

**EXISTING VOLUNTEERISM IN RESPONSE AND RECOVERY ON
DISASTER MANAGEMENT IN BANGLADESH**



A Dissertation for the Degree of Master in Disaster Management

By

Muhammad Ferdaus

Student Id no: 16168003

Summer 2017

Postgraduate Programs in Disaster Management (PPDM)

BRAC University, Dhaka, Bangladesh

Abstract

Community participation is the most effective elements to achieving sustainability in dealing with natural disaster risks. As a disaster, prone country Bangladesh is affected by different types of natural hazards like tropical cyclones, tidal bores, floods, tornados, river bank erosions, earthquakes etc. almost every year and destroy many lives and resources of people. It is surrounded by thousands of rivers, in the North the Himalayan range and in the South the Bay of Bengal creates harsh weather especially for a large number of poor people live in the southern part of Bangladesh making them as common victim of natural calamities, sometimes the vulnerability is so miserable that they must resettle themselves in the newly accreted land. For sustainable development, the negative impacts of these natural hazards must be minimized that affecting the socio-economic condition. The prevention of occurrence of natural disasters influenced by natural causes may be impossible but it can be reduced by proper planning, management and human collective participation. From realization of this reality, the government of Bangladesh has adopted disaster management plans and programs for the mitigation of disaster and its possible adverse impacts. This study analyzes the approaches to disaster management by grassroots community participation in Bangladesh based on literature review.

Keywords: Disaster management, Sustainable development, Natural disaster, Community participation, Mitigation.

Acknowledgement

I am very grateful to the Almighty Allah for giving me such opportunity to acquire knowledge on peace and conflict studies program, Late Glory, Honor and Praised be to him. I am also grateful to the BRAC University, Dhaka, Bangladesh for generous support during my postgraduate program in Disaster Management.

First and foremost, I would like to express my endless gratitude to my thesis supervisor **Dr. Md. Humayun Kabir** Professor, for his consistent cooperation and excellent guidance throughout the whole thesis work. He was always available to look through the pages and give constructive valuable feedbacks. In fact, he guided me to develop the idea of initiating a research in the field of community engagement in disaster response and recovery. As a student, I have nascent knowledge on research methodology that's why I am in hesitations whether I make mistakes but his inspirations to know the unknown and wise instructions make me valor to launch the journey of preparing this thesis.

I also extend my gratitude to **Professor Dr. Baqee**, who has given accurate and authentic information on contemporary situation of Bangladeshi volunteerism for which I myself is indebted to him. Moreover, I would like to acknowledge Professor Jamil Hossain at University of Massachusetts, USA, Professor Dr. Kazi R. Javed at Kentucky State University, USA and Barrister Mohammad Rejaul Karim whose allows supported me in everywhere to complete this master's program.

Many thanks to my Best friend *Mahadi Hassan* who supported me tirelessly to bring this paper veracity, and obvious to my parents who bringing me in this beautiful earth to explore this fantastic human being especially volunteer without their cooperation and help, the study would not have been possible.

Date: August 10, 2017.

Table of Contents

ACKNOWLEDGEMENT.....	I
TABLES AND FIGURES	V
ABSTRACT.....	VI
CHAPTER-1.....	1
1.1 INTRODUCTION	1
1.2 OBJECTIVES OF RESEARCH	3
1.3 METHODOLOGY	3
1.4 RESEARCH QUESTION	3
CHAPTER-2.....	4
..... LITERATURE REVIEW ON DISASTER RESPONSE AND RECOVERY	4
.....	4
2.1 DISASTER AND DISASTER MANAGEMENT.....	4
2.2 KEY COMPONENTS OF AN EFFICIENT DISASTER MANAGEMENT CYCLE.....	5
2.3 IMPORTANCE OF STRATEGIC DISASTER MANAGEMENT PLANS AND HAZARD	5
MAPPING	5
CHAPTER-3.....	7
..... CONCEPTUAL FRAMEWORK DISASTER	7
.....	7
3.1 DISASTER MANAGEMENT	7
3.2 COMMUNITY-BASED DISASTER MANAGEMENT (CBDM)	7
3.3 EMERGENCY RESPONSE.....	8
3.4 VULNERABILITY.....	8
3.5 PREPAREDNESS	8
3.6 PREVENTION	9
3.7 RECOVERY	9
3.8 MITIGATION	9
CHAPTER-4.....	10
... MAJOR DISASTERS AND THEIR CONSEQUENCES IN BANGLADESH	10
.....	10
4.1 NATIONAL PLAN FOR DISASTER MANAGEMENT 2010-15	14
4.2 THE SCOPE OF THE PLAN INCLUDES.....	15
CHAPTER-5.....	16

..... **DISASTER MANAGEMENT IN BANGLADESH**
 **16**

5.1	BACKGROUND TO THE ESTABLISHMENT OF EWS IN BANGLADESH.....	16
5.2	GOVERNANCE AND INSTITUTIONAL ARRANGEMENTS (NATIONAL TO LOCAL LEVELS)	18
5.3	CDMP PARTNERS ON INCORPORATION OF DRR IN THE TRAINING INSTITUTES IN BANGLADESH	20
5.4	POLICY, INSTITUTIONAL AND LEGAL FRAMEWORKS TO SUPPORT EMERGENCY PLANNING AND RESPONSE.....	22
5.4.1	<i>Disaster Management Act.....</i>	22
5.4.2	<i>National Plan for Disaster Management</i>	22
5.4.3	<i>National Disaster Management Policy</i>	23
5.4.4	<i>Guidelines for Government at all Levels</i>	23
5.4.5	<i>National to Local Emergency Planning and related Linkages to EWS</i>	24
5.4.6	<i>Organizational Structure for Implementing the Plans</i>	25
5.4.7	<i>Institutional Capacities and Concept of Operations</i>	27
5.4.8	<i>Key Factors considered for Sustainability of different Components of Early Warning Systems with a Multi-Hazard Approach</i>	28
5.4.9	<i>The National Disaster Response and Recovery Fund.....</i>	29
5.4.10	<i>The National Risk Reduction Fund</i>	29

CHAPTER-6.....31

..... **DISASTER MANAGEMENT PRACTICES IN BANGLADESH PERSPECTIVE.....31**

CHAPTER-7.....33

..... **COMMUNITY-BASED DISASTER MANAGEMENT IN BANGLADESH**
 **33**

7.1	TRAINING & EDUCATION.....	33
7.2	CONSIDERATIONS FOR IMPLEMENTATION OF CBDM	33
7.3	STUMBLING BLOCKS IN COMMUNITY PARTICIPATION	34
7.4	COMMUNITY COPING STRATEGY TO DISASTER	35
7.4.1	<i>Creation of public awareness</i>	35
7.4.2	<i>Proper utilization of climate information</i>	35
7.4.3	<i>Appropriate prevention and mitigation measures.....</i>	36

CHAPTER-8.....37

..... **CONCLUSION AND RECOMMENDATIONS**
 **37**

8.1	MOTIVATIONS FOR SPONTANEOUSLY VOLUNTEERING DURING A DISASTER.....	37
-----	---	----

8.2	PERSONAL, SYSTEMIC AND ORGANISATIONAL CONDITIONS THAT FACILITATE THE TRANSITION FROM SPONTANEOUS TO SUSTAINED VOLUNTEERING AMONGST THOSE WHO VOLUNTEER DURING A DISASTER	38
8.3	PRACTICAL IMPLICATIONS.....	38
8.3.1	<i>The power of asking</i>	39
8.3.2	<i>The effects of past experience</i>	39
8.3.3	<i>The therapeutic effects of spontaneous volunteering</i>	40
8.3.4	<i>The power of storytelling</i>	40
9	REFERENCES	41

Tables and Figures

Figure 1: Cyclone BOB-01(29 April 1991).....	16
Figure 2: Cyclone Sidr (15 November 2007).....	16
Figure 3: Cyclone Aila (27 May 2009).....	16
Figure 4: Cyclone Nargis(27 April 2008).....	16
Figure 5: Inter-linkages between various regulative instruments and programming for implementation	18
Figure 6: CDMP partners on incorporation of DRR in the education system in Bangladesh	24
Table 1: Different Types of Natural Disasters Occurred in Bangladesh.....	14
Table 2: Overall summary of damage & Losses by Cyclone Sidr 2007 in Bangladesh....	15
Table 3: List of major Earthquakes in Bangladesh.....	17

Chapter-1

1.1 Introduction

Bangladesh is a developing country in South Asia which has above sixteen core population (www.bbs.gov.bd). Its geo-physical location makes it prone to various disasters like floods, cyclones, earthquakes, etc. which cause great losses of lives and damage to properties, livelihoods and economic infrastructure (Zimmermann et al. 2012) and human-induced climate change exacerbates the problem, with its already manifested effects and the predicted rise in sea level of 0.3 m to 0.5 m by 2050 (Agrawala et al. 2003; GBNAPA, 2005; Loucks et al. 2010). As a result, the country facing at least one major disaster a year; it has lost on average 3.02 % of its GDP every year during the last 10 years and holds the highest disaster mortality rate in the world (UNDP, 2004). In the period of 1970–2004, about 0.7 million people lost their lives due to natural disasters, and economic losses total about US \$5.5 billion (Chowdhury & Rahman, 2001; Haque, 2003; CRED, 2004; FFWC, 2005). Disaster reduction and sustainable development are necessary preconditions for a country's economic development and overall prosperity. Natural disasters have been severely affecting the progress and goals of sustainable development. It has undergone significant changes in recent decades in the developing world, particularly in terms of reduction in the loss of human lives as a consequence climate change not only affecting individual countries but also other countries in the world ultimately Bangladesh as a part of South Asia experiencing extreme weather (Haque and Uddin, 2013). In 1970, in the coastal areas of East Pakistan, cyclone claimed over half a million lives and in the period of 1991 and 2007 it caused the loss of about 149,000 and 3,406 people respectively. 12 November 1970 cyclone took a toll of 0.3 million human lives in Bangladesh and damaged more than one billion US dollars with enormous property (Carter, 1991), moreover another worst cyclone which hit Bangladesh coast on April 1991 killed 0.14 million people and damaged property which worth more than two billion US dollars. The cyclone of 1876, 1919, 1961, 1963, 1965, 1985 and 1988 were also of severe nature (Nawaz and Shah, 2011).

In 1988, terrible flood inundated 89,000 sq. km. areas of 52 districts of the country and caused loss of 1517 human lives and in the time of 1998 flood inundated 53 districts covering about 100,000 sq. km. areas and it took lives of 918 people that last for 65 days. The severe floods of

1922, 1954, 1955, 1974, 1984 and 1987 were also mentionable. In recent time, the increasing frequency of destructive floods causes economic loss and in history the most devastating flood occurred in July 2004 with an economic loss of about US \$2.2 billion (ADB and World Bank, 2004). In terms of GDP, this loss was less than what the world's poorest countries faced during the 1985–99 disasters – a loss of 13.4% of combined GDP (ISDR, 2004). But the loss in Bangladesh amounted to an immense step backwards in development efforts. The floods in 2007 inundated about 36% of the total area in 57 out of 64 districts (CEGIS, 2007) and affected at least 4.5 million people (OSAF, 2007). Tornadoes of 14 April, 1969, 11 April, 1974, 01 April, 1977 and 26 April, 1989 caused localized devastation, both in terms of lives and properties. Because of the extreme vulnerability of the people various regimes of the government of Bangladesh have developed an institutional infrastructure to deal with natural hazards and their potential losses (GOB, 1997; GOB, 2004). Traditionally, the disaster management approach in the country has been failed to effectively deal with the problems of disaster loss. In present time, non-structural measures as well as pre-disaster mitigation and preparedness are initiatives that recognize the roles of different stakeholders (government, local communities, NGO/ CBOs, media, the private sector, academia, neighboring countries, and donor communities). For example, the Disaster Management Act of 1998 acknowledges the capacity of affected populations (GOB, 1998). The GOB constructed 2500 cyclone shelters (<https://en.m.wikipedia.org/wiki/>) and 200 flood shelters and 482 small, medium and large water and flood control projects (Dewan, 2015) but only 99 flood shelters are active (IFRC, 2014) for evacuation of people exposed to impending cyclone as well as floods.

The extent and effectiveness of community participation from the perspective of a shift from a managerial approach to an approach using participatory, collective decision-making and resource-sharing to manage disaster risk. There is very limited research about the disaster management to attain sustainable development via community participation and further analysis needed in near future. This study is undertaken to find out the necessity of community based disaster management, its barrier and its possible solution for the betterment of the affected people in the vicinity of disaster prone areas.

1.2 Objectives of Research

This research plan promotes the design of risk reduction strategies Disaster Education, Learning and Simulation and Community Based Adaptation Programs as an outcome of the risk reduction and assessment process. This ensures Prevention, Preparedness, Response and Recovery programs are multi hazard focused and that the move from being hazard 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

- Gather knowledge and skills from the disaster management system in Japan especially the techniques of community mobilization in Japan.
- Mainstreaming disaster risk reduction;
- Strengthening of community institutional mechanisms;
- Empowering community at risk particularly women, the poor and the disadvantaged;
- Expanding risk reduction programming across a broader range of hazards (all hazards approach);
- Strengthening emergency response systems; and
- Developing and strengthening networks of relevant national, regional

1.3 Methodology

This paper is qualitative in nature and document analysis method has been used as a research approach. Data have been collected from secondary sources such as government document, research reports as well as journal and newspaper articles to analyze the research issue. Relevant secondary data and information from various official sources collected to support the study such as project documents, annual reports, official statistics, official regulation documents, grey literature and journal articles.

1.4 Research Question

- a What are the major factors that enable volunteers to perform best in disaster management?
- b What are the advantages of effective contributions of youth in disaster response and Recovery?

Chapter-2

Literature Review on Disaster Response and Recovery

2.1 Disaster and Disaster Management

The term disaster is defined as “a serious disruption of the functioning of society, causing widespread human, material, or environmental losses which exceed the ability of affected society to cope using only its own resources” by the United Nations (1992). The damage caused by disaster depends on climate, the geographical location and the type of the earth surface/degree of vulnerability and disasters adversely the mental, socio-economic, political and cultural state of the affected area in general (Rahman, 2012: 88; Press and Hamilton, 1999: 1927; Ergünay, 1996).

Previous losses experienced in recurring disasters have led to a paradigm shift from “a traditional relief approach (where communities are considered as “victim” and “beneficiaries” of assistance) to disaster preparedness (a more holistic and long term approach which incorporates vulnerability reduction as part of the development planning process)”. This comprehensive approach recognizes that disaster mitigation has the highest effectiveness at the community level where specific needs are met (Rahman, 2012: 88). Thus; an efficient disaster management system becomes mandatory in order to mitigate recurring losses and manage the disaster in a successful manner. From this point of view, disaster management is defined as “a process or strategy that is implemented when any type of catastrophic event takes place”. In some studies, it is also described as disaster recovery management; the process may be initiated when anything threatens the normal operations or puts the lives of human beings at risk (Kale and Kutemate, 2011: 35).

The subject of building resilience of nations and communities to disasters was discussed in 2005, in Dhaka as a blueprint for global disaster reduction. In this framework, strategic goals are determined as below:

- a) “The integration of disaster reduction into sustainable development policies and planning,
- b) Development and strengthening of institutions, mechanisms and capacities to build resilience to hazards,

- c) The systematic incorporation of risk reduction approaches into the implementation of emergency preparedness, response and recovery programs”.

This subject is also enlisted among the seven critical issues in terms of ensuring sustainable development at the strategic level, at Rio + 20 Conference organized by the United Nations. The significance of reducing disaster risks, building disaster resilient cities and developing efficient disaster management systems was discussed by the delegates from both public and private institutions as well as nongovernmental organizations at Rio + 20 Earth Summit on Sustainable Development (Report of the United Nations Conference on Sustainable Development, 2012).

2.2 Key Components of an Efficient Disaster Management Cycle

In a disaster management system, incidents are categorized according to their levels as the following; incident command, emergency management and disaster management. In this study, we focus disaster management and in a modern disaster management system, while the works related to mitigation, preparedness, prediction and early warning, disaster awareness are called as “risk management” (Haddow and Bullock, 2003:1), post disaster works such as impact analysis, response, amendment, reconstruction are called as “crisis management”. Crisis management is accepted as a primitive management style on its own and it cannot be efficient as long as the process of risk management is ignored. In other words; crisis management is a responsive, asynchronous, inefficient, premature, untimely, unreliable way of coping with disasters and it might turn an incident into a catastrophe (Kadiolu, 2008: 3).

2.3 Importance of Strategic Disaster Management Plans and Hazard Mapping

Crucial factors in organizations’ survival in a time of disaster heavily depend on effective and efficient preparation in advance of the disaster; a quick response to the occurring situation; and strategic recovery following the disaster (McCool, 2012: 1). Thus; implementing a strategic plan is highly significant in order to “provide a comprehensive, all hazards, all agencies approach by achieving the right balance of prevention, preparedness, response and recovery; supporting the mainstreaming of disaster preparedness and mitigation into relevant areas of activity of government, non-government, small business and corporations; and aligning disaster risk reduction, disaster mitigation, disaster resilience and climate change adaptation policy and

actions with international and national reforms” (Disaster Management Strategic Policy Framework, 2010).

Hazard maps, which combine hazard information with evacuation routes and locations of assembly points, are effective tools for promoting evacuation procedures and increasing risk awareness among the public. However, as it is seen in the case of the Great East Japan Earthquake (GEJE), these hazard maps which are created before the event, might have given people a false sense of security by underestimating the disaster’s potential impact (Sagara and Saito, 2012). Therefore, it becomes important to design comprehensive hazard maps according to the unique structures of the countries.

Chapter-3

Conceptual Framework Disaster

Disaster is a sudden, calamitous, distressing, or ruinous effects of a disastrous event such as drought, flood, fire, hurricane, war that cause serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources (<https://en.m.wikipedia.org/wiki/Disaster>).

3.1 Disaster management

Disaster management is a process of getting prepared to improve the impacts and to mitigate the risk of disaster involving emergency operation and rebuilding the society after the occurrence of devastating disaster (Tan, 2009). It is associated with various factors and it is obvious for us to have good understanding about the disaster. According to Ariyabandu (2003) describes the concept in the following manner:

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

Hazard is always not disaster but when the structural and non-structural infrastructures of affected area are too dilapidated to cope with these risks then hazard turn into disasters. Basically, hazard like flood, cyclone, drought, tidal wave etc. are meteorological risk (Bhatti, 2003) but according to UNDP (2007) this type of hazard get the shape of disaster when vulnerable populations do not have the capability to combat it and who are unable to cope with it.

3.2 Community-Based Disaster Management (CBDM)

The government alone cannot and will not be able to properly manage and handle all types of disasters with its machinery without active participation by the people of any country, a common theory given by policy makers, experts and professionals. Failures of top-down effective disaster

management approach to reduce the risk of disaster are the evident of that notion. As a consequence, numerous scholars and stakeholders feel that it is high time to adopt a new strategy that will involve vulnerable people directly in the planning and implementation of mitigation, preparedness, response, and recovery measures because communities are the best judges of their own vulnerability and capable of making the best decisions regarding their well-being. This philosophy, involves local level people, leaders and community to provide necessary services and logistics to their victims during and after disaster has been encouraged both in the developed and developing countries and launched the generation of Community-Based Disaster Management (CBDM) strategy.

3.3 Emergency response

Emergency response includes the fundamental services and activities that are undertaken during the initial impact or in the aftermath of a disaster including those to save lives and to prevent further damage to properties (Bhatti, 2003; Kreps and Gary, 2006; Kapucu, 2008).

3.4 Vulnerability

Vulnerability refers to a set of prevailing and consequential conditions that adversely affect the ability of a person, group or community to prevent, mitigate, prepare for and respond to hazardous events and recover from impact of natural hazards (Bhatti, 2003; O'Brien et al., 2006) which is related not only to physical factors, but also to a range of social, economic, cultural and political factors (Ariyabandu, 2003).

3.5 Preparedness

Preparedness is a broad term that covers the activities designed in foresight of a disaster to ensure that appropriate and effective action is taken earlier to cope with the disaster and to abate the loss of lives and properties. These measures include the disaster plans, the training of responders, the maintenance of human, material and financial resources and the establishment of public education and information system (Kreps and Gary, 2006).

3.6 Prevention

There is an old adage that “prevention is better than cure” that includes the measures taken to impede the occurrence of a disaster. Notwithstanding, it is not possible to prevent the occurrence of natural disasters fully but the extent of its damages can be reduced (Ahmed, 1994).

3.7 Recovery

Getting back of something that has been lost during the occurrence of any odd situation is called recovery (Hornby, 2000) but in disaster management it refers to the activities that are taken after the initial impact to develop socio-economic and environmental conditions that are demolished by disaster for achieving normality (Kapucu, 2008), that is, disaster recovery activities are related to the reestablishment of pre-disaster social and economic routine provision of financial and other services to the victims and to repair of destroyed properties (Kreps and Gary, 2006).

3.8 Mitigation

Minimization of the destructive effects of hazards and lessening the magnitude of disaster through some meaningful activities that can occur before, during and aftermath of disaster and overlap of all phases of disaster management is called mitigation (Fernando, 2001). In brief flood, cyclone, drought, tidal surge, tornado, cold wave, river erosion, arsenic contamination of ground water is acquiesced as disaster when it turns into hazardous event and affects a certain territory and the affected people of that area who are not able to cope with it. On the contrary, disaster management is considered as an approach that combines prevention, preparedness, mitigation, emergency response and recovery to cope with hazardous situation created by above-mentioned natural hazards.

Chapter-4

Major Disasters and their consequences in Bangladesh

Bangladesh is a low-lying deltaic country in South Asia formed by the Ganges, the Brahmaputra and the Meghna rivers system (DMB, 2010) with long coastline, is highly exposed to different types of natural disasters (Hossain, 2012) which have negative impacts on 136.7 million (SVRS, 2004, BBS) people within its 147,570-sq. km (Agriculture Statistics Win Wing, BBS 2004-2005) territory. The country has experienced 200 natural disasters causing loss of more than 600,000 lives, millions of livestock and leaving prolonged damage to property, quality of life and livelihoods since the independence in 1971 (MoFA, 2006).

Table 1: Different Types of Natural Disasters Occurred in Bangladesh

<i>Year</i>	<i>Type of Disaster</i>	
1965	<i>Cyclone</i>	19279
1965	<i>Cyclone</i>	873
1966	<i>Cyclone</i>	850
1970	<i>Cyclone</i>	300000
1985	<i>Cyclone Flood</i>	11,069
1987	<i>Cyclone Flood</i>	1,657
1988	<i>Cyclone</i>	7,457
1991	<i>Cyclone</i>	1 , 38,868
1997	<i>Flood</i>	550
1998	<i>Flood</i>	1050
2000	<i>Flood</i>	36
2004	<i>Flood</i>	800
2007	<i>Cyclone</i>	554
2007	<i>Cyclone</i>	3406
2009		503

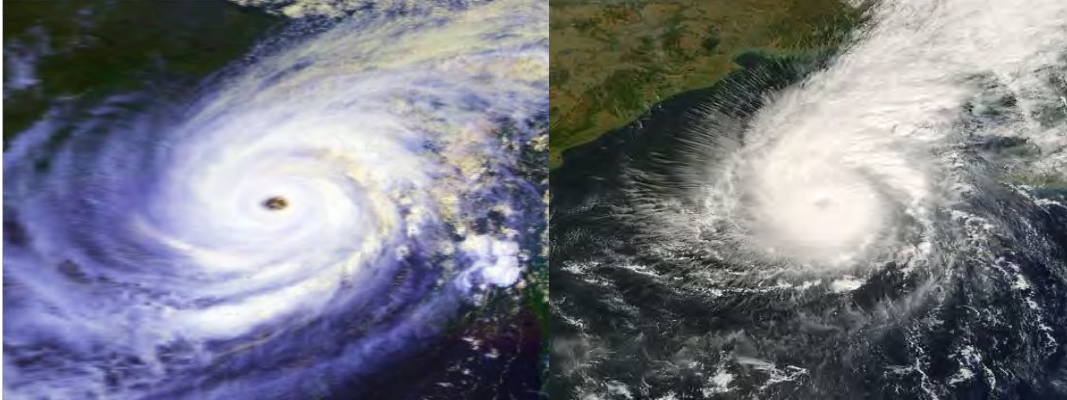
Source: Bangladesh Meteorological Department 2007

Table 2: Overall summary of damage & Losses by Cyclone Sidr 2007 in Bangladesh

<i>Sector</i>	<i>Subsector</i>	<i>Disaster Effects (BDT Million)</i>			<i>Disaster Effects (US\$ Million)</i>		
		<i>Damage</i>	<i>Losses</i>	<i>Total</i>	<i>Damage</i>	<i>Losses</i>	<i>Total</i>
<i>Infrastructure</i>		71064	2130	73194	1029.9	30.90	1060.8
	<i>Housing</i>	57915	--	57915	839.3	--	839.3
	<i>Transport</i>	8006	1725	9731	116.0	25.00	141.0
	<i>Electricity</i>	576.0	359.0	935.0	8.300	5.200	13.60
	<i>Water and Sanitation</i>	157.0	46.00	203.0	2.300	0.700	2.900
	<i>Urban and Municipal</i>	1696	--	1696	24.60	--	24.60
	<i>Water Resource Control</i>	4918	--	4918	71.30	--	71.30
<i>Social Sectors</i>		4482	1453	5934	65.00	21.00	86.00
	<i>Health and Nutrition</i>	169.0	1038	1206	2.500	15.00	17.50
	<i>Education</i>	4313	415.0	4728	62.50	6.000	68.50
<i>Productive Sectors</i>		1734	32083	33817	25.10	465.0	490.1
	<i>Agriculture</i>	1472	28725	30197	21.30	416.3	437.6
	<i>Industry</i>	262.0	2035	2297	3.800	29.50	33.30
	<i>Commerce</i>	--	1258	1258	--	18.20	18.20
	<i>Tourism</i>	--	65.00	65.00	--	0.900	0.900
<i>Cross-Cutting Issues</i>		420.0	0.000	420.0	6.100	0.000	6.100

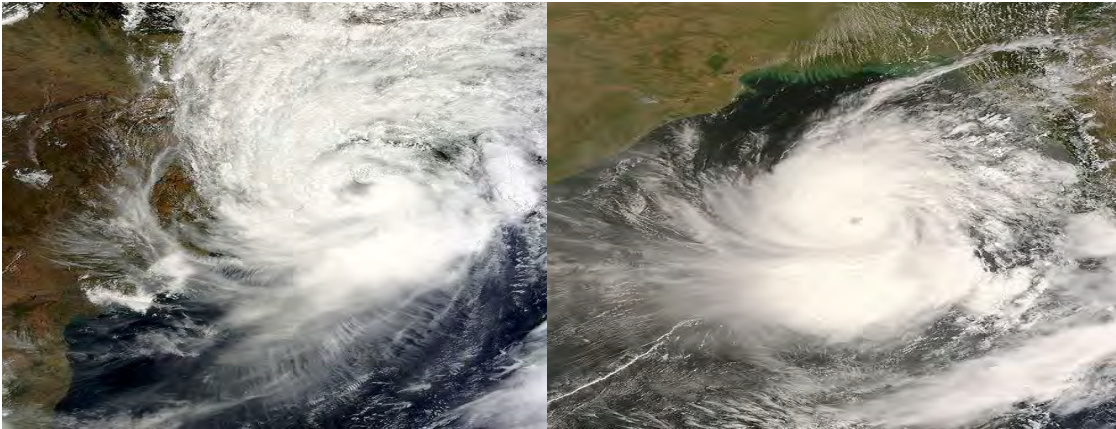
	<i>Environment</i>	<i>420.0</i>	<i>--</i>	<i>420.0</i>	<i>6.100</i>	<i>--</i>	<i>6.100</i>
<i>Total</i>		<i>79904</i>	<i>35665</i>	<i>115569</i>	<i>1158</i>	<i>516.9</i>	<i>1674.9</i>

Source: Estimates by JDNLA Team.



*Figure 1: Cyclone BOB-01(29 April 1991)
2007)*

Figure 2: Cyclone Sidr (15 November



*Figure 3:: Cyclone Aila (27 May 2009)
April 2008)*

Figure 4:: Cyclone Nargis(27

Table 3: List of major Earthquakes in Bangladesh

<i>Date</i>	<i>Name</i>	<i>Magnitude (Richter)</i>	<i>Epi-central Distance from Dhaka (km)</i>	<i>Epi- central City Distance from Sylhet (km)</i>	<i>Epi-central Distance from Chittagong (km)</i>
<i>10 Janua ry, 1869</i>	<i>Cachar Earthquake</i>	<i>7.5</i>	<i>250</i>	<i>70</i>	<i>280</i>
<i>14 July, 1885</i>	<i>Bengal Earthquake</i>	<i>7.0</i>	<i>170</i>	<i>220</i>	<i>350</i>
<i>12 June, 1897</i>	<i>Great Indian Earthquake</i>	<i>8.7</i>	<i>230</i>	<i>80</i>	<i>340</i>
<i>8 July, 1918</i>	<i>Srimongal Earthquake</i>	<i>7.6</i>	<i>150</i>	<i>60</i>	<i>200</i>
<i>2 July, 1930</i>	<i>Dhubri Earthquake</i>	<i>7.1</i>	<i>250</i>	<i>275</i>	<i>415</i>
<i>15 Janua ry, 1934</i>	<i>Bihar-Nepal Earthquake</i>	<i>8.3</i>	<i>510</i>	<i>530</i>	<i>580</i>
<i>15 Augus t, 1950</i>	<i>Assam Earthquake</i>	<i>8.5</i>	<i>780</i>	<i>580</i>	<i>540</i>

Source: Choudhury, 2005

4.1 National Plan for Disaster Management 2010-15

According to the National Plan for Disaster Management 2010-15, the vision of the government is to reduce the risk of people, especially the poor and the disadvantaged, from the effects of natural, environmental and human induced hazards, to a manageable and acceptable humanitarian level, and to have in place an efficient emergency response system capable of handling large scale disasters. The Plan envisages a group of broad-based strategies:

- Disaster management would involve the management of both risks and consequences of disasters that would include prevention emergency response and post-disaster recovery.
- Community involvement for preparedness program for protecting lives and properties would be a major focus. Involvement of local government bodies would be an essential part of the strategy. Self-reliance should be the key for preparedness, response and recovery
- Non-structural mitigation measures such as community disaster preparedness training advocacy and public awareness must be given a high priority; this would require an integration of structural mitigation with non-structural measures.

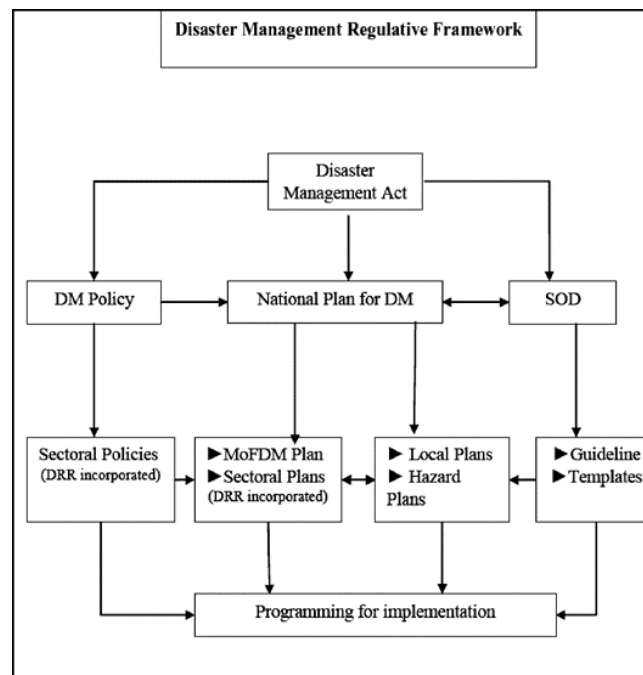


Figure 5: Inter-linkages between various regulative instruments and programming for implementation

4.2 The scope of the Plan includes

- a. Analyze the natural and man-made disaster threats including climate change to their people and society, economy and infrastructure, with a view to identifying where and when these threats are likely to occur and in what frequency.
- b. Identify by further detailed analysis who and what are vulnerable to the occurrence of these threats and how these are likely to be affected by them.
- c. Investigate what measures are possible to prevent occurrence of the disaster events, (unlikely to be possible in the case of the natural phenomenon but possible in the case of man-made disasters and environmental degradation), what can be done to mitigate the effects of disaster events and what disaster preparedness measures can be put in place in anticipation of these.
- d. Determine where responsibilities for prevention, mitigation and preparedness planning and action should lie in the Government, non-government organizations (NGOs) and the private sector.
- e. Make provision in the national budget for funding of activities related to Disaster Reduction and a contingency fund to meet the immediate needs of disaster relief, at all administrative levels of the administration.
- f. Ensure that the costs of disaster relief and post-disaster recovery are managed and coordinated by a high-level committee to avoid duplication or waste across the spectrum of donor agencies, including government, national and international NGOs and the private sector.
- g. Ensure an effective system within Government to link and coordinate the processes of planning and the management of sustainable development, environmental management and disaster reduction.

Chapter-5

Disaster Management in Bangladesh

5.1 Background to the Establishment of EWS in Bangladesh

Disaster Management in Bangladesh had gone through a process of significant reform. After independence, the focus was limited to relief and rehabilitation activities. Following the devastating floods of 1988 and the cyclone of 1991, which created a massive destruction in the economy, the focus has been shifted towards adoption of a holistic approach that embraces processes of hazard identification and mitigation, community preparedness and integrated response efforts. As a result, a short-term project entitled “Assistance to Ministry of Relief in Coordination of Cyclone Rehabilitation: BGD/91/021” was initiated after the killer cyclone of 29 April 1991. In April 1993, the Government of Bangladesh (GoB) established the Disaster Management Bureau (DMB) as the successor to the Disaster Coordination and Monitoring Unit and renaming of the Ministry of Relief and Rehabilitation as the Ministry of Disaster Management and Relief (MDMR). Additionally, in 1993, the GoB established Disaster Management Councils and Committees from the national down to the field level.

The Disaster Management Bureau was assigned responsibility to perform specialist support functions, working in close collaboration with District and Upazila level authorities and the concerned line ministries, under the overall authority of a high-level Inter-Ministerial Disaster Management Co-ordination Committee (IMDMCC). The DMB also has the responsibility to create public awareness regarding the severity and risks associated with natural and human-induced hazards and to formulate programs and projects that will better prepare at-risk communities and public officials to mitigate their consequences. As a technical arm of the Ministry of Food and Disaster management, DMB overviews and coordinates all activities related to disaster management from the national to the grass-roots level. It is also entrusted with maintaining effective liaison with government agencies, donors and non-governmental organizations (NGOs) to ensure maximum cooperation and coordination in all aspects of disaster management.

The main mission of the Government is to bring about a paradigm shift in the disaster management approach from conventional response and relief to a more comprehensive risk

reduction culture and to promote food security as an important factor in ensuring the resilience of communities to hazards. In May of 2004, the Ministry of Relief and Rehabilitation was renamed as the Ministry of Food and Disaster Management. The Ministry of Food and Disaster Management has the responsibility for food management and for:

- a. planning, coordination, monitoring and evaluation of matters relating to relief activities and disaster management;
- b. coordination among the different organizations for pre-disaster, during-disaster and post-disaster activities including preparation of disaster management guidelines;
- c. provision of assistance to disaster related ministries and organizations in preparing the action plan on matters related to disaster management;
- d. formulation of policy and its implementation on matters relating to the preparation, monitoring and evaluation of food assisted projects and programs;
- e. coordinating matters relating to the distribution of external food aid and other relief assistance; and
- f. other relevant matters relating to food, relief and disaster management.

As a continuation of the paradigm shift process, the Comprehensive Disaster Management Program (CDMP), designed as a long-term program of the Ministry of Food and Disaster Management with multi-agency involvement, was launched in November, 2003 to optimize the reduction of long-term risk and to strengthen operational capacities for responding to emergencies and disaster situations, including actions to improve recovery from these events.

The idea of a Cyclone Preparedness Program developed in 1965 when the National Red Cross Society, now the Bangladesh Red Crescent Society (BDRCS), requested the International Federation of Red Cross and Red Crescent Societies (IFRC) to support the establishment of a warning system for the population living in the coastal belt. In 1966, the International Federation and the Swedish Red Cross began the implementation of a pilot scheme for Cyclone Preparedness, which consisted of providing warning equipment such as transistor radios, sirens etc. and training the local militia (Ansars). Following the withdrawal of the International Federation as a direct implementation partner in July 1973, the

GoB and the Bangladesh Red Crescent Society created a partnership which led to a new program management structure in a form of joint partner venture. An agreement was signed by both parties spelling out that this program would be known as the Cyclone Preparedness Program

(CPP) of the Bangladesh Red Crescent Society. Operations would remain, primarily, under the leadership of the Red Crescent Society and there would be increased involvement of local communities. A Policy Committee and an Implementation Board were created to jointly administer and implement the program. A seven-member Policy Committee, headed by the Minister of the Food and Disaster Management Ministry, was constituted to give policy direction and allocate resources for the program. The implementation Board is tasked with implementing the policy directives from the Policy Committee. The Director of the Bangladesh Meteorological Department (BMD) is a member of the 15-member Implementation Board.

5.2 Governance and Institutional Arrangements (National to Local Levels)

Under the program memorandum of understanding (MoU) has been signed with the following partners to share knowledge, resources and experience on DRR issues. The list of Institutes and tasks is outline in Table

National Curriculum and Text Book Board (NCTB), Ministry of Education	To incorporate, different risk reduction issues with special emphasis on natural disaster risk identification, risk prevention, mitigation, risk treatment and emergency response in the text books from elementary to secondary level, teachers training colleges.
Armed Forces Division (AFD), Prime Ministers Office	Director (Operations and Plans) of AFD is the focal point and Defence Service Command and Staff College (DSCSC), BIPSOT, are also in the partnership programme. To incorporate different risk reduction issues with special emphasis on evacuation, search and rescue, emergency relief and restoration service as first responding forces/team in all level of training and degree programme and develop tailored training course on disaster and emergency management fro armed forces.
University of Dhaka (DU)	There are three focal departments presently, Department of Sociology, Centre for Vulnerability and Disaster Studies and Department of Geography and Environment, Centre for Disaster Studies, and Institute of Social Welfare and Research (ISWR) to carry out research, Professional Certificate course, Diploma course and Masters in Disaster Management to incorporate risk reduction issues in other degree programme curricula, courses and in course contents.

University of Rajshahi (RU)	Institute of Environmental Science (IES) is the focal to carry out research, professional Certificate course, Diploma course and Masters in Disaster Management and to incorporate risk reduction issues in other degree programme curricula, courses and in course contents.
Jahangirnagar University (JU)	There are two focal departments presently, Department of Environmental Science and Department of Geography and Environment to carry out research, professional certificate course in Disaster Management and to incorporate risk reduction issues in other degree programme curricula, courses and in course contents.
Bangladesh Agricultural University (BAU), Mymensingh	There are three focal departments presently, Department of Environmental Science, Graduate Training Institute (GTI), and Department of Agricultural Extension Education (DAEE) to carry out research, professional certificate course in Disaster Management and to incorporate risk reduction issues in other degree programme curricula, courses and in course contents.
Khulna University (KU)	There are three focal disciplines presently, Environmental Science Discipline, Urban and Rural Planning Discipline, Biotechnology and Genetic Engineering Discipline to carry out research, Professional Certificate course, Diploma course and Masters in Disaster Management to incorporate risk reduction issues in other degree programme curricula, courses and in course contents.
Patukhali Science and Technology University (PSTU)	Department of Environmental Science and Disaster Management (DESDM) is the focal point to carry out research, Professional Certificate course, Bachelor of Science in DM and Masters in DM and to incorporate risk reduction issues in other degree programme curricula, courses and in course contents.
Mawlana Bhashani Science and Technology University (MBSTU), Tangail	Department of Environmental Science and Resource Management (ESRM) is the focal to carry out research, professional Certificate course, and to incorporate risk reduction issues in other degree programme curricula, courses and in course contents.

Shahjalal University of Science and Technology (SUST), Sylhet	Department of Environmental Engineering (DEE) is the focal to carry out research, professional Certificate course, and to incorporate risk reduction issues in other degree programme curricula, courses and in course contents.
Chittagong University of Engineering and Technology (CUET)	Department of Civil Engineering (DCE) is the focal to carry out research, professional Certificate course, and to incorporate risk reduction issues in Diploma Engineering and Bachelor degree (Engineering) programme curricula, courses and in course contents.
Independent University Bangladesh (IUB), Dhaka	Department of Environmental (DES) is the focal to carry out research, and Post-Graduate Certificate course in leadership and Management, and to incorporate risk reduction issues in other degree programme curricula, courses and in course contents.
BRAC University (BRAC-U), Dhaka	Post-Graduate Programme in Disaster Management (PPDM) is the focal to carry out research and Masters in Disaster Management, and to incorporate risk reduction issues in other degree programme curricula, courses and in course contents.

Figure 6: CDMP partners on incorporation of DRR in the education system in Bangladesh

5.3 CDMP partners on incorporation of DRR in the Training Institutes in Bangladesh

Bard Academy for Rural Development (BARD), Kotbari Komilla	To incorporate, different risk reduction issues with special emphasis on natural disaster risk identification, risk prevention, mitigation, risk treatment and emergency response in the foundations training of all Bangladesh Civil Service (Cadres) and have special session on other training course curricula and contents and develop “disaster management for sustainable rural development” tailored training module.
Rural Development Academy (RDA), Sherpur, Bogra	To incorporate, different risk reduction issues with special emphasis on natural disaster risk identification, risk prevention, mitigation, risk treatment and emergency response in the foundations training of all Bangladesh Civil Service (Cadres) and have special session on other training course

	<p>curricula and contents and develop “disaster management for sustainable rural development” tailored training module.</p>
<p>National Academy for Educational Management (NAEM)</p>	<p>To incorporate, different risk reduction issues with special emphasis on natural disaster risk identification, risk prevention, mitigation, risk treatment and emergency response in the foundations training of Bangladesh Civil Service and have special session on other training course curricula and contents and develop disaster management for educational management” tailored training module.</p>
<p>BCS Administration Academy, Shahbagh, Dhaka</p>	<p>To incorporate, different risk reduction issues with special emphasis on natural disaster risk identification, risk prevention, mitigation, risk treatment and emergency response in the foundations training of Bangladesh Civil Service (Administration Cadre) and have special session on other training course curricula and contents and develop “disaster management for civil service administration” tailored training module.</p>
<p>Bangladesh Public Administration Training Centre (BPATC) , Savar Dhaka</p>	<p>To incorporate, different risk reduction issues with special emphasis on natural disaster risk identification, risk prevention, mitigation, risk treatment and emergency response in the foundations training of all Bangladesh Civil Service (Cadres) and have special session on other training course curricula and contents and develop “disaster management for sustainable development” tailored training module.</p>

5.4 Policy, institutional and legal Frameworks to support Emergency Planning and Response

Bangladesh has a well-structured framework for disaster risk reduction.

The Bangladesh Government's regulatory framework includes:

- a. A Disaster Management Act.
- b. A National Plan for Disaster Management.
- c. A National Disaster Management Policy.
- d. Standing Orders on Disasters (SOD) – guidelines for Government at all Levels.

The Bangladesh Government's regulatory framework for disaster management provides the relevant legislative, policy and best practice framework under which the activity of Disaster Risk Reduction and Emergency Management is managed and implemented in Bangladesh (Fig. 3.3 for a schematic flow diagram). The framework includes the following components:

5.4.1 Disaster Management Act

A Disaster Management Act was enacted with a view to creating the legislative tool under which disaster risk and emergency management actions are undertaken in Bangladesh and providing the legal basis under which activities and actions are identified, undertaken and managed. It also establishes the roles and responsibilities of Ministries, committees and appointments. The objectives of the Act are to:

- a. Assist communities in mitigation of potential adverse effects of hazardous events;
- b. Prepare for managing the response to the effects of a disastrous event;
- c. Assist in effectively responding to and recovering from a disaster or an emergency situation;
- d. Prepare for and adapt to potential adverse effects of climate change;
- e. Provide for effective disaster management for Bangladesh;
- f. Establish an institutional framework for disaster management; and
- g. Establish risk reduction as a core element of disaster management.

5.4.2 National Plan for Disaster Management

The National Plan for Disaster Management is prepared by the Ministry of Food and Disaster Management. This plan points the way to a culture of prevention that should be developed by

introducing disaster management in school curricula, including relevant aspects of disaster management in professional courses, enhancing the capacity of disaster managers by better training facilities and by creating massive awareness at all levels. The latter thrust emphasizes involving people at the grassroots, particularly those who are more vulnerable, for better preparedness and response and encouraging community level initiatives for disaster preparedness. Appropriate zoning regulations, design standards, building codes and performance specifications are developed for safe construction. All development schemes in vulnerable areas include a disaster mitigation analysis whereby the feasibility of a project is assessed with respect to the vulnerability of the area. Moreover, disaster mitigation components are built into all development projects and financed under the Plan as part of approved project costs.

5.4.3 National Disaster Management Policy

A National Disaster Management Policy has been formulated to define the national perspective on disaster risk reduction and emergency management and to describe the strategic framework and national principles of disaster management in Bangladesh. It is strategic in nature, describing the broad national objectives and strategies in disaster management.

Standing Orders on Disasters

Standing Orders on Disaster (SOD) describe, in detail, the roles and responsibilities of committees, Ministries and other organizations involved in disaster risk reduction and emergency management activities and establish the necessary actions required in implementing Bangladesh's Disaster Management Model. An updated SOD is under active consideration by the GoB.

5.4.4 Guidelines for Government at all Levels

Guidelines for Government are implemented at all levels, based on best practice models, and are used to assist Ministries, Directorates, Institutions and Divisions under the Ministry, NGOs, disaster management committees and civil society in implementing disaster risk management. The following is a list of Guidelines and Templates prepared to assist in the EWS process:

- ✓ Disaster Impact and Risk Assessment Guideline
- ✓ Local Disaster Risk Reduction Fund Management Guidelines
- ✓ Emergency Fund Management Guidelines

- ✓ Indigenous Coping Mechanism Guidebook
- ✓ Community Risk Assessment Guidelines
- ✓ Damage and Needs Assessment Methodology
- ✓ Hazard Specific Risk Assessment Guidelines
- ✓ Emergency Response and Information Management Guideline
- ✓ Contingency Planning Template
- ✓ Sectoral Disaster Risk Reduction Planning Template
- ✓ Local Level Planning Template
- ✓ National Risk Reduction Fund Management Guideline
- ✓ National Disaster Reduction and Emergency Fund Management Guideline
- ✓ Local Disaster Management Fund Guide line
- ✓ Guideline for road and water safety
- ✓ Guideline for industrial safety
- ✓ Guideline for Disaster Shelter Management
- ✓ Monitoring and Evaluation Guideline for the Implementation of the Plan
- ✓ Guideline for international Assistance in disaster emergency

5.4.5 National to Local Emergency Planning and related Linkages to EWS

The Bangladesh National Plan for Disaster Management is a strategic document. It is an umbrella Plan which provides the overall guideline for the relevant sectors and disaster management committees at all levels to prepare and implement specific plans in their respective areas of concern. As the focal ministry for disaster risk reduction and emergency management, the Ministry of Food and Disaster Management (MoFDM) will assume the lead role in disaster risk reduction and emergency management planning. Additionally, there will be several hazard-specific management plans such as a Flood Management Plan, Cyclone and Storm Surge and Tsunami Management Plan, an Earthquake Management Plan, a Drought Management Plan, a River Erosion Management Plan, etc. There will, moreover, be a detailed Disaster Management Plan for each District, Upazila, Union and Ppurashava and City Corporation in the country. A District Disaster Management Plan will be produced from the compilation of the Upazila Disaster Management Plans within the District. Similarly, an Upazila Disaster Management Plan will represent a compilation of the Union Disaster Management

Plans of that Upazila, prepared by the Union Disaster Management Committees. The Disaster Management Committees (DMCs) at Union and Pourashava levels will, consequently, be responsible for conducting the risk assessments and preparing the ground-level plans. Once developed these ground-level plans will be sent to the DMCs at the next (higher) level (i.e. Upazila DMCs) whose role will be to verify and compile the Union plans and identify the resource requirements for the Upazila. The disaster management-planning framework in Bangladesh is presented in Fig. 3.4.

The National Plan is a dynamic document, reviewed and evaluated annually to ensure consistency with national initiatives and Government priorities. Key performance indicators are monitored and reported on annually to assess progress with implementation of the framework. The Disaster Management Bureau (DMB) is responsible for carrying out evaluations, in coordination with its stakeholders including the Bangladesh Meteorological Department (BMD). The Inter-Ministerial Disaster Management Coordination Committee (IMDMCC) guides the Ministry of Food and Disaster Management (MoFDM) in monitoring progress with implementation of this Plan at the national level. The MoFDM is responsible for monitoring at the local level through the Disaster Management Bureau.

5.4.6 Organizational Structure for Implementing the Plans

The Ministry of Food and Disaster Management (MoFDM) of the Government of Bangladesh (GoB) has the responsibility for coordinating national disaster management efforts across all agencies. In January 1997, the Ministry issued the Standing Orders on Disaster (SOD) to guide and monitor disaster management activities in Bangladesh. The Standing Orders have been prepared with the objective of making concerned persons understand and accomplish their duties and responsibilities regarding disaster management at all levels. All Ministries, Divisions/Departments and Agencies prepare their own Action Plans with respect to their responsibilities under the Standing Orders, for efficient implementation. The National Disaster Management Council (NDMC) and Inter-Ministerial Disaster Management Coordination Committee (IMDMCC) ensure coordination of disaster related activities at the National level. Coordination at District, Upazila and Union levels is undertaken by the respective District, Upazila and Union Disaster Management Committees. The Disaster Management Bureau renders assistance to them by facilitating the process. At both national and sub-national levels, a

series of inter-related institutions (Fig. 3.5) have been created to ensure effective planning and coordination of disaster risk reduction and emergency response management.

At the national level

- ✓ The National Disaster Management Council (NDMC), headed by the Honorable Prime Minister, formulates and reviews disaster management policies and issues directives addressing EWS key stakeholder and partner concerns;
- ✓ The Inter-Ministerial Disaster Management Co-ordination Committee (IMDMCC), headed by the Honorable Minister in charge of the Ministry of Food and Disaster Management (MoFDM), implements disaster management policies and decisions of the NDMC;
- ✓ The National Disaster Management Advisory Committee (NDMAC) is headed by an experienced person nominated by the Honorable Prime Minister;
- ✓ The Cyclone Preparedness Program Implementation Board (CPPIB), headed by the Secretary, Ministry of Food and Disaster Management, reviews the preparedness activities in the face of the initial stage of an impending cyclone;
- ✓ The Disaster Management Training and Public Awareness Building Task Force (DMTATF), headed by the Director General of the Disaster Management Bureau (DMB), co-ordinates the disaster related training and public awareness activities of the Government, NGOs and other organizations;
- ✓ The Focal Point Operation Coordination Group of Disaster Management (FPOCG), headed by the Director General of DMB, reviews and co-ordinates the activities of various departments/agencies related to disaster management and also reviews the Contingency Plan prepared by the departments concerned;
- ✓ The NGO Coordination Committee on Disaster Management (NGOCC), headed by the Director General of DMB, reviews and co-ordinates the activities of concerned NGOs in the country;
- ✓ The Committee for Speedy Dissemination of Disaster Related Warning/ Signals (CSDDWS), headed by the Director General of DMB, examines, investigates and ensures ways and means for the speedy dissemination of warnings/signals among the people.
- ✓ At sub-national levels:

- ✓ The District Disaster Management Committee (DDMC), headed by the Deputy Commissioner (DC), co-ordinates and reviews the disaster management activities at the District level;
- ✓ The Upazila Disaster Management Committee (UZDMC), headed by the Upazila Nirbahi Officer (UNO), co-ordinates and reviews the disaster management activities at the Upazila level;
- ✓ The Union Disaster Management Committee (UDMC), headed by the Chairman of the Union Parishad²² co-ordinates, reviews and implements the disaster management activities of the Union concerned;
- ✓ The Pourashava Disaster Management Committee (PDMC), headed by the Chairman of the Pourashava (municipality), co-ordinates, reviews and implements the disaster management activities within its area of jurisdiction;
- ✓ The Pourashava Disaster Management Committee (PDMC), headed by the Mayor of a City Corporation, co-ordinates, reviews and implements the disaster management activities within its area of jurisdiction.
- ✓ At the international level:
- ✓ The World Meteorological Organization (WMO) provides real-time data and information through the Global Telecommunications System (GTS) to the Bangladesh Meteorology Department (BMD) and also provides expertise and guidance materials to BMD and the Department of Hydrology;
- ✓ The World Health Organization (WHO) provides help and advice to the governmental and non-governmental health sectors, through its Country Office in Dhaka, Bangladesh;
- ✓ The International Red Cross and Crescent Societies, through the Bangladesh Red Crescent Society (BDRCS), administer the Cyclone Preparedness Program (CPP), in cooperation with the DMB.

5.4.7 Institutional Capacities and Concept of Operations

The Standing Orders on Disaster (SOD) document all stakeholders, including the CPP, clarifying their duties and responsibilities regarding disaster management at all levels. All Ministries, Divisions/Departments and Agencies prepare their own Action Plans in relation to their responsibilities under the Standing Orders, for efficient implementation. The National Disaster

Management Council (NDMC) and Inter-Ministerial Disaster Management Coordination Committee (IMDMCC) ensure coordination of disaster related activities at the National level. Coordination at District, Thana and Union levels is undertaken by the respective District, Upazila and Union Disaster Management Committees. The Disaster Management Bureau renders assistance to them by facilitating the process.

5.4.8 Key Factors considered for Sustainability of different Components of Early Warning Systems with a Multi-Hazard Approach

The national budget allocates funds to government institutions to support their roles in disaster management. These institutions include:

- ✓ The Ministry of Food and Disaster Management
- ✓ The Disaster Management Bureau
- ✓ The Directorate of Relief and Rehabilitation
- ✓ The Directorate of Food

Many other Government agencies also contribute to disaster management. In emergencies, these include, principally, the Armed Forces Division, Bangladesh Police, Bangladesh Ansars, Fire Service and the Civil Defense Directorate. In addition, a National NGO Coordination Committee on Disaster Management, chaired by the Director General of the Disaster Management Bureau, provides a mechanism for coordination of Government and NGO activities.

The salaries of officers and staff of the Bangladesh Meteorological Department (BMD) and other EWS along with the costs of routine operation and maintenance of the establishments are met directly from the regular budget of the Government of Bangladesh. In addition, the costs of upgrading and improvement of the existing MHEWS and of overseas training are, mostly, covered by WMO, UNDP, JICA, KOICA, CMA etc. as donations through VCP, grant aid and counterpart training. The National Meteorological and Hydrological Service (NMHS) has very limited scope to allocate extra budget for human resources development. Regular professional training courses are conducted using a very small portion of the annual budget (less than 0.5%). All expert training is conducted in foreign countries with the help of international organizations and agencies like WMO, UNESCO, UNDP, ADPC, JICA, KOICA, CMA etc. or of other countries. Some of the training and advocacy programs in the organizations that are directly

involved with disaster management and preparedness are also conducted using foreign aid for human resource development (see Appendix II for details). No systematic mechanism is in place to analyze the costs and benefits in multi-hazard early warning systems. The NMHS is the main source of observational hazard information for impact analysis, however, and the observational data on disasters are always utilized to improve the products and services delivered by the MHEWS, working in conjunction with DMB and other disaster managers.

The Ministry of Food and Disaster Management has established special funds for disaster response and recovery, risk reduction, sectoral planning and disaster management. The following provides additional details regarding these funds.

5.4.9 The National Disaster Response and Recovery Fund

The Government has established a fund known as the National Disaster Response and Recovery Fund from its own resources and donations from home and abroad. This fund is to be used for response, relief and recovery with the allocation and utilization of the fund being governed by rules and guidelines laid down by the Government. The Ministry of Food and Disaster Management, in consultation with Ministry of Finance, takes the initiative to establish the fund by consolidating the existing relief funds.

5.4.10 The National Risk Reduction Fund

The Government has established a fund known as the National Risk Reduction Fund for projects which are designed for the purpose of prevention, mitigation and preparedness. The allocation and utilization of the fund is governed as per rules and guidelines laid down by the Government. The Ministry of Food and Disaster Management, in consultation with Ministry of Finance, takes the initiative to establish the fund by consolidating existing risk reduction funds.

Financing Sectoral Plans

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

District/Upazila/Union/Pourashava/City Corporation Disaster Management Fund

Disaster Management Committees at the District, Upazila, Union, City Corporation and Pourashava levels are responsible for arranging a Disaster Management Fund to implement

programs and activities outlined in the Disaster Management Plans for their respective areas. The expected sources of funding for this mechanism are:

- ✓ Funding from the Government;
- ✓ Funding from local government; and
- ✓ Local donations.

Chapter-6

Disaster Management Practices in Bangladesh Perspective

Disaster management in independent Bangladesh has undergone a complex process of development that's why it develops a workable system of disaster management as Bangladesh is one of the worst victim of natural disasters (Sabur, 2012). In Bangladesh disaster management program is the combination of both the development of physical infrastructure and non-structural practices (Asian Disaster Reduction Center n.d.:68-69). Building of cyclone and flood shelters for emergency resort, and construction of flood protection embankments, sluice gates, drainage channel, and regulators as safety measures against inundation by tidal waves, storm-surges and flooding, and establishment of emergency operation center mean development of physical infrastructure. On the other hand, in the nonstructural practices preparedness action and strategies, and coordination among the actors are mainly involved (GoB, voluntary agencies, civil society, and affected community). It is a process of adoption associated with national disaster management policy, disaster management legislation, arrangement of training program and workshop disaster management plan; and introduction of institutional framework of disaster management with the establishment of Disaster Management Bureau, establishment of councils and committees at the national, district, upazila and union levels (Hossain, 2012).

Construction of cyclone and flood shelters, erection of flood protection embankments, adoption of disaster management plan, development of institutional framework, development of strong, simple and understandable warning system that is linked to local, regional and national information system, awareness raising campaign, training program in disaster preparedness, community first aid, and cyclone shelter maintenance, installation of drinking water, food storage facilities and social safety net program are the initiatives taken by GoB to reduce disaster intensity (MoFD, 2007).

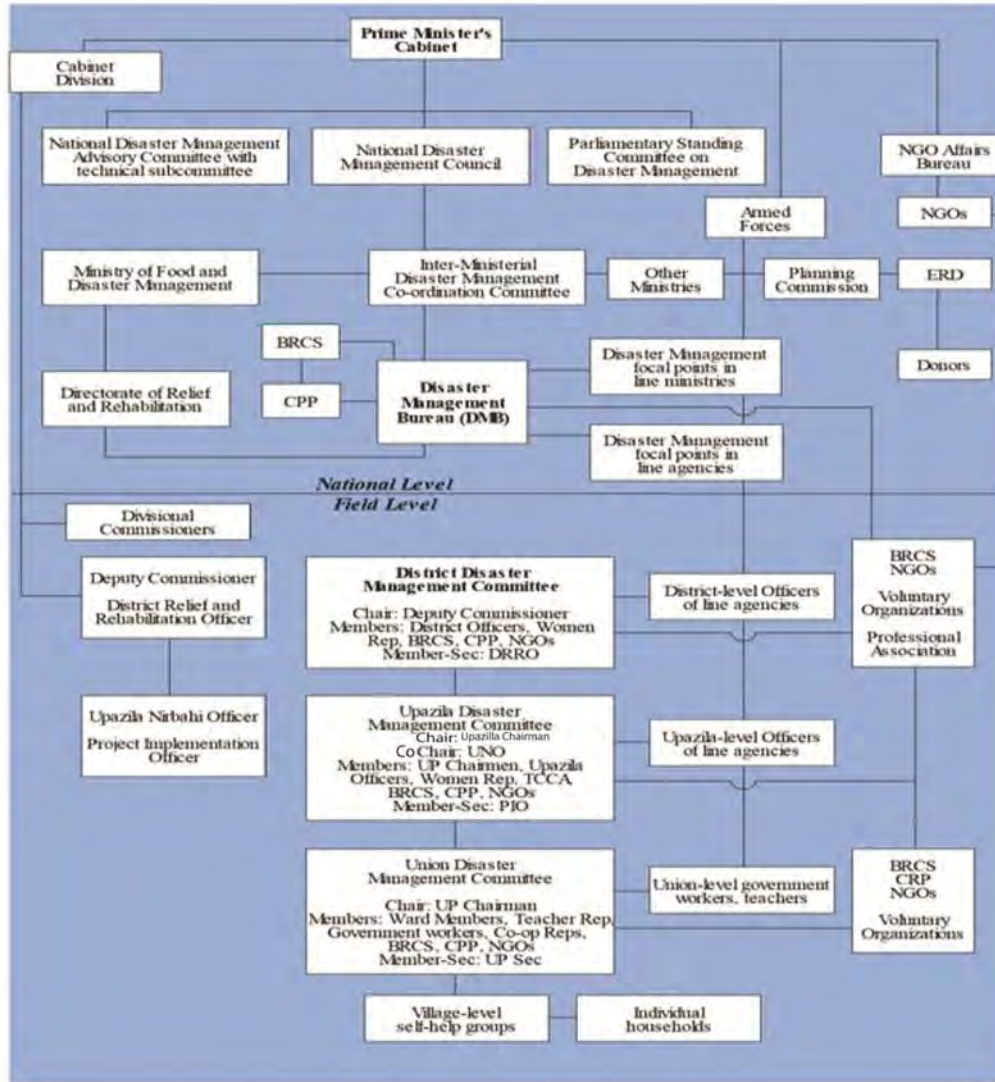


Figure 5. Organizational structure and institutional arrangements for disaster management at the national level and field level

Chapter-7

Community-Based Disaster Management in Bangladesh

The main vision of CBDM is to alleviate vulnerabilities and to strengthen people's capacity to deal with hazards and cope with disasters. The community will be able to address the problems related to disaster and mitigation measures in the existing system for disaster management in the country that covers activities at normal times for important disaster management aspects like mitigation/prevention, preparedness, response and recovery. Development program and participation from the community in planning and executing the programs will improve the local capacity and preparedness measures (Cuny, 1983).

7.1 Training & Education

One of the important initiatives of the MoFDM through CDMP is Human Resource Development (HRD) in its plan which includes the inclusion of disaster management in the curriculum of schools and professional education system. 3.2 Disaster management in elementary and secondary text books

The NCTB has introduced the issues of natural and human induced hazards, vulnerability, risk and disaster preparedness in different chapters of the subjects on Disaster Management in different books e.g Social Sciences, General Science, Bangla, English, which is being reviewed now in order to further incorporation considering re-defining risks and of new and emerging issues like climate change (CC) and other related issues is being incorporated after a periodical interval.

7.2 Considerations for implementation of CBDM

According to Yodmani (2001) the considerations are:

- a. The focus must be on the local community in case of disaster management as the local community has a central role in long-term and short-term disaster management.
- b. To reduce Disaster risk or vulnerability CBDM must increase a community's capacities and their resources, and by improving and strengthening coping strategies.

- c. CBDM should establish linkages to the development process and improve the quality of life of the vast majority of the poor people and of the natural environment. 4. CBDM contributes to people's empowerment which affects their lives; to enjoy the benefits of a healthy environment.
- d. As community is a key resource in disaster risk reduction, their role and interests must be recognized.
- e. A multi-sectoral and multi-disciplinary and trans-disciplinary approach must be applied.
- f. The CBDM is an involving and dynamic framework so its implementation must be monitored, evaluated and adapted to incorporate newer elements.

7.3 Stumbling blocks in Community Participation

From the study, it is proved that without simultaneous participation of community it is very painstaking to cope with natural disaster but traditional thinking of community, bureaucratic attitude of government officials, scarcity of resources and prevalent socio-cultural norms and values made it extremely gigantic task (Ahmed, 1994; Rahman, 2008). The major hindrances that pave the way of community participation in disaster management are outlined below:

- a. Primitive notion that distribution of relief materials among the victims is the solely responsibility of government and/or voluntary agencies during the period of disaster. But this culture must be eradicated from the society (Rahman, 2008).
- b. The associated administrators are not willing to accept the opinion of illiterate but wise and experienced local people in policy cycle (Ahmed, 1994).
- c. Financial assistance is fundamental component of disaster management though Bangladesh approved annual allocation of US\$ 12 million but this amount is not adequate (Rahman, 2008). Moreover, the national and local voluntary agencies have lack of adequate financial resources to operate community-based program due to scarcity of resources (Miskel, 1996).
- d. Absence of common forum, lack of co-ordination, confusion of jurisdiction of work, lack of mutual trust and respect etc are constraints of community participation ((Nawaz and Shah, 2011).

Women do not want to leave their residence and take shelter in the public buildings during disaster system of social arrangement is the institution of *purdah* or female seclusion. Practice of

purdah inhibits the mobility of women (Kabbeer, 2000) and limitation of sanitation facilities for women in public buildings is another barrier (Nahar, 2001). That are the great barrier to women participation in disaster management.

7.4 Community coping strategy to disaster

To face the various disasters community, undertake multi steps to cope with the severity of disaster individually. The Disaster Management Bureau set up first milestone by conducting research on the issue and implementing the objectives to reduce disaster risk and loss. Moreover, DMB organized six workshops for community leaders on disaster preparedness and indigenous knowledge on coping mechanism in the year of 2003.

7.4.1 Creation of public awareness

This tool is very important in disaster management because there are some superstitions about women participation that can be eradicated by creating awareness among the people. Ping-Pong as barangay (barangay meetings) was started in June 2000 to empower the people. The municipal government has planned to set up a community radio station to empower the people through information dissemination and informative/educational programs (Nawaz and Shah, 2011). Programs on farming techniques and new technologies, health care, livelihood, and an interactive program that would serve as a platform for community-local government dialogue and financial assistance has been sought from and committed by Congressman Monforte (Haider, 1991).

7.4.2 Proper utilization of climate information

Information on climate is very essential for preparedness and reducing disaster related losses. Timely weather forecasting is the urgent need as a consequence community radio station was established to broadcast time-relevant and accurate information and advisories during emergencies and technical support is provided by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA). Community-based flood forecasting and warning in collaboration with PAGASA help in identifying risks and measures to reduce these risks.

7.4.3 Appropriate prevention and mitigation measures

The allocation of National government resources to LGUs is determined by a formula that effectively aims to improve the quality of life in the least densely populated areas awarding 50% of the resources according to population size, 25% by land area and 25% divided equally between all (local governments of the same categories (World Bank, 1995b). However, the World Bank argues that 'the amounts transferred bear no necessary relationship to the actual cost implications of devolved functions. Nor do they take into account the capacity of local governments is to raise their own resources or to carry out devolved functions' (World Bank, 1995a). Varying levels of funding are actually drawn down depending on the incidence of disasters in a particular year (Rahman, 1991) because different LGUs face varying expenditure demands with regard to natural disasters at particular points in time, depending both on their vulnerability to disasters and LGUs feel obliged to use such funding in full cost-recovery projects, a practice which could discriminate against investment in disaster prevention and mitigation projects (Walker, 1994). Furthermore, land can be exempted from land taxes which accrue to LGUs if natural disasters legally or physically prevent improvement, use or cultivation of that land (Kafiluddin, 1991).

Chapter-8

Conclusion and Recommendations

Disaster management in Bangladesh is an important phenomenon for the sustainable and meaningful development as Bangladesh is a natural disaster prone country by its geographical location. Government alone cannot cope with the disaster for this need community participation with their opinion and ensuring participation in every stage of policy cycle, emerged on the backdrop of dominant approach though it is very difficult to predict the impending danger and the socio-economic conditions and the logistic support facilities. But there are some problems related to community participation which must be solved by social workers as they have extended networks in communities, they are familiar with community resources and potentiality of local leaders and are equipped with necessary knowledge for addressing complex situation resulting in emergency at local and national levels (Mathbor, 2007). Because of climate change more trained as well as devoted social worker need for post disaster situation. Moreover, the government has to allocate more funds in disaster management sector, government officials have to give-up bureaucratic attitude and have to be more people friendly to make CBDM program a success (Hossain, 2012). Nonstructural measures should be enhanced (Mirsa and Mathur, 1993) for flood management. Weather forecasting and warning system should be adequately planned and timely done. For this need expert and trained personnel which can be generated by training on regular basis. Seminars, consultations and public discussions are necessary tools for providing education and counseling services. Giving emphasis on building more strong infrastructures for shelter during disaster. At the end, it is urgent to bring disaster prone areas under feasible communication system for the reduction of disaster period losses.

8.1 Motivations for spontaneously volunteering during a disaster

Survey respondents were asked to rate the importance on a scale of 1 (Not important at all) to 5 (Extremely important) that each factor played in prompting them to register as an emergency volunteer with Volunteering Queensland (Graphs 6 and 7). Helping and supporting others were rated as the most important factors for people when they were deciding to volunteer. The most important factors in prompting respondents to register as an emergency volunteer were

that respondents felt the need to help (M=4.64), were upset at what was happening (M=4.16) and had family or friends affected in the disaster (M=3.90). The biggest differences were seen with the group who had volunteered previously but are not volunteering now. They rated “Another organization called for volunteers”, “Family and Friends had been affected” and “Knew someone already volunteers” as significantly more important than the other groups did. There is no clear explanation for this. Those who had not volunteered previously but who are volunteering now rated “Upset at what was happening” higher than the other groups, suggesting this was a factor that motivated them to continue volunteering.

8.2 Personal, systemic and organizational conditions that facilitate the transition from spontaneous to sustained volunteering amongst those who volunteer during a disaster

One fifth of the respondents decided to become more involved in their community after volunteering during the disaster (Graph 9) with the most important reasons for this decision due to feeling like they made a difference and feeling that they made an important contribution. As noted in the analysis of network characteristics of our participants, the nature and quality of interactions with volunteer-based organizations influenced people’s volunteering experiences and their motivations to continue or take up new volunteering opportunities. On balance, feedback about these interactions suggested negative experiences. However, respondents also identified the following as positive experiences: Organizational contact in modes that allowed current or potential volunteers to respond at times that suited them;

1. Having friends already volunteering within the contact organization;
2. Effective organizational management of volunteers and activities;
3. Strong leadership of volunteer programs and activities; and
4. The availability of volunteering opportunities suitable to people with differing abilities & skills.

8.3 Practical Implications

Our research findings suggest that much of the motivation and many of the opportunities to engage meaningfully in spontaneous volunteering in response to a disaster are predicated on personal factors and relationships that are outside the remit of institutions or organizations. We

focus hereon those practical implications of the research where organizational or policy responses may be beneficial, while recognizing that carefully engineered responses to ‘managing’ or ‘capturing’ spontaneous volunteerism are neither entirely possible nor entirely desirable

8.3.1 The power of asking

The results from this research send a loud message that the way in which people are asked to participate has a powerful effect on their actions with regard to volunteering. The most powerful ‘askers’ that emerged from this study were: people who were personally or professionally close to potential volunteers; governmental and nonprofit institutions that were recognized as ‘being in charge’; individual political leaders who were viewed as ‘being in charge’; and professional associations and institutions with expertise and networks needed to broker skilled volunteer responses. These findings suggest that improved identification of (different types of) network brokers, and targeted marketing and messaging of requests for volunteer contributions are important in both mobilizing and managing effective volunteer efforts in response to disasters, and in ensuring sustained engagement of emergent volunteers beyond the crisis period.

8.3.2 The effects of past experience

In this study, people’s past experiences, both of disasters and volunteering, motivated their initial and sustained involvement in volunteer efforts in different ways. In terms of sustaining people’s involvements in volunteer efforts beyond the immediate aftermath of a disaster, and/or redirecting volunteer efforts to longer term forms of civic engagement, our study suggests that it might be important for volunteer and government agencies to distinguish ‘emergent’ spontaneous volunteers from ‘experienced’ spontaneous volunteers. While the latter group requires less targeted support to remain involved, more tailored responses that take into account individual needs are required to ensure that the former group engage and remain engaged, if this is a desired outcome. Our research also suggests that there are a great many latent networks present in communities that may be relatively easily mobilized in response to certain needs or events. Over utilizing these networks is not advisable, but it may be useful to periodically check in on volunteers to make sure that they are still there and connected and that their ‘connectors’ are also still in place and able to mobilize.

8.3.3 The therapeutic effects of spontaneous volunteering

Similarly, to other studies, our research suggests that the act of volunteering can have important therapeutic effects for people directly and indirectly affected by crisis events. Yet, like any unguided therapeutic process, its effects on individuals are likely to be inconsistent. Better understanding these effects through targeted research and through dialogue between professionals and organizations with relevant expertise in mental health and volunteer coordination - is important both to effective volunteer management and to population health and health promotion in the aftermath of natural disasters. Recognizing that an offer *to* help is sometimes a cry *for* help is important in ensuring that appropriate referral systems and service coordination are in place during and after these events.

8.3.4 The power of storytelling

Findings suggest that stories – conveyed through personal relationships, mainstream and social networking media are powerful motivators for spontaneous volunteering and important mechanisms by which healing associated with collective volunteerism is disseminated. While the stories of recovery from the 2010-2011 Queensland flood and cyclone crises are still unfolding, more could be done to share and disseminate these stories, and to link these stories with the wider communities affected by these and future disasters.

References

1. Agrawala, S, Ota, T, Ahmed, A. U, Smith, J, & Aalst, M. V. 2003. *Development and Climate Change in Bangladesh: Focus on Coastal Flooding and the Sundarbans*. Paris: Organization for Economic Co-operation and Development (OECD).
2. Ahmed and Salehuddin, 1994. "Key-note Paper on Disaster Preparedness and Management. SAARC Workshop Report. Edited by Fazlul Bari, Kamaluddin Ahmed and Begum NurunNaheer. Comilla: BARD.
3. Ariyabandu, M.M., 2003. "Bringing together Disaster and Development – Concepts and Practice, Some Experiences from South Asia." In Pradeep Sahni and MadhaviMalalgoda Ariyabandu (Eds.), *Disaster Risk Reduction in South Asia*. New Delhi: Prentice-Hall of India.
4. Asian Development Bank (ADB) and World Bank Bangladesh, 2004 *Post-Flood Recovery Program: Damage and Needs Assessment*. Dhaka.
5. Asian Disaster Reduction Center (n.d.), 2005. *Total Disaster Risk Management – Good Practices. On-Going Disaster Mitigation Practices in Bangladesh*. Retrieved from http://www.adrc.asia/publications.TDRM2005/TDRM_Good_Practicies?PDF/PDF2005e/chapter3_3.3.2-2pdf on 25.04.2009.
6. A.K.M. AbdusSabur, 2012. *Disaster management system in Banladesh (An overview)*, *A Journal of International Affairs*, doi: 10.1177/097492841106800103
7. Bhatti, Amjad, 2003. "Disaster Risk Reduction through Livelihood Concerns and Disaster Policy in South Asia." In Pradeep Sahni and MadhaviMalalgodaAriyabandu (Eds.) *Disaster Risk Reduction in South Asia*. New Delhi: Prentice-Hall of India.
8. BBS, 2005. *Bangladesh Population Census, 2001, Community Series, Rajshahi*, Bangladesh Bureau of Statistics, Dhaka.
9. Carter WN, 1991. *Disaster Management: A Disaster Management Hand Book*. Manila. ADB.
10. CEGIS (Center for Environmental and Geographic Information Services), 2007. *Bangladesh Flood Affected Areas; (2007)*. <http://www.cegisbd.com/flood2007/index.htm>.
11. Chowdhury, J. R, & Rahman, R. 2001. *Bangladesh Environment Outlook*. Dhaka; (2001).
12. Cuny FC, 1983. *Disaster and Development*. New York. Oxford University Press.
13. CRED (Centre for Research on Epidemiology and Disasters), 2004. *An International Disaster Database*. Brussels: UniversitéCatholique de Louvain. <http://www.emdat.be>

14. C. EmdadHaque and M. Salim Uddin, 2013. *Disaster Management Discourse in Bangladesh: A Shift from Post-Event Response to the Preparedness and Mitigation Approach through Institutional Partnership*, available at the end of the chapter <http://dx.doi.org/10.5772/54973>
15. Choudhury, Jamilur Reza 2005, "Options for Urban Disaster Risk Management: The Bangladesh Experience", Paper presented at the National Workshop on "Options for Urban Disaster Risk Management in Bangladesh" organized by the Comprehensive Disaster Management Program, DM&RD, on 28th May, 2005 at Hotel Lake Shore, Dhaka.
16. Disaster Management Bureau. 2010. *National Plan for Disaster Management 2010-2015*, Government of the People's Republic of Bangladesh.
17. Faraha Nawaz and MdNurunNabi Shah, 2011. *Mechanisms and challenges for managing disaster in Bangladesh*, *African Journal of History and Culture* Vol. 3(7), pp. 104-112, August 2011, Available online at <http://www.academicjournals.org/AJHC> ISSN 21416672 ©2011 Academic Journals.
18. Fernando, W.B.J., 2001. *Disaster Mitigation*. In Pradeep Sahni, Alka Dhameja and Uma Medury (Eds.) *Disaster Mitigation: Experiences and Reflections*. New Delhi: Prentice Hall of India Private Limited.
19. FFWC (Flood Forecasting and Warning Center), 2005. *An Overview of Flood Forecasting and Warning Services in Bangladesh*. A paper presented on 2nd April. Dhaka: Bangladesh Water Development Board.
20. IFRC (International Federation of Red Cross and Red Crescent Societies), 2014. *World disaster report*.
21. GoB (Government of Bangladesh), 1997. *Standing Orders on Disaster Management*. Dhaka: Disaster Management Bureau.
22. GoB (Government of Bangladesh), 2004. *Poverty Reduction Strategy Paper (PRSP)*, December. Dhaka: Ministry of Finance and Planning.
23. GoB (Government of Bangladesh), 1998. *Disaster Management Act*. Dhaka: Disaster Management Bureau.
24. Government of Bangladesh National Adaptation Program of Action (GBNAPA), 2005. Dhaka: Ministry of Environment and Forest.
25. Haque, C. E., 2003. *Perspectives of Natural Disasters in East and South Asia, and the Pacific Island States: Socio-economic Correlates and Needs Assessment*. *Natural Hazards*, 29, 465-483.
26. Haider R, 1991. *Cyclone 91-A Follow up Study Bangladesh Centre for Advanced Studies*. Dhaka.
27. IPCC (Intergovernmental Panel on Climate Change) *Climate Change, 2001. The Scientific Basis. Contribution of Working Group-I to the IPCC Third Assessment Report*, edited by Houghton et al. Cambridge University Press.

28. ISDR (*International Strategy for Disaster Reduction*), 2004. *Living with Risk: A Global Review of Disaster Reduction Initiatives*. Geneva; (2004).
<http://www.unisdr.org/eng/about/isdr/bd-lwr-eng.htm>
29. Kabeer, Naila, 2000. *The Power to Choose: Bangladeshi Women and Labour Market*. Decision in London and Dhaka. London: Verso.
30. Kapucu, Naim, 2008. "Collaborative emergency management: better community organizing, better public preparedness and response". *Disasters*, 32: 239-262.
31. Kafiluiddin AKM, 1991. *Disaster Preparedness for Bangladesh Flood and Other Natural Calamities*. Dhaka. Padma Printers and Colour Limited.
32. Kreps and Gary A., 2006. *Facing Hazards and Disasters: Understanding Human Dimensions*. Washing, D.C.: The National Academies Press.
33. Loucks, C, & Barber-meyer, S. Hossain MAA, Barlow A, Chowdhury RM., 2010. *Sea Level Rise and Tigers: Predicted Impacts to Bangladesh's Sundarbans Mangroves*. *Climatic Change*, 98, 291-298.
34. Markus Zimmermann, Karl-Friedrich Glombitza and Barbara Rothenberger, 2012. *Disaster Risk Reduction Program for Bangladesh 2010-2012*.
35. Mathbor, Golam M., 2007. "Enhancement of community preparedness for natural disasters. The role of social work in building social capital for sustainable disaster relief and management." *International Social Work* 50(3):357369.
36. Mirsa GK, Mathur GC, 1993. *Natural Disaster Reduction*. New Delhi: Reliance Publisher House.
37. MoFDM, 2007. *National Plan for Disaster Management. 2007-2015. Draft National Plan v.6*. Ministry of Food and Disaster Management. The Government of the People's Republic of Bangladesh.
38. MoFA, 2006. *Disaster Management in Bangladesh*. External Publishing Wing. Ministry of Foreign Affairs. The Government of the People's Republic of Bangladesh.
39. Md. Anwar Hossain 2012. *Community Participation in Disaster Management: Role of Social Work to Enhance Participation*.
40. Nahar, Nazmun, 2001. "Coping with Cyclone Disasters: A Study in Two Coastal Locations in Bangladesh." In Nasreen Ahmad and Hafiza Khatun (Ed.) *Disaster Issues and Gender Perspectives*. Conference Proceedings. Dhaka: Bangladesh Geographical Society and CARE Bangladesh. pp. 389-402.
41. O'Brien, Geoff; Phil O'Keefe; Joanne Rose and Ben Wisner, 2006. "Climate change and disaster management." *Disaster*, 30(1):64-80.
42. Rahman, Muhammad Fazlur, 2008. *Interim national progress report on the implementation of the Hyogo Framework for Action*. Dhaka: DMB.

43. Rahman M, 1991. *Training the Armed Forces for Disaster Operation*. Bangladesh Army J. Dhaka, 5(2): 33-34.
44. South Asia Floods, 2007.
http://www.oxfam.org/en/programs/emergencies/southasia_floods_07/update_070806.
45. Tan and NghoTiong, 2009. *Disaster Management: Strengths and Community Perspective*. *Journal of Global Social Work Practice*, Vol. 2, No. 1.
46. Tanvir H. Dewan, 2015. *Societal impacts and vulnerability to floods in Bangladesh and Nepal*, *Journal of Weather and Climate Extremes*, vol. 7(2015), 36-42. doi: 10.1016/j.w...
47. UNDP, 2007. *Human Development Report 2007/2008. Links between Natural Disasters, Humanitarian Assistance and Disaster Risk Reduction: A Critical Perspective*. UNDP Human Development Report Office.
48. Walker J, 1994. *The Book of Natural Disasters*. New York: Shooting Star Press Inc.
49. Yodmani, S. *Disaster Risk Management and Vulnerability Reduction: Protecting the Poor*. Paper presented at *The Asia and Pacific Forum on Poverty*. Bangkok: Asian Disaster Preparedness Center; (2001). P VI, 32.