Practical ACTION

WORKING PAPER
August 2021

Assessing and addressing CLIMATE-INDUCED LOSS AND DAMAGE IN BANGLADESH

Background

This working paper is based on a study carried out to improve understanding of, and identify actions to address, climate change–induced loss and damage in Bangladesh. As climate change impacts increase in intensity and frequency, vulnerable countries are incurring accelerating loss and damage. For countries like Bangladesh, developing policies, plans, and strategies to avert and minimize loss and damage to the extent possible and to address loss and damage that cannot be avoided has never been more critical. In this paper we provide policy recommendations for supporting efforts to minimize (or avoid) and address loss and damage from floods at the national level in Bangladesh. This includes scaling up action at the local level and facilitating coordination across line ministries undertaking work relevant to minimizing and addressing climate-related loss and damage. We also highlight implications for efforts to avert, minimize, and address loss and damage under the United Nations Framework Convention on Climate Change and its Paris Agreement.

To cite this paper: Practical Action (2021) *Assessing and addressing climate-induced loss and damage in Bangladesh*, Practical Action, Rugby.

About Practical Action

We are an international development organization putting ingenious ideas to work so people in poverty can change their world.

We help people find solutions to some of the world's toughest problems. Challenges made worse by catastrophic climate change and persistent gender inequality. We work with communities to develop ingenious, lasting, and locally owned solutions for agriculture, water and waste management, climate resilience, and clean energy. And we share what works with others, so answers that start small can grow big.

We're a global change-making group. The group consists of a UK registered charity with community projects in Africa, Asia, and Latin America, an independent development publishing company, and a technical consulting service. We combine these specialisms to multiply our impact and help shape a world that works better for everyone.

In Bangladesh, Practical Action works in areas of Climate and Resilience, Farming that Works, and Energy that Transforms.

Practical Action is a member of the Zurich Flood Resilience Alliance, a multi-sectoral partnership focusing on finding practical ways to support communities in developed and developing countries strengthen their resilience to flood risk. Members of the Zurich Flood Resilience Alliance are funded by the Z Zurich Foundation, with the exception of Zurich Insurance Group. However, the views expressed in this publication do not necessarily reflect the official position of either the Foundation or the company.

CONTENTS

1 Introduction

As climate change impacts increase in intensity and frequency, vulnerable developing countries are incurring accelerating loss and damage due to increasing frequency and intensity of extreme weather events and slow onset climatic processes. For countries like Bangladesh, developing policies, plans, and strategies to avert and minimize loss and damage to the extent possible and to address loss and damage that cannot be avoided has never been more critical. The scoping study[1] on which this summary is based had several objectives, including to explore response mechanisms in place to support households faced with loss and damage from a climate-induced extreme weather event or slow-onset climatic process; develop an understanding of plans for a national mechanism for loss and damage in Bangladesh; and identify the potential role and limitations of insurance as a tool to address loss and damage in flood-prone communities in Bangladesh.

This summary builds on the scoping study, with two primary objectives. The first is to provide policy recommendations for supporting efforts to minimize (or avoid) and address loss and damage from floods at the national level in Bangladesh. This includes scaling up action at the local level and facilitating coordination across line ministries undertaking work relevant to minimizing and addressing climate-related loss and damage. The second objective is to highlight implications for efforts to avert, minimize, and address loss and damage under the United Nations Framework Convention on Climate Change (UNFCCC) and its Paris Agreement. This includes the provision of finance and the delivery of technical assistance, including through the Santiago Network on averting, minimizing, and addressing loss and damage from the adverse effects of climate change (SNLD). The scoping study was informed by a review of relevant policy and academic literature as well as focus group discussions and key informant interviews with local and national stakeholders engaged in loss and damage.

Loss and Damage[2] has emerged as a significant focus of discussions under the UNFCCC in recent years. This section provides a definition of loss and damage and an overview of how it is addressed under the UNFCCC. It also provides background on the key climate-related hazards Bangladesh is exposed to, setting the context for this study.

What is loss and damage?

There is no universally agreed definition of loss and damage in the context of climate change which is used in discussions under the UNFCCC. In the literature, loss and damage has been defined as the impacts of climate change which are not avoided by mitigation or adaptation (see Verheyen, 2012; Mace and Verheyen, 2016; Roberts and Pelling, 2018). Verheyen (2012) describes three categories of loss and damage: avoided, unavoided, and unavoidable. This framing stresses the role of mitigation and adaptation – among other measures – which can be used to avoid (or avert) and reduce (or minimize) loss and damage before it occurs.

Loss and damage can be direct, as in damage to crops, which has implications in the form of indirect loss and damage such as the loss of income resulting from the reduced yields. Loss and

damage has both economic dimensions which can be quantified in monetary terms and non-economic dimensions which cannot (see Morissey and Oliver-Smith, 2013; Serdeczny et al., 2016). Non-economic loss and damage (NELD) includes the loss of lives, culture, community, and biodiversity, and the psychological and mental impacts of climate change – among others. As articulated above, the Intergovernmental Panel on Climate Change (IPCC) distinguishes between *Loss and Damage*, the policy agenda focused on reducing and addressing loss and damage, and *loss and damage*, the manifestation of the impacts of climate change (IPCC, 2018).

Loss and Damage also highlights the limits of adaptation, which can be 'soft', whereby an adaptation measure might exist but might not be available, or 'hard', whereby adaptation measures do not yet exist (IPCC, 2018). While we talk of the 'limits to adaptation' as if they are a known entity, they are influenced by a number of factors and can expand and shrink depending on which (and whose) values are influencing decision making (see Dow et al., 2013a, 2013b; Preston et al., 2013).

How is loss and damage addressed under the global climate regime?

Under the UNFCCC, the Warsaw International Mechanism for Loss and Damage Associated with Climate Change Impacts (WIM) is the oversight body on Loss and Damage. The mandate of the WIM – which was established at the 19th Conference of the Parties (COP) in late 2013 – is to promote approaches to address loss and damage in vulnerable developing countries (UNFCCC, 2014). The WIM has three functions:

- enhancing knowledge and understanding of comprehensive risk management (CRM) approaches to address loss and damage;
- strengthening dialogue, coordination, coherence, and synergies among relevant stakeholders;
- enhancing action and support, including finance, technology, and capacity building, to address loss and damage including through:
    - providing technical support and guidance on approaches to address loss and damage;
    - providing information and recommendations for consideration by the COP when providing guidance relevant to reducing the risk of loss and damage and, where necessary, addressing loss and damage, including to the operating entities of the financial mechanism of the UNFCCC;
    - facilitating the mobilization and securing of expertise, and enhancement of support, including finance, technology, and capacity building, to strengthen existing approaches and, where necessary, facilitate the development and implementation of additional approaches to address loss and damage – from both extreme weather events and slow onset climatic processes (UNFCCC, 2014).

The WIM is guided by an Executive Committee (ExCom), with 10 members from developed countries and 10 members from developing countries. The work of the ExCom is supported by several working groups – including on NELD, CRM, and action and support – which include

both ExCom members and external experts. The work of the ExCom is guided by a five-year rolling workplan, which includes five strategic workstreams:

- enhanced cooperation and facilitation in relation to slow onset climatic processes;
- enhanced cooperation and facilitation in relation to non-economic losses;
- CRM approaches to address and build long-term resilience of countries, vulnerable populations, and communities to loss and damage;
- enhanced cooperation and facilitation in relation to human mobility, including migration, displacement, and planned relocation;
- enhanced cooperation and facilitation in relation to action and support, including finance, technology, and capacity building, to address climate-related loss and damage.

In 2015, at COP 21, Loss and Damage was included as a distinct article in the Paris Agreement, separate from adaptation (UNFCCC, 2016). The Paris Agreement recognizes the importance of averting, minimizing, and addressing loss and damage – bringing all the policy agendas under the UNFCCC (mitigation, adaptation, and Loss and Damage) together. As such, Loss and Damage stresses the importance of increasing mitigation ambition, scaling up adaptation finance, and ensuring vulnerable developing countries have the support they need to address the residual impacts of climate change not avoided by those efforts, or loss and damage.

In 2019 the WIM was reviewed for the second time since it was established,[3] with the final outcome culminating from discussions at COP 25. The review had several important outcomes, most notably the establishment of the SNLD to catalyse the technical assistance of relevant organizations, bodies, networks, and experts for the implementation of approaches at the local, national, and regional level in particularly vulnerable developing countries (UNFCCC, 2020). The outcome of the review also included recognition of the need to scale up and mobilize support for averting, minimizing, and addressing loss and damage in developing countries particularly vulnerable to the impacts of climate change (ibid.).

Finance (or the lack thereof) for addressing loss and damage in vulnerable developing countries remains a critical issue in the Loss and Damage discussions. Another issue within the negotiations has been the diversion of focus on addressing loss and damage with the inclusion of averting and minimizing loss and damage in discussions on loss and damage since COP 21. It is important to note that averting and minimizing is outside the mandate of the WIM and the role of the UNFCCC in promoting approaches to address loss and damage from the adverse effects of climate change (see UNFCCC, 2013, 2014). In recent years, there has been increasing focus on facilitating concrete action on the ground regardless of the politics of the negotiations. Vulnerable developing countries are already implementing measures to address loss and damage but most of these activities to avoid and address loss and damage are borne by households or financed by domestic budgets (see Eskander and Steele, 2019). Support to scale up these efforts is critical in light of the increasing magnitude and frequency of climate-related hazards and the economic consequences of the COVID-19 pandemic worldwide.

What is the reality of climate change impacts in Bangladesh?

Bangladesh is one of the most densely populated countries in the world (Zamudio and Parry, 2016), made up of a complex patchwork of different agro-ecological zones (see Figure 1). With approximately 1,200 people per square kilometre, Bangladesh is home to nearly 166 million people.[4] Much of Bangladesh is a delta or floodplain, with most of its territory less than 10 metres above sea level (Zamudio and Parry, 2016). Over 200 rivers, including three major river systems – the Brahmaputra, the Ganges/Padma, and the Meghna – and their tributaries, travel through Bangladesh from the Himalayas to the Bay of Bengal, altering the landscape as their paths change (Lewis, 2011). Bangladesh has a tropical monsoon-like climate which is marked by hot and humid weather from March to June, cooler temperatures with monsoon rains from June to September, and a typically drier winter from October to March (MoEF, 2012; Zamudio and Parry, 2016). Agriculture remains a key sector of the economy, employing 40 per cent of the labour force and contributing 14 per cent to GDP (Bangladesh Bureau of Statistics, 2019). This reliance on agriculture, together with the exposure to climate-related hazards, makes Bangladesh's economy highly vulnerable to climate change impacts.

According to the 2021 Climate Risk Index, from 2000 to 2020, Bangladesh was the seventh most affected country in terms of loss and damage from extreme weather events (Eckstein et al., 2021). Economic losses incurred during this period from 185 extreme weather events were estimated to total nearly US$1.9 bn (Eckstein et al., 2021). The climate-related risks which are of concern for Bangladesh include:

- greater inter-annual rainfall variability which leads to more extreme rainfall events and greater exposure to floods;
- earlier onset and later retreat of the Indian summer monsoon;
- continued glacier retreat;
- rising sea levels and associated increase in the frequency of storm surges, intensity of cyclones, and the rate of salinity intrusion;
- higher mean annual temperatures;
- increases in the occurrence of drought in the north-west and south-west regions (Zamudio and Parry, 2016).

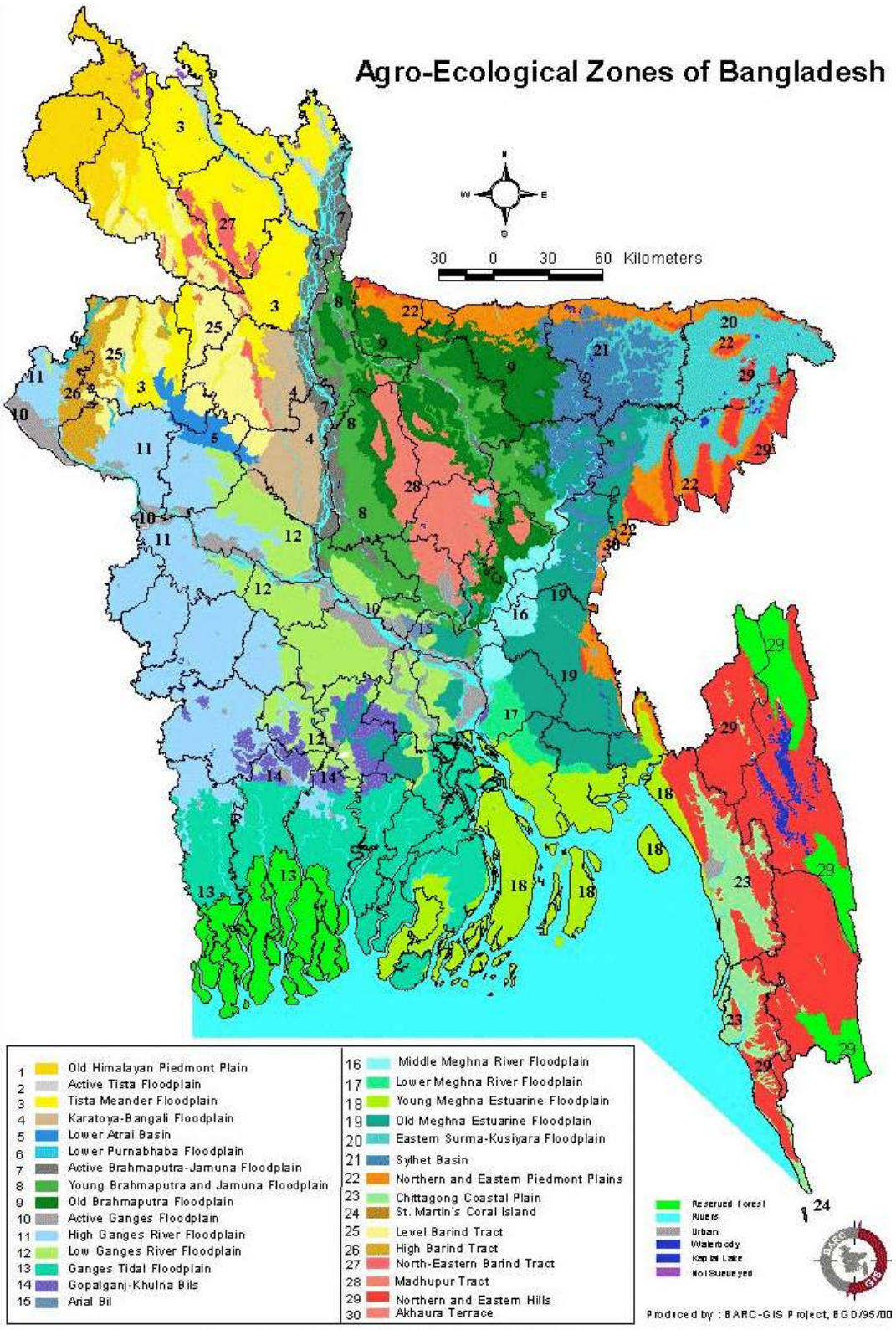

Figure 1 Map of agro-ecological zones in Bangladesh

Source: from BUET, 2008

Flooding is the most widespread climate-related hazard facing Bangladesh. Four types of floods are experienced in Bangladesh: coastal, flash, riverine, and rain-fed floods. On average riverine floods affect nearly 20 per cent of the country, increasing to 37 per cent (10 year), 43 per cent (20 year), 52 per cent (50 year), and up to 68 per cent (100 year) in extreme years (Department of Disaster Management, 2014). 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).

Eighty per cent of Bangladesh is a floodplain, between 20 and 25 per cent of which is flooded annually in a typical year (Zamudio and Parry, 2016). In recent years flooding has increased in both magnitude and frequency; a trend which is likely to continue. The IPCC reports that mean annual precipitation will increase by 3 per cent by 2035 and 8 per cent by 2065 (Christensen et al., 2013). Greater variability and an increase in the incidence of extreme rainfall events is also expected, particularly at high emission trajectory scenarios (ibid.). Increased precipitation during the monsoon season will increase the volume of water in the three main river systems, which may lead to increased flooding (Zamudio and Parry, 2016). In its last assessment report, the IPCC reported with a medium level of confidence that the frequency of cyclones will increase in South Asia (Christensen et al., 2013). Research has also found that those tropical cyclones that make landfall in the region are expected to bring more extreme rainfall (ODI and CDKN, 2014).

While this summary focuses on how Bangladesh is experiencing and addressing loss and damage from flooding, it is important to acknowledge that Bangladesh is experiencing loss and damage from a spectrum of other climate-related hazards. Historically between three and seven cyclones hit the coastline of Bangladesh each decade (MoEF, 2012). In recent years cyclones are making landfall more frequently. In 2007 Cyclone Sidr caused an estimated economic damage of $2.3 bn and left nearly 4,000 people dead (Eskander and Steele, 2019). Two years later, Cyclone Aila hit coastal Bangladesh, caused nearly $270 m in economic damage, and left 190 people dead (UNOCHA, 2009). While some support is available for those who incur loss and damage, the costs of loss and damage are largely being borne by households. The national budget allocated to managing climate and disaster risks in 2018/19 was estimated at $2.25 bn (Eskander and Steele, 2019). While this allocation has increased, it still does not come close to meeting the scope of the needs, particularly in years with severe flooding or cyclone events.

Bangladesh is also experiencing (and poised to experience more) loss and damage from slow onset climatic processes[5] such as sea level rise and salinization. It is important to note that salinization has other drivers which include upstream water use in neighbouring India, and as such is a politically sensitive issue (see Mirza, 1998). Parts of north-west Bangladesh also experience frequent drought which has significant implications, particularly for agriculture and agriculture-based livelihoods in the region (Zamudio and Parry, 2016).

Loss and damage in Bangladesh (as in all countries) does not affect everyone equally. Inequality and marginality influence which people and communities are most exposed to and vulnerable to the impacts of climate change. In Bangladesh, gender inequality resulting from patriarchal norms renders women and girls more vulnerable to the impacts of climate change than men and

boys. The increased vulnerability of women and girls manifests in reduced mobility, limited access to resources and ownership of land and other assets, and gender-differentiated roles, both within households and in society at large (Tanny et al., 2017). Recent research has found that women are less likely to evacuate to emergency shelters when extreme weather events hit as they are less likely to know how to swim, tend to wear clothing that makes it difficult to move, and are often carrying children (Ayeb-Karlsson, 2020). A fear of physical and sexual violence also makes women less likely to evacuate to emergency shelters (ibid.). In 2013 the Ministry of Environment and Forest developed the Bangladesh Climate Change and Gender Action Plan (MoEF, 2013) which recognizes that while climate change impacts are gendered, women have a key role to play in efforts to address climate change in Bangladesh (MoEF, 2013). That said, women are not a homogeneous group, and other factors, like socio-economic status, also play a role in determining exposure and vulnerability to climate-related hazards.

Bangladesh is currently categorized as a least developed country (LDC) but has met the conditions to graduate from this category. In February 2021 it was given until 2026 to make the transition to developing country status (Parvez, 2021). The Government of Bangladesh has also articulated the goal of completely eliminating poverty and achieving upper middle income status by 2030 (GED, 2020). Over the past few decades Bangladesh has been successful at decreasing poverty but, as of 2018, 21.8 per cent of the population still lives below the national poverty line (ADB, 2018). Climate change impacts have the potential to impede economic development and poverty reduction efforts. With that in mind, the Government of Bangladesh is currently developing the Mujib Climate Prosperity Plan, which is a strategic investment framework to mobilize finance, including through international cooperation, for implementing both renewable energy and climate resilience initiatives (MoEFCC, 2020).

2 How is loss and damage experienced at the local level?

Sub-nationally, administrative structures in Bangladesh are devolved to the local level through eight divisions, each of which is divided into districts within which are several Upazilas which are divided into Union Parishads (UPs). The scoping study which informs this summary is based on research (conducted virtually due to the COVID-19 pandemic) in three climate-affected areas: Faridpur district, Satkhira district, and Munshiganj, a region in southern Satkhira. Focus group discussions involved members of disaster-affected communities, local government representatives, women leaders, community volunteers, and representatives of local civil society organizations (CSOs). The sections below summarize the findings of this research.

Faridpur: Loss and damage in a flood- and drought-prone district

Faridpur is a district in southern Bangladesh exposed to floods, seasonal drought, storm surges, and cyclones. Discussants reported that the impacts of floods and drought are the most severe. The intensity of flooding has increased within the last 10 years, with the floods of 2020 bringing the most devastating impacts within that period. This has resulted in increasing loss and damage, in particular in the loss of crops and damage to infrastructure – including housing. The direct impacts of flooding include the inundation of standing crops such as rice with indirect losses in yield which decrease household income. Damage to household assets such as vegetable gardens and aquaculture ponds and the loss of poultry and livestock also result in a loss of income. The flooding also resulted in damage to roads, bridges, and other infrastructure, reduced or lack of space for grazing livestock, and disruption to schooling. The flood waters created a more hospitable environment for snakes and as a result many people have suffered snake bites. The cost of protecting households from snakes and treating snake bites are additional indirect impacts and economic costs of flooding.

Flooding has also increased river erosion which has knock-on effects for those living along river banks. River erosion can also result in the permanent loss of land and displace households and communities. As floods have increased in intensity, seasonal drought has also become more severe, with reduced rainfall during certain periods of the year. While discussants did not expand on the loss and damage they experienced as a result of drought, this highlights the fact that households and communities are grappling with multiple climate-related hazards simultaneously.

The ex-ante disaster risk management (DRM) measures to avert and minimize loss and damage which were adopted by households and communities in Faridpur include early warnings received as text messages, building raised platforms to keep livestock safe during flooding, and storing food and essentials in waterproof containers. Ex-post DRM measures implemented to address loss and damage include formal mechanisms to repair infrastructure and informal support (neighbours helping each other) to plough land or harvest the crops that were not

damaged. Community-based initiatives such as sharing seeds and agricultural equipment and the provision of short-term credit were also identified as important strategies. Emergency food and medicine and emergency loans are provided to some households by CSOs. Loans are also provided by local money lenders, though with much higher interest rates. Discussants reported that currently there are no safety net schemes to support them in the aftermath of disasters nor are there micro-insurance schemes to compensate for the loss of income due to crop and livestock losses. Research found that there are social safety net schemes operating in Faridpur but they are not oriented towards providing short-term, immediate support in the wake of climate-related disasters.

In loss and damage ex post at the UP level, which usually involves an assessment of loss and damage from each household in the aftermath, the Standing Orders on Disaster (GoB, 2019) provides guidance for assessing loss and damage. Discussants reported that affected households were not consulted when the assessment was undertaken and that it is the local UP member who fills out the form which indicates the amount of loss and damage sustained by each household. Discussants reported that many community members have not seen the form used to assess loss and damage though UP members claim to consult with each household. In addition, the assessment process managed by the Ministry of Disaster Management and Relief (MoDMR) focuses on only economic losses.

In terms of the governance of humanitarian assistance, discussants reported that the UP distributes post-disaster relief including emergency food assistance. While relief cards are distributed, through which households can receive aid, not all households receive relief cards. Some discussants reported that personal and political interests play a role in determining which households are selected for relief and in some cases households provide money or incentives in exchange for relief cards. That said, other discussants reported that aid is distributed according to those who need it most. Overall discussants were unsatisfied with the existing system for both support to avert and minimize loss and damage ex ante and support to address loss and damage ex post. Better warnings are needed before the onset of floods, and roads and infrastructure need to be constructed to avoid and reduce waterlogging. Discussants made a number of recommendations for supporting communities affected by disasters arising from flooding. These included more accountability in the implementation of development projects in areas exposed to climate-related hazards and prone to disasters; long-term rehabilitation programmes such as cash for work schemes; interest-free loans for farmers; and better employment opportunities in post-disaster situations which could include work to repair infrastructure and roads.

Satkhira: loss and damage in a cyclone-affected district

Satkhira is a coastal district, also in southern Bangladesh, exposed to cyclones as well as tidal flooding. Discussants in Satkhira reported that the magnitude of river erosion and the frequency of tidal flooding have both increased. In addition, they reported that salinization of freshwater has increased by between 30 and 50 per cent. Drought and drought-like conditions have also increased in frequency according to focus group discussants. These climate-related hazards – both alone and together – have prompted disaster events.

In Satkhira, loss and damage include crop, livestock, and vegetation loss due to the salinization of land as well as the loss of water supplies and the cost of purchasing drinking water. The loss of productive time to collecting water was also identified as a loss. Increased unemployment and the increase in child labour due to the inability to pay for schooling and the need to contribute to the household income were also identified as indirect loss and damage. The rise in the incidence of early marriage is another indirect impact of climate change identified in Satkhira. The increase in economic migration, often by male members of the household, to seek employment had many repercussions including leaving the women behind in precarious situations.

Ex-ante DRM measures, implemented to avert and minimize loss and damage in Satkhira, include providing early warning through loud speakers in villages, broadcasting warnings through the community radio, and the raising of cyclone warning flags. Training and awareness raising on disaster preparedness was also provided according to some discussants – though they did not indicate from whom they received this training. Voluntary and involuntary evacuation, including to cyclone shelters, were also identified as important ex-ante DRM measures. Discussants also stated that some households had strengthened infrastructure, including by raising housing and storing food and essentials in waterproof containers. Some farming households diversified their crops and changed their agricultural methods while other households also had emergency savings to draw on. Discussants reported that they were able to reduce loss and damage from cyclones by implementing ex-ante DRM measures.

Ex-post DRM measures implemented to address loss and damage include emergency relief provided to cyclone-affected households. Cheap loans with flexible terms and conditions are provided through CSOs. Some discussants identified livelihood diversification as a means of responding to loss and damage ex post including by migrating to cities in search of work and transitioning from agricultural labour to rickshaw pullers or field or construction labourers. These measures were adopted by individuals and households themselves rather than supported by government or CSO-funded schemes. Discussants reported that they do receive support from CSOs and that there are community-based organizations which help them save money to fund DRM strategies. Agricultural loans are also available, though it was not clear from whom. Discussants reported that no support is available for lower intensity disasters such as those prompted by tidal flooding, erosion, and drought or to address loss and damage resulting from slow onset climatic processes like salinization.

As in Faridpur, discussants reported that ex-ante assessments of loss and damage at the UP level were conducted largely without consulting with affected households. However, in some cases, discussants reported that a representative of the UP would call an individual from the affected community to get a better idea of the extent of economic loss and damage. Once again, some discussants reported that the relief was distributed unequally at the UP level and that political bias played a role in determining which households were eligible for relief. Discussants also reported that social safety net schemes and microcredit programmes were not available to help them in the wake of climate-related disasters. As in the case of Faridpur, research revealed that there are several social safety net programmes operating in Faridpur, but they are not oriented towards providing emergency relief and food aid.

Discussants reported that they could better avert and minimize loss and damage from the onset of climate-related hazards if they were provided with training, including from CSOs. The participation of community members and affected households could make relief operations more effective. More robust safety nets are needed to help those affected by disasters, in particular women who are unable to move as easily as men in the wake of disasters for a number of reasons including social norms. Discussants reported that there is a standing committee on disasters in their UP which they could attend to articulate these issues. Other recommendations include raising homes to protect households from flood waters, installing drinking water facilities, and introducing resilient seed varieties to farmers.

Munshiganj: loss and damage in a coastal district affected by multiple hazards

Munshiganj is a coastal area within Satkhira exposed to tidal surges and flooding, coastal flooding, river erosion, and salinization. Discussants reported that tidal surges and flooding are becoming increasingly frequent and that the magnitude and frequency of river bank erosion has increased. Salinization is increasing and some discussants indicated that some parts of Munshiganj are experiencing more drought during certain parts of the year.

Direct loss and damage identified include loss of land, homes and livestock washed away by floodwaters or river erosion, and damage to standing crops and fish farms. Indirect loss and damage identified include the loss of employment opportunities and agricultural productivity, and both temporary and permanent migration (both internal and across border) as the agricultural sector becomes less productive due to salinization. The loss of productive time to collect drinking water, a task mostly taken on by women in the household, was also reported.

Discussants in Munshiganj reported that ex-ante DRM measures implemented to avert and minimize loss and damage include raising homes and planting trees to reduce river erosion, constructing safe places for livestock, and storing food and other essentials under their basements. Ex-post DRM measures identified include post-disaster relief and rehabilitation support provided by CSOs – though this is declining.

Discussants reported that in the aftermath of disaster events, UP members visit households together with the local police to collect information about household members, property, and other challenges arising from the disaster event. Based on the outcome of the assessment, cash and food aid is distributed according to discussants (although the extent of aid provided varied according to discussants). Ex-post assessments calculate direct economic loss and damage, but not the secondary impacts. Discussants reported that there is no support to address the residual impacts of climate change in the long term. Better support is needed for women who suffer disproportionately from loss and damage, and many have no source of income or savings to draw on to help them address loss and damage. Relief is also often distributed disproportionately to those who have political connections. In addition, discussants reported that there is no specific social safety net scheme for disaster-affected people and communities. Rather, social safety nets are longer-term schemes that are available to vulnerable people such

as widows, disabled people, the elderly, and others who need permanent assistance. In the wake of disasters discussants reported that this type of support is not available. This is consistent with the information found in Faridpur and Satkhira and suggests that enhanced social safety nets which provide immediate support to households affected by climate-related disasters are needed. The research also suggests that accountability mechanisms must be in place to ensure the benefits are provided to those who need them.

Discussants in Munshiganj recommended that to avert and minimize loss and damage, stronger and more sustainable dams and embankments are needed, particularly to reduce soil erosion and flooding. More robust roads that are better connected to one another are needed. Better accountability for development projects is critical, according to discussants, such that these projects are finished and attain the objectives they set out to achieve.

3 How is loss and damage assessed in Bangladesh?

There are two ways of assessing loss and damage: evaluating past loss and damage (ex post) and estimating future loss and damage (ex ante) (Surminski et al., 2012). There are also two primary schools of thought for assessing climate-related loss and damage, both ex ante and ex post. The first is from the DRM perspective which has long employed methodologies to assess economic loss and damage after disasters occur.[6] A more in-depth overview of various methodologies for assessing loss and damage can be found in a report commissioned by the UNFCCC (see Surminski et al., 2012). This report remains relevant as methodologies for assessing loss and damage have not evolved significantly over the last decade. An overview of the methodologies which have been employed in Bangladesh can be found in Appendix A of the main report.

The second school of thought comes from the climate change adaptation (CCA) perspective. Climate change has brought a new dimension to assessing loss and damage ex ante, which is projecting geographies, economies, societies, and ecosystems at risk of incurring loss and damage. Figure 2 illustrates the two schools of thought for assessing loss and damage and the various methodologies associated with each.

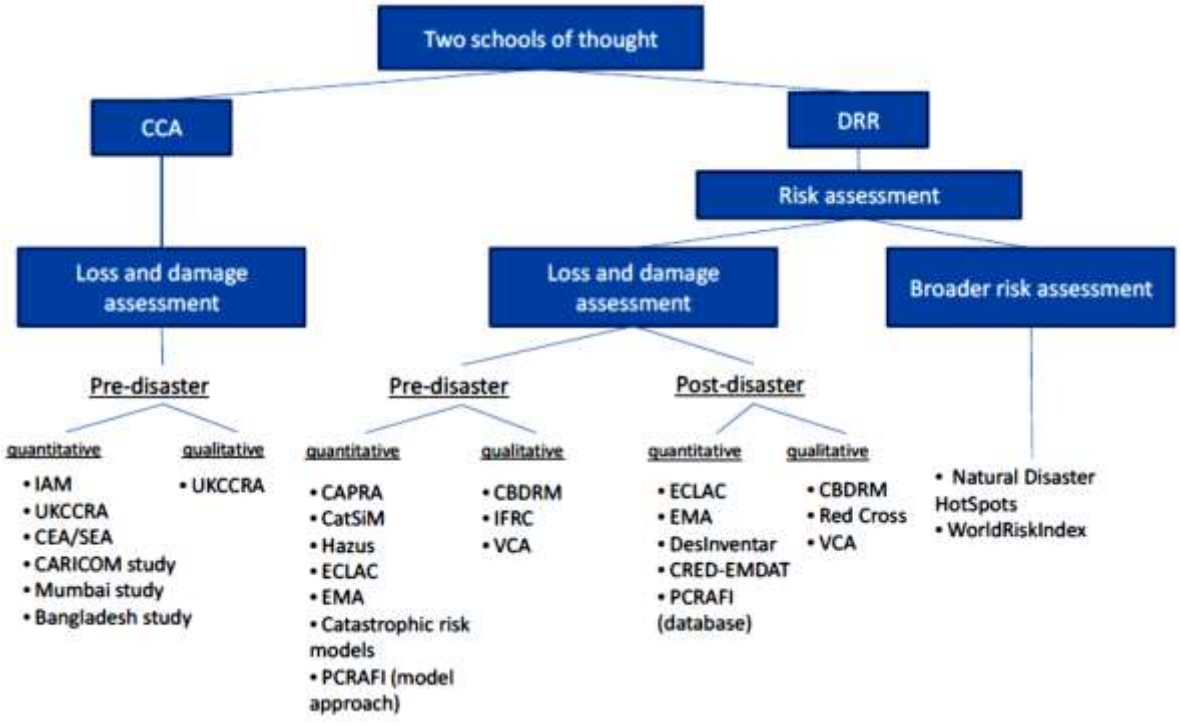

Figure 2 Overview of different approaches to assess loss and damage

Source: adapted from Surminski et al., 2012

In Bangladesh, the primary means of assessing loss and damage ex post is the Damage, Loss, and Needs Assessment (DALA) methodology which is implemented by the Department of Disaster Management. This process is called the Joint Needs Assessment (JNA) and is used to trigger emergency relief, rehabilitation, and reconstruction support to affected communities. The JNA is overseen by the Standing Orders on Disaster (GoB, 2019) which provides guidance for collecting data for DRM actors from the national to the local level (Union Parishad). A standard form is used (called Form D) to collect information on loss and damage, both direct and indirect, from households. This information is used to assess the overall level of loss and damage in an area and to trigger the release of emergency aid where it is needed. One drawback of the DALA methodology is that it only assesses economic impacts. It is typically used to assess loss and damage from the impacts of extreme weather events which leaves a gap in assessing loss and damage ex post from slow onset climatic processes. The research finds that there are also problems with the way in which Form D is used. In some cases discussants reported that a local official, rather than the household, evaluated the extent of loss and damage in the aftermath of disaster events.

A methodology for assessing loss and damage ex post from climate-related impacts at the household level was developed in 2012 by a team from United Nations University (UNU) (Warner and van der Geest, 2013). The methodology was tested in nine developing country contexts, including Bangladesh (see Rabbani et al., 2013). A study of loss and damage incurred from salinization was conducted in three communities in coastal Bangladesh. The research estimated that the economic cost of loss of rice yields in the aftermath of cyclones Sidr and Aila (in 2007 and 2009 respectively) was $2 m (ibid.). In 2017 UNU developed the *Handbook for Assessing Loss and Damage in Vulnerable Communities* which is a step-by-step guide for researchers planning to undertake assessments of loss and damage ex post at the local level in vulnerable developing countries (van der Geest and Schindler, 2017).

In recent years there has been increasing focus on assessing NELD arising from climate change impacts. In 2014, the Asian Development Bank commissioned a study on NELD in eight communities in coastal Bangladesh (Andrei et al., 2014). The study was qualitative in nature and found that individuals, households, and communities were incurring a spectrum of NELD arising from impacts on physical and psychological well-being, culture, social connections, and ecosystem services – among others. The study recommended further work to develop methodologies to assess NELD and integrate approaches for addressing NELD into both DRM and climate change policies and plans.

The most prominent methods of assessing loss and damage ex ante in Bangladesh are through climate risk and vulnerability assessments and mapping. These models, which include risk mapping, can be narrow in nature, focusing solely on the climate-related hazards and their impacts, or broader in nature, taking into account vulnerabilities and combining qualitative with quantitative data (Asaduzzaman et al., 2013). Risk mapping should take into account both local and scientific knowledge (Surminski et al., 2012). Several risk and vulnerability assessments have been undertaken in Bangladesh to inform policies and plans. In order to support risk and vulnerability assessments data in high quality and quantity is needed, both on extreme weather

events and slow onset climatic processes as well as on the people, ecosystems, and assets exposed to and vulnerable to climate-related hazards (Surminski et al., 2012; Asaduzzaman et al., 2013). Databases in Bangladesh will need to be strengthened at all levels, in particular to ensure data and information about slow onset climatic processes is included (Asaduzzaman et al., 2013). Assessments must also incorporate future projects based on global climate models and/or regional climate models (ibid.).

Recently LDCs and other vulnerable countries have been calling for a process to identify and articulate their needs vis-à-vis addressing loss and damage.[7] Research is currently being undertaken by the International Centre for Climate Change and Development to identify what LDCs would need in order to begin to develop Loss and Damage Needs Assessments. These assessments would identify where support is needed (including finance, technology, and capacity building) and what level of support is required to address loss and damage. There are opportunities for supporting these processes through the work of the WIM and the operationalization of the SNLD.

4 What are the key ministries responsible for addressing loss and damage?

Loss and Damage in Bangladesh has been influenced by Bangladesh's engagement in the Loss and Damage negotiations under the UNFCCC. In 2010, a two-work programme on Loss and Damage was created under the UNFCCC to better understand approaches to assess and address the risks of loss and damage (UNFCCC, 2011). Shortly thereafter, the Government of Bangladesh requested a project to better understand how loss and damage could be both assessed and addressed in Bangladesh in a climate change context. The resulting project, the Loss and Damage in Vulnerable Countries Initiative, was funded by the Climate and Development Knowledge Network (CDKN) and included both a national study in Bangladesh and broader research and policy support for the LDCs. The Loss and Damage in Vulnerable Countries Initiative, which was implemented from late 2011 to the end of 2013, started a national conversation on Loss and Damage in Bangladesh among both climate change and DRM stakeholders – among others. While that discussion has continued, it has been much less cohesive in recent years.

The mandates of ministries and departments in Bangladesh is guided by the Rules of Business (GoB, 2017). There are two main ministries responsible for Loss and Damage in Bangladesh (though others also play a role): the Ministry of Environment, Forest and Climate Change (MoEFCC) and the Ministry of Disaster Management and Relief (MoDMR). The Ministry of Finance and the Ministry of Planning are also critical to efforts to address loss and damage (as well as avoiding and reducing loss and damage where possible). The Climate Fiscal Framework (Finance Division, Ministry of Finance, 2014), which was adopted in 2014, provides guidance for integrating climate change into Bangladesh's financial systems. National resources for climate action are included in the budget of 20 line ministries and tracked through a system of budget tagging (Cooke, 2018). In 2018/2019 8.82 per cent of the total budget of these 20 ministries was 'climate relevant' (GoB and UNDP, 2018). In the context of preparing for floods, apart from the MoDMR, the Ministry of Water Resources (MoWR) is the most important ministry in Bangladesh.

Ministry of Disaster Management and Relief

Given Bangladesh's exposure to extreme weather events, Loss and Damage has traditionally been associated with the MoDMR and its Department of Disaster Management (DoDM), which oversees and coordinates activities related to reducing the risks of and responding to disasters. The MoDMR also ensures that disaster risk reduction (DRR) measures are integrated into the policies, plans, and programmes of other ministries and departments (Shamsuddoha et al., 2018). Guidance on DRM is provided by the National Plan for Disaster Management (2021–2025), which has three objectives: to save lives, protect investments, and ensure effective recovery (MoDMR, 2020).

The Disaster Management Act (GoB, 2012) articulates the mandate and activities of the MoDMR (GoB, 2012). The National Plan for Disaster Management (MoDMR, 2020) includes responses

to disasters that result from the onset of extreme weather events and the advancement of slow onset climatic processes (MoDMR, 2020). The Standing Orders on Disaster (see GoB, 2019) provides guidelines for avoiding and reducing loss and damage before it occurs and responding and recovering from loss and damage in the aftermath of disasters. The Inter-Ministerial Disaster Management Coordination Committee facilitates inter-ministerial coordination and supervises and monitors the work of the armed forces and CSOs in responding to disasters. Responsibilities are devolved to local level administrations, including to the District Disaster Management Committee, the Upazila Disaster Management Committee, and the Union Disaster Management Committee in areas affected by climate-related disasters (see Figure 3). The MoDMR is the focal point for the Sendai Framework for Disaster Risk Reduction and has strong levels of engagement in the processes under the United Nations Office for Disaster Risk Reduction.

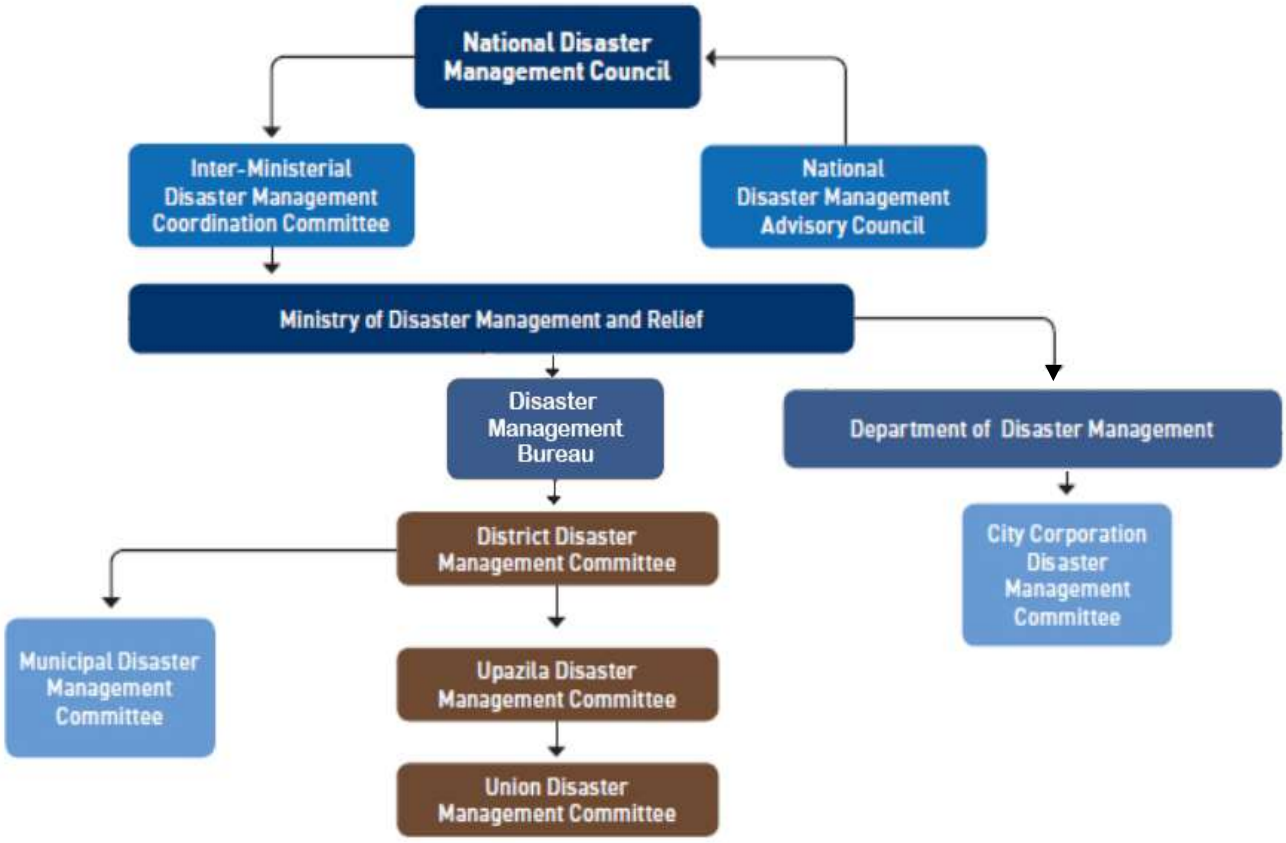

Figure 3 National disaster management system in Bangladesh

Source: modified from Reliefweb, 2019

In the context of floods, the Flood Response Preparedness Plan (Department of Disaster Management, Ministry of Disaster Management and Relief, 2014) guides efforts to avoid, reduce, and address loss and damage from flooding, which is overseen by the MoDMR. The MoDMR clearly holds the mandate for avoiding, reducing, and addressing loss and damage from floods but must work with other ministries in delivering this mandate. The Standing Orders on Disaster articulates the mandate and role of the MoEFCC, the Ministry of Water Resources in the context of flood forecasting and flood warning (among other activities), and the Planning Commission (among other line ministries and departments) in responding to disasters arising from floods.

Ministry of Water Resources

The Ministry of Water Resources (MoWR) oversees the development and management of water resources in Bangladesh. It fulfils its mandate through the development of policies, plans, strategies, guidelines, and regulations relating to water resources. The National Water Policy (MoWR, 1999) articulates that the MoWR is responsible for institutional reforms to guide all water sector-related activities. This includes flood control and protection, erosion control and protection, delta development, and land reclamation, including the development of embankments, canals, dykes, and other infrastructure (MoWR, 2018). The MoWR is responsible for implementing the Delta Plan 2100 and has oversight on international cooperation and transboundary river activities for flood control and developing water resources (GED, 2018).

The implementing arm of the MoWR is the Bangladesh Water Development Board (BWDB). The BWDB collects, processes, stores, and disseminates hydrological data and information. Flood forecasting and warnings are provided through the Flood Forecasting and Warning Centre, which sits within the BWDB. The Guidelines for Participatory Water Management (MoWR, 2000) provides a framework for stakeholders to engage in water management at all levels. The planning arm of the MoWR is the Water Resources Planning Organization (WARPO) which develops relevant policies and plans including the National Water Policy (MoWR, 1999), Coastal Zone Policy (MoWR, 2005), and National Water Management Plan. The Standing Orders on Disaster outlines the role of the MoDMR, the MoWR, and other ministries engaged in responding to floods (GoB, 2019).

Ministry of Environment, Forest and Climate Change

Climate action in Bangladesh is guided by the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) (MoEF, 2009). First developed in 2008 and updated in 2009, the BCCSAP is currently being revised (MoEF, 2009). The BCCSAP has six pillars as follows:

- food security, social protection, and health;
- comprehensive disaster management;
- infrastructure;
- research and knowledge management;

- mitigation and low carbon development;
- capacity building and institutional.

Bangladesh submitted its original Nationally Determined Contribution (NDC) in 2015 (GoB, 2015) and more recently, in late 2020, submitted an interim revised NDC and plans to provide a full version of the revised NDC in 2021 (MoEFCC, 2020). The original NDC (GoB, 2015) identified 10 key areas as follows:

- food security, livelihood, and health protection;
- comprehensive disaster management;
- coastal zone management including salinity intrusion control;
- flood control and erosion protection;
- building climate-resilient infrastructure;
- increasing rural electrification;
- enhancing urban resilience;
- ecosystem-based adaptation including forestry co-management;
- community-based conservation of wetlands and coastal areas;
- policy and institutional capacity building.

The MoEFCC[8] is the focal point for the UNFCCC and has traditionally had a high level of engagement in the international climate negotiations. Until 2013 the Bangladesh delegation included many representatives of CSOs, but recently civil society participation has declined.

In the context of Loss and Damage, there has been some conflict and there are certainly overlapping mandates between the MoDMR and the MoEFCC. The MoDMR is responsible for avoiding, reducing, and responding to loss and damage from all disasters which includes those induced by climate-related hazards. However, the MoEFCC is responsible for climate action and oversees the development of climate change policies and plans including the BCCSAP, the National Adaptation Plan (NAP), and the NDC. Coordination with the MoDMR and all the relevant ministries is critical in carrying out these plans. These efforts are made possible through the budget allocation from the Ministry of Finance under the Climate Fiscal Framework. Coordination with the Ministry of Planning in the context of the implementation of the framework for achieving the Sustainable Development Goals (SDGs) (UN Department of Economic and Social Affairs, n.d.) is also critical to the overall effort to integrate climate change into sectoral policies, plans, and programmes.

Ministry of Planning

The Ministry of Planning, and in particular its Planning Division, are also important for efforts to avoid, reduce, and address loss and damage. The Planning Division oversees the preparation and review of economic and social development plans as well as coordination of the development activities of various ministries, divisions, and agencies within the government where those activities are related. From June 2020 the 8th Five-Year Plan (2020–2025) has guided sustainable development (GED, 2020). The Planning Commission is the focal point for

the implementation of the SDGs in Bangladesh, which is a very robust and comprehensive process. There is some cross-over of mandates in particular as some of the SDGs are relevant for averting, minimizing, and addressing loss and damage. The Ministry of Planning has the potential to convene all ministries relevant for averting, minimizing, and addressing loss and damage and to ensure these efforts are better coordinated.

Ministry of Finance

Like many countries, the environment ministry in Bangladesh is less powerful than other ministries. The Ministry of Finance and the Ministry of Planning are the most powerful ministries in Bangladesh and ensuring they are engaged in efforts to address loss and damage is critical to their success. The Economic Relations Division within the Ministry of Finance oversees the coordination, review, and monitoring of official development assistance. This division is also responsible for liaising with international development agencies such as UN agencies and multilateral development banks. It also oversees engagement with global institutions and matters related to treaties and agreements relevant to its mandate and is the focal point for the Addis Ababa Action Agenda.

When the BCCSAP was being developed, the Government of Bangladesh decided to establish the Bangladesh Climate Change Trust Fund (BCCTF) to fund the activities which would help achieve the BCCSAP (Khan et al., 2012). The BCCTF funds projects which are aligned with the themes and objectives of the BCCSAP but does not fund long-term planning. The Ministry of Finance is critical in efforts to address loss and damage from flooding, as through the Finance Division, it implements the Climate Fiscal Framework described above (Finance Division, 2014). Through this framework, national resources for addressing climate change are tagged and integrated into the budget of line ministries so that they can carry out policies, plans, and programmes.

5 How is loss and damage averted, minimized, and addressed in Bangladesh?

Efforts to address (as well as to avert and minimize) loss and damage are broad in Bangladesh. A comprehensive overview within the scope of this report was not possible. However, there are five key measures that are covered below: DRM, adaptation, social protection, insurance-related initiatives, and support for migrants. It is important to note that a lot of DRM and adaptation activities are driven by CSOs, which play a significant role in sustainable development and climate action in Bangladesh (see Lewis, 2011). Recent research by the International Institute for Environment and Development (IIED) in Bangladesh has found that the cost of preparing for and responding to climate-related loss and damage is largely borne by households. In 2015, households in Bangladesh spent an estimated $2 bn on climate and disaster risk management, which is double what was spent by the Government of Bangladesh and more than 12 times what was received from multilateral institutions in absolute terms (Eskander and Steele, 2019). As a share of income, female-headed households spent three times more to avert, minimize, and address climate-related loss and damage than male-headed households (ibid.). This section is not an exhaustive summary of all the work being done in Bangladesh, but rather an overview of the mandates and focus of government actors.

Disaster risk management

As described above, the MoDMR oversees activities relating to reducing and responding to disaster risk while the Standing Orders on Disaster articulates the responsibility of each ministry, division or department, and agency in preparing for and responding to disasters (GoB, 2019). The MoDMR therefore has the mandate to avert and minimize loss and damage ex ante through risk reduction and address loss and damage ex post through recovery and rehabilitation efforts. Together, the National Disaster Management Council, the Inter-Ministerial Disaster Management Coordination Committee, and the Cabinet Committee on Disaster Response lead DRM efforts. District management committees oversee DRM activities at the local level with assistance from the Disaster Management Bureau. A key challenge for DRM in Bangladesh is that urban disasters are becoming more frequent. In addition, increased coordination is needed to ensure coherence between DRM and efforts to avert, minimize, and address climate-related loss and damage. The National Plan for Disaster Management has recognized the need to increase both leadership and technical capacity within the Department of Disaster Management to ensure more effective inter-ministerial coordination and more holistic DRM policies, plans, and frameworks (MoDMR, 2020).

Adaptation measures

Much of the work on adaptation tends to be project based and led by CSOs. Bangladesh is the country in which the concept of community-based adaptation arose. The work on adaptation driven by CSOs is too broad to cover here but it supports the work of the government. Adaptation plans driven by the government are largely inspired by the UNFCCC, which Bangladesh then builds on. Bangladesh was the first country to submit its National Adaptation

Programme of Action (NAPA) to the UNFCCC in 2005 (MoEF, 2005). The NAPA identifies 15 priority adaptation activities which range from supporting coastal afforestation through participation, providing drinking water to coastal communities affected by salinization, to capacity building for integrating climate change into planning, and mainstreaming adaptation into policies and plans in a variety of sectors (MoEF, 2005). The process of developing the NAPA inspired Bangladesh to develop its national climate change strategy, the BCCSAP. Bangladesh has been developing its National Adaptation Plan (NAP) for the past few years and is also currently revising the BCCSAP. According to reports, the NAP will include efforts to address loss and damage along with those to avert and minimize loss and damage through adaptation.

Social protection

In Bangladesh there has been significant focus on responding to loss and damage ex post. The loss and damage that is averted and minimized is unseen and is therefore highlighted much less by politicians and the media. The potential for scaling up approaches to avoid and reduce loss and damage before it occurs is significant, through DRM measures, sustainable development, and targeted tools such as social protection measures. According to the Social Security Policy Support Program (SSPS), an initiative which sits under the Planning Commission, 75 million people in Bangladesh are in need of social protection (SSPS, 2018). Currently there are over 100 different social protection programmes being implemented by approximately 20 different government ministries and divisions ranging from housing and employment support to school feeding programmes (ibid.).

As of 2018, 10 social protection programmes are being implemented by the MoDMR with a focus on disaster relief and rehabilitation, and several other social protection programmes also focus on DRM and resilience building efforts (SSPS, 2019). However, governance issues, such as corruption and inefficient bureaucracy, have made targeting the poorest and most vulnerable challenging. It is estimated that only 13 per cent of the poorest households actually receive the full scope of benefits from social protection programmes (General Economics Division et al., 2013). The Government of Bangladesh has committed to increasing both the efficiency and effectiveness of social protection measures to ensure that they better benefit the poorest and most vulnerable and to allocating more resources to these efforts. In 2018, the government committed to allocating almost 14 per cent of its total budget to social security programmes, or 2.5 per cent of GDP (SSPS, 2019). In 2020/21 the budget allocation to social security programmes is nearly 17 per cent (ibid.).

However, based on the findings of the case studies, many households remain unaware of social protection mechanisms through which they could receive support after having incurred loss and damage. In addition, corruption and a lack of transparency remain an issue in the disbursal of social protection benefits. Clearly, there remain gaps in channelling support to where it is needed ex post. There are also opportunities for scaling up social protection mechanisms to avert and minimize loss and damage before the onset of climate-related hazards culminate in disasters.

Insurance-based mechanisms

In recent years focus on insurance as a tool to address loss and damage has increased but this has been controversial. Although the potential for climate risk insurance in Bangladesh would appear high the take up of insurance is problematic and remains underdeveloped and those products that do exist do not cover flood risks nor livelihood losses comprehensively. Over the past decade several pilot programmes have been implemented to test various risk transfer tools, a few of which are described below.

Pilots of insurance-based mechanisms

In 2012 the Sadharan Bima Corporation began implementing an index-based insurance scheme with $2 m in support from the Asian Development Bank. An overarching objective of the project was to build the capacity of a local regulator, insurance companies, multilateral financial institutions, civil society organizations, farmer cooperatives, and agricultural banks among other actors. The ultimate goal was to build a solid institutional and regulatory framework to implement index-based insurance schemes in a sustainable way to support, in particular, smallholders and marginalized farmers (ADB, 2012). It seems, however, that there is much more work to do to develop the institutional and regulatory frameworks and in particular the enabling environment to increase the coverage of insurance in Bangladesh.

From 2013 to 2015 an index-based flood insurance project was implemented in Sirajganj in northern Bangladesh. The pilot project was financed by the Swiss Agency for Development and Cooperation (SDC) in partnership with national and international organizations (Swiss Re, 2013). Technical and data collection support was provided by Swiss Re. Premiums were paid on behalf of households by SDC. From 2014 to 2018 a weather index-based crop insurance project was piloted in three districts: drought-prone Rajshahi, flood-prone Sirajganj, and cyclone-prone Noakhali. This project introduced index-based insurance to this part of the country but it is unclear if the impacts have been long-lasting.

In 2015 the International Finance Corporation with the support of the Global Index Insurance Facility, an initiative supported by the World Bank, launched a project to develop index-based insurance products to support farmers affected by drought, excess rainfall, heatwaves, and cold spells throughout Bangladesh (Global Index Insurance Facility, 2018). The project has been implemented through a partnership with both a national insurance company and a seed manufacturer and relies on weather data from Bangladesh's Meteorological Division.

In 2020 Vivid Economics implemented an exploratory project on climate resilient parametric insurance with the objective to ensure the viability, sustainability, and impact of parametric flood insurance in Bangladesh (Vivid Economics, 2020). From August 2020 to March 2021 a 'discovery phase' took place to assess the technical feasibility, secure the buy in of stakeholders, and develop a plan for an operational phase. The operational plan aims to roll out products including modelling, earth observation indices, and a flood risk platform as well as an accompanying business model with a view to commercialization.

Challenges to roll out of insurance-based mechanisms

These recent developments on the climate risk insurance front in Bangladesh are promising but they also highlight some gaps and challenges. As a concept, climate risk insurance remains somewhat controversial in Bangladesh underpinned by the belief that the poorest and most vulnerable should not be made to pay for the impacts of a phenomenon (i.e. climate change) for which they are ultimately not responsible (Rahman et al., 2018). There are also challenges to implementing insurance mechanisms on the ground which include a lack of data as well as a lack of awareness of how climate risk insurance works in practice (ibid.).

In 2013, as part of the Loss and Damage in Vulnerable Countries Initiative, a paper was written assessing micro-insurance as a tool for addressing loss and damage in Bangladesh (Khan et al., 2013). The paper found that Bangladesh currently has no framework to guide the operations of micro-insurers, but that the Insurance Act of 2010 provides for the possibility of insurance-based social protection systems. Further, the Microcredit Regulatory Act of 2006 acknowledges that microfinance institutions (MFIs) provide insurance services as a part of their broader activities. That said, the lack of a clear policy and regulatory framework creates an environment of uncertainty among both providers and purchasers of insurance and could inhibit the growth of the micro-insurance market. Perhaps a greater issue, however, is the lack of support from climate actors in Bangladesh including those working with the Government of Bangladesh.

The International Research Institute for Climate and Society (IRI)[9] has been working on index-based insurance in Bangladesh over the past few years. Through its engagement with various insurance stakeholders in Bangladesh, the IRI has found three main challenges. The first is a lack of capacity to implement insurance-based mechanisms. To address this IRI has provided trainings on the basics of index-based insurance for those new to the topic and wishing to gain an understanding of key concepts, and on more advanced data and product development and validation for those involved in existing projects. Due to the COVID-19 pandemic the training was provided remotely.

The second challenge is the lack of data. There have been some questions around the accessibility, cost, and adequacy of datasets, though there are a few that could be used. A past flood insurance project used data from the Institute of Water Modelling which proved to be expensive to access and difficult to scale. Current pilots on index-based insurance are using satellite data from MODIS. Since MODIS cannot see through clouds, IRI has recently been testing data from a radar satellite (Sentinel-1); preliminary results reveal that this has higher spatial and temporal accuracy and is better correlated with on the ground damages. However, Sentinel-1 only has four years of data (2017–present) while MODIS has 20 years (2001–present), and data fusion will be required for index development. NASA-funded research with stakeholders on the project at Bangladesh IRI has also developed novel approaches to quantify basis risk by using Natural Language Processing of news media data to identify higher spatial and temporal resolution of flood damage than available through government or Twitter data. Through the IRI project an Impact and Science and Advisory Board has been established with a number of flood and insurance stakeholders to share the results of the research.

The final challenge has been push back from the government on the concept of insurance, which is unpopular with many climate actors in Bangladesh. Current pilots on index-based insurance are using satellite data from MODIS and there are some questions around its viability. Although technical solutions may exist, perhaps greater hurdles will remain around the ability to pay and the injustice inherent in insurance as an approach to address loss and damage impacting the people least responsible for the problem in the first place.

Supporting climate-induced migration

In recent years climate actors in Bangladesh have been focusing more on supporting migrants who move to cities in search of economic opportunities when their livelihoods become unviable due to climate change impacts. The Climate Bridge Fund (CBF) was established in 2018 with funding from the Government of Germany and is hosted at the Bangladesh Rural Advancement Committee. The CBF provides direct finance to initiatives which support those displaced or at risk of being displaced by climate change. Support is provided to ensure that climate-related migrants have access to basic services as well as economic opportunities in the cities in which they land. The aim is to bridge the gap between short-term project funding and the provision of services and infrastructure over the long term for climate-induced migrants. Given the way in which climate change impacts are prompting migration, support to migrants is critical. The work of the CBF is important but larger and long-term support is needed to ensure that migrants have economic opportunities and safe places to live and to ensure those left behind are supported as well.

6 What is the status of the national mechanism on loss and damage?

During the era of the Loss and Damage in Vulnerable Countries Initiative the WIM was established (at COP 19 in late 2013). In the lead-up to COP 19, key climate policy actors in Bangladesh had the idea of establishing a national mechanism on loss and damage, modelled on the WIM, to build on the work of the Loss and Damage in Vulnerable Countries Initiative. The Government of Bangladesh asked for support from CDKN to do a scoping study on a national mechanism on Loss and Damage but this request was not fulfilled due to the political sensitivities around Loss and Damage. A consortium of ActionAid Bangladesh, the International Centre for Climate Change and Development (ICCCAD), CARE International, and Nature Conservation Management decided to undertake the study with their own resources. In 2016 the scoping study was submitted to the Director General of the Department of Disaster Management proposing that the national mechanism could have the following components (Huq et al., 2016):

- a framework for enhancing understanding and knowledge related to climate impacts, vulnerabilities, and loss and damage;
- tools and methodologies for comprehensive risk assessment;
- nationally appropriate approaches of CRM, including risk reduction, risk retention, and risk transfer;
- approaches for addressing residual loss and damage, including permanent and irreversible loss and damage;
- a framework for developing early warning systems (EWS) and emergency preparedness;
- financial instruments to address loss and damage and pay compensation;
- nationally appropriate technologies and support to access global technologies;
- a capacity-building framework;
- a framework for enhancing the resilience of communities, livelihoods, and ecosystems;
- nationally appropriate specific approaches to address loss and damage associated with slow onset climatic processes;
- nationally appropriate specific approaches to address NELD;
- a clearing house for data and information;
- a framework for facilitating research on Loss and Damage;
- policies, plans, legislation, and institutions for migration and displacement, and collaboration with regional and international efforts;
- integration of loss and damage into sectoral policies, plans, legislation, and institutions;
- specific national policy and legislation for loss and damage;
- a collaborative framework between the national mechanism on loss and damage and the global Loss and Damage agenda under the WIM.

The study proposed that the reserve funds from the Bangladesh Climate Change Trust Fund (BCCTF), which had been set aside for as yet undefined emergency purposes, could be used to operationalize the national mechanism (see Haque et al., 2018).

For a number of reasons progress on the national mechanism has effectively stalled. The mechanism lacks a champion within the MoDMR to propel it forward. In addition to that, the MoDMR has been occupied with the Rohingya refugee crisis, and more recently with the COVID-19 pandemic. More recently alternative venues (or other ministries) for hosting the national mechanism have been proposed.[10] One of the key issues that has reduced momentum on Loss and Damage in recent years is that the MoEFCC and the MoDMR both see climate change as their 'domain'. There is a need for better cooperation both between those two ministries and among the ministries whose mandates are relevant to addressing (and averting and minimizing) loss and damage. It has been proposed that until that occurs, the national mechanism could be hosted with a different agency to carry out the pilot project and further studies.

7 What are the challenges to averting, minimizing, and addressing loss and damage?

The case studies which informed this summary found that disaster preparedness remains business as usual and tends to focus on extreme weather events. Measures to address loss and damage from slow onset climatic processes, in particular irreversible and permanent losses, need to be defined, developed, and implemented. Ex-post DRM measures need to be more sustainable. The indirect impacts of climate hazards such as erosion and waterlogging as well as NELD need to be addressed holistically and comprehensively.

In the context of DRM in Bangladesh, there is greater focus on addressing loss and damage ex post than on averting and minimizing loss and damage through risk reduction measures implemented ex ante. More focus on developing guidelines as well as policies, plans, and strategies for DRR are needed, especially at the Union Parishad level. Long-term adaptation planning in collaboration with CSOs and local communities would further strengthen efforts to avert and minimize loss and damage. Given that households are bearing the greatest burden for averting, minimizing, and addressing loss and damage, support must also be mobilized and channelled to the local level.

A pervasive barrier to developing a comprehensive framework to avert, minimize, and address loss and damage is the capacity of institutions and their willingness to cooperate. The scoping report on the national mechanism (see Huq et al., 2016) highlighted lack of coordination among relevant ministries as a critical gap in moving the Loss and Damage agenda forward. Other gaps and barriers identified included a lack of institutional capacity and financial resources, and corruption. As highlighted by the case studies, elite capture and corruption in the provision of emergency relief and food aid is a critical issue. If households do not receive support to recover from loss and damage, they are more likely to spiral into poverty. In fact, research by UNU found that when they do not have a safety net, households are likely to adopt erosive coping strategies such as selling productive assets, removing children from school, and forcing girls into early marriage (Warner and van der Geest, 2013). These measures have long-term social and economic consequences and are likely to result in significant levels of NELD, including impacts to mental health. Support must be provided to those who need it in a timely way.

The conflict between the MoDMR and the MoEFCC in the context of who is responsible for addressing climate-related loss and damage has become a significant impediment to action. The National Mechanism on Loss and Damage is effectively stalled because it lacks a champion under the MoDMR and has suffered from detractors under the MoEFCC. The mandates are clearly delineated under the Rules of Business and it is clear that the MoDMR has a legitimate mandate to avert, minimize, and address loss and damage. Yet, MoEFCC's claim is also legitimate as the oversight ministry on climate change and the focal point for the UNFCCC. These two ministries must work together and with all the other ministries relevant to averting, minimizing, and addressing loss and damage.

8 Recommendations for supporting efforts to avoid, reduce, and address loss and damage from floods in Bangladesh

The territory now known as Bangladesh and the people who live there have always been both highly exposed to and vulnerable to loss and damage from flooding. Policies, plans, and strategies to avert, minimize, and address loss and damage through DRM in Bangladesh have evolved over the five decades since Bangladesh was established as an independent state. Over the past two decades climate change has added an additional element through the focus on adaptation. Bangladesh is often heralded as an example for other vulnerable developing countries. In 2020 Bangladesh assumed an even greater leadership through its role chairing the Climate Vulnerable Forum. Recommendations for scaling up action at the national and sub-national level to support vulnerable communities on the frontline of climate change in Bangladesh are described below.

Recommendations for scaling up action at the national level

Devolving support to the local level. The case studies and recent research undertaken by IIED demonstrate that the cost of averting, minimizing, and addressing loss and damage is largely borne by households. At the national level, efforts to avert, minimize, and address loss and damage are largely financed by resources from the national budget. It is critical that, as part of the commitment to international cooperation on Loss and Damage in the Paris Agreement, developed countries provide finance to support efforts to address loss and damage in vulnerable developing countries like Bangladesh. For its part, Bangladesh will need to develop devolved mechanisms to get support to the Union Parishad level and to ensure that support gets to those who need it. These mechanisms must therefore be accountable and transparent to reduce corruption and ensure that affected households and communities have access to social protection, micro-insurance, and microcredit schemes where appropriate so that loss and damage does not propel households further into poverty.

Ensuring the national mechanism engages with CSOs and the voices of those on the frontline of climate change. The national mechanism on loss and damage has been effectively stalled because of a lack of political support to drive it forward. Rather than embedded in a government ministry, the national mechanism could be hosted with an autonomous institution and governed by a high level steering committee which would include government and non-government actors. Ensuring that there are mechanisms to facilitate the participation of local communities is also critical.

Scaling up support to avert and minimize loss and damage. Although adaptation and DRM policies, plans, and strategies in Bangladesh have advanced, the case studies have demonstrated that there is still room for improvement to avert and minimize loss and damage, including through EWS, emergency shelters, and other risk reduction measures. Adaptation and

DRM efforts must recognize and address the gendered experience of climate-related loss and damage and ensure targeted support to the poorest and most vulnerable.

Creating mechanisms to facilitate inter-ministerial collaboration. The lack of coordination mechanisms is one of the biggest barriers to scaling up action to avert, minimize, and address loss and damage. This could be addressed through an inter-ministerial mechanism to bring the key actors in the relevant ministries together to work more effectively, for example in a formal committee or a contact group. This effort could be hosted by powerful ministries such as the Ministry of Finance and the Ministry of Planning. Support from the Prime Minister's Office would be critical to ensure that actors are able to bridge their differences to collectively drive action.

Developing legal and institutional frameworks to support insurance-based mechanisms and integrate them into climate risk management strategies. In order to broaden the coverage of insurance in Bangladesh there must be legal and institutional frameworks in place that support insurance and adequate data must be available. However, that alone will not be enough. The sustainability of insurance products, their affordability given the local economic potential, and the increasing risk must be factored into this decision. Climate actors, especially the Government of Bangladesh, must see insurance as a viable way to support the most vulnerable from the impacts of floods and other climate-related hazards, otherwise alternative financial risk transfer mechanisms, such as social protection or relief, should be employed. If the government chooses the insurance modality, they must first work with both climate and insurance stakeholders to bridge gaps and raise awareness. This is essential to garner the buy in of key actors. In this respect it would be important to build on work currently being undertaken, rather than beginning new projects, as there are many existing opportunities for further learning and development.

Recommendations for averting, minimizing, and addressing loss and damage from floods in the long term

Flooding in Bangladesh is likely to increase in frequency and magnitude in the future which makes it urgent to enhance long-term responses to avert, minimize, and address loss and damage from flooding. The following are recommendations for averting, minimizing, and addressing loss and damage from floods over the long term.

Increasing understanding of the risks. Improving the way in which flood risks are managed will require a better understanding of what those risks are and where they lie. This should include needs assessments that take into account where support is needed to avert, minimize, and address loss and damage.

Introducing social protection mechanisms specifically for flood-exposed households. There are a number of social safety net programmes in Bangladesh to provide support to poor and vulnerable households. However, the case studies demonstrated that many households affected by floods and other extreme weather events do not have protection. A dedicated social protection programme to build resilience (and avert and minimize loss and

damage) to floods ex ante and address loss and damage ex post would help households recover more quickly and reduce the impact of flooding on the local and national economy. These programmes could also include a system through which households could access loans with no or low interest in order to support recovery efforts.

Increasing engagement of local level actors in planning. The development of flood-risk informed resilience building plans with the engagement of local communities and local CSOs at the Union Parishad level would build capacity at the local level and also support the integration of resilience building measures into annual development plans. Articulating the needs at the local level could also help mobilize finance ex ante to avert and minimize loss and damage. To ensure that the needs of vulnerable households are recognized and addressed in these processes, a Citizen's Group on Flood Risk Response could be included in discussions on DRM.

Increasing national community-based early warning systems. Early warning systems (EWS) play a key role in enhancing understanding of climate-related risks. Community-based EWS are particularly vital to helping communities better understand their risk and the individual and collective actions they need to take. Bangladesh has a strong track record of using EWS to broadcast risks associated with cyclones. This expertise and capacity must be applied to other risks, especially riverine flooding, to better understand and document the scale and impacts of flood loss and damage in the country.

Recommendations for the global climate regime and the advocacy agendas of CSOs

Developing countries require significant support to implement a broad range of measures to avert, minimize, and address loss and damage (see Stamp Out Poverty et al., 2021b). The role of CSOs in advocating for the needs of the most vulnerable in relation to climate change impacts is critical. Recommendations for how the UNFCCC, including through the WIM and the SNLD, could support efforts to scale up action to avert, minimize, and address loss and damage in Bangladesh and other vulnerable developing countries are included below.

Providing technical assistance to those who need it. The Santiago Network on Loss and Damage (SNLD) was established at COP 25 to catalyse technical assistance to vulnerable developing countries. It is critical that that technical assistance benefit the most vulnerable people and communities within those countries. Therefore, it should not be only the focal ministry that is able to request and access support from the SNLD, but any entity that requires support, including government ministries and agencies at all levels, CSOs, and grassroots initiatives. Accountability mechanisms must be in place to ensure the support is provided to those who request it and that it is targeted to those who need it most.

Supporting the development of Loss and Damage Needs Assessments. One of the significant challenges for vulnerable developing countries like Bangladesh is determining where to invest and in what types of and combinations of measures to avert, minimize, and address loss and damage. Countries like Bangladesh could benefit from guidance on undertaking ex-ante assessments to determine where and in what magnitude future loss and damage from climate-

related impacts is likely to occur. This support could be provided under the SNLD as part of its role to catalyse technical assistance.

Establishing a global Loss and Damage solidarity fund. Regardless of the source of finance for Loss and Damage, and irrespective of the mechanism or morality of the contributory mechanism, it is clear that new and additional climate finance is needed to respond to the growing scale of loss and damage. Currently it is the poorest and most vulnerable who are paying for the costs of climate inaction. If the international community does not provide support, climate vulnerable developing countries like Bangladesh are likely to face increasing economic loss, making it almost impossible for them to meet the SDGs and, at worst, increasing the risk of default on existing loans, mass migration, and other drivers of social and political unrest (see Stamp Out Poverty et al., 2021a).

Notes

1. Full report: Understanding climate-induced loss and damage and how it is assessed and addressed in Bangladesh (Practical Action, 2021).

2. Loss and Damage (capitalized) has been used to refer to the spectrum of policies which can be implemented to address loss and damage while loss and damage (lower case) refers to the manifestation of the impacts of climate change (IPCC, 2018).

3. The first review of the WIM took place at COP 22 in 2016.

4. Real-time estimates of the population of Bangladesh can be found at World Population Review (2021).

5. Under the UNFCCC slow onset climatic processes (often called 'slow onset events') include desertification, glacial retreat and related impacts, increasing temperatures, land and forest degradation, loss of biodiversity, ocean acidification, salinization, and sea level rise (UNFCCC, 2011).

6. The definition of 'disaster' used in this summary is based on the IPCC definition of disaster risk (IPCC, 2012) which is where vulnerability and exposure meets the onset of a climate-related hazard (be it an extreme weather event or a slow onset climatic process).

7. This information was obtained during discussions with the principal investigator of this research.

8. Now known as the Ministry of Environment, Forest and Climate Change (MoEFCC), prior to 14 May 2018 it was simply known as the Ministry of Environment and Forest (MoEF).

9. This information was provided by individuals at IRI working on index-based insurance in Bangladesh.

10. This information was provided during a conversation with a key stakeholder on Loss and Damage in Bangladesh who is engaged in the process to drive the national mechanism on loss and damage.

References

Andrei, S., Rabbani, G. and Khan, H.I. (2014) *Non-Economic Loss and Damage Caused by Climatic Stressors in Selected Coastal Districts of Bangladesh* [online], Dhaka: ICCCAD and BCAS <http://www.icccad.net/wp-content/uploads/2016/02/ADB-Study-on-Non-Economic-Losses-and-Damages-Report_Final-Version-Reduced-File-Size.compressed1.pdf> [accessed 19 May 2021].

Asaduzzaman, M., Haque, A.K.E., Islam, K.M.N., Munir, M.Q., Roddick, S., Roberts, E. and Hasemann, A. (2013) *Assessing the Risk of Loss and Damage Associated with the Adverse Effects of Climate Change in Bangladesh* [online], Dhaka: ICCCAD <https://assets.publishing.service.gov.uk/media/57a08a45ed915d3cfd00069a/bangladesh-climaterisk.pdf> [accessed 19 May 2021].

Asian Development Bank (ADB) (2012) 'Project Information Sheet: Bangladesh: Pilot Project on Weather Index-Based Crop Insurance' [online] <https://www.adb.org/projects/46284-001/main> [accessed 19 May 2021].

Asian Development Bank (ADB) (2018) 'Poverty Data: Bangladesh' [online] <https://www.adb.org/countries/bangladesh/poverty> [accessed 19 May 2021].

Ayeb-Karlsson, S. (2020) '"I do not like going to the shelter": stories on gendered disaster (im)mobility and wellbeing loss in coastal Bangladesh', *International Journal of Disaster Risk Reduction* 50: 101904 <https://doi.org/10.1016/j.ijdrr.2020.101904>.

Bangladesh Bureau of Statistics (2019) 'Preliminary Report on Agriculture Census 2019' [online] <http://data.bbs.gov.bd/index.php/catalog/164> [accessed 19 May 2021].

Bangladesh University of Engineering & Technology (BUET) (2008) Characterizing Country Settings: Development of a Base Document in the Backdrop of Climate Change Impacts [online] <https://www.scribd.com/document/261228013/Characterizing-Country-Settings-Development-of-a-Base-Document-in-the-Backdrop-of-Climate-Change-Impacts-2009> [accessed 3 June 2021].

Christensen, J.H. and Kanikicharla, K.K. (coordinating lead authors) (2013) 'Climate phenomena and their relevance for future regional climate change', in Stocker, T.F., Qin, D., Plattner, G.-K., Tignor, M., Allen, S.K., Boschung, J., Nauels, A., Xia, Y., Bex, V. and Midgley, P.M. (eds), *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [online], Cambridge: Cambridge University Press <https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter14_FINAL.pdf> [accessed 19 May 2021].

Cooke, K. (2018) 'To combat climate change, Bangladesh is the example to follow', Oxford Policy Management [online] <https://www.opml.co.uk/blog/combat-climate-change-bangladesh-example-to-follow> [accessed 19 May 2021].

Department of Disaster Management, Ministry of Disaster Management and Relief (2014) *Flood Response Preparedness Plan of Bangladesh* [online] <https://www.sheltercluster.org/sites/default/files/docs/flood_response_preparedness_plan_of_bangladesh_june_2014.pdf> [accessed 19 May 2021].

Dow, K., Berkhout, F. and Preston, B.L. (2013a) 'Limits to adaptation to climate change: a risk approach', *Current Opinion in Environmental Sustainability* 5(3–4): 384–91 <https://doi.org/10.1016/j.cosust.2013.07.005>.

Dow, K., Berkhout, F., Preston, B.L., Klein, R.J.T, Midgley, G. and Shaw, M.R. (2013b) 'Commentary: limits to adaptation', *Nature Climate Change* 3: 305–7 <https://doi.org/10.1038/nclimate1847>.

Eckstein, D., Künzel, V. and Schäfer, L. (2021) *Global Climate Risk Index 2021: Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 2019 and 2000-2019* [online], Germanwatch <https://germanwatch.org/en/19777> [accessed 19 May 2021].

Eskander, S. and Steele, P. (2019) *Bearing the Climate Burden: How Households in Bangladesh are Spending Too Much* [online], London: IIED <https://pubs.iied.org/sites/default/files/pdfs/migrate/16643IIED.pdf> [accessed 19 May 2021].

Finance Division, Ministry of Finance (2014) *Climate Fiscal Framework* [online] <https://www.climatefinance-developmenteffectiveness.org/sites/default/files/event/CFSDforum2015/climate/Bangladesh%20Climate%20Fiscal%20Framework.pdf> [accessed 19 May 2021].

General Economics Division (GED) (2018) *Bangladesh Delta Plan 2100: Bangladesh in the 21st Century* [online] <https://oldweb.lged.gov.bd/UploadedDocument/UnitPublication/1/756/BDP%202100%20Abridged%20Version%20English.pdf> [accessed 19 May 2021].

General Economics Division (GED) (2020) *8th Five Year Plan (July 2020 – June 2025): Promoting Prosperity and Fostering Inclusiveness* [online] <https://www.ircwash.org/sites/default/files/2021-02-03-17-04-ec95e78e452a813808a483b3b22e14a1.pdf> [accessed 3 June 2021].

General Economics Division, Planning Commission, Government of the People's Republic of Bangladesh (GoB) (2013) *National Sustainable Development Strategy* [online] <http://nda.erd.gov.bd/en/c/publication/national-sustainable-development-strategy-nsds-2010-2021> [accessed 24 May 2021].

Global Index Insurance Facility (2018) *Case Study: Weather Index Insurance Pilot in Bangladesh* [online], Washington, DC: World Bank <https://www.indexinsuranceforum.org/publication/case-study-weather-index-insurance-bangladesh> [accessed 19 May 2021].

Government of the People's Republic of Bangladesh (GoB) (2012) *Disaster Management Act* [online] <https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/documents/files/disaster-mgt-act-2012-english.pdf> [accessed 19 May 2021].

Government of the People's Republic of Bangladesh (GoB) (2015) *Intended Nationally Determined Contributions (INDC)* [online] <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Bangladesh%20First/INDC_2015_of_Bangladesh.pdf> [accessed 24 May 2021].

Government of the People's Republic of Bangladesh (GoB) (2017) *Allocation of Business Among the Different Ministries and Divisions: Schedule I of the Rules of Business, 1996* (Revised up to April 2017) [online] <https://cabinet.portal.gov.bd/sites/default/files/files/cabinet.portal.gov.bd/legislative_information/d8e711a8_0744_47d4_a1fd_fce1dfb1a5d7/Rules%20Of%20Business-2-19960001.pdf> [accessed 19 May 2021].

Government of the People's Republic of Bangladesh (GoB) (2019) *Standing Orders on Disaster 2019* [online] <https://modmr.gov.bd/sites/default/files/files/modmr.portal.gov.bd/policies/7a9f5844_76c0_46f6_9d8a_5e176d2510b9/SOD%202019%20_English_FINAL.pdf> [accessed 19 May 2021].

Government of the People's Republic of Bangladesh (GoB) and UNDP (2018) *Bangladesh's Citizens Climate Budget Report 2018–19* [online] <https://reliefweb.int/sites/reliefweb.int/files/resources/Citizens%20Climate%20Budget%20Report%202018-19.pdf> [accessed 19 May 2021].

Haque, M., Pervin, M., Sultana, S. and Huq, S. (2018) 'Towards establishing a national mechanism to address losses and damages: a case study from Bangladesh', in Mechler, R., Bouwer, L.M., Schinko, T., Surminski, S. and Linnerooth-Bayer, J. (eds), *Loss and Damage from Climate Change: Climate Risk Management, Policy and Governance*, pp. 451–73 [online], Springer Link <https://link.springer.com/chapter/10.1007/978-3-319-72026-5_19> [accessed 19 May 2021].

Huq, S., Kabir, F., Khan, M.H., Khan, M.H.I., Hossain, T., Hossain, J.B., Pasternak, L., Nasir, N., Hadi, T., Mahmud, S. and Mahid, Y. (2016) *National Mechanism on Loss and Damage in Bangladesh: Scoping Paper*, Dhaka: ICCCAD <https://www.scribd.com/document/329856845/Bangladesh-loss-and-damage-proposal>.

IPCC (2012) *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* [online], Field, C.B., Barros, V., Stocker, T.F., Qin, D., Dokken, D.J., Ebi, K.L., Mastrandrea, M.D., Mach, K.J., Plattner, G.-K., Allen, S.K., Tignor, M., and Midgley, P.M. (eds.), Cambridge and New York: Cambridge University Press

<https://www.ipcc.ch/report/managing-the-risks-of-extreme-events-and-disasters-to-advance-climate-change-adaptation/> [accessed 19 May 2021].

IPCC (2018) 'Glossary', in *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty* [online], V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds), Geneva: IPCC <https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_AnnexI_Glossary.pdf> [accessed 19 May 2021].

Khan, M.R., Roddick, S. and Roberts, E. (2013) *Loss & Damage: Assessing Microinsurance as a Tool to Address Loss and Damage in the National Context of Bangladesh* [online], Dhaka: ICCCAD <https://assets.publishing.service.gov.uk/media/57a08a48ed915d3cfd0006a8/bangladesh-microinsurance.pdf> [accessed 19 May 2021].

Khan, S.M.M., Huq, S. and Shamsuddoha, M. (2012) *The Bangladesh National Climate Funds: A Brief History and Description of the Bangladesh Climate Change Trust Fund and the Bangladesh Climate Change Resilience Fund* [online] <https://www.ldc-climate.org/wp-content/uploads/2018/02/LDC-paper-series-18.pdf> [accessed 24 May 2021].

Lewis, D. (2011) *Bangladesh: Politics, Economy and Civil Society*, New York: Cambridge University Press.

Mace, M.J. and Verheyen, R. (2016) 'Loss, damage and responsibility after COP21: all options open for the Paris Agreement', *Review of European Community & International Environmental Law* 25(2) <https://doi.org/10.1111/reel.12172>.

Ministry of Disaster, Management and Relief (MoDMR) (2020) *National Plan for Disaster Management (2021-2025): Action for Disaster Risk Management Towards Resilient Nation* [online] <https://modmr.portal.gov.bd/sites/default/files/files/modmr.portal.gov.bd/page/a7c2b9e1_6c9d_4ecf_bb53_ec74653e6d05/NPDM2021-25%20DraftVer5_23032020.pdf> [accessed 19 May 2021].

Ministry of Environment and Forest (MoEF) (2005) *National Adaptation Programme of Action (NAPA)* [online] <https://unfccc.int/resource/docs/napa/ban01.pdf> [accessed 19 May 2021].

Ministry of Environment and Forest (MoEF) (2009) *Bangladesh Climate Change Strategy and Action Plan 2009* [online] <https://moef.portal.gov.bd/sites/default/files/files/moef.portal.gov.bd/page/7022053a_0809_4e4b_a63b_60585c699de2/climate_change_strategy2009.pdf> [accessed 19 May 2021].

Ministry of Environment and Forest (MoEF) (2012) *Second National Communication of Bangladesh to the United Nations Framework Convention on Climate Change* [online] <http://unfccc.int/resource/docs/natc/bgdnc2.pdf> [accessed 19 May 2021].

Ministry of Environment and Forest (MoEF) (2013) *Bangladesh Climate Change and Gender Action Plan* [online] <https://portals.iucn.org/union/sites/union/files/doc/bangladesh.pdf> [accessed 24 May 2021].

Ministry of Environment, Forest and Climate Change (MoEFCC) (2020) *Nationally Determined Contributions 2020 (Interim): From Vision to Action* [online] <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Bangladesh%20First/Updated_NDC_of_Bangladesh.pdf> [accessed 19 May 2021].

Ministry of Water Resources (MoWR) (1999) *National Water Policy* [online] <http://nda.erd.gov.bd/files/1/Publications/Sectoral%20Policies%20and%20Plans/National%20Water%20Policy%201999.pdf> [accessed 7 June 2021].

Ministry of Water Resources (MoWR) (2000) *Guidelines for Participatory Water Management* [online] <http://warpo.portal.gov.bd/sites/default/files/files/warpo.portal.gov.bd/page/13e59421_7437_4cf1_ab12_983caa073116/GPWM.pdf> [accessed 7 June 2021].

Ministry of Water Resources (MoWR) (2005) *Coastal Zone Policy* [online] <http://nda.erd.gov.bd/files/1/Publications/Sectoral%20Policies%20and%20Plans/Costal-Zone-Policy-2005.pdf> [accessed 7 June 2021].

Ministry of Water Resources (MoWR) (2018) 'The Ministry of Water Resources' [online] <https://mowr.gov.bd/site/page/328c56b4-a102-48bc-be1c-bbc6a99c902d/Brief-History> [accessed 19 May 2021].

Mirza, M.M.Q. (1998) 'Research: diversion of Ganges Water at Farrakka and its effects on salinity in Bangladesh', *Environmental Management* 22(5): 711–22 <https://doi.org/10.1007/s002679900141>.

Morissey, J. and Oliver-Smith, A. (2013) *Perspectives on Non-Economic Loss and Damage: Understanding Values at Risk from Climate Change* [online], Bonn: Germanwatch <https://www.researchgate.net/publication/289130103_Perspectives_on_non-economic_loss_and_damage_Understanding_values_at_risk_from_climate_change> [accessed 19 May 2021].

Overseas Development Institute (ODI) and Climate and Development Knowledge Network (CKDN) (2014) *The IPCC's Fifth Assessment Report: What's in it for South Asia? Executive Summary* [online] <http://cdkn.org/wp-content/uploads/2014/04/CDKN-IPCC-Whats-in-it-for-South-Asia-AR5.pdf> [accessed 19 May 2021].

Parvez, S. (2021) 'Bangladesh qualifies for LDC graduation: the beginning of the end', *The Daily Star*, 26 February [online] <https://www.thedailystar.net/business/news/bangladesh-qualifies-ldc-graduation-the-beginning-the-end-2051333> [accessed 7 June 2021].

Preston, B.L., Dow, K. and Berkhout, F. (2013) 'The climate adaptation frontier', *Sustainability* 5: 1011–35 <https://doi.org/10.3390/su5031011>.

Rabbani, G., Rahman, A. and Mainuddin, K. (2013) 'Salinity induced loss and damage to farming households in coastal Bangladesh', *International Journal of Global Warming* 5(4): 400–15 <https://doi.org/10.1504/IJGW.2013.057284>.

Rahman, M.M., Shamsuddoha, M., Iqbal, S.M.S. and Datta, M.S. (2018) *Transferring Climate-induced Disaster Risks: Policy, Practices and Readiness of Bangladesh* [online], Dhaka: Center for Participatory Research and Development (CPRD) <https://cprdbd.org/transferring-climate-induced-disaster-risks-policy-practices-and-readiness-of-bangladesh/> [accessed 24 May 2021].

Reliefweb (2019) 'Cyclone "Fani": Joint Situation Analysis Needs Assessment Working Group – Bangladesh 2019', 13 May 2019 [online] <https://reliefweb.int/report/bangladesh/cyclone-fani-joint-situation-analysis-needs-assessment-working-group-bangladesh> [accessed 19 May 2021].

Roberts, E. and Pelling, M. (2018) 'Climate change-related loss and damage: translating the global policy agenda for national policy processes', *Climate and Development* 10(1): 4–17 <https://doi.org/10.1080/17565529.2016.1184608>.

Serdeczny, O., Waters, E. and Chan, S. (2016) *Non-economic Loss and Damage: Addressing the Forgotten Side of Climate Change Impacts* [online], Briefing Paper 3/2016, Bonn: German Development Institute <https://www.die-gdi.de/uploads/media/BP_3.2016_neu.pdf> [accessed 19 May 2021].

Shamsuddoha M., Iqbal S.M.S., Datta, A. and Rahman, M.M. (2018) *Troubled Journey towards Climate Justice: Tackling Manifest Climate Injustice in the Loss and Damage Negotiations* [online], Dhaka: CPRD <https://cprdbd.org/wp-content/uploads/2019/11/Troubled-Journey-towards-Climate-Justice.pdf> [accessed 24 May 2021].

Social Security Policy Support (SSPS) Programme (2018) 'About NSSS' [online] <http://socialprotection.gov.bd/en/2018/11/04/about-nsss/> [accessed 24 May 2021].

Social Security Policy Support (SSPS) Programme (2019) 'Social Security in Bangladesh: Budget' [online] <http://socialprotection.gov.bd/social-safety-nets-in-bangladesh-budget/> [accessed 19 May 2021].

Stamp Out Poverty, Bread for the World, Heinrich Boel Stiftung and Practical Action (2021a) *Unpacking Finance for Loss and Damage: Lessons from COVID-19 for Addressing Loss and Damage in Vulnerable Developing Countries* [online]

<https://www.robinhoodtax.org.uk/sites/default/files/Unpacking%20Finance%20for%20Loss%20and%20Damage%20brief%201%20-%20Lessons%20from%20Covid.FINAL__0.pdf> [accessed 19 May 2021].

Stamp Out Poverty, Bread for the World, Heinrich Boel Stiftung and Practical Action (2021b) *Unpacking Finance for Loss and Damage: Why Do Vulnerable Developing Countries Need Support to Address Loss and Damage?* [online] <https://www.robinhoodtax.org.uk/sites/default/files/Unpacking%20finance%20paper%202.FINAL_.pdf> [accessed 19 May 2021].

Surminski, S., Lopez, A., Birkmann, J. and Welle, T. (2012) *Current Knowledge on Relevant Methodologies and Data Requirements As Well As Lessons Learned and Gaps Identified at Different Levels, in Assessing the Risk of Loss and Damage Associated with the Adverse Effects of Climate Change* [online] <unfccc.int/resource/docs/2012/tp/01.pdf> [accessed 19 May 2021].

Swiss Re (2013) 'Swiss Re supports flood insurance for river basin residents in Bangladesh' [online] <https://www.swissre.com/our-business/public-sector-solutions/thought-leadership/flood-insurance-for-river-basin-residents-bangladesh.html> [accessed 19 May 2021].

Tanny, N.Z., Rahman, M.W. and Ali, R.N. (2017) 'Climate-induced gender vulnerabilities in northwestern Bangladesh', *Indian Journal of Gender Studies* 24(3): 360–72 <https://doi.org/10.1177%2F0971521517716808>.

UNFCCC (2011) *Report of the Conference of the Parties on its Sixteenth Session, Held in Cancun from 29 November to 10 December 2010, Addendum*, FCCC/CP/2009/11/Add.1 [online] <https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf> [accessed 19 May 2021].

UNFCCC (2013) *Report of the Conference of the Parties on its Eighteenth Session, Held in Doha from 26 November to 8 December 2012*, FCCC/CP/2012/8/Add.1 [online] <https://unfccc.int/resource/docs/2012/cop18/eng/08a01.pdf> [accessed 19 May 2021].

UNFCCC (2014) *Report of the Conference of the Parties on its Nineteenth Session, Held in Warsaw from 11 to 23 November 2013*, FCCC/CP/2013/10/Add.1 [online] <https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf> [accessed 19 May 2021].

UNFCCC (2016) *Report of the Conference of the Parties on its Twenty-First Session, Held in Paris from 30 November to 13 December 2015*, FCCC/CP/2015/10/Add.1 [online] <https://undocs.org/en/FCCC/CP/2015/10/Add.1> [accessed 24 May 2021].

UNFCCC (2020) *Report of the Conference of the Parties Serving as the Meeting of the Parties to the Paris Agreement on its Second Session, held in Madrid from 2 to 15 December 2019*, FCCC/PA/CMA/2019/6/Add.1 [online]

<https://unfccc.int/sites/default/files/resource/cma2019_06a01E.pdf> [accessed 19 May 2021].

United Nations Department of Economic and Social Affairs (no date) 'The 17 goals' [online] <https://sdgs.un.org/goals> [accessed 7 June 2021].

UNOCHA (2009) 'Cyclone Aila losses in Bangladesh estimated at 269 million USD', 22 June 2009 [online] <https://reliefweb.int/report/bangladesh/cyclone-aila-losses-bangladesh-estimated-269-mln-usd> [accessed 19 May 2021].

van der Geest, K. and Schindler, M. (2017) *Report: Handbook for Assessing Loss and Damage in Vulnerable Communities* [online], Bonn: United Nations University Institute for Environment and Human Security (UNU-EHS) <https://collections.unu.edu/eserv/UNU:6032/Online_No_21_Handbook_180430.pdf> [accessed 19 May 2021].

Verheyen, V. (2012) *Tackling Loss & Damage: A New Role for the Climate Regime?* [online], Bonn: Germanwatch <http://www.geo.uzh.ch/~chuggel/files_download/phd_colloquium/verheyen_tackling_loss_damage_cdkn12.pdf> [accessed 19 May 2021].

Vivid Economics (2020) 'New parametric insurance product to be developed for emergency flood relief costs in Bangladesh' [online] <https://www.vivideconomics.com/casestudy/new-parametric-insurance-product-to-be-developed-for-emergency-flood-relief-costs-in-bangladesh/> [accessed 19 May 2021].

Warner, K. and van der Geest, K. (2013) 'Loss and damage from climate change: local level evidence from nine vulnerable countries', *International Journal of Global Warming* 5(4): 367–86 <https://doi.org/10.1504/IJGW.2013.057289>.

World Population Review (2021) 'Bangladesh Population 2021 (Live)' [online] <https://worldpopulationreview.com/countries/bangladesh-population> [accessed 19 May 2021].

Zamudio, A.N. and J.-E. Parry (2016) *Review of Current and Planned Adaptation Action in Bangladesh* [online], CARIAA Working Paper #6 <https://www.iisd.org/system/files/publications/idl-55862-bangladesh.pdf> [accessed 19 May 2021].

Together we can create a world that works better for everyone.

Contact us

Afsari Begum
Senior Specialist Disaster Risk Reduction
Practical Action Bangladesh
Afsari.Begum@practicalaction.org.bd

Practical Action Bangladesh
House 28/A, Road 5, Dhanmondi, Dhaka – 1205

www.practicalaction.org

Flood Resilience Portal: www.floodresilience.net

Flood Resilience Alliance

Practical ACTION