

ADRC Peer Review 2010 BANGLADESH

1. Introduction

ADRC launched the ADRC Peer Review project in 2009 to facilitate mutual learning among member countries for the purpose of achieving the goals established by the Hyogo Framework for Action 2005-2015 (HFA). This activity is not intended to be a one-way process, but an interactive effort that facilitates the sharing of experiences and good practices in disaster risk reduction among members. Each year's reviews focus on certain themes in accordance with HFA priorities.

The review process starts with the submission of country reports by target countries, which will be used as background information by reviewer teams. Then, a team of reviewers consisting of representatives of two other member countries, a disaster management expert, and ADRC staff members visits to the target countries to conduct surveys and interviews of government ministries and agencies, NGOs, international organizations, and academic institutions involved in disaster risk reduction activities. Through their surveys and interviews, the reviewer teams identify the strengths and weaknesses of the target countries and provide each country with a set of recommendations, which are to be shared with all ADRC member countries.

2. General Information on Disaster Management in Bangladesh

Bangladesh is located at the innermost end of the funnel of the Bay of Bengal, between 21 and 27 north latitude and 88 and 92.5 east longitude, situated under the tropic of Cancer. Bangladesh is included in the Indian monsoon climate and has four obvious seasons: the pre-monsoon from March to May, monsoon from June to September, post-monsoon in October and November and winter from December to February. About 70 percent of the annual total precipitation occurs during the monsoon season. Bangladesh has an area of 144,000 km² and a population of 150 million, making it one of the most densely populated countries in the world.

Many kinds of natural hazards, such as cyclones, floods, droughts, cold waves and heat waves occur seasonally all over the country. The most severe disasters include cyclones, which during the pre-monsoon and post-monsoon seasons, and floods during the monsoon season. The southern coastal areas along the Bay of Bengal are at the highest risk when cyclones make landfall. The northern and eastern regions are also susceptible to earthquakes. Severe local tornadoes and fires also occur throughout the country.

2.1 Disaster Management System

The Ministry of Food and Disaster Management (MoFDM) is the national focal organization for disaster management in Bangladesh and is comprised of the following three agencies: Disaster Management Bureau (DMB), Directorate of Relief and Rehabilitation (DRR), and Directorate General of Food. Other government agencies, such as Fire Services & Civil Defence, Disaster Emergency Centre of Armed Forces Division, Bangladesh Meteorological Department (BMD), Bangladesh Water Development Board (BWDB), and Bangladesh Red Crescent Society support the activities of MoFDM and disaster management committees at all levels.

2.2 Legal System

The Standing Orders on Disasters (SOD) assigns roles and responsibilities to relevant government agencies as well as to Disaster Management Committees (DMCs) at all levels. It provides ample scope for government organizations (GO), non government organizations (NGOs) and the private sector to conduct need-based programs that involve community members. Thirteen committees and specialized bodies are under the SOD. The enactment of a disaster management law is in progress.

2.3 Planning

The National Plan for Disaster Management 2010-2015 was developed as an outcome of the national and international commitments of the Government of Bangladesh (GoB) and the Ministry of Food and Disaster Management (MoFDM) for comprehensively addressing disaster risks. It was developed on the basis of the GoB Vision and MoFDM mission to reduce the vulnerability of the poor to the effects of natural, environmental and human induced hazards to a manageable and acceptable humanitarian level by (a) bringing a paradigm shift in disaster management from conventional response and relief practices to a more comprehensive risk reduction culture and (b) strengthening the capacity of the Bangladesh disaster management system in improving response and recovery management at all levels.

3. Cyclone Preparedness

3.1 General View of Severe Cyclone

Cyclones are the most common threat, occurring every year in the Bay of Bengal (Fig. 1). As shown in Fig. 2, there are two seasons during which cyclones are most prevalent: the end of the pre-monsoon and the beginning of the monsoon season (May, June and July), and the post-monsoon season (October and November). The intensity of cyclones in the post-monsoon season is the greater of the two.

Cyclones frequently make landfall along the coastal areas of Bangladesh as well as the states of West Bengal, Orissa and Andrapradesh in India. A cyclone that made landfall along the southeastern coast of Bangladesh in 1970 caused a high storm surge (9m) that resulted in 300,000 to 500,000 casualties and extensive damage. This cyclone was the worst natural hazard to hit Bangladesh and is considered to be one of events that triggered the movement that led Bangladesh to gain independence from East Pakistan.

In April 1991, a severe cyclone made landfall along the southeastern coast of Bangladesh, creating a high storm surge of 7-8m that caused 140,000 casualties. The lowest air pressure was observed in Chittagong port, where it was less than 920hPa, and the instantaneous strong winds that resulted were estimated at more than 60m/s. Cyclone Sidr in 2007 made landfall along the southwestern coast of Bangladesh, killing more than 3,000 people and affecting around 9 million. The Bangladesh Meteorological Department reported the lowest pressure at less than 944hPa and the highest wind speed at more than 60m/s. The paths of those two cyclones are shown in Fig. 3. While the 1991 cyclone made landfall along the southeastern coast near Chittagong, the second largest city behind Bangladesh, the 2007 cyclone made landfall further east near Sundarban, which has been awarded world heritage recognition as home to the largest mangrove forest in the world.

The satellite pictures of these two cyclones are shown in Fig. 4. Both had clear eyes and both had developed sufficiently prior to making landfall along the coast of Bangladesh. The picture of the 1991 cyclone provided by NOAA (USA satellite) has much lower resolution than the high resolution image of the 2007 cyclone provided by the MT-SAT (Japanese satellite).

Two meteorological radar dishes were installed for the purpose of cyclone watching at Cox's Bazar and Khepupara in the coastal areas along the Bay of Bengal in Bangladesh, supported by Japanese

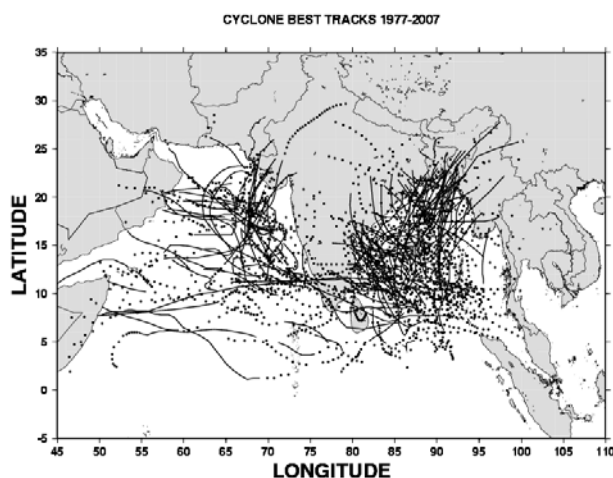
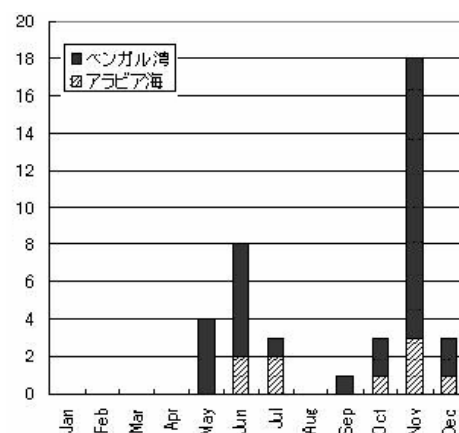


Fig. 1 Path of cyclones from 1977 to 2007



!! Fig. 2 Monthly occurrence of cyclones in the northern Indian Ocean

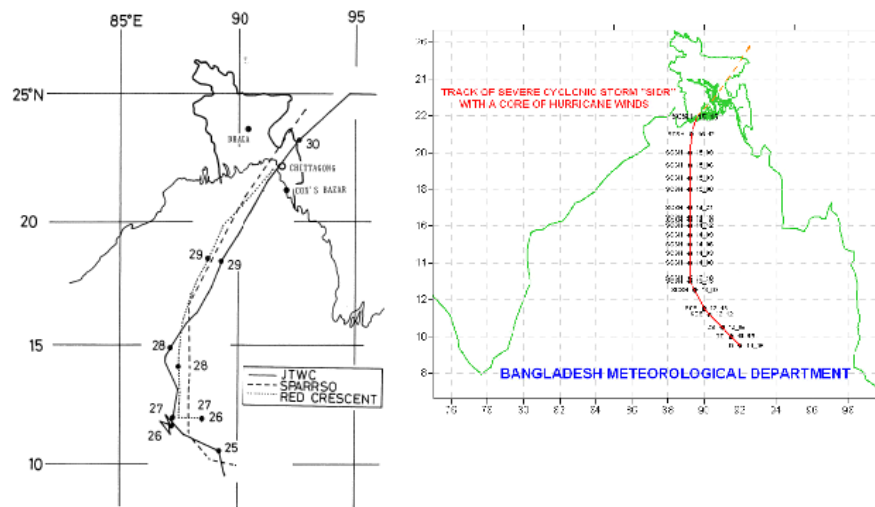


Figure 3.1 Tracking paths of the 1991 cyclone.

Fig 3. Paths of cyclones in 1997(left) and 2007(right)

ODA from the 1980s (Fig. 5). These radar dishes were very effective for the detection of the movement of the cyclones in 1991 and 2007. The exact location of the cyclones is identified by the radar echo picture on the PC display, and timely alerts were issued before they made landfall. Those two radar dishes were recently upgraded with Doppler radar equipment, which can observe wind speed as well as the location of cyclones.

Fig. 6 shows the damaged area in the case of the 2007 Cyclone Sidr. Damage was concentrated in the southwestern and southern coastal areas of Bangladesh. As shown in Fig. 4, the 1991 cyclone made landfall along the southeastern coast near Chittagong, the second largest city behind Bangladesh, and the 2007 cyclone made landfall further east near Sundarban. The area where the 2007 cyclone made landfall was less populated than that of the 1991 cyclone. Therefore, the latter cyclone caused fewer human casualties.

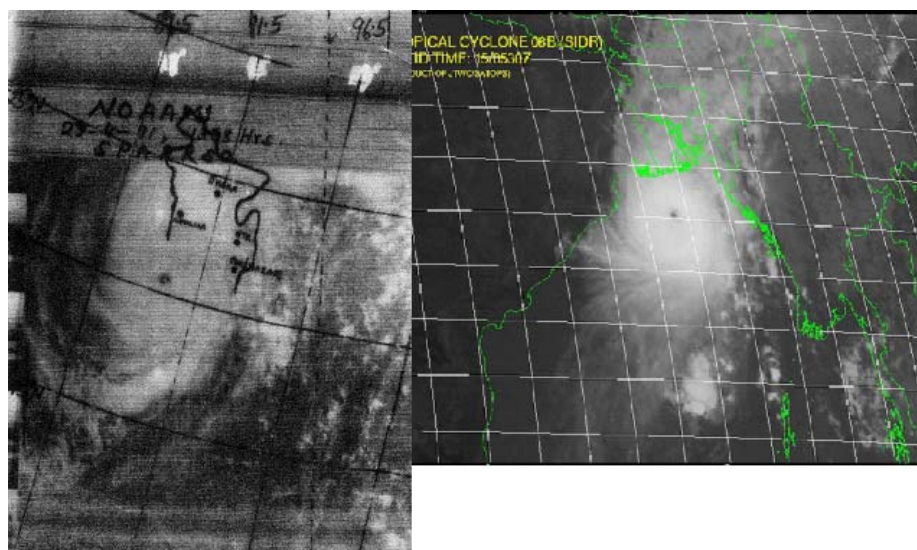


Fig 4. Pictures of cyclones in 1997(left) and 2007(right)



Fig. 5 Radar system of the Bangladesh Meteorological Department

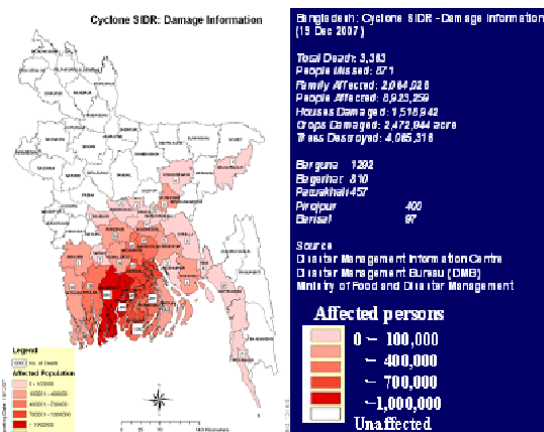


Fig. 6 Distribution of damaged area at the coast of the Bay of Bengal in Bangladesh during the 2007 cyclone

3.2 Countermeasures to Prepare for Severe Cyclones in Hatiya and Nijumdpip

Hatiya and Nijumdpip are islands in the Bay of Bengal. The port on Hatiya Island is not well developed and the bank is eroding as shown in Fig. 7. The Cyclone Preparedness Programme (CPP) is operated to notify local residents about cyclones and to issue evacuation instructions. This voluntary information system is most effective in reducing human damage. The situation is similar on Nijumdpip Island. No coastal embankment has been constructed.

After the 1991 cyclone, many cyclone shelters were constructed by the Government of Bangladesh as well as with the support of many countries and development partners. Approximately 3,000 cyclone shelters were completed to serve as multipurpose facilities. These are utilized as schools and community centers during normal times. Cyclone shelters are the most effective way to save human lives during severe cyclones. However, about 10 % of these shelters will not function sufficiently because the facilities are old or worn out.



Fig. 7 Bank of Hatiya Island (right top), Fig. 8 Cyclone shelter in Hatiya (left), and Fig. 9 Cyclone shelter in Nijumdpip (right)

Ministry for Food and Disaster Management (MoFDM), Disaster Management and Relief Division (DMRD), Disaster Management Bureau (DMB) and Bangladesh Red Crescent Society

The Cyclone Preparedness Programme (CPP) was established in 1965, with the help of the Bangladesh Red Crescent Society, to assist the population living in the coastal regions of Bangladesh. The main activities of CPP are the following: to disseminate cyclone warnings to local residents; to assist people in taking shelter; to rescue victims affected by cyclones, and to provide first aid to people injured by cyclones. As a very small and poorly equipped unit, CPP did not prove useful during the cyclone of 1970.

CPP was revitalized in 1972 with a bigger network in the sub-districts and was officially taken over by the government in 1973. Since then, it has been jointly implemented and managed by the Bangladesh Red Crescent Society and the Government of Bangladesh, with continuing financial and technical support from the International Federation of Red Cross and Red Crescent Societies. Two committees were formed: a seven-member policy committee and a 15-member implementation board.

CPP currently has 159 full-time personnel and over 42,000 trained volunteers in four different levels (2,845 units, 274 unions, 32 upazilas and 6 zones). Volunteers are recruited and trained at the local level. The public is made aware of hazards through the use of volunteers in the performance of drills and demonstrations, video presentations, and a publicity campaign using tri-media and drama staging. Announcements are also made using an extensive network of radio communication facilities in coastal areas, which are linked to Dhaka, as well as using warning equipment and gear for volunteers.

Through the Ministry for Food and Disaster Management (MoFDM), the vision of the Government of Bangladesh is to reduce the vulnerability of people, especially the poor, to the effects of natural, environmental and human induced hazards to a manageable and acceptable humanitarian level.

The Disaster Management and Relief Division (DMRD) under the Ministry aims to bring a paradigm shift in disaster management from conventional response and relief to a more comprehensive risk reduction culture. It also aims to promote food security as an important factor in ensuring the resilience of the community to hazards.

The Disaster Management Bureau (DMB) was established in 1993 as the successor of the Disaster Coordination and Monitoring Unit in line with the concept of having a specialist disaster management unit as per the MoFDM's paradigm shift. The mandate of this bureau is to promote activities to raise public awareness; to facilitate the preparation of local disaster management action plans at the union, upazila and district levels; to maintain coordination with departments/agencies, NGOs, social organizations, and other organizations; to act as a depository of all disaster management related information; to maintain an inventory of skilled disaster management personnel; and to monitor disaster preparedness activities through district administrations and district disaster management committees.

Bangladesh Water Development Board (BWDB)

Originally the water division of the East Pakistan Water and Power Development Authority in 1959, the Bangladesh Water Development Board (BWDB) was created under the Bangladesh Water and Power Development Boards Order 1972 (P.O. No. 59 of 1972) as a fully autonomous organization responsible for accomplishing the tasks of flood control and the implementation of drainage and irrigation projects. Under the BWDB Act 2000, its functions are to be guided by the National Water Policy (NWPo) and National Water Management Plan (NWMP).

The top management of the BWDB is now vested in a policy and oversight governing council (GC) whose 13 members are headed by the Minister of Water Resources.

Flood Forecasting and Warning Centre (FFWC)

The Flood Forecasting and Warning Centre (FFWC) was established as a permanent entity in Dhaka in 1972 by the Bangladesh Water Development Board (BWDB) under the Chief Engineer, Hydrology and Director, Processing & Flood Forecasting.

FFWC operates the “Flood Information Centre” as a focal point for the disaster management of cyclones and floods. It functions by collecting, processing, and managing real-time data to generate flood forecast models in order to provide the following information:

1. daily monsoon bulletins and river situation reports,
2. river level forecasts for 24, 48, and 72 hours,
3. current warning messages,
4. local inundation status maps, and
5. flood forecast maps.

FFWC utilizes such systems as voice data (HF wireless network, 67 stations), mobile telephones (3 stations), a telemetry system (14 stations), satellite imagery (GMS, NOAA-12 & NOAA-14), and online data from the Bangladesh Meteorological Department, including satellite and rainfall radar data.

Institute of Water Modelling (IWM)

The Institute of Water Modelling (IWM) is a trust formed by the Government of Bangladesh in December 1986, with its roots tied to United Nations Development Programme-Danish International Development Agency (UNDP-DANIDA) aided Surface Water Simulation Modelling Program (SWSMP) implemented in 1986-1996. It functions as a Center of Excellence and Learning in the field of Computational Hydraulics, Water Modelling and Allied Sciences.

IWM offers state-of-the-art services in enhancing the quality of water resources planning and management as well as hydrometric measurements, hydrographic and topographic surveys and monitoring. It has developed numerical models of rivers, estuaries and bays covering all of Bangladesh for use in national projects.

Bangladesh Meteorological Department (BMD)

The Bangladesh Meteorological Department (BMD) is the authorized government organization for all meteorological activities under the Ministry of Defense. BMD maintains the integrated network of surface weather stations and upper air observatories, radar sites and satellite stations, agro-meteorological observatories, geomagnetic and seismological observatories and the meteorological telecommunication system. Its main activities are the observation of meteorological components and the analysis and forecast of weather conditions. BMD maintains 24 hr operational capabilities for issuing disaster warnings related to cyclones and floods and contributing to the reduction of serious natural hazards. BMD is comprised of its headquarters and the Storm Warning Centre (SWC) in Dhaka, as well as the Meteorological & Geo-Physical Centre (M&GC) in Chittagong.

4. Observation and Analysis by Peer Review Team

4.1 Findings

- Cyclones and floods are the most serious natural hazards in Bangladesh and the regions at most risk extend along the coastal areas facing the Bay of Bengal. The land of Bangladesh consists mostly of plains and therefore is very prone to flooding.
- Disaster management councils/committees exist from the national level to the lowest levels of the union and village, that is, the levels at which the Cyclone Preparedness Programme (CPP) is implemented. The CPP is implemented based on the Standing Orders on Disaster (SOD), which also contains provisions regarding NGOs, the private sector and the community. In the event of a serious natural hazard, early warning and evacuation orders are issued, and rescue operations are conducted.
- The Disaster Management Bureau (DMB) has technical and scientific partners which are obviously of great support in database maintenance and research activities regarding inundation risk mapping and modeling, which are the basis for Disaster Management (DM) planning programs, especially related to structural measures such as shelters, embankments, polders (low-lying areas enclosed by embankments) and coastal forestation.
- The Bangladesh Meteorological Department (BMD), like any other meteorological agency, has highly technical facilities and plays a significant role in cyclone warning and preparedness.
- The Bangladesh Water Development Board (BWDB) is tasked with the governance of the efficient utilization of water, the measurement of the impact of floods, drought, cyclones and ground water extraction, the monitoring of future climate change and food security, and the planning of embankments and polders. A serious problem during and after severe disasters is the acute scarcity of pure water, but the BWDB is undertaking relevant studies, experiments and other works in coordination with relevant agencies, with support from funding organizations, to provide solutions.
- The Institute of Water Modelling (IWM) has been continuously working to carry out storm surge modeling during severe cyclones for disaster preparedness. Comprehensive disaster management programs, including the development of risk maps, are conducted for severe cyclone and climate change condition.

4.2 Positive Aspects

- In accordance with the Hyogo Framework for Action, the Ministry of Food and Disaster Management (MoFDM) and Disaster Management Bureau (DMB) are actively taking steps to improve implementation for reducing the probable disaster risks to human lives and property in Bangladesh. Activities include the preparation of hazard maps, distribution of training manuals on disaster management to stakeholders, and regular publication of a newsletter on disaster related issues.
- The Government of Bangladesh is keen to uphold the continuous professional development of CPP. An active approach is being taken to support the enhancement of disaster management in cooperation with all stakeholders, by forming strong ties with regional and international relevant organizations and NGOs involved in Disaster Risk Reduction (DRR). Many organizations are active in the coastal areas, including NGOs as well as the World Food Programme (WFP), United Nations Development Programme (UNDP), Bangladesh Red Crescent Society (BRCS), Asian Disaster Preparedness Center (ADPC), World Bank (WB), Asia Developing Bank (ADB), Japan International Cooperation Agency (JICA), and International Federation of Red Cross and Red Crescent Societies.
- CPP leverages volunteers, NGOs as well as officials from national and local governments for the purpose of raising awareness and preparedness motivation, and ensuring the safe evacuation of volunteers and the general public.
- Warnings issued by BMD trigger actions by the CPP, which disseminates warnings at the

community level. CPP volunteers inform residents in rural areas of impending disasters and help people evacuate to cyclone shelters.

- Community-based approaches, such as using the loudspeakers installed at mosques, are also playing a vital role.
- Members of this peer review team visited Noakhali and Hatia after a long trip from Dhaka and had the opportunity to interview members of CPP, the local disaster responders. CPP volunteers are unpaid, and are respected in this area and devoted to their work in disaster reduction.
- During normal times, these volunteers give lectures on the lessons of cyclone disasters and the importance of preparedness, and conduct drills and training for evacuation. They also provide instruction on evacuation procedures, and activities related to first aid, signaling, shelter, rescue, food and relief.
- Communities have begun implementing resilience-oriented activities without guidance from higher or national agencies on what to do for disaster mitigation. People have taken the initiative in building embankments to prevent saltwater inundations, which will destroy their crops. This initiative has been in place in Bangladesh and is one of the good practices implemented by CPP.
- As many as 3,000 cyclone shelters have already been constructed in the coastal regions where they are most needed and many people can evacuate to these shelters in case of cyclones and other disasters.
- Cyclone shelters are most effective for saving human lives in high risk zones. Non-governmental and international organizations, particularly JICA and the Red Crescent Society, have fully supported the construction of some units, and promote and implement the program.
- More than 7,000 km of coastal embankments, cyclone shelters and afforestation efforts are playing important roles.
- Studies were conducted on the existing cyclone shelters and the water level height of past storm surges as well as past flooding to ensure the appropriate design of cyclone shelters and higher buildings.

4.3 Challenges Ahead

Structural measures:

- Existing embankments need reconstruction and repair. Also there are areas where embankments and mangrove forests are missing or have not been well developed.
- Some cyclone shelters need repair work so they can store necessary equipment and relief goods as intended.
- Houses should be constructed with water and wind resistant design. The foundations of houses in rural area are too fragile to resist heavy rainfall and strong wind.

Capacity development for relevant agencies:

- The relevant and technical agencies are continuously conducting necessary studies to improve areas have been considered priorities of the CPP. It was noted that some agencies have only a few technical staff, but they are working with what they have to accomplish their tasks.
- The predictive capabilities of the Weather Forecasting Division of the BMD needs to be improved through the addition of technical manpower and equipment, as they are still conventional in some aspects of their work.
- Specifically, local government officials need to increase their skills and knowledge of disaster risk signals and public awareness needs to be improved. From the standpoint of disaster management, DMB is currently implementing projects to mitigate probable disaster risks to human lives and property by promoting preparedness, disaster response and mitigation efforts in Bangladesh. This strong initiative at the national level is an important factor in helping to ensure that disaster reduction activities are prioritized at the local level. DMB has a large mandate and level of responsibility and thus should be further capacitated to accomplish its

mission.

Operation and documentation:

- Warning information is reaching the grassroots volunteers, but there may be a need to explore other telecommunication capability to improve dissemination of disaster warnings.
- Past major disasters might be subject to an examination of the lessons learned by concerned stakeholders so that those stakeholders can learn what was done well and what was done poorly during those disasters, thereby providing reference material for the DMB and DRM community.
- The emergency operation center (EOC) should be kept open on a non-stop basis. Local authorities should be instructed in the assessment of loss and damage and relief requirements.

4.4 Suggestions and Recommendations

Structural measures:

- More cyclone shelters are necessary. Present cyclone shelters are not distributed sufficiently for local residents to evacuate. Smaller scale cyclone shelters should be built in a much more dense distribution in the local area.
- Reinforcement of embankment river lines and coastal regions is necessary in the important areas, but not in all fluvial and coastal areas. Furthermore, new embankments need to be constructed.
- New afforestation and forest maintenance measures are necessary. Mangrove forests in the Bay of Bengal are important as natural embankments that protect the shore from storm surge. Some embankment areas need to be planted with mangroves. Many cyclone shelters and community volunteers are involved in cyclone preparedness programs in coastal areas.

Institutionalization:

- Enactment of the DM Law. Priority should be given to advocacy involving all stakeholders to push for the passage of the DM Law.
- Instead of only DM, Disaster Risk Reduction (DRR) is suggested in view of the paradigm shift from response, which is reactive, to risk reduction (prevention and mitigation) which is proactive. The DRR program is also related to climate change.
- Establishment of an emergency communication system. Communication systems to ensure early warnings of natural hazards can be promoted using mobile phones, which are popular even in rural Bangladesh.
- Regular review and revision/updating of Standard Operating Procedures (SOP) in manning of Operations Centers, as well as contingency plans and other operational tools related to DM/Disaster Risk Reduction Management (DRRM).
- The government should have flagship disaster management projects, especially those involving multiple agencies which might easily get funding from international organizations.
- It is necessary to reinforce the network of all DRR institutions and promote coordination and information-sharing among them to ensure a common understanding of SOP visions and avoid overlap.

Capacity development:

- There is a need to promote human resource development in all agencies in order to increase their capacity and expertise in using state-of-the art DRR tools and methods.
- Conduct regular disaster drills and exercises including table top exercises covering the issuance of warnings, receipt of those warnings by DM officials, and the timeliness of the reaction of disaster response teams, to learn where the gaps are and where improvements are needed.

Operation:

- Identify and propose projects based on the DM framework involving all stakeholders and in

consideration of the problems facing CPP agencies, such as the need for equipment repairs, lack of technical personnel, the need for capacity building and training, deteriorating state of cyclone shelters and a lack of state-of-the-art facilities for accurate warnings.

Documentation:

- There should be complete documentation of disaster incidents that can be used as reference material during reviews by stakeholders. This is being done by disaster prone countries and may be of some help to disaster managers.
- Maintenance of databases is also suggested. These may already be available to some agencies but the DMB should be a repository of all DM and DRR related information.

5. Appendix

Overview of Peer Review Mission to Bangladesh

Members

- (1) Counterparts in Bangladesh
 - Mr. Mohammad Abdul Wazed, Joint Secretary, Ministry of Food & Disaster Management
 - Mr. Mohammad Abu Sadeque, Director (Planning & Training), Disaster Management Bureau
- (2) Reviewer Team to Bangladesh
 - Dr. Taiichi Hayashi, Associate Professor, Disaster Prevention Research Institute, Kyoto University
 - Ms. Crispina B. Abat, Chief, Plans and Program Division/ Chief, NDCC TMG Secretariat, Office of Civil Defense, Department of National Defense, Government of the Philippines
 - Mr. San Kung, Superintendent/ Assistant Staff Officer, International Relation Division, Relief and Resettlement Department, Ministry of Social Welfare, Government of the Union of Myanmar
 - Ms. Yumi Shiomi, Researcher, Asian Disaster Reduction Center (ADRC)

Survey Period

12-16 December 2010

Visited Organizations, Officers and Sites

- 1) Disaster Management and Relief Division
 - Mr. Mohammad Abdul Wazed, Joint Secretary, Disaster Management & Relief Division, Ministry of Food & Disaster Management
 - Mr. Mohammad Munir Chowdhury, Deputy Secretary, Ministry of Food & Disaster Management
- 2) Disaster Management Bureau (DMB)
 - Mr. Mohammad Abu Sadeque, Director (Planning & Training), Disaster Management Bureau
- 3) Bangladesh Meteorological Department (BMD)
 - Ms. Arjumand Habib, Director
 - Mr. Soshi Iwata, Certified Weather Forecaster, Disaster Prevention Department, Japan Weather Association
- 4) Flood Forecasting and Warning Centre (FFWC), Bangladesh Water Development Board (BWDB)
 - Mr. Mohammad A. Wadud Bhuiyan, Chief Planning
 - Mr. Mohammad Sarafat Hossai Khan, Executive Engineer
- 5) Institute of Water Modeling (IWM)
 - Mr. Abu Saleh Khan, Deputy Executive Director
 - Mr. Zahir-ur Haque Khan, Director, Coast Port Management Division
 - Mr. Manjur amurshed Zahid Ahmed, Senior Specialist, CPE Division
- 6) Cyclone Preparedness Programme (CPP) Head Office, Bangladesh Red Crescent Society
 - Mr. Mohammad Abdul Ahad, Director (Admin.)
- 7) CPP, embankment, cyclone shelters, afforestation in Noakhali
 - CPP leaders and volunteers
- 8) Upazila Management Committee, CPP, embankment, cyclone shelters, afforestation in Hatia and Nijumdip
 - CPP leaders and volunteers