POST EVENT REVIEW CAPABILITY (PERC) STUDY

Learning from the 2020 Floods in Faridpur District, Bangladesh to build resilience

Flood affected people move to a safe place using a raft © GMB Akash, Independent photographer

The Post Event Review Capability (PERC) methodology developed by Zurich Insurance Company Ltd, in collaboration with the Institute for Social and Environmental Transition-International (ISET) in 2013, provides a structured method for examining why a hazard becomes a disaster. Utilized 18 times before to examine cyclones, floods, and wildfires in different contexts around the world, this study examines the 2020 floods in Bangladesh.

This report has been developed by members of the Zurich Flood Resilience Alliance – Practical Action and ISET International. The study focuses on why the 2020 floods resulted in a disaster in Bangladesh. It draws on three weeks of field work, 21 interviews and two focus groups with stakeholders from government, UN agencies, donors, NGOs and humanitarian response agencies, academics, and community members, and the review of over 30 secondary sources to highlight key opportunities for building resilience.

An electronic copy of this product is available at: www.i-s-e-t.org/perc-bangladesh-2020. Additional information about the PERC can be found at www.floodresilience.net/perc and additional information about flood resilience can be found at https://www.zurich.com/en/sustainability/our-role-in-society/flood-resilience and www.floodresilience.net.

ACKNOWLEDGEMENTS

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1 INTRODUCTION

Bangladesh is a highly disaster-prone country due to a combination of topography, climate, and exposure to natural hazards. Nonetheless, 2020 was distinct for the series of compounding events that devastated communities across Bangladesh.

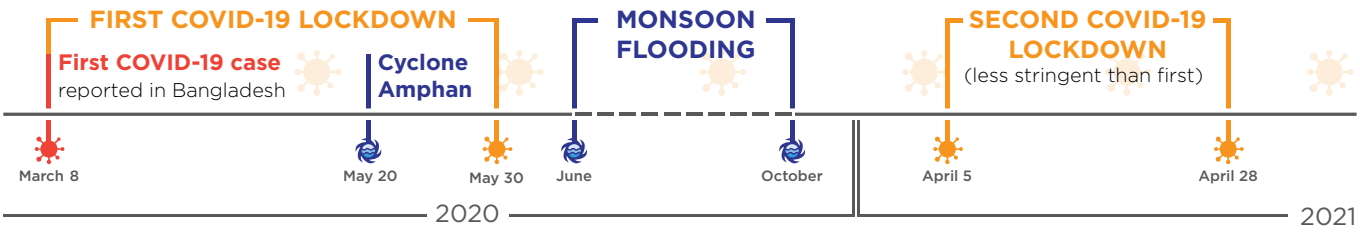
In May 2020, Cyclone Amphan made landfall in west Bangladesh. Amphan impacted a country already reeling from the economic and social devastation caused by the COVID-19 pandemic. Pandemic lockdowns and movement restrictions which had begun in March 2020 were contributing to the emergence of a 'new' poor and exacerbated the vulnerability of already struggling communities. A month later, in June, the monsoon season began, further impacting communities across the country. What is normally a two-to-three-week flooding period was, in 2020, a prolonged four-month flooding event extending from June to September that left nearly a third of the country underwater.

1.1 2020–2021 timeline of events

Cyclone Amphan

On 20 May 2020, Cyclone Amphan crossed West Bengal, along the Bangladesh coast (to the east of Sagar Island), with a maximum sustained wind speed of 160-180 km/hr, rainfall totals of up to 203mm (the highest ever recorded in the district of Chuadanga), and with a storm surge of about 1.5 m in low-lying regions. Over the course of the next several days, the cyclone swept north through the

FIGURE 1
Timeline of major natural hazard, economic, and political events mentioned by interviewees



Process of drying crops during a flood © GMB Akash, Independent photographer

country killing 26 people, damaging or destroying 200,000 homes (Reliefweb, 2020a), and leading to the evacuation of more than 2.4 million people to permanent and temporary shelters. Ultimately, 150 km of protection embankments, 200 bridges and culverts, and 100 km of roads were lost or damaged; 8,235 water points and 40,894 latrines were destroyed in the worst affected districts alone, and about 149,000 hectares of agriculture lands and fish farms were damaged, resulting in an estimated economic impact of BDT 3.25 bn (US$38.33 m).

The 2020 monsoon floods

Monsoon season in Bangladesh usually occurs from June to October. While approximately 80 percent of Bangladesh's yearly rain falls during these months, heavy rainfall in India and Nepal, both upstream of Bangladesh, can cause extensive flooding throughout the country. Moderate flooding is beneficial – it provides water and transports fertile soil, supporting the agricultural industry. Monsoon seasons with heavy rainfall and flooding, however, cause loss of life, damage to property, destruction of crops, loss of livestock, and can lead to the spread of waterborne diseases. Essential facilities like schools, health clinics, and markets are also often impacted.

In 2020, as a result of Cyclone Amphan, Bangladesh was saturated and flooding when the monsoon season began. Because the 2020 monsoon season was also extreme – perhaps the most intense monsoon season in a decade – within weeks nearly a third of the country was underwater and remained so for months. The country is used to managing two-to-three-week floods; however, the prolonged nature of the 2020 flooding – five months, from June to October – combined with the impacts of the cyclone and the pandemic, was an altogether different challenge.

According to the Needs Assessment Working Group Report (NAWG, 2020), the 2020 monsoon floods affected the northern, north-eastern, middle, southern, and south-eastern regions of the country, affecting over 30 districts, with moderate to severe impacts in 15 districts, including Faridpur, in south-central Bangladesh. As of early August, floodwaters had inundated 1,022 unions from 158 upazilas, impacting 5.4 million people, leaving 1,059,295 families waterlogged[1] and leading to 135 deaths (OCHA Services, 2020). In particular, more than 1.7 million women and girls were affected by the floods, including 84,195 female-headed households, 101,000 pregnant women, and 160,000 girls aged between 5 and 18.

COVID-19

The COVID-19 pandemic first arrived in Bangladesh on 8 March 2020. As for most countries around the globe, the Bangladeshi Government declared a shutdown across the country beginning on 26 March and continuing to 4 April. As COVID cases gradually spread, the government extended the shutdown, until 31 May. Though COVID continued to spread and the number of cases increased through early July, the government lifted the initial lockdown noting it was posing an undue burden on the country's residents.

As of May 2021, there have been 785,000 reported cases of COVID-19 and 12,300 deaths in Bangladesh. The country has undergone subsequent lockdowns to limit the spread of the disease coinciding with a second wave in December 2020 and a third in April 2021. These lockdowns have had cascading impacts on people's livelihoods and well-being. Restrictions on movement have contributed to price increases, disruptions in commerce and labour, and delays in harvests, all of which have threatened livelihoods and contributed to increased food insecurity.

1.2 Climate change in Bangladesh

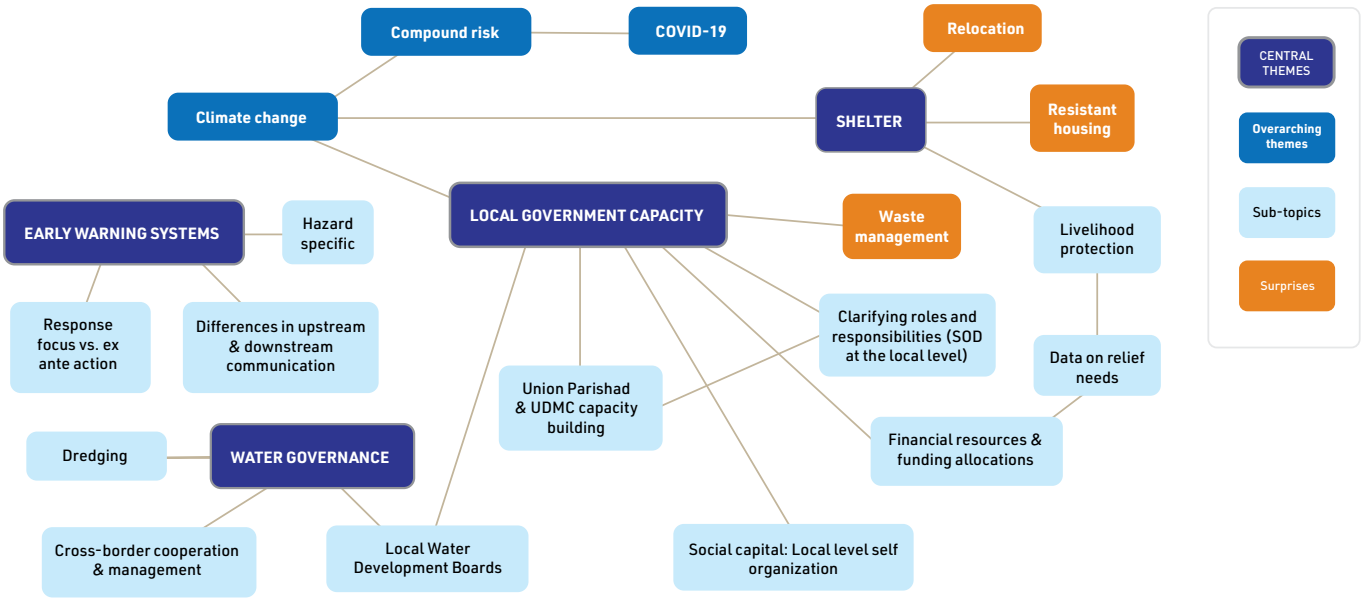
Global climate change projections indicate increasing flood risk due to more frequent cyclones, sea level rise, glacial melt, and more intense precipitation events (Zamudio and Parry, 2016). Bangladesh is already seeing the impacts of climate change with increases in mean annual air surface temperature and variations in rainfall (ibid.). Looking forward, models indicate the amount and severity of precipitation will most likely increase (ibid.). The monsoon season may also become wetter and more severe, and the season itself may last longer though it may become more variable. Taken together, these changes in rainfall will likely increase Bangladesh's exposure to floods.

Communities in Bangladesh and the Bangladesh Government are therefore at the forefront of the fight against climate change. However, how Bangladesh addresses the impacts of climate change needs to be informed by how past climate events, such as floods and cyclones, became disasters. In 2020, this became particularly critical as COVID-19 constrained the country's capacity to address climate and disaster risk and deepened people's vulnerability. Learning from the 2020 disasters – extreme monsoon floods, Cyclone Amphan, and the COVID-19 pandemic – can help to identify good practices for better managing disaster risk prior, during, and after future such events.

1 Waterlogged refers to when an area is filled with stagnant water. As water channels are blocked by debris, water can remain stagnant for a longer duration or take a longer time to recede. While waterlogging in rural and urban areas in Bangladesh is not a new problem, drainage problems during the rainy season and in low-lying areas have led to displacement, presenting humanitarian challenges in safe water supply, sanitation, shelter, food security, and employment opportunities.

FIGURE 2

Mind Map of topic areas discussed by interviewees



1.3 This study

This Post Event Review Capability (PERC) study was undertaken to learn from Cyclone Amphan and the 2020 monsoon floods in Bangladesh by examining what worked well, and what more needs to be done to prepare for the impacts of future extreme events and climate change. The study provides local and national policy makers, practitioners, and donors with lessons learned and tangible recommendations on how to practically improve resilience practice, spending, and policy, to address growing climate risk in Bangladesh with a specific focus on flooding.

The main themes of this study include:

- how early warning systems performed during flooding;
- the capacity of local government institutions, especially Union Parishad (UP) and Union Disaster Management Committees (UDMC) to manage disaster (flood) risk; and
- how COVID-19 impacted these systems, complicated hurricane and flood risk management and response, and illustrated both weaknesses and strengths in Bangladeshi disaster risk management.

The information for this study was collected via a series of key informant interviews and focus group discussions conducted with UP, UDMC representatives and members, community members, think tanks, and other government and non-government stakeholders between December 2020 and February 2021. Study findings build on Practical Action Bangladesh's work in four Unions in the Faridpur district as a part of the Zurich Flood Resilience Alliance's work.

2 WHY FLOODS RESULT IN DISASTERS

2.1 Floods and the implications of climate change

Bangladesh is a flood-prone country and highly vulnerable to climate change. The topography of the country is mostly low and flat. Two-thirds of the country is less than 5 m above sea level and, as a result, these areas are highly susceptible to river and rainwater flooding with lower-lying coastal areas exposed to tidal flooding during storms. Bangladesh is also the delta of the outflow of virtually the entire Himalayas. Approximately 75 per cent of the Ganges delta, the largest river delta in the world, is in Bangladesh. The country's geography and its exposure to seasonal monsoons create the ideal conditions for several types of regularly recurring floods – coastal, flash, riverine, and rain-fed – each of which affects different areas in its own distinct ways. Up to two-thirds of the country experiences some type of flood annually, with the coastlines also prone to storm surges and tidal flooding (MoEF, 2009).

Normal flooding provides several benefits to the agricultural industry in Bangladesh: sediment deposited by floodwaters fertilizes fields; flooding can reduce the need for irrigation systems, which can be time-consuming and costly to build; and floods remove salt deposited on fields from high rates of evaporation, thereby preventing the land from becoming infertile.

However, while small-scale annual flooding in Bangladesh is critical for agricultural livelihoods, larger floods cause significant devastation to communities, critical assets, and the economy. Historically, 25% of the country is at risk of normal flooding; 60% of the country is at risk of severe flooding (ibid.). Floods contribute to riverbank erosion and salinization of coastal lands, leading to the loss of agricultural lands and devastation of livelihoods of the most vulnerable.

Climate change in Bangladesh is expected to exacerbate both extreme floods and other hazards. According to the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report, there is 'evidence that the peak intensity of cyclones may increase by 5 per cent to 10 per cent and precipitation rates may increase by 20 per cent to 30%' (IPCC, 2001). The Fourth IPCC report projects that monsoon rainfall will increase, resulting in higher flows during the monsoon season in the rivers that flow into Bangladesh from India, Nepal, Bhutan, and China (IPCC, 2007). These flows

BOX 1. PREVIOUS EVENTS: FLOODING TIMELINE IN BANGLADESH

- **1988** extreme floods, made worse by the Bangladesh Cyclone
- **1998** heavy monsoon coupled with high tides contributed to the longest lasting flooding of the 20th century; 30 million people affected
- **2004** 50% of the country damaged by monsoon flooding and heavy rainfall
- **2007** heavy rainfall and a storm from the Bay of Bengal resulted in extensive flooding and landslides
- **2010** heavy monsoon flooding
- **2017** flash flooding
- **2020** Cyclone Amphan, extreme monsoon season, and extensive flooding coupled with the global pandemic

are likely to further increase in the medium term due to the melting of the Himalayan glaciers. The IPCC also projects that global warming will result in sea level rise of between 0.26 and 0.89 m by 2050 (USAID, 2015), which will increase coastal flooding and saline intrusion into aquifers and rivers across a wide belt in the south of the country. Cyclone-induced storm surges will be exacerbated by this sea level rise. Runoff[2] is projected to increase along with peak one-day rainfall intensity (which is a surrogate for an extreme storm event), yet droughts are also expected to intensify, especially in the drier northern and western parts of the country (MoEF, 2009).

2.2 Study location

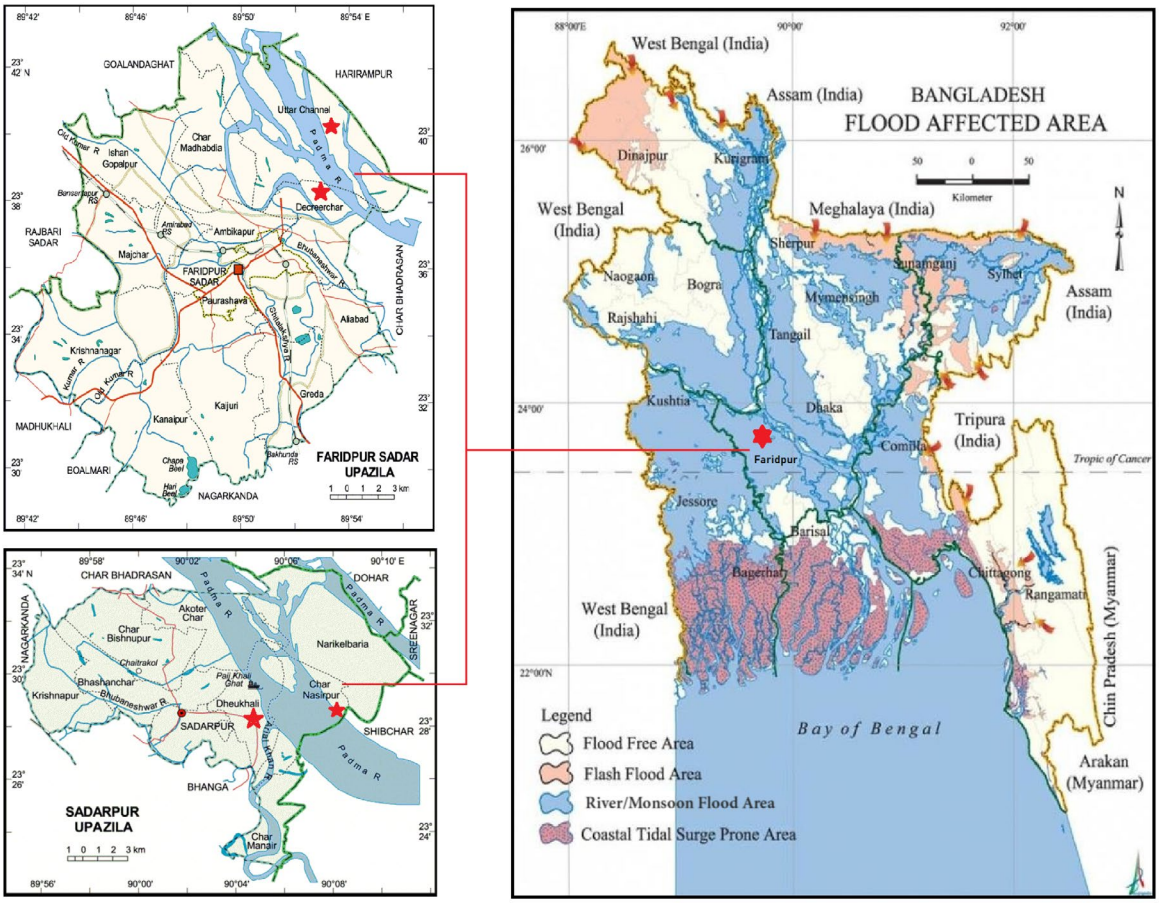
This study specifically focuses on flood risk and resilience in Faridpur District (Figure 3). Located in south-central Bangladesh, Faridpur district is surrounded by four main rivers – the Padma, Madhumati, Arial Khan, and Kumar. One of the major rivers of Bangladesh, the Padma River is formed at the junction of the Ganges and Jamuna Rivers in the Himalayas. It then merges with the Meghna River and ultimately empties into the Bay of Bengal. The average water discharge rate of the Padma River is 28,000 cubic meter/sec. The maximum discharge rate is approximately 75,000 cubic meter/sec (Habib et al., 2004). In the monsoon, the discharge rate of this river varies from 57,000 to 80,000 cubic meter/sec (Kapuria and Modak, 2019).

Thousands of people depend on the 120-km long Padma River for transportation and agriculture. However, with limited protection along banks and situated on a sand bed, the river is susceptible to severe erosion. Since 1967, the river has eroded over 66,000 hectares of land (Earth Observatory, n.d.). Faridpur's location along the western bank of the Padma River increases its exposure to both monsoon and riverine flooding and to river erosion.

2 Runoff is the 'precipitation, snow melt, or irrigation water that appears in uncontrolled (not regulated by a dam upstream) surface streams, rivers, drains or sewers' (USGS.gov).

FIGURE 3

Maps of Faridpur and our working area on flood resilience building



2.3 Disaster management in Bangladesh

Addressing disaster and climate change risk along the Padma River and more broadly in Bangladesh requires strong coordinated and integrated disaster and water governance systems and long-term investment. National to local governance of floods in Bangladesh, however, remains constrained by poor disaster risk management funding and capacity, lack of necessary data, and coordination challenges.

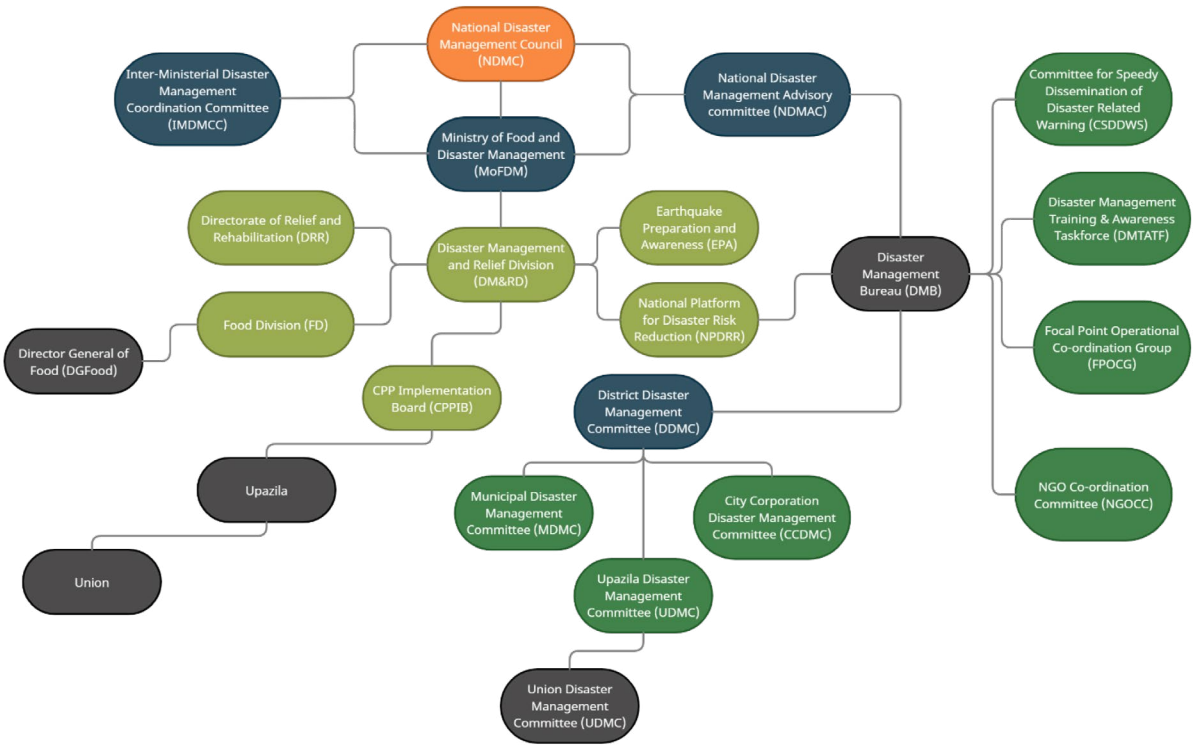
The disaster risk management (DRM) system in Bangladesh is predominantly response-focused. Figure 4 illustrates the sheer number of government agencies from the national to local levels involved in this sector. As a result, at both the policy and implementation level there is a massive coordination effort required to execute disaster mandates and plans.

Disaster governance structure

There are three main departments coordinating disaster response in Bangladesh at the national level:

FIGURE 4

Disaster governance structure in Bangladesh



(CSDDWS): Speedy Dissemination and Determination of Strategy of Special Weather Bulletin
(FPOCG): Focal Point Operational Co-ordination Group
(NGOCC): NGO Co-ordination Committee
(DMTATF): Disaster Management Training & Awareness Taskforce

1. The National Disaster Management Council (NDMC), the highest-level decision-making body, is responsible for strategic decisions for disaster management. Headed by the Prime Minister of Bangladesh, it includes ministers from 13 relevant ministries.
2. The Inter-Ministerial Disaster Management Coordination Committee (IMDMCC) is responsible for coordination across ministries.
3. The National Disaster Management Advisory Committee (NDMAC) is responsible for policy development and advice.

In 1997, Bangladesh became the first country within South Asia to develop Standing Orders on Disaster (SOD). As per the Standing Orders, each ministry, division, department, and agency will prepare its own detailed work plan to perform its responsibilities and functions as mentioned in the SOD, and will take necessary measures to implement it according to their own duty and capacity. The Ministry of Disaster Management and Relief (MoDMR), with the line agency, Department of Disaster Management (DDM), is responsible for coordinating national disaster management efforts across relevant ministries and agencies.

The following acts and policies enable those responsibilities and actions:

- National Plan for Disaster Management (2010; revised in 2016–2020);
- Standing Orders on Disaster (developed in 1997; revised in 2010 and 2019);
- Disaster Management Act (2012);
- Disaster Management Policy (2015);
- National Earthquake Contingency Plan; and
- other relevant documents published by the DDM and MoDMR.

At the sub-national level, to support disaster governance, two tiers are responsible:

- District Disaster Management Committee headed by the Deputy Commissioner;
- Upazila Disaster Management Committees headed by the Upazila Chairperson at the upazila level.

At the union level the Union Disaster Management Committee (UDMC), responsible for DRM at the community level, is headed by the Union Chairperson. While the UDMC's role is laid out in policies, a lack of capacity and time on the part of members limits their functionality. Consequently, activities such as risk assessments are not conducted and disaster risk management needs are not identified.

Despite these challenges, UDMCs do mobilize for response. Often, for example, committee members who have the capability to support the worst affected people in the community provide in-kind support as well as cash from their own pockets. In 2020 the UDMCs activated when the floods hit and worked on response throughout the crisis period.

Overall, however, in spite of policies that clearly outline roles and responsibilities at the national, sub-national, and local levels, actors are still constrained by the rigidity of the governance structure at the national level, and by limited capacity at the local level. The SOD, for example, helped to integrate Bangladesh's disaster risk

Concreate blocks used to prevent river erosion © Afsari Begum, Practical Action

BOX 2. CHARS IN BANGLADESH

The char lands as well as riverine islands are areas of new land formed through the continuous process of erosion and deposition in the major rivers and coastal areas throughout Bangladesh. These low-lying areas lack basic services such as water, sanitation, and health and education facilities; however, they are conducive to growing crops and animal husbandry and thus attractive to labourers who cannot find land or work elsewhere.

Char lands are highly unstable and prone to annual and seasonal flooding and to riverbank erosion. Annually, char areas are impacted by floods, leading to loss of life, homes, and land. As a result, as several char communities who work with Practical Action, reported, almost every household has migrated five to seven times during their lifetime.

The extreme and hazardous conditions of frequent and intensive flooding experienced by char lands and their residents are well known. Yet with limited livelihood alternatives, many residents are left without other viable options for survival. Their vulnerability is intensified by a lack of government support for dealing with the floods and riverine erosion in these areas.

management efforts; however, the government is still largely focused on response, and the top-down nature of Bangladesh's management structure limits efficiency. At the local level funding is often lacking, or when available is distributed via very top-down approaches that do not take into account the context of the communities. This limits the capacity of local-level DRM actors to prepare for and respond to floods.

Government investment

The local water and disaster governance system at large suffers from a lack of government investment, which constrains DRM and response. While this is recognized at the national level – the Honourable Prime Minister declared in a 2018 speech at parliament, for example, that creating funds for char islands is vital – little progress has been made on the issue. Due to limited funds, many local government authorities, non-governmental organizations (NGOs), and District Commissioners have resorted to raising their own funds to support disaster response and relief distribution.

Response efforts are further challenged by poor access to data on high-risk zones, on vulnerable communities and their needs, and on the different organizations (e.g. NGOs, civil society organizations) that conduct relief distribution. Consequently, some vulnerable groups are consistently left out of relief distribution efforts, and where aid is delivered, it is poorly coordinated between local government, NGOs, and local organizations, often leading to duplicate efforts.

River dredging is used to extract sand randomly in a community © Ashikul Islam, Practical Action

2.4 Flood risk arising from river management practices

Bangladesh flood risk is naturally high due to the country's geographic location; in many places this natural risk is being exacerbated by development. BWDB conducts feasibility studies and surveying before river dredging or construction of protection infrastructure, particularly on the major rivers. Activities by other departments, private entities, and the public, however, are not similarly managed. This can, and often does, result in uncoordinated development that changes river flow behavior and increases river erosion. Interviewees identified that the following river management practices in particular have unintentionally led to severe river erosion:

- unplanned and irregular river dredging, such as by sand mining companies that sell dredged material for construction;
- informal embankment construction and associated lack of maintenance, sometimes by community members themselves. These projects may stabilize the bank in one location but often lead to unintended consequences up or down-stream;
- maintenance and operation of sluice gates. Institutions such as BWDB, LGED (Local Government Engineering Department), BADC (Bangladesh agricultural Development Corporation) are responsible for the sluice gate operations and maintenance, but a lack of coordination among these institutions leads to poor maintenance and operation of the sluice gates, thereby intensifying flooding. Community members have a similar view on this.

Both dredging and protection infrastructure are valuable tools in river and flood management. Dredging can be used to increase the water holding capacity and/or depth of the river and create passageways for boats. Protection infrastructure can be used to harden specific sections of riverbank or protect specific assets. Both, however, can fail to provide the intended benefits and/or make nearby flooding (upstream, downstream and/or on the opposite bank) worse if they do not step back and look at the larger system in which the proposed dredging or protective infrastructure will operate. This larger system view is not consistently being applied in Bangladesh.

Communities report that current dredging as a flood mitigation measure is largely unplanned, inadequate, and uncoordinated, changing the river's flow and resulting in erosion. This includes dredging done by the government, for example, for maintaining river navigability; it also includes sand mining by private entities to extract sand for construction, extraction that is typically unregulated and untracked. These activities, by both government and private entities, change river flow behaviour, which in turn increases riverbank erosion, making the existence of those who live and work along the banks quite precarious.

River erosion also occurs in Faridpur because of the high degree of agricultural development and economic activity that occurs in and along the river. Some protection infrastructure exists, such as embankments and concrete blocks to protect critical locations where there is inadequate or no formal protection. However, even though the Bangladesh Water Development Board, which is responsible for surface water and groundwater management, monitors their functionality, and is supposed to do periodic maintenance and management, interviewees reported that this is not the case. Given these challenges and the infeasibility of constructing an embankment protection structure along the 120 km long, 4–8 km wide Padma River, softer solutions such as community led adaptation and timely access to early warning messages should be implemented.

2.5 COVID-19 impacts on flood vulnerability

Preparing for the floods in 2020 was complicated by the pressing and increasing socio-economic needs of affected populations and the critical demands of the COVID-19 response. Typically, local government institutions hold annual planning meetings to prepare for the upcoming flood season. However, in 2020 this kind of planning generally did not take place as local-level stakeholders were fully occupied with the COVID-19 response.

Despite prior experiences with floods, evacuation, and shelter, only limited use was made of the available knowledge on transmission of the virus. Though there was information on the actions and guidance needed to maintain safe public health practices and WASH in shelters, this was not as actively disseminated as it could have been. Physical access to primary health care was also limited during the pandemic, complicating access during the floods. And, had they had COVID safety information, many Bangladeshi would still have been unable to maintain COVID WASH precautions through the monsoon season because of how the monsoon floods severely compromised safe drinking water and safe hygiene practices. Out of the affected districts, seven districts ran out of safe drinking water, and 100,223 latrines and 92,860 tube-wells were damaged or destroyed.

Small group of children using a raft, this is a common means of transportation for people living in char communities © GMB Akash, Independent photographer

Approximately 93 per cent of sanitation facilities were disrupted (NAWG, 2020).

The pandemic added a further complication to flood response due to its impacts on livelihoods. The March–May 2020 shutdown left many labourers in cities and towns without work, and many of those chose to return to their home villages, increasing household size just before the cyclone and the onset of the monsoon. Communities reported that the compounding impacts of the pandemic and floods meant that primary income earners were pressed to provide for their families. Livelihood/ income-generating activities, the functioning of local markets, crops, livestock, and fisheries were severely impacted in many of the flood-affected areas, resulting in increased dependence on relief assistance and increased food insecurity.

2.6 Early warning

National-level forecasting systems exist for both cyclones and flooding in Bangladesh. At the local level, for floods, community members and local government institutions monitor the river erosion and pass the information to the sub-district and district levels, and to the BWDB. Then, depending on the situation, protective action is taken.

The Bangladesh Meteorological Department (BMD) and the Flood Forecasting and Warning Centre (FFWC) play a pivotal role in monitoring and communicating cyclone and flood risk. Specifically, the BMD issues the warnings, while disaster ministries lead the planning and pass early warning messages to the district level. The Cyclone Preparedness Programme (CPP), which works to spread cyclone early warnings to those living along the 710 km long coastal region of the country, is particularly strong and effective. The CPP disseminates official warnings from the BMD via a network of trained volunteers who spread the early warning messages via megaphones, hand sirens, whistles, and public addresses. Once the early warning messages are disseminated the CPP assists with sheltering and disaster recovery. They are also active in supporting the implementation of Bangladesh Red Crescent Society disaster preparedness strategies.[3]

The FFWC is responsible for river monitoring and early warning for river flooding. The FFWC provides long-, mid-, and short-term flood forecasting information to the Department of Disaster Management (DDM) and the Bangladesh Meteorological Department (BMD) according to the Standing Orders on Disaster (SOD). First priority for the FFWC is to improve the flood forecasting warning service and bring the warnings at the national level to the district administration. While the FFWC has a web portal to disseminate the warning to different levels, the portal does not necessarily ensure that the warnings will arrive in a timely manner - it is up to the local level authority to take responsibility to disperse the warning.

3 The early dissemination of these messages is key to providing community members with sufficient time to evacuate to safe houses or shelters before the cyclone makes landfall.

BOX 3. LOCAL GOVERNMENT EARLY WARNING MANDATES

Section 3.1.10 of the SOD 2019 for Speedy Dissemination of Special Weather Bulletin/Urgent Disaster Warning Message and Determining Strategy states there must be a committee whose responsibilities are:

1. Determine the ways, methods, and strategies for disaster-related message dissemination, and further improvement on forecasts and warnings for floods, flash floods, landslides, precipitation, thunderstorms, cold waves, etc.
2. Provide specific recommendations to take measures for timely dissemination of weather bulletins among the last mile users.
3. Develop effective approaches to increase public awareness of disaster-related issues including warning messages and make recommendations on related issues.
4. Determine ways to quickly disseminate weather messages and disaster warning signals among the communities at risk.
5. If needed, utilize the wireless signal system of the Armed Forces to establish alternative telecommunication, and also take assistance from the Police and the Rapid Action Battalion.
6. Perform any other necessary functions.

Contamination of drinking water supplies is a major risk during floods © GMB Akash, Independent photographer

As a result, critical messages often fail to arrive at the local level or only arrive in certain areas as the system does not exist in certain downstream communities. Critical information regarding the floods, for example, often does not reach those living on char islands, which are particularly at risk of flooding; communities living in coastal and riverside areas are often unable to receive early warning messages due to limited electricity and access to the internet. Also, people can recieve flood information via Interactive Voice Response (IVR) (dialing 1090-5, toll free) from anywhere inside Bangladesh. Although sometimes difficulties arise due to weak mobile coverage in areas.

Both the cyclone and flood early warning systems depend on accurate forecasting; however, forecasting is challenged by the coordination gap between India and Bangladesh. Critical discharge information associated with opening barrage gates tends to be received by Bangladesh late, if at all, and the information does not include peak flow timing, which is critical to aligning river flow with tidal forecasts and understanding flood potential. As a result, people in coastal and riverside areas experience sudden water flows/flash floods that they could otherwise better prepare for with timely early warnings. Additionally, there is Joint River Commission (JRC) in place which is a bilateral working group established by India and Bangladesh. The goal of the JRC is to oversee the sharing of water resources, irrigation, floods and cyclone control between the two countires. However, there is a coordination gap between India and Bangladesh and the data Bangladesh receives is insufficient. Therefore, there is a need to improve the coordination gap and also enhance the role of JRC.

Once early warning forecasts are available, they need to be communicated to their audience. Critical issues preventing communities from accessing much-needed early warning information include poor connections between the national and local levels, a lack of translation (to non-technical language) of forecasts, and poor coordination among local government institutions. The FFWC, the BMD, and the DDM are not well connected to local government institutions and communities. Early warnings that do reach the local levels are difficult to use as they are often prepared using technical terms like 'Water Level with respect to Danger Level' (Rahman, 2013). These warnings are not translated into usable, actionable formats for local government and communities, especially those in rural areas.

Local use of early warnings is further constrained by poor coordination between local government institutions, including UDMCs and local Water Development Boards. These two in particular do not coordinate with each other to share or act on early warning information, even though this is a mandated part of their roles and responsibilities. For a variety of reasons, including lack of manpower, local authorities tend to focus on using early warning information to inform relief plans and supplies rather than on passing these alerts to communities. Water Development Boards, though they closely monitor the water level of major rivers and operate sluice gates, do not communicate sluice gate operations to communities. Water management groups or associations operate the sluice gates and while they are well known, sluice gate operations need to be improved. While issues of sluice gates and embankments are high priority in national policy (i.e. the Delta Plan, the National Water Policy, Integrate Water Management etc.), in operation efforts need to be improved. These can be improved via coordination among ministries and institutions like BWDB, LGED (Local Government Engineering Department), BADC (Bangladesh agricultural Development Corporation). When communities do receive forecasts or warnings, they are best disseminated by microphone and speaker announcements and leaflet distributions. Some communities also report that religious leaders and mosques provided early warning information in 2020.

BOX 4. AN EXAMPLE OF AN EFFECTIVE END-TO-END EARLY WARNING SYSTEM CONNECTED TO LOCAL RESPONSE

In light of the gaps in the national-to-local flood early warning systems in Bangladesh, Practical Action is working in Faridpur to refine flood early warning system technology in cooperation with communities we work with as part of the Zurich Flood Resilience Alliance project.[4] Their goal is to create a better integrated planning and preparedness mechanism to support community resilience.

Their early warning system consists of four main components:

- digital board for early warning and weather information, established at the union digital centre;
- voice message through mobile phone;
- Krishi Call Centre for responding to technical queries;
- resilient agents (local-level volunteers).

Practical Action established a digital board for early warning and weather information at the union digital centre run by local entrepreneurs located at the Union Parishad premises. The local entrepreneur passes the early warning information to community members by phone and to centre visitors.

By locating the boards in accessible Local Union Information Service centres and providing visual forecasts (for people who cannot read), the digital boards are able to reach a wide local audience with up-to-date early warning messages and weather forecasts. Krishi Call Centre[5] provides support around technical inquiries related to forecasts and early warnings.

Concurrently, Practical Action developed a database of flood vulnerable communities, which can be accessed easily during an emergency to support dissemination of early warning. They also created a pool of 181 skilled local resilience agents, who are trained in livestock support, vaccinations, primary health, first aid support, and water level monitoring during the monsoon season. Resilience agents are trained to disseminate flood early warnings and provide community guidance on preparedness and response.

During an emergency, resilience agents receive flood information on their mobile phones and then pass this information on to their communities and to community group leaders, who then pass the messages on to their community groups. They also pass back information to Union Parishads about flood levels or breaches or splits in embankments. They further support the local government in relief distribution, beneficiary list preparation, informing communities about the support they can get during the crisis period, 'search and rescue' activities, etc.

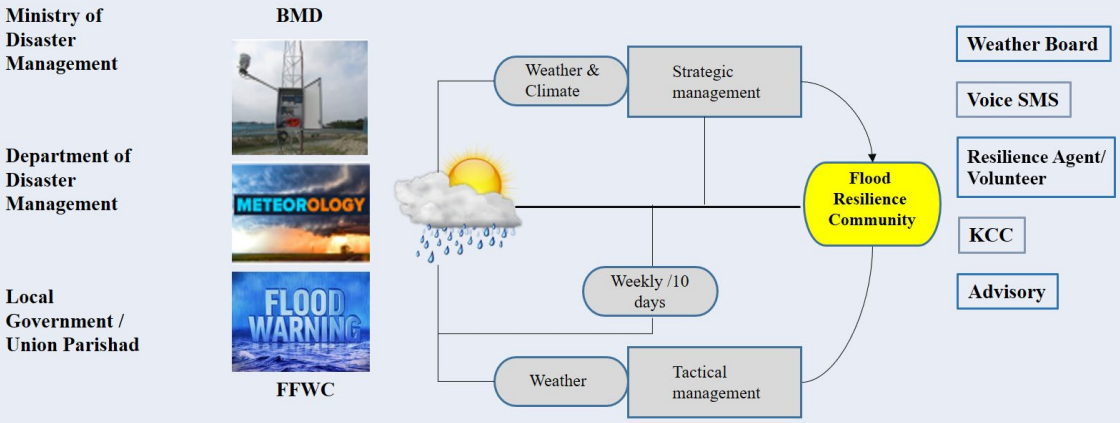
This end-to-end system, which can be easily adapted for different risks, proved very useful

4 See Begum et al. (2020) for more information.

5 Note: The Krishi Call Centre is a joint initiative of Practical Action and the Agricultural Information Service (AIS) under the Ministry of Agriculture. The objective of the centre is to provide faster access to information in relation to agriculture, livestock, fisheries, nutrition, and weather especially for poor farmers. Krishi is a Bangla word which means agriculture.

FIGURE 5

Early warning and weather forecast linked advisory service



during the COVID-19 pandemic in reaching vulnerable communities with important messages on coronavirus prevention and dealing with upcoming flooding. Voice messages were sent directly to the flood vulnerable communities, Union Parishads, UDMC members, and rÐesilience agents. Resilience agents were particularly instrumental for disseminating messages to communities, especially remote communities, on coronavirus prevention, social distancing, and on how they should plan for the flooding while also social distancing. Resilience agents were widely lauded by interviewees as an example of resilience and early warning best practice.

In the 2020 floods, Practical Action Bangladesh disseminated voice messages on COVID-19 prevention and flood early warnings to around 9,000 households within Faridpur District where they work. Furthermore, resilience agents worked hand-in-hand with local government to disseminate timely early warnings to communities, and provide other response functions such as: creating community awareness on COVID-19 prevention during floods, identifying households in need of relief, and providing households with relief information and medical support.

Overall, Practical Action's system for more efficiently transmitting flood warnings is a success. Communities, especially women, who aren't always able to access early messages, found the messages very effective and they reported that the messages helped them to better understand the severity of the flood and thus how to better prepare and respond. Women reported that after hearing the early warning messages, they coordinated with other households in their community, and with relatives living in nearby communities, to take the necessary precautions to prepare for the floods. The warnings also provided communities with adequate time to take preparedness actions such as relocating livestock and moving valuables and critical assets to safe places.

3 WHAT HAPPENED

Cyclone Amphan hit Bangladesh in the middle of the COVID-19 pandemic and was followed by a relentless flooding and cyclone season in 2020. The intense rainfall from the cyclone filled rivers to overflowing, breaking embankments, sending floodwaters into nearby communities, and waterlogging 0.2 million hectares of agricultural fields and fish farms (Reliefweb, 2021). As a result, when the monsoon season hit, rivers and land across Bangladesh were heavily saturated, limiting how quickly the rain from the monsoon could be absorbed.

From June to September 2020, there was widespread and recurrent flooding in Bangladesh; in some places, communities were hit five times by floods. Flooding continued for up to four months until the Brahmaputra, Ganges, and Meghna rivers started flowing below the danger level. High river flows and the prolonged nature of the flooding also intensified river erosion and weakened embankments; in some places, embankments were breached and/or collapsed with homes swept away as a result.

In some areas, water levels were 4 or 5 m deep, inundating crops and fields. Water levels were so high that even elevated homes and paddocks, constructed based on levels from previous floods, were inundated. Relocating the elderly, children, and those with disabilities during a flood is always challenging; in 2020, pandemic concerns made it even more difficult to move to a relative's house, and the flooding was so severe and widespread that almost everyone was in a similar situation. As a result many people, even those with past experience of extreme flooding, reported that they chose to stay in their homes to avoid shelters or because they felt it was the safest and best option.

According to the Needs Assessment Working Group report, the 2020 monsoon flooding affected 5.4 million people and 1,059,295 households were inundated (NAWG, 2020). The Ministry of Agriculture reported that US$42 m worth of crops, a total of 83,000 hectares of paddy fields, and 125,549 hectares of agricultural land were damaged across the country. Furthermore, the floods caused moderate to severe damage to livestock and fisheries. According to the Department of Livestock Services, the sector lost US$74.5 m worth of livestock including 16,537 hectares of grassland. And according to the Department of Public Health and Engineering, 92,860 tube-wells and 100,223 latrines were damaged across the country. In the immediate aftermath of the floods, and without any

Flood water in the yard of an affected community © Tapan Titum Karmokar, VERC

BOX 5. IMPACTS IN FARIDPUR DISTRICT

Communities in Faridpur experienced flooding three to four times between June and September. Five upazilas, 23 unions, and 308 communities faced the following impacts:

- **33,264 families** were affected by waterlogging;
- **149,607 people** were partially affected by floodwaters;
- **21,809 houses** were fully or partially damaged;
- **15,000 hectares of crops** were damaged, including paddy, vegetables, and jute, affecting 63,425 farmers.

better options, many of those affected had to resort to open defecation and drinking water from open sources.

These impacts affected a population already struggling because of COVID. Recent studies conducted by Mercy Corps, Concern Worldwide, and Practical Action with 15 UDMCs in areas where the Zurich Flood Resilience Alliance works revealed that 74 per cent of the population was unemployed in 2020 due to movement, pandemic-related restrictions, and workplace closures (Okura et al., 2020). Daily wage workers, such as rickshaw and transport drivers, masons, garment workers, small-scale traders, and farmers were especially impacted by lockdowns and because of damage to transportation systems from the floods. Additionally, many individuals who were working in Dhaka had returned to their homes following factory and workplace closures, increasing the number of people impacted by the flooding. Overall, this left many flood-impacted households unable to meet basic needs such as accessing food and drinking water.

BOX 6. DISPROPORTIONATE IMPACTS ON WOMEN

Women and girls are among the most vulnerable to the impacts of floods due to food insecurity, gender-based violence, and lack of access to essential services. Since March 2020, when lockdowns were put in place to limit the spread of COVID-19, there has been a marked increase in gender-based violence in Bangladesh. The flooding only made the situation worse: 80 per cent of those affected by floods are displaced and living in shelters or neighbours' and relatives' houses. However, due to limited space in shelters and facilities, many women are living on elevated roads and embankments.

Floods have also exacerbated the situation for those who had already lost their livelihood due to COVID-19. Lockdowns in Dhaka, for example, caused many garment factories to shut down, resulting in job loss for the (mostly) women who worked there. As incomes have disappeared or shrunk, many female-headed households are facing financial duress and food insecurity. And for many women and girls who rely on livelihood practices like poultry, livestock, vegetable cultivation, and tailoring, they have limited collateral to recover.

Health care is also a pressing concern. In the Joint Needs Assessment (NAWG, 2020), 11 per cent of the unions indicated that maternal health care is a priority. However, the pandemic and the floods have pushed the health care system to breaking point, putting the lives of pregnant women and infants at risk. Additionally, water and sanitation facilities were heavily damaged in flood-affected areas making women and adolescent girls vulnerable to bacterial infections like urinary tract infection and reproductive tract infection.

Source: Reliefweb, 2020b

3.1 Response

Early warnings

Communities across Bangladesh are accustomed to floods. However, in 2020, due to constraints and limitations of Bangladesh's early warning mechanisms, in particular around forecast translation and dissemination, communities were, for the most part, unaware of how the 2020 floods might be different from their previous flood experiences. As a result, people were unable to take the actions needed to protect themselves, their assets, and their livelihoods. However, where communities received adequate early warnings through, for example, voicemails left on their mobile phones or television broadcasts – such as in the eight communities that work with Practical Action – communities were able to take actions to protect themselves and their assets and to prepare for the floods.

Local government response

During the response, the national government (the Prime Minister's Office, the Ministry of Disaster Management and Relief, the Department of Disaster Management, etc.) prepositioned supplies based on forecasts and distributed relief via the UDMCs and

Building collapsed into the Padma River due to erosion of the riverbank © GMB Akash, Independent photographer

local governments – both cash grants via mobile banking and food items through an organized food distribution channel. The Prime Minister's Office was also involved with relief distribution and frequently held virtual meetings to receive situational updates with district administrations or concerned authorities.

At the local level, Union Parishads responded, albeit with limited capacity due to a lack of funding, staff, and other physical resources. And, though the UDMCs are typically constrained by limited funding, they were quite active during the 2020 floods, responding to instructions from the Prime Minister to respond to the crisis. The UDMCs worked closely with the Union Parishads to create lists of vulnerable people, provide relief, and disseminate COVID-19-related awareness messages around preventing mass gatherings, mask use, maintaining social distancing, etc. Local NGOs also participated in the response, distributing relief among those they work with; some social organizations and individuals also provided support to those affected.

In some communities, local NGOs worked with the local government to distribute WASH supplies and to set up health centres for those affected by the floods. In Faridpur, medical care was heavily compromised. The union health centre was inundated by the floods. The next level of care, at the upazila health complex, was difficult or impossible to access due to its greater distance and because flood waters cut off access to the upazila area for almost two months.

While interviewees reported that the relief provided was generally adequate, there were several limitations highlighted by desk research and interviews. Some interviewees reported that there were still unaddressed needs particularly

People were forced to take shelter in open spaces because shelter capacity was reduced to prevent the spread of COVID-19 © GMB Akash, Independent photographer

in more remote or inaccessible areas. Relief was harder to distribute to those communities due to the high water levels and because of a lack of data on vulnerable households (both who they are and where they were located). Women and the elderly were reported to have received less relief, as were those living in char and coastal areas. There were also inconsistencies in the distribution, with some receiving BDT2,500 (US$29) of cash support and others receiving no cash support. Though the Union Parishad does not have a database indicating who received the cash support, the perception among interviewees was that relief tended to go towards extremely poor or poor households. The result was, the middle class – who were heavily affected by job and income losses due to the pandemic and consequently had different needs from a more typical year – may have been inadvertently left out from receiving flood relief. Interviewees also highlighted that the relief management could have been more organized and systematic and could benefit from enhanced monitoring to ensure that adequate relief reaches the most vulnerable.

Relocation and shelter

At the local level, local authorities typically open temporary shelters in elevated schools, colleges, or community centres. In 2020, however, because of the focus on COVID and the lack of the typical pre-monsoon planning, there was no coordinated evacuation or set relocation facilities at the community or union level, nor temporary shelters organized by the government. The recurring nature of the flooding further complicated relocation and sheltering as there was very little time to recover between floods. And COVID complicated the challenge of safely moving people; officials reported immense challenges as volunteers were

afraid of contracting the disease, space in the shelters they were able to arrange was limited, and the need for shelter space was huge. In spite of the challenges, at the national level more than 12,000 shelters, including schools, were opened for the 2.4 million people evacuated during 2020 due to floods and the cyclone (Ober, 2020). Nonetheless, many communities in flood-prone areas were mostly left to their own devices as to when and how they sought shelter.

Where shelters did exist, there was often not enough space for everyone. In other cases, even when there were shelters, people chose not to relocate because they wanted to protect assets, maintain their distance from others due to COVID-19, or because they were concerned about safety. In Faridpur, for example, though schools were converted into temporary shelters, people preferred to remain at home for as long as they could so that they could protect their household valuables. Some families chose to take shelter at their relatives' homes or on elevated roads by erecting temporary shelters and latrines. Basic WASH facilities were otherwise unavailable. Others stayed on their boats, moving to land to cook, while the char communities changed their shelter several times as water levels changed.

The decision to avoid shelters came at a significant cost for many households. Community members, for example, were forced to sell valuable assets such as domestic cattle at a minimal price because they were unable to evacuate them to higher grounds due to limited space – in some cases, they were only able to receive one-tenth of the usual price.

3.2 Recovery

Bangladesh's national recovery plan (National Plan for Disaster Management 2016–2020), which is addressed in the 2019 Standing Orders on Disaster (SOD), details the actions needed to restore basic services and facilities for communities affected by disasters (see Box 7).

BOX 7. BANGLADESH'S NATIONAL RECOVERY PLAN

The Bangladesh National Plan for Disaster Management (2016–2020) and the SOD of 2019 together outline the actions needed to restore basic services and facilities for communities affected by disasters. Actions include:

- repairing damaged infrastructure to its prior condition and/or improving it;
- restoring the lives, livelihoods, and work environment of the affected areas by enhancing the organizational capacity of the affected people, including their mental, economic, and physical well-being;
- if necessary, relocating those affected while also providing them with livelihood options;
- tending to cattle, fisheries, etc. and if needed, supporting the restoration of farms;
- organizing debris removal and taking steps for access to safe drinking water for people and animals and to avoid contamination/pollution/toxicity in the affected area.

Source: Reliefweb, 2020b

However, while these roles and responsibilities are outlined in the SOD of 2019, in practice, formal recovery mechanisms are weak and insufficient. The government provides some relief and rehabilitation measures in affected areas, but the adequacy and coverage of relief is insufficient to address the need. As a result, community members who are returning to their homes and fields to rebuild and replant are doing so without the resources they need to build their resilience to future floods.

In the immediate aftermath of the floods, relief supplies from the national government are passed through to local government agencies for distribution. Relief typically includes agricultural inputs, cash support, and food and WASH items. Non-government institutions provide similar relief in coordination with the government but through their own distribution channels, and so have a slightly different reach. This support is continuing due to the ongoing impacts of the pandemic, but is not enough to address the needs of those affected nor to help them to build their resilience. Further, the relief that does exist is mostly based on the level of poverty; however, as noted above, the floods and the pandemic affected people across the economic spectrum.

Housing

After the floods, most survivors had to rebuild using their own means as there was limited government support. Some NGOs filled this gap by providing support to raise plinths and repair homes. For the most part, homes are constructed of mud brick, wood, and straw, which collapses when saturated. Where corrugated sheeting is used for walls and roofs, it is less prone to damage and can typically be recovered and moved if needed. Concrete and brick, which are more expensive and less typical, are resistant but unmovable. The plinths themselves, upon which homes are constructed, consist of mud or concrete, which provide different levels of resilience and security.

Community members who lost their homes completely or were unable to rebuild because of river erosion were, at least initially, left on their own to relocate. However, finding land that was unaffected by the floods is a challenge, forcing families to live on boats, only accessing higher grounds to cook before going back to their boats to eat and sleep. For those who were able to find unaffected land, the national government later provided them with limited support to construct new homes.

For the communities in the area where Practical Action works, specifically those situated on char islands and along river embankments, almost every household has relocated five to seven times.

BOX 8. FLOOD RESISTANT HOMES

Additional measures for rebuilding more flood resistant homes include constructing on raised land so that flood water cannot reach the plinth, building the house on a raised plinth made from sand, clay, and cement (so that it will be less likely to be washed away in floods), and/or made using concrete pillars and treated bamboo poles. These construction materials and design would ideally make the home strong and high enough to last through repeated floods, unlike the traditional earthen floors that simply wash away.

Flood affected community in Faridpur © Tapan Titum Karmokar, VERC

However, because moving to higher ground can be costly, many of these households remain on flood-prone land.

Livelihoods

During any crisis (e.g. natural or other events), microfinance institutions (MFIs) offer borrowers a margin of flexibility to deal with predicaments in the form of loan repayment flexibility or access to emergency loans. The COVID-19 pandemic has exposed the degree to which microfinance programmes have reshaped the rural economy and how desperately the rural people need financial services to sustain their livelihoods. Unfortunately, when the floods hit, many MFIs stopped disbursing loans to the flood victims as they were utilizing the loans to address pressing daily needs and could not repay them on time. Though there is provision to borrow from commercial banks, the procedure is somewhat complex and thus not a realistic option for rural people. As a result, faced with limited income sources and critical needs such as food and pressing health concerns, many turned to high interest loans from money lenders. Many have used the loans to rebuild their homes, to prepare their farm for cultivation, to plinth raise their homes, to purchase livestock, to reconstruct poultry sheds, and to rebuild latrines and tube-wells.

4 LESSONS LEARNED AND RECOMMENDATIONS

Union Parishads need greater funding and capacity building to be fully functional and active

Recommendations:

1. Close the financing gap to give Union Parishads the capacity to support community preparedness/resilience building. Allocation should be need-based. One option for doing this is for Union Parishads to collect a small amount of money annually from the community.
2. Linkages between the Union Parishads and the UDMCs should be strengthened by allocating funds from the Union Parishads specifically to the UDMC. This will enable Union Parishads to provide UDMCs with trainings to close local capacity gaps and to support disaster governance such as preparing annual budgets and conducting community risk assessments.
3. Leverage existing climate funds and channel them to the Union Parishad budget according to community need.

The PERC study team discussing the experience of floods with community members as part of the PERC process © Afsari Begum, Practical Action

Woman and child walking through water in their flooded communities. Children and women are often the hardest hit by floods © GMB Akash, Independent photographer

Flood early warnings need to reach the 'last mile' with adequate lead time

The country's flood early warning system needs substantial improvements. Early warning information should not only be used for planning and managing relief but also to support communities to better prepare. This means ensuring that messages are passed on by local institutions and stakeholders to the most remote of communities, that the messages are received, and that communities understand the message and know what actions to take.

Recommendations:

1. Explore ways to address the gap in knowledge caused by insufficient communication regarding upstream river operations. One way to do so is to strengthen the role of the Joint River Commission.
2. Develop an expert pool at the national, district, sub-district, and local level to support the generation of accurate and actionable advisories based on the forecast.
3. Develop diverse channels to disseminate early warning messages (i.e. via youth volunteers, community leaders, the UDMC, Union Parishads, etc.).
4. Develop communications linkages, such as phone chains, between upstream and downstream communities to add detail to forecasts.
5. Flood related hydrometeorological and morphological data sharing need to be strengthened between Bangladesh and upstream countries.
6. Early warning systems should be linked with livelihoods of vulnerable people so that they can protect their assets including their homes, valuables, and crops.

Improve coordination and collaboration between communities, local government, and institutions to improve understanding of community needs

UDMCs are a mandated part of local government. However, currently the UDMCs are volunteer-based and, in many places, not active due to a lack of funding, staff, and adequate capacity. As a result, critical activities are not being implemented, such as risk assessments that can identify where funds should be invested and the development of databases on vulnerable populations that can aid in emergency warning delivery and post-event outreach and aid distribution. UDMCs do not meet regularly and are usually dominated by members external to the communities, making it difficult to provide services based on understanding of communities and marginalized groups. If the UDMCs are to successfully deliver their mandate, they need to be enabled via government funding mechanisms, technical support, and incentives that promote inclusion and greater representation.

Recommendations:

1. Provide dedicated funding for the UDMCs so that they can perform their mandated activities as specified in the SOD.
2. Establish a national level plan to build the capacity of the UDMCs and other local institutions.
3. Develop a monitoring system to track whether UDMCs are meeting their mandated functions.
4. Restructure the UDMCs to incorporate more members of the community and to ensure that the needs of marginalized groups are heard. Critically, UDMCs need more female members to ensure that gender-specific needs are accounted for.

Improve multi-hazard preparedness

2020 illustrated the need to prepare for multiple hazards. The impacts of the pandemic, Cyclone Amphan, and the monsoon floods on Bangladesh as a whole, and on their most vulnerable populations, as well as the current and future impacts of climate change, highlight a need for communities and disaster management institutions to improve their multi-hazard preparedness.

Recommendations:

1. Develop an updated database of the vulnerable communities in the Union Parishads so they can provide the most vulnerable with relief and ensure they receive the necessary early warning messages.
2. Develop a cohort of skilled community volunteers who can work closely with local institutions to help communities to prepare for, recover from, and build their resilience to disasters.
3. Develop and promote mobile-based apps so that all the stakeholders, including the most vulnerable, can access critical information such as early warnings, alerts, preparedness and response advice, and service directories on one platform.
4. Recognize that disaster management plans at all levels need detail on how to deal with multiple simultaneous emergencies and begin addressing this in plan updates.

Young children transporting water on a raft. Access to safe water during floods is a serious problem in many communities © GMB Akash, Independent photographer

Emergency response actors can do more to reduce disruption and the recovery timeframe

Communities across Bangladesh are faced with recurrent flooding. However, many people cannot afford to relocate to higher grounds. Recognizing this, sheltering options need to be strengthened, communities supported to develop preparedness strategies to reduce household damages and losses, and better systems established for recovery. During floods sheltering options are often not adequate and many women report feeling that they are not safe or comfortable. Households lose assets because they lack the tools and information they need to adequately prepare. And in the recovery, people and communities are faced with having to rebuild, but without financial resources so they are unable to do so in a way that will build their resilience to the next flood. This applies to homes, schools, and WASH facilities alike.

Recommendations:

1. Strengthen the UDMC so it can support communities in developing preparedness and recovery plans. If feasible, develop reconstruction and relocation plans that include livelihood options. If relocation is not possible, funds should be allocated post-disaster to communities, channelled via UDMCs, to ensure people are rebuilding resiliently.
2. Improve mechanisms for accessing low-interest financing.
3. Allocate part of the local government annual budget to needs-based resilience and pre-event planning.
4. In every vulnerable community there should be adequate shelter to accommodate community residents with the necessary facilities, while ensuring safety, such as separate toilets for different genders, water and sanitation, hygiene kits, and space to keep livestock.

River management needs to be better coordinated between government departments and institutions

The Faridpur landscape is largely a modified landscape with a high degree of agricultural development along its banks. The riverbanks of this region are always at risk of river erosion, placing livelihoods at increased flood risk. This risk is being intensified by river management, which is often conducted in silos with different institutions managing the protection and development of the rivers (i.e. hydrology, flood protection infrastructure, dredging, transportation, navigation, etc.). Dredging in particular is an issue; it contributes to river erosion, it is largely insufficient for flood management, and there is no coordination between stakeholders dredging for construction versus flood management versus navigation. To protect livelihoods, river management and coordination need to be improved.

Recommendations:

1. Strengthen collaboration between relevant ministries, departments, and stakeholders through the creation of river basin management committees. Discussion and consultation should happen among key institutions before planning or designing river projects.
2. Conduct studies to identify appropriate and inappropriate areas for sand mining, coupled with strengthening the dredging management system.
3. Develop active, vocal, and functional committees who can raise and address river-related issues.
4. Maintain, repair, and protect embankments on a regular basis in coordination with local institutions.
5. Consider indigenous technologies, such as planting of species that help in binding the soil to prevent river erosion and protect the river.

Farmers moving their cattle to a safe place on higher ground © Ashik Islam, Practical Action

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This report presents a snapshot of what happened during the 2020 floods in Bangladesh. While the goal of the PERC is to present a birds-eye view of an event, there is more that could be studied and written about the floods and resilience in Bangladesh. This report provides review of the systems and actions that helped to reduce damages, while also delving into the factors that constrained people and systems' resilience. It also highlights lessons learned and points towards opportunities for increasing resilience to future hazards.

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