

Chapter 6

Bangladesh: Natural Disaster Risk Management

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6.1 Introduction

6.1.1 Background

Bangladesh, located in the South Asian region, is considered one of the most disaster-prone countries in the world (Ali et al. 2012). Bangladesh has suffered from several natural disasters, such as earthquakes, cyclones, floods and droughts, nearly every year (Asgary and Halim 2011). In addition, the country was also faced with issues associated with disasters, including shortage of food and clean water supply, climate change impact, and land management. Floods, cyclones and earthquakes are regular phenomena that have created a massive impact on the population, land management and socio-economic well-being of the people. Asgary and Halim (2011) explained that the root causes of disasters do not only include flood and cyclone hazards, but also lack of planning and resources, unsafe conditions and many others. Thus, the post-2015 will be a period of great challenge when concerted efforts of the government, the private sector, donors and civil society organizations are required for the timely intervention and mitigation of natural disasters.

Many authors have discussed various issues associated with natural disaster management in Bangladesh. For example, Choudhury (2002) explained the economic losses due to natural disasters and proposed measures to minimise such

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losses. Akter (2009) discussed environmental displacement due to climate change in the country. Khan and Nahar (2014) examined how Bangladesh has addressed natural disasters, and the extent to which the country can adapt to such disasters. Yet, there are insufficient studies on how different sectors in the country have involved in the governance and management of natural disasters. Ha (2012), Ha and Dhakal (2013), Koiman et al. (2008) and Stocker (1998, 2004) asserted that good governance is impossible without the participation and contribution of different groups of sectors in normal conditions. Since disaster management requires resources and efforts from various groups of stakeholders, it is impossible to hold any single group of stakeholders or individuals to be accountable for the whole process of disaster risk management (DRM); this chapter aims to address this gap by discussing national plans and initiatives by various groups of stakeholders to manage disasters in Bangladesh.

6.1.2 Research Objectives

The objectives of this chapter are to (i) revisit key natural disasters and their associated issues in Bangladesh, (ii) examine institutional and regulatory frameworks as well as measures to manage disasters, including pre-disaster planning and post-disaster recovery and (iii) assess the current initiatives to manage disasters against the three-sector governance model, including government, the private sector and civil society. The chapter also includes some policy and technical recommendations, followed by a conclusion.

6.2 Research Method and Framework for Analysis

6.2.1 Research Method

This chapter is conceptual and explorative in nature since it reflects what the authors' views and experience on how disasters have been managed. The authors have gathered secondary data from both academic and non-academic literature, including government reports, non-governmental organisations' (NGOs) reports and international organisations' documents. The authors have also introduced the three-sector governance model which has been adapted to mitigate climate change and manage the environment. Firstly, the authors have reviewed key natural disasters in Bangladesh. Secondly, the authors have discussed various practice and activities to address disaster risk reduction by government, the private sector and civil society, using Bangladesh as a case study. Then, the authors have assessed such activities against the three-sector governance model, and the implications of

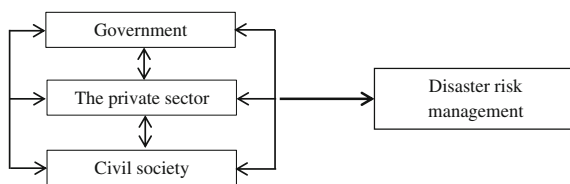


Fig. 6.1 Three-sector governance model and DRM

the current state of DRM in Bangladesh. Finally, the authors have made some policy recommendations to address such gaps.

6.2.2 *Framework for Analysis*

Governance refers to the structures, mechanisms, institutional arrangements, regulatory and non-regulatory frameworks, etc., to plan, organise, lead and control national affairs (Braithwaite and Drahos 2000; Lidskog and Elander 2010; Fisher and Surminski 2012). In DRM, governance is defined as the instruments, mechanisms, informal and formal institutions in charge of planning, implementation and evaluation of policies and programs to mitigate and adapt to the impact of disasters. It also refers to the allocation of resources and authority, and the coordination among different groups of stakeholders in disaster risk reduction (Ha 2012, 2013; Ha and Dhakal 2013). Disaster management is a challenging task which cannot be addressed by any single sector, any single group or individual. Also, the impact of disasters is long-lasting, far-reaching and profound. Thus, the theoretical framework for this chapter has been built based on the three-sector governance model and participation of all groups of stakeholders (see Fig. 6.1).

The three sectors included in this governance model are government (the first sector), the private sector or business (the second sector), and civil society or the third sector. In DRM, government can play the role of a strategic planner, a resource allocator, a policy and regulation maker, a policy implementer and a law enforcer (Braithwaite and Drahos 2000). Government should work closely with other sectors to improve the efficiency and effectiveness of any attempts to prepare for disasters, reduce risk and mitigate the impacts of disasters; government should coordinate the activities of state and non-state actors, and mobilise resources from various groups of stakeholders (Koiman 1999; Ha 2012). The private sector and civil society organisations (CSOs) can provide feedback and contribute resources to support programs and initiatives to address political and socio-economic issues associated with disaster management. Government should engage the second and third sectors in any policy discussion and debates since these sectors and the public are the recipients of any policies, and such policies usually affect their welfare and well-beings. In democratic societies, business, CSOs and the public should have equal rights and opportunities to participate in national affairs (Moore and Hartley 2008; Black 2012).

6.3 Natural Disasters and Associated Issues in Bangladesh

6.3.1 *Natural Disasters in Bangladesh*

Similar to other disaster-prone countries, cyclones, floods, tornadoes, hail storms, landslide and earthquakes are frequent visitors of Bangladesh. This section briefly discusses some major natural disasters in the context of Bangladesh.

6.3.1.1 Cyclones

Severe tropical cyclones and tidal surges during the monsoon period (April–May) are most common. The post-monsoon period of October–November creates equal impact on the population of the coastal belt (Alam and Collins 2010). Low-lying areas in the coastal regions make the residents highly vulnerable causing immense loss to human lives, livestock, food output and overall infrastructure and creating a massive problem for the economic well-being of a large section of the population of Bangladesh (Khan and Nahar 2014).

The cyclone in 1991 hit Bangladesh and killed about 140,000 h (Nehal 2005). In 2007, cyclone “Sidr” swept through the south-western coast of Bangladesh. About 8.9 million people, and 30 out of 64 districts in Bangladesh were affected by this cyclone. The number of casualty reached 3,295 people and over 50,000 people missing or injured (Ministry of Food and Disaster Management 2008). Cyclones usually cause heavy economic loss. For instance, the cyclone Sidr in 2007 damaged assets (e.g. buildings, roads, bridges, etc.), crops, livestock, and fisheries and caused production loss which were totalled about US\$437.6 million (Khan and Nahar 2014). Cyclone Aila in 2009 was another severe one in Bangladesh which caused over 7,000 people to be infected by an outbreak of diarrhoea, and about 8,202 people missing (Islam and Chick 2011). Islam and Chick (2011) reported that “about 20 million people were at risk of post-disaster disease due to Aila. The damage caused by Cyclone Alia was estimated to total \$US40.7 m” (p. 523).

6.3.1.2 Floods

Floods are frequent but unwelcome visitors of Bangladesh. Severe floods usually occur in July and August. There are four types of floods that occurred in Bangladesh, namely (i) flash floods which are caused by “overflowing of hilly rivers in the eastern and northern” regions in the country, (ii) rain floods which are “caused by drainage congestion and heavy rains”, (iii) monsoon floods which are caused by major rivers due to the monsoon and (iv) coastal floods which are caused by “storm surges” (Disaster Management and Relief Division, Disaster Management Bureau 2010, p. 6).

The economic and human losses of floods have been as huge as the losses caused by other natural disasters. For example, more than 60 % of the areas in Bangladesh were affected by the flood in 1988. The flood in 1998, which lasted for more than 2 months, “alone caused 1,100 deaths, rendered 30 million people homeless, damaged 500,000 homes and caused heavy loss to infrastructure” (Disaster Management and Relief Division, Disaster Management Bureau 2010, p. 6). This devastating flood had an enormous impact on the national economy, in addition to causing hardships for people and disrupting people’s livelihood in urban and rural areas. The recent flood in 2013 in Bangladesh affected nine northern districts and hundred thousands of people and damaged several properties (Network for Information, Response and Preparedness Activities on Disaster [NIRAPAD] 2013).

Generally, the effects of cyclones and floods are the same as the effects caused by other natural disasters, including loss of life, destruction of assets and property, disruption of economic and sociocultural activities, and change in ecological systems (Pramanik 1991; Ministry of Environment and Forest 2001).

6.3.2 Issues Associated with Natural Disasters

It is impossible not to refer to land and water management, and climate change and other disaster-associated issues when discussing DRM since there is a strong correlation between these above issues and disasters (Schneider 2011).

Land management Bangladesh is one of the most densely populated countries where land management on account of fragmentation and subdivision makes it difficult to obtain economies of scale in agriculture. The total forest area in Bangladesh is 2.53 million hectares that is 17.49 % of the total land area of the country (Choudhury and Hossain 2011). Clearing forest land for pineapple gardens, banana plantations, homestead and agricultural purposes has depleted a great deal of forest resources. Ahmed (2008) explained that

watersheds that are no longer able to sustain and regulate water flows from rivers and streams. Trees are highly effective in absorbing water quantities, keeping the amount of water in watersheds to a manageable level. The forest also serves as a cover against erosion. Once they are gone, too much water can result to downstream flooding, many of which have caused disasters (p. 17).

Deforestation has been the main cause of soil erosion which in turn has made siltation of rivers and sea level rise as a major challenge for the country to cope with. Bangladesh is overpopulated with a high level of density in the urban areas (Ministry of Environment and Forests 2012). Urbanisation has been considered a major concern for the loss of agricultural land (Naab et al. 2013). A part of the land loss is going for industrialisation, and the other part for real estate development.

Urban dwellers Dhaka, the mega capital city of Bangladesh, has about 15.391 million people (CIA n.d.). This is a major challenge for the city planners to

provide safe drinking water, sanitation and a network of communication infrastructure. As of 2009, there were more than 300 “secondary towns (pourashavas)”, and each had about 15,000–500,000 people (Asian Development Bank 2009, p. ii). The Asian Development Bank (ADB) also reported that “with their local governments languishing due to lack of budgets and decision-making powers, the economic conditions are not very buoyant and, in many cases, the environmental and social conditions are poor” (p. ii). Apparently, when disasters occur, there would be several problems, including (i) lack of healthcare, food and clean water, (ii) poor hygienic conditions, and (iii) lack of proper shelters which aggravate the effects of such disasters.

Food shortage Although the land of many areas in Bangladesh, e.g. the chars, is very fertile, natural disasters have destroyed many crops and hinder the development process of the local residents (Ali et al. 2012). Floods, cyclone and land erosion do not only destroy several crops, which causes shortage of food to the local residents, but they also wash away residents’ shelters, livestock, schools, and hospital and affect any means of making a living (Ali et al. 2012).

Water challenges About 30 million people are exposed to drinking arsenic-contaminated water with 90 % living in rural areas in Bangladesh (Faruque and Alam 2002). Open water ecosystems have been seriously degraded because of pollution, land use changes, impacts of climate change such as prolonged droughts and salinity intrusion. Trans-boundary issue is upstream withdrawal of water that has greatly affected downstream water systems. Water quality and water quantity with grave scarcity during dry season and excess water during wet season have become a major life-threatening issue for Bangladesh (Ministry of Environment and Forest 2001).

Climate change It is unfortunate for Bangladesh to be faced with a situation of a changing climate pattern caused due to the effect of global warming for which the industrialised nations are responsible. It is observed that there has been an increase in the average temperature in Bangladesh. Disaster Management and Relief Division, Disaster Management Bureau (2010), explained that “climatic changes in Bangladesh would likely exacerbate present environmental conditions that give rise to land degradation, shortfalls in food production, rural poverty and urban unrest” (p. 23). The vulnerability of calamities has increased to a level whereby there is a direct bearing on the water supply situation, sustainability of food security and impact on livelihood (Johnston 2014; Ericksen et al. 1993). Since about three-thirds of natural disasters originate from weather–climate extremes, it is imperative to mitigate climate change impact (Disaster Management and Relief Division, Disaster Management Bureau 2010).

Overall, the effects of a natural disaster or a combination of disasters are prolonged and unpredictable. It requires large resources and continuous efforts to address the issues associated with natural disasters and disaster management, including mitigation, recovery and preparedness (Ministry of Environment and Forest 2001). In addition, natural disasters result in environmental degradation which, in turn, poses several threats to the socio-economic development of Bangladesh. Therefore, it is imperative to explore novel and innovative disaster

warning and dissemination mechanisms as explained by the Ministry of Environment and Forest (2001) that “a timely and accurate alert system about impending disasters will help reduce the loss of life and property” (p. ii). The next section will discuss how different sectors in Bangladesh have managed disasters.

6.4 Disaster Risk Management in Bangladesh

6.4.1 Activities by Government

6.4.1.1 Disaster Management Model

The government in Bangladesh has adopted a three-step model to manage disasters in the National Plan for Disaster Management 2010–2015. The first step is to define and redefine the risk environment. Relevant government agencies and stakeholders have to scan and analyse the environment, including technical analysis, community risk assessment (CRA), and documentation of risk and hazard factors. Given the correlation between climate and disasters, this step also includes the analysis of “climate change and climate variability impacts” (Disaster Management and Relief Division, Disaster Management Bureau 2010, p. 37). The second step is to manage various types of risk. Respective institutes and stakeholders have to search for different options to reduce risk and assess the costs and benefits of each option to select the optimal alternatives which can help to achieve the preset goals. The last step is to respond to the threat environment. Governmental and non-governmental Institutions need mobile resource and have to implement the selected options. They need to predict potential impact scenarios via the use of risk databases. Importantly, communication and reporting channels and means must be effectively established and sustained. Organisations should also share their expertise and experience and learn from others’ experience as well (Disaster Management and Relief Division, Disaster Management Bureau 2010). This model can be compared with the action research model in business strategy since it is a feedback cycle; i.e. feedback gathered during the implementation stage will be disseminated to relevant stakeholders in the first and second stages for evaluation of the system and for further improvement.

6.4.1.2 Disaster Management Institutions

The disaster management system in Bangladesh includes activities of various organisations at five levels, namely national, district, Upazila, union and community levels (see Table 6.1). Several institutes are involved in disaster management in Bangladesh, such as National Disaster Management Council, National Disaster Management Advisory Committee, Inter-Ministerial Disaster Management Coordination Committee and so on. At the national level, the Disaster

Table 6.1 Institutional frameworks at different levels

Level	Institutions
National	National Disaster Management Council (NDMC)
	Inter-Ministerial Disaster Management Co-ordination Committee (IMDMCC)
	National Disaster Management Advisory Committee (NDMAC)
	National Platform for Disaster Risk Reduction (NPDRR)
	Cyclone Preparedness Program Implementation Board (CPPIB)
	Cyclone Preparedness Programme (CPP) Policy Committee
	Focal Point Operation Coordination Group of Disaster Management (FPOCG)
	NGO Coordination Committee on Disaster Management (NGOCC)
	Committee for Speedy Dissemination of Disaster Related Warning/Signals (CSDDWS)
District	District Disaster Management Committee (DDMC)
Upazila	Upazila Disaster Management Committee (UZDMC)
Union	Union Disaster Management Committee (UDMC)
Community	Pourashava Disaster Management Committee (PDMC)
	City Corporation Disaster Management Committee (CCDMC)

Source Information is from Disaster Management and Relief Division, Disaster Management Bureau (2010)

Management and Relief Division (DM&RD), under the Ministry of Food and Disaster Management (MoFDM), is the coordinator of disaster management activities and efforts. In order to respond to the need for better disaster management, the MoFDM issued the Standing Orders on Disaster in 1997 which provides guidance and directions to stakeholders regarding implementation and monitoring of disaster management activities in the country (Disaster Management Bureau, Disaster Management and Relief Division 2010). At the subnational level, several committees have been established to coordinate, review and implement disaster-related activities in their jurisdictions, such as District Disaster Management Committee, Upazila Disaster Management Committee, Union Disaster Management Committee, Pourashava Disaster Management Committee and City Corporation Disaster Management Committee.

One of the action agendas in the National Plan for Disaster Management 2010–2015 is to increase public awareness regarding social mobilisation and disaster reduction via public education, capacity building training for academics in training institutions and engagement of NGOs in disaster management programs and plans. Although the NGO Affairs Bureau and Bangladesh Scouts have been mentioned in the National Plan, they are not included in the list of disaster management institutions in Bangladesh (Disaster Management and Relief Division, Disaster Management Bureau 2010).

6.4.1.3 Disaster Reduction Strategies

Five key strategies to reduce risks and manage disaster have been introduced in the National Plan. The government of Bangladesh does acknowledge that the private sector and civil society are key partners in implementation of these strategies. The first strategy is advocacy which aims to enhance the awareness of government agencies, government officials, media personnel, institutions and relevant groups of stakeholders with regard to their roles in various risk reduction initiatives and the benefits of such risk reduction programs (Disaster Management and Relief Division, Disaster Management Bureau 2010).

The second strategy is to reform policy and planning via reviewing of disaster management policy and planning. This aims to ensure that the planning and policy (i) are consistent with the national plan, (ii) can promote a risk reduction culture at various levels and (iii) facilitate the implementation of the national agenda for disaster management (United Nations, International Strategy for Disaster Reduction Secretariat 2012).

The third strategy is to build capacity of stakeholders at all levels. This strategy has been implemented via the review of the roles and responsibilities of various disaster management committees in order to avoid overlapped functions and waste of resources and efforts. The strategy is also supported by the development of a national training curriculum which can help to build capacity of these committees and enhance their functional capabilities (Disaster Management and Relief Division, Disaster Management Bureau 2010).

The fourth strategy is to develop a planning framework which incorporates the needs and limitations of stakeholders at all levels. The planning frameworks take into account the constraints of different committees (Disaster Management and Relief Division, Disaster Management Bureau 2010).

The final strategy is to provide uniform CRA guidelines in order to ensure consistency in the analysis of community and environment risk identification. This also aims to foster “stronger linkages with scientific analysis information” (Disaster Management and Relief Division, Disaster Management Bureau 2010, p. 40).

6.4.1.4 Disaster Management Regulatory Framework

The government of Bangladesh has enacted a number of legislative and introduced plans with regard to risk reduction and disaster management. These include Disaster Management Act, National disaster Management Policy, Disaster Management Plans and so on. In addition, the National Plan for Disaster Management 2010–2015 and the sixth Disaster Preparedness ECHO (DIPECHO) action plan are comprehensive and include activities and strategies to implement both large- and small-scale adaptive activities in some areas where natural disasters usually occur, such as Galbandha (Ali et al. 2012).

Apart from these above acts and guides, Bangladesh does have plans to address specific natural disasters and their associated issues, such as the earthquake contingency plan, the Cyclone Shelter plan, the Disaster Resilient Cluster Housing, and the Tsunami Response plan. Respective government agencies have also introduced best practice models which are adopted by a number of state and non-state organisations to implement DRM. Some of them are (i) “Disaster Impact and Risk Assessment Guideline, (ii) Local Disaster Risk Reduction Fund Management Guidelines, (iii) CRA Guidelines, (iv) Emergency Response and Information Management Guideline” and many others (Disaster Management and Relief Division, Disaster Management Bureau 2010, p. 45).

6.4.2 Activities by the Private Sector

While there is information about how professional organisations (such as Bangladesh Earthquake Society, South Asian Association for Regional Cooperation (SAARC) Meteorological Research Centre, Network for Information Response and Preparedness Activities on Disaster and International Centre for Climate Change and Development) and civil society (Bangladesh Centre for Advanced Studies) have supported various disaster management initiatives, and shared knowledge and expertise, there is little information about the contribution of the private sector in disaster management. Activities of the private sector to manage risk mainly include donation of money and sponsor risk reduction programs, but business enterprise “tends to lack incentives in funding disaster mitigation initiatives and seems content to leave the job to the public sector and international aid funding through the NGOs” (Matin 2002, p. 13).

Most of the time, interventions by private enterprises are to donate money to disaster victims. The monetary contribution is usually from their employees. For example, it is a common practice in Bangladesh that companies call for donation from their employees in response to the call for relief support after each disaster. Unions’ members are usually very active in such campaigns. However, the contribution from private businesses is quite limited. For instance, “during the 4-month period from 9 October 2000 to 12 February 2001, out of 236 entries of donations to the Prime Minister’s Fund, 47.9 % were made by various associations and employees’ unions that collected contributions of one day’s salary by the staff ... Only 5.5 per cent were private businesses though it was not clear from the data if the fund was collected from individual subscriptions or came from industrial/business establishments” (Matin 2002, p. 15).

Occasionally, private enterprises do sponsor special programs supporting risk reduction and disaster mitigation. A good example is the case of the Square Pharmaceutical Company which has (i) sponsored the “Dhaka Community Hospital (DCH) for part of its arsenic mitigation activities” and donated vitamins and medicine and (ii) supported “the Health Camps of DCH in rural areas” (Matin 2002, p. 16). Vista Communications Company and WorldSpace Corporation in

Bangladesh have tried to ensure their operational continuity in order to provide robust and effective means of communication, especially during disasters (United Nations, International Strategy for Disaster Reduction [UNISDR] Secretariat 2009, p. 14).

6.4.3 Activities by Civil Society

Activities of CSOs to contribute to disaster management can be classified in three main groups, namely provision of education programs, support relief activities and provision of financial assistance. Many international and national CSOs in Bangladesh have played a critical role in social and economic development, and disaster management, especially in the rural areas in the country. For example, an estimated “32,000 trained volunteers work in the coastal areas under a Cyclone Preparedness Program (CPP) jointly operated by the Red Crescent Society and the Ministry of Disaster Management and Relief” (Khan 2008, p. 667). Key CSOs in provision of public education regarding disaster reduction and management are “Bangladesh Rural Advancement Commission, Proshika, Gono Shahajiyo Shongstha, Dhaka Ahsania Mission, and Disaster Management Forum” (Khan 2008, p. 669). International and national CSOs have contributed to offer formal and non-formal education programs to the public in order to raise their awareness of disaster preparedness and risk reduction. Another example of active NGO is Islamic Relief Worldwide which has established the National Alliance for Risk Reduction and Response Initiatives (NARR) in 2010 in Bangladesh. The aims of these initiatives are to enhance disaster reduction efforts via collaboration and coordination among NGO members (Ali et al. 2012).

CSOs have also contributed to build local capacity regarding disaster reduction via the establishment of disaster management committee, community-based task forces, and rebuilding schools, hospitals, clinics. They have also worked with local government and enterprises to mitigate and adapt to the impacts of disasters and climate vulnerabilities (Ali et al. 2012). Such CSOs have gained support from various communities who have the willingness to improve the living standards of their communities. For instance, as of 2012, there were “625 volunteers in 25 Village Development Communities”, working with Islamic Relief Worldwide in Bangladesh (Ali et al. 2012, p. 5).

6.5 Assessment of the Current Activities to Manage Disasters

Bangladesh has strived to implement a comprehensive approach to address disaster-associated issues. The government has emphasised the importance of collaboration and close working relationship with all groups of stakeholders “to

build strategic, scientific and implementation partnerships with all relevant government departments and agencies, other key non-government players including NGOs, academic and technical institutions, the private sector and donors” (Disaster Management and Relief Division, Disaster Management Bureau 2010, p. III). A good example of such partnership is the collaboration between the government and non-state actors to disseminate information and good practice through the media and print media, as well as “community-led events” since public education is one of the mechanisms to enhance the public awareness of risk and disaster impact (Ali et al. 2012, p. 5).

In the current framework for disaster governance, the government has included all groups of stakeholders in the planning, development and implementation process of risk reduction. Yet, the roles and responsibilities of such groups have not been clearly and adequately documented in national plans and reports. The government has engaged the private sector and civil society in some of their activities although such opportunities evolve around getting feedback from civil society, partnerships for provision of voluntary work, and resource mobilisation via donation and contribution from different groups.

It is plausible that CSOs are quite active in disaster management in the country. Yet, it is not clear how the private sector and CSOs have been engaged in the national framework for disaster governance. Non-inclusion of all groups of stakeholder in the process of disaster governance will certainly produce negative effects and undermine the effectiveness of any efforts and mechanisms adopted by state and non-state institutes (Ha 2013; Dhakal and Ha 2013; Sealza and Ha 2013). As proposed by Drexhage and Murphy (2010), governments should adopt “partnerships between government, business and civil society to identify and test new approaches, and to scale up promising approaches” in governance (p. 20).

6.6 Policy and Technical Recommendations

Overall, disaster reduction management concerns everyone, every group and nation, and thus, various groups of stakeholders must be involved and engaged in this process (Ishiwatari 2003). Although Bangladesh has shown remarkable resilience in reducing the impact of natural disasters on the poor and marginalized population, the authors propose the following recommendations in order to address issues associated with DRM.

Firstly, the existing disaster preparedness programs and plans, including cyclone and flood preparedness training, evacuation plans, early warning systems and communication, etc., are not inclusive enough since some groups of stakeholders may be excluded in these plans and programs (Akter and Mallick 2013). This can be enhanced by fostering the partnerships between groups of stakeholders, and the recipients of disaster plans and policies.

Secondly, although the government has included “social safety net programs”, training programs, shelter programs and so on in the national plan for disaster

Table 6.2 Technical recommendations for disaster risk management in Bangladesh

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- Develop and maintain mechanisms to build cooperative land farming/tenure systems as subdivision and fragmentation are a very crucial issue leading to problems associated with land management

 - Construct new embankments and increase the height of the existing ones in order to prevent floods

 - Continue massive afforestation programs in all 67 districts since upstream deforestation contributes to increasing floods. Deforestation contributes to soil erosion

 - Use of surface water from rivers and lakes is the main solution to reverse the trends of the lowering of water table in and around major cities

 - Recycling used water in the residential houses, hotels, restaurants and other institutions can also contribute to address the shortage of clean water

 - Consider to sign MOUs with neighbouring countries to share water rationally with a fair share of river water distribution for the lower riparian countries for a durable friendship, peace and harmony in the relationship for all parties

 - Build more cyclone shelters across the country

 - Approach international donors and large private enterprises for financial contribution

 - Create a revolving fund to be patronised by the government from the annual budget, and involve the private sector to step up their corporate social responsibility activities to meet challenges of DRM

 - Provide public education and orientation to the public regarding disaster preparedness and recovery on an ongoing basis in order to reduce loss of life and properties

 - Develop a system of insurance for the coverage of agricultural loss due to natural disasters, and cover life insurance for human loss at a subsidised rate

management, such programs are aimed to respond to disaster impact. (Atker and Mallick 2013, p. 36). They cannot act as “a shield against environmental shocks” mentioned by Atker and Mallick (2013 p. 36). Thus, the government should also introduce proactive initiatives and activities to reduce risk.

Other technical recommendations are discussed in Table 6.2.

6.7 Conclusion

This paper has discussed the key types and associated issues of natural disasters and discussed the three-sector governance model for climate change governance. An all-inclusive governance approach towards DRM should include the public sector (government), the private sector and civil society since they can all contribute to risk deduction and disaster management as well as can affect the outcome of any plans and strategies to DRM. Although the government of Bangladesh has introduced a number of strategies, initiatives, and actions, to mitigate and manage disasters, it is not clear how such initiatives and actions have been implemented and evaluated and how different groups of stakeholders can be more involved in the governance process of DRM. This suggests that further research on disaster governance should focus on stakeholder engagement and participation and

mechanisms to evaluate the effectiveness of the current plan and institutional frameworks for DRM.

In conclusion, we acknowledge the fact that it is impossible to completely prevent natural disasters. However, with proper and adequate planning and implementation, effective collaboration and coordination among various groups of stakeholders, damage caused by natural disasters can be mitigated.

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