Country Profile: Bangladesh*

1. INTRODUCTION

Bangladesh is a low-lying deltaic country in South Asia formed by the Ganges, the Brahmaputra and the Meghna rivers. It is a land of about 140 million people within its 147,570 sq. km territory. More than 310 rivers and tributaries have made this country a land of rivers. Diversified cultural heritage, archaeological sites and the natural beauty of the country have made this land attractive. The country has the world's longest unbroken sandy beach of 120km, sloping gently down to the blue waters of the Bay of Bengal. Around 52% percent of the civilian labor force of the country is engaged in agriculture and 14% is engaged in industry. Per capita GDP for 2010-11 was US$ 751 (BBS).

Since independence in 1971, Bangladesh has achieved substantial improvements in some social indicators like a decrease in infant and maternal mortality as well as illiteracy, and an increase in life expectancy, access to safe water and sanitation. However, approximately 31.5% (HIES, BBS, 2011) of the population still continue to live below the poverty line (BBS, 2011). The economic performance of the country has been relatively strong since 1990, with an annual 5% average GDP growth rate and the last FY 2010-11 was 6.7% (Economic Review). Although half of the GDP is generated through the service sector, nearly two thirds of Bangladeshis are employed in the agriculture sector with paddy as the single most important

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product.

The geographical location, land characteristics, multiplicity of rivers and the monsoon climate render Bangladesh highly vulnerable to natural hazards. The coastal morphology of Bangladesh influences the impact of natural hazards on the area. Especially in the south western area, natural hazards increase the vulnerability of the coastal dwellers and slow down the process of social and economic development.

Significant country features include :

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

Natural and human induced hazards such as floods, cyclones, droughts, tidal surges, tornadoes, earthquakes, river erosion, fire, infrastructure collapse, high arsenic contents of ground water, water logging, water and soil salinity, epidemic, and various forms of pollution are frequent occurrences. Climate change adds a new dimension to community risk and vulnerability. Although the magnitude of these changes may appear to be small, they could substantially increase the frequency and intensity of existing climatic events (floods, droughts, cyclones etc). Current indications are that not only will floods and cyclones become more severe, they will also start to occur outside of their "established seasons". Events, such as drought, may not have previously occurred in some areas and may now be experienced.

A. Risk and disaster management

1. Summary of disaster risk and disaster management issue

Bangladesh is a low-lying deltaic country in South Asia formed by the Ganges, the Brahmaputra and the Meghna rivers. It is a disaster-prone country of an area of about 1,47,570 sq. km. with population nearing 140 million. Major disasters that occur in Bangladesh are: tropical cyclone, flood, riverbank erosion, tornado, earthquake etc.

Tropical cyclone:

On April 1991, a devastating Cyclone hit Bangladesh coast and killed 0.13 million people and property damages were more than two billion US dollars. The Cyclone SIDR hit Bangladesh coast on 15

November 2007. As of the reporting period, it was observed that 3,363 peoples are dead and approximately 563,877 houses were totally destroyed. It is also reported that 186,883 hectares of crop areas are fully and 498,645-hectare area partly damaged by Sidr. Cyclone Aila hit the south western coast of Bangladesh on 25 May 2009 and killed 190 people.

Floods:

The 1998 flood lasted for 65 days from July 12 to September 14 and affected about 67% of area of the country. The 1998 flood alone caused 1,100 deaths, rendered 30 million people homeless, damaged 500,000 homes and caused heavy loss to infrastructure. This devastating flood had an enormous impact on the national economy, in addition to causing hardships for people, and disrupting livelihood systems in urban and rural areas. In the year 2000, Bangladesh faced an unusual flood over its usually flood-free south western plain, which also caused loss of life and massive damage to property. In 2004, flood inundated about 38% of the country and caused 747 deaths and economic loses of about US$2,200 Million.

Tornado:

Tornadoes during pre-monsoon period hit Bangladesh and cause localized devastation, both in terms of lives and properties. The tornado that took place on April 26, 1989 caused approximately 1300 people deaths and 12,000 injured. The towns of Saturia and Manikgank sadar were leveled and about 80,000 people were made homeless. In January 9, 1993 nearly 50 people were killed and thousands made homeless when a tornado battered villages in northeast Bangladesh. In October 12, 1997 at least 15 and as many as 25 people were killed in Tongi, a town about 10-20 miles north of Dhaka in Bangladesh, when a tornado tracked through the town. Tornadoes of 14 April 1969; 11 April 1974; 01 April 1977 and 26 April 1989 are noteworthy.

River Bank Erosion:

Rivers in Bangladesh are morphologically highly dynamic. A study concluded in 1991 reported that: out of the 462 administrative units in the country, 100 were subject to some form of riverbank erosion, of which 35 were serious, and affected about 1 million people on a yearly basis. Around 10,000 hectares land is eroded by river per year in Bangladesh (NWMP, 2001). A recent study of CEGIS (2005) shows that bank erosion along Padma River during 1973 – 2004 was 29,390 hectares and along Jamuna River during 1973 – 2004, it was 87,790 hectares.

Droughts:

Drought conditions due to deficiency in rainfall affect different parts of Bangladesh mostly during the pre-monsoon and post-monsoon periods. Between 1949 and 1991, droughts occurred in Bangladesh 24

times. Very severe droughts hit the country in 1951, 1957, 1958, 1961, 1972, 1975, 1979, 1981, 1982, 1984 and 1989. Past droughts have typically affected about 47% area of the country and 53% of the population (WARPO, 2005). Bangladesh faces unpredictable drought hazard in the dry monsoon due to inadequate and uneven rainfall. It varies from place to place, however, and the northwestern region suffers most from the drought. As much as 17% of the Aman crops, the main paddy crops in the wet season may be lost in a typical year due to drought.

Earthquake:

The historical seismic data of Bangladesh and adjoining areas indicate that Bangladesh is vulnerable to earthquake hazard. Bangladesh, as a whole, lies in the earthquake zone of which two-third comes under major and moderate fault. In the recent past, a number of tremors of moderate to severe intensity had already taken place in and around Bangladesh. As examples, the Chittagong earthquake of 21 November 1997 (M= 6.1), the Bhuj earthquake of 26 January 2001 (M= 7.9) and the Chittagong -Rangamati earthquakes of 27 July 2003 (M=5.9, M = 3.69 and M=4.79) may be cited.

2. National disaster risk reduction and disaster management system

A series of inter-related institutions, at both national and sub-national levels have been created for disaster management. As per the Rules of Business of the Government of Bangladesh, MFDM is mandated to formulate policies, prepare plans, and monitor and coordinate all aspects of disaster activities. The field level activities of MFDM are carried out by two subordinate offices e.g. the Disaster Management Bureau (DMB) and the Directorate of Relief and Rehabilitation (DRR). While DMB is responsible for dissemination of all information on natural disasters, including flood information at community level, flood preparedness, awareness raising and capacity building activities, DRR is responsible for conducting relief and rehabilitating operations with the help of district and upazila administrations. The Ministry issued the Standing Orders on Disaster (SOD) in January 1997 to guide and monitor disaster management activities in Bangladesh.

The SOD has been prepared for concerned persons to understand their duties and responsibilities regarding disaster management. All Ministries, Divisions/Departments and Agencies shall prepare their own Action Plans in respect of their responsibilities under the Standing Orders for efficient implementation. The National Disaster Management Council (NDMC) and Inter-Ministerial Disaster Management Coordination Committee (IMDMCC) will ensure coordination of disaster related activities at the National level. Coordination at District, Thana and Union levels will be done by the respective District, Thana and Union Disaster Management Committees. The Disaster Management Bureau will

render all assistance to them by facilitating the process.

A series of inter-related institutions, at both national and sub-national levels have been created to ensure effective planning and coordination of disaster risk reduction and emergency response management.

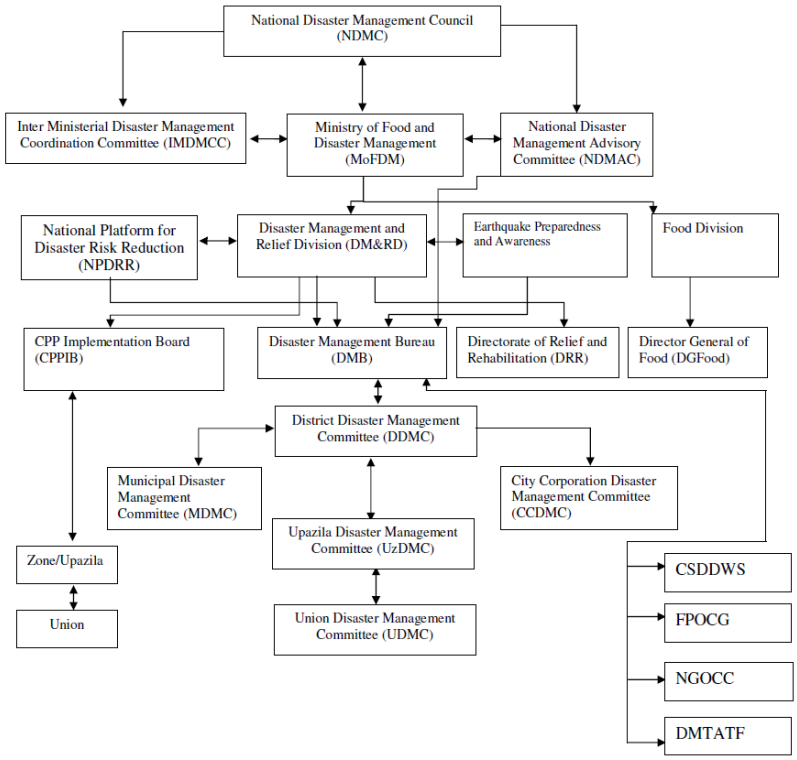

Figure 1: Disaster Management Institutions in Bangladesh

Disaster Management Institutions:

At the national level

1. National Disaster Management Council (NDMC)
2. Inter-Ministerial Disaster Management Co-ordination Committee (IMDMCC)
3. National Disaster Management Advisory Committee (NDMAC)
4. National Platform for Disaster Risk Reduction (NPDRR)
5. Earthquake Preparedness and Awareness Committee (EPAC)
6. Cyclone Preparedness Program Implementation Board (CPPIB)
7. Cyclone Preparedness Programme (CPP) Policy Committee
8. Disaster Management Training and Public Awareness Building Task Force (DMTATF)
9. Focal Point Operation Coordination Group of Disaster Management (FPOCG)
10. NGO Coordination Committee on Disaster Management (NGOCC)

11. Committee for Speedy Dissemination of Disaster Related Warning/ Signals (CSDDWS)

At sub-national level

1. District Disaster Management Committee (DDMC)
2. Upazila Disaster Management Committee (UZDMC)
3. Union Disaster Management Committee (UDMC)
4. Pourashava Disaster Management Committee (PDMC)
5. City Corporation Disaster Management Committee (CCDMC)

Other institutions:

1. Space Research and Remote Sensing Organization (SPARRSO)
2. Bangladesh Meteorological Department (BMD)
3. Flood Forecasting and Warning Center (FFWC)
4. Center for Environmental and Geographic Information Services (CEGIS)
5. Institute for Water Modelling (IWM)

3. Disaster risk reduction and disaster management institutions

Disaster Management Bureau (DMB)

DMB is designed as a small dynamic professionals unit at national level to perform specialised functions in the field of disaster preparedness, local disaster action planning, contingency planning, raising public awareness, training and facilitating improved disaster information flows. DMB works under MFDM and overviews and coordinates all activities related to disaster management from the national level down to the grass-roots level. DMB is committed to enhancing regular dialogues and fostering co-operation in practical disaster preparedness matters 'before, during and after' a disaster between all levels of government, donors, non-government organisations, community groups and others. DMB's main strength is the mandate and authority for dissemination of early warning of different disasters. DMB has a total of 48 technical professionals stationed at their head office in Dhaka. It has a vast network under its authority through a standing order.

Currently, DMB is working on cyclone and flood information warning dissemination, but it has plans to extend its dissemination activities to other disasters. A process of hazard mapping is also under consideration. A website (http://www.dmb.gov.bd) is currently available with only static historic information, but it could be made dynamic for updating with early warnings like the FFWC website.

Space Research and Remote Sensing Organization (SPARRSO)

SPARRSO acts as the centre of excellence and national focal point for the peaceful applications of space science, remote sensing and geographic information system (GIS) in Bangladesh. SPARRSO also advises the government in all matters relating to space technology applications and policies. SPARRSO maintains close collaboration with national, regional and international organizations, institutions and agencies and disseminates research results, satellite data and information to the relevant public, autonomous and private agencies for their development and policy-making activities. SPARRSO's mandate includes monitoring and research on environmental issues. For this purpose they receive images daily to observe weather patterns and floods and prepare flood reports including flood maps showing flood-affected areas.

Bangladesh Meteorological Department (BMD)

BMD is the government organization authorized for all meteorological activities in the country. It maintains a network of surface and upper air observation stations, radar and satellite stations, agro-meteorological observation stations, geomagnetic and seismological observation stations and meteorological telecommunication system. BMD contributes to flood forecasting and warnings by preparing short/medium and long term weather forecasts, 3-hourly surface charts, 6 and 12-hourly upper air charts, heavy rainfall warnings, and special weather bulletins with storm surge information. BMD is the only government authorized organization mandated to issue all sorts of weather forecast and record meteorological observations (surface and upper air) in Bangladesh. BMD has been affiliated to the World Meteorological Organization (WMO) since 1972.

FFWC is a division of the Directorate of Processing and Forecasting, under the Chief Engineer, Hydrology. Together FFWC, Surface Water Hydrology (SWH) and Construction and Instrumentation (C&I) undertake the transmission and processing of data for flood forecasting and warning services. It maintains a strong institutional network for disseminating flood forecasts at national level.

Center for Environmental and Geographic Information Services (CEGIS)

CEGIS is a Public Trust organization under the Ministry of Water Resources and functions under a Board of Trustees chaired by the Secretary of the Ministry of Water Resources on behalf of the government. CEGIS works in the fields of initial environment examination, environmental impact assessment, disaster management modelling, natural resource and risk management, GIS/RS mapping, and survey. CEGIS serves government and non-government organizations. CEGIS has developed several disaster and warning related tools including a Community Based Flood Information System (CFIS); an Environmental

Monitoring Information Network (EMIN); and a Climate Forecast Application Network (CFAN). Currently, CEGIS is in the process of development/acquiring technology for a regional basin flood forecast modelling for use in Bangladesh. Also, CEGIS has started to acquire knowledge on urban and flash flood forecasting.

An operational pilot system was developed to produce daily flood monitoring and forecast maps for use at the community level under Community Flood Information System (CFIS). CFIS project was designed as a pilot operational system to produce accurate and timely information on current and forecasted flood conditions for a floodplain community by using easy understandable mobile SMS. This created an important opportunity for low-cost, reliable, and deeply penetrating dissemination of flood forecasts for vulnerable communities.

CEGIS has developed a methodology for predicting the morphology process and bank erosion along the Jamuna, Ganges and Padma Rivers based on space-based technology. The methodology makes it possible to predict morphological development and bank erosion one to two years ahead.

The Institute of Water and Flood Management (IWFM)

IWFM is a research institute of the Bangladesh University of Engineering and Technology (BUET). Its mandate includes conducting research on floods focusing on integrated water management, organizing seminars and workshops related to floods, and offering a post graduate diploma in Water Resources Development.

Institute for Water Modelling (IWM)

IWM is an institute of learning and research in the fields of water modelling, computational hydraulics and allied sciences established as a Public Trust under the ministry of Water Resources. IWM activities in flood forecasting and warning include the collection of real time hydrometric data for running flood forecasting and inundation models; annually updating and validating the forecasting models; providing technical backstopping and training to FFWC; assisting FFWC to expand into new areas; developing dynamic flood inundation models (MIKE FLOOD) and issuing medium (10 days) flood predictions based on climate forecasts produced by the CFAB project.

Institutes for Disaster Management:

1. **National Disaster Management Council (NDMC)** headed by the Honourable Prime Minister to

formulate and review the disaster management policies and issue directives to all concerns.

2. **Inter-Ministerial Disaster Management Co-ordination Committee (IMDMCC)** headed by the Hon'ble Minister in charge of the Disaster Management and Relief Division (DM&RD) to implement disaster management policies and decisions of NDMC / Government.
3. **National Disaster Management Advisory Committee (NDMAC)** headed by an experienced person having been nominated by the Honourable Prime Minister. Advise NDMC, IMDMCC, MoFDM and DMB on technical matters and socio-economic aspects of Disaster Risk Reduction and emergency response management.
4. **National Platform for Disaster Risk Reduction (NPDRR)** headed by Secretary, DM&RD and DG, DMB functions as the member secretary. This platform shall coordinate and provide necessary facilitation to the relevant stakeholders. Coordinate various relevant stakeholders for interrelated social, economic and environmental risks and vulnerabilities. Support identification of priority needs in the area of DRR, advise for allocating resources, presenting timetable for actions and monitoring and reviewing the implementation of DRR activities in line with the HFA.
5. **Earthquake Preparedness and Awareness Committee (EPAC)** headed by Honourable minister for MoFDM and DG, DMB act as member secretary. Review national earthquake preparedness and awareness programme and recommend suggestion for concerned organizations.
6. **Cyclone Preparedness Program Implementation Board (CPPIB)** headed by the Secretary of the Ministry of Food and Disaster Management to review the preparedness activities in the face of initial stage of an impending cyclone.
7. **Disaster Management and Relief Division** to review the preparedness activities in the face of initial stage of an impending cyclone.
8. **Cyclone Preparedness Programme (CPP) Policy Committee** headed by Honourable Minister, MoFDM and Secretary, DM&RD act as member secretary. To provide policy directives and guideline to the CPP implementation board for effective implementation of the programme.
9. **Disaster Management Training and Public Awareness Building Task Force (DMTATF)** headed by the Director General of Disaster Management Bureau (DMB) to coordinate the disaster related training and public awareness activities of the Government, NGOs and other organizations.
10. **Focal Point Operation Coordination Group of Disaster Management (FPOCG)** headed by the Director General of DMB to review and coordinate the activities of various departments/agencies related to disaster management and also to review the Contingency

Plan prepared by concerned departments.

11. **NGO Coordination Committee on Disaster Management (NGOCC)** headed by the Director General of DMB to review and coordinate the activities of concerned NGOs in the country.
12. **Committee for Speedy Dissemination of Disaster Related Warning/ Signals (CSDDWS)** headed by the Director General of DMB to examine, ensure and find out the ways and means for the speedy dissemination of warning/ signals among the people.
13. **District Disaster Management Committee (DDMC)** headed by the Deputy Commissioner (DC) to coordinate and review the disaster management activities at the District level.
14. **Upazila Disaster Management Committee (UZDMC)** headed by the Upazila Nirbahi Officer (UNO) to coordinate and review the disaster management activities at the Upazila level.
15. **Union Disaster Management Committee (UDMC)** headed by the Chairman of the Union Parishad to coordinate, review and implement the disaster management activities of the concerned Union.
16. **Pourashava Disaster Management Committee (PDMC)** headed by Chairman of Pourashava (municipality) to coordinate, review and implement the disaster management activities within its area of jurisdiction.
17. **City Corporation Disaster Management Committee (CCDMC)** headed by the Mayor of City Corporations to coordinate, review and implement the disaster management activities within its area of jurisdiction.

4. National disaster risk reduction and disaster management policy and program

A. Other Relevant Initiatives

1. Country involvement in regional and international initiatives

SAARC Comprehensive Framework on Disaster Management

SAARC has articulated a Comprehensive Framework on Disaster Management and Disaster Prevention during the 13th SAARC Summit in Dhaka, 12-13 November 2005. The SAARC Centre for Disaster Management and Preparedness (New Delhi), SAARC Coastal Zone Management Centre (Male) and SAARC Meteorological Research Centre (Dhaka) are implementing the framework in the context of regional cooperation. The framework envisages some priority areas of action and Some of them relevant to the current study are listed below:

- Development and implementation of risk reduction strategies
- Establishing regional and national response mechanisms that include (a) Establishing, strengthening and improving Regional Early Warning Systems; (b) Developing systems and procedures to establish an effective Community Alerting System.
- Establishing regional information sharing system and developing a network of institutions and organizations involved in geo-information technologies, research information database, and emergency response management. Developing network with relevant national, regional and international systems
- Developing and implementing disaster management training, education, research and awareness programmes
- Applying ICT for disaster management.

South Asian Floods (SAF)

ICIMOD, in collaboration with the World Meteorological Organization (WMO) and the United States Geological Survey (USGS), has developed the Flood Information System (FIS) under the project "Regional Cooperation in Flood Information Exchange in the Hindu Kush Himalayas" of ICIMOD. The system is conducting a 'Demonstration and Testing phase' since monsoon 2005. This phase is devoted to testing of the feasibility of exchange of flood-related hydrological and meteorological data on a real-time basis from selected pilot stations of the participating countries.

Abu-Dhabi Knowledge Forum

The Abu-Dhabi Knowledge Forum was initiated as an offshoot of the Abu-Dhabi Dialogue on South Asia Water Cooperation under IISS with representation from Himalayan region countries like Afghanistan, Bangladesh, Bhutan, China, India, Nepal and Pakistan. The Abu- Dhabi Knowledge Forum is to identify the internal strength and weakness of the region and explore areas where a coordinated research and training activities on impact of climate change, water governance structure and current management would be of immediate use. The creative and productive discussions and dialogues are evolving some good strategies for future action and cooperation. The importance of creating reliable data and sharing the data and the need to focus more on them in the near future by mutual cooperation and facilitation, was acknowledged.

WMO Global Network - Global Telecommunication System (GTS) – New Delhi regional centre

The World Meteorological Organization's (WMO) Global Observing System (GOS) enables the observation and collection of weather, water and climate information from around the globe with help from the National Meteorological and Hydrological Services (NMHSs) in member countries. WMO is further enhancing its Global Telecommunication System (GTS) and other information systems into a

single coordinated global information infrastructure called the WMO Information System (WIS). This would facilitate the collection and sharing of relevant environmental information for a large number of international programmes and provide a more flexible telecommunication network around the globe. BMD (Dhaka) is connected to GTS by a dedicated 64K Non-IP link through the New Delhi regional centre. BMD transmits weather information to the New Delhi centre at an interval of 3 hours. BMD receives regional and international weather information every 6 hrs, and only regional (India, Pakistan) information every 3 hrs. BMD also gets regional water level data and provides it to FFWC.