Decentralized DRM and Disaster Impact Recovery for National Resilience of Bangladesh

Sheikh Tawhidul Islam, PhD
Jahangirnagar University

5.1 Introduction

The significant decrease in the deaths of people by disaster impacts in current times compared to the past is one of the major testimony of Bangladesh's success in establishing smart policy-institutional architecture in disaster risk management. The results show, in contrast, that the loss of assets, properties and overall economy of disaster impacts has increased manifolds in recent times. This decreased death of lives and increased economic loss provides indications about the need to take different route in disaster risk management in Bangladesh. The major programs that the government agencies do immediate after the occurrence of disasters are distributions of relief items among the affected people, intensifying the pre-existing social safety net programs, distribution of cash, sell of food and other necessities at heavily subsidized price though OMS (Open Market Sell). But long term recovery of impacts that happened as results of past disaster is generally missing in the disaster risk management approach in Bangladesh. In this backdrop, '***National Disaster Resilience Framework***' is proposed based on two corresponding phenomenon, viz. '***decentralized disaster risk management***' and long term '***disaster recovery planning***'. In doing that the chapter provides rationale why the proposed framework is appropriate for the time for Bangladesh and how pertinent elements of the resilience framework should work within the existing policy institutional landscape of Bangladesh.

5.2 Journey from disaster response to disaster resilience in Bangladesh (1970-2020)

Degree of capacity of individuals or households to cope with change determines the extent of vulnerability. Capacity depends on contingent contextual settings like economic, socio-cultural, environmental milieu which is again influenced by formal and traditional governance structure of the area where they are situated. The characteristics of individuals living in a household such as whether he/she is male or female, disabled or not, old-age or young are important factors that determines the capacities of individuals vis-à-vis households to interact with contextual settings. Cluster of households create communities and a community maybe labeled as a 'vulnerable' if vulnerable households predominate the number in the settlement cluster. This suggests that vulnerability of individuals or households or a larger communities are not only determined by the household characteristics, it is rather shaped by surrounding contexts that include service provisioning aspects, communication and accessibility, access to information etc. Reduction of vulnerability not only depend on post disaster relief and response services, it rather depends on post-disaster recovery actions that support people offset the loss and gain capacities to face the upcoming challenges and shocks.

The authoritative theoretical discussions on these issues was introduced by Piers Blaikie (1994) which was further improved by Wisner, et al. (2004), Olson (2020) (Figure 5.1). They provided detailed discussions on how economic and social vulnerabilities of a community living in areas exposed to hazards create risks. Based on these concepts a number of international agencies such as UNDRR (formerly UNISDR), UNDP, DFID, Rockefeller Foundation etc. suggested a number of conceptual instruments vis-à-vis guidelines such as HFA, SFDRR, SLA (Sustainable Livelihoods Approach), suggestions on identifying vulnerability indicators. And at the same time they provided risk assessment tools so that degree of vulnerability could be properly understood for designing disaster risk management programs such as pre-disaster risk reduction, disaster response/relief during emergencies and post-disaster recovery. In Bangladesh state agencies like DDM adopted a number of approaches prescribed by these international agencies, namely CRA (Community Risk

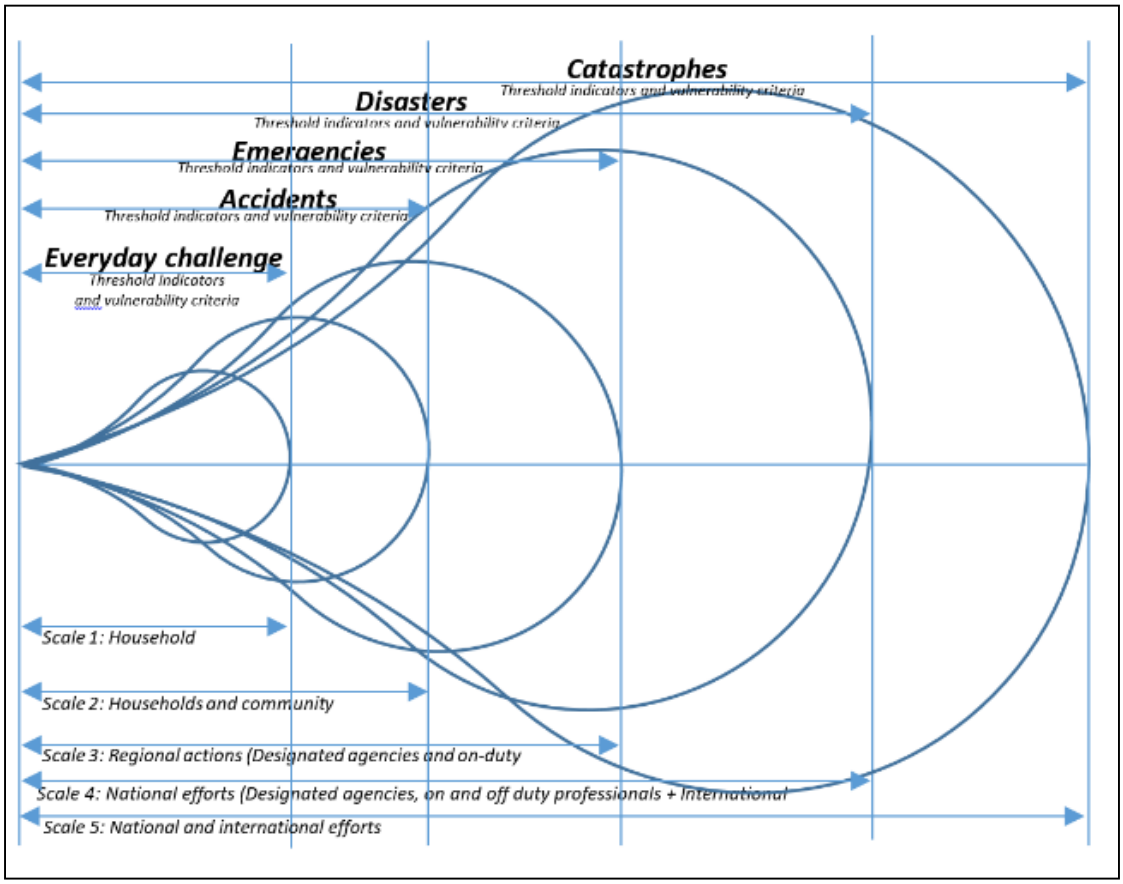

Figure 1: Scale of disasters.

Assessment), RRAP (Risk reduction Action Plan). The lessons learnt from two decades of disaster risk reduction (since 1994) activities in Bangladesh informs about at least three gaps, these are,

(i) *mainstreaming DRM into regular development programs is not adequate*,

(ii) *DRM is not properly decentralized so that local stakeholders could play effective roles in disaster and climate sensitive program design, implementation and impact monitoring,*

(iii) *lack of scientific models, state-of-the-art data, methods and tools for risk-informed decision making*.

However, it is observed that the communities at risk are still not resilient to cope with change and shocks despite having a range of activities related to DRM were implemented in Bangladesh (Table 1). For example, people living in coastal areas had to face a number of mega and recurrent disasters in last two decades (i.e. Sird in 2007, Aila 2009, COVID-19, Amphan 2020) and caused to wash away the progress made, developments gained and finally that did not allow people to be resilient to cope with disasters the next disaster

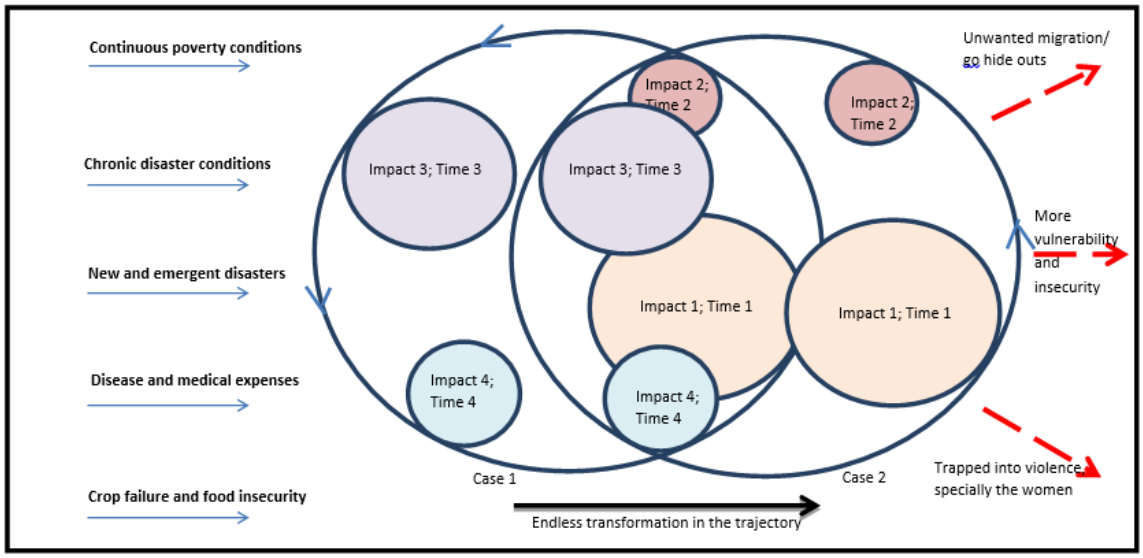

Figure 2: Disaster impacts, residuals effects and shifting state of households.

episodes. Figure 2 shows how chronic stress push people into the point of no-return. However, Ministry of Disaster management and Relief in partnership with UNDP designed and implemented program named NRP (National resilience Program, following CDMP) based on the lessons learned during last couple of decades on DRM and to secure the impressive economic progress so far been achieved by Bangladesh.

Table 1: Chronology of National Capacity Development in Response to Disaster Management

Time periods	Key activities
1970-1985	Reactive in nature: Establishment of Directorate of Relief and Rehabilitation; Creation of CPP Volunteers
1985-1999	Flood Action Plan (FAP) 1988 Flood Forecasting and Warning Centre Flood Modeling and GIS

	Establishment of Disaster Management Bureau in 1993 Formulation of SOD,1997 with institutional framework Shifting from MoRR to MoDM
2000 -2012	A comprehensive DM system-Shifting focus to Risk Reduction, CDMP, Phase I, DRR Fund Re-structuring institutional framework Formulation of NPDM, DM Act, etc. Revision of SOD (2010)
2012 Onward	Convergence of DRR and CCA and Resilience CDMP, Phase II NRP

The National Resilience Program (NRP) has four outcome and thirty output level indicators to achieve at the end of its first phase of activities. Unlike other disaster risk reduction programs implemented in the past in Bangladesh such as CDMP (Phase I and II), the NRP set ambitions higher where risk reduction approaches were exceled to national resilience

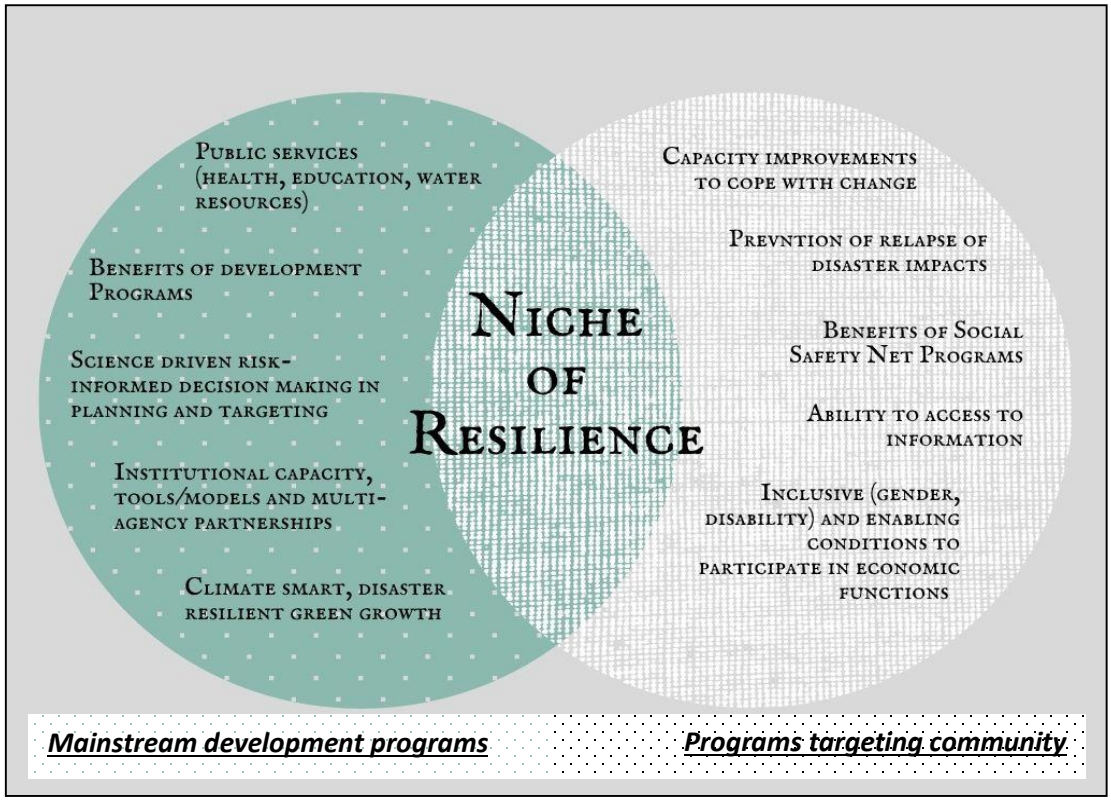

Figure 3: Resilience is combined product of regular development programs and DRR, CCA actions including social safety net interventions.

development in both human and economic development dimensions. In doing that NRP developed partnerships with agencies such as Planning Division and LGED for improving

the existing project formulation processes and infrastructure design and development that is inclusive, gender responsive and risk informed. In parallel, NRP developed partnerships with DDM and DWA for more effective targeting of vulnerable households towards developing their resilience. NRP provides technical support so that more effective disaster response and targeting could be achieved through on-ground program implementation. Therefore the NRP is more process led program aiming at developing increase in resilience to disaster and reduction in disaster risk, loss of lives, livelihoods and health of men, women, girls and boys, and protection of persons, businesses and communities in Bangladesh. The inputs received from the baseline study and based on the motivations received from the progress so far been made in other sectoral areas in Bangladesh, the MoDMR aspires to make an appraisal of past DRM activities leading to formulate future 'Disaster Resilience' programs in succession that is conceptually strong, operationally pragmatic and shared and aligned with common and overarching national targets.

5.3 Rationale for 'Resiliency' Pathway to DRM: Economic costs of disaster impacts and recovery gaps in Bangladesh

The Asian Development Bank (2015) estimated the economic loss of disaster impacts from 2000 to 2013 in Bangladesh was 10.7 Billion USD, where flood caused 7.1 Billion USD (66%) loss, tropical cyclone 3.2 Billion USD (30%), earthquake 14 million USD (0.13%) and severe storm 374 million USD (3.5%). ADB (2015) also mentioned that only USD 2 Billion funding was available during 2000-2013 for relief, rehabilitation and reconstruction against 10.7 Billion USD loss and damage. It was also forecasted that Bangladesh will incur of about 3.2 Billion USD (2.2% of GDP) on average per year due to cyclone or flood impacts. On the other hand, a total of 8351 people died from four mega disasters during this period (2000 to 2013), where 2065 people died from floods (25%) and 6281 people from tropical cyclones and severe storms (75%) together. The estimates suggest that floods appears to be the major disaster of Bangladesh considering the economic loss while cyclone is the major disaster while considering deaths of people. CPEIR (2015) study revealed that government spending to address the disaster and climate change induced damages stand at 6% to 7% of national GDP - combining development and non-development budget together that equates to an annual sum of USD 1 Billion. It is also important to note that 77% of total spending comes from domestic sources and the remaining 23% from foreign donor resources (CPEIR 2015).

5.4 Conceptual framework of resiliency in the Lens of NRP: The theory of change and institutions

5.4.1 Policy-institutional landscape of Bangladesh in Framing Disaster Resilience

Disaster-Development linkage is gradually taking strong footholds in disaster management discourse, policy making and program design and implementation in Bangladesh. Paradigm shift from relief and response to comprehensive disaster management to sustainable human development vis-à-vis disaster resilience during last two decades contributed in making the

storyline of globally appreciated DM approach of Bangladesh. The conceptual framing depicted in policy narratives (in DM Act 2012, NPDM 2016-2020, SOD 2019 etc.) and its translations into innovative program design and field implementation provide necessary motivation to make effectual disaster management approach which is more aligned with inclusive and sustainable development. The policy-institutional landscape of Bangladesh, briefly

Figure 4: Key stakeholders of National Resilience Framework.

discussed below, provide background rationale why 'recovery' focused disaster management could be more necessary considering the current size of economy and the pace of economic development.

5.4.2 Disaster 'recovery and rehabilitation' reflected in disaster management policy frameworks in Bangladesh

The SOD (2019) provided explanation on disaster recovery actions – it stated that the disaster recovery process starts immediate after the occurrence of disasters and the actions should aim to bring the conditions of disaster affected people back to normal. In addition, SOD recommended actions for reconstruction of infrastructure, resume public services, rebuild economic systems with necessary alliance with long term need of the community and over-arching development plan. SOD also indicated that disaster recovery (popularly echoed as build-back-better) activities also include rebuilding-rehabilitation and relief-

response activities that are being implemented for disaster affected people and recommended to carry out such activities through local DMCs, if and when necessary.

DM Act (2012) called for actions towards (disaster induced) humanitarian response, post disaster recovery and rehabilitation and to facilitate coordinated actions by involving government and non-government agencies. Three kinds of disasters are taken in the consideration, viz. natural, man-made and climate change induced threats in the DM Act (2012). Article 11 (Section 3 and 4) mentioned about pandemic related disasters while Article 15 mentioned about rehabilitation through recovery of systems

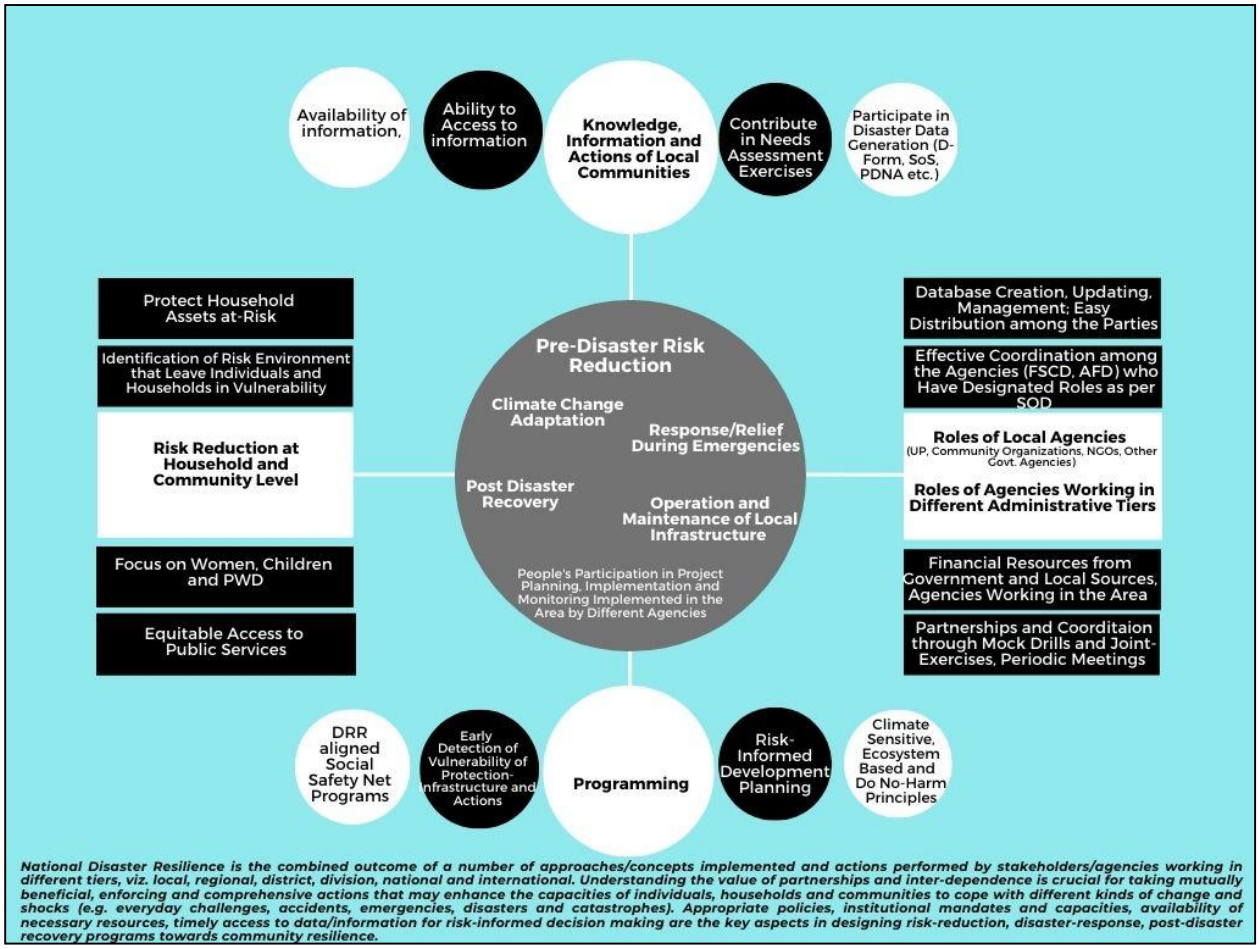

Figure 5: Key components, comprehensive National Resilience Framework.

and infrastructure at least to ensure earlier state or better state. The Act indicated the areas/sectors of rehabilitation that include infrastructure, life and livelihoods of people, relocate the affected people or livestock resources to safe places and WASH. The DM Act (2012) mentioned that inter-agency coordination should be ensured through NDMC (National Disaster Management Council) headed by the PM with 41 members in the Council. It is stated that the NDMC will also supervise and give directives on disaster recovery process (see NDMC, see Article 6, Section 5 and 6). Long term recovery and rehabilitation

from disaster impacts is mandated in the activities of DDM (see Article 9, Section 2), as indicated in the Act.

NPDM (2016-2020) tag line as asserted 'Building resilience for sustainable human development', followed by three overarching goals such as (i) saving lives, (ii) protecting investments and (iii) effective recovery explicitly affirms the commitment of the Government towards community resilience to disasters. During current NPDM (2016-2020), MoDMR have contributed in mainstreaming disaster risk reduction culture into regular development planning process through multi-agency partnerships (by taking 'whole-of-government' approach) and program implementation. The development of DIA, DRIP, digital D-form by Planning Commission, gender and disability inclusive infrastructure development by LGED, enhanced women leadership for gender responsive disaster management decisions, investments and policy making by Department of Women Affairs, working with private sectors (e.g. business continuity plan for garments sector) could be cited as good examples in this connection. These achievements made necessary foundations to integrate DM measures with development initiatives since themes like poverty, sustainable development, disasters and climate change are interlinked and overlapped in many respects.

5.4.3 Rationale for 'recovery' focused Disaster Risk Management in Bangladesh

SFDRR (2015-2030) Priority Actions - 4 indicates about long term recovery towards build back better. UNDRR termed 'build-back-better' as actions to be performed in post disaster situations towards recovery, rebuilding and rehabilitation of affected infrastructure, service sectors and economic systems. UNDRR also mentioned that the actions related to 'build-back better' finally contribute in developing national resilience by doing necessary reconstruction of economic systems for sustained livelihoods of people and at the same time rehabilitate environmental systems for ensuring productive ecosystems services.

A number of guidelines for different levels (national, district, local) have been produced for effective disaster risk management in Bangladesh. These are (1) Guideline for conducting CRA, (2) Estimating loss and damage, (3) DIA, (4) National DM Fund and District DM Fund, (5) Emergency planning, (6) Minimum humanitarian standards, (7) Disaster information and communication guidelines, (8) Disaster shelter building and maintenance, (9) Monitoring and evaluation of implemented DM projects, (10) guidelines for receiving international support during emergencies, (11) Multi-agency disaster incident management guidelines, (12) Post disaster dead body management, (13) Disaster trash and debris management, (14) Institutionalizing disaster volunteerism, (15) SoP for earthquake disaster management, (16) National nuclear and radiological emergency response plan, (17) Development of expert panel on disaster management, (18) Hospital management during disasters. But no guidelines are available on 'disaster recovery actions and processes'

The predecessor of current NPDM, i.e. the NPDM (2010-2015) advocated for shifts in approach from relief and response to comprehensive risk reduction. The second phase of NPDM (2016-2020) was more aligned with international instruments such as HFA. It is, therefore, logical to argue that third phase of NPDM (2021-2026) should make further

advancements by putting ‘integrated recovery’ at the center so that disaster risk management is more attuned with national development planning, i.e. ‘sustainable human development’. The ‘integrated recovery’ approach will be comprised of pre and post disaster recovery and rehabilitation activities and also relief and response actions will be important

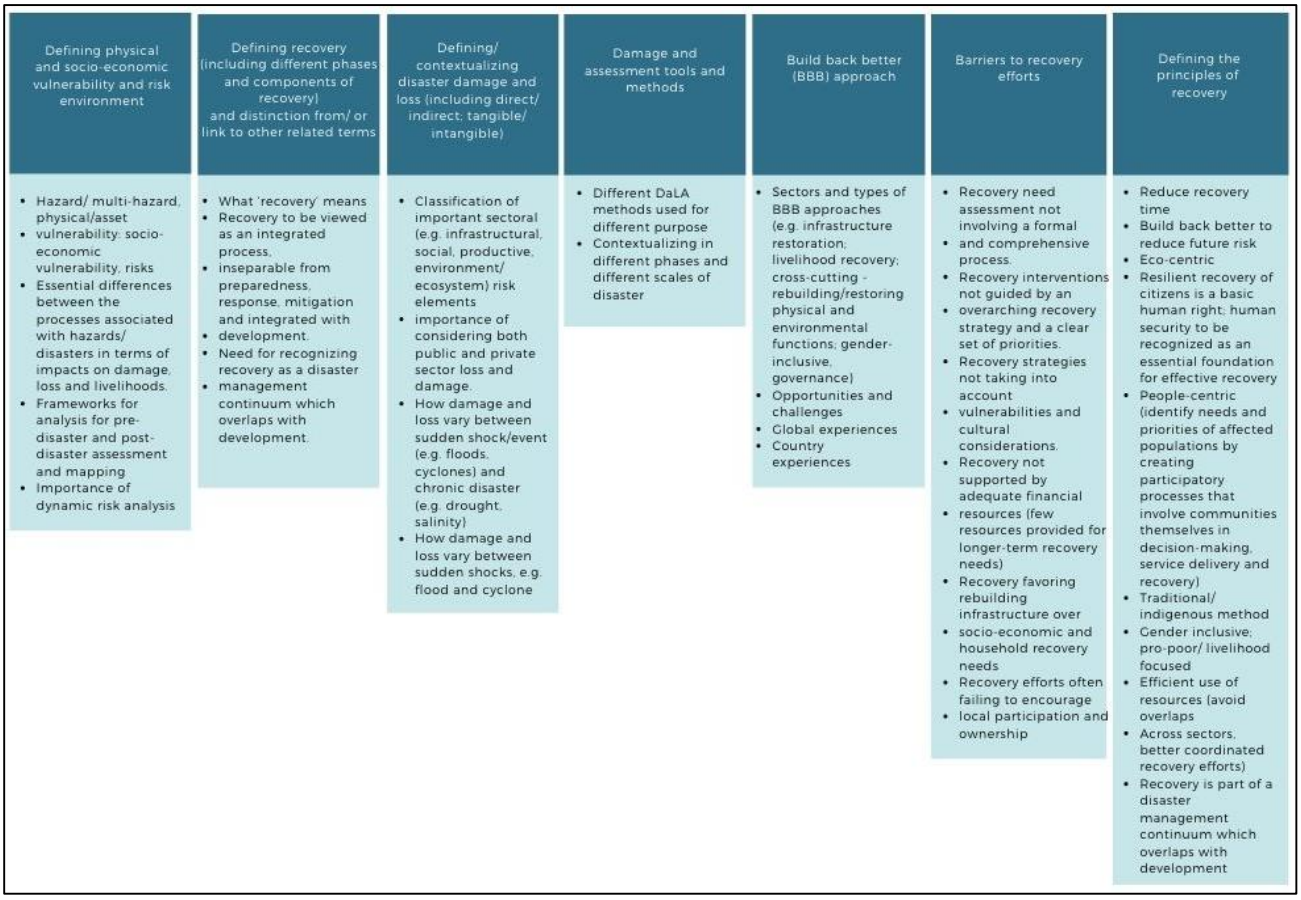

Figure 6: The terms and principles for which clear definition/illustration is needed for effective planning and implementation of disaster recovery actions.

elements of the framework. This can be achieved within the scope of current policy-institutional landscape of Bangladesh and taking this approach may promote further the risk-informed planning and implementation of investment initiatives.

5.5 Decentralized Disaster Risk Management

5.5.1 Lessons learned from past DRM in Bangladesh

The sections above suggest that Bangladesh has passed a long journey in managing disaster risks. During this journey, the country achieved good progress in some areas such as policy formulation, effective response during disasters, developing early warning models and risk assessment tools, institutional framework based on specific disaster risk management mandates etc. In contrast, gaps still remained in some areas such as

(i) decentralized disaster risk management and
(ii) post-disaster recovery planning, resource allocation and program implementation.

It is indicated before that the size of the economy has increased many folds in recent times (see World Economic Outlook, IMF 2020) and also the frequency and magnitude of recurrent and mega-disasters have increased significantly; all these happened under the contexts of climate change and recent phenomenon of COVID-19 pandemic. Therefore the impacts of disasters becomes large and devastating. It is also noteworthy that disaster risk management in Bangladesh still following top-down approach where strong *partnership with the local stakeholders with national level agencies (Fire Service and Civil Defense, Armed Forces Division etc.) did not established adequately*. It is also *not clear how financial resources could be raised at local levels so that pre-disaster proofing and maintenance could be carried out* and big impacts and damages could be averted. Even the local communities and community based organizations including local government agencies like Wards and Union Parisads are *not adequately equipped with resources for negotiations* with external agencies and not skilled enough to develop partnerships with national level agencies so that *local voices are properly heard* and risk reduction programs take place as per the local necessity at different stages of disaster risk management (pre-during-post). *Decentralized DRM based strong post-disaster recovery activities* may make local communities including the local agencies strong and resilient to cope with change and shocks. But not the local communities, neither the local agencies are prepared to take part the decentralized DRM activities for a number of reasons. The *major concerns* in this regard include,

- **Lack of awareness and knowledge management:** People and local agencies know about the challenges but they have limited understanding about the necessity, functions and processes of decentralized DRM and vis-à-vis their roles to play to carry forward the decentralized DRM.

- **Generation of financial resources for risk reduction actions:** In the current conditions the local government agencies such as Wards and Union Parisads receive (non-development) financial resources from the provisions made available through MBF (Ministry Budget Frameworks) of the Ministry of Finance. In addition development-budgets may go to the local areas if any projects supported by ADP (Annual Development Plan) are designed for the area. Financial resources could be made available by making the external agencies agree through negotiation processes to allocate a certain percentage of project funding for local level disaster risk reduction/management activities if they implement any projects in the area.

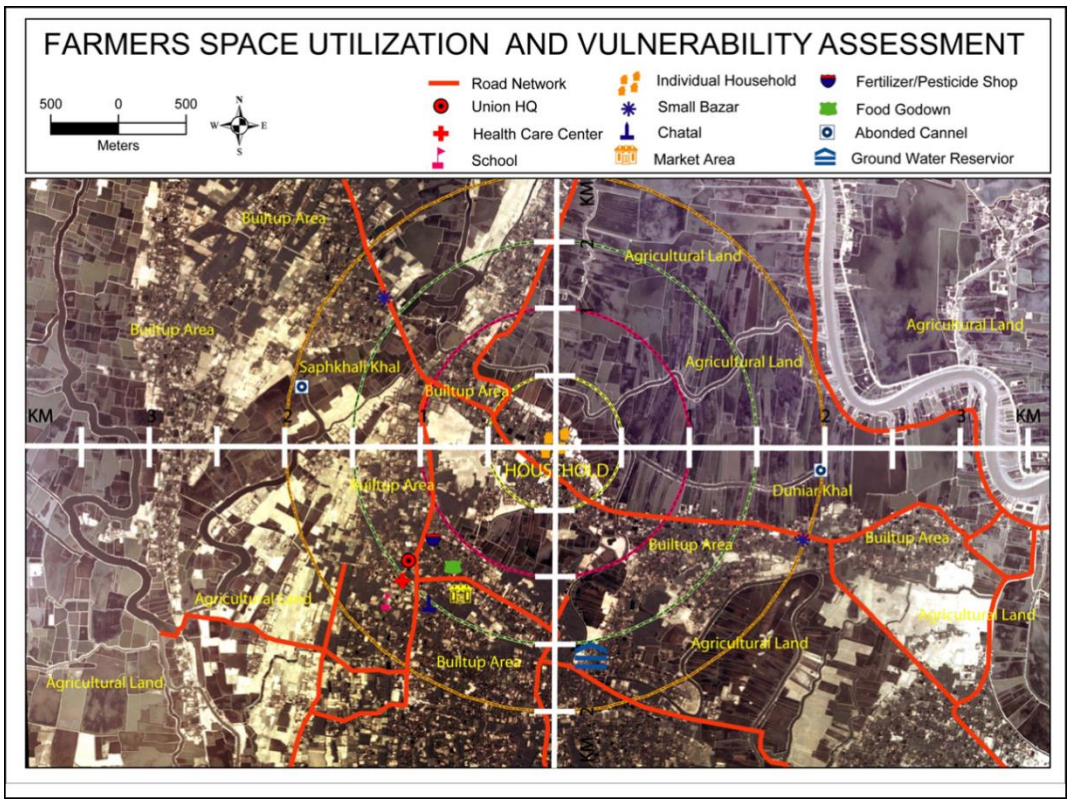

Figure 7: Inter-connected social and physical elements, all these in collective fashion help to develop community resilience.

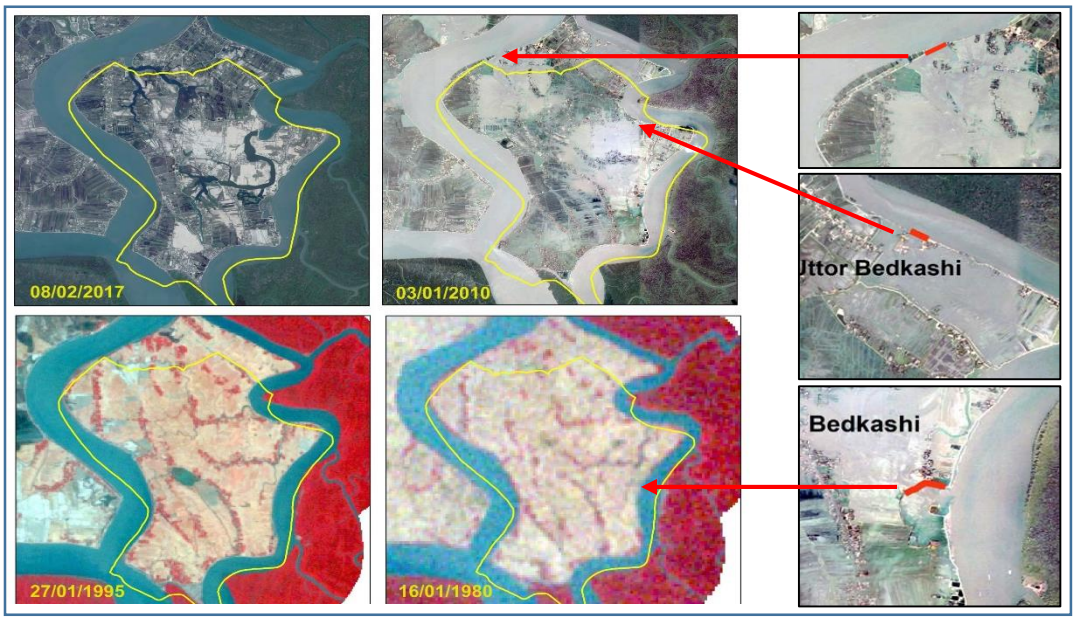

Figure 8: South Bedkashi (KoyraUpazila, Khulna District) in 1980, 1995, 2010 and 2017 shown in Landsat TM image. Repair and maintenance of 800-meter pre-existing crack along the 25 kilometers protection embankments might have saved the island from cyclone induced disasters cause by two repeated disasters (Sird in 2007 and Aila in 2009).

- **Local participation in disaster loss and damage data generation:** Government has a made provisions to collect disaster loss and damage data through D-form and SoS form. Local communities could play useful roles in by involving themselves in gathering household level vulnerability data on demographic, dwelling and other socio-economic indicators. Participation of local communities in this regard will enhance the quality of data and simultaneously the process will receive necessary local approvals. The process will also inform the local communities how generation of vulnerability information could led to design and implement risk reduction action programs in the local areas.

It is indicated earlier that a certain degree of progress have already been made in Bangladesh in regards to decentralized DRM. Proper understanding of these advancements may help to know how those results/resources could be used as foundations upon which the effective decentralized DRM could be designed for Bangladesh. Hence, the following sections highlights the developments in this regard.

5.5.2 Risk assessments tools used at local levels

Ministry of Disaster Management and Relief (MoDMR) developed Community Risk Assessment (CRA) tool to identify and better understand the local level disaster risks. CRA is a participatory process for assessing hazards, vulnerabilities, risks, ability to cope, preparing coping strategies and finally preparing a risk reduction action plan (called Risk Reduction Action Plan, RRAP) by the local community. The CRA method recognizes that the vulnerability, disaster loss, reduction or mitigation strategy and coping mechanism vary from community to community and group to group (women, person with disability, landless, farmers-fisher folks, etc.) of a same community. It ensures representation of professional, community and other groups so that their views are reflected. CRA tool plays an important role in assisting communities and disaster management committees to identify “all hazards” risk, together with the most appropriate range of risk reduction options that can be introduced to either eliminate or reduce risk to more manageable means.

5.5.3 Data generation and reporting on loss and damage assessments in Bangladesh

Government of Bangladesh has developed an institutional process to estimate local level disaster loss and damage for different sectors. In this bottom up process, field level administrative representatives use prescribed form (called D Form) to collect information related to financial loss, number of affected units, challenges faced by different communities etc. In addition, other agencies like Bangladesh Bureau of Statistics (BBS) has taken initiatives to gather climate change induced disaster impacts data by undertaking a project titled ‘Generation of Disaster Related Statistics 2020: Climate Change and Natural Disaster Perspectives’; data will be generated from different disaster hot-spots every year by using mobile phone enabled smart data collection tool. BBS is also going to prepare four disaster and climate change focused reports under the framework of Bangladesh Environmental Statistics Framework (BESF 2016-2030). The major reports are **Report No. 3**: Climate

Change and Disaster Related Statistics (what is currently underway), **Report No. 10**: Disaster Risk Reduction Expenditure Accounts, **Report No. 11**: Climate Change and Natural Disaster Impacts Vulnerability Index and **Report No. 13:** Climate and Natural Disaster Induces Survey. In 2015, BBS conducted 'Impact of Climate Change on Human Life (ICCHL) Survey' and produced useful data on disaster impacts for the first time in Bangladesh. This data generation needs active involvement of local stakeholders in a variety of ways.

Figure 9: Proposed disaster recovery plan and implementation strategy for Bangladesh.

In addition, Planning Commission conducted background studies (Report No. 11a and 11b) on disaster and climate change impacts to better understand the risks and vulnerabilities of the communities, which finally give directives to formulate related targets for Seventh Five Year Plan (SFYP). The Eighth Five Year Plan (that is currently underway) has incorporated a number of DRR indicators in the scope of actions. The CPEIR (Climate Public Expenditure and Institutions Review) study undertaken by Planning Commission, CFF (Climate Fiscal Framework) published by Ministry of Finance are significant documents that provided

valuable insights in understanding local level disaster risks and vulnerabilities and may provide useful insights to promote decentralized DRM in Bangladesh. In parallel many other activities in allied fields were performed by different agencies, such as forest (e.g. REDD+, coastal afforestation project), water resources (e.g. Blue Gold Project by BWDB and DAE, The Bangladesh Delta Plan 2100), and education (e.g. production of report *Climate Change Education for Sustainable Development*, by the Ministry of Education through BANBEIS). These study reports may supply useful information for a conceptual construct to better understand disaster vulnerabilities and develop action plans to address disaster impacts and to reduce local disaster risks.

5.5.4 Dissemination of risk information and early warning at community levels

The Government of Bangladesh has strong Early Warning (EW) systems for cyclone and flooding. The Bangladesh Meteorological Department (BMD) and FFWC produce and disseminate disaster warning information through the media and institutions at the local level. The GSB (Geological Survey of Bangladesh) has established landslide EW systems in parts of Chittagong, Cox‘s Bazar, and Teknaf cities. MoDMR has also established local EW systems through 30 community radio stations.

5.5.5 What to do for effective decentralized DRM in Bangladesh

Analysis of gaps is a prerequisite for promoting decentralization of DRM in Bangladesh. The areas of gaps may include capacity of local actors, needs assessment of the different communities in different hazard contexts, resource provisions, strategies for decentralized DRM execution (e.g. ICT based applications) and finally monitoring and accountability framework. The capacity of actors to play active roles in different phases of disaster management (e.g. risk assessments, early warning and evacuation, emergency response, disaster recovery) is pivotal to authorize them for responsible actions. Actors’ capacity in using disaster risk assessment tools (also loss and damage tools) such as CRA/RRAP, MSNA/PDNA, D-Form etc. may help to receive proper understanding about local needs at different phases of DM cycle. The budget allocation and programme implementation strategy depend on this risk assessment results and local understanding. However, the key questions/areas to take into purview in the scoping study would be as follows.

- ***Capacity development of risk assessment concepts, tools***, government DM approaches, including capacities to align DRR/CCA activities with SSNPs.
- ***Improvements in the dissemination of disaster early warning*** messages and promote community based early warning.
- Put in place necessary provisions so that ***local communities/stakeholders/DMCs can play effective roles in different phases of disaster management***.
- ***Empower communities*** for proactive risk reduction actions.
- ***Restructuring local institutional landscape*** (local government including DMCs at different tiers) where necessary for better performance in

technical monitoring, capacity building, preparedness and response in reducing disaster risks.

- Capacity development of ***local stakeholders to use ICT in connection to DRM*** such as receiving periodic updates through IVR instructions provided to DMCs through SMS (Short Message Service), promote better use community radio, gathering data using digital D-Form, use of ICT based automated platforms to identify disaster vulnerable households at local levels where PIOs (Project Implementation Officers of DDM) could play roles hand in hand with local government agencies/stakeholders.

Challenges in disaster Recovery Strategy and Action Plan for medium to mega-disasters in Bangladesh

- Absence of comprehensive post-disaster recovery planning framework; recovery attempted in scattered/fragmented manner, with limited coordination among recovery efforts
- Long recovery time; less financing (often delayed) compared to post-disaster recovery financing needs; overlapping of recovery efforts across sectors; sub-optimal use of resources
- Inadequate achievement in terms of BBB approach, both in structural and non-structural/institutional measures (focus mostly on repair and restore functionality); rebuilding to preexisting condition; not enough human-centric, gender-sensitive and eco-centric (nature friendly); lack of monitoring of previous efforts and learning lessons from best management practices
- Inadequate failure analysis (structural, non-structural, institutional), in the context of geo-hydrological factors and its variation in different geographic settings; not in alignment with resilience and sustainability
- Absence of efforts to generate statistics on loss- of-gains and also the statistics on loss-of-gains due to lack of effective recovery strategy and action plan.
- Focus on physical or direct damage; incomplete focus on economic loss (largely ignoring private sector losses) and absence of non-economic (intangible) loss; multiplier effects;
- Consideration of dynamic nature of risk in a changing climatic conditions with changing socio-economic vulnerability is absent. Systems thinking approach may help to understand the interwoven risk environment and risk informed decision making;

5.6 Conclusion

Bangladesh has achieved a commendable success in Disaster Risk Management (DRM). This success is realized primarily based on a number of accomplishments happened at national levels. The major thematic areas of success are (i) effective policy formulation at

central/national level (i.e. SOD[1], NPDM, DM Act), (ii) building and reforming institutions (e.g. creation of MoDMR[2] from MoFDM, establishment of DMB[3] and then DDM), (iii) making provisions of resource for disaster risk reduction (e.g. providing food and monetary support through a series of SSNP[4]s), (iv) development of Early Warning mechanisms, especially for floods and cyclones, (v) investing on infrastructure development towards disaster risk mitigation (e.g. building of embankments, cyclone and flood shelters). These centralized national level efforts were evolved by addressing disaster risks/impacts at local levels and by implementing programs through partnerships with local government agencies and stakeholders. In this top-down DRM approach, the apex disaster management agency of Bangladesh such as MoDMR is responsible for policy formulation and performing oversight activities while DDM plays roles in implementing action programs at local levels.

Involvement of local government agencies like Upazila and Union Parisad and disaster management committees set at different tiers (DDMC[5], UzDMC, UDMC) and related stakeholders is crucial to attain success in the DM (Disaster Management) cycle of activities. ***In these cases, the local level agencies function within strong grip and control of central agencies. It is also pertinent to indicate that the local needs, priorities and capacities remain overlooked due to the absence of effective decentralized DRM systems in Bangladesh.*** As a result, achieving high degree of success in disaster risk management at local levels remain unfulfilled which is manifested in the existence of bulk masses of non-resilient communities in Bangladesh who recurrently suffers from disaster impacts despite having significant efforts given by central agencies. The centralized efforts contributed in reducing the number of deaths[6] over the years but the number of disaster affected people those are endured with disaster loss and damage has increased significantly. This suggests that reducing disaster loss and damage still remain as a fault line in the whole disaster risk management environment in Bangladesh and absence of effective decentralized DRM system might be the major reason for this. However, the decentralized DRM along with disaster recovery planning mainstreamed through regular development processes may help to develop disaster resilient Bangladesh in near future.

[1]Standing Orders on Disasters (2010), National Plan for Disaster Management (2016-2020), Disaster Management Act (2012).

[2]Ministry of Disaster Management and Relief (MoDMR), Ministry of Food and Disaster Management (MoFDM).

[3]Disaster Management Bureau (DMB), Department of Disaster Management (DDM).

[4]Social Safety Net Programme (SSNP) like Food for Work (FFW), Gratuitous Relief (GR) etc.

[5]District Disaster Management Committee (DDMC), Upazila Disaster Management Committee (UzDMC), Union Disaster Management Committee (UDMC).

[6] According to Em-DAT (https://emdat.be/) 34506 people died between the year 1975 to 1989; 9701 people died between 1990 to 2004; 7392 people died between 2005 to 2016.

Bibliography

ADPC, 2014, study conducted for ADB TA-8144 BAN: Project Summary Capacity Building for Disaster Risk Finance. Figures received from EM-DAT 2014.)

Asian Development Bank (ADB) (2015). Capacity Building for Disaster Risk Finance in Bangladesh. Manila (TA 8144-BAN).

Agrawala, S., Ota, T., Ahmed, A.U. *at al.*, 2003: *Development and Climate Change in Bangladesh: Focus on Coastal Flooding and the Sundarbans*. Organisation for Economic Co-operation and Development (OECD), Paris, 70 pp.

Blaikie, P., T. Cannon, I. Davis, and B. Wisner. (1994). At Risk: Natural hazards, people's vulnerability, and disasters. Routledge, London

Bangladesh Bureau of Statistics, BBS (2011). Population Census: National Series. . Ministry of Planning. Government of the People's Republic of Bangladesh, Dhaka.

Bangladesh Bureau of Statistics, BBS (2015). Bangladesh: Disaster Related Statistics 2015: Climate Change and Natural Disaster Perspectives. . Ministry of Planning. Government of the People's Republic of Bangladesh, Dhaka.

Brammer, H. 2014. *Climate Change Sea Level and Development in Bangladesh*. The University Press Limited, Dhaka.

CDMP (2009). Earthquake Risk Assessment of Dhaka Chittagong and Sylhet City Corporation Area. Ministry of Disaster Management and Relief (MoDMR), Government of the People's Republic of Bangladesh, Dhaka.

CRED (Centre for Research on the Epidemiology of Disasters). 2020. "EM-DAT: The international disaster database." Accessed in November, 2020. https://www.emdat.be/.

Diffenbaugh N.S., Martin S., Trapp R.J. (2013). Robust increases in severe thunderstorm environments in response to greenhouse forcing. *Proceedings of the National Academy of Sciences of the United States of America.* Vol. 110 (41), pp. 16361-16366.

EM-DAT (2020). The International Disaster Database. Centre for Research on the Epidemiology of Disasters – CRED, Brussels. www.emdat.be/

INC (Initial National Communication) (2002*). Initial National Communication to UNFCCC*. Ministry of Environment and Forest, Government of People's Republic of Bangladesh, Dhaka.

MoDMR (2015). Atlas: Seismic Risk Assessment in Bangladesh for BograDinajpurMymensinghRajshahiRangpur and Tangail City Corporation/Municipality Areas. Government of People's Republic of Bangladesh, Dhaka.

MoDMR (2016). Annual Report of Ministry of Disaster Management and Relief. Government of People's Republic of Bangladesh, Dhaka.

MoDMR(2016). National Plan for Disaster Management (2016-2020): Building Resilience for Sustainable Human Development, Government of People's Republic of Bangladesh, Dhaka.

MoDMR (2016). Plan of Action to Implement Sendai Framework for Disaster Risk Reduction 2015-2030. Government of People's Republic of Bangladesh, Dhaka

MoEF, (2013). Bangladesh Climate Change and Gender Action Plan. Ministry of Environment of Forest, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh.

Ministry of Finance (2018). Climate Fiscal Framework. Government of the People's Republic of Bangladesh, Dhaka, Bangladesh.

MPO (1991). Evaluation of Historical Water Resources Development and Implications for the National Water Management Plan Project - Phase II (BGD/85/076), Ministry of Irrigation, Water Development and Flood Control, Government of Bangladesh, Dhaka.

Olson, R.S. N.E. Ganapati, V.T. Gawronski, R.A. Olson, E. Salna, J.P. Sarmiento (2020). From Disaster Risk Reduction to Policy Studies: Bridging Research Communities. Natural Hazards Review, Vol. 21 (3), pp. 04020014-1 to 04020014-12.

Planning Commission (2012). Climate Public Expenditure and Institutional Review. Ministry of Planning. Government of the People's Republic of Bangladesh, Dhaka.

Planning Commission (2015). Climate Change and Disaster Management: Sectoral inputs towards the formulation of Seventh Five Year Plan (2016 -2021). Ministry of Planning, Government of People's Republic of Bangladesh, Dhaka.

Rashid, H. Er. (1991). *Geography of Bangladesh*. The University Press Limited, Dhaka.

Samenow, J. (2013). Climate change may boost violent thunderstorms, study finds. Available at: https://www.washingtonpost.com/news/capital-weather-gang/wp/2013/09/24/climate-change-may-boost-violent-thunderstorms-study-funds/ [Accessed 4 June 2016]

Tasin, F. (2016). Lightning Strikes Most in May in Bangladesh. The Daily Star [Online]. Available at: http://www.thedailystar.net/backpage/lightning-strikes-most-may-85924 [Accessed 8 June 2016]

United Nations ESCAP(2015). Asia-Pacific Disaster Report 2015: Disasters without Borders – Regional Resilience for Sustainable Development, UN-ESCAP, Bangkok.

WFP, UNICEF (2009). Bangladesh Household Food Security and Nutrition Assessment Report 2009. Ministry of Health and Family Welfare, Government of the People's Republic of Bangladesh.

Wisner, B., P. Blaikie, T. Cannon, and I. Davis. (2004). At Risk: Natural hazards, people's vulnerability, and disasters. 2nd ed. Routledge, London.