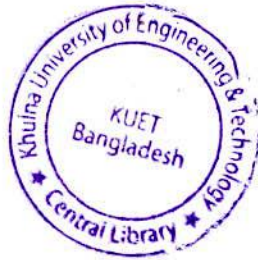


Sustainable Disaster Management in Coastal Areas of Bangladesh

by

Abu Naim Muhammad Abdus Sabur



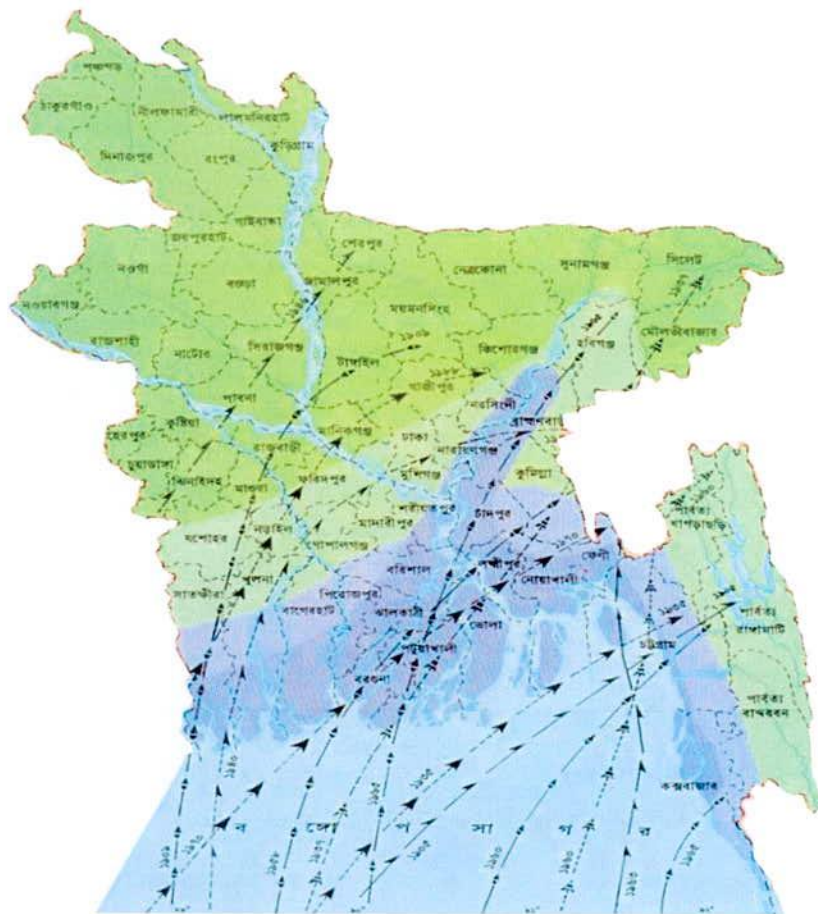
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September, 2009

Sustainable Disaster Management in Coastal Areas of Bangladesh

by

Abu Naim Muhammad Abdus Sabur



A project submitted in partial fulfillment of
the requirements for the degree of Master of Science in Engineering
in
Industrial Engineering and Management
Khulna University of Engineering and Technology
Khulna 9203, Bangladesh.

Declaration

This is to certify that the project work entitled "Sustainable Disaster Management in Coastal Areas of Bangladesh" has been carried out by Abu Naim Muhammad Abdus Sabur in the Department of Industrial Engineering and Management, Khulna University of Engineering & Technology, Khulna, Bangladesh. The above project work or any part of this work has not been submitted anywhere for the award of any degree or diploma.


12/9/09

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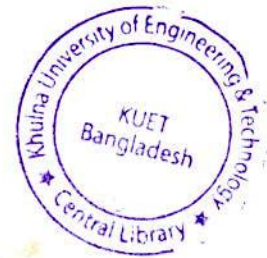
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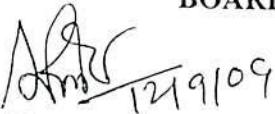
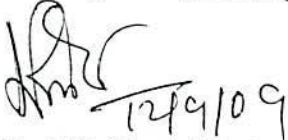


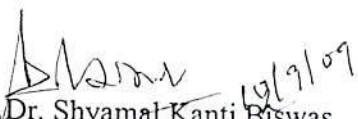
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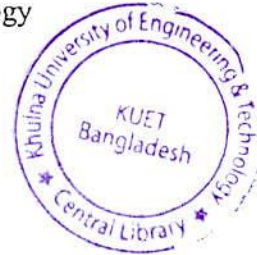


Approval

This is to certify that the thesis work submitted by *Abu Naim Muhammad Abdus Sabur* entitled "*Sustainable Disaster Management in Coastal Areas of Bangladesh*" has been approved by the board of examiners for the partial fulfillment of the requirements for the degree of *Master of Science in Engineering in the Department of Industrial Engineering and Management, Khulna University of Engineering & Technology, Khulna, Bangladesh in September 2009.*

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31 August, 2009

The Author

Abstract

Bangladesh is a country that has been intrinsically associated with natural disaster and vulnerability. Bangladesh's geographical vulnerability lies in the fact that it is an exceedingly flat, low-lying, alluvial plain covered by over 230 rivers and rivulets with approximately 580 kilometres of exposed coastline along the Bay of Bengal. In addition, there are three geological faults running underneath the capital of Dhaka. As a result of its geography, Bangladesh frequently suffers from devastating floods, cyclones and storm surges, tornadoes, riverbank erosion, and drought as well as constituting a very high-risk location for seismic activity. With the prolonged natural calamities and geographical location makes it one of the poorest countries among the third world countries. Whole economy of Bangladesh has been ruined and level of poverty increases with the prevailing disaster scenario.

Disasters are inevitable in human life. There are natural disasters like Cyclone, drought, flood, earthquake etc. However there are some manmade disasters like deforestation, epidemic, pollution, industrial accidents, nuclear explosion etc. Bangladesh is a disaster-prone country of an area of about 1,47,570 sq. km. with population nearing 140 million. Bangladesh becomes the worst victim of natural calamities causing colossal loss of lives and properties.

Disaster management has become an important national and international issue particularly in the context of some highly damaging disasters occurred in recent past over the coastal areas of Bangladesh like Sidr and Tsunami. The coastal areas of Bangladesh have been exposed to natural disasters from time immemorial. Natural disasters in these region increases the vulnerability and in recent years it has been serious threat to the overall development of the country. The aim of the present project would be to highlight techniques and strategies for sustainable disaster management in the coastal areas. The adverse impacts of all the natural hazards affecting socio-economic condition need to be reduced for sustainable development.

Disaster management includes all aspects of planning of and responding to disasters. There are vast opportunities of research and development on such issues and to develop new mitigation planning and rehabilitation techniques that will contribute towards sustainable development of the society. It is also felt that a comprehensive and sustainable disaster

management system should be adopted for preparation, mitigation and prevention of the disaster impacts.

In this research it is investigated how integrated approach of disaster management can help to minimize the loss of lives and property during natural calamities and utilize resources to mitigate the post disaster situation in effective manner achieving sustainable development.

Keeping this view in mind, disaster and related terminologies are briefly described. Data for this paper were collected from Sidr hit Amtali upazila as primary data through a prescribed questionnaire. During study different categories of affected people were interviewed based on the level of practical knowledge, experience and livelihood with the disaster. For relevant study, the disasters in Bangladesh and cyclones recorded are described. For better comparison of the national disaster management to the global disaster management aspect is also included in the paper. The project is mainly based upon the practical experience of Sidr-2007 in the coastal area. So, the related data is illustrated in the paper. At last, the analysis of the findings and proposed solutions with some recommendations are made for betterment of disaster management system. The proper application of the recommendations and solutions will be helpful to reduce the sufferings of the people and there will be possible a sustainable development in the region as a whole.

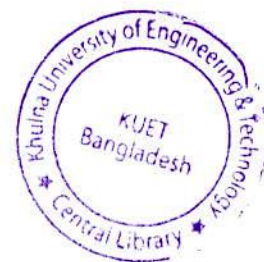


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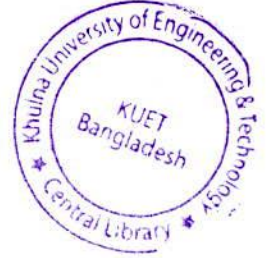


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List of abbreviations

- ❖ ADB- Asian Development Bank
- ❖ ADRC- Asian Disaster Reduction Center
- ❖ IDNDR-International Decade for Natural Disaster Reduction
- ❖ DMB- Disaster Management Bureau
- ❖ UN-United Nations
- ❖ MoFDM-Ministry of Food und Disaster Management
- ❖ IJMD- Bangladesh Meteorological Department
- ❖ FFWC- Flood Forecasting and Warning Centre
- ❖ FFW- Food for Work
- ❖ CPP- Cyclone Preparedness Program
- ❖ SPARSO- Space Research and Remote Sensing Organization
- ❖ CEGIS-Center for Environment and Geological Information System
- ❖ WARPO -Water Resources Planning Organization
- ❖ IWM-Institute of Water Modeling
- ❖ KUET-Khulna University of Engineering and Technology
- ❖ SOD- Standing Order on Disaster
- ❖ DMCs - Disaster Management Committee
- ❖ DRRO- District Relief and Rehabilitation Officer
- ❖ NDMC- National Disaster Management Council
- ❖ IMDMCC- Inter Ministerial Disaster Management Coordination Committee
- ❖ CPFIB- Cyclone Preparedness Program Implementation Board
- ❖ NDMAC-National Disaster Management Advisory Committee
- ❖ DMTFABTF- Disaster Management Training and Public Awareness Building Task Force
- ❖ NGOs – Non Government Organizations
- ❖ FFOCG- Focal Point Operation Coordination Group
- ❖ NOOCC-NGO Coordination Committee
- ❖ CSDDWS- Committee for Speedy Dissemination of Disaster Related Warning
- ❖ DDMG- District Disaster Management Committee
- ❖ UNO-Upazila Nirbahi Officer
- ❖ UDMC- Union Disaster Management Committee
- ❖ UPL- University Press Limited
- ❖ PDMC- Pourashava Disaster Management Committee
- ❖ CCDMC- City Corporation Disaster Management Committee
- ❖ MDG- Millennium Development Goals
- ❖ FRSP- Poverty Reduction Strategy Paper
- ❖ UP- Union Parishad



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Chapter 1

Introduction

Bangladesh is one of the most vulnerable disaster prone countries in the world and that requires the country to have considerable strengthening of her disaster management. The geography of the country not only gives a favorable monsoon; but also causes the catastrophic devastations of cyclone, nor'easter tornado and flood. Since Bangladesh is a low lying country, floods and cyclones of various magnitudes, riverbank erosions occur almost every year causing extensive damage to her life and property. Disasters occur frequently and in such magnitude in Bangladesh that they multiply the problem of poverty and seriously challenge the effort of the country towards self reliance. Disaster hampers much of its development activities every year. In view of the seriousness of the disaster risk, there exists a crying need for research work on disaster management to find out efficient and effective systems for coping with the situation arising out of the natural disasters. It is also felt that a comprehensive disaster management system should be adopted for preparation, mitigation and prevention of the disaster impacts. The project investigates that an integrated disaster management or one-way disaster management headed by government machinery having help from all quarters can ensure better results.

1.1 Objectives

Having an assumption that Bangladesh is lagging behind in disaster governance, the present project tries to make an empirical investigation in order to tackle future catastrophic disasters like cyclone, hurricane and Sidr. The work inquires for a budgetary allocation in order to tackling disaster in Bangladesh. If the government has an allocation for disaster governance in every fiscal year, the quantum of resources mobilization would be sufficient to meet the need of disaster affected people. It would enable govt. to easily allocate money from this accumulated fund in hour of natural disaster. The mechanism can help reduce financial assistance from the donor communities. The selection of the present topic was to partly justify the above arguments as well as to investigate how much losses to human life and property have caused to the selected area and how responsive the government machinery was in handling the situation. Another pertinent issue of the investigation was to formulate future course of action to minimize the loss during and post disaster concerted activity.

Thus, the objectives of the project can be summarized as follows:

- To identify the existing problems of coordination in disaster governance in Bangladesh.
- To suggest measures/ recommendations to help improve traditional disaster governance to integrated sustainable disaster management.
- To earmark government funds in every fiscal year in order to tackle natural disasters, especially in the coastal areas.

1.2 Scope of the study

The disaster of 15 November 2007, popularly known as Sidr-2007, has caused huge sufferings to people's life and loss of properties. Bangladesh has been trying to stand on its feet since the catastrophic Sidr. The present research topic 'Sustainable Disaster Management in Coastal Areas of Bangladesh' is based upon the experience of Sidr 2007 in Amtali Upazila. It encompasses the entire gamut of disaster management in Amtali Upazila under Barguna district. The study covered a small area in comparison to the vastness of the subject.

In order to make it an insightful analysis, some issues of international disaster management were covered so that comparative measures could be explored to cope with the pre-disaster tasks and help to implement the post disaster recovery programs in future.

Details of hazards and vulnerability could not be incorporated in the project. Similarly details of relief operations, FFW program, test relief and other food aided activities were also kept outside of this exercise. The data used in this study are mostly primary and some of them are secondary.

Chapter 2

Literature Review

Disaster management is a vast subject. It encompasses the whole gamut of administrative management and social actions right from policy decisions at the highest level down to community preparedness. Many authors, both from local and overseas origins, have contributed to the disaster management literature.

The work *Disasters in Bangladesh* edited by K. Nizamuddin [2001] discussed about the need for a holistic approach in the management of disaster in Bangladesh and how to overcome the impact of disaster in a combined way.

The book entitled *Options for Flood Risk and Damage Reduction in Bangladesh* [2006] Edited by Kamal Uddin Siddiqui & A.N.H. Akhtar Hossain addresses the impacts of floods on the economy of Bangladesh and flood disaster management were narrated elaborately. Nonetheless, the mitigation program of the government and other agencies was discussed inadequately in this work.

From Crisis to Development: Coping with Disasters in Bangladesh [1982] jointly edited by Hameeda Hossain, Cole P. Dodge and Fazle Hasan Abed described the practical experience of disasters in Bangladesh that lacks material resources. The work demonstrates that this country is blessed with resourceful people. A common Bangladeshi man or woman has mastered the skills of living through an endless string of adverse circumstances. The book also presents the ideas and efforts of the inner strength of Bangladesh in order to construct the future of the country around them.

Natural Disaster Reduction for Nineties Perspectives, Aspects & Strategies [1992] edited by Prof. D.K. Sinha provided a generalized overview of natural disaster, disaster management and mitigation.

Disaster Mitigation in Asia and the Pacific [1991] an ADB publication highlighted some case studies regarding disasters in Asia and the Pacific. In this publication, the characteristics of the country wise disasters and how to overcome them are discussed. The post disaster rehabilitation program taken by different countries was also discussed elaborately.

Natural Disasters and Development in a Globalizing World [2003], an edited book by Mark Pelling focuses on the risks and vulnerability of the mankind throughout the whole world and emphasized the need for addressing the disaster in a concerted manner.

Another work by J.M. Albala- Bertrand on *The Political Economy of Large Natural Disasters with Special Reference to Developing Countries* [1993] emphasized on the socio-economic framework of disaster management rather than on disaster policy prescription. This framework is also intended to facilitate a critical analysis of existing viewpoints on disasters, particularly in relation to the economy. The book also refers especially to developing countries affected by large natural disasters in the last three decades.

Chapter 3

Research Methodology

3.1 General

In order to meet the objectives as outlined above, the study was accompanied in a systematic manner on the present disaster management system of our country. We observed that in our country disaster occurs every year but the management system still has not been modernized. We have no database comprising the individual information reflecting all real pictures of one's assets, family structure, occupation etc. We build the traditional type of shelter although it is not able to sustain against cyclone, flood and tidal surge. We have not developed our national policy yet to meet the need of pure drinking water after disaster.

3.2 Research Methodology

The study analyzes the perception of disaster management both in national and international perspectives. The methodology, which was used in this study, enables to collect valid and reliable information/data and to analyze those data to arrive at correct decision. Keeping this in mind, utmost care has been taken for using proper methods in all aspect of this study.

3.2.1 Selection of Sample:

Data has been collected from the Primary stakeholders of Sidr hit areas of Amtali Upazila under Barguna district. The stakeholders include teachers, officials, farmers and victims of Sidr-2007 in that area.

A questionnaire was formulated by comprising 16 questions to facilitating raw data collection. Through the questionnaire the Sidr victims were interviewed about their past experiences and post Sidr relief operations and recommendations were sought from them.

3.2.2 Sampling Technique:

Sample selected in such a way that collected data fulfill the objectives of this study. As the total numbers of sample were very large, considering the limitations of time, efforts, purposive sampling technique were used in this study.

3.2.3 Period of Research:

Geographically, Bangladesh is situated within the tropical zone. Cyclone occurs in the tropical regions is called tropical cyclones, which are usually destructive and Bangladesh being situated in the tropical zone, is affected by this type of cyclone. Bangladesh is prone of destructive tropical cyclones associated with tidal surge, particularly in the pre-monsoon months of April, May and post monsoon months of October, November. The frequency and magnitude of cyclones in Bangladesh has a very telling effect on her economic development. The impact of natural disasters in terms of casualties and material losses are on the increase due to high population density in the country. Therefore the research work was conducted in the selected area from November, 2007 to April, 2008 for data collection.

3.2.4 Research Instruments:

In order to collect information, a set of interview schedules with the officials both from GO and NGOs. We also made substantial discussion with the local elites and UP chairmen. Keeping the objectives of the study in mind, a primary visit and informal discussion was made with all concerned in order to develop a proposal with practical aspect. Based on the primary survey and knowledge gathered from the people, a set of preliminary questionnaire were prepared before preparing the final Questionnaires, to do pre-test on people. Most of questions were close ended, but few questions were kept open for the interest of the study. This pretest was helpful to find the gaps to locate faulty questions and statement in the draft questionnaires to fulfill the objectives of the study. Necessary additions, alterations and adjustments were made in the questions on the basis of the feedback from pre-test. The finalized version of questionnaires were photocopied and used for collecting information. The data for this project work were collected from the stakeholders using the prescribed questionnaire as shown in appendix F.

3.2.5 Procedure of Data Collection:

Data for this study were collected from the respondents of the study area by using the questionnaire prepared. The interviews were made in Amtali. Sometimes, they hesitated to provide some information about matters relates to him or the information that would go against the local administration and local union parishads. Keeping this in mind, it was tried to explain the purpose of the study to each of the interviewee and established rapport before

starting the interview with every respondent. Whenever any respondent faced difficulty in understanding any question, the researcher took utmost care to explain that particular question clearly to him.

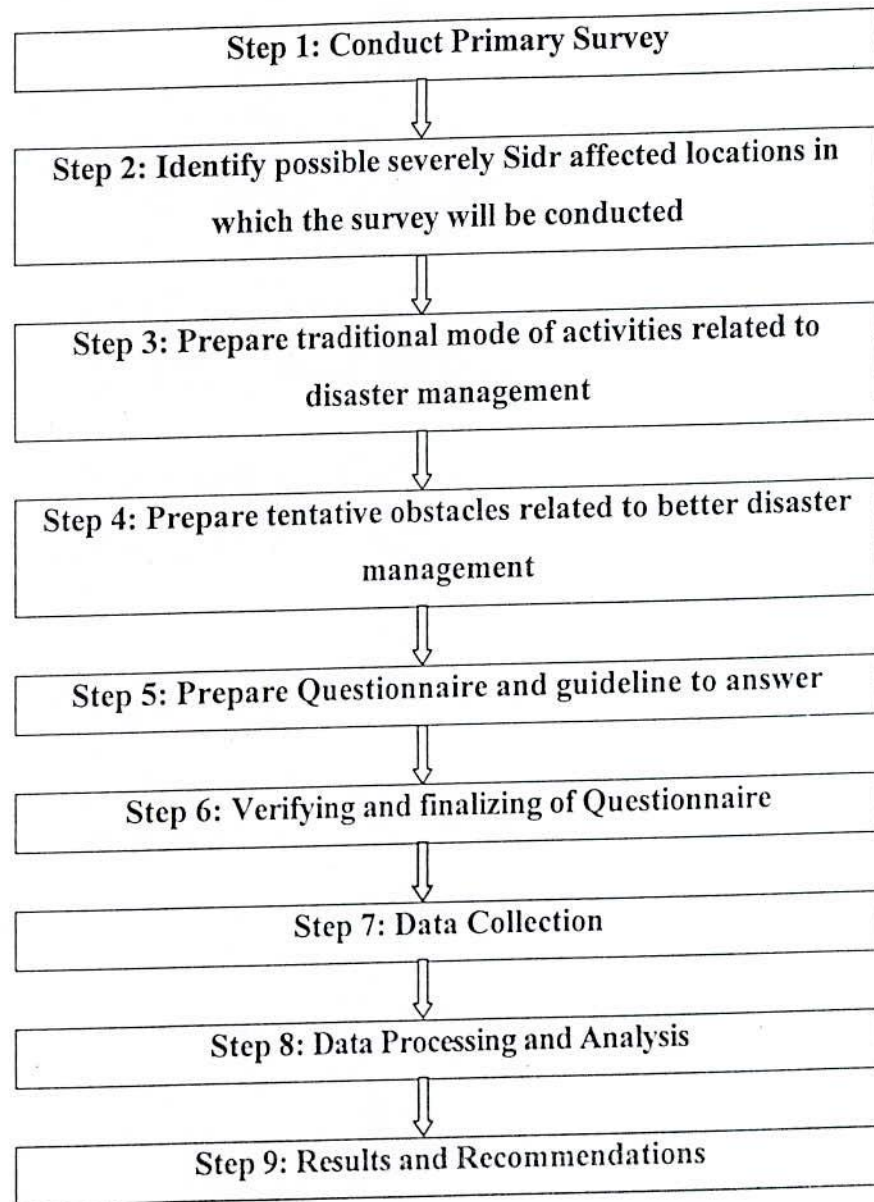
In response to the question related to management, some respondent was reluctant to answer. But after being motivated they tried to give the information as they could remember or understand. Some information they provided on assumption. To overcome this problem, all possible efforts were made by the researcher himself to ensure that the collection of reasonably accurate data from the field. When each interview was over, each schedule was checked and verified to be sure that answers to all items had been properly recorded.

3.2.6 Techniques of Data Analysis:

Based on the prepared questionnaire, data on the variables were considered and the information were summarized, compiled to fit those into tables and finally analyzed in accordance with the objectives of the study. In this way overall picture of the study were identified to point out various activities of the management.

3.2.7 Interpretation of the Results:

On the basis of the results, necessary recommendations were made according to appendix E for the betterment of the sustainable disaster management process. The whole process of study work can be shortly explained by the following flowchart:



Disaster and Related Terminologies

4.1 Disaster

A disaster is a serious disruption of the functioning of a society, causing widespread human, material, or environmental losses which exceed the ability of the affected society (or community) to cope using only its own resources. Disasters are often classified according to their speed of onset (slow or sudden), or according to their cause (natural, man-made or complex).

Disasters may take many forms, and occur as a result of one or more wide range of events, both natural and man induced. The duration of these events may range from a few seconds to many years. The severity of the effects of a disaster may vary according to the degree to which man has created an environment susceptible to damage, that is, an environment in which life and property are at risk.

4.2 Hazards.

A hazard is a rare or extreme event in the natural or human-made environments that adversely affects human life, property or activity to the extent of causing a disaster. The list of hazard types is very long. Many occur infrequently or impact a very small population. Other hazards, such as severe snowstorms, often occur in areas that are accustomed to dealing with them and seldom become disasters. However, from the perspective of a disaster victim it is not particularly useful to distinguish between minor and major disasters. Where natural hazards become disasters, they become potential focal points for International Disaster Relief Assistance (IDRA). Examples include:

- **Sudden onset hazards** -- (geological and climatic hazards) earthquakes, tsunamis, floods, tropical storms, volcanic eruptions, landslides.
- **Slow onset hazards** -- (environmental hazards) drought, famine, environmental degradation, desertification, deforestation, pest infestation.
- **Industrial/technological--system failures/accidents, spillages, explosions, fires.**
- **Wars and civil strife--armed aggression, insurgency, terrorism, and other actions leading to displaced persons and refugees.**

- **Epidemics**--water and/or food-born diseases, person-to-person diseases (contact and respiratory spread), vector-born diseases and complications from wounds.

4.3 Natural Phenomena

Natural phenomena are extreme climatologic, hydrological, or geological processes that do not pose any threat to persons or property. A massive earthquake in an unpopulated area, for example, is a natural phenomenon, not a hazard. So the annual flood along the Nile is an essential element to the well being of its neighboring inhabitants.

4.4 Emergency

Another term closely related to disaster is an emergency. An emergency might be regarded as a particular type (or sub-set) of a disaster. "Emergency" suggests an intense time period and level of urgency. An emergency is bound by a specific period in which lives and essential property are immediately at risk. A disaster can encompass a more general period in which there is a clear and marked deterioration in the coping abilities of a group or community. Unusual initiatives by groups, communities and external intervention are also evident during this period.

Disasters and emergencies are fundamental reflections of normal life. They are consequences of the way societies structure themselves, economically and socially; the way societies and states interact; and the way relationships between decision-makers are sustained. It is essential to make a distinction between hazards and disasters (to include emergencies), and to recognize that the effect of the former upon the latter is essentially a measure of society's vulnerability.

4.5 Vulnerability

The term vulnerability stems from the fact that certain communities or groups have settled in areas susceptible to losses resulting from the impact of a particular phenomenon, hazards or disasters.

Vulnerability is seen as the progression of three stages:

1. Underlying causes: a deep-rooted set of factors within a society that together form and maintains vulnerability.

2. **Dynamic pressures:** a translating process that channels the effects of a negative cause into unsafe conditions; this process may be due to a lack of basic services or provisions or may result from a series of macro-forces.

3. **Unsafe conditions:** the vulnerable context where people and property are exposed to the risk of disaster; the fragile physical environment is one element; other factors include an unstable economy and low income levels.

4.6 Population displacements

This term is associated with crisis-induced mass migration in which large numbers of people are forced to leave their homes to seek alternative means of survival. Such mass movements normally result from the effects of conflict, severe food shortages or collapse of economic support systems.

4.7 Human-made emergencies

Disasters or emergency situations where the principal, direct causes are identifiable, human actions, deliberate or otherwise. Apart from "technological" and "ecological" disasters, this mainly involves situations in which civilian populations suffer casualties, losses of property, basic services and means of livelihood as a result of war or civil strife. Human-made disasters/emergencies can be of the rapid or slow onset types, and in the case of internal conflict, can lead to "complex emergencies" as well.

4.8 Causal Factors of Disasters

Common causal factors play a large role in determining the severity and magnitude of a disaster. The following causal factors are general in nature, and not ranked. They may be more or less applicable to any given society and contributes to determining the vulnerability of a society to disasters.

4.8.1. Poverty: The single most important factor that increases the vulnerability of a people to disaster is poverty. An impoverished people who lack education, usually lack the economic and political clout to cope with the hazards of their surroundings.

4.8.2. Ungoverned population growth: Ungoverned population growth can lead to settlements in hazardous areas susceptibility to disease, competition for scarce resources, and civil strife. Disaster losses are significantly reduced when the people of any given society are organized with effective laws and controls to protect the population from potentially

hazardous areas, access to public utilities, medical care, education, and economic resources. Vulnerability to disaster increases when a nation's capacity to govern does not consider the impact and trends in population growth in potentially hazardous areas. Even in the most benign climates rapid urbanization can create slowly evolving time bombs which could lead to disaster vulnerability.

4.8.3 Rapid urbanization and migration: Rapid population growth and migration are related to the major phenomenon of rapid urbanization. It is characterized by the rural poor or civilians in an area of conflict moving to metropolitan areas in search of economic opportunities and security. These massive numbers of urban poor increasingly find fewer options for availability of safe and desirable places to build their houses. Here again, competition for scarce resources, an inevitable consequence of rapid urbanization, can lead to man-made disasters. Many landslides or flooding disasters are closely linked to rapid and unchecked urbanization forcing low-income families to settle on the slopes of steep hillsides or ravines, or along the banks of flood-prone rivers. Many earthquake victims in urban areas have been impoverished families where the physical location vice the structure of their houses were hazardous, as evidenced by landslides onto the house or out from under it.

4.8.4. Transitions in cultural practices: Many of the inevitable changes that occur in all societies lead to an increase in societies' vulnerability to disasters. Obviously, all societies are in a continual state of transition and change. These transitions are often extremely disruptive and uneven, leaving gaps in social coping mechanisms and technology. These transitions include nomadic populations that become sedentary, rural people who move to urban areas, and both rural and urban people who move from one economic level to another. More broadly, these examples are typical of a shift from non-industrialized to industrializing societies. One example of the impact of these transitions is the introduction of new construction materials and building designs in a society that is accustomed to traditional designs and materials. This often results in new materials being used incorrectly. In disaster prone areas, inadequate use of new construction techniques contribute to houses unable to withstand earthquakes or wind storms.

Compounding the problem is the formation of post disaster communities of survivors who find themselves without social support systems or networks to assist in relief and recovery. Traditional coping mechanisms may not exist in new settlements and the population becomes increasingly dependent on outside intervention for assistance. Conflicting cultural

practices can also lead to civil conflict, and strife. Examples include events leading to violence triggered by religious intolerance.

4.8.5. Environmental degradation: Many disasters are either caused or exacerbated by environmental degradation. Deforestation leads to rapid rain runoff, which contributes to flooding. The destruction of mangrove swamps decreases the coastlines ability to resist tropical winds and storm surges. The creation of drought conditions - and the relative severity and length of time the drought lasts - is mainly a natural phenomena. Man-made contributions to drought conditions include: poor cropping patterns, overgrazing, the stripping of topsoil, poor conservation techniques, depletion of both the surface and subsurface water supply, and, to an extent, unchecked urbanization.

4.8.6. Lack of awareness and information: Disasters can also occur when people who are vulnerable, have not been educated on how to get out of harm's way or take protective measures at the onset of a disaster event. This ignorance may not necessarily be a function of poverty, but a lack of awareness of what measures can be taken to build safe structures on safe building sites. People may be unaware of safe evacuation routes and procedures. Others may be unaware on where to turn for assistance in times of acute distress. Nevertheless, this point should not be taken as a justification for ignoring the coping mechanisms of the majority of people affected by disasters. In most disaster-prone societies, there is a wealth of understanding about disaster threats and responses. This understanding should be incorporated into external assistance initiatives and planning.

4.8.7. War and civil strife: War and civil strife are regarded as hazards or extreme events that produce disasters. War and civil strife often cause the displacement of the population. The causal factors of war and civil strife include competition for scarce resources, religious or ethnic intolerance, and ideological differences. Many of these are also byproducts of the preceding six causal factors of disasters.

Chapter 5

Comparison of Natural Disasters

Geographically, Bangladesh is situated within the tropical zone. Cyclone occurs in the tropical regions is called tropical cyclones, which are usually destructive. Bangladesh being situated in the tropical zones is affected by this type of cyclone. Bangladesh is prone of destructive tropical cyclones associated with tidal surge, particularly in the pre-monsoon months of April, May and post monsoon months of October, November. The frequency and magnitude of cyclones in Bangladesh has a very telling effect on her economic development. The impact of natural disasters in terms of casualties and material losses are on the increase due to high population density in the country. The current chapter demonstrates a comparative study of the natural disasters in Bangladesh in global and regional perspectives.

5.1 Typology of disasters

The term 'disaster' is of administrative origin, which has been applied to any event causing or suffering on a scale sufficient to warrant an extraordinary response from outside the affected area or community. In determining whether or not an event is to be considered a disaster, the word is used in a variety of ways. For example, disaster often refers to disaster agent, such as hurricane, earthquake or flood. A second use of the term refers to physical impact which the agent has, such as damage to property or loss of life (Brown, 1979 : 53). Disaster also has a meaning dependent upon an evaluation of agent. Damage may be evaluated as disastrous in one area but not in another. This depends upon the vulnerability. Finally, disaster can mean the socioeconomic disruption created by the physical event.

In view of above discussion, disasters could be categorized into three: (i) natural, (ii) manmade and (iii) combination of both. Within the category of manmade disasters, there are a variety of conditions resulting disaster. Within the category of natural disasters, the following are noteworthy.

- a) Metrological disasters: storms (cyclones, hailstorms, hurricanes, tornadoes, typhoons and snowstorms), cold spells, heat waves and droughts.
- b) Topological disasters: earthquakes, avalanches, landslides and floods and

- c) Biological disaster: insect swarms (e.g. locust) and epidemics of communicable diseases.

By contrast, manmade disasters include:

- a) Civil disturbances: riots and demonstrations.
- b) Warfare: conventional, nuclear, biological, chemical, guerilla warfare, including terrorism.
- c) Refugees: forced movements of large numbers of people usually across frontiers and
- d) Accidents: transportation accidents, collapse of buildings dams etc, mine disasters and technological failures such as pollution, chemical leaks or nuclear accidents.

In his pioneering work *Disaster Management: A Disaster Manager's Handbook*, Carter W. Nick scaled down global disasters into two categories, which are as follows:

Natural	Manmade
Flood	Fires
Cyclone	Industrial accidents
Tornado	Chemical hazards
Earthquake	Environmental pollution
Drought	Disposal of toxic waste
Volcano eruption	Road accidents
Tsunami	Mass accidents
Landslide	Arsenic pollution
Bushfire	Civil unrest
River bank erosion	

(Source: Carter, 1991:9)

The number of humanitarian disasters, triggered by a natural hazard, has doubled across the globe every decade since the 1990s. Some records show that, however, there has been a fivefold increase in the frequency of disasters, from the 1960s to 1980s, coupled

with increased economic and human losses. In view of the global scenario, Figure 1 demonstrates a comparative study of disasters in Asian countries in recent years.

Table: 01 Frequency of disasters in the world and in the Southeast Asia during 1990-1991

Types of disaster	Global		Southeast Asia	
	Number	Percentage	Number	Percentage
High winds **	1473	21.09	216	24.32
Flood	1198	17.15	197	22.18
Accident	814	11.66	127	14.30
Earthquake	951	13.62	83	9.35
Epidemic	284	4.07	66	7.43
Drought	566	8.10	45	5.07
Fire	663	9.49	35	3.94
Landslide	186	2.66	27	3.04
Volcano	132	1.89	26	2.93
Civil strife	202	2.89	18	2.03
Chemical accidents	247	3.54	13	1.46
Cold wave	55	0.79	12	1.35
Heat wave	33	0.47	8	.090
Tsunami	31	0.44	5	0.56
Famine	35	0.50	3	0.34
Displaced persons	85	1.22	6	0.68
Avalanche	29	0.42	1	0.11
Total	6984	100.00	888	100.00

(Source: SEAR Study : WHO by Mokammel 1992:28)

** High wind includes all cyclone, typhoons, hurricanes and major storms

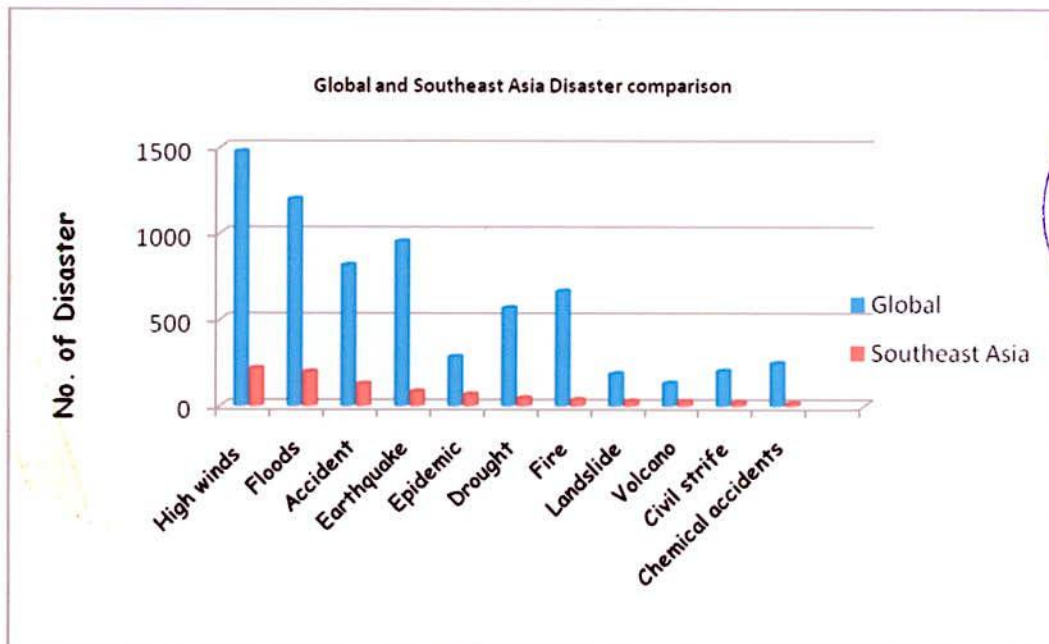


Figure-01 Global and Southeast Asia Disaster comparison (Self compilation)

Table 2 shows that natural and other types of disasters continually affect several countries of the Southeast Asian region, particularly Bangladesh, India and Indonesia. It further indicates the increase in number of events and scope of disaster during the 1960s, 70s and 80s.

Table-02: Countries with the highest prevalence of disasters by ten-year periods, 1960-69 to 1980-1989*

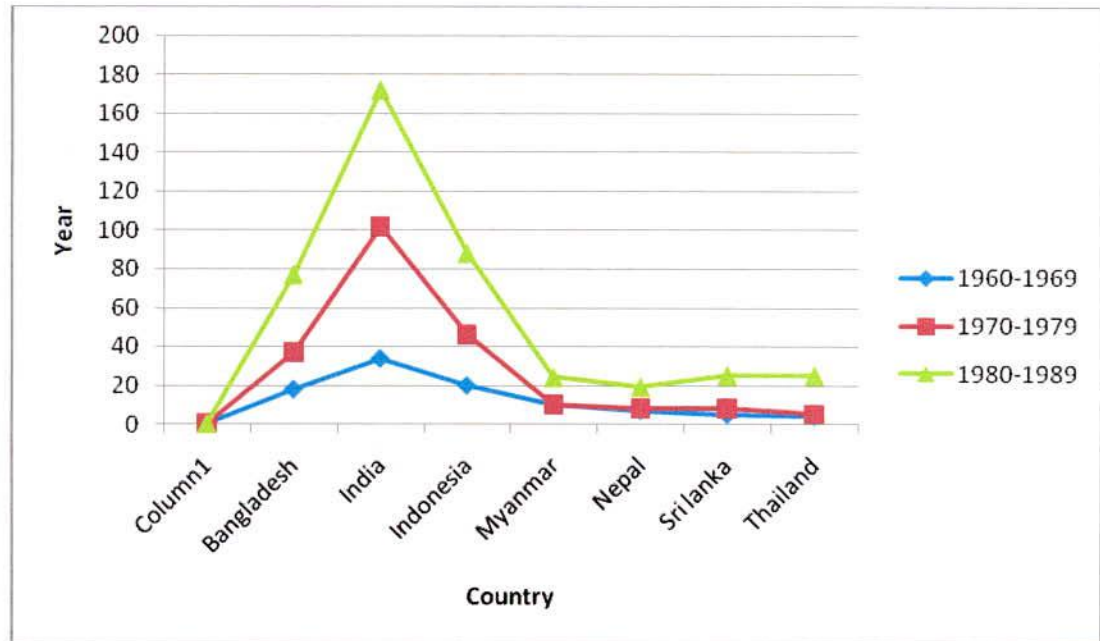
Countries	1960-'69	1970-'79	1980-'89
Bangladesh	18	37	77
India	34	102	172
Indonesia	20	46	88
Myanmar	10	10	24
Nepal	7	8	19
Sri lanka	5	8	25
Thailand	4	5	25

Source: Mokammel, 1992:28

Recent studies demonstrate that Bangladesh has witnessed about 80% of the disasters, the combined disasters of SARRC and ASEAN countries over the past 25 years,

while the other countries in the region have lived through only 20% (Shamsul, 1999:9). Figure:2 demonstrates the progressive trends of natural disasters in Bangladesh in recent decades.

Figure-02 Country-decade disaster propensity



Source : Asian Institute of Technology, Bangkok (Mokammel, 1992 :29)

Figure: 2 shows the reported events only. Lack of reporting for several countries in the region effectively distorts the ranking of countries. Nevertheless, as compared to the regional cyclones and floods, recurrent disasters cause huge loss of lives and severe damage to crops and properties in Bangladesh.

5.2 Disasters in Bangladesh:

In his articles on 'Disaster management', Muhammad Saidur Rahman discussed about different types of disaster and showed ways how to overcome those disasters. The following discussion demonstrates how Bangladesh, being a delta country, has to face other natural catastrophes in a multiple ways.

A large part of the snow melted waters of the Himalayan Mountain drain into the Bay of Bengal. The Ganges River, entering from the west, drains water from the entire southern side of the central Himalayan range through the plains of north central India. The

A large part of the snow melted waters of the Himalayan Mountain drain into the Bay of Bengal. The Ganges River, entering from the west, drains water from the entire southern side of the central Himalayan range through the plains of north central India. The Brahmaputra River that enters Bangladesh from the north drains water from the northern side of the Himalayan as well as the Indian states of Arunachal and Assam. The Meghna River that enters Bangladesh from the north east drains rain water of the Indian states of Meghalaya and Tripura. Water from cross border sources sometimes causes flood during the monsoon season and draughts during the summer as a result of the arbitrary control of Himalayan water by India.

Bangladesh is a riverine country and is situated at the lower most reaches of three great river systems viz. the Ganges, the Brahmaputra and the Meghna, which drain a vast basin having a heavy monsoon rainfall. Since the monsoon clouds burst more or less simultaneously all over the entire catchments, the country's network of rivers has to discharge efficiently an enormous amount of flow coming down from an area 12 times its own size (Kafiluddin, 1991:10). The low gradient of the rivers of Bangladesh and a flat terrain contribute greatly to the causation of floods. As a result of overflowing of the river banks the excess waters submerge the adjoining areas. This type of flood is experienced by small rivers of Bangladesh winding through a hilly catchments area.

In the second type of flood there is an onrush of rain waters down the hill slopes over land and their ultimate pooling on the low lying areas. Large parts of Bangladesh are below the high tide level. During spring tides, tidal waves surge over a wide area of the coastal belt, Bangladesh thus experience normal monsoon floods, flash floods, tidal floods and floods due to the onrush of water

The drought of 1989 which occurred as a sequel to successive devastating floods of 1987 and 1968 had hit areas on drinking water supply situation in affected regions of Bangladesh. Bangladesh experienced 19 droughts, major or minor, within a span of 31 years (Kafiluddin, 1991:13). There were major droughts in 1951, 1957, 1958, 1961, 1972 and then in 1979, when 46.54% of the country was affected.

Minor Earthquake, which is common in Bangladesh, occurs due to sudden and violent movement of the earth's surface and various changes in soil layers. Thrust faulting in a plate to plate interaction area of soil layers causes crustal uplift, leading to production of a sudden wave by which some parts of the surface of the earth either sink or rise above the sea level (Kafiluddin, 1991:14). The usual type of earthquake may cause collapse of

buildings, injuries of human beings, may induce fires, produce floods from collapsed dams and land or mud slides. The earthquake of June 12, 1989 which occurred in Bangladesh, killed a child and injured 20 people. Two thirds of the country including the Dhaka city was hit by a mild tremor lasting for 23 to 50 seconds.

The cyclones and floods pose the greatest risk to Bangladesh on a country level. Sub nationally, the northern and eastern regions of the country are susceptible to earthquakes while the southeast is particularly vulnerable to cyclones, droughts and earthquakes. Bangladesh is also vulnerable to other natural and manmade hazards, such as river bank erosion, tornadoes, tsunami, the high arsenic contents of ground water, water logging, water and soil salinity etc. Bangladesh is also at a great risk from global climate change impacts because of its very low elevation and exposure to various climate related hazards. Although the magnitude of these changes may appear to be small, they could substantially increase the frequency and intensity of existing climate events, such as floods, droughts, cyclones etc.

Table-03: Major disasters in Bangladesh in recent years

Year	Disaster type	Death
1988	Flood	2373
1988	Cyclone	5704
1989	Drought	800
1991	Cyclone	135868
1995	Tornado	545
1997	Cyclone	550
1993	Flood	1050
2004	Flood	747
2007	Flood and Sidr	3353

Source: Self-compiled.

The economy and life style of the country are predominantly dependent on agriculture having strong linkage with climatic conditions. The weather systems in Bangladesh become, at times, hazardous due to violent manifestations of the nature. Natural hazards turn out to be disasters causing colossal loss of human lives and properties. Because of its geographical locations, Bangladesh is one of the most disaster prone countries in the world. The most

prominent natural disasters of which Bangladesh is the worst victim is tropical cyclones followed by storm surges, floods, draughts, earthquakes, tornadoes, river-bank erosions, monga, arsenic pollution etc.

5.3 Cyclones on record

The area that comprises Bangladesh today experienced cyclone since the beginning of its recorded history. A cyclone is a relatively small and intense low latitude pressure area having wind circulation in an anticlockwise direction in the northern hemisphere and clockwise direction in the southern hemisphere (Kafiluddin, 1991:12). The first account of a cyclone and tidal surge in Chittagong is traced in Abul Fazal's *Ain-I-Akbari* that goes on telling a place called Mirsari in Chittagong was hit by a severe cyclone and tidal surge in the 16th century (*Mokammel* 1992:30). A large number of people died and excepting a temple all houses were destroyed. *Ain-I- Akbari* and *Riaz-us-Salatin* recorded the other oldest account of a similarly violent cyclone in Chittagong in 1582. According to the Met office records, on 1 November 1676, the 'Great Bakergong storm' hit Barisal region with a wind force of 220 kmph killing about two lakh people [*The Daily Star*, 17 November 2007]. The storm was considered a human disaster, the records say adding that the tidal surge created by the storm was as high as 10 feet to 45 feet.

Records also suggest that during the colonial period a number of cyclones hit Bangladesh from time to time. On 3 June 1775 a severe cyclone hit Chittagong from 7 pm to midnight, accompanied by torrential rains. Excepting five buildings in Chittagong town, all houses were razed to the ground [*Mokammel*: 1992]. Two years later, in 1777, another cyclone hit Chittagong. Two ships anchored in the port sank. A severe cyclone hit again in 1876 along the coastal belt about 644 kilometers from Teknaf to Khulna.

On 24 October 1897, a severe cyclone hit Chittagong area, killing several thousand people in Kutubdia and Banshkhali. All the shops of Rangamati Bazar were damaged by the cyclone. The velocity of the cyclone between Cox's Bazar and Chittagong was between 113 to 129 kilometers per hour. It damaged the Kutubdia lighthouse built in 1777. The cyclone and accompanying tidal bore killed 14,000 people in Chakoria. The cholera epidemic following the tidal surge killed another 18000 people.

There were also cyclones in the then East Pakistan in 1960 and 1970, On 9 October 1960, a cyclone ravaged Chittagong and hit Noakhali and adjoining islands of Bhola and Patuakhali. In Ramgati alone 3000 people died due to cyclone and tidal surge. On 31

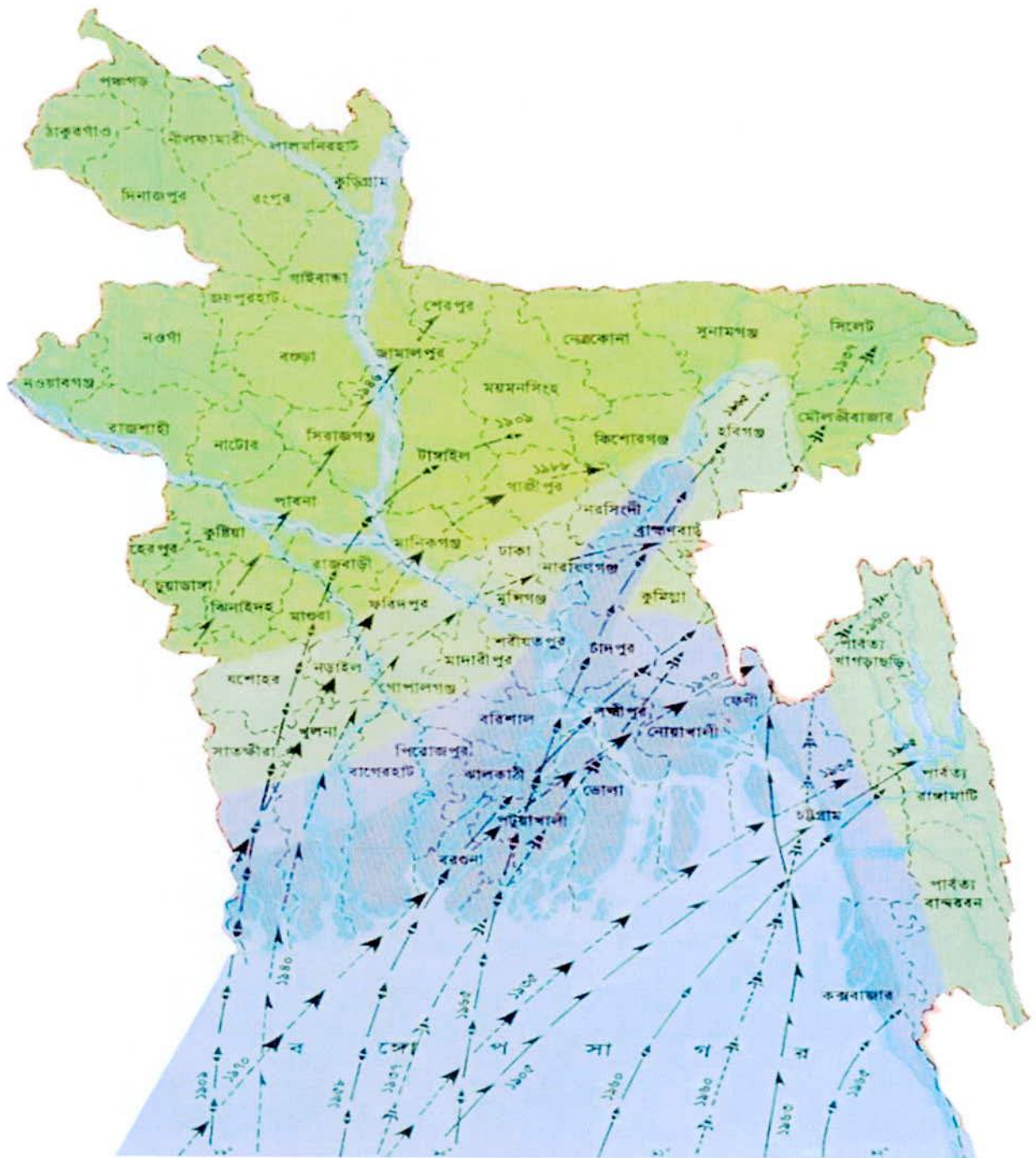


Figure: 03 Cyclone tracking in the history

October 1960, a severe cyclone hit Chittagong with a velocity of 120 mph, the worst affected areas being Kutubdia, Banskhali, Anwara, Gohira, Double Mooring, Patenga and Halishahar. On 30 May 1963, a severe cyclone storm hit Chiittagong area and the southern coastal belt. Wind speed was 100 mph which caused death of ten thousands of people and loss to houses, cattle, boats etc. were substantial. On 12 November 1970 a terrible cyclone,

loss to houses, cattle, boats etc. were substantial. On 12 November 1970 a terrible cyclone, packing a hurricane speed of 222 kmph, ravaged the coastal districts of Barisal, Patuakiali, Nnakhali, Manpura and Bhola and washed away a million people under 4.5 to 10 meter high waves. It has since been remembered as the fearful November 12. As the eye of the storm passed over the Meghna channel, washed away the entire alluvial plain lands from Sandwip to Patuakhali. It was the worst disaster of the century that claimed 500,000 lives [Mokammel, 1992:31]. Chittagong city escaped its full fury but many ships and thousands of boats were sunk or damaged.

Other cyclones that hit post-independent Bangladesh took place in 1974, 1985, 1986, 1988, 1991, 1997 and 2007. On 25 May 1985, a localized cyclone storm with a tidal surge blew over Urir Char under Sandip upazila. Extensive localized deaths and damage took place, claiming 6504 as dead. The tidal bore was 4.5 to 6 meters high.

Tornado which means a violent and destructive whirlwind is also very common in Bangladesh. A severe tornado that had lashed Manikganj is considered to be one of the most disastrous natural calamities in Bangladesh. The cyclone in 1991 and the recent super cyclone called Sidr are the dangerous one in Bangladesh,

On 15 November 2007, the super cyclone called Sidr not only took away thousands of human lives but also caused enormous loss and damage to crops, livestock and other property. In a review article *The Daily Star*, on 17 November 2007, revealed that the cyclonic storm of hurricane strength, Sidr is one of the 10 fiercest cyclones that had hit the regions of Bangladesh in 131 years between 1875 and 2007. Sidr is compared as fierce as the cyclone of 1970 and 1991, whereby 5 lakh and 1.4 lakh people were killed respectively. The above accounts suggest that the aftermath of cyclone killed more people through Epidemics than by the cyclone and tidal surge.

This discussion deals with natural disasters in global as well regional perspective. It shows that natural disaster has direct and indirect loss to property and lives. The severity and intensity of disasters is a great concern for the world community. This concern should be addressed properly with concerted efforts and efficient use of resources. The vulnerable areas like Bangladesh and other south Asian countries should be given more weights in terms of pre and post disaster governance. The sooner the issue will be addressed by the global community the better would be for the endangered humanity in Bangladesh.

Chapter 6

Global Disaster Management

The notion about international cooperation and assistance in disaster management is apparently a new phenomenon. It was initially started with the US Marshal Plan immediately after the World War II. This, in fact, constituted international disaster assistance on a massive scale.

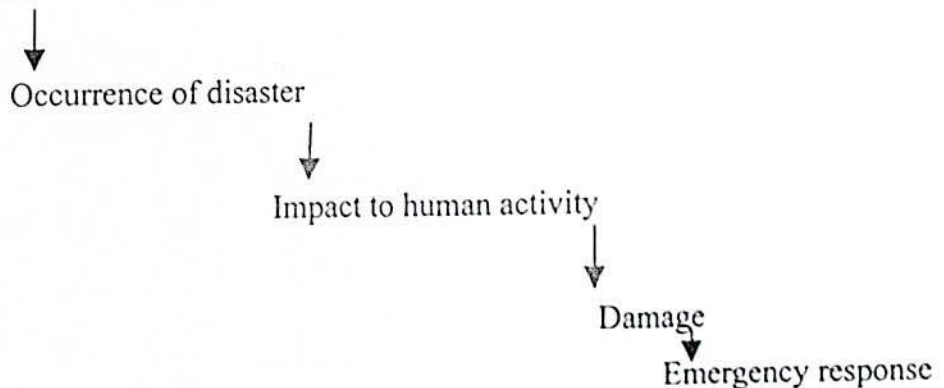
Europe had been shattered by the disaster of global war and the continent was clearly going to be threatened by political, economic and social uncertainties; unless it could have been provided substantial assistance towards recovery (*Carter, 1991:10*). The aim of the Marshal Plan was to rehabilitate die economies of the post World War II in order to create stable conditions where democratic institutions could survive. European nations accepted this plan. The plan's concept of economic aid was so successful that it was later extended to underdeveloped countries worldwide (*ADB, 1991: 11*). In line with these international assistance activities of the US, other programs began to develop. These were concerned with countries, which were getting independence from former colonial masters such as Britain, Holland, France and Germany.

6-1 From traditional to modern approach:

The post-independent countries, in many ways, were accustomed with traditional concept of disaster prevention, whereby disaster was viewed as natural phenomena. After the occurrence of disaster and its damage or impact on human lives, emergency response was followed. This practice could be showed in the following figure:

Traditional perception of disaster management

Natural phenomena



With the change of time a new concept of to directional disaster prevention has been felt needed because traditional one-way disaster management combining top down and bottom up management is suggested nowadays, because it can integrate the total communication flow. Reduction of communication gap is recommended for minimizing the loss.

Moreover, it is also felt that securing safety has to be based on nothing but people's self help efforts. The effective management of disaster prevention facilities cannot be developed unless people who receive benefits from them participate positively in the maintenance of these facilities. People living in dangerous areas in general belong to low income class and their activities are confined to daily struggle for survival so that they have no room to think about disaster prevention facilities were established, a great deal of global effort would be required to maintain and manage them. It is hard for governments of the underdeveloped countries to meet every such need without foreign assistance.

6.2 Emergence of IDNDR

Of late, however, disaster management was picked up as humanitarian issue by the United Nations (UN) during the 1990's. International Decade for Natural Disaster Reduction (IDNDR) has launched in January 1990 by UN and it is said to be a US inspired and UN sponsored program. The IDNDR concept was first presented by Dr. Frank Press, an eminent seismologist and president of US Academy of sciences, in his address at the 8th world congress on earthquake engineering in 1984 (Sinha, 1992:26). Subsequently, on 11 December 1987, the UN in its resolution 42/169 decided to designate the 1990 as the IDNDR. Under the auspices of UN the international community paid special attention to fostering international cooperation in the field of natural disaster reduction. In the resolution the General Assembly also noted the following important aspect:

- Recognizing the responsibility of the UN system for promoting international cooperation in the study of natural disaster geographically and in the development of technique to mitigate risks arising there, it suggests for integrated coordinating disaster relief, preparedness and prevention including prediction and warning.

- Considering the concept of global programs for national disaster reduction is predicted on collaborative efforts among culturally and economically driver nations, together with relevant organizations of the UN system and other

national and international non-government organizations including the scientific and technological institutions concerned.

- Deciding that the objective of this decade is to reduce through concerted international actions especially in developing countries, loss of lives, property, damage and social and economic disruption caused by natural disasters such as earthquakes, windstorms (cyclone, hurricanes, tornadoes, typhoons), tsunamis, floods, landslides, volcano, eruptions and other calamities of natural origin. (SAZANAMI, 1990 : 29).

With the adoption of above aspects, the world body was convinced that concerted international action for the reduction of natural disasters over the course of 1990s should give genuine impetus to a series of concrete measures at the national, regional and international levels. The goals of the UN disaster management were decided as follows:

- To improve the capacity of each country to mitigate the effects of natural disasters expeditiously and effectively, paying special attention to assist developing countries in the establishment of early warning systems when needed.
- To devise appropriate guidelines and strategies for applying existing knowledge, taking into account the cultural and economic diversity among nations.
- To foster scientific and engineering endeavors aimed at closing initial gaps in knowledge in order to reduce the loss of life and property.
- To disseminate existing and new information related to measure for the assessment, prediction, prevention and mitigation of natural disasters through programs of technical assistance and technology transfer, demonstration projects and education and training, tailored to specific hazards and locations and evaluate the effectiveness of those programs (SAZANAMI, 1990 : 29).

The IDNDR has a broad perspective for unified opportunities for the world community to undertake in a concerted manner endeavors for reducing the human, economic, social and often, cultural dislocations infected by natural disasters worldwide. All studies, thoughts, seminars, workshops during IDNDR have emphasized a truly integrated approach of disaster management having dimensions all over the world.

6.3 Types of International assistance:

There is a variety of international assistance available for pre-disaster and post-disaster management. The following are typical examples:

❖ Assistance in prevention/mitigation:

assistance in building a system of dams, aimed to prevent flooding.

❖ Assistance in preparedness:

- Planning: provisions of assistance in the formulation of plans at national and other levels; also with departmental operational guidelines and standard operating procedures.
- Organization: the establishment of a national disaster management centers, office or section. Systems and facilities, provision of assistance with warning system, communication system, emergency operation systems, protection of key installations such as power supplies. Equipment stocking of emergency items such as generators, chain, saws, shovels, cooking equipment, shelter materials and medical equipment

❖ Assistance in response operation:

As with pre-disaster circumstances assistance in response operations also take various forms. Some common examples are:

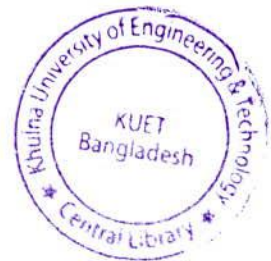
- Monitoring and warning of potential disaster impact: for instance assistance from world meteorological networks or tsunami warning centers.
- Post impact survey and assessment for instance, aerial photographic or visual reconnaissance.
- Provision of emergency assistance team: for instance medical teams, defense force teams and other specialist teams.
- Provisions of emergency equipment and supplies; for instance communications, generator, clothing, shelter materials, food, transport and medical supplies,
- Provisions of specialist personnel; for instance to install and operate water purification plant.

- Temporary provision of major response capabilities; for instance helicopter capability for various emergency roles (including survey and assessment and food distribution), shipping capability for movement of heavy/bulky supplies, off road vehicle capability.

❖ **Assistance in recovery program:**

The post disaster recovery process usually consists of a series of distinct interrelated programs far covering infrastructure, medical and health system, education facilities and so on. International assistance may, therefore, be directed towards a specific recovery program or comprise some form of contribution to overall recovery for example;

- Financial grants or credits
- Building materials
- Technical equipment
- Agricultural rehabilitation
- External feeding programs
- Specialists or specialist teams
- Food for works



❖ **Assistance in future developments:**

In many cases international assistance in post disaster recovery may develop or merge into long term development programs for instance development of transport systems, agriculture programs.

❖ **International and local community participation:**

In integrated disaster management and regional development planning collaboration between international and local community is important.

The ultimate aim of the policy of community involvement is to encourage participation of common people in integrated disaster mitigation to help create a self reliant society, which would be able to contribute towards integrated disaster preparedness, cooperative disaster fighting and post disaster recovery as well as local level integrated planning, integrated implementation, operation and maintenance of project and infrastructure facilities as a whole.

Disaster Governance in Bangladesh

Asian Development Bank publication *Disaster Management: A Disaster Manager's Handbook* discussed about the implication of disaster threat, national disaster management pulley, major requirements for coping with disaster, and the disaster management cycle [Carter, 1991]. Adoption of long term measures for preparation, mitigation of disaster management and facilitating support requirements, for example, training, public awareness and research were also discussed in the book. The current chapter addresses how these measures would be valuable in combating natural disasters in Bangladesh. In order to understand disaster governance in Bangladesh, the chapter focuses on various dimensions of organizational preparedness and administrative mechanism to combat disaster in the country.

7.1 Managing Disaster

Being a disaster prone country, Bangladesh has an elaborate system of managing disaster. Standing orders released by the erstwhile Ministry of Disaster Management and Relief in 1999 emphasized the need for post disaster operations and designed overall strategies and measures under national disaster management program. The standing order on disasters (SOD) assigns roles and responsibilities to relevant government agencies as well as to disaster management committees (DMCs) at all levels. This standing order is a basic guideline for the institutional arrangements and defining the responsibilities of various line ministries, departments, organizations, agencies for effective handling of disaster in Bangladesh.

In the present contest, Ministry of Food and Disaster Management (MoFDM) is the national focal point for disaster management in Bangladesh. It manages disasters through its three agencies: Disaster Management Bureau (DMB), Directorate of Relief and Rehabilitation (DRR) and Directorate General of Food. It is assisted by other government agencies such as Fire Services and Civil Defense Department, Disaster Emergency Centre of Armed Forces Division, Bangladesh Meteorological Department (BMD), Flood Forecasting and warning Center (FFWC), Cyclone Preparedness Program (CPP) etc. MoFDM has technical and scientific partnership with Space Research and Remote Sensing

Organization (SPARSO), Geological Survey of Bangladesh (GSB), Center for Environmental and Geological Information System (CEGIS), Water Resources Planning Organization (WARPO), Institute of Water Modeling (IWM), Bangladesh University of Engineering and Technology (BUET) etc.

A series of inter-related institutions, at both national and sub-national levels have been created to ensure effective planning and coordination of disaster management and emergency response events. Currently, there exists a central national council (Appendix A), district committee (Appendix B) and union level committee (Appendix C) which are concerned with disaster management. At the field level, the office of the Deputy Commissioner at the district level, the office of the Upazilla Nirbahi Officer at the upazila level and the Union Parishad at the lowest level of the administration play crucial roles in disaster management.

Organizational structure of the national level Council /Committees are as follows:

- I. National Disaster Management Council (NDMC): Headed by the Prime Minister the council formulates and reviews the disaster management policies and issue directives to all concerns,
- II. Inter-Ministerial Disaster Management Coordination Committee (IMDMCC): Headed by the Minister in charge of the Ministry of Food and Disaster Management (MoFDM) the committee implements disaster management policies and decisions of NDMC or government.
- III. Cyclone Preparedness Program Implementation Board (CPPIB): led by the Secretary, Ministry of Food and Disaster Management, the board reviews the preparedness activities in the face of initial stage of an impending cyclone.
- IV. National Disaster Management Advisory Committee (NDMAC): The committee is led by an experienced person having been nominated by the Prime minister.
- V. Disaster Management Training and Public Awareness Building Task Force (DMTATF): It is headed by the Director General of Disaster Management Bureau (DMB) to coordinate the disaster related training and public awareness activities of the Government, NGOs and other organizations.
- VI. Focal Point Operation Coordination Group of Disasters Management (FPOCG): Chaired by the Director General of DMB the group reviews and coordinates the

activities of various departments/ agencies related to disaster management and also reviews the contingency plan prepared by concerned departments.

VII. NGO Coordination Committee on Disaster Management (NGOCC): It is headed by the Director General of DMB to review and coordinate the activities of concerned NGOs in the country.

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

Structures at sub-national levels are as follows:

- a) District Management Committee (DDMG): It is headed by the Deputy Commissioner (DC) to coordinate and review the disaster management activities at the district level.
- b) Upazila Management Committee (UZDMC): It is headed by the Upazila Nirbahi Officer (UNO) to coordinate and review the disaster management activities at the Upazila level.
- c) Union Disaster Management Committee (UDMC): It is headed by the chairman of the union parishad to coordinate, review and implement the disaster management activities of the concerned union
- d) Pourashava Disaster Management Committee (PDMC): It is headed by Mayor of pourashava to coordinate, review and implement the disaster management activities within its area of jurisdiction.
- e) City Corporation Disaster Management Committee (CCDMC): It is headed by the Mayor of City Corporation to coordinate, review and implement the disaster management activities within its area of jurisdiction.

The SOD provides detailed roles and responsibilities of all disaster management committee, relevant ministries, divisions, departments and agencies at all levels for normal period risk reduction and during emergency response periods.

7.2 Risk Management

Nowadays, the government acknowledges the need for disaster risk reduction as opposed to the earlier concepts of responding after a disaster as a necessary as well as a *cost* effective approach. Thus priority has been accorded to focus on community level preparedness, response, recovery and rehabilitation (National Workshop 1998:91). Program to train people living in disaster prone areas and for improving their capability to cope with natural disasters is highlighted. Bangladesh has created a simplistic model to guide the disaster management programs including development or review of policy and training course material (National Workshop 1998:90). The model has three key elements and ensures that the move to a more comprehensive risk reduction culture remains central to all efforts.

1. **Defining the risk environment:** This element promotes the use of scientific, analysis (including climate change impacts) as the basis of accurately determining the future risk environment relative to all hazards, all sectors and all geographical areas.
2. **Managing the risk environment:** It promotes the design of risk reduction strategies (community based adaptation programs) as an outcome of the risk assessment process. This ensures prevention, preparedness, response and recovery programs are multi hazard focused and they move from being generic in nature to risk specific. This will enable communities to better understand their changing risk environment and thus become more resilient through proactive risk reduction efforts.
3. **Responding to the threat environment:** This involves responding to an actual threat situation. It helps Bangladesh disaster management officials to clearly articulate the difference between risk reduction and emergency response and how accurately defining risk environment can influence and enhance emergency response systems and decisions.

7.2.1 Planning

Under the MoFDM corporate plan, framework for action 2005-2009 sets out the priorities and broad strategies for achieving reform within the disaster management sector.

The plan recognizes that there are many interdependent elements that make up an effective disaster management system. These elements are listed below as six strategic focus areas (National Workshop 1998).

Focus area 1: professionalizing the disaster management system

Focus area 2: mainstreaming of risk management programming (partnership development).

Focus area 3: Strengthening of community institutional mechanisms (community empowerment)

Focus area 7: expanding risks reduction programming across a broader range of hazards.

Focus area 5: strengthening emergency response systems.

Focus area 6: maintaining and strengthening the national food security system with a focus on ensuring access to sustainable food supplies.

Many of the disaster related matters fall outside the pattern of life, however, it is possible to predict many such matters with reasonable accuracy. Counter disaster measures make heavy demands as administrative legal support. The scale of logistic and administrative baking in legal form is required for debris clearance, survey and for assessment, distribution of relief supplies, repairs of essential services, declaring a particular district or area as calamity area. This is also required for mobilization of resources on an emergency basis and requisitioning of various essential services. Realizing this basic reality, DMB as per the direction of MDMR has drafted the following act/plans:

- I. National Disaster Management Act
- II. National Policy of Disaster Management
- III. National Disaster Management Plans
- IV. Disaster Action Plans for District, Upazila and Union levels

These are under examination at various levels and it is expected that it will be finalized soon. Necessary action plan for simplification of existing cyclone warning signals have been initiated. At present there exist four warning signals for river part and ten warning signals for seaports. The signals are of 200 years old and need to be made simple and understandable. Government has set up a committee to make appropriate recommendation for their improvements. The recommendations of the committee are as follows:

- a. Simplification of existing cyclone warning signals. Further expansion and modernization of FFWC of BWDB and SWC of BMD are being carried out under specific projects.
- b. Modernization of CPP with latest and most updated telecommunication equipment is under consideration of the Government.
- c. Constructions of barrack houses known as *Asrayan* on khas lands are in progress. So far a number of *Asrayan* has been constructed and handed over to the landless poor. More and more *Asrayans* are under consideration.

The above recommendations are still under examination of the government.

7.2.2 Strategies

The management of both risks and consequences of disaster is the disaster management, which includes prevention and mitigation, preparedness, emergency response and post disaster recovery (i.e. rehabilitation and reconstruction). The Government of Bangladesh (GOB) is convinced that disasters costing innumerable lives and millions of dollars to the national economy can be alleviated with preparedness and preventive measures such as hazard and risk analysis, land use zoning, building codes, disaster preparedness training etc. The need for the integration of all efforts to design a total disaster management strategy is now strongly realized at all tiers of the government machinery.

Self-reliance of the community is the keynote for preparedness, response and recovery. This requires community involvement, which is, at present, encouraged for optimum coordination, best utilization of resources and protection of lives and properties against disasters.

Previously mitigation aspect, as part of disaster management, tended to be considered as structural measures for engineering solutions. There is now a growing awareness at government levels that non government structural mitigation measures such as community

disaster preparedness, training and public awareness, linked to micro income generating projects need to be given a high priority. It is therefore, important for the government to continue its efforts in the following directions.

I. International help and experts have to be sought to develop appropriate programs for preparedness involving awareness build up modern communication facilities, enhancement of institutional capacities etc.

II. A continuous process is required to be pursued by the Government to review the existing disaster management arrangements in the country. In the process based on past experience and present changes, the needful, in phases, has to be done by the government at national level for updating overall disaster management in the country so as to keep pace with time and catch up with appropriate technological advancement.

III. At field level as efficient disaster management involves community participation, the government needs to give priority on efforts for increasing awareness of the community, people and households regarding the practical ways of reducing disaster risks and losses. While formulating development programs of the country, the government needs to ensure that the disaster action plans are established in the most disaster prone upazilas and unions with the aim to mobilize communities for preparing and protecting themselves and also for increasing their own capacities to cope with and recover from disaster without looking for outside help.

In summing up the discussion we can say that disaster governance is a complex issue with no simple and single solution. To make it more successful, it needs coordinating and integrated management from all parts.

Chapter 8

The Sidr Experience 2007

The ferocious cyclone that hit Bangladesh on the 15th November came to be known as Sidr afterwards was one of the fiercest cyclones in the history of Bangladesh the country has ever met. The word Sidr in Sinhalese language means 'hole' or 'eye'. The names of earlier cyclones could not be found in the record since the practice of naming them was not a standard those days. Met office sources said the names of future cyclones that are likely to form over the Bay of Bengal and the Arabian Sea have already been selected [Daily Star 17 November 2007]. Following Sidr, the cyclone *Nargis* has hit Myanmar in mid-2008 and caused heavy losses of lives and properties. The next possible cyclones that axe to hit the region will be known as *Aila*, *Khaimle* or *Chapala* and the names were fixed at a meeting of the World Meteorological Organizations (WMO). It is expected, however, that the above cyclones are not necessarily going to hit Bangladesh; they might strike some other countries in the region as well.

8.1 Grounds of cyclone Sidr

Bangladesh faces cyclones and depressions every year during pre-monsoon and post monsoon seasons due to its geographical location. Sometimes more than one strong cyclone hit the country in a year. The cyclones formed on the Bay of Bengal usually hit Bangladesh between April and May and between October and November, during the pre-monsoon and post-monsoon seasons respectively. Weather experts of the Met office say that many of the cyclones hit the country in post monsoon seasons, especially in the month of November. The temperatures of the sea surface needs to be more than 27 degree Celsius to form a cyclone. According to met office sources higher the temperature, greater the probability of forming a cyclone.

During the monsoon season wind streams over the Bay usually have greater force that does not usually allow any cyclonic formation to stay put at a point. But in the post and pre monsoon seasons, cyclones formed on the bay get opportunity to stay put at a point for a much longer period and gather ferocity from evaporating water of the sea and turn into a 'low' first and then a well marked low and then a depression which turns into a cyclone if it

keeps gaining force. When a cyclone gains wind speed of more than 118 mph, weather experts call it a hurricane.

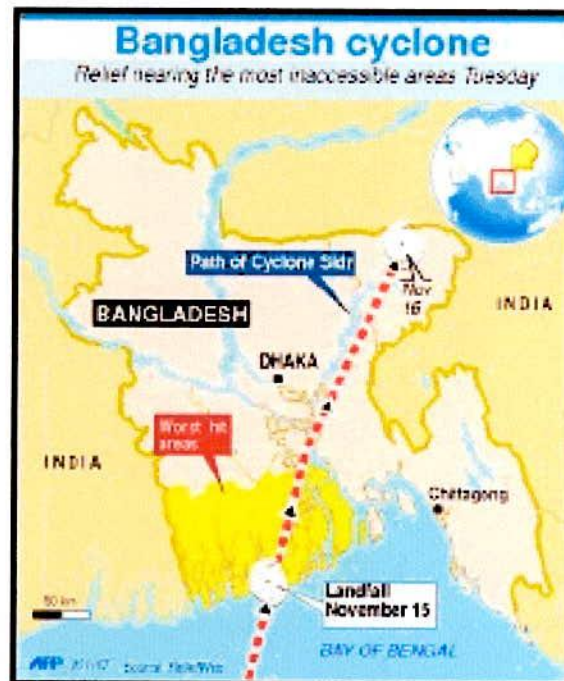


Figure: 04 The Path of Sidr, 2007

Many scientists and environmentalists perceive that the incidents of cyclones in Bangladesh have some links to global environmental change. In their recent study Neil and Nick maintained that all forms of environmental change are in some sense global or more accurately, universal (Neil & Nick, 2003:19). They believe that global warming is the 'Culprit' contributing to the occurrence of recurrent. When it comes to global warming impacts, Bangladesh is often a focal point because it is a nation of 142 million people living in low lying flood prone river deltas and that makes cyclone Sidr a big, glaring warning signal. In a recent report, entitled 'the age of consequences' released by the center for strategic and international studies and the center for a new American security claims that Bangladesh will be threatened by devastating floods and other damages from monsoons caused by rising sea level (Daily Star 20 November, 2007). Although, the frequency and intensity of hurricanes are yet to be definitely linked to global warming - the evidence of sea level rise and its impact for Bangladesh, however, is undeniable.

8.2 Wounds by Sidr

The natural disaster Sidr caused huge sufferings to people's life and of properties in the coastal areas of Bangladesh. Losses are immense and these are not properly estimated because of inaccessibility to the actual scenario due to damage of roads and transport system. Nevertheless, the major damages are as follows:

8.2.1. Damages to shrimp sector

In the aftermath of cyclone Sidr, the country's shrimp or frozen food industry, the second largest foreign exchange earner, fears an estimated loss of Tk250 crore. Shrimp farms in the three southern districts – Bagerhat, Satkhira and Khulna were severely ravaged by Sidr, these are likely to suffer 70% or Tk175 crore could be the estimated loss (The Daily Star 23th November, 2007). Firms in this region are well known for their black tiger shrimp, also called *bagda* Shrimp locally. The rest of the shrimp farms located in Barguna, Patukhali, Pirojpur, Madaripur and Gopalgong suffered 30% loss, amounting Tk75 crore, of fresh water shrimp, locally known as *golda*.

8.2.2. Damages to Sunderbans

About one fourth of the four lakh hectares of forest area of the world heritage site, the Sunderbans has been damaged by cyclone Sidr. It was found in a primary assessment of the forest department (The Daily Star November 1, 2007). One fourth of the Sunderbans forest area has been damaged by the cyclone; 8% to 10% of the forest has been completely damaged and those trees will never grow, while 15% has been partly damaged, a part of which will re-grow, said a forest official. The southeastern part of the Sunderbans sustained the main wound that provides livelihood for more than two million people.

8.2.3. Damages to Education sector

Academic activities of around 10000 institutions in 30 districts have been seriously disrupted because of the devastating cyclone Sidr which badly damaged schools, colleges and madrashas and education materials in these areas. According to the disaster control centre, 1,335 educational institutions in 30 districts, especially Bagerhat, Barguna., Patuakhali, Pirojpur, Bhola, Jhakakathi and Barisal were completely damaged by Sidr.

8.2.4. Damages to livestock sector

The country's livestock sector suffered a loss of around Tk 300 crore in the recent cyclone Sidr. According to the department of livestock services, one lakh cattle and 21.5 lakh poultry birds were killed in the four severely affected districts (The Daily Star, 27 November, 2007) .The department estimated that infrastructures of over 800 cattle farms and 2000 poultry farms were destroyed. Besides, over 45 lakh cattle and 2.7 crore poultry birds were affected in 12 south and southwestern districts. A large number of cattle and poultry are feared to have died due to various post cyclone infectious diseases.

8.2.5. Disease scenario

Spread diarrhea and other water born diseases and acute water crisis are the main problems chasing the survivors. Safe drinking water has become a major concern because the powerful cyclone has also damaged the tube wells. Sweet water ponds have become saline as the tidal surge that swept through the area, came from the bay. The tidal wave entered more than 35 kilometers into the mainland.

8.3 Summary of cyclone Sidr

The following table shows the different data on Sidr.

Table-04: Sidr 2007 at a glance.

Damages Sector	Quantity
Affected district	30
Most affected district	12
Affected union/ pourashava	1950
Affected family	2064026
Affected people	8923259
Fully damaged crops	742826 acre
Partially damaged crops	1730116 acre
Fully damaged households	563877
Partially damaged households	955065
No of death people	3363
No of injured people	55282
No missing people	871
No of livestock death	1778507
Fully damaged educational institution	4231
Partially damaged educational institution	12723
Fully damaged roads	1714 km
Partially damaged roads	6361 km
Damaged bridges/ culverts	1687
Embankments	1875 km
Damaged trees	4065316

Sources : Ministry of Disaster Management

8.4 Disaster management in Amtali Upazila

Experience suggests that the disaster management both in the pre and post-Sidr situation was far from satisfactory and well managed. Due to lack of resources, inadequate transport system and different factors behind the management, it is difficult to handle properly all the activities related to relief and rehabilitation. Another obstacle of the sustainable disaster management is the lack of proper policy in national level.

In Amtali it was tried to implement the program in a systematic and progressive manner. The signal, immediate after the national media, like TV and Radio announcement or transmission, was duly disseminated to the locality through mobile and in the traditional system. The local administration and union parishad were alert enough taking precautionary measures to save the local people. During Sidr, volunteers were engaged to save lives in various vulnerable locations with their utmost efforts and sincerity. The post Sidr operation was conducted according to the government instructions properly. In the survey conducted by the present researcher in the Sidr hit Amtali Upazila found that people were not aggrieved on the government team. The team was careful about the miseries of the people. The local administration was over and again reiterated on well-coordinated relief and rehabilitation efforts to fulfill the real needs of the cyclone affected people. But according to the government existing policy and due to inadequate relief materials the administration was unable to fulfill the current need of distressed people. For example, about 14000 shelters were fully demolished, but assistance to rebuild these shelters was about 5000. The shelters built are not designed to fulfill the future protection against natural calamities. The government tried to cover the maximum affected people, whereas NGOs with their fewer amounts of materials tried to maximization of benefits. So this opposite strategies should be made unified enacting proper policy. We suggest that all the resources irrespective of Go and NGO must be aggregated in a common place, then the distribution will be done in a homogenous way. It will reduce the misunderstanding and malpractice in relief distribution.



8.5 Rescue and Relief operations in Amtali upazila

The present author has surveyed about 100 people in the Sidr hit Amtali Upazila with a questionnaire of 17 questions. The respondents included farmers, school teachers, official and common people. The results are in the following Table.

Table-05: Reaction Matrix

Questions	Reply/Reaction parameter	Percentage	Comments
How the affected or wounded people were recovered and got medical treatment	By the local people	61	Local people are the main rescuers. So local people should be trained in this regard
	Govt. rescue team	12	
	NGO rescue workers	6	
	Armed forces	-	
	Abandoned	3	
Is there any warning from the govt. or others like TV, radio or local micking?	Yes	89	Local govt. / administration was properly active
	No	11	
Is the cyclone shelter capable to make asylum of all?	Yes	0	Bangladesh has inadequate cyclone shelters.
	No	100	
Is there any undue interference or nepotism in the relief operation?	Yes	58	Local Govt. members are not fair to select the beneficiaries and to distribute the relief materials
	No	42	
What was the role of the local govt. members in the relief operations and rehabilitation program	Very good	23	Although local government bodies were playing the key roll, their activities are not praiseworthy.
	Good	45	
	Bad	25	
	Very bad	7	
Who did or managed relief operations well	Local Govt.	25	People trust was on Upazila Administration due its comprehensive efforts.
	Upazila Administration	58	
	(NGOs, local individuals)	17	

What type of relief operation do you prefer?	Joint or Combined	80	Joint or Combined operation ensures better outcomes
	Separate	3	
	Both	17	
Were the relief operation materials adequate?	Yes	80	Relief goods were sufficient
	No	20	
Evaluate the armed forces	Very good	18	Though Armed Forces in aid to civil administration in disaster management bring better results, But unfortunately in Amtali Bangladesh Navy did not do the job in an efficient way.
	Good	32	
	Moderately good	2	
	Bad	48	
Give your preference of the following program	Cyclone shelters	8	One time financial help is needed.
	Individual house building one time financial help	29	
	Others like grants income generating activities	55	
		8	

Figure-05: Percentage of recovery & treatment

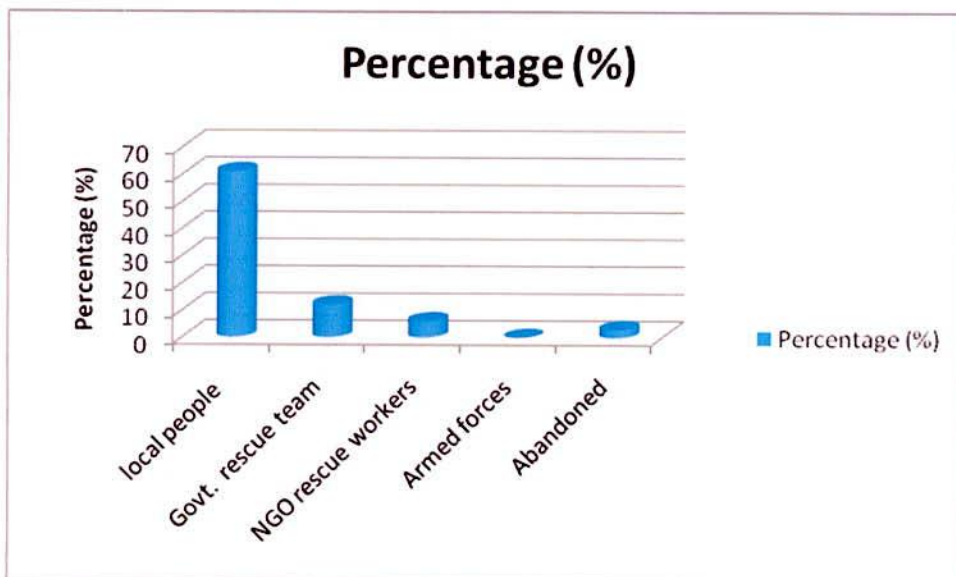


Figure- shows that the general people are the best rescuers because they stay in the locality. For this reason they need training and awareness in rescue operation and first aid.

Figure-06 Role of armed forces in relief distribution

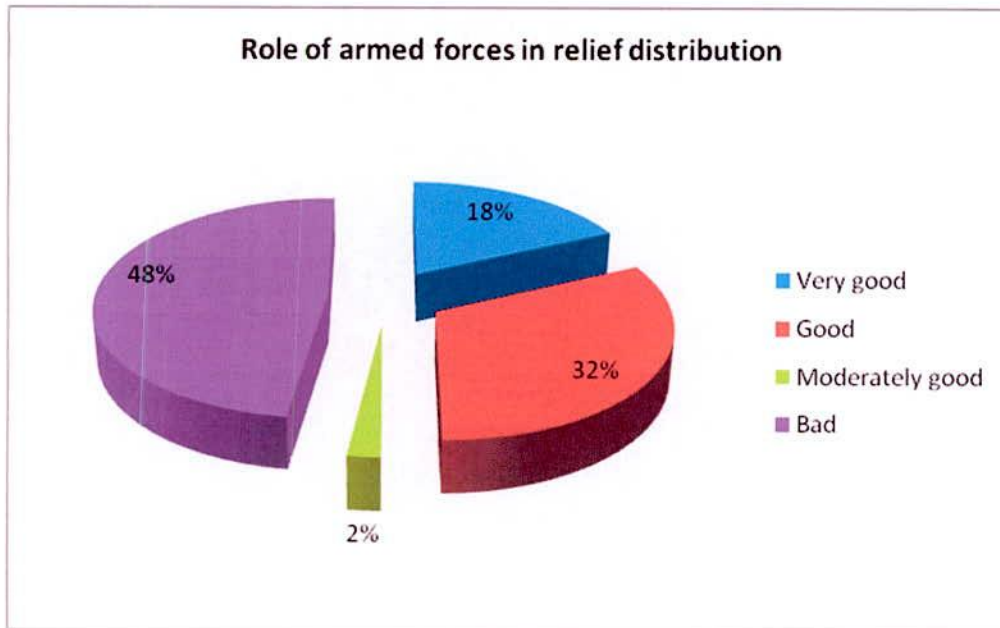


Figure- shows that relief operations done by armed forces were not satisfactory and effective. Though armed forces in aid to civil administration in disaster management bring better results, unfortunately in Amtali, Bangladesh Navy did not do the job in an efficient way.

Few of the reasons of their failure were identified.

- Lack of transport
- Lack of experience
- Lack of manpower

8.6 Damages in Amtali at a glance

The following table shows the damages caused by Sidr-2007 in Amtali Upazila.

Table-06: damages incurred by Sidr in Amtali Upazila

Damaged Unions	Damaged (sq km)	Affected people			Dead	Wounded
		Seriously	Moderately	partially		
Amtali Pourashava	20	3870	2195	3000	07	243
Gulishakhali	59	8510	4620	10000	10	135
Kukua	50	4100	2431	7250	-	77
Atharagachia	54	4740	2800	6550	02	124
Haldia	86	9164	4900	10000	-	75
Chaoura	47	4996	2758	10000	-	65
Amtali sadar	66	8125	4825	7000	05	130
Arpangashia	40	6480	3590	7500	13	435
Panchakoralia	68	13250	7820	11500	13	367
Karaibaria	70	9800	6300	8800	10	340
Bara Bagi	16	21965	22600	14400	238	513
Total	720	95000	65000	96000	298	2500

Affected Families			Totally damaged houses	Partly damaged houses	Livestock loses			
Seriously	Moderately	Partially			Cattle	Buffalo	Goat	ships
850	460	775	583	1730	10	03	20	-
1869	1015	1690	1355	2590	25	-	85	-
900	490	815	594	2000	4	-	80	-
1040	565	945	659	1194	4	-	50	-
1400	1050	1750	1586	3026	6	-	150	-
1000	570	955	885	2586	25	-	100	-
1786	970	1625	997	2060	20	-	300	-
1426	775	1295	889	1334	220	05	500	01
1914	1585	2645	1798	3800	350	10	500	01
2153	1175	1960	1206	1717	102	12	700	-
6083	3345	5545	4188	1462	1634	72	372	29
22000	12000	20000	14739	34500	2400	102	2957	40

Loss of crops (Thousand Tk)	Loss to fisheries sector (Thousand Tk)	Damage to educational institution		Damage to Religious institution
		Fully	Partial	
565	178	Primary school-28	Primary	Mosque
25542	594	Secondary school-38	school-186	damaged fully -
21170	-	Madrasha-48	Secondary	222
20506	-	College-05	school-03	partially -452
27681	-	Ebtedai madrasha-64	Madrasha-09	Temple
18261	107	Hafeji	College-02	damaged fully -
21699	118	Madrasha-12		37
13601	891	Qaomi Madrasha-03		Partially-38
21988	1782			Pagoda
18550	208			damaged fully -
34437	2422			01
668781	6300			partially-09

Figure-07 Unionwise affected people in Amtali

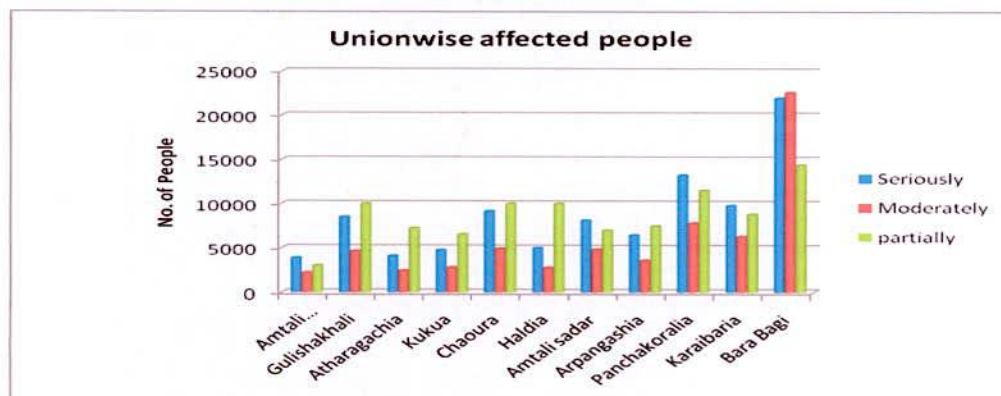


Figure-08 Unionwise No of Dead in Amtali

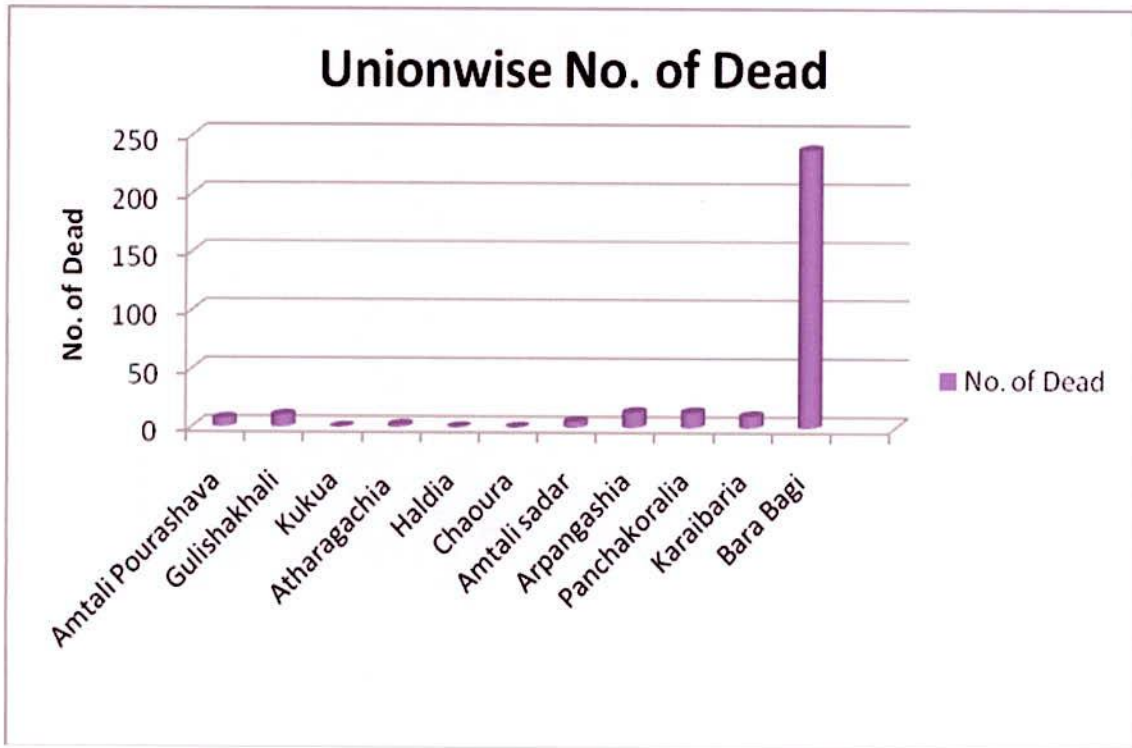


Figure-09 Unionwise No of wounded in Amtali

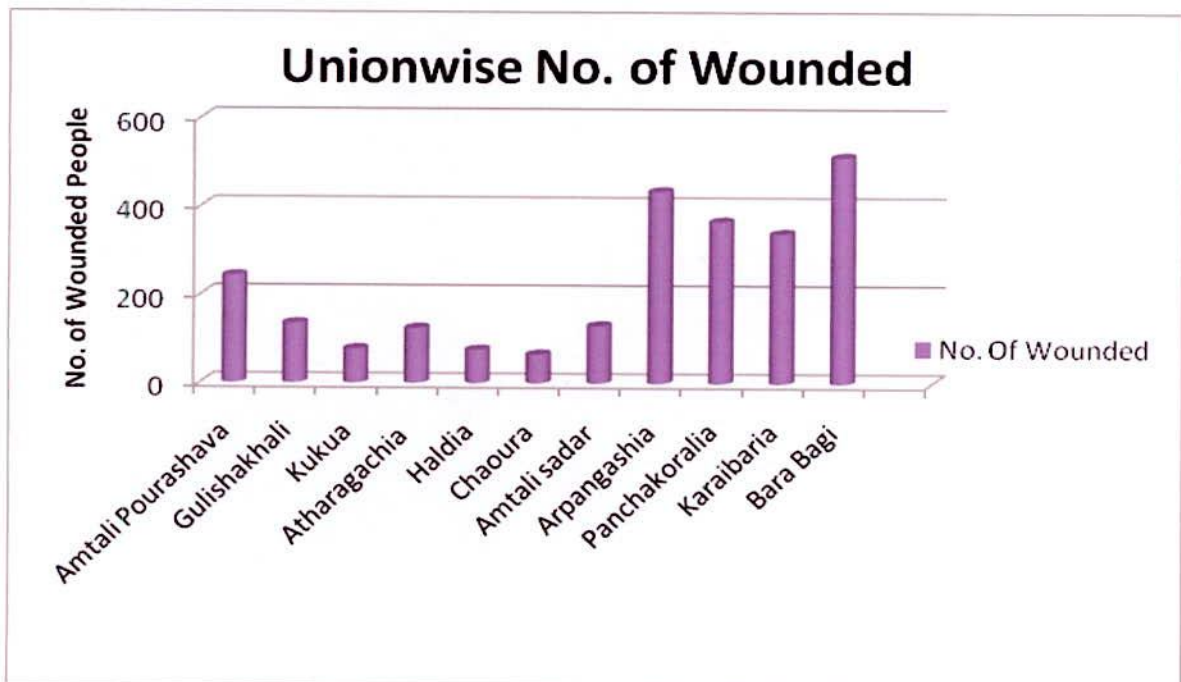


Figure-10 Unionwise No of Affected Families in Amtali

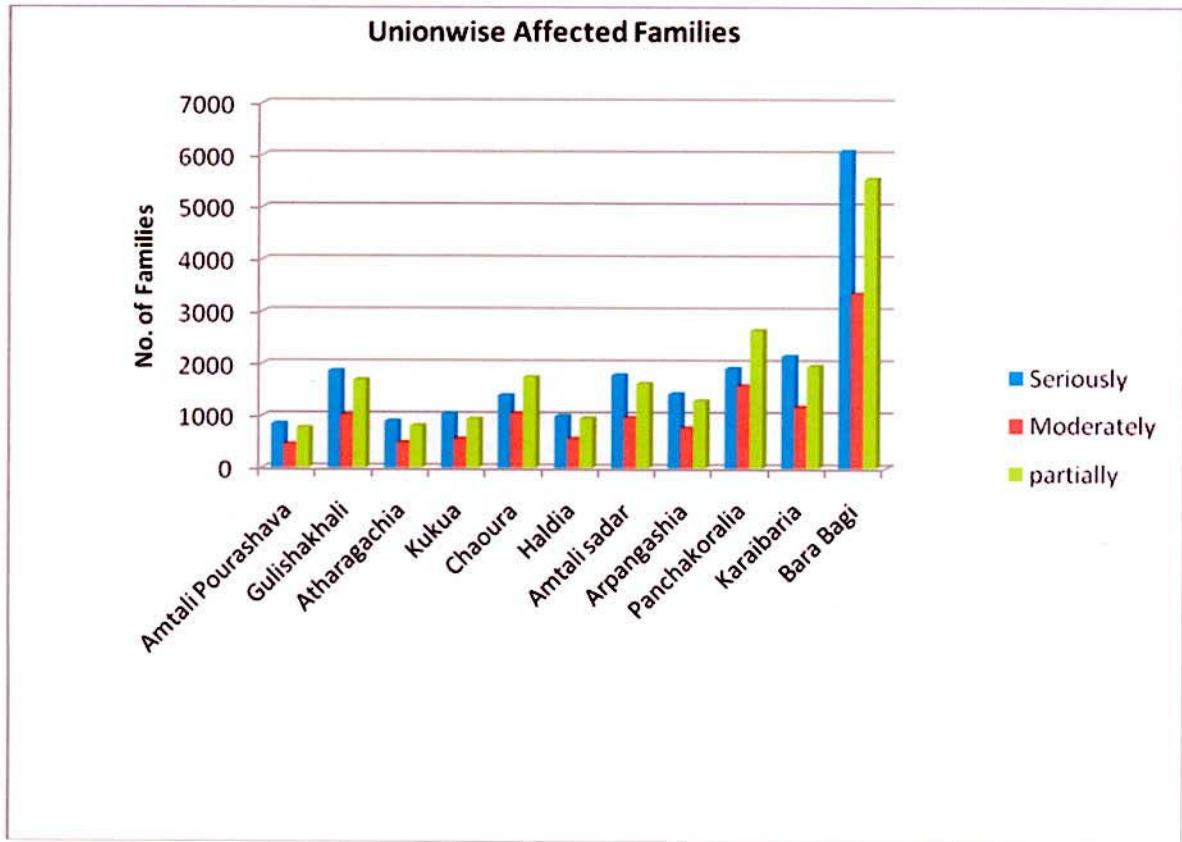
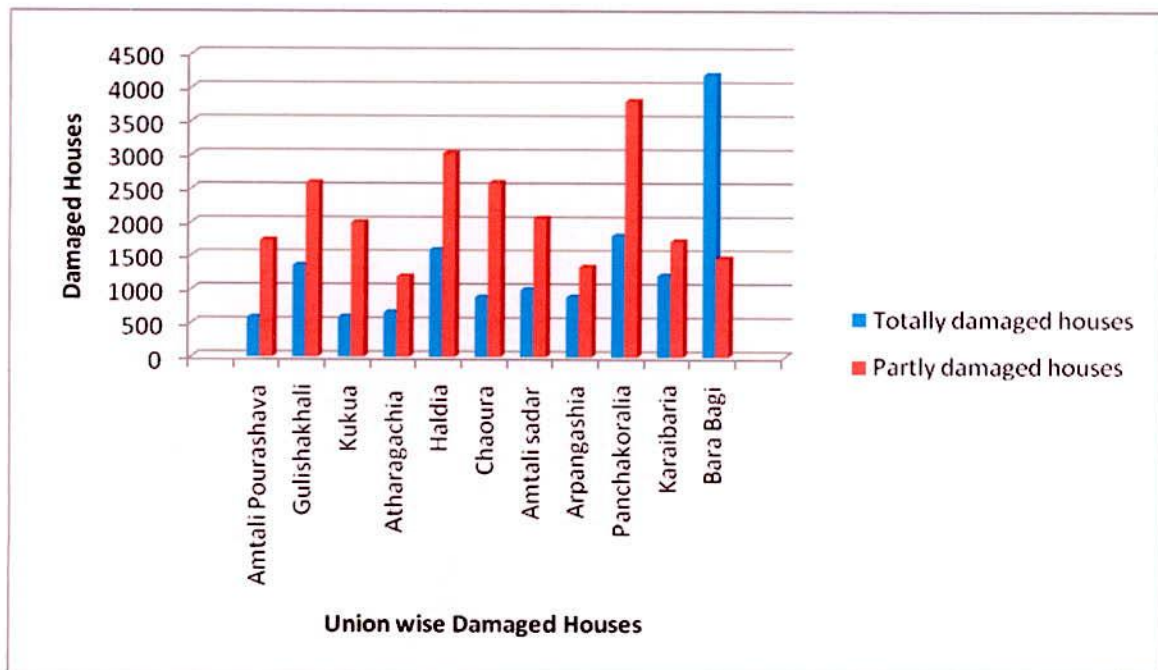


Figure-11 Unionwise No of Damaged Houses in Amtali



8.7 Relief Distribution in a nutshell:

Total relief distribution according to the allotment is shown in Table-07

Table-07: Relief distribution activities in Amtali Upazila

GR Cash	44,15,000 Tk
GR Rice	680 MT
GR Cash For Relief distribution	1,20,000
GR Cash for Buying Shari	90,000
House Grant	10,46,00,000
Cash for buying Children and Mother's Food	6,00,000
Cash for buying Winter Cloths	5,40,000
Chira	6500
Gur	1650
Plastic and Garments	560
Blanket	4350
Milk Liquid	610
Tent cotton	328
Milk Powder	610 cartoon
Stencils	150
Water Filter	50
Shari	7000
Various Types of Food packet	75 c
Bed Sheet	2500 pc
Sola	31.020 MT
Garments	1160 packet
Shatrangi	110 pcs
Gerican	6620
Soap	1500
ORS	160
Match	120
Date	14,400MT
Plastic Mug	180 pc

Bio milk	12 c
Biscuit	1000 c
Soudi Mixed Food	675 c
Chuna	15 MT
Tarpolin	1200 pcs
Bleaching Powder	500 kg
Glass	1000 pc
Woolen Blanket	55
Used Cloths	3000 Cartoon
Edible Oil	1 MT
Fresh Water	1800 Liter
T-Shirt	170 packet
Panjabi	80 packet
Sweaters	25 packet
Shirts	1500 pcs
Pants	300 pcs
Indian Foods	385 cartoon
Tent (Large size)	13
Relief packet from Oman	200 Cartoon
Relief packet from Thailand	29 Cartoon
Shari and woolen Cloths for Disables	1046 pcs

Source : Upazila relief office, Amtali

8.8 Rehabilitation:

Relief and rehabilitation program was carried simultaneously. Some of the picture is given bellow.

8.8.1 Agricultural Sector

Table-08 Rehabilitation program of Agriculture sector in Amtali

Sl. No.	Item	No of Beneficiaries	Land Area (Bigha)	Seeds (MT)	Urea (MT)	TSP (MT)	MOP (MT)	Cash (TK)
01.	Seeds and Fertilizer of Vegetables	6000	545.45	0.780	4.890	4.110	3.120	-
02.	Mug Dal	250	750	-	-	-	-	-
03.	Battle Leaf	540	-	-	-	-	-	1080000
04.	Seeds and Fertilizer of Paddy	15000	15000	97.5	270	105	120	-
05.	Tractor (50 Nos)	1000	-	-	-	-	-	4000000

Source : Upazila relief office, Amtali

8.8.2 Kabikha, TR and Kabita

Table-09 Rehabilitation program of Food for Works in Amtali

Name of the Program	Allotment	No of Projects
Kabikha	217 MT	21
TR	169 MT	74
Kabita	27,00,000/=	26

Source : Upazila relief office, Amtali

8.8.3 Shelter

Table-10 Rehabilitation program of building shelter in Amtali

Name of the Organization	Total No. of Shelter	Comments
Saudi Arabia	1290	Cost around 70,000/=
Friendship	160	Cost around 65,000/=
Bangladesh Scouts	16	Cost around 30,000/=
Save the Children	742	Cost around 20,000/=
ACI	62	Cost around 25,000/=
Bandhan	31	Cost around 30,000/=
Hope-87	125	Cost around 45,000/=
Expatriate of UK	40	Cost around 10,000/=
Adra	65	Cost around 65,000/=
Total	2531 Nos.	

Source : Upazila relief office, Amtali

8.8.4 Food Aids

Table-11 Food aids in Amtali

Sl. No.	Item	No. Of Families	Amount/ Family	Duration
01	VGD	1050	30 kg rice	2 years
02	VGF	44140	15 kg rice	6 months
03	WFP Food	11820	30 kg rice 9 kg Dal 2 kg Soabin etc	5 months

Source : Upazila relief office, Amtali

Chapter 9

Analysis of the Findings and Solutions

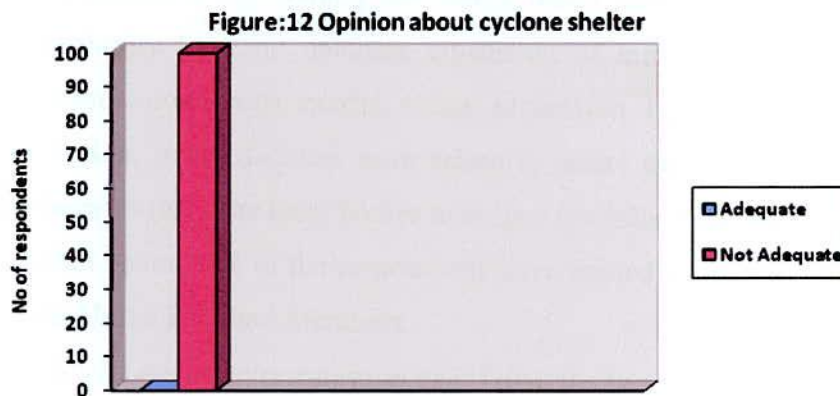
9.1 Analysis

It is stated earlier that this project paper is based upon the working experience in Sidr affected area 'Amtali'. Upazila Nirbahi Officer was the chief coordinator of total activities carried on. The author observed closely the situation and the problems arisen to carry out the relief and rehabilitation program effectively.

Besides this the present author has surveyed on 100 people in the Sidr hit Amtali Upazila with a questionnaire of 17 questions. The respondents were included farmers, school teachers, official and common people. Their opinion and practical experience of the author have led to analyze the following factors that are lagging behind sustainable disaster management in the coastal areas of Bangladesh.

9.1.1 Lack of cyclone shelters:

From the questionnaire, we observed that 100% people answered about the insufficiency of cyclone shelters. This is shown in the following figure.



The author has the observations that the coastal belt of Bangladesh has cyclone shelters but these are situated far from the localities and the shelters are not capable to fulfill the need of that particular area. People do not want to rush to these shelters escaping their houses, cattle and wealth. Unfortunately, some of these cyclone shelters are situated in the isolated places. Secondly, some of the shelters were built to fulfill the political agenda avoiding the proper need assessment and neglecting the better utilization of government money. Thirdly, the existing shelters are capable hardly to provide 10% of the total need on

9.1.4 Absence of Upazila wise Relief and Rehabilitation Card:

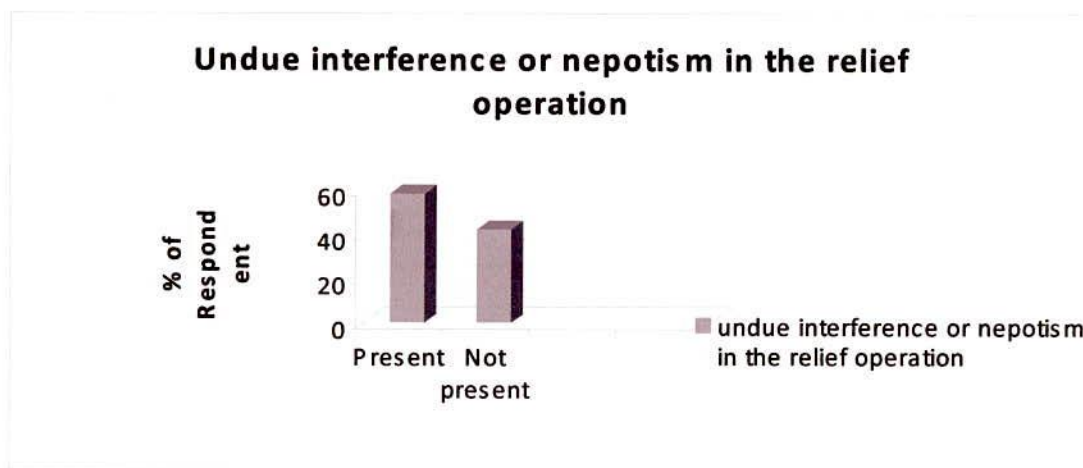
Bangladesh government is running VGF and VGD program in the rural area by using card system. There is no system of preparing card to carry out the relief and rehabilitation program in the affected area.

9.1.5 Involvement of local bodies:

Currently, the relief and rehabilitation program is implemented by the local bodies. The government as well as the NGOs is mostly dependent on Union Parishad to collect the exact information and to distribute relief goods among the beneficiaries.

The activities of the local govt. members were not acceptable by the people due to nepotism, corruption and favoritism. To reply about the undue interference or nepotism in the relief operation, about 58% of the respondents have expressed that interference or nepotism was present.

Figure-14 Undue interference or nepotism in the relief operation



The activities of the local govt. members are not accepted by the local people in general. On the other hand, the government policy is to strengthen the activities of local bodies. To overcome the situation a new approach and policy should adopted.

9.1.6 Lack of proper plan for construction of embankments, sluice gates and excavation of canals:

In the coastal area, embankment and sluice gates were constructed before independence. These are almost ruined in the course of time. The embankments are not strong enough to protect the locality from high surge during cyclone.

9.1.7 Promising a lot and doing a few by Government officials and NGOs:

Immediate after the Sidr, representatives of various organizations came to Upazila Administration to take several measures on relief and rehabilitation program both from home and abroad. Among these, UNDP and EU, Save the children, USA and Save the children, UK, India, US embassy, BRAC, Uddipan, Sangram, ADRA, Hope-87, Austria, Karitas, Red crescent, Kuwait, Lutharan Health Care, Word Vision, Friendship, Head Bangladesh, World Food, UNICEF, Jaica, Sankalpa, Grmeen Bank, Grameen Phone, Gono Shashtho, Ahsania Mission etc.

These organizations promised a lot to assist the affected people, but carried a few. For example we can remember the proposal of Indian Foreign Minister Mr. Pronab Mukharji. Upon his promise, we were informed that 3 (three) most affected villages should be selected to build shelter in which other organizations must not be entitled to do the same job. We selected three mostly affected villages of Amtali Upazila as Nidra char, Sakina and Nalbungia. Total Information regarding the damages of these villages with other related data were submitted to the Deputy Commissioner, Barguna within a short time. But a single shelter was not built till April, 2009 almost one and half a year past from Sidr.

The then Chief of the Army Mr. Mueen U Ahmad was assuring the distressed people to assist rebuilding their shelters, yet it is not carried on. He also said that in every Upazila cyclone cum mosque would be built. It also was a fake promise.

9.1.8 Big expenditure over carrying small quantity of relief material:

Many Organizations were showing their activities but helped the people in a small scale. The US Naval forces came with helicopters carrying small amount of relief materials. They tried to show their external sympathy. One helicopter carried goods that cost about 0.70 lakh to 1.0 lakh, whereas the jet fueling cost was about 2.5 lakhs and it was not in our emergency period. They came after overcoming the emergency situation.

9.1.9 Limited resources and duplication among the activities of NGOs:

NGOs came and wanted to cover a small area with their limited resources. All of them tried to launch relief and rehabilitation program in the same seriously affected area where other organizations had the same obligation. Their fund makers directed to do so. It was very difficult task to select an area for them avoiding duplication. The local administration faced a lot of problem. Sometimes, multi-organizations were given opportunities to launch their program in the same locality in a view to fulfill their conditions imposed.

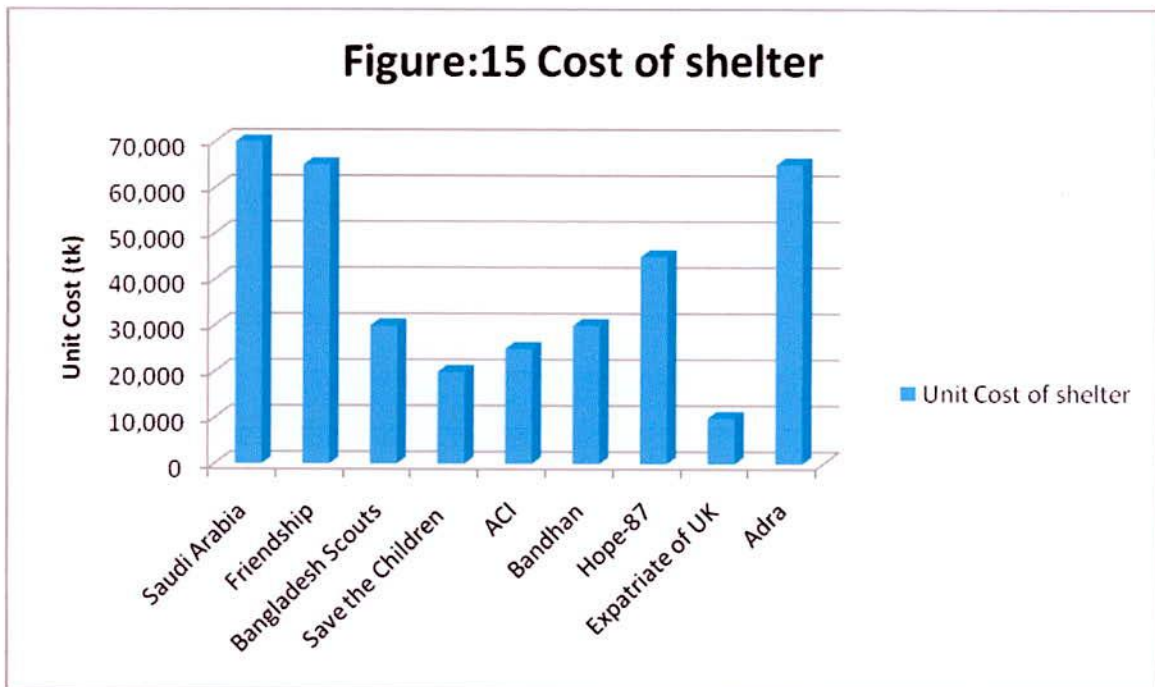
9.1.10 Variation of the duration, quantity and quality of relief goods:

In the variation of the duration, quantity and quality of relief goods was another problem. Some of the NGOs have packages that were attractive to the people. For example, ADRA, provided 2 blankets, 30 kgs rice, 10 kgs potato, 2 kg dals, 2 liters soya bin for one month, on the other hand World Food Program had 30 kgs rice, 10 kgs potato, 2 kg dals, 2 litres soyabin for 4 months. ADRA provided to 1000 people, on the other hand WFP carried their program within 23742 families. The government provided only 15 kgs of rice to 55000 families for 6 months under the Vulnerable Group Feeding program.

The organizations built shelter in different shapes and sizes which was one of the reasons that aggrieved the beneficiaries to the local administration. This can be shown in the following table. The data shows what variations in reconstruction of damaged houses were

Table: Rehabilitation program of building shelter in Amtali (Source : Upazila relief office, Amtali)

Name of the Organization	Total No. of Shelter	Comments
Saudi Arabia	1290	Cost around 70,000/=
Friendship	160	Cost around 65,000/=
Bangladesh Scouts	16	Cost around 30,000/=
Save the Children	742	Cost around 20,000/=
ACI	62	Cost around 25,000/=
Bandhan	31	Cost around 30,000/=
Hope-87	125	Cost around 45,000/=
Expatriate of UK	40	Cost around 10,000/=
Adra	65	Cost around 65,000/=
Total	2531 Nos.	



carried out. Figure shows the variation of unit cost to build a shelter for the distressed families. So it can be said that the opportunities of malpractice in distribution of relief and rehabilitation items laid on the variation of duration, quantity and quality.

9.1.11 Negligence of the middle class families:

One of the shortcomings in the relief program was the negligence of the middle class families who lost everything but were ashamed to show their hands. The government as well as the NGOs had fewer target to have taken these families under their relief activities. So one family received more quantity of relief goods, others received nothing.

9.1.11 Financial help:

It was observed that many organizations distributed various kinds of relief and rehabilitation goods. Immediate after disaster the distressed need food and clothing support. But in the long term they need their livelihood support. None can assess the others need. Many people need shelter, someone needs fishing net and boat, someone needs means for cultivation, someone needs clothing and so on.

Figure-16 People's choice

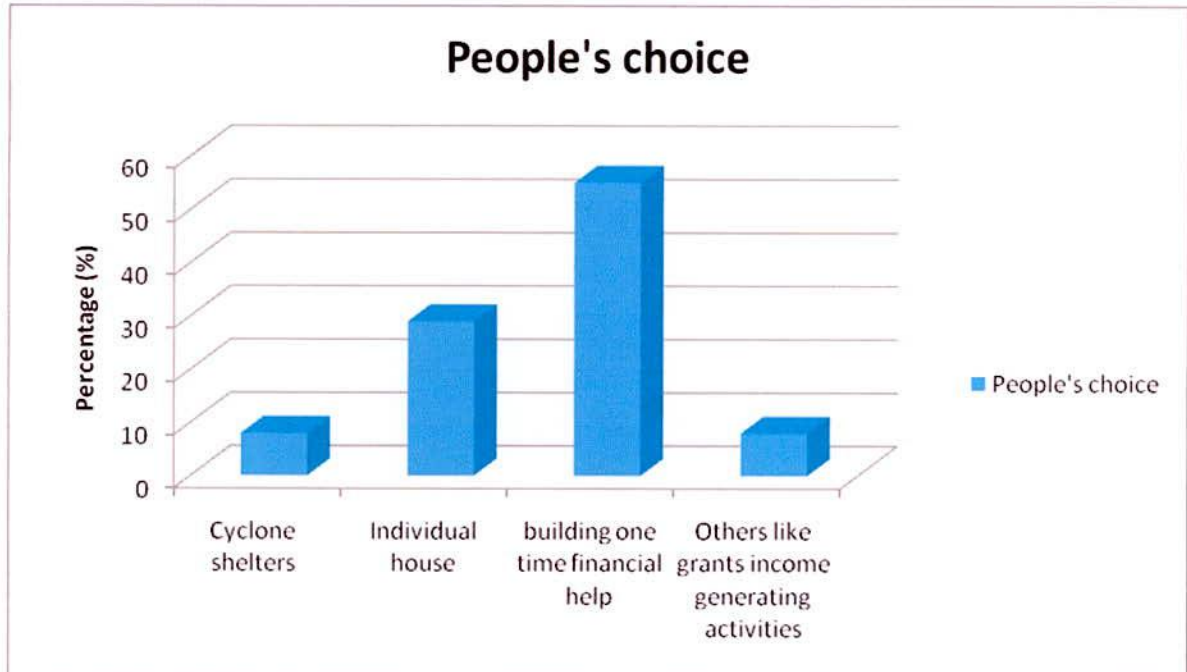


Figure- shows that the Sidr victims have chosen one time financial help to materialize their emergency needs and utilize money in the optimum ways. The other program like house building and construction of cyclone shelters has also importance to the people.

The variation of the demands can be reduced providing cash among the beneficiaries. So, relief and rehabilitation program should be associated with one time financial help which is more desirable by the victims. They can assess their own need and fulfill accordingly.

9.1.13 Scarcity of pure drinking water:

During the natural calamities, crisis of pure drinking water is a big problem. Most of the sources of sweat water either being damaged or become non-operational.

9.2 Proposed Solutions

After reviewing the above analysis, data, table and discussion on the Sidr 2007 victim's perception matrix [annex-F], the following major solutions are suggested for sustainable disaster management in the coastal belt of our country.

9.2.1 Enactment policies to build offices, institutions, houses, mosques as Cyclone shelters

The coastal belt has cyclone shelters but these are situated far from the localities and the shelters are not capable to fulfill the need of that particular area. People do not want to rush to these shelters escaping their houses and wealth. Bangladesh has scarcity of fund to build adequate cyclone shelters. So the government should enact the new policy. The policy should include;

- (a) All the government offices, schools, madrashas, colleges, foreign aided mosques and offices of NGOs must be designed and built as cyclone shelters. The government should allocate adequate money according to the policy.
- (b) New design of "Community base house cum cyclone shelter" should be incorporated. The government/NGOs could assist the financially capable families to build their own houses in such a way so that the nearest family members can take shelter during the cyclone or natural calamities. These shelters should be at least three to four storied. Interest free loan or one time grant may be given as financial assistance to construct these houses. Four to five houses will be situated within one square kilometer area depending upon the population density.
- (c) These houses cum cyclone shelters must contain overhead reservoir to catch the rainy water so that sweet drinking water can meet the need of emergency period after disaster. Another solution could be setting up small plant to desalinate water during emergency period as proposed by Professor Quazi *Hamidul Bari* and Kh. Md. Shafiul Islam.

9.2.2 Upazilawise cash and rice allocation:

The allocation for the DC's relief fund is very inadequate to meet up the emergency situation. Moreover, the flat rate allocation in all districts is a common phenomenon. In

every year the coastal districts experience natural calamities but flat rate allocation of amounting Tk. 50,000/- and 50MT rice is very negligible. In view of the facts, government should increase DC's relief fund to a reasonable amount and it should be reallocated among the upazila accordingly.

Further it is suggested that there should be a standing order of using food grains from the warehouses situated at upazila during the disasters without giving further instructions. The expense would be realized with the regular allocations. This will help the local administration to meet the urgent need when the communications are being disrupted.

9.2.3 Upazilawise Database formulation:

A database consisting information regarding the family members, economic conditions, marital status, profession, type of the shelter, crops, cattle etc. should be prepared in every upazila. This ready database will help the administration to identify the losses and compare the need assessment of individual. It is an easy task. We have already national database for voter ID card. With a few modifications on this database can be transformed into the new database to use for sustainable disaster management

9.2.4 Preparing Upazilawise Relief and Rehabilitation Card:

Bangladesh government is running VGF and VGD program in the rural area by using card system. There is no system of preparing card to carry relief and rehabilitation program in the affected area. The government should prepare family based 'Relief and Rehabilitation Card' using the database immediately after the proper assessment of losses in disaster.

9.2.5 Reconstruction of Embankments, Sluice gates and excavation of canals:

In the coastal area, embankment and sluice gates were constructed before independence. These must be repaired/ reconstructed with well designed to protect the locality. This should be done with the excavation of internal canals so that the sweet water can be used for irrigation in the dry season.

9.2.6 One time financial help:

The relief and rehabilitation program should be associated with one time financial help which is more desirable by the victims. They can assess their own need and fulfill accordingly.

9.2.7 Role of Local bodies:

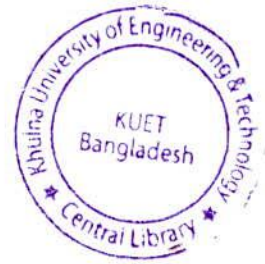
The role of members of union parishad is not praiseworthy in relief operation. Their direct participation should be reduced. Dependence upon them may be reduced through using database and proper assessment of losses.

9.2.8 Developing better coordination among the GO and NGOs:

There should be given some permanent instruction to formulate better coordination among the GO and NGOs so that the duplication and major variation among the relief materials could be reduced. The instruction may include;

- (i) All NGO will place their fund, relief and rehabilitation materials before the District/ Upzila administration.
- (ii) The authority will select the working area of a particular NGO.
- (iii) The authority will ensure the homogeneous distribution of relief and rehabilitation materials among the beneficiaries within the upazila.
- (iv) Small fund based NGOs should be given the less responsibility or they may be tagged with another organization.

Recommendations and conclusion



10.1 Recommendations

The coastal belt of Bangladesh has been facing natural calamities in the form of cyclones and tidal surge from time immemorial. Man cannot prevent natural disaster but it is possible to minimize the loss of life and properties through the integrated and proper management of disaster. By disaster management, usually it is understood post disaster activities as response, recovery, relief and rehabilitation. But the new concept of disaster management has been widened to include prevention, mitigation and preparedness as vital components of disaster management. The new concept is named as sustainable disaster management. It means all the activities and government visions should be focused for achieving the better solutions of managing disasters substantially. Through the empirical and local people's views a new term may be included and it is concerted or integrated disaster governance among the different stakeholders like government NGOs, civil societies, media and individuals. If the authority can integrate all actors in the disaster management, it will be able to ensure all affected people to get their due share of relief and rehabilitation program. Now the following recommendations are given below for integrated or concerted disaster Governance.

There are many committees that have been constituted to coordinate the disaster management activities. Effectiveness of these committees depends on their proper and regular functioning. It has been observed that the role of DMB in the time of disaster is almost absent. It is therefore, recommended that the number of coordination committees at national level should be reduced as far as possible.

Different simulation exercise on various aspect of disaster management like warning system, evacuation plan and communication network, response mechanism, coordination should be conducted on regular basis with officials from concerned govt. departments, national and international organizations and civil societies for testing the procedure of coordination and reviewing co-ordinations arrangements in decision making information management, damage/needs assessments.

During the survey at the Sidr hit areas, it was found initially the local people are the best rescuers but they have no training and no awareness about disaster management. So in the coastal belt, awareness program under the direction and guidance of district and upazila administration can be arranged in every year among the local people.

It is the people's view that relief distribution among the victims should be done in a combined way. A committee in every upazila headed by UNO of the concerned upazila can be set up to implement the integrated approach of distribution program. The formation of the committee may be as follows

MP	chief adviser
Upazila Chairman/ vice chairman	adviser
UNO	president
All UP chairmen	member
One member from each working NGO	member
One local elite of each word	member
One educationist from Upazila HQ	member
PIO	member secretary

In this regard a permanent warehouse must be set up at the upazila headquarters. The govt. must allocate some money in every fiscal year. No relief distribution both govt. and private without the approval of the integrated committee will be done. Every year the district administration will arrange a workshop to aware the people of the coastal areas in this regard.

At present there is no coordination committee in the city corporation and pourasava areas. It is necessary to constitute disaster management coordination committees for city corporation and pourasava area.

It is further suggested following recommendations for better and coordinated way of sustainable disaster management

- ❖ To improve and implement the disaster management system throughout the coastal belt for improved recording and reporting of disaster, a data processing and storage capability of MIS through computer (with e-mail facilities) may be established at national and district levels.

- ❖ Personnel engaged in disaster management and Officials may be properly trained to handle the related issues.
- ❖ For planning and actual implementation during disaster situation, a clear cut demarcation of duties and responsibilities are to be declared.
- ❖ Inter coordination among various service departments dealing with relief, rehabilitation and development as well as different branches of organization should be intensified for efficient policy implementation
- ❖ To meet sudden catastrophe situation a 'Disaster Reserve Fund' be created and placed at the disposal of the DCs and UNOs of coastal districts.
- ❖ More and more embankments in the coastal area be constructed
- ❖ A massive forestation program should be carried out throughout the country, especially at the costal belts
- ❖ The network of cyclone preparedness program should be extended in more upazilas prone to cyclone.
- ❖ The existing cyclone warning signal should be modified and simplified and the modified signal is introduced at the earliest. Before introduction of the signaling systems, public he educated about the contents and implications of the new signaling systems with proper publicity activities.
- ❖ More and more cyclone- cum flood shelters be constructed at the vulnerable areas of the country
- ❖ Community disaster preparedness and community vulnerability reduction as a part of integrated rural development be given priority.

10.2 Conclusion

In wrapping up the whole discussion we can say that almost the entire coastal belt of Bangladesh is exposed to the potential danger of cyclone followed by storm surges. The country has also vast flood plains where flooding occurs annually during southwest monsoon from June to September. To alleviate flooding embankments have been constructed along certain river reaches as structural preparedness measures. Similarly to cope with cyclones, for eventual evacuation of people from risk areas, cyclone shelters were constructed. As comprehensive control of natural hazards is not possible, the GOB have been continuously making endeavor to make disaster counter measures under the total disaster governance plan within its reach. Such efforts have proved to be somewhat effective in minimizing human death toll significantly and mitigating suffering of the people.

Nevertheless, organizations managing disaster need high degree of coordination because the main function of any disaster governance lies with the high degree of uncertainty of the related tasks. Investment on activities related to disaster reduction such as flood control, building cyclone shelters, distributing relief and rehabilitation may be increased manifold; but due to lack of coordination and absence of integrated disaster governance the overall losses would continue to rise. To arrest the trend, the importance of coordination is vital and the process alone can help ensure integrating the objectives and activities of separate work units and realize the minimization of losses effectively. The extent of the need for coordination depends on the nature and communication requirement of the tasks performed and the degree of Interdependence of the various units performing them.

In line with the Neo-classical Management model a 'task force' could be created with officials and humanitarian aid workers to pursue long term programs. This task force would be responsible for planning of relief, rehabilitation, reconstruction and development program. This will act as a permanent coordination mechanism to ensure the services in order to guarantee a minimum coherence and coordination of relief and rehabilitation activities and also a vehicle for smooth transition towards development actions. Similarly, the model could be applied in coordination and integrated approach at national, regional, local and al organizational levels.

While the need for effective relief management and coordination is usually well understood in the context of Bangladesh, it is unusual for a central agency to have overall responsibility for providing leadership and coordination of the wide diversity of mitigation

activities. For example, building laws concerned with seismic safety can be drafted by one department of government without adequate consideration being given to how the laws will be enforced, how they will be taught to engineers, architects, construction workers or what will be the source of finance to pay for the additional costs they may entail. In order to integrate diverse mitigation measures, a coordinating agency need to be established which should be independent of any of the existing ministries that may implement mitigation measures.

Some countries have found it is expedient to place the coordination in the President's or Prime Minister's office. Participatory frameworks should permit those affected by mitigation measure to express concerns and influence divisions. It is essential to have effective leadership, which is recognized and accepted by those involved in applying mitigation policies. Without direction and application of skills at the appropriate levels, implementation will be slow and patchy and scare resources may be wasted on effective measures or duplication of efforts.

Over the past 36 years, Bangladesh has developed a considerable experience and expertise in managing wide range of disasters, cyclones and floods having been the primary focus of attention, while structures and procedures for disaster management exist, the real challenge lies in energizing and rendering these truly operational at all levels. In that case, integrated approach can help minimize the loss of property and lives and the post disaster governance needs coordination among all actors. The actors include national, international donor agencies, NGOs and civil societies, local elites. If we can integrate all actors in a systematic and concerted manner taking representatives from all concerns, it is thought that the disaster management would be very fruitful. Moreover, basic principles of disaster mitigation may also be included in the curriculum of ordinary school education, which would be extremely helpful to lead public to a better understanding and enhance people's positive participation.

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- C. The Daily Star 23th November, 2007
- D. The Daily Star 25th November, 2007
- E. The Daily Star 26th November, 2007
- F. The Daily Star 29th November, 2007

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Appendix - A: National Council / Committees

Prime Minister	Chairman
Minister, Ministry of Water Resources	Member
Minister, Ministry of Finance	Member
Minister, Ministry of Local Govt. Rural Development and Cooperation	Member
Minister, Ministry of Communication	Member
Minister, Ministry of Health and Family Welfare	Member
Minister, Ministry of Home Affairs	Member
Minister, Ministry of Food	Member
Minister, Ministry of Disaster Management and Relief	Member
Minister, Ministry of Agriculture	Member
Minister, Ministry of Shipping	Member
Chief of Army staff	Member
Chief of Navy	Member
Chief of Air force	Member
Cabinet Secretary	Member
Principal secretary to the prime minister	Member
Secretary, Ministry of Agriculture	Member
Secretary, Finance division	Member
Secretary, Ministry of Health and Family Welfare	Member
Secretary, Ministry of Home Affairs	Member
Secretary, Ministry of defense	Member
Secretary, Local govt. division	Member
Secretary, Roads and Highways Division	Member
Secretary, Ministry of Shipping	Member
Secretary, Jamuna Bridge Division	Member
Secretary, Ministry of Water Resources	Member
Secretary, Ministry of Food	Member
Secretary, Ministry of Disaster Management and relief	Member
Member (Socio Economic infrastructure) Planning Commission	Member
Principal Staff Officer, Armed Forces Division	Member

Source: SOD, Disaster Management Bureau (1999]

Appendix- B: District Disaster Management Committee

Deputy Commissioner	Chairman
Officials of concerned department at district level	Member
Distinct executive officers	Member
Women's representative	Member
District representative of Bangladesh Red Crescent Society	Member
Representative of cyclone preparedness programs (CPP)	Member
NGO's representative	Member
Representative of Armed Forces (During Disaster time)	Member
DRRO	Member Secretary

All the MPs of the District will be advisers to the Committee.

Source: SOD, Disaster Management Bureau [1999]

Appendix- C: District Disaster Management Committee

Upazila Nirbahi Officer	Chairman
Officials of concerned department at upazila level	Member
Women's representative	Member
Upazila representative of Bangladesh Red Crescent Society	Member
Representative of cyclone preparedness programs (CPP)	Member
NGO's representative	Member
Representative of Armed Forces (During Disaster time)	Member
All UP Chairman	Member
PIO	Member Secretary

The MP of the Upazila will be advisers to the Committee.

Appendix-D: Union Disaster Committee

Union parishad Chairman	Chairmen
UP members	Member
Teacher's representative	Member
Govt. officials/employees at union level specially health Workers	Member
Union leader of union cyclone preparedness programs of unions in cyclone prone areas	Member
Representative of Bangladesh Red Crescent Society	Member
Representative of local NGOs or societies	Member
At least two women's representatives	Member
UP Secretary	Member secretary

Source: SOD, Disaster Management Bureau [1999]

Appendix- E: Questionnaire
Masters in Industrial Engineering and Management (IEM),
Khulna University of Engineering and Technology.

An evaluation of disaster management of Bangladesh, A post Sidr operation program.

Questionnaire

[Note: The present study is an attempt to conduct a research on relief and rehabilitation operation in Sidr hit areas of the coastal districts. Collected data will be used for research purpose only. Please help the study by your practical experience. Please put the mark or write 'yes' or 'no' where necessary.]

Name:

Husband / father's name:

Male/ female

Present address:

Permanent address: vill-

Occupation –

qualification-

age-

1. During Sidr-2007 where you were Staying

Home

Upazila

Distant location

2. Give your experience about Sidr

3. How the affected or wound people were recovered and got medical treatment

By the local people

Goyt. rescue team

NGO rescue workers

Army / navy / armed forces

Abandoned

4. Is there any warning from the govt. or others like TV, radio or local micking ?

Yes

No

5. Is the cyclone shelter capable to make asylum of all?

Yes

No

6. After how many days did you get relief?

7. How the relief operations were done?

In a body or combined way or haphazardly

8. Is there any undue interference or nepotism in the relief operation?

9. What was the role of the local govt. members in the relief operations?

Very good

Good

Bad

Very bad

10. Who did or managed relief operations well

Local Govt.

Upazilla administration

Others (NGOs)

11. What type of relief operation do you prefer?

Joint or Combined

Separate

Mixed or both

12. Was the relief operation adequate?

Yes

No

13. Do you have any special suggestion for relief operation

14. Evaluate the army, navy or armed forces operation

Very good

Good

Moderately good

Bad

Very bad

15. Rank your preference about relief operation (1 TO 10)

Jointly (govt. + local govt. +NGOs)-

Individually

Govt. + armed forces

Armed forces only

Local govt. only

16. Have you got any help/ relief from any source?

17. Give your preference of the following program (1 to 4)

No shelters

Individual house building program

One time financial help

Others like grants income generating activities

Signature:

Thank you for cooperation

Appendix -F: Respondent reaction matrix

Questions	Reply/Reaction parameter	Percentage	Comments
How the affected or wounded people were recovered and got medical treatment	By the local people	61	Local people are the main rescuers. So local people should be trained in this regard
	Govt. rescue team	12	
	NGO rescue workers	6	
	Armed forces	-	
	Abandoned	3	
Is there any warning from the govt. or others like TV, radio or local micking ?	Yes	89	Local govt. / administration was properly active
	No	11	
Is the cyclone shelter capable to make asylum of all?	Yes	0	Bangladesh has inadequate cyclone shelters.
	No	100	
Is there any undue interference or nepotism in the relief operation?	Yes	58	Local Govt. members are not fair to select the beneficiaries and to distribute the relief materials
	No	42	
What was the role of the local govt. members in the relief operations and rehabilitation program	Very good	23	Although local government bodies were playing the key roll, their activities are not praiseworthy.
	Good	45	
	Bad	25	
	Very bad	7	
Who did or managed relief operations well	Local Govt.	25	People trust was on Upazila Administration due its comprehensive efforts.
	Upazila Administration	58	
	Others (NGOs, local individuals)	17	
What type of relief operation do you prefer?	Joint or Combined	80	Joint or Combined operation ensures better outcomes
	Separate	3	
	Both	17	

Were the relief operation materials adequate?	Yes	80	Relief goods were sufficient
	No	20	
Evaluate the armed forces	Very good	18	Though Armed Forces in aid to civil administration in disaster management bring better results, But unfortunately in Amtali Bangladesh Navy did not do the job in an efficient way.
	Good	32	
	Moderately good	2	
	Bad	48	
Give your preference of the following program	Cyclone shelters	8	One time financial help is needed.
	Individual house building one time financial help	29	
	Others like grants income generating activities	55	
		8	

Appendix: G

