyclone or tidal surge.

1.3 Statement of the problem

Bangladesh is subject to natural calamities since time immemorial. The lives and property of the people living in the coastal belt which stretches from Khulna in the east to the Teknaf in the west, and abode of hundreds of thousands of people, are always at stake. This people are poor, vulnerable and completely depend on the nature. They are so poor that they cannot even afford the mobile phone despite the fact that mobile phone tariff is the lowest in the world. They can hardly afford a radio set, the cheapest gadget to have an access to the outer world merely. Repeatedly they fight for their survival. Once all the belongings is destructed by a strong cyclone or tidal surge they again start from zero to re-accumulate their minimum wealth to run their lives until another calamity comes and takes its tolls on them. This is a vicious circle for these people. They can never afford to break through this cycle. As a result these people are always poor. They cannot maintain their family properly, let alone contribute to the country. If their position cannot be improved they are likely to pose a threat in the run to become a middle income group by 2021.Bangladesh Betar can play an important role in this regard by providing early warnings during the time of natural calamities. If these people can get warning of any upcoming disaster in time they could save their valuables and more importantly their lives by quickly moving to any safe place. In short Bangladesh Betar can reduce the risk associated to the cyclone and tidal surge or anything of that sort. Not only is the individual, but early warning system also necessary for our Government also. If cyclone and tidal surge are not properly handled a vast area of the coastal region become inundated with saline water which results in infertility of the land for years together.

1.4 Scope of the Research

Lives and property of the people are of utmost importance for any country especially when it comes to a considerable portion of population consisting of hundreds of thousands of people. There should have been a lot of research for reducing the risk that poses threat to their lives and livelihood. The role of radio in this regard has not been put in use so far. But this handy gadget can save many lives and property if it plays its role effectively and efficiently in time of cyclone and tidal surge. It has been doing it for many years but no empirical research has been done to assess its accurate role.

1.5 Rationale of the Research

Lives and property are the most important possession that human being are likely to protect with all possible efforts. This is also the prime objective of any form of governance, be it a democracy or autocracy or any anything else. People of the coastal region of this country are always so unlucky that the records of last four/five hundred years show that they became subject to enormous loss of lives and property, though the trend in recent days shows decline in the loss of lives and property due to better management practice. In early days people died in thousands. Property especially the cattle loss outnumbered the human and houses destroyed that left them helpless like anything. This also may have served as the main cause for the people of the coastal area so impoverished. The recent decline in the lives and property is presumed to be the result of, among other things, improvement in communication which results in the quick dissemination of cyclone warnings and other obligatory dos during the emergency time of cyclone and tidal surge. The decline in the number of loss of lives and property does not necessary provide any solace, because casualty figure should be brought to near zero if not absolutely zero and the loss of property including cattle should be minimum. That is why a study, according to me, is necessary to find out the variables that plays vital role in time of emergency like cyclone or tidal surge. Bangladesh Betar is thought to be playing vital roles to this extend. But the study can confirm to what extend Bangladesh Betar is effective in saving lives and property by reducing risk in the coastal zone of Bangladesh.

Moreover Bangladesh aims at becoming a middle income country by 2021. But without changing the lives of the people living in the coastal belt, the aim of becoming middle income country is very difficult. Furthermore uneven development in a country never speaks of equity that every citizen is entitling to. Uneven development may lead to social instability. Moreover it is the onus of the state to protect the life and property of its citizen. On the basis of above discussion, there should not be any stone left untouched to improve the lives of these people of coastal belt. This research would supplement a little bit to that effort in the end.

1.6 Objectives of the Research

Objective of the research would be to find out how the people living in the coastal belt behave during of natural calamities. What sources they look for help at that time, especially how Bangladesh Betar comes to their help during natural calamities. It is very important that lives and property of these people should be saved at any cost. So the main objective of this research is to find out the ways and means to help these people in facing the misfortune arising from natural calamities. Thus the major objectives of the study are as follows;

a) To assess the role of Bangladesh Betar in taking measures against risk reduction by disseminating information of early warnings prior to cyclone and tidal surge.

b) To identify factors affecting coastal belt people's decision making during cyclone and tidal surge.

1.7 Research Question

a) Is Bangladesh Betar reaching the people of coastal belt in terms of cyclone warning information dissemination?

b) Is there any impact of Bangladesh Betar's transmission on the people of the coastal belt during natural calamities?

c) Is Bangladesh Betar's transmission helping to save lives and property of the people living in the coastal belt?

1.8 Study Area:

The study has been conducted to Maheshkhali Upazila of Cox's Bazaar district of Bangladesh.

1.9Organizational Framework of the Dissertation:

The dissertation has been organized in five chapters. These are;

Chapter One – Introduction: It intends to present the background of the study, state the research problem and the scope of the research. It also specifies the objectives and focuses on the rationale of the study.

Chapter Two – Literature Review: This chapter deals with the previous researches, publication and other write up on cyclone and tidal surge affecting coastal areas, role of radio in communicating warnings in time of natural calamities. It also takes into account any publication on the nature of cyclone and tidal surge and other related write ups.

Chapter Three – Research Methodology: This chapter expresses the methods, tools and techniques of data collection. It also provides the rationale for selection of site and limitation of the study.

Chapter Four – Research Findings: This chapter presents the survey data and analyses them in accordance with the research objectives and it also presents appropriate arguments with findings.

Chapter Five – Conclusions and Recommendations: The final chapter comes at conclusions based on the findings of the study. Subsequently some suggestions and recommendations or policy alternatives are made on the basis of field observations.

1.10 Limitation of the Study

This study has been carried out only in one upazila of Cox's Bazaar district namely Maheshkhali and the sample size were limited to 75 though millions of people live in the coastal area in Bangladesh. However, it is perceived that the small number will not be a hindering factor in gaining in sight to various envisaged research questions.

Another limitation of the study is related to time and budget constraints. This dissertation is a part of the M.A in Governess and Development-5 (MAGD-5) of BRAC University. Very limited time and resources were allocated to carry out the study. Accuracy of the information is another limitation. Local people and the local elites were a bit hesitant to answer the questions included in the questionnaire. Sometimes they answered in such a hurry that contradictory information were provided by them. Many of the women denied to give any interview was another constraint we faced.

CHAPTER TWO

LITERATURE REVIEW

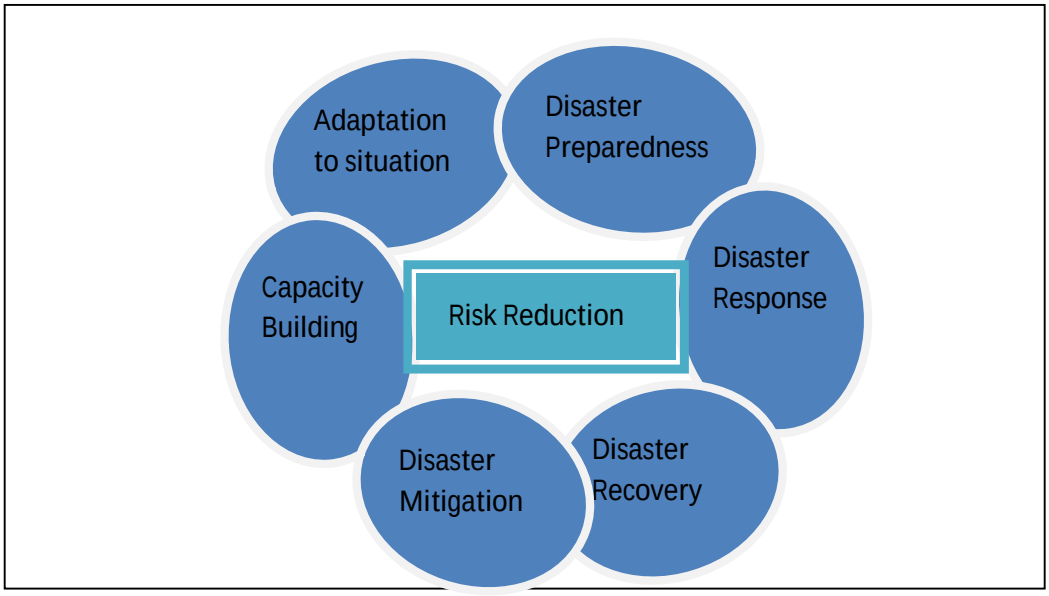
2.1 Cyclone and Its Impact on Bangladesh

Bangladesh is one of the most disaster prone countries in the world (SOD, 2010). Earlier studies show that 80–90 % of global losses and 53 % of total cyclone-related deaths worldwide took place in Bangladesh (Ali 1980; GoB 2008; Paul 2009). Around 42 % of deaths related to cyclone and tidal surge have been recorded in Bangladesh in the last two centuries. For example, in 1971 the great Bhola cyclone claimed lives around 500,000, with 100,000 missing people; estimated damage was about USD 450 million. In 1991 another devastating cyclone occurred with the official death toll recorded as 140,161 and the total affected population reached 10,721,707; estimated damage was USD 1.8 billion to 4.3 billion. In comparison with the cyclones in 1970 and 1991, the death toll in 2007 was relatively small: approximately 3,406 people died and 55,000 were injured, with more than 1,000 missing, and estimated damage of USD 1.6 billion (Ali 1980; Haider et al. 1991; GoB 2008; Paul 2009). In addition to the geophysical characteristics of the Bangladesh coast, the poor socio-economic conditions of coastal people also contribute to increasing the vulnerability of people to cyclones and storm surges. Bread and butter of the coastal populations is highly dependent on ecosystems linked with agriculture, fishery, forestry and salt farming, etc. Therefore, the increasing trend of cyclones and tidal surge will certainly affect the livelihood of vulnerable population living in low-lying coastal Bangladesh. In spite of being poor and vulnerable to a range of natural hazards, Bangladesh has made significant progress in disaster management in recent years. Blake (2008), Heath (2007), Hossain et al. (2008) observed in their studies that the lower-than-expected death toll and damage caused by Cyclone Sidr in Bangladesh was the result of timely cyclone forecasting and dissemination of warnings, as well as the evacuation of vulnerable people in the right time living in cyclone-prone areas.

2.2 Disaster and Risk

Disaster Risk Reduction (DRR) or simply the risk reduction is a systematic process of identifying, assessing and addressing risks related to any field (UNISDR 2004). When it comes to the risk associated with the disaster or natural calamities, it simply tells how this risk can be dealt with so that the life and property of the people can be saved or at least be lessened. The attempt of risk reduction is to lessen socio-economic vulnerabilities to disaster or natural calamities. A host of research has been done on DRR in 1970s (UNISDR 2004). It is the onus of government, development and relief agencies alike. It should be an integral part of the way such organizations do their work, not an ad-hoc or one-off action. DRR covers a very wide-range: Its scope is much broader and deeper than conventional emergency management. The most commonly cited definition of DRR is one used by UN agencies such as UNISDR and UNDP. "The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.

2.2.1 Risk Reduction Model

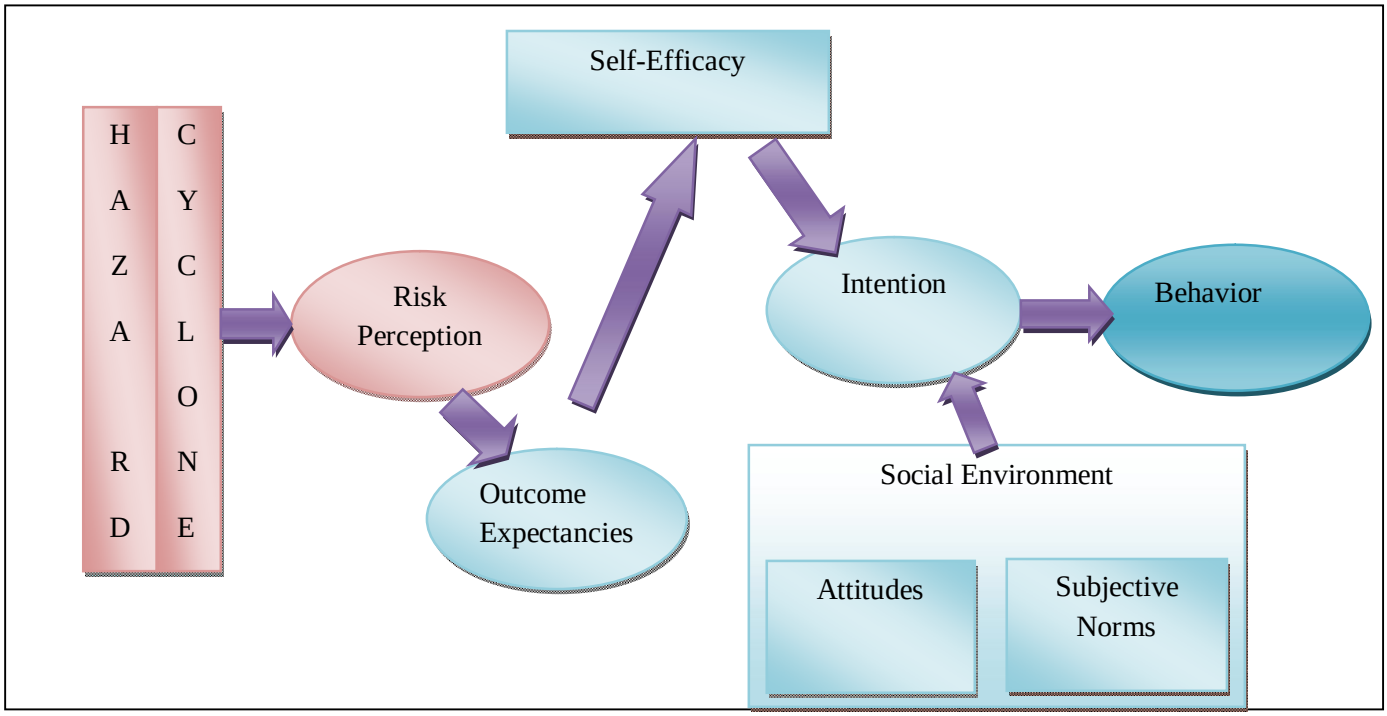


Adopted from Federal Emergency Management Agency of the USA

Source: http://cityofpascagoula.com/hazard-mitigation-plan-update

The evolution of disaster management thinking and practice since 1970s has put more emphasis on more holistic and integrated approach to reduce risk on individuals and society as a whole. It has seen a progressively wider and deeper understanding why disasters happen and how it impact on the wellbeing of people. The recent paradigm of disaster management — disaster risk reduction (DRR) — concentrates on this path. DRR is relatively a new concept in formal terms, but it embraces much earlier thinking and practice. It is being widely accepted by international agencies, governments, disaster planners and civil society organizations.

2.2.2 Risk Management Model



Source: Adapted from Bennett and Murphy (1997)

Available at: https://www.google.com.bd/search?q=risk+reduction+model&es_sm=93&tbm=isch

2.3 Some Factors Related to Disaster Management in Bangladesh

Bangladesh is well known for its successful disaster management all over the world. Even the most advanced country like the USA could not show the excellence in managing Katrina, a devastating hurricane in 2012 which Bangladesh showed in 2007 in case of cyclone Sidr. Over the years Bangladesh has attained excellence in managing disaster. Bangladesh now

can boast of some best practices in disaster management especially in case of cyclone and tidal surge. These are given bellow.

2.3.1 From Relief and Rehabilitation (R&R) to Risk Reduction (R&R): Paradigm Shift

National Disaster Management Framework: As a result of progressive and demonstrative achievement over the last two decades, Bangladesh is now recognized as a leader in responding to natural disasters and adopting a more holistic approach to risk reduction. The country now has a well designed disaster management mechanism, while the people have range of coping strategies to mitigate the impacts of disasters.

In line with the global shift in thinking on approaches to disasters, and most specifically with the strategic priorities of the Hyogo Framework for Action (HFA), the stated vision of the GoB 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". The Government of Bangladesh has a well-defined disaster management institutional mechanism for disaster management. There are disaster management committees at all tiers of the government. It goes from the apex body institution level of the national Disaster Management Council chaired by the Head of the Government, the Honorable Prime Minister, to Union Disaster Management Committee – UDMC (lowest Local Government level disaster management institution) chaired by the Union Parishad chairman.

The mandates of the Ministry of Food and Disaster Management (MoFDM) and the key institutions- Disaster Management Bureau (DMB) and Director of Relief and Rehabilitation (DRR)- have been sharpened and capacities are being strengthened to advanced risk reduction agenda towards fulfilling national and international commitment of the country. Disaster vulnerable communities remain at the heart of this process supporting a bottom up approach in defining risks and drawing mitigation options. (GoB n.d)

2.3.2 Effective Early Warning Dissemination at Community Level

Cyclone Preparedness Program (CPP) is a unique institutional arrangement for community preparedness to mitigate the challenges of catastrophic cyclones that frequently visit Bangladesh coast. CPP has been evolved with a true spirit of volunteerism that Bangladesh can demonstrate to the world communities. It provides an effective early warning system for 35

million coastal populations in 19 districts. This is a joint program of the Government of Bangladesh and the Bangladesh Red Crescent Society, which was established after the 1970 cyclone, the deadliest of disaster in the recorded history, as has been mentioned earlier. Currently CPP have 42,675 volunteers, out of which 14,225 are women. Many CPP volunteers have lost their relatives, while 26 of them have sacrificed their own lives during 1991 to 2007, while trying to save lives of others.

CPP volunteers disseminate cyclone warnings to the people at risk, risking their own lives. They help the people evacuate and take them to cyclone shelters or other safe places, rescue distressed people, provide first aid to the injured and assist in the emergency relief operation.

Due to the success of CPP and other disaster preparedness initiatives, there has been dramatic decrease in death toll from cyclones: with equal severity as that of 1970, Sidr claimed only 3,406 people. CPP is thus the tremendous story of indomitable spirit of voluntarism and community fellow feelings in this land of 150 million of people most of whom are very poor. (GoB n.d)

2.3.3 Community Empowerment and Resilience

Poor and apparently vulnerable people have been living with and surviving disaster for a long period; thus developed their own way of coping up mechanism and resilience. The government and all other parties involved in relief and rehabilitation process are aware of these facts and therefore have been trying to build the risk reduction practice on that. Community Risk Assessment (CRA) and Risk Reduction Action Plan (RRAP) are some of the tools to assist the vulnerable communities take charge of their own risk reduction in a more systematic way. Besides, communities have many effective strategies which they have been using for a very long time. (GoB n.d)

2.3.4 Reducing Risk Factor

Severe cyclone with water surge as high as nine meters in the coastal area and flood flowing well over danger level in a densely populated and predominantly rural country like Bangladesh require special focus in reducing underlying risk factors through structural,

technological and cultural shift from the traditional disaster management response approach. To combat with the serious cyclones and tidal surges which can rise as high as 7 meters and can travel at a speed of 50 kilometer inland, about 2500 cyclone shelters have been built on the coastal belt of Bangladesh. This cyclone shelters will serve as the key mitigating measures to save lives. Around 1.5 million people took shelter in cyclone shelters when super cyclone Sidr made its landfall on the coast of Bangladesh in November, 2007.

There are many designs adopted by different agencies, built mainly as multi-purpose shelters: schooling, health centers and community centers. These are usually concrete buildings built on pillars which enables water surge to pass bellow these structures. A typical shelter can accommodate 600 to 2000 people. In coastal belt another type of shelters are in use to protect the cattle. These types of shelters are called 'Killa'. These are usually 5 meter high earthen mound, with drainage facilities. (GoB n.d)

2.3.5 Reducing Loss of Lives through Effective Response

Response to Cyclone Sidr of November 2007 could be marked as another exemplary illustration of efficient disaster response system in the country. The coordinated and timely actions of the Government, local authorities and the volunteers' networks proved that this country has made significant progress from where it was in 1991 cyclone with total official death 1, 38,000. Government of Bangladesh, with support from humanitarian partners and local authorities, was able to mobilize its resources and capacities to orchestrate actions that could manage the difficult challenges of cyclone Sidr. (GoB 2007)

2.4 Disaster Management framework of some Asian countries including Bangladesh

2.4.1 Disaster Management Framework of India

The vision of National policy on Disaster Management 2009 of India aims to build a safe and resilient India by developing a holistic, proactive, disaster oriented and technology based

strategy through a culture of prevention, mitigation, preparedness and response. Disaster Management Act, 2005 of India lays down legal and institutional framework at the National, State, District and local level. Institutional Framework under the Act is as follows:

National Disaster Management Authority (NDMA) as the apex body for disaster management in India, headed by the Prime Minister. NDMA is entrusted with the responsibilities for laying down policies, plans and guide lines for Disaster management and coordinating their enforcement and implementation for ensuring timely and effective response to hazards. It will approve the National Disaster Management Plan and Disaster Management plans of the central Ministries or divisions.

National Executive Committee (NEC) is the executive committee of the NDMA. The NEC is to coordinate the response in the event of any threatening disaster situation or disaster itself. The NEC will prepare the National Plan for Disaster Management based on the National Policy on Disaster Management. The NEC will monitor the implementation the guidelines issued by NDMA.

State Disaster Management Authority (SDMA) is headed by Chief Minister. He will lay down policies and plans for Disaster Management in the state levels. The State Government shall constitute a State Executive Committee (SEC) to assist the SDMA in performing its activities and functions. The SEC will be headed by the Chief Secretary to the State Government and coordinate and monitor the implementation of the National Policy, the National Plan and the State Plan.

District Disaster Management Authority (DDMA) is headed by the District Collector, Deputy Commissioner or District Magistrate as the case may be, with the elected representative of the local authority as the Co-Chairperson. The DDMA performs the job of planning, coordinating, and implementing body for Disaster Management at the district level and take all necessary measures for the purpose of disaster management in accordance with the guide lines laid down by the NDMA and SDMA. It will prepare the District Disaster Management plan for the districts and monitor the implementation of the National Policy, the State Policy, the National Plan, the State Plan and the District Plan (NPDM, 2009)

2.4.2 Disaster Management Framework in Pakistan

In Pakistan, NDMA, 2010 possesses comprehensive institutional system to deal with the entire disaster management system at federal, provincial and district levels. National Disaster Management Committee (NDMC), headed by the Prime Minister of Pakistan, is an apex body for policy making in the field of disaster management. National Commission is proportionately represented by the federal units, ministries, armed forces and civil societies. National Disaster Management Authority (NDMA) works as the secretariat to NDMC and its responsibility is to policy implementation, resources mobilization and allocation while coordinating with donor agencies and countries. National Institute of Disaster Management (NIDM) was established to prepare the disaster managers at all levels to response to disasters effectively and efficiently. Provincial Disaster Management Committee (PDMCs) and Provincial Disaster Management Authority (PDMA) have the similar role at the provincial/ regional levels. District Disaster effectively and efficiently r Management Authority is the lowest tier mandated to respond to all disaster on ground (NDMA, 2010)

2.4.3 Disaster Management Framework of Sri Lanka

In 2004, Sri Lanka was taken aback by the wide spread destruction of tsunami and concentrated on having a multi disciplinary approach to face such devastation in future. As a result, the government, civil society organizations and international organizations have worked together for a comprehensive and pro active disaster risk management framework instead of post-disaster relief formulae. In May2005, the Sri Lanka Disaster Management Act No 13 of 2005 was enacted paving the path to a solid legislative and institutional arrangement for disaster risk management.

Under the Act, a powerful National Council for Disaster Management (NCDM) was established headed by its President. The Prime Minister is the vice-chairman of the council with participation of the Leader of the opposition, Ministers, Provincial Council Chief Ministers and five members of the opposition to provide direction for the Disaster Risk Management (DRM) efforts of the country. The Disaster Management Centre (DMC) was established in July 2005 to implement the directives of NCDM. In November 2005, the Ministry of Disaster Management was established under the Prime Minister to take the lead role in directing the planning for disaster response, risk reduction and mitigation and preparedness for ensuing disaster. In

December 2005, the Ministry of Disaster Management decided a comprehensive framework (Jayawardane n.d).

2.4.4 Disaster Management Framework of the Philippines

As far as the disaster management is concerned the Philippines has a long history and tradition. In the Philippines the Disaster Management was an integral part of the national defense and became embedded in its national practice and national life. This history is difficult to change, although there is consideration of moving the function to the Office of the President. In 1954, Republic Act RA1190 (the Civil Defense Act) came in to effect, establishing the National Civil Defense Administration (NCDA), under the Office of the President. Act RA1190 also created civil defense councils at national and local levels. Executive order E0159 (November 1968) required the establishment of a disaster control organization by all government offices including departments, bureaus, offices, agencies, instrumentalities and political subdivisions of government, including all corporations owned and/ or controlled by government. President Marcos approved a Disaster and Calamities Plan in 1970. The Office of civil Defense (OCD) was established in 1972, with a mandate to coordinate national level activities and functions of the national government, private institutions and civil organizations. Presidential Decree PD1566, promulgated on 11th June, 1978 is the current5 basis of the Philippines' disaster management arrangements. PD1566 provides for the national Disaster Coordinating Council (NDCC) as the highest policy-making body on matters pertaining to disasters, advising the President (NDRMP).

2.4.5 Disaster Management Framework of Bangladesh

Legal Framework

The Disaster Management and Relief Division (DM&RD) of Disaster Management and Relief of Bangladesh have the sole responsibility for coordinating all the activities related to disaster and relief. Concerned Ministry issued a Standing Order on Disaster (SOD) in 1997 which was amended in 2010 to facilitate guidance and monitor disaster management activities in the country.

Disaster Management Act, 2012

Disaster Management Act, 2012 was passed and subsequently enacted in 2012 to provide a legal ground for the people (ministries, local authorities, committees and volunteers) working for disaster management and relief operation in Bangladesh. The objective of the law is to assist the communities to prepare for ensuing hazards and mitigate the adverse effects of it, effectively respond to and recover from a disaster or an emergency situation, and adapt to adverse effects of climate change and thus facilitating an efficient and effective disaster management process in Bangladesh. The law has institutionalizes the process of disaster management for risk reduction as a core element of disaster management.

The National Plan for Disaster Management, 2010-15

Bangladesh has prepared a long term National Plan for Disaster Management taking into account the international context and regional commitment. The plan is in congruence with the basic principles of the SAARC. The main focus of the National Plan for Disaster Management is to strengthen institutional capacity and accountability according to their commensurate authority in preparing and implementing disaster management plan at different levels of the country. Development Plans incorporating Disaster Risk Reduction and Hazards Specific Multi-Sectoral Plans have made this plan an exclusive tools for reducing risk and achieving sustainable development. The plan will also act as basic guideline for all relevant agencies in facilitating better working relations and enhancing mutual cooperation.

Standing Orders on Disaster, 2010

The Standing Order is a sort of permanent document which tells about what to do and what not to do during an emergency situation. It's a standing order for concern people who are engaged and entrusted with the duties and responsibilities of risk reduction and mitigation for endangered communities or individuals. It is the detail rules and responsibilities of the ministries and other organizations involved in disaster management. All Ministries, Divisions or departments and Agencies shall prepare their own Action Plan in respect of their responsibilities, says the Standing Order for efficient and effective management of disaster. The National Disaster Management Council (NDMC) and Inter-Ministerial Disaster Management Coordination Committee (IMDMCC) will ensure coordination of disaster related activities at

national level. Coordination at District, Thana and Union levels will be carried out by the respective District, Thana or Union Disaster Management Committees.

The Department of Disaster Management will provide them with all assistance to facilitate the process.

Bangladesh Climate Change Strategy and Action Plan 2009

Climate change is a hot issue worldwide and for Bangladesh it is more of a question for survival, as Bangladesh is likely to be worst affected by climate change. It is a hindrance to the government of Bangladesh in achieving the goal of poverty reduction and attaining sustainable development as a support to its long term vision of becoming middle income country by 2020. This can be achieved by a pro-poor climate change strategy, which prioritizes adaption and disaster risk reduction and the provision of adequate finance. Accordingly Government of Bangladesh has developed and enacted Bangladesh Climate Change Strategy Action Plan (BCCSAP 2009).

Disaster Management Organizational Framework in Bangladesh

The SOD has been prepared with objective to enable the persons concerned readily understand their duties and responsibilities in time of emergency, without waiting for any order as to how they should act in time of natural calamities. SOD is applicable for national and local levels alike. A series of interrelated institution, both at national and local levels have been created to ensure effective planning and coordination of disaster risk reduction and emergency response management (NPDM 2010).

2.5 Organizational Structure at National Level

2.5.1 National Disaster Management Council (NDMC)

Work of NDMC is to provide policy guide lines towards disaster risk reduction and emergency response management. NDMC is multi-sectoral and inter-disciplinary in nature, meaning involving people from various sectors and disciplines. It ensures participation from public, private and civil society, involving all institutions concerned in the country, as well as representative from United Nations. It is headed by the prime Minister of Bangladesh.

2.5.2 Inter-Ministerial Disaster Management Co-ordination Committee (IMDMCC)

IMDMCC is established at the national level to assist policy formulation, planning, programming and implementing measures related to disaster risk reduction and emergency response management. It is also headed by Prime Minister in charge of the Ministry of Disaster Management and Relief to implement disaster management policies and decisions of NDMC or the Government.

2.5.3 National Disaster Management Advisory Committee (NDMAC)

On 19 November, 2009, National Disaster Management Advisory Committee was established with an aim at assisting disaster management endeavor more effectively and more importantly in a time befitting way. It is generally headed by an experienced person nominated by the country's Prime Minister.

2.5.4 National Platform for Disaster Risk Reduction (NPDRR)

NPDRR is headed by Secretary of DM&RD and Director General of DDM functions as the member secretary. This platform is to coordinate and provide necessary assistance to the relevant stakeholders.

2.5.5 Cyclone Preparedness Program Implementation Board (CPPIB)

This board is entrusted with responsibilities to oversee the overall preparedness for any ensuing cyclone in the initial stage. The board is headed by the Secretary of Disaster Management and Relief Division.

2.5.6 Cyclone Preparedness program (CPP) Policy Committee

This committee acts to build capacity and public awareness by providing training to the people and community concern. The committee is headed by Minister of MoFDM and Secretary of DM&RD act as member secretary. Director General of Department of Disaster Management to coordinate the disaster related training.

2.5.7 Coordination Committee of NGOs related to Disaster Management

Coordination Committee of NGOs related to Disaster Management is headed by DG, of Disaster Management. Its main responsibilities are to ensure the co-ordination of disaster management and relief work between government and non-governmental agencies. It also disseminates and preserves the disaster related information.

2.5.8 Focal Point Operation Coordination Group of Disaster Management (FPOCG)

This group is headed by the Director General of DDM to review and coordinate the activities of various departments, agencies related to disaster management and also to review the Contingency Plan prepared by department concern.

2.5.9 Organizational Structure at Local Level District Disaster Management Committee (DDMC)

This committee is responsible for co-coordinating and reviewing the disaster management activities at the district levels. Deputy Commissioner of the concerned district generally heads the committee and the local Member of the Parliament (MP) acts as the advisor of this DDMC.

2.5.10 Upazila Disaster Management Committee (UZDMC)

This committee is responsible for co-coordinating and reviewing the disaster management activities at Upazila levels. Upazila Parishad Chairman generally heads the committee and the local Member of the Parliament (MP) act as the advisor of this DDMC.

2.5.11 Union Disaster Management Committee (UDMC)

This committee is the lowest level and grass root level committee in Bangladesh. It is headed by the Chairman of the concern union to co-ordinate, review and implements the disaster management activities of that union.

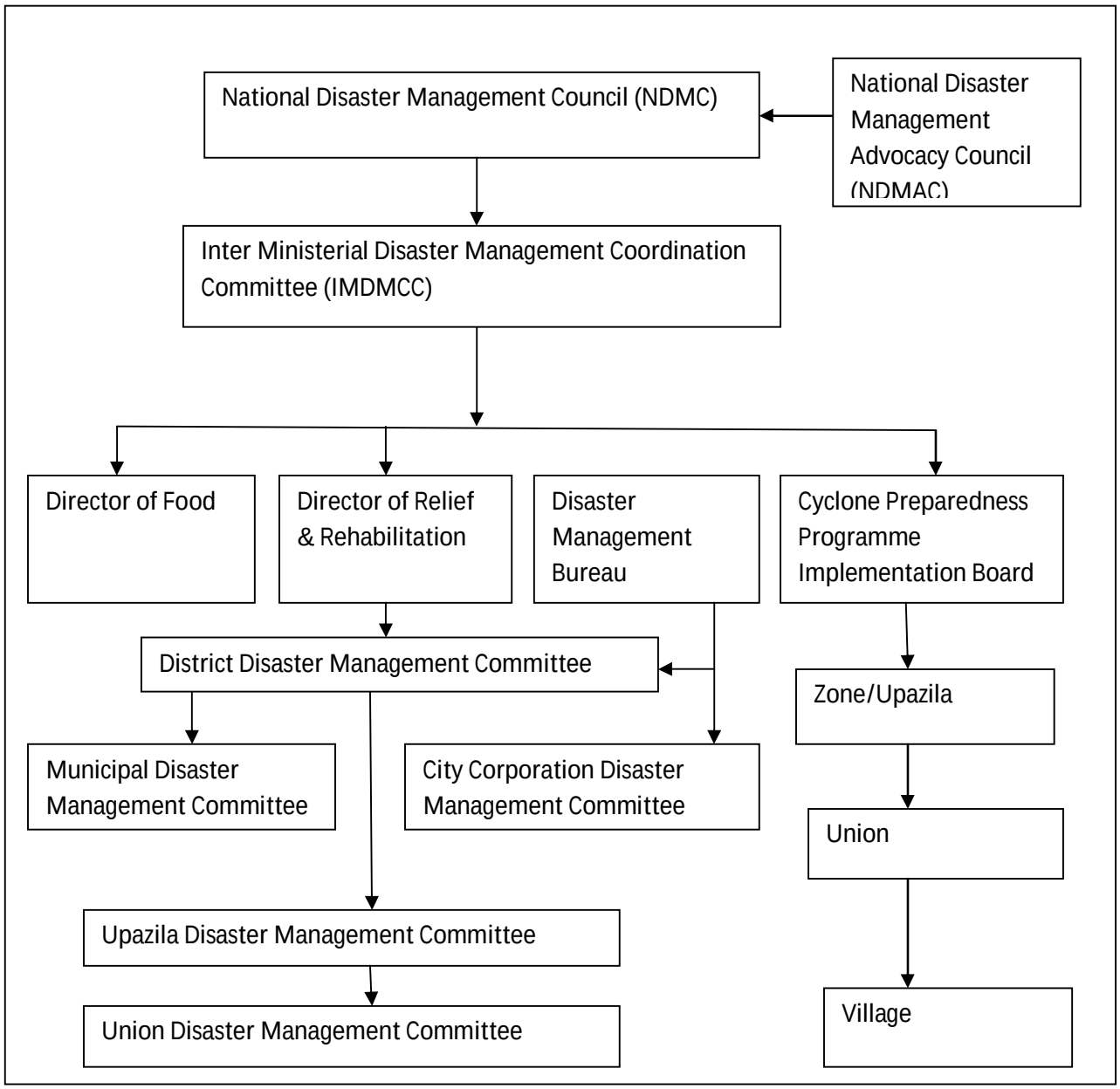
2.5.12 City Corporation Disaster Management Committee (CCDMC)

This committee is headed by the Mayor of that city corporation to co-ordinate, review and implements the disaster management activities of the area covered by the city corporation.

2.5.13 Pourashava Disaster Management Committee (PDMC)

This committee is headed by the Chairman of that Pourashava (municipality) to co-ordinate, review and implements the disaster management activities within its area of jurisdiction. Local Member of the Parliament will be the advisor of the committee.

2.5.14 Institutional Arrangement for Disaster Management in Bangladesh



Source: Adapted from NPDM, 2010

2.6 An overview of the cyclones and tidal surges that hit Bangladesh from time to time, starting from 1582 to recent days

Bangladesh, because of its unique geographic location, suffers from devastating tropical cyclones frequently and it is not a recent phenomenon. It has also been subjected to the natural disaster from medieval age, so far as the records go. The funnel-shaped northern portion of the Bay of Bengal causes tidal bores magnify when cyclones make landfall for which thousands of people living in the coastal areas are affected. Some of the most deadly natural disasters in recorded history with high casualties and enormous loss to property were tropical cyclones that hit the region now forming Bangladesh. Among them, the cyclone that hit Bhola in 1970 commonly known as '1970 Bhola cyclone' alone claimed more than 500,000 lives. The historical records of major cyclones and tidal surge that hit Bangladesh are given bellow.

2.7 Chronology of major cyclonic storms

(Source: SMRC-No.1 - The impact of tropical cyclones on the coastal regions of SAARC countries and their influence in the region, SAARC Meteorological Research Center (SMRC), 1998.)

1584 Bakerganj (presently Barisal) and Patuakhali; hurricane with thunder and lightning continued for five hours; the houses and boats were swallowed up, leaving only Hindu temples on a height; about 2,000,000 living creatures perished.

1585 Mouth of the Meghna estuary; severe storm wave swept up the eastern side of Bakerganj; number of living creatures perished, standing crops destroyed.

1822 (May) Barisal, Hatiya Island and Noakhali district; severe cyclonic storm with storm wave; Collectorate records swept away, 40,000 people killed and 100,000 cattle lost.

1876 (31 October) Meghna estuary and coasts of Chittagong, Barisal, Noakhali; most severe storm-surge of about 12.2m (40 ft) height; about 200,000 people died during the storm, but perhaps more people died from the after-effects of the storm, such as epidemic and famine and enormous properties destroyed by tidal bore. Considering the population at that time, a death figure of 200,000 was indeed too heavy.

1897 (24 October) Chittagong; hurricane reached maximum intensity with series of storm-waves; Kutubdia Island and coastal villages were swept over, 14,000 people killed and 18,000 died in epidemics (cholera)

1948 (17-19 May) Between Chittagong and Noakhali; cyclonic storm; about 1,200 persons killed and 20,000 cattle lost.

1958 (16-19 May) East and west Meghna estuary, east of Barisal, Noakhali; cyclonic storm along with surge; 870 persons killed, 14,500 cattle lost and standing crops destroyed.

1960 (9-10 October) Eastern Meghna estuary (Noakhali, Bakerganj, Faridpur and Patuakhali; severe cyclonic storm, maximum wind speed 201 km/hr, maximum storm wave 3.05m; considerable damage to Char Jabbar, Char Amina, Char Bhatia, Ramgati, Hatiya and Noakhali; 3,000 lives lost, 62,725 houses damaged, crops on 94,000 acres of land were fully damaged and thousands of cattle perished.

1960 (30-31 October) Chittagong, Noakhali, Bakerganj, Faridpur, Patuakhali and eastern Meghna estuary; severe cyclonic storm, maximum wind speed 210 km/hr, surge height 4.5-6.1m; about 10,000 persons killed, 27,793 cattle lost and 568,161 houses destroyed (especially 70% of houses in Hatiya blown off), two large ocean liners washed ashore, 5-7 vessels capsized in Karnafuli river.

1961 (9 May) Bagerhat and Khulna; severe cyclonic storm with a wind speed of 161 km/hr, surge 2.44-3.05m; rail track between Noakhali and Harinarayanpur damaged, heavy loss of life in Char Alexander, 11,468 people killed and about 25,000 cattle head destroyed.

1963 (28-29 May) Chittagong, Noakhali, Cox's Bazaar and the offshore islands of Sandwip, Kutubdia, Hatiya and Maheshkhali were badly affected; severe cyclonic storm with storm-wave rising 4.3-5.2m in Chittagong, maximum wind speed 203 km/hr and at Cox's Bazaar 164 km/hr; more than 11,520 people killed, 32,617 cattle lost, 376,332 houses, 4,787 boats and standing crops destroyed.

1965 (11-12 May) Barisal and Bakerganj; most severe cyclonic storm, maximum speed 162 km/hr with storm-wave rising 3.7m; total loss of life 19,279; in Barisal alone 16,456 people killed.

1965 (14-15 December) Cox's Bazaar along with adjacent coastal area and Patuakhali; severe cyclonic storm with storm-wave rising 4.7-6.1m; maximum speed 210 km/hr in Cox's Bazaar, hoisted danger signal no 10 at Cox's Bazaar and along the coast of Sonadia, Rangadia and Hamidia islands, and Patuakhali; 40,000 salt beds in Cox's Bazaar inundated and 873 people killed.

1970 (12-13 November); Most deadly and devastating cyclonic storm that caused the highest casualty in the history of Bangladesh. Chittagong was battered by hurricane winds. It also hit Barguna, Khepupara, Patuakhali, and north of Char Burhanuddin, Char Tazumuddin and south of Maijdi, Haringhata and caused heavy loss of lives and damage to crops and property. Officially the death figure was put at 500,000 but it could be more. A total of 38,000 marine and 77,000 inland fishermen were affected by the cyclone. It was estimated that some 46,000 inland fishermen operating in the cyclone affected region lost their lives. More than 20,000 fishing boats were destroyed; the damage to property and crops was colossal. Over one million cattle head were reported lost. More than 400,000 houses and 3,500 educational institutions were damaged. The maximum recorded wind speed of the 1970 cyclone was about 222 km/hr and the maximum storm surge height was about 10.6m and the cyclone occurred during high-tide.

1974 (24-28 November) Coastal belt from Cox's Bazaar to Chittagong and offshore islands; severe cyclonic storm with a wind speed of 161 km/hr and storm surge of 2.8-5.2 m; 200 people killed, 1000 cattle lost and 2,300 houses perished.

1983 (14-15 October) Offshore islands and *chars* of Chittagong and Noakhali; severe cyclonic storm with a wind speed of 122 km/hr; 43 persons killed, 6 fishing boats and a trawler lost, more than 150 fishermen and 100 fishing boats missing and 20% aman crops destroyed.

1983 (5-9 November) Chittagong, Cox's Bazar coast near Kutubdia and the low lying areas of St Martin's Island, Teknaf, Ukhia, Moipong, Sonadia, Barisal, Patuakhali and Noakhali; severe cyclonic storm (hurricane) with a wind speed of 136 km/hr and a storm surge of 1.52m height; 300 fishermen with 50 boats missing and 2,000 houses destroyed.

1985 (24-25 May) Chittagong, Cox's Bazar, Noakhali and their offshore islands (Sandwip, Hatiya, and Urirchar); severe cyclonic storm, wind speed Chittagong 154 km/hr, Sandwip 140 km/hr, Cox's Bazar 100 km/hr and storm surge of 3.0-4.6m; about 11,069 persons killed, 94,379 houses damaged, livestock lost 135,033 and road damaged 74 km, embankments damaged.

1986 (8-9 November) Offshore island and *chars* of Chittagong, Barisal, Patuakhali and Noakhali; cyclonic storm hit 110 km/hr at Chittagong and 90/hr at Khulna; 14 persons killed, damaged 97,200 ha of paddy fields, damage to schools, mosques, warehouses, hospitals, houses and buildings at Amtali upazila in Barguna.

1988 (24-30 November) Offshore islands and *chars* of Barisal and Khulna; severe cyclonic storm with core wind speed 162 km/hr, storm surge of 4.5m at Mongla point; killed 5,708 persons and lots of wild animals - deer 15,000, Royal Bengal Tiger 9, cattle 65,000 and crops damaged worth about Tk 9.41 billion.

1991 (29 April); The Great Cyclone of 1991, crossed the Bangladesh coast during the night. It originated in the Pacific about 6,000 km away and took 20 days to reach the coast of Bangladesh. It had a dimension of more than the size of Bangladesh. The central overcast cloud had a

diameter exceeding 600 km. The maximum wind speed observed at Sandwip was 225 km/hr. The wind speeds recorded at different places were as follows: Chittagong 160 km/hr, Khepupara (Kalapara) 180 km/hr, Kutubdia 180 km/hr, Cox's Bazaar 185 km/hr, and Bhola 178 km/hr. The maximum wind speed estimated from NOAA-11 satellite picture obtained at 13:38 hours on 29 April was about 240 km/hr. The cyclone was detected as a depression (wind speed not exceeding 62 km/hr) on the 23rd April first in the satellite picture taken at SPARRSO from NOAA-11 and GMS-4 satellites. It turned into a cyclonic storm on 25 April. The cyclone in its initial stage moved slightly northwest and then north. From 28 April it started moving in a north-eastern direction and crossed the Bangladesh coast north of Chittagong port during the night of the 29th April. The cyclone started affecting the coastal islands like Nijhum Dwip, Manpura, Bhola and Sandwip from the evening of that day. The maximum storm surge height during this cyclone was estimated to be about 5 to 8m. The loss of life and property was enormous. The loss of property was estimated at about 60 billion taka. The death toll was estimated at 150,000; while cattle number was about 70,000.

1995 (21-25 November) Offshore island and *chars* of Cox's Bazaar; severe cyclonic storm with maximum wind speed of 210 km/hr; about 650 people killed, 17,000 cattle lost.

1997 (16-19 May) Offshore islands and *chars* of Chittagong, Cox's Bazaar, Noakhali and Bhola; severe cyclonic storm (hurricane) with a wind speed of 225 km/hr, storm surge of 3.05m (similar strength to that of 1970 cyclone); only 126 people killed because of better disaster management measures taken by the government and the people.

1998 (19-22 November) Offshore islands and *chars* of Khulna, Barisal and Patuakhali; cyclonic storm with maximum wind speed of 90 km/hr, storm surge of 1.22 to 2.44m.
2007 (15 November) cyclone Sidr makes landfall on southern Bangladesh, causing over 2,000 deaths and severe damage.

2007 (November 15) Cyclone Sidr makes landfall on southern Bangladesh, causing over 3,400 deaths and severe damage. The wind speed reached up to 240 kilometer per hour and the tidal wave up to five meter high and tidal surge six meters high. More than thousand people were missing. One million people were seriously affected while the total loss of property reached to 115.6 billion taka .

2009 (May 27) Cyclone Aila hit the southern Bangladesh, causing death to 330 people and more than 8000 missing. It left one million people homeless and 552.6 million dollar in damage.

2013 (May 22) Cyclone Mahasen hit Patuakhali of southern Bangladesh. 13 people died while 49000 houses were completely destroyed and 1.2 million people were affected.
Beside all these every year normal cyclone causes death to many fishermen in the Bay of Bengal while they go out fishing in deep sea. It's a common tragedy for the helpless fisherman and their families.

2.8 Cyclone Forecasting System in Bangladesh: A Brief Review

Disaster warning is considered as a linear process of communication between warning-issuing organizations and recipients of the warnings (Sorensen and Sorensen 2006). Irrespective of hazards, the main objective of warning is to reduce disaster impacts through enabling people to take precautionary measures. Therefore, the success of warnings depends on appropriate hazard detection, information dissemination, and responses by affected people.

The Bangladesh Meteorological Department (BMD) is the main responsible organization and possesses the authority of issuing cyclone warning in Bangladesh. It not only prepares warnings but also provides the public media with warnings about dissemination (Miyan, 2005); the Cyclone Preparedness Program (CPP), meanwhile, is responsible for the dissemination of warnings to the coastal villagers. The Storm Warning Centre (SWC) is a specialized body of the BMD, responsible for weather forecasting and issuing warnings to sea and river ports, public, non-governmental organizations (NGOs), relief and rehabilitation authorities and local level administrative officials (Chowdhury 2002). The CPP volunteers ensure the hoisting of flags. One flag is hoisted for caution (signal no 1, 2, and 3), two flags for danger (signal no. 4 and 6) and three flags for great danger (signal no. 8, 9, and 10). Such displays can serve as a means of warning dissemination and at the same time prepare the community for an appropriate response, which will in turn increase the effectiveness of warning (Miyan 2005). In recent times, cyclone

warning systems have improved a lot because of information and communication technology, especially Internet, mobile phones, and improved broadcasting technology with global television and radio channels (Hossain et al. 2008). However, though significant improvements have been made in cyclone warning in Bangladesh, it still has several limitations. The existing warning system is cumbersome, not easy to understand and even sometimes incomprehensible to educated people as well (Haque and Blair 1992, Miyan 2005). Due to the criticism of having different signal systems for maritime and river ports, the BMD has recently unified the warning system with eight sets of signals using the Beaufort scale (Habib 2009). In the past, in many cases warnings were inaccurate on the landfall time of destructive cyclones. This is not a new phenomenon, as is revealed when the earlier studies of Frank and Hossain (1971), after the great Bhola cyclone in 1970, compared with a study carried out after Cyclone Sidr in 2007 (Hossain et al. 2008). These weaknesses in the cyclone warning system of Bangladesh need to be addressed properly to improve the efficiency of the existing warning system for making people proactive and more resilient against future cyclones.

Interaction between heat and moisture produces cyclone. Low pressure is the main weather factor associated with cyclones. Cyclones can cause devastating damage and knock out electric and water supplies. It is recommended people should have a supply kit ready in case a cyclone hits their area.

Bangladesh does not have any satellites of its own. The three satellite ground stations, situated in Betbunia, Talibabad, and Mohakhali, are used to receive feeds from other satellites. Bangladesh Space Research and Remote Sensing Organization (SPARRSO), a government own organization under the Ministry of Defense provides storm predictions and early warnings using feeds from NASA and NOAA's satellites. The warnings are usually disseminated in a scale of 10, with 10 being used for the deadliest storms.

Table-2.8.1 Cyclone signal system for maritime and river ports in Bangladesh.

No	Maritime Signals		Reverie Signals	
1	Warning Signals	Wind speed (kph)	Warning Signals	Wind speed (kph)
2	Distant cautionary Signal No - 1	51-61	Not Applicable	N/A
3	Distant cautionary Signal No - 2	62-88	Not Applicable	N/A
4	Local cautionary signal No-3	40-50	Local cautionary Signal No-3	40-50
5	Local Warning Signal No-4	51-61	Local Warning Signal No- 4	51-61
6	Danger Signal No-6	62-88	Danger Signal No- 6	62-88
7	Great Danger Signal No-8	89-117	Great Danger Signal No- 8	89-117
8	Great Danger Signal No- 9	118-170	Great Danger Signal No- 9	118-170
9	Great Danger Signal No- 10	More than 170	Great Danger Signal No- 10	More than 170

Source: Adopted from BMD (2009)

CHAPTER THREE

STUDY AREA AND RESEARCH METHODOLOGY

3.1 Study Area

Maheshkali is an Upazila of Cox's Bazaar district. It is an island in the Bay of Bangal. Moheshkali consists of four major isles, namely Maheshkhali, Sonadia, Dhal Ghat and Matar bari. Sonadia is currently being considered by the Government of Bangladesh to build a deep sea port. The Upazila consists of eight unions and a pourasava.

Dated back from time immemorial Maheshkhali island has fallen victim to cyclones and tidal surge that led to great loss of lives and property inflicted upon the inhabitants. In 1991, a strong cyclone devastated Maheshkhali once again causing enormous loss of lives and property.

Maheshkhali Upazila has eight unions. They are Materbari, Dholghat, Kutubzum, Huyanok, Kalarmar Sora, Shaplapur, Boro Maheshkhali and Soto Maheshkhali. It has also a pourasava. Out of eight unions and a pourasava seven unions and the lone pourasava have been covered for questionnaire survey. Covered unions are Materbari, Dholghat, Kutubzum, Huyanok, Kalarmar Sora, Shaplapur, and Soto Maheshkhali. Survey was also conducted in the lone Maheshkhali pourasava.

Table 3.1 Basic information of Study Area

Description	Information
Name of the Study Area	Maheshkhali Upazila
District	Cox's Bazaar
Total Area	388.50 Sq.k.m
Number of Unions in Maheshkhali	08
Number of Pourashava	01
Number of Villages	180
Population	2,56,546
Hospital	01 (50 Beds)
Number of Cyclone shelters	94
Number of Earthen Killa	05
Major Occupations	Agriculture, Fishing, Business and Service
Literacy Rate	28% (2001)

Source: Google Map & http://www.lged.gov.bd/ViewMap.aspx

Figure 3.2 Study area in the Map

3.2 Methodology

Methodology is the systematic, theoretical analysis of the methods applied to a field of study, or the theoretical analysis of the body of methods and principles associated with a branch of knowledge. It, typically, encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques. (Wikipedia, access date 30/09/13)

A Methodology does not set out to provide solutions but offers the theoretical underpinning for understanding which method, set of methods or so called "best practices" can be applied to a specific case.

This research was based on both secondary and primary data. Primary data had been collected through key informant interviews and a questionnaire survey. By assuming a 95 % confidence level, the total sample size for the questionnaire survey was conducted among 75 individuals. Samples had been drawn proportionately by using simple random sampling from different locations. However, this had provided opportunity to select individuals without any bias. Descriptive statistics had been used to analyze data, while in a few cases other statistical tools were used to identify similarities and differences among the samples. The study had focused on the respondent's perception of various awareness-related issues and causes of loss of lives and property. For a deeper understanding, cross sectional data and expert opinion had been sought for confirmation of findings. Reliability and validity of study variables had been properly explored through triangulation.

3.2.1 Questionnaire Development and Field Testing

Questionnaires were designed and developed taking into the objectives and purposes of the study. Once the questionnaire was developed it was field tested to determine its relevance. After receiving feedback from the field, the questionnaire was fine tuned to accommodate the feedback.

3.2.2 Questionnaires Administration

Questionnaires were administered among the respondents in seven unions of Moheshkhali Upazila. About ten respondents were selected from each Union for the purpose of

the study. . While selecting respondents, gender, education, age and geographical location were considered to get a fair view of the perception of the respondents of all strata. A few field enumerators were employed to administer the questionnaires.

3.3 Conceptual Framework of the Study

Conceptual framework in figure 3.3 describes the independent variables, intermediary variables and dependent variables and their interaction in a graphical ways. Here independent variable is emergency transmission of Bangladesh Betar and intermediary variables are early warnings, social environment, preparedness, number of cyclone shelters, volunteer's activities, and disaster management committee's activities and transport facilities. Bangladesh Betar's emergency transmission assumed to influence the intermediary variables which modify self efficacy and self efficacy plays positive role in risk reduction.

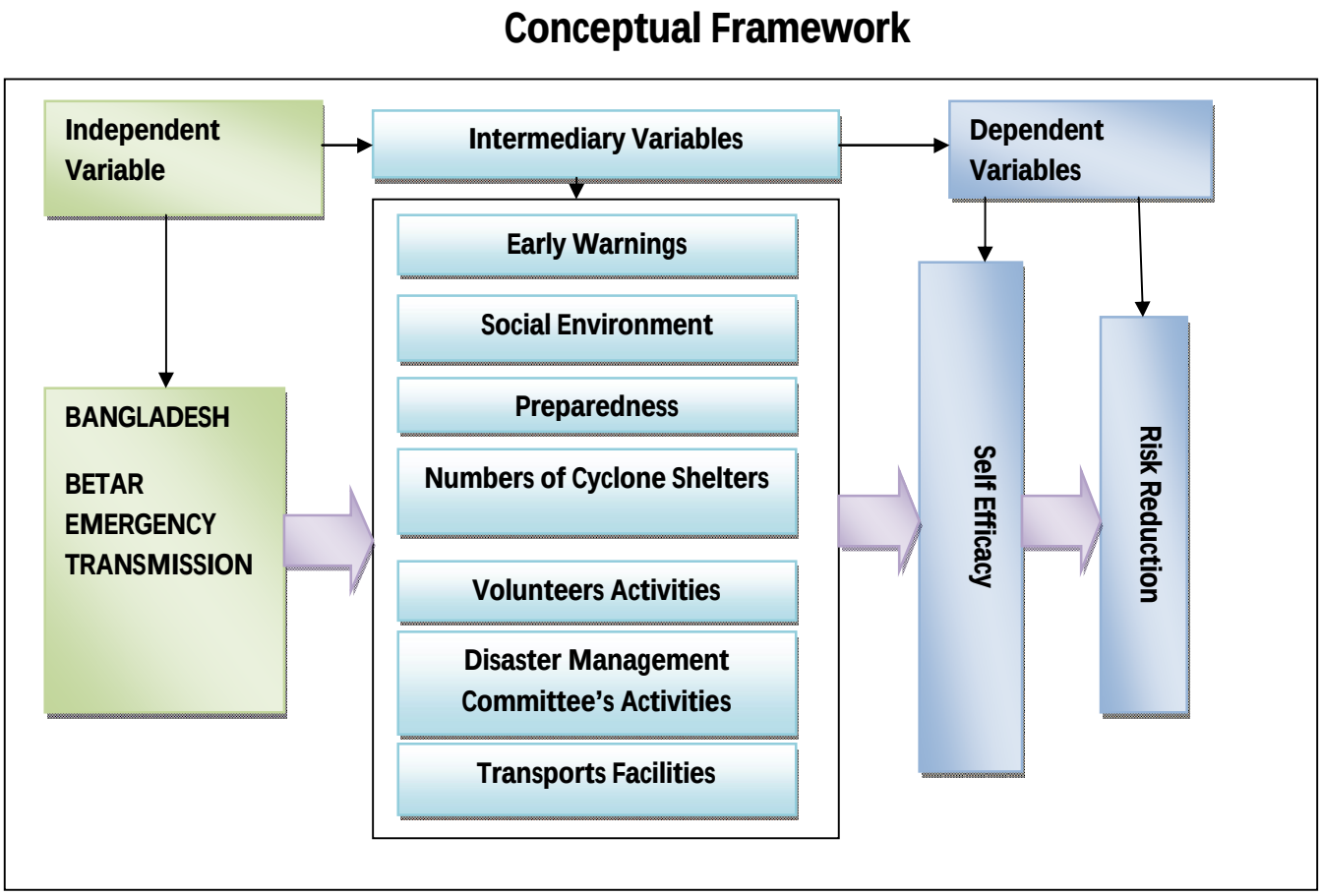


Fig- 3.3 Conceptual Framework

3.4 Data Source

3.4.1 Primary Data

Primary data were collected through questionnaire survey from 75 respondents from seven unions and seven key informants. For these purposes a questionnaire was developed for general survey and a check list was developed for Key Informant Interview (KII). The questionnaire had both open and close ended questions. Some parts of it were designed to get opinions and comments on specific issues to get deeper knowledge and insight. Data have been collected through field visits and the field visits were made during the month of March 2014.

3.4.2 Secondary Data

Secondary data are important for getting an insight of the research topic. Secondary data have been collected from published journals, books, articles, government documents, policy papers, manuals, maps, web based documents etc.

3.4.3 Data Processing

The data were accumulated, categorized and analyzed keeping in mind the objectives of the study. The analysis of the quantitative data has been done with the help of statistical tools like Statistical Package for Social Science (SPSS, version 16), MS Excel etc. Descriptive statistic such as frequency distribution and percentage are also used to analyze data. The qualitative information is presented in a narrative form. Moreover, in some cases charts and tabular presentation have also been used to present the findings of the study. In fact, quantitative method was used to generalize and identify prevalence from the data provided by the respondents and qualitative method was used to explain the significant phenomenon, causalities, social realities and experience.

CHAPTER FOUR

FINDINGS

In this chapter, primary data collected from field by Questionnaire Survey and Key Informant Interview (KII) are systematically processed and analyzed to extract overall finding in terms of Bangladesh Betar's role in reducing risk associated with natural disaster like cyclone and tidal surge. The data had been collected from two perspectives, from demand side, viz. people receiving information and help during cyclone time and from supply side, viz. people delivering services during cyclone time, viz. government officials, organization and volunteers working in the Upazila. Finally an attempt is made to make brief conclusion of the discussion.

4.1 Personal Profile of the Respondents

4.1.1 Age

The distribution of the respondents on the basis of age is shown in figure 4.1. The age of the respondents represent a well mixture of the young and the old. In the table it is shown that highest respondents (41.3 %) fall in the age group of 31 to 40 years where 92% respondents are below the age of 50 years. 6% respondents age is below 20 years and the same numbers of respondents are older than 50 years.

Table 4.1.1 Distribution of the Respondents by Age (n=75)

Age Group	Frequency	Percent	Cumulative Percent
Less than 20 years	6	8.0	8.0
20-30 years	11	14.7	22.7
31-40 years	31	41.3	64.0
41-50 years	21	28.0	92.0
More than 50 years	6	8.0	100.0
Total	75	100.0	

4.1.2 Education

The distribution of the respondents on the basis of education is shown in figure 4.2 As far as education is concerned the respondents are basically from six strata. They are (i) no education (ii) primary pass (iii) below S.S.C (iv) S.S.C pass (v) H.S.C pass and (vi) graduate and above.

Table 4.1.2 Distribution of the Respondents by Education (n=75)

Education Level	Frequency	Percent	Cumulative Percent
No Education	6	8.0	8.0
Primary Pass	14	18.7	26.7
Below S.S.C	13	17.3	44.0
S.S.C Pass	14	18.7	62.7
H.S.C Pass	11	14.7	77.3
Graduate and Above	17	22.7	100.0
Total	75	100.0	

The highest numbers of respondents (22.7%) are having educational qualification equivalent to graduation or above. 18.7% respondents are S.S.C passed while 14.7% are H.S.C passed. Among all respondents 92% are literate and only 8% respondents are illiterate.

4.1.3 Occupation

Table 4.1.3 shows the distribution of the respondents on the basis of their occupation. Highest percentage of the respondents are from service (28%), followed by business (24 %), fisherman (16 %), house wife (14.7%) and agriculture (9.3%).

The highest numbers of respondents from service indicate that many a people are employed in other people establishment as the area is growing up as a local business hub. Many people are employed in salt producing factories. On the other hand, many people are also setting up their own small business enterprises.

Table 4.1.3 Distribution of the Respondents by occupation (n=75)

Profession	Frequency	Percent	Cumulative Percent
Agriculture	7	9.3	9.3
Business	18	24.0	33.3
Fisherman	12	16.0	49.3
House Wife	11	14.7	64.0
Service	21	28.0	92.0
Others	6	8.0	100.0
Total	75	100.0	

4.1.4 Gender

Table below shows the distribution of the respondents on the basis of their sex. Among the 75 respondents 20 respondents are female and 55 respondents are male. Representation of the female respondent is of special importance as they are the worst victim of any natural calamities.

Table 4.1.4 Distribution of the Respondents by sex (n=75)

Gender	Frequency	Percent	Cumulative Percent
Male	55	73.3	73.3
Female	20	26.7	100.0
Total	75	100.0	

4.2 Reaching People in Terms of Cyclone Warning Information Dissemination

4.2.1 Weather Bulletin Listening Pattern

In response to a question, how often they do listen to weather bulletin, highest 43% respondents opined that they do listen to weather bulletin on any electronic media (radio or television) in time of cyclone or tidal surge. Only 12% of the respondents always keep an eye on

the weather reporting irrespective of weather-condition and another 12% very often listen to or watch weather reports on media.

Table 4.2.1 Weather Bulletin Listening Pattern (n=75)

Listening Pattern	Frequency	Percent	Cumulative Percent
Rarely	2	2.7	2.7
Sometimes (in time of cyclone only)	43	57.3	60.0
Often	12	16.0	76.0
Very Often	9	12.0	88.0
Always	9	12.0	100.0
Total	75	100.0	

In response to another question about special weather bulletin cent percent respondents told that they all listen to or watch weather reports during emergency time like cyclone or tidal surge. It signifies that people of the Moheshkhali are especially concerned with weather as their lives and livelihood are somewhat regulated by the whims of the weather.

4.2.2 Sources of Information about Cyclone Warnings

About the sources of information the respondents were given seven options, viz. Bangladesh Betar, other radios, television, news papers, local government, Bangladesh Red Crescent Society & CPP and others that included peers, relatives, neighbors etc. (shown in table 4.2.2).One could choose more than one options here. To this question 89.3 % respondents, among other sources, relied on Bangladesh Betar for their main source about cyclone and tidal surge.

Table 4.2.2 Source of Information

Sl. No.	Sources of Information	Frequency	Percent
1	Bangladesh Betar	67	89.3
2	Other Radios	18	24.0
3	Television	48	64.0
4	News Papers	12	16.0
5	Local Government	32	42.7
6	Bangladesh Red Crescent Society	62	82.7
7	Others (Peers, Relatives, Neighbors, etc)	7	9.3

Bangladesh Red Crescent Society stood second as the source; as many as 82.7 percent respondents took it in their confidence followed by television (64%), local government (42.7%), other radios (24%), news papers (16%). Seven in75 or 9.3% get the information from their friends, neighbors or relatives. It is important to note here that respondents do not rely on single source during emergency.

4.2.3 Cyclone Signals

Signals understanding regarding cyclone seem to be satisfactory among the respondents. Among all 75 respondents none told that they do not understand signals at all. More than 37% respondents (28 among 75 respondents) claimed that they understand all the signals used to communicate the severity of cyclone, while highest 48 respondents told that they understand some signals. Only 14.7% respondents told that they do understand cyclone signals superficially.

Table 4.7: Signal understanding

Signal Understanding	Frequency	Percent	Cumulative Percent
Understand all signals	28	37.3	37.3
Understand some signals	36	48.0	85.3
Understand superficially	11	14.7	100.0
Do not understand	00	00	00
Total	75	100.0	

4.3 Impact of Bangladesh Betar's Transmission in Preparedness for Cyclone

4.3.1 Refuge during Cyclone

The two tables bellow describe the decision about taking shelter during cyclone time. Table 4.3.1 tells about how many respondents do take shelter during cyclone time. Among the respondents 90.7% say that they do take refuge during cyclone while 06.7% say they do not go anywhere to take shelter at this time, 2.6% remain undecided.

Table 4.3.1: Refuge during cyclone

Decision about Taking Refuge	Frequency	Percent
Yes	68	90.7
No	5	6.7
Undecided	2	2.6
Total	75	100.0

4.3.2 Places of refuge during cyclone

Table 4.3.2 describes the places where the respondents usually take shelter during cyclone or tidal surge. Among 75 respondents 68 respondents seek refuge during emergency. Of the 68 respondents 82.4% take refuge in the cyclone shelters to protect them from the danger of cyclone or tidal surge while 05.9% move to other safe places and only 08.8% stay home during cyclone as they feel safe at their home. This is because their houses are strong, as they feel, to survive the onslaught by the furry of natural calamities. Among 68 respondents 02.9% remain undecided about the places where they would seek refuge during cyclone or tidal surge.

Table 4.3.2: Places of refuge

Places of Refuge	Frequency	Percent
Cyclone Shelters	56	82.4
Other Safe Place	4	5.9
Stay Home	6	8.8
Undecided	2	2.9
Total	68	100

4.4 Reasons for Staying Home

To a question why they do stay home during cyclone 13 respondents, out of 75, identified some of the reasons which have been summarized in the table 4.4. These13 respondents have picked up more than one reason for the decision for staying home despite the deadly threats of cyclone. Out of 13, seven agreed that long distance and poor road communication is one of the causes for not moving out of their houses to avoid danger of cyclone. Five respondents said that fear of burglary is a cause while another six pointed out that limited capacity and poor condition of cyclone shelters bar them from going there. Five people said that age is a factor and very old person cannot move to cyclone shelters. Out of 13 respondents six remains at their respective houses as they feel that their houses are strong enough to sustain the wind speed of cyclone or it is in some high land which does not submerge during cyclone or tidal surge. It is again important to note that respondents could pick more than one option.

Table 4.4 Reasons for staying home

Reasons for Staying Home	Frequency	Percent
Long Distance & Poor Road Network	07	53.8
Fear of Burglary	05	38.5
Limited Capacity and Poor Condition of Cyclone Shelters	06	46.2
Too Old to Move	05	38.5
Other Reasons (Houses are strong)	06	46.2

4.5 Bangladesh Betar's Role in Preparedness during Cyclone

To a question if Bangladesh Betar helps them preparing for any ensuing cyclone 85.3% of the respondents have said positively about betar's role while 05.3% responded negatively. However 9.3% could not exactly identified the role of Bangladesh Betar for making people able to prepare for any forthcoming cyclone. These facts have been summarized in the table 4.5.1

Table 4.5.1: Role in Preparedness

Bangladesh Betar's Help in Preparation for Cyclone	Frequency	Percent
Yes	64	85.3
No	4	05.3
Do Not Know	7	09.3
Total	75	100.0

About the extended question how Bangladesh Betar helps those preparing for the danger of cyclone, the respondents have identified some of the commonly perceived knowledge which they believe to have learnt from Betar are summarized below in the table 4.5.2. Of the 64 respondents 79.69% move to cyclone shelters, 45.3% store dry food and drinking water under ground for further use, 35.9% move their cattle and valuable to safe places, 32.8% keep torch-lights and dry-cell battery handy so that they can use it in time of cyclone when darkness engulf and visibility becomes near zero.

Table 4.5.2: Ways of Preparation

Ways of Preparation	Frequency	Percent
Move to cyclone shelters	51	79.69
Take necessary steps for preserving food and water	29	45.3
Move cattle and valuables to safe places	23	35.9
Keep handy torch light and dry-cell battery	21	32.8
Total	64	

4.6 Use of Information Received from Bangladesh Betar

Answering to a question as to whether they can recall information received from Bangladesh Betar and make use of it, most of the respondents (73.3) have answered in positive while 22.7% said no, 3.9% are not quite sure if they get it from Bangladesh Betar or not.

Table 4.6.1 Recalling information and make use of it.

Information receive from Bangladesh Betar	Frequency	Percent
Yes	55	73.3
No	17	22.7
Not sure	3	3.9
Total	75	100.0

About another question as to how they apply their information in practical lives; they have identified some of the ways which are summarized in the table 4.6.2. These include;

i) Taking necessary steps for safe-guarding their own lives and property.

ii) Making other people aware of danger arising from cyclone when it poses to make its landfall somewhere in their locality.

iii) Some of them take part in volunteer activities. And

iv) Some perform all the activities mentioned above.

Table 4.6.2 Ways of applying information received from Bangladesh Betar

Applying information received from Bangladesh Betar	Frequency	Percent
Taking Necessary Steps for Safe-Guarding own Lives and Property	43	78.2
Making Others people Aware of Danger	15	27.3
Taking Part in Voluntary Activities	11	20.0
Total	55	

4.7 Reasons for Using Radios

Of the 75 respondents 67 respondents somehow get information about cyclone or tidal surge from radio. These 67 respondents further identified some causes for using radios in time of emergency which have been summarized in table 4.7 below.

Table 4.7 Reasons for using radios

Reasons for Using Radios	Frequency	Percent
It is cheap	12	17.9
It is easy to use	24	35.8
There are no other sources other than radio	49	73.1
Its information is reliable	39	58.2
Total	67	

4.8 Other Stakeholders in Disaster Management

When asked about the work of other organization in disaster management in their respective area they have identified the following organizations which are summarized in table 4.8 below. Among the 75 respondents 41.3% feel the work of Union Disaster Management Committee (UDMC), 72% strongly feel the presence of Bangladesh Red Crescent Society. Other organizations are government offices that accounts for 30.7% and NGOs whose presence is very negligible, accounts for only 6.7%.

Table 4.8 Other stakeholders working in disaster management

Other Stakeholders in Disaster Management	Frequency	Percent
UDMC	31	41.3
Red Crescent & Other volunteers	54	72.0
Government Offices	23	30.7
NGOs	5	06.7
Total	75	

4.9 Performances of Different Organizations

When the respondents were asked to grade the organizations based on their performances, they did it in the following ways which are summarized in the table 4.9 below. They used a scale of 1 to 5, where 1 represent very poor and 5 is for excellent, to assess the performances. In the following table we can see that out of 75 respondents 73 have graded Bangladesh Betar with a mean of 4.55, second position goes to Bangladesh Red Crescent Society & CPP with a mean score of 4.16, followed by Government Offices (mean score 4.11), UDMC (mean score 3.74), Television (mean score 3.65), other radios (mean score 3.07). The performances of NGOs were dismal in this area as reflected in the grading and it scored lowest position in the list.

Table 4.9: Grading of Different Organizations based on their performances

Grading of Organizations According to their Performances	N	Minimum	Maximum	Mean	Std. Deviation
Bangladesh Betar	73	3	5	4.55	0.708
Other Radios	60	1	5	3.07	0.954
Television	75	2	5	3.65	0.830
NGOs	67	1	4	2.90	0.631
Union Disaster Mgt. Committee (UDMC)	70	2	5	3.74	0.582
Govt. Offices	63	3	5	4.11	0.785
Red Crescent & Other Volunteers (CPP)	75	3	5	4.16	0.717

4.10 Summary of the Key Informants Interviews (KII)

4.10.1 Reaching People in terms of Cyclone Warning Messages:

The Key Informants (KIs) from government sector, in other words the government officials (all of them are from Moheshkhali Upazilla) emphasized on getting information from offices sitting atop them i.e from the office of the Deputy Commissioner and the Ministry of Disaster Management and Rehabilitation. Many of them also told the name of CPP. But the KIIs from

volunteers and local elites have told that they first gather information from media, especially from Radio and then keep on tracking it from other sources of information such as contacting local authorities and volunteers. Many volunteers have their radio sets even some of them are water proofed, provided by their higher authority.

4.10.2 Role of Bangladesh Betar in Disaster Management

Most of the respondents from the Key Informants (KIIs) opine that Bangladesh Betar has no direct role in disaster management as it is not involved in any committee meant for working in disaster management but certainly it has important role in capacity building regarding fighting natural catastrophes of the people. They say that Bangladesh Betar educate the people about ensuring cyclone and also suggest do's and don'ts for their safety. Some says Bangladesh Betar and some says it is Television that they get information about any depression formed in sea which later leads to cyclone but most of them agree that radio is the fastest media to reach commoners.

They say Bangladesh Betar tells them what to do and what not to do in the event of any ensuing cyclone, which means it educates people with necessary information and knowledge about any imminent danger. Bangladesh Betar provides them with the current position of any cyclone and the exact timing of its(cyclone) landfall They also say that some times forecasting does not match with realities and that creates confusion which ultimately diminishes the reliability of Bangladesh Betar and causes great losses of lives and properties of the people living in Moheshkhali. Recently in the case of forecasting Sidr in 2007 and Aila in 2009 such confusion were made, they add.

Some also opine that Bangladesh Betar could be embedded with CPP or Upazila Disaster Management Committee in the process of disaster management.

4.10.3 Other stakeholders

A host of organizations are working in the field of disaster management in coastal belt. There are committees at different levels such as Union Disaster Management Committee, Upazila Disaster Management Committee, City Corporation Disaster Management Committee and Municipal Disaster Management Committee, District Disaster Management Committee. Besides, many volunteers, organizations and some NGOs are also working in the disaster management area. Without being in the committee or being physically present electronic medias such as Bangladesh Betar, other radios and televisions are also working with an aim to reduce risk arising from cyclones or tidal surge and save life and property of the people living in Moheshkhali. The respondents from the KIs say that except Upazila Disaster Management Committee, other committees are of no good. Other committees such as union, municipal or city disaster management committees are not properly manned. Their existence is not noticeable. They further say that despite limited resources and knowledge Upazila Disaster Management Committee works hard and contribute substantially especially in times of cyclone.

4.10.4 Media

Key Informants are of divide opinions with regards to the major role of media in disaster management in the form of information and warning message dissemination. Some says radio plays the major role, some says Television plays major role. But none denies the role of Bangladesh Betar in disaster management and helping people with information and knowledge to face the life threatening cyclone or tidal surge. About reasons for using Bangladesh Betar they have identified some of the reasons. They are as follows; i) it is cheap, anyone, even the poor of the poorest, can afford to buy one. ii) it is portable, one can easily carry it , even all of the modern days mobile phones have the features of FM radio iii) it is reliable, as the information or message are coming from reliable sources iv) it is easy to use, only a used dry cell battery is enough to run a radio set.

4.10.5 Problems of Bangladesh Betar

When asked about the problem of Bangladesh Betar in terms of reaching people, the respondents from the Key Informants have identified a number of problems with some suggestions.

The respondents complain that the network of Bangladesh Betar is not available in remote places and the programs are not audible. They also feel that the content of the program are not so attractive to entice people as would otherwise increase the number of listeners. Other problems they identify to be are the same as those identified by the survey respondents which have been discussed later in the chapter in "Summary of the Findings."

Some suggestions come up to the problems faced by Bangladesh Betar. Majority of the KI respondents have suggested modernizing Bangladesh Betar with latest technology and the capacity of the transformer should be increased to expand the coverage area deep into the Bay of Bengal. They emphasize on making Bangladesh Betar clearly audible to the listeners with attractive programs. Two of the respondents have said that Bangladesh Betar should be equipped with able man and machines.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Several earlier studies show that mass media and broadcast media are the most effective sources of primary information for warning dissemination though some scholars argue that television is more effective than radio. Some scholars, in fact, suggest that radio is more effective than television (Dillman et al.1982, Drabek and Stephenson 1971). The data of table 4.2.2 suggest that Bangladesh Betar is an important broadcast media for disseminating cyclone forecasting in remote rural coastal areas like Moheshkhali of Bangladesh. The present study finds that 89.3% respondents, among other sources, listen to Bangladesh Betar for getting early warnings. The majority of respondents in all six unions were detached from modern warning facilities but radios. The present study explores the fact that 40% of the respondents regularly listen to weather bulletin and remaining 60% casually listen to it (table 4.2.1).

People holding key positions in CPP listen to Bangladesh Betar for general information about weather. When any depression is formed in the sea they always keep an eye on it through Bangladesh Betar whether it takes a form of a cyclone or not. Fishermen, while they are in deep sea for fishing, have only two sources to know about the cyclone, viz. radio and mobile phone. All these are reflected in the performances evaluation of different stakeholders. About the performances of all stakeholders working in the field of disaster management to reduce risk, Bangladesh Betar was ranked top (table 4.9).

Challenges of risk reduction associated with any natural calamities especially with cyclone is not merely disseminating information about a cyclone which is posing threats to lives and property of a vulnerable section of people. It requires educating them and making available all the logistics that they may require in time of danger. Even after the cyclone is over, coordinated efforts are required to rescue marooned people and provide them with basic medicine, food and drinking water. These efforts can easily be orchestrated through any media like Bangladesh Betar.

Bangladesh is thriving towards becoming a middle income country by 2020. But it has considerable size of people living along the coast line. Its coastal belt stretches from Teknaf in the east to the Sunderbans in the west. It cannot ignore this section of people and let them fall behind the development process. In fact, this section of people will pull back the entire process of development if they are not taken into account for development. As this study has shown that Bangladesh Betar has an important role in information dissemination about cyclone which warns people against any ensuing disaster like cyclone or tidal surge, thus playing an important role in risk reduction arising from the natural calamities, it should be incorporated in the process of disaster management more integrated way and seriously and its capacity should be enhanced to reach the vulnerable people in time of actual need.

In this regard Bangladesh Betar is underutilized. It could be better engaged in time of cyclone or tidal surge which will ultimately result in risk reduction thus helping people to save their lives and property.

5.2 Recommendations

Cyclones and storm surges are recurrent phenomena in coastal Bangladesh, causing significant damage every time they occur. In recent times the cyclone forecasting system in the country has been improved significantly in terms of identifying, monitoring and disseminating warnings among coastal inhabitants. Though progress has been made, criticisms should still be made of the complexity of warning language, the differing warning signals for maritime and river ports, the inaccuracy in the prediction of landfall timing and level of intensity. Coastal inhabitants are quite familiar with the regular occurrence of cyclones and aware of the related potential risks. The present study reveals that the majority of the respondents usually receive cyclone warning. Broadcasting media and word-of-mouth from relatives and neighbors were the main sources of early warnings. Therefore electronic media especially Bangladesh Betar should be made available for both general people and those who are working with disaster management to reduce potential risk. The specific recommendations are as follows;

a) Present study shows that Bangladesh Betar (radio) has played an important role in saving lives and property of the people of coastal areas. As such, the area coverage of Bangladesh

Betar should be increased by installing powerful transmitters so that it could reach the remotest area including deep sea for the fishermen of Bangladesh.

b) Radio sets which are water proof and having alternate power source like in built hand crank generator or solar panel should be made available among the coastal belt people.

c) People along the coast line and specially the fisher men going into the sea for fishing should be encouraged to listen to Bangladesh Betar in case of nonexistence of other form of media or sources that would give them information about the forthcoming danger.

d) Bangladesh Betar should be included in different disaster management committees especially in the district level committees.

e) Training for Betar personnel working during cyclone time should be organised.

f) Attempts should be made to make the contents of SOD familiar to the Beter personnel and other members of the different committees of disaster management.

g) Academics and research institution need to carry out comprehensive studies to find out ways to make media like Bangladesh Betar more effective in disaster risk reduction.

h) Future research on the role of media in reducing risk arising from disaster could be another recommendation.

5.3 Implication for future Research

In this research the role of Bangladesh Betar has been explored in reducing risk arising from the natural calamities. There are others areas where further research can be conducted. Bangladesh Betar is a state owned media. Role of community radio in disaster management can be a subject of interest for future research. In fact role of media in disaster management in Bangladesh has so far attracted fewer researchers. That is why it is important to explore in-depth impact of electronic media especially the community radio on disaster management.

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APPENDIX

Annexture-1

QUESTIONNAIRE-1

ROLE OF BANGLADESH BETAR IN REDUCING RISK ARISING FROM NATURAL CALAMITIES ESPECIALLY IN THE COASTAL BELT OF BANGLADESH.

(A study on the people living in Moheshkhali union of Cox's Bazaar.**)**

Questionnaire (survey)

(Highly confidential, Only for Research Purpose)

Date: SL NO:

A. Identification of the Area

Zila: Thana: Union:

B. Personal Information:				
i. Age: ☐ Less than 20 Years ☐ 20 – 30 Years ☐ 31 - 40 Years				
☐ 41 – 50 Years ☐ More than 50 Years				
i. Gender: (Please put- √)	☐	Male:	☐	Female:
ii. Education:	☐ No education			
	☐ Primary			
	☐ Below S.S.C			
	☐ S.S.C			
	☐ H.S.C			
	☐ Graduate and Above			
iii. Occupation:	☐ Agriculture			
	☐ Business			
	☐ Fisherman			
	☐ House Wife			
	☐ Service			
	☐ Others			

C. Questions

I. Do you listen to cyclone warnings/signals?	☐	Rarely
	☐	Sometimes
	☐	Often
	☐	Very Often
	☐	Always
	☐	Never

II.	Where do you get the cyclone warnings from?	☐	Bangladesh Betar
		☐	Other Radios
		☐	Television
		☐	News Papers
		☐	Local Govt. and NGOs
		☐	Bangladesh Red crescent Societies
		☐	Word-of-mouth (peers, relatives, neighbors)

III.	Do you understand cyclone warnings/signals?	☐	Understand all signals
		☐	Understand some signals
		☐	Understand superficially
		☐	Do not understand

iv. Do you take refuge during cyclone?	☐ Yes	☐ No	☐ Undecided

iv.a. where do you take refuge during cyclone?	☐	Cyclone shelters
	☐	Other safe place
	☐	Stay home
	☐	Remains undecided

iv.b. Why do you stay at home during cyclone?	☐	Long distance and poor road network
	☐	Fear of burglary
	☐	Disbelieve in early warnings
	☐	Depends on God
	☐	Poor capacity of cyclone shelters
	☐	Too old to move
	☐	Others

v.a. Does Bangladesh Betar help you in preparing for forth coming cyclone?	☐	yes
	☐	no
	☐	Do not Know

v.b. If yes, how?	☐	Move to cyclone shelters
	☐	Take necessary steps for preserving food and water.
	☐	Move cattle and valuables to safe place
	☐	Others

vi. Can you recall information that Bangladesh Betar gives during cyclone time and apply it when necessary?	☐	Yes
	☐	NO
	☐	Not sure

vii. Why do you use radios for getting information about cyclone?	☐	It is cheap
	☐	It is easy to use
	☐	There are no other sources other than radios
	☐	Its information is reliable
	☐	Others

viii. What are the other stakeholders (except Bangladesh Betar) involved in disaster management?	☐	Union Disaster Management Committee
	☐	Red Crescent & Other volunteers
	☐	Govt. Offices
	☐	NGOs
	☐	Others

ix. How efficient do you think the stakeholders are? (Please rank from the scale)

(1= Very Poor, 2= Poor, 3= Average, 4= High, 5= Very High)

Name of the Stakeholders	**Scale**				
(1) Bangladesh Betar	1	2	3	4	5
(2) Other print and electronic medias	1	2	3	4	5
(3) Union Disaster Management Committee	1	2	3	4	5
(4) Govt, Organisations	1	2	3	4	5
(5) Red Crescent, CPP and other Volunteers	1	2	3	4	5
Others (Please specify and give rank)					
(6)	1	2	3	4	5
(7)	1	2	3	4	5
(8)	1	2	3	4	5

x. Suggest how dissemination of the cyclone signal message can be improved?

a.

b.

c.

d.

Annexture-2

QUESTIONNAIRE-2

ROLE OF BANGLADESH BETAR IN REDUCING RISK ARISING FROM NATURAL CALAMITIES ESPECIALLY IN THE COASTAL BELT OF BANGLADESH.

(A study on the people living in Moheshkhali union of Cox's Bazaar.**)**

Checklist for Key Informant Interview: Upazila Chairperson, Upazila Nirbahi Officer (UNO), Concerned Officials of the Government Agency, Others related to Disaster Management Committee.

Name and Designation: Sl.No:

District:

Upazila:

Position in the Upazila Disaster Management Committee:

Date of KII:

This interview checklist is designed to guide the discussion session. All questions listed below are to be discussed in details. Notes are to be taken against each topic of discussion.

A.1) What sources do you get information from when a cyclone approaches to your area and poses threats?

2) What role do you play as a Govt. representative when a cyclone approaches to your area and threaten to hit?

3) What challenges do you face in performing your duties? Please mention some.

4) What are the factors that facilitate you to perform well?

5) Suggestion to improve your performances:

a)

b)

c)

B. Relevance of Disaster Risk Management activities.

1) Is it supply driven or demand oriented?

2) Does it contribute to real risk reduction?

D. Comment on the role of stakeholders in Disaster Risk Management. (Please rank from the scale)
(1= Very Poor, 2= Poor, 3= Average, 4= Good, 5= Very Good)

Name of the Stakeholders	**Scale**				
(1) Bangladesh Betar	1	2	3	4	5
(2) Other print and electronic medias	1	2	3	4	5
(3) Union Disaster Management Committee	1	2	3	4	5
(4) Govt, Organisations	1	2	3	4	5
(5) Red Crescent and other Volunteers	1	2	3	4	5
Others (Please specify and give rank)					
(6)	1	2	3	4	5
(7)	1	2	3	4	5
(8)	1	2	3	4	5

D.1) Problems of Disaster Management Committee:

E.1) Suggestions to improve the role of Bangladesh Betar:

Thank you for your kind cooperation

Annexture-3

QUESTIONNAIRE-3

ROLE OF BANGLADESH BETAR IN REDUCING RISK ARISING FROM NATURAL CALAMITIES ESPECIALLY IN THE COASTAL BELT OF BANGLADESH.

(A study on the people living in Moheshkhali union of Cox's Bazaar.**)**

Key Informant's Interview Checklist: Local Elite (School Teachers/Former UP Chairpersons/Religious Leaders/ Others)

Name and Designation: Sl. No:

District:

Upazila:

Date of KII:

This interview checklist is designed to guide the discussion session. All questions listed below are to be discussed in details. Notes are to be taken against each topic of discussion.

A.1) What sources do you get information from when a cyclone approaches to Bangladesh and poses threats?

2) Do you think the Disaster Management Committee is working efficiently?

3) Do you think various volunteers organization working efficiently?

4) Do you think Bangladesh Betar can be used more efficiently in Disaster Management?

5) What are the factors that hinder the performances of Disaster Management Committee and volunteer activities?

6) What are the factors that facilitate performances of different organization?

6) Suggestion to improve performances of Disaster Management Committee and volunteers activities:

a)

b)

c)

B.) Relevance of Disaster Risk Management activities.

1) Is it supply driven or demand oriented?

2) Does it contribute to real risk reduction?

E. Comment on the role of stakeholders in Disaster Risk Management. (Please rank from the scale)
(1= Very Poor, 2= Poor, 3= Average, 4= High, 5= Very High)

Name of the Stakeholders	**Scale**				
(1) ıBangladesh Betar	1	2	3	4	5
(2) Other print and electronic medias	1	2	3	4	5
(3) Union Disaster Management Committee	1	2	3	4	5
(4) Govt, Organisations	1	2	3	4	5
(5) Red Crescent and other Volunteers	1	2	3	4	5
Others (Please specify and give rank)					
(6)	1	2	3	4	5
(7)	1	2	3	4	5
(8)	1	2	3	4	5

D.) Problems of Bangladesh Betar in disaster management and disaster risk reduction:

a)

b)

c)

E.1) Suggestions to improve the activities related to cyclone and disaster management of Bangladesh Betar:

Thank you for your kind cooperation