

# Management Approach to Disaster Scenario in Bangladesh: An overview

Abu Reza Md. Towfiqul Islam<sup>1</sup>, Anjum Tasnuva<sup>1</sup>, Md. Tanziul Islam<sup>2</sup>, Md. Rezaul Haque<sup>3</sup>

<sup>1</sup>Department of Disaster Management, Begum Rokeya University, Rangpur-5400, Bangladesh

<sup>2</sup>Department of Political Science, Begum Rokeya University, Rangpur-5400, Bangladesh

<sup>3</sup>Department of Economics, Thakurgaon Govt. College, National University, Bangladesh

**Abstract-** This paper focuses on an overview of disaster scenario in Bangladesh. It is generally true that no one can be eliminated natural disaster but the extent of its damage can be reduced to its reasonable limit to minimize the loss of lives and properties by implementing disaster action plan and co-ordinate disaster management method. Both qualitative and quantitative techniques were applied to carry out this study. It is necessary to the work before the disaster occur to mitigate, preparedness and collaboration with different organization can reduced the loss of huge lives and properties. Communication technology play an important role in management approach to disaster especially preparedness phase of disaster. The main aim of this research is to examine existing Disaster Management System (DMS) and investigation of current development of DMS. This paper attempts to develop a proposed model for enhancing DMS which reducing loss and copes with all kind of disaster in Bangladesh. It can be concluded that number of victim people caused by disaster decreases because of technological advancement but disaster occurrence increases from past to recent due to climate change impact.

**Index Terms-** Disaster scenario, Disaster technology and Disaster Management System

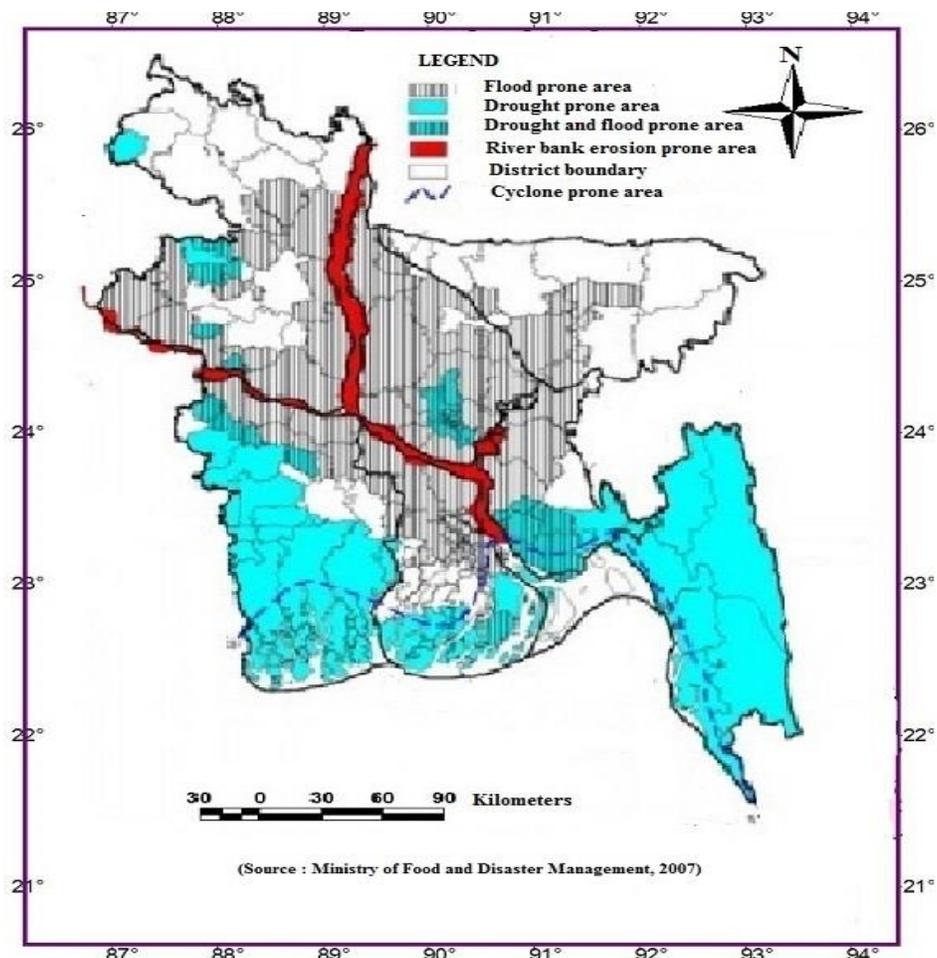
## I. INTRODUCTION

Bangladesh is a natural disaster-prone country of an area about 1, 47, 570 sq. km with population about 140 million (BBS, 2012). Bangladesh is facing various types of natural disaster due to its geographic and geologic setting (Carter, 1991). Bangladesh suffers regularly and frequently from disasters like flood, cyclone, drought, earthquake and landslide etc. (Fig.1). Disasters are annual event in Bangladesh (Nasreen, 2004). From time immemorial, the geographical location, land characteristics, multiplicity of rivers, monsoon climate and coastal morphology of Bangladesh have been a mixed blessing (Sabur, 2012). Bangladesh does not meeting all the necessities of pre, during and post disaster activities that cannot deal with to have large collaboration of different organization with highly advanced equipment. Disaster management in Bangladesh is mainly concerns to disaster mitigation and preparedness (Kafiluddin, 1991). In case of any devastating natural disaster, collaboration of Government agencies with non-Government agencies, international and UN agencies play a crucial role in terms of massive immediate response and subsequent rehabilitation of the affected people (Khan, 2000). The adverse impacts of all the

natural hazards affecting socio-economic condition need to be reduced for sustainable development (Pande, 1992). Disaster management needs to effective communication, collaboration between different departments; NGO's can reduce and minimize the loss of lives and properties (Shafiq, 2013). The diversity, complexity and the dynamics of disasters management of Bangladesh need an elaborate system giving warning well ahead of time. The complexity of the problems make it very difficult to predict the impending danger and the socio-economic conditions and the logistic support facilities make it more difficult to take appropriate actions (Rahman, 1991). Early warning system is used to minimize the risk of a disaster in the mode of technology advancement (Meadows, 1972). Information technology in the form of internet, GIS, GPS satellite and electronic communication are beneficial for planning and implementation of hazard reduction in Bangladesh (Islam, 2011). A policy assessment in partnership approach to Disaster Management in Bangladesh was carried out by Khan and Rahman (2007). There is a problems being faced during the disaster management in Bangladesh that is absence of common disaster preparedness plan, communication gap, bureaucratic hassle, confusion about legal framework and the collaboration between national and local level. The purpose of the study focuses on disaster preparedness of Bangladesh in order to get quickly government and community responses. This study makes a bridge among the sporadic research work. By this paper an attempt has been made to overview of disaster management scenario in Bangladesh about how to manage and ways and means to overcome the effect of these disasters. The objective of this paper is to manage and recommended measures to reducing loss of a disaster.

## II. METHODOLOGY

This paper has used secondary data and information to understand the disaster management in Bangladesh. The relevant secondary data were collected from various institutes such as Disaster Management Bureau, Bangladesh Meteorological Department and agencies working on disaster management directly or indirectly. The sources includes relevant government report, online databases, literature, books, journal and other document analysis in order to know the overall picture of disaster scenario in Bangladesh where the study was carried out. All data have been processed and analyzed with the help of conventional statistical techniques. The research is both qualitative and quantitative in nature with discussion outputs and recommendations.



**Figure 1: Map showing the location of major disaster prone areas in Bangladesh**

### III. DISASTER MANAGEMENT CYCLE AND PHASES

Disasters are gigantic in nature and paralyze human life activities which need to strengthen and coordination of different organization that are responsible and cope with them (Shafiq, 2013). Disaster management is a cyclic phase, normally in a cyclic phases ending of one phase is starting of second phase but in case of disaster management, more than one phase can execute simultaneously (Warfield, 2005). The essence of disaster management cycle is the collaboration and coordination of different organization and organized effort to respond against disaster, prepare for adverse event and recover from comical

destruction of the disaster (Fig.2). Quick response and management of natural disaster is not easy job (Walker, 1994). For that reason requires massive chain of activities with effective management system in order to humanitarian ground of exigency in all the phases of disaster management (Das, 1997). Understanding of disaster and its management is divided into four distinct phase (Fig.3). Each of these phase involve a specific set of task to be accomplished. Although, no identical rule will be apply to explain various phase of disaster management. Disaster management task can be carried out in accordance with nature, purpose and also exact objective set by different coping organization in a specific phase of disaster management.



Figure 2: Disaster Management Cycle (Modified after Warfield, 2005)

Natural phase	Alert & Warning Phase	Disaster phase	Recovery phase
# No immediate threat to disaster. # Long term action required. # Unknown time need in future impact of disaster. # Known hazard.	# Alert or public warning of disaster. # Passage of the threat and lifting of the warning. # Precautionary measures required.	# Direct impact of slow onset and rapid onset disaster. # Emergency period and measures required are emergency basis	# Resume normal lives and means of livelihood. # Restore infrastructure, service and economy. # Long term need and development.

(Source: Government of Bangladesh, 2010)

Figure 3: Disaster management phases of Bangladesh

#### IV. DISASTER IN BANGLADESH SCENARIO

Bangladesh is a developing country which cannot afford to manage properly natural disaster. Developing country like Bangladesh is disproportionately affected disaster because of its limited resource, weak infrastructure, and lack of disaster preparedness plan (Watson et al., 2007). Due to its geologic setting and unique geography, Bangladesh is fatally under attack of various kinds of natural hazard. Cyclone on 29 April, 1991 is the most devastating one in its history. In the last couple of years Bangladeshi people were suffering from both natural and human induced disaster. Natural disaster in Bangladesh including cyclone, flood, earthquake, drought, landslide while man-made disaster like as fires, political unrest, terrorism, epidemics, transport and industrial accident (Nizamuddin, 2001). Natural and man-made disasters have been affected people and their livelihood throughout the history of human kind of Bangladesh, causing enormous losses of human lives and material destruction (Haen, 2006). Both losses of life and property are unbearable and direct impact of this type of disastrous event on social and economic life of Bangladeshi people is overstraining (Sabur, 2012). Like other developing countries, Bangladesh is facing the damage and destruction due to natural hazard. Bangladesh established her coping deficiencies so many times against violent natural disaster events. In a disaster situation early response is very much important to minimize the casualties and the damages to human lives caused (Chandio et al., 2006). Here the table 1 shows the associated damages and estimated economic loss caused by two recent disasters in Bangladesh. According to world disaster report 2013, the table 2 that demonstrates total number of killed and affected people by disaster in Bangladesh from 1980 to 2012. Ongoing disaster management system and

policies shows great deficiencies in all phases of disaster management cycles. This lacking shows poor institutional arrangement in order to solve disaster related problems as well as weak collaboration and communication gap between different level of Govt. and NGO sector and also deficiency of concrete policies of reconstruction and rehabilitation. In this reality, the Government of Bangladesh has undertaken a lot of plans and programs for disaster reduction through disaster management. Problem is hinder for implementing disaster management plans; the Government of Bangladesh initiated a project "Comprehensive Disaster Management Programme (CDMP)" with overall goal to reduce the human, economic and environmental costs of disaster in Bangladesh. One of the objectives of this research was to increase the capacities of the households and local communities in the highly disaster prone areas through the coping with cyclones, floods and other potentially disaster situations

Table 1: Damage caused by two most recent disaster in Bangladesh

Date	Disaster	Area affected	No. of death	Estimated economic loss
13 May 2013	Cyclone Mahasen	Coastal areas of Patuakhai, Coxsbazar district	17	US \$ 5.14
22 March 2013	Tornado	Brahmanbaria district	36	US \$ 1.41

Source: <http://www.en.wikipedia.org/wiki/cyclone> & <http://www.en.wikipedia.org/wiki/tornado>

**Table 2: Recent disaster of Bangladesh reported total number of killed and affected people**

Reported total number of people killed (1980-2010)	Reported total number of people affected (1980-2010)	Reported total number of people killed (2011-2012)	Reported total number of people affected (2011-2012)
191836	323,480,847	1311	1647973

Source: <http://www.preventionweb.net.htm>

V. RESULT AND DISCUSSIONS

Bangladesh is highly vulnerable to floods, cyclone, landslide and tornado etc. Ten biggest disasters were occurred in the history of Bangladesh since 1988 to 2013. Major disasters have adversely impacted upon millions of lives and uncountable damage of property in Bangladesh. Mainly flood and cyclone have occurred frequently in our country and caused a heavy disastrous effect. Flooding in Bangladesh is very common disaster because of low lying deltaic region. Strong cyclone is responsible for producing unexpected flood (Mirza, 2011). The most devastating flood was occurred in 1988 and 2007 that killed 1517 people and 1110 people respectively (Table 3). The 1988 flood inundated 84 % of the land area of 52 districts and it affected about 45 million people. Again the flood of 1998 was disturbing for its unprecedented duration of 65 days and 1050 people lost their lives and its economic impact was equivalent to 3 billion US dollars (Haris, 1999). Past years report flood indicates that number of occurrence of small to large flood were 69 and frequency of flood decreases in recent years (Fig.4). The last reported flood in 2007 affected 13771380 people. Both 1998 and 2004 floods were inundated 61 % and 68 % area of the country respectively (Khatun, 2013). From the result, it can be interpreted that damage and loss of property and lives caused by disaster decreases in recent year due to proper application of DMS. Cyclone was mainly appearing with 47,211 square km area facing the Bay of Bengal in the coastal zone of Bangladesh (Islam, 2004). From 1980 to 2013, 169 cyclones and tornado were occurred in Bangladesh (Fig.4). Cyclone in Bangladesh is happened to be quite frequent almost every year. The two recent cyclones were killed 4234 and 330 in 2007 and 2009. Cyclone in 1991 was occurred and 138866 people were killed and 15438849 people were affected in addition to the total victim were 15577715 people (Table 3 & Fig.5). In year of 1991, the worst cyclone of the Bangladesh created landslide on coastal area. Human death toll rose to 0.14 million and property losses exceeded two billions of US dollars (Haris, 1999). A strong cyclone Mahasen struck in 2013 of the coastal part of Bangladesh but people aware about it and evacuated vulnerable zone because of developed early warning and response system. The result indicates that death toll was little (17 people) in 2013 cyclone than previous cyclone yet affected 12, 8550 people of Bangladesh (Fig.5). From the table it can be interpreted that the

number of occurrence of major cyclone has drastically increased in the recent year due to global climate change impact but decreasing the loss of live and property due to technological development in Bangladesh. Landslide is a common disaster in southeastern part of Bangladesh. One notable landslide was occurred on 27 June 2012 which caused 362587 victim and death toll 122 people (Table 3 & Fig.5). From 1980 to 2013, major 4 landslide occurrence associated which highlighted in figure 4. Tornado causes a local damage and it requires an early warning response. A ruthless tornado struck in 1996 caused 545 deaths and injured about 34000 people (Table 3 & Fig.5). Tornos are a very common phenomenon in Bangladesh during late chaitra and baishak months and are known in Bengali as Kalbaishaki (Chowdhury, 1978). Drought is recurrent event in Bangladesh and present change of land use pattern made the country more vulnerable to drought (Shahid and Behrawan, 2008). Mainly 3 drought occurrence associated within 1980-2013. Bangladesh was experienced a horrible drought in 1994 affected 53 % of the people (Akter, 2009). Rangpur is one of the most vulnerable divisions to drought in Bangladesh. In Rangpur 25 % of total population caused immense crop damage due to drought (Khatun, 2013). The number of occurrence of earthquake and epidemic were 10 and 29 events from 1980 to 2013 (UNISDR, 2013).

**Table 3: Most recent disaster in Bangladesh**

No	Date	Disaster	Total killed	Total affected
1	20 August 1988	Flood	1517	73000000
2	29 April 1991	Cyclone	138,866	15,438,849
3	13 May 1996	Tornado	545	34,000
4	8 July 1998	Flood	1050	15,000,050
5	12 August 2004	Flood	747	36,000,000
6	1 September 2007	Flood	1110	13,771380
7	15 Nov, 2007	Cyclone	4234	89,23259
8	25 May 2009	Cyclone	330	50,000
9	27 June 2012	Landslide	122	3,62465
10	13 May 2013	Cyclone	17	1,28550

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

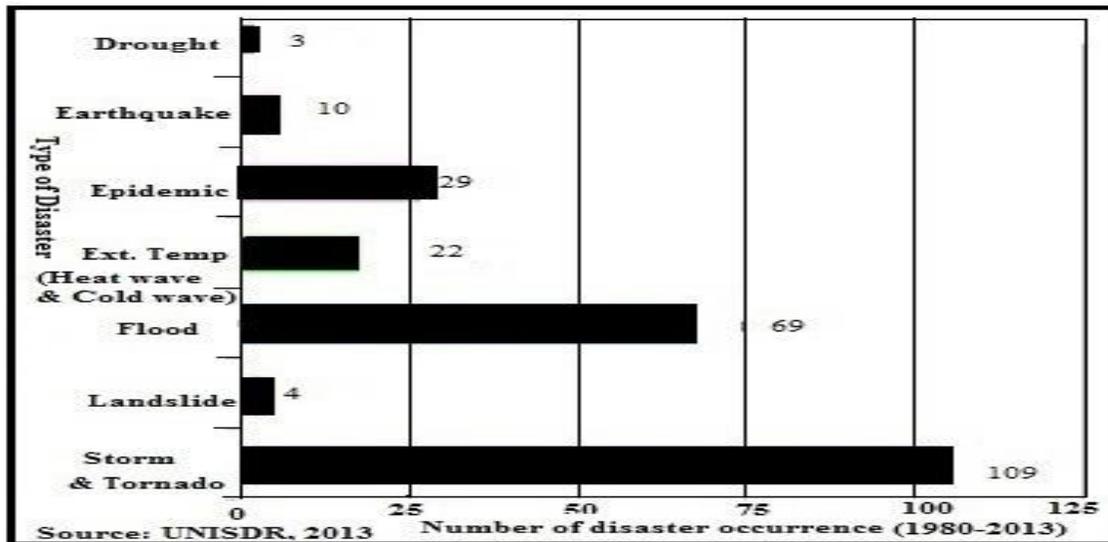


Figure 4: Disaster occurrence in Bangladesh from 1980 to 2013.

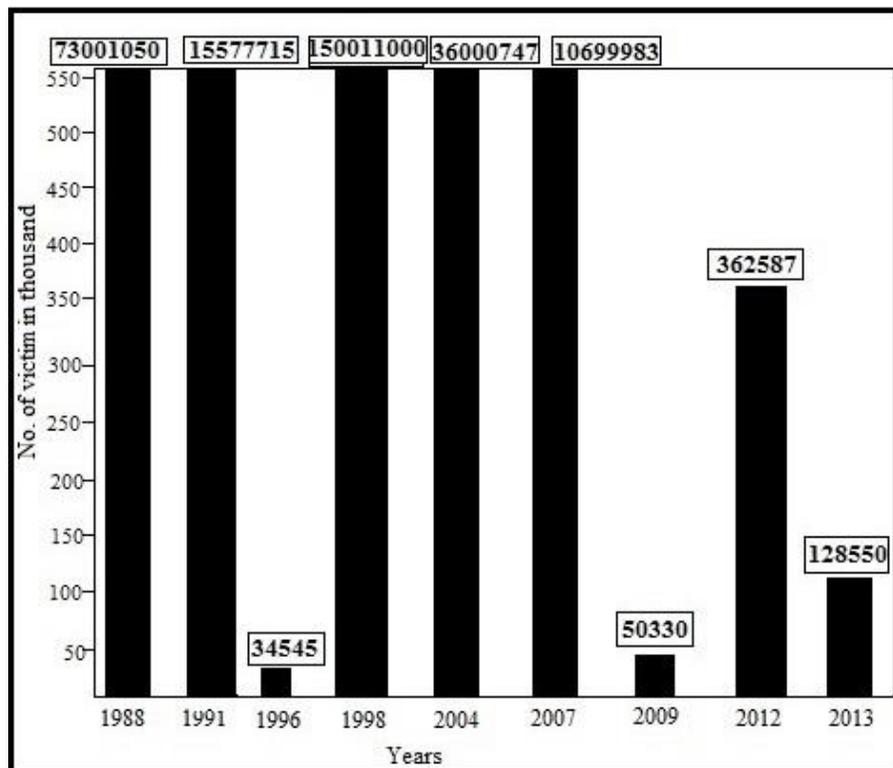


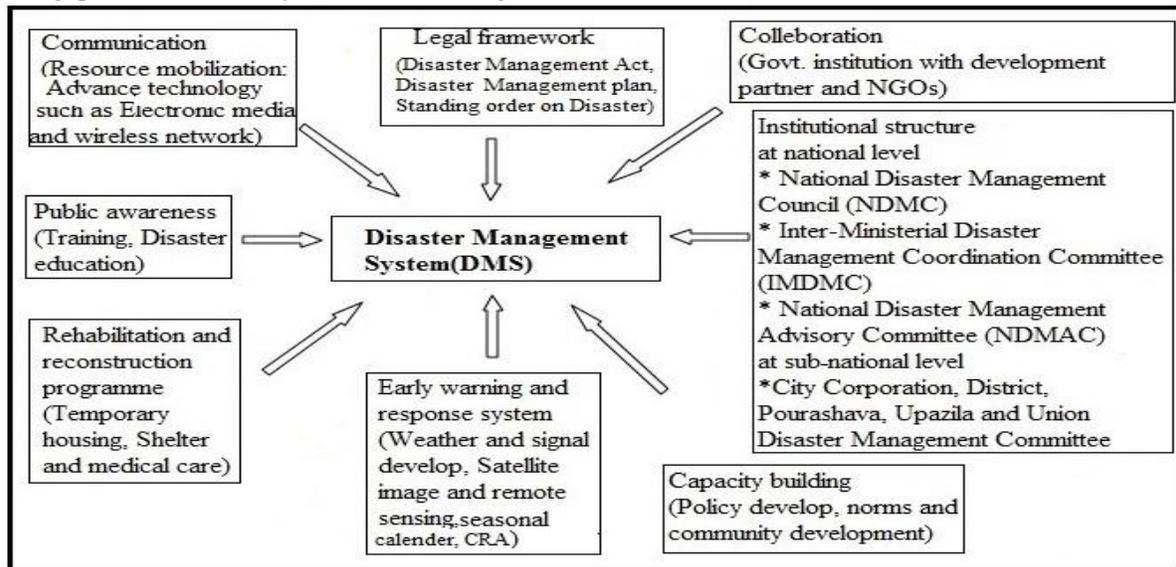
Figure 5: Reported victim of Disaster in Bangladesh from 1988 to 2013.

There is a need for effective handling of disaster situation with proper disaster management system (DMS). It is not possible to manage disaster without strengthening of national institutional structure, strict legal jurisdiction, collaboration and communication and also awareness build up at all levels of the community. The present research is proposed for disaster management system (DMS) modal which is a way to overcome the problem existing disaster management system in Bangladesh (Fig.6). Proposed DMS modal indicate that preparedness plan and related measure such as awareness build-up, community risk assessment, enhancement of institutional capacity and suitable

technological advancement in disaster prone area whatever necessary. DMS model demonstrated that forecasting, warning dissemination system, also the standing order for evacuation, the organization of rescue, relief and also the short-term rehabilitation and long-term reconstruction activities are very necessary factor in a disaster occurrence period. The model also suggests that mitigation measures into suitable plan, policy and act of disaster management and also guideline for development partner with NGOs task at top to bottom levels to mobilize people for increasing their own capacity to cope with and recover from disaster in disaster prone area and also structural and non-

structural measures to reduce the risk and the consequences of disaster occurring in Bangladesh. Review the literature of disaster management system in Bangladesh is to identify the relevant existing practice and theory of disaster management.

Proposed DMS modal is linked with the gap and issues of existing DMS and its instant need to enhance DMS in Bangladesh.



**Figure 6: Proposed model of Disaster Management System (DMS) in Bangladesh**

## VI. CONCLUSION AND RECOMMENDATIONS

Disaster in Bangladesh is frequent event and impossible to control it but effective DMS can ensure to save thousands of lives and property. The Government of Bangladesh is motivated to establish a sophisticated and practiced disaster management system from national to local level to mitigate the effects of disasters. Having limited resource and the vulnerable condition of the country to natural disaster, the GoB has been made an effort to safer Bangladesh in the 21st century and seeks logistic and financial help of development partners and NGOs. This paper revealed that the number of natural disaster frequency was increasing in recent decade but at the same time the loss of lives and property by disaster was reduced at reasonable limit due to technological advancement in Bangladesh. Further research and study will require for improvement of early warning dissemination in Bangladesh. Collaboration, coordination and technology advancement are used to effective DMS beneficially in Bangladesh. There are required improvement in the area of communication, remote sensing, and computing capabilities in the field of knowledge shearing and information of Disaster management. Based on these realities and existing DMS in Bangladesh, the following recommendations are require:

1. To build up awareness at all level of the community concerning practical ways to reduce disaster risk through training, education and collaboration with national curriculum board and text book of Bangladesh.

2. To enhance the knowledge and skill of the key personnel and capacity building and prerequisite of relevant operational guidelines in the outline of disaster management handbook.

3. To set up disaster management action plan in the most vulnerable districts, upazilas, unions and resource mobilization of local community in most disaster prone area to prepare and

shelter themselves and improvement of their own capacities to cope with recover from disaster.

4. To improve the early warning broadcasting practices and follows the guideline for facilities at protection and evacuation site for highly at risk people.

5. To collaborate in making timely stipulation of meteorological and hydrological information from neighboring country for disaster forecasting and other disastrous events.

6. To coordinate between Government and development partner with NGOs for professional management of disaster situation at the national level to local levels.

7. To support the national institutional capacity for DMS through emergency and exigency situation by disaster management committee at district, upazila and union levels.

8. To reduce bureaucratic hassle for proper implementation of disaster management system in Bangladesh at all levels.

## ACKNOWLEDGMENT

The authors would like to grateful the Disaster Management Bureau of Bangladesh and Bangladesh Meteorological Department (BMD) and agencies working on disaster management directly or indirectly in Bangladesh.

## REFERENCES

- [1] Akter, T. (2009). Climate change and flow of environment displacement in Bangladesh. Unnayan onneshan, Dhaka.
- [2] Bangladesh Bureau of Statistics (BBS) (2012), Retrieved 3 June, 2012, from <http://www.bbs.gov.bd/home.aspx>.
- [3] Carter, W. N. (199). Disaster Management - A Disaster Management Hand Book, Manila: ADB.

- [4] Chandio, A.F, Shu, L.Y., Memon, N.m. and Khawaja, A., (2006). GIS based route guiding system for optical path planning in disaster management, IEEE international, pp. 2996-2999.
- [5] Chowdhury, A.M. (1978). Rose petals for tropical cyclones, Nuclear Science and Applied. 11 (B): 1-7.
- [6] Das, K.M. (1997). Disaster Management with particular reference to Bangladesh, DMB, Dhaka.
- [7] Government of Bangladesh (GoB) (2010). Standing order on disaster, Disaster Management Bureau, Ministry of food and Disaster Management, Retrieved 3 June, 2012, from [http://www.dmb.gov.bd/reports/sod\\_final.pdf](http://www.dmb.gov.bd/reports/sod_final.pdf).
- [8] Haen, H. and Hemrick, G.(2006). The economics of natural disasters-implications and challenges for food security presented 26th conference of International Association of Agricultural Economics, Bridgetown, Australia, 12-18 August, 2006.
- [9] Haris, M. (1999), Country report: Bangladesh, IDNDR-ESCAP Regional meeting for Asia was held during 23-26 February, 1999, Bangkok, Thailand.
- [10] Islam, S.M.T. and Chik, Z. (2011), Disaster in Bangladesh and management with advanced information system, 20 (5): 521-530.
- [11] Islam, M.R. (2004). Living in the coast: problems, opportunities and challenges. Working paper WP011, pp.13-15
- [12] Kafiluddin, A.K.M. (1991). Disaster Preparedness for Bangladesh Flood and Other Natural Calamities, Dhaka: Padma Printers & Color Limited.
- [13] Khan, M.N.U., (2000). Disaster Management System in Bangladesh, Bangladesh Army Journal, Dhaka.
- [14] Khan, M.R. and Rahman, M.A. (2007). Partnership approach to disaster management in Bangladesh: A critical policy assessment, Natural Hazards, 41(2)
- [15] Khatun, M. (2013). Climate change and migration in Bangladesh: Golden Bengal to land of disaster. Bangladesh e-journal of Sociology. 10 (2): 64-79.
- [16] Meadows, O.H., (1972). A report for the club of Rome project on the predicament of mankind signal book, pp.159.
- [17] Mirza, M. Monirul, Q. (2011). Climate change, flooding in south Asia and its implication. Regional environmental change. 11(1): 95-107.
- [18] Ministry of Food and Disaster Management, (2007). National plan for Disaster Management 2007-2015. Draft national plan, Dhaka, v.6.
- [19] Nasreen, M. (2004). Disaster Research: Exploring sociological approach to disaster in Bangladesh. Bangladesh e-Journal of Sociology. 1(2): 1-8
- [20] Nizamuddin, N. (2001). Disaster in Bangladesh, Disaster research training and management centre, University of Dhaka, Dhaka, Bangladesh.
- [21] Pande, M. (1992). Disaster Relief, Trisul. Journal, III(2), India.
- [22] Rahman, M. M. M. (1991). Training the Armed Forces for Disaster Operation, Bangladesh Army Journal, Dhaka.
- [23] Sabur, A.K.M.A. (2012), Disaster Management system in Bangladesh: An overview, India quarterly: A journal of International affairs, 68 (1): 29-47
- [24] Shafiq, F. and Ahsan, K. (2013), Knowledge management for disaster scenario: An exploratory study, Res. J. Recent Sci. 2(10): 61-66
- [25] Shahid, S. and Behrawan, H. (2008). Drought Risk Assessment in the Northwestern of the part of Bangladesh. Natural hazards, 46: 391-413
- [26] United Nation International Strategy for Disaster Reduction (UNISDR, 2013). Disaster statistics report, Bangladesh at <http://www.preventionweb.net.htm>.
- [27] Walker, J. (1994). The Book of Natural Disasters, N. Y.: Shooting Star Press Inc.
- [28] Warfield, C. (2005). The Disaster Management Cycle, ([http://www.gdrc.org/uem/disaster/1-dm\\_cycle.html](http://www.gdrc.org/uem/disaster/1-dm_cycle.html), Accessed on 15/10/2012.
- [29] Watson, J.T., Gayer, M. and Connolly, M.A. (2007). Epidemics after natural disaster, Emerging infectious diseases, 13(1): 1-5.

#### AUTHORS

**First Author:** Abu Reza Md. Towfiqul Islam, Lecturer, Dept. of Disaster Management, Begum Rokeya University, Rangpur-5400, Bangladesh

**Second Author:** Anjum Tasnuva, Lecturer, Dept. of Disaster Management, Begum Rokeya University, Rangpur-5400, Bangladesh

**Third Author:** Md. Tanziul Islam, Lecturer, Dept. of Political Science, Begum Rokeya University, Rangpur-5400, Bangladesh

**Fourth Author:** Md. Rezaul Haque, Lecturer, Dept. of Economics, Thakurgaon Govt. College, National University, Bangladesh.

**Correspondence authors:** Abu Reza Md. Towfiqul Islam, E-mail address: [gm\\_towfique\\_06@yahoo.com](mailto:gm_towfique_06@yahoo.com). Contact no: +8801912720944.