



CLIMATE CHANGE AND NATURAL DISASTER MANAGEMENT OF BANGLADESH: AN OVERVIEW

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Abstract

Bangladesh is highly vulnerable to climate change due to its geographical location in South Asia and is susceptible to a variety of natural and human induced disasters. The government has made progress through preparing plans, policies and acts by gradually shifting their climate change and disaster management approach to a comprehensive risk reduction methodology based on common disaster experiences, lessons learned, and the desire to reduce future impacts. The country has a well-established community preparedness capability due to the implementation of comprehensive education and training programs by government agencies, non-governmental organizations and donor foreign agencies. Disaster management committees have been established at national and local levels and trained at all administrative levels. These committees and volunteers disseminate early warning information, effective response, recovery and evacuation instructions to rural, urban and coastal residents and assist with coordinating relief and rehabilitation activities through a comprehensive approach.

Key words: Climate Change, Disasters; Risk Reduction; Disaster Related Committees, Early Warning Information, Effective Response.

Introduction

Bangladesh is one of the most disaster-prone countries in the world, with great negative consequences being associated with various natural and human-induced hazards such as floods, tropical cyclones, droughts, storm surges, tornadoes, earthquakes, *Hills destroys*, Soil erosion, riverbank erosion deforestation, fire, infrastructure collapse, high arsenic content of ground water, water logging, water and soil salinity, epidemics, and various forms of pollution are frequent occurrences. Moreover, the geophysical location, land characteristics, multiplicity of rivers and the monsoon climate render Bangladesh highly vulnerable to natural hazards. In the past, the focus of disaster management had been relief and rehabilitation but over the years, Bangladesh has developed an elaborate system of disaster management. Establishment of National Plan for Disaster Management for institutional accountability in preparing and implementing disaster management plans at different levels of the country. Development Plans incorporating Disaster Risk Reduction and Hazard Specific Multi-Sectoral Plans have made an exclusive tool for reducing risk and achieving sustainable development.

The National Disaster Management Council (NDMC), Inter-Ministerial Disaster Management Coordination Committee (IMDMCC) and Cabinet Committee on Disaster Response (CCDR) ensure the coordination of disaster-related activities at the National level. On the other hand, coordination at District, Upazila and Union levels are done by the respective District, Upazila and Union Disaster Management Committees with the support of Bangladesh Red Crescent Societies (BRCS) and NGOs. The Disaster Management Bureau renders all assistance to them by facilitating the process. Therefore, the main focus areas of the study are basically in threefold; firstly to present national and local level coordination through strengthening institutions and secondly to address the implemented initiatives to reduce disaster risk both rural and urban areas and finally warning dissemination mechanism that reduces large scale loss of lives and resources. The general objective of this study is to bring forward the contemporary status of Bangladesh Disaster Management System rather than early nineties. The specific objects of this study are the following:

1. To present national and local level coordination of government and non-government organizations;
2. To assess the initiatives of Ministry of Disaster Management and Relief for strengthening institutional capacity;

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Methodology

This study has been written mainly based on secondary data. Data and information for this study have been collected from books, journals, magazines, national dailies, research reports, government policies and standing orders on disaster (SOD) of Bangladesh.

Results and Discussion

National Level Coordination

National Disaster Management Council (NDMC)

Prime Minister of the People's Republic of Bangladesh is the Chairperson of this Committee and Cabinet Secretary acts as member secretary. This is the apex body of the government for disaster management in Bangladesh. The committee review policy and planning documents on disaster management and provide strategic advice to the Inter-Ministerial Disaster Management Coordination Committee for disaster risk reduction and emergency response management. Moreover this committee evaluates disaster preparedness, response and recovery measures of concerned Ministries particularly after a large scale disaster to improve the system and procedures.

Inter-Ministerial Disaster Management Coordination Committee (IMDMCC)

The chairman of this committee is Minister of Ministry of Disaster Management and Relief (MoDMR) and Secretary of Disaster Management and Relief Division acts as Member Secretary. This committee implements the advice of National Disaster Management Council and ensures coordination among all relevant ministries in emergency response, relief and rehabilitation operations. Mock exercise on fire evacuation drills, search and rescue operation for preparedness activities are promoted by this committee. Furthermore, the committee monitors disaster risk reduction activities and programs of concerned departments and inform the progress to NDNC. According to the direction of NDMC and Standing Order of Disaster (SOD) the committee approves national and sub-national plans, guidelines and templates.

National Disaster Management Advisory Committee (NDMAC)

Prime Minister of Bangladesh appoints Chairman of this committee and Director General of DMB acts as Member Secretary. To advice NDMC, IMDMCC, MoDMR and DMB on socio-economic aspects of disaster risk reduction, emergency response management and technical matters are the prime duty of the committee. Besides, problem identified by DMB or any other government agency, the committee is liable to recommend appropriate solution.

Coordination Committee of NGOs Relating to Disaster Management:

The committee plays a vital role to ensure the coordination between government and non-government agencies on relief work and disaster management. Director General of DMB and Director (Planning) of DMB perform as Chairperson and Member Secretary in this committee respectively.

Committee for Focal Points Operational Coordination Group

The committee supervises overall coordination of national and field level activities of Disaster Management Committees and gives appropriate direction for solution of arising problems. In this committee Director General of DMB and Director (Planning) foster their responsibilities as Chairperson and Member Secretary respectively.

Earthquake Preparedness and Awareness Committee (EPAC)

The main function of the committee is to review national earthquake preparedness and awareness program. Besides, the committee prepares and recommends a list of equipment for earthquake risk reduction, search, evaluation and rescue program for the concerned agencies.

Local Level Coordination

City Corporation Disaster Management Committee (CCDMC)

For city corporation disaster management committee Mayor perform as Chairman and Chief Executive Officer as Member Secretary. The committee prepare contingency plan for earthquake and other natural and human-induced disasters. They arrange speedy and effective dissemination to the individuals, volunteers and target organizations related to disasters. Moreover they prepare a checklist for emergency activities during disaster period and coordinate all relief activities in the city corporation area for impartial distribution of relief materials as well as determine specific safe centers so that people of particular can get shelter and securities at the time of disaster.

For establishing field hospitals and medical operations for the management of mass casualties, they identify open space. Besides, the committee ensures the overall security of women, children and disable people during disaster in safe centers and takes necessary initiatives so that people can return to their previous place after disaster.

District Disaster Management Committee (DDMC)

The committee prepares short, medium and long term District Disaster Risk Reduction Plan with regards to keep district authority and local organizations well prepared. For effective and speedy dissemination of early warnings, the committee engages trained institutions, volunteers and community people.

Moreover, the committee coordinates and monitors search, rescue, evacuation, relief and primary rehabilitation activities. For emergency rescue work with locally available facilities the committee works through “Emergency Operation Center (EOC)”. Besides, the overall security of women, children and disable persons in shelters is ensured. During disaster period the committee operates and distributes necessary materials collected from local sources and relief that is received from DMB. Furthermore, information relating to death toll of man and cattle’s, loses of resources, number and types of infrastructure to Disaster Management Information Center (DMIC) and DMB.

Upazila Disaster Management Committee (UzDMC)

The committee assists Pauroshava and Union Disaster Management Committee and provides guidance to increase their efficiency to reduce risk and disseminate early warning in pre disaster period. Besides, during disaster period the committee operates EOC at upazila level to coordinate and monitor rescue, evacuation and relief activities (GO-NGOs) and ensure rehabilitation activities at post disaster period and security of women, children, disable persons and national and international NGO activists. Moreover, necessary actions are taken to protect environmental degradation by quick funeral of corpses. Upazila Nirbahi Officer (UNO) and Upazila Project Implementation Officer (UPIO) perform as Chairman and Member Secretary in this committee.

Union Disaster Management Committee (UDMC)

Motivation and drill work to the local institutions volunteers, youth, school and college students and community people by the committee for strengthening their capacity to adopt disaster resistant housing features, agriculture and other livelihood options. They provide training to the students, youth, volunteers and local club members and aware people on community based water purification technology as well as arrange mock drill on warning message dissemination activities to the community people. The committee ensures the security of women, children, person with disability and external relief workers during disaster. In addition, collection of statistical data on death toll of man and livestock’s, damages of resources and infrastructures to UzDMC and UPIC. Union Parishad Chairman and Secretary act as Chairperson and Member Secretary respectively.

Institutional Strengthening in Comprehensive Risk Reduction

MoDMR with the advice of NDMC and its two departments like DMB and Directorate of Relief and Rehabilitation (DRR) as well as active participation of Cyclone Preparedness (CPP) disseminate early warning system. Besides, CPP and Bangladesh Red Crescent Society (BRCS) maintain warning and relief activities in coastal Bangladesh with a network of about 42,000 trained volunteers. Through this network emergency response, rescue and recovery activities at Upazila, Union and village level are performed. The potential merger of DMB with Directorate of Risk Reduction (DRR) which create greater decentralization that allowed for sub- national or divisional level hubs. The overall structure of MoDMR has become an integral part through these hubs/centers. Comprehensive Disaster Management Program (CDMP) phase two took into account disaster response and early recovery planning to meet the basic needs of the poorest people. The disaster management system in Bangladesh has strengthened and improved with the support of CDMP through training and the provision of technology hardware at both national and local level. Large scale investment through CDMP helped reduce mortality, damages of property and livelihood options. With the support of CDMP, MoDMR had undertaken a number of policy initiatives including National Disaster Management Act, National Disaster Management Policy, National Disaster Management Plan and the Ministries own revised Allocation of Business. Moreover, Directorate of Relief and Rehabilitation maintains and communicates with al Disaster Management Committee (DMC) offices and provide necessary support the Member Secretary to coordinate multi-sectoral government agencies and NGOs in risk reduction and response.

Disaster Database

Disaster Management Information Center (DMIC) was established and developed to prepare situation analysis report and event database on national disasters as for example cyclone and flood. For that reason UPIO collects primary and secondary data from union level with the help of UDMC for sending to District Relief and Rehabilitation Officer. Later he/she again sends these data to Divisional Relief and Rehabilitation Officer. Finally, Divisional Relief and Rehabilitation Officer send it to DMIC. DMIC creates GIS-based open source database and its contents is focused on recent disaster events. This is an interactive web based system that includes tables, maps and dynamic quarry. Besides, Disaster Management Information Network (DMIN) was also developed for linking DMCs other government agencies and NGOs through internet portal.

ICT Humanitarian Emergency Platform

The activities of mobile technology are implemented for disaster management through the coordination of DMB and have a line of communication with other forecasting agencies. DMB teamed up with mobile broadcasting has been introduced through Grameenphone and Taletalk to provide early warnings for tropical cyclones (Coax’s Bazar) and floods (Sirajgang). Moreover, Airtel another private mobile operator provides early warnings to fishermen at sea using its Global Positioning System (GPS).

Community Radio (FM 99.2)

Bangladesh is the second country in South Asia in formulating policy for Community Radio. Meanwhile, the government has approved and provided license to DwipUnnayanSongstha to install a Community Radio in the island of Hatiya in the name and style ‘‘Radio SagorDwip’’ with the help of JICA from 2014 to 2017. To address the social issues like poverty reduction and social exclusion at the community level, empower marginalized rural groups in disaster management and catalyze democratic processes including ongoing social development effort. Interactive Voice Response Service (10941) provides up-to-date messages about weather conditions, disaster information and early warnings.

Rural Risk Reduction

Disaster Management Committee (DMC) guidelines and training modules are prepared for capacity building and effective coordination for strengthening institutional capacity of DDMC, UzDMC and UDMC. Besides, vulnerability assessment and livelihood analysis at household level were done for 40 districts.

Local Level Disaster Risk Reduction Fund (LDRRF)

With the economic support of UNDP, Local Level Disaster Risk Reduction Fund (LDRRF) have done about 750 small and medium-scale structural works for risk reduction intervention related projects as for example: Socio-economic infrastructure (ie. building/rehabilitating schools, water supply systems and roads), productive investments (e.g. microfinance and income generating projects), social services (i.g. supporting nutritional campaigns, literary programs, youth training support to the elderly and disabled) and capacity building program (training for community based organizations, NGOs and local governments). These interventions have been implemented through a network of 44 NGOs and 39 Union Council Disaster Management Committees.

Infrastructure and Employment Project through Char Livelihoods Projects (CLP)

The CLP is jointly funded by UKaid through the Department for International Development and the Australian Government (Australian Aid) through the Department of Foreign Affairs and Trade (DFAT), sponsored by the Rural Development and Co-operatives Division of the Government of Bangladesh’s Ministry of Local Government, Rural Development and Co-operatives, and implemented through Maxwell Stamp Plc. This project was taken to improve the livelihoods of extremely poor households living on erosion prone islands in the Jamuna river and disaster preparedness of the community. For this reason, plinth of core beneficiaries and a significant number of non-core participant’s plinth were raised 60 cm above the highest record flood water line on earthen plinths. Soil were laid and lifted from adjoining area by hired labor, later compacted by the recipient families. The plinths slops were used to plant fodder grasses to protect eroding, on the other hand, providing a supply of feed for livestock. There is significant space on the plinths for livestock rearing as well as to plant a small garden and fruit trees.

The core CLP households were given up to 50 days of work during monga (September to November), though some labors had been required from non-core beneficiaries and of them 35 percent job cards were reserved for women and restricting the working week to five days to allow and rest two days for home duties as well as rest. Besides, average earnings were around 80-120 Tk/day or US \$ 1.00 -\$1.50. To ensure drinking water a significant number of tube wells were constructed for share and to reduce water borne diseases 1, 50,000 flood proofing low cost hygiene sanitary latrines were installed. Some interventions are listed below:

Table 1: Interventions to ultra poor and poor households through CLP

Interventions	Quantities	Outcome
Plinth raised	1,80,000	Disaster risk reduction
Tube well	10,000	Save drinking water
Flood proof sanitation	1,50,000	Ensured hygiene sanitation and reduced water borne diseases

Source: clp-bangladesh.org

Disaster Response

The CLP experienced a unanticipated disruption to its implementation innate 2007 when serious flooding struck Jamuna and other part of Bangladesh, causing widespread damage and loss. The response was delivered through Implementation Organization (IMO) and Community Development Officers (CDO) network, including the rescue of people and livestock and the provision of food aid and relief supplied to 1,28,000 households across 713 villages (Marks and Islam, 2007). Further to this, the CLP distributed 33500erosion grants to core households of between TK 2000-3000 (US \$ 24-26) and 24000 households received flood proofing materials (Conroy et al, 2010).

Livelihood Adaptation to Climate Change (LACC) Project

The LACC was a pilot project implemented by the Department of Agricultural Extension funded by Food and Agriculture Organization of the United Nations (FAO) which promotes climate change adaptation (CCA) and disaster risk reduction (DRR) processes and adaptive capacities to climate variability and change for sustainable livelihoods and food security in the rural areas of Bangladesh through involving local communities in making effective CCA strategies. It was operated with two

phases. The first phase (i.e. LACC I) was implemented in 2005-2007 which focused on translating climate change impacts into local and regional agriculture impacts and response options and livelihood adaptation practices. It covered four pilot drought prone sub-districts in north-western part of Bangladesh. The LACC II was implemented in 2008–2009 in 10 sub-districts with expanding its area to south-western coastal region of Bangladesh, which is characterized by high salinity, siltation, water logging, degradation, fresh water scarcity, cyclones, and storm surges and flooding. It aimed to introduce, improve or further strengthen DRR and CCA capacities for sustainable livelihoods and food security including crops, livestock, fisheries and forestry and other key sectors of rural livelihoods of Bangladesh (FAO, 2008). The LACC projects have demonstrated certain strengths and good practices such as use of social mobilization for community participation, integration of climate change science in Climate Field School, capitalization of local knowledge as entry point for enhancing livelihood adaptation practices, and programmatic messages in terms of the various livelihood adaptation options.

Effectiveness/Achievement/Output of LACC Project

The project involves anticipated measures to the impacts of climate change by involving local communities. With special focus on livelihood adaptation, the project fits into the CCA concept. It demonstrated the effectiveness of bottom-up approaches to adaptation. Some important achievements of LACC project:

- Farmers and extension agents are trained on CCA options to face the challenges of climate change and environmental stresses in the sectors of crop, fisheries, livestock and social forestry production;
- DRR and CCA options in agriculture go hand to hand;
- Adaptation and farmers livelihood interests are linked;
- It linked between the bottom-up livelihood perspective and top-down government perspective.

Low-Cost Disaster Resistant Housing Project

As part of a broader approach to improving resilience to floods Action Plan one of the renowned NGO has designed a low coast flood resistant houses especially people living on the char lands-the sand banks lying in the rivers. The worked focused on individual houses and on cluster villages. These houses incorporated a number of flood resistant features. Water cannot reach the plinth in normal floods due to raised land.

Individual Houses

The house is built on a plinth made from sand, clay and cement (meaning it is less likely to be washed away in floods), and made using concrete pillars and treated bamboo poles. Strong and high enough to last through repeated floods, unlike the traditional earthen floors that simply wash away.

The design included an improved attic that could be used as living and storage space during times of flooding. Jute panels make resilient walls that cost very yet are quick and easy to replace. Treated bamboo poles on concrete bases are strengthened with metal tie rods to hold the wall firm and safe. Besides, treated jute stick woven mat partitions increased durability. The structure, with woven bamboo walls, can be dismantled in the case of forecast severe flood, and moved for re-erection on a new site or restoration after flood water subsides. Bracings and fastenings bind the walls firmly to the house 'skeleton' through a network of holes and notches- locally called a 'calm system'- and the whole building can stay standing through the strongest of wind and rain. Moreover, Nuts and bolts, screws, ties and nails are required. Bamboo poles are treated to make them more resilient to flooding so that they last longer. Reinforced concrete posts with footings were introduced to strengthen the structure. Short reinforced concrete stumps for the treated bamboo posts make the structure more resilient to the water.

Corrugated Galvanized Iron Steels as roofing material help to reduce maintenance costs and are more resilient to rain also. Introduction of windows for ventilation has improved the general housing conditions and speeds the process of drying out after flooding. As well as the changes in the structure of the house other interventions to help make household resilient to water-thirsty plants are set around the house, such as bamboo, banana, dhal kolmi and hogla that 'drink up' flood water and hold onto the soil, helping the whole homestead stay intact and helps to prevent the house suffering from erosion.

Cluster Houses

Another integrated approach taken up by Practical Action was the resettlement of dam dwellers through the development of cluster villages where the whole village was built on a raised land. 500 decimal (1 decimal is equal to 1/100 of an acre or approximately 40.46 m²) of land were acquired that was large enough to contain a small village of up to about 100 houses and the height of earth embankment was determined by considering the flooding records for the previous 40 years i.e. ground level of cluster village should be 3 feet above the highest flood level. The targeted beneficiaries were the vulnerable people of Gaibandha river erosion project living besides the dam such as the landless, displaced, widows the old and beggars. 1710 displaced vulnerable dam dwellers had been re-homed in four cluster villages with livelihood supports (agriculture, livestock, fisheries, light engineering, small enterprise and agro processing) and capacity building training.

Microfinance

In response to the floods or cyclones, the Microfinance Institutions (MFIs) allowed the members to withdraw their savings. Grameen Bank, BRAC, ASA, Proshika, TMSS, CODEC, GUK and many other small MFIs despite a very serious financial consequence for their liquidity, opened access to compulsory savings account in an attempt to reduce the precipitous decline many households experienced in their incomes. In the wake of SIDR Cyclonic storm surge in 2007, BRAC commenced a loan/grant scheme named "SIDR loan/disaster loan" where they disburse maximum Tk.40,000 for loan and Tk.4,000 as grant. Disbursing the disaster loan, for 2 months, BRAC withheld from taking installment from the affected people. Disaster loans are given to purchase of power pump, rickshaw, van, agricultural equipment, power tiller, boat and fishing net, domestic animal and for crop, nursery and fish culture etc.

During disaster, TMSS (Thengamara Mohila Sabuj Sangha) can give loans only to those who have already completed their installments. After the disaster, however, TMSS gives interest free loan only for 3 months. After 3 months, Tk.20 per thousand has to be deposited in order to repay the loan in 18 months or 53 installments, whichever is suitable. Besides, during disasters, GUK (Gono Unnyon Kendro) gives interest free loans and they provide seasonal loan also.

Urban Risk Reduction

Geographically Bangladesh is located close to the plate boundaries of two active plates, one is Indian Plate which is in the north-west part of Bangladesh and another is Eurasian Plate in the north-east. For that reason, CDMP With the help of Asian Disaster Preparedness Center (ADPC) took initiatives for Dhaka, Chittagong and Sylhet cities to develop contingency planning with regards to earthquake hazards. ADPC had been made possible estimation using Monte Carlo Simulation model to prepare contingency plan. How many people will be injured and killed during earthquake ADPC estimated into four severity levels that describe the extent of the injuries in Dhaka city. This is why; ADPC took into account two times such as at 2 pm and 2 am. Finally ADPC decided the time of 2 am and the levels are described as follows:

Severity Level 1: Injuries will require medical attention but hospitalization is not needed.

Severity Level 2: Injuries will require hospitalization but are not considered life threatening

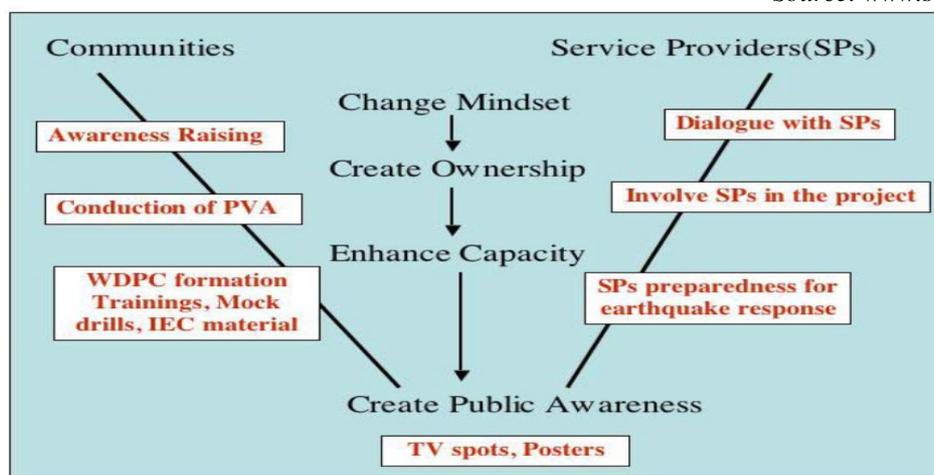
Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.

Severity Level 4: Victims are killed by the earthquake.

Table 2: Potential Casualties in different Scenarios of Earthquake

Originated Place	Magnitude & Time	Building Damage	Damage and Injuries of People
Plate Boundary Fault-2	8.0 Mw At night	about 93,605 buildings will be at least moderately damaged which is about 29.00 % of the total number of buildings	about 2 thousand people will be killed immediately
Madhupur Fault	7.5 Mw At night	about 166,570 buildings will be moderately damaged. This is about 51.00 % of the total number of buildings in the city and about 75,218 buildings that will be damaged beyond repair	about 18 thousand people will be killed immediately
Under Dhaka city	6.0 Mw At night	about 136,434 buildings will moderately damage and about 53,989 buildings will be damaged beyond repair	About 13 thousand people will die

Source: www.scribd.com



Source: www.adpc.net

Flow chart 1: Awareness of and capacity to manage for urban hazard risk

At first leaflets were distributed in city area to inform urban dwellers about urban disasters like earthquake, flooding, fire and water logging etc. Then posters were hanged on wall over the Dhaka,

Chittagong and Sylhet City Corporation’s area for awareness building about the risk of these hazards and also some TV programs broadcasted.

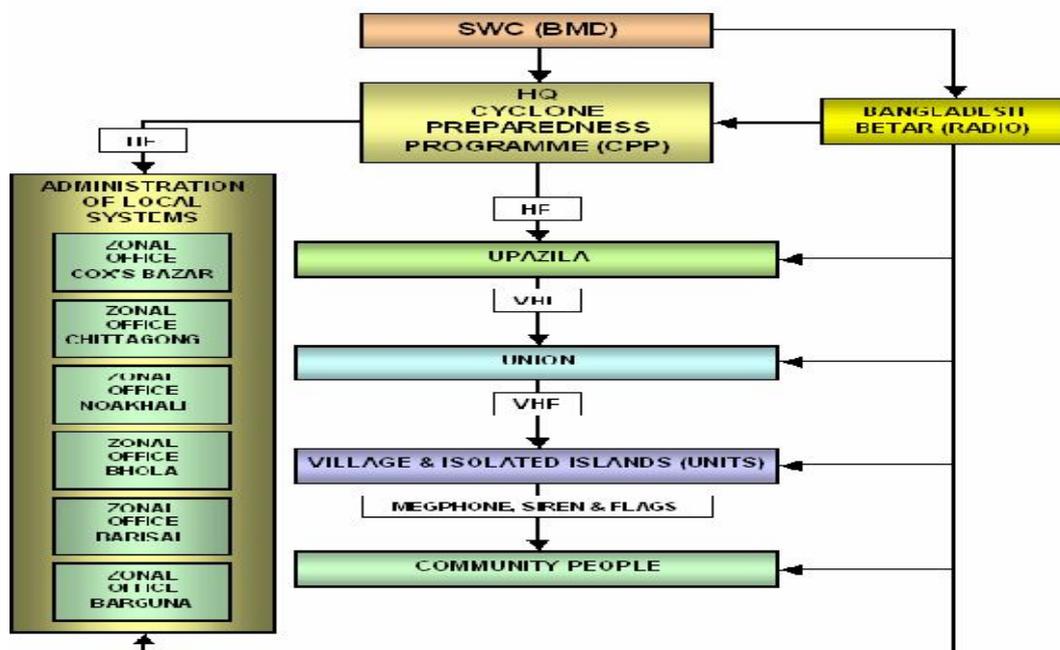
Community-based CRA/RRAP and mitigation

- Conducting Participatory Vulnerability Assessment (PVA) was very effective at communities in making people realize that what was the status of their community with regard to risk of earthquake and their preparation to face that situation.
- The PVA exercise helped to indicate the main risk areas and respective communities, and also helped in identifying receptive communities based on the assessment of their participation and interest.

Ward level contingency planning

- Urban community groups are prepared as the first responders for an emergency period and different training programs are arranged for them such as firefighting, first aid, search and rescue etc.
- 62,000 community volunteers are ready to carry out rescue operation immediately after disasters, including earthquake.
- At present 96 Wards have in Dhaka and in each Ward have five teams. There are 39 people in a team including three professional fire brigade personnel. On an average, there are 200 volunteers per Ward, of them 50 to 60 percent are active.

DISSEMINATION OF CYCLONE WARNING IN BANGLADESH



Source: www.wmo.int

Flow Chart (02): of Warning Dissemination Mechanisms

Activities of CPP

1. Disseminate cyclone warning signals issued by the Bangladesh Meteorological Department to the community people.
2. Assist People in taking shelter.
3. Rescue distressed people affected by a cyclone.
4. Provide First Aid to the people injured by a cyclone.
5. Assist in relief and Rehabilitation operations.
6. Assist in the implementation of the BDRCS Disaster Preparedness Plan.
7. Assist in participatory community capacity build-up activities.
8. Assist in the co-ordination of disaster management and development activities.

Early Warning Saves Millions of Lives

The damage of lives and properties of the coastal communities could be reduced through raising awareness, motivation and effective warning dissemination at community level and a scenario of damages of recent disasters are shown below:

Table 3: Number of death toll and frequency of Cyclone

Year	Wind Speed	Death Toll
1970 cyclone	223 km/hr	Almost 5,00,000
1991 cyclone	225 km/hr	1,4,0000
2007 cyclone	220 km/hr	3,347

Source: BBS 2007 and 2009

Conclusion

Bangladesh is highly vulnerable to disasters due to its geographical location. Each year it faces different types of natural and man-made hazards which cause enormous damage of human lives and properties. In spite of these colossal risks, Bangladesh has taken various measures to prevent and mitigate the loss of lives and resources through a series of government and non-government initiatives to address these issues as well as prepare national and local level institutional setup through coordination, trained volunteers and community people. To address the vulnerabilities and adaptation for the adverse situation with some Acts, Policies and Guidelines were prepared. Besides early effective response, rescue, evacuation, relief and rehabilitation activities with a joint venture of GO, NGOs and communities through a comprehensive manner carry to a role model in the world by reducing mentionable damages of lives and resources.

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