Loss & Damage

A Range of Approaches to Address Loss and Damage from Climate Change Impacts in Bangladesh

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Foreword

The objective of this report is to explore the range of approaches for addressing climate change induced loss and damage in Bangladesh. At this time, there is no universally agreed definition for the term "loss and damage". To date, loss and damage has been discussed and debated within the global climate change negotiations under the United Nations Framework Convention on Climate Change (UNFCCC). While the negotiations themselves have focused on the need for enhancing understanding of how to assess and address loss and damage, there has been a concurrent international discussion, which has focused on allocating responsibility and providing compensation. However, while loss and damage is being discussed at the global level, it is being incurred at the local level. For those experiencing it, the concept of loss and damage has no meaning, but its impacts do. Thus, it is important to understand how loss and damage is being experienced within states and communities and more importantly, how it can be addressed and ultimately reduced.

Undertaking this research was challenging given that research on loss and damage was largely unchartered territory, when we began writing this paper. We grappled with understanding loss and damage ourselves and - in particular - with determining where adaptation ends and approaches to address residual loss and damage begin. We know there are boundaries and limits to adaptation but it has been challenging to determine where those boundaries lie. Our thanks go to Dr. S. M. Munjurul Hannan Khan, Professor Fuad Hasan Mallick, Professor M. Hashemi, Mr. M. Shamsuddoha and Dr. M. Asaduzzaman for their valuable input. We would also like to acknowledge the working group team members and the valued suggestions from participants in the expert workshops. Our sincere thanks are also due to Dr. Koko Warner from the United Nations University (Bonn), Sven Harmeling and Sönke Kreft from Germanwatch for their tremendous support as external reviewers and conceptual leaders. Last but not least, we would like to thank Dr. Saleemul Huq, for without his valuable input this report would not have been possible.

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List of Acronyms

ADPC	Asian Disaster Preparedness Centre
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BMD	Bangladesh Meteorological Department
BWDB	Bangladesh Water Development Board
CCA	Climate Change Adaptation
CCC	Climate Change Cell
CCCD	Commission on Climate Change and Development
CDKN	Climate Development Knowledge Network
CDMP	Comprehensive Disaster Management Programme
CDSP	Char Development and Settlement Project
CEGIS	Center of Excellence for Geospatial Information Science
CPP	Cyclone Preparedness Programme
DRR	Disaster Risk Reduction
GDP	Gross Domestic Product
GoB	Government of Bangladesh
ICCCAD	International Centre for Climate Change and Development
IPCC	Intergovernmental Panel on Climate Change
IWM	Institute of Water Modelling
LDC	Least Developed Countries
MoEF	Ministry of Environment and Forests
MoF	Ministry of Finance
NAPA	National Adaptation Programme of Action
UNFCCC	United Nations Framework Convention on Climate Change
WARPO	Water Resources Planning Organization

Executive summary

Bangladesh is one of the countries most vulnerable to climate change, but has increasingly developed national capacity to address climate change impacts. Climate-related hazards are expected to increase in frequency and intensity, however, and as such it is now becoming clear that adaptation will not be sufficient to avoid loss and damage caused by the adverse effects of climate change. At the global level the emergence and increasing prominence of loss and damage in the international climate negotiations is a result of the failure of both mitigation and adaptation efforts to minimise the impacts of climate change. While there is no universal definition of climate change it has been described as "impacts on human systems, which are often channelled through the negative impacts of climate change on natural systems" (UNFCCC, 2012a). The authors understand loss and damage to be current or future negative impacts of climate change that cannot be addressed by adaptation efforts. Loss can be thought of as irrecoverable negative impacts while damage can be characterised as those that can be recovered. In 2010, a work programme was created under the United Nations Framework Convention on Climate Change (UNFCCC) to enhance understanding of loss and damage and the possible means to address it. The work programme has had the following three thematic areas: (1) Assessing the risk and current knowledge of loss and damage, (2) Exploring a range of approaches to address loss and damage, including impacts related to extreme weather events and slow onset event (3) Determining the role of the Convention, or the UNFCCC, in enhancing the implementation of approaches to address loss and damage. This technical paper addresses questions relating to thematic area 2.

Approaches to address loss and damage from both extreme events and slow onset processes can be divided into four categories. These include risk reduction, risk retention (social safety nets and contingency funds), risk transfer (insurance) and approaches to specifically target loss and damage from slow onset processes. Risk reduction measures can be structural or non-structural in nature. Structural approaches can be expensive, but in general, investment in risk reduction measures is offset by the avoidance and reduction of loss and damage. Frequent flooding is responsible for significant loss and damage in Bangladesh and thus the focus of risk reduction approaches. Structural risk reduction methods for floods and storm surges include dykes, recognised as one of the most economical means for flood control. Over the last 50 years, the Bangladesh Water Development Board (BWDB) has completed roughly 700 flood control, drainage and irrigation projects at a cost of about USD 3 billion. Other structural approaches undertaken include the construction of embankments and multi-purpose cyclone shelters, reforestation efforts as well as the building of river closures to reclaim land from siltation.

Non-structural risk reduction measures include risk identification, which allows relevant institutions to take the action needed to reduce impacts and early warning systems, which have recently undergone a re-design to simplify them, reducing the number of agencies involved and increasing efficacy. Traditionally early warning systems have worked well at the district level, but not at the sub-district level. There are also rehabilitation and relocation programs, which address issues like inadequate housing or weak emergency services and infrastructure. In general, there are some inadequacies in risk reduction measures. For example, many structural adaptation measures currently in place are not adequate to offset the risk of increasing loss and damage, especially with the level of predicted climate change. In addition, most of the flood and water management projects in Bangladesh were initiated without considering the needs of local beneficiaries. One risk reduction approach that seeks to address loss and damage concerns in conjunction with development needs is climate resilient agricultural development, which includes the development of saline tolerant crop varieties and the provision of agricultural emergency support, which has helped prevent post-disaster crop loss. Given the predominance of livelihoods dependent on agriculture, as well as the way in which climate change threatens food security, approaches to address loss and damage must enhance agricultural productivity.

Recommendations for improving risk reduction efforts in order to address – and ultimately reduce – loss and damage include increasing the coverage of structural protection measures, implementing national plans, mainstreaming risk reduction into integrated land management projects to promote resilience and communicating early warnings in a way that is more easily understood by communities.

Risk retention efforts focus on resilience building and providing a cushion when the impacts of climate change damage assets and result in the loss of livelihoods – and in some cases – lives. Risk retention initiatives currently underway in Bangladesh include food for work programmes and other social safety nets as well as

emergency food distribution, a common method used in Bangladesh in the aftermath of extreme events.

There are some challenges associated with implanting risk retention approaches to address loss and damage in Bangladesh. Social safety net programmes are not always targeted to those who most need support. For example, a study by UNDP (2006) found that as much of 27 percent of the beneficiaries of social safety net programmes in Bangladesh are not living in extreme poverty. Corruption can also lead to less successful outcomes and those most in need do not always benefit from social safety net programmes. For example, a study by Morshet (2009) found that as much of 27 percent of the beneficiaries of social safety net programmes in Bangladesh are not living in extreme poverty. Recommendations for risk retention measures include better targeting of the extreme poor and enhanced monitoring of corruption.

The third approach to addressing loss and damage covered in this study is risk transfer, which shifts economic risks from an individual or organisation to an insurer. The transfer of risk is primarily done through insurance mechanisms, such as microinsurance. However, there are some significant barriers to implementing successful microinsurance programmes in Bangladesh including the extremely low penetration rate of insurance (0.9 percent) in the country. Crop insurance schemes have been implemented in the past in Bangladesh but have suffered extreme losses due to bad programme design, including universal premium levels. Most microinsurance schemes currently underway in Bangladesh are not cost-effective and need external funding. Thus, the implementation of microinsurance as part of a package of approaches to address loss and damage will be challenging, but not impossible if the products are designed well. However, in order to protect insurers and re-insurers international mechanisms to link the national to the international should be in place.

A fourth category of approaches to address loss and damage is specifically aimed at slow onset processes like sea level rise. The Cancun Agreements defines slow onset events as sea level rise, increasing temperatures, ocean acidification, glacial retreat and related impacts, salinisation, land and forest degradation, loss of biodiversity and desertification. In Bangladesh, sea level rise is projected to displace from 14 million to 30 million people given a one-metre rise in sea level by 2100. Migration is one approach to address loss and damage from slow onset processes and covers a spectrum from forced displacement to voluntary, temporary migration to seek livelihood opportunities. In order to facilitate migration – both internally and internationally – proper policies will need to be in place to ensure migration helps address (and reduce) loss and damage, promote resilience, and enhance development.

There are also institutional and governance-based approaches to address loss and damage. Good governance structures ensure appropriate responses to climate change induced loss and damage and disaster risk management and climate change adaptation should be integrated into a range of development activities. To build a national mechanism to respond to loss and damage, appropriate institutional mechanisms for enabling finance and technology transfers, as well as mainstreaming loss and damage into development programmes are needed.

Many effective adaptation and risk reduction measures are already being undertaken in the country, but gaps and challenges remain. None of the above outlined approaches can offset loss and damage risk individually. In addition, funding is critical and it remains to be seen if sufficient funding will come from developed countries and if so, if these funds will be accessible. Technology will be needed to facilitate and enhance the implementation of approaches to address loss and damage. The voices of local people at the community level must be involved in the national and international planning and decision-making processes. Finally, good governance with regards to climate change and risk of loss and damage is critical in local, national, regional, and international forums.

1. Introduction

1.1. Background

It is widely recognised that developing countries – those least responsible for climate change – will bear the brunt of its impacts (Huq et al., 2003). In economic terms, disaster losses from weather, climate, and geophysical events are greater in developed countries (IPCC, 2012). However, fatalities and losses as a proportion of GDP are more significant in developing countries (Ibid). Moreover, these estimates do not take into account losses that are difficult to quantify – or non-economic losses – such as loss of life, culture, and ecosystem services (Ibid).

losses as a proportion of GDP are more significant in developing countries

Frequent exposure to natural hazards combined with widespread poverty results in the loss of life, damage to infrastructure and economic assets, and adversely impacts lives and livelihoods, especially those of the extreme poor. Bangladesh, one of the countries most vulnerable to climate change (Maplecroft, 2010; Harmeling and Eckstein, 2012), experienced a total of 247 extreme events between 1991 and 2011. The average annual death toll was 824, equivalent to 0.6 people per 100,000 inhabitants (Harmeling and Eckstein, 2012). In addition to the loss of life, the annual average financial loss from extreme events is estimated at nearly USD 1.7 billion, equivalent to 1.18 percent of annual GDP in Bangladesh (Ibid).

Bangladesh has developed significant national capacity to address climate change impacts

While clearly vulnerable, Bangladesh has developed significant national capacity to address climate change impacts. Climate change adaptation (CCA), disaster risk reduction (DRR), and to some extent mitigation measures are a priority on the political agenda. However, despite successful adaptation efforts, it is now becoming clear that adaptation will not be sufficient to avoid all loss and damage caused by the adverse effects of climate change, especially given the fact that we are on track for an increasingly warmer world (Ibid).

As of yet, there is no definition of the term loss and damage under the UNFCCC. However, for the purposes of this paper, a working definition of loss and damage will be used. Loss can be thought of as irrecoverable negative impacts while damage can be characterised as those that can be recovered (UNFCCC, 2012a). The authors understand loss and damage to be current or future negative impacts of climate change that will not be addressed by adaptation efforts.

Although the issue of loss and damage was raised early on in the UNFCCC negotiations, it has only gained prominence within the past few years. In December of 2010 at COP 16 in Cancun, a work programme on loss and damage was created under the Subsidiary Body for Implementation (SBI) in order to enhance understanding of loss and damage and the possible means to address it (UNFCCC, 2011). At the 34th session of the SBI in June of 2011, the work programme was further differentiated into three thematic areas: (1) Assessing the risk and current knowledge of loss and damage, (2) Exploring a range of approaches to address loss and damage, including impacts related to extreme weather events and slow onset event, and (3) Determining the role of Convention in enhancing the implementation of approaches to address loss and damage (UNFCCC, 2011). Later that year at COP 17 in Durban, questions related to enhancing understanding of each thematic area were decided on and included in the annex of the decision (UNFCCC, 2012b).

To a large extent, it is unclear what specific loss and damage climate change will bring in the future. Thus, without a thorough understanding of what the future impacts of climate change might be, policy makers and planners will be unable to implement plans that adequately address – and ultimately reduce – loss and damage from these impacts.

Loss and damage is still a new concept and thus there are not yet approaches that were developed to specifically address loss and damage in Bangladesh. However, Bangladesh has established policies and developed institutions and strategies to address climate change impacts. This paper will provide an overview of some of these on-going initiatives relevant to addressing loss and damage and will make some key recommendations on further action that could be taken to reduce loss and damage in the national context of Bangladesh.

The linkage between the local or national and the global in loss and damage research is an important one. At

COP 18, which took place in Doha in December of 2012, Parties decided to establish institutional arrangements to address loss and damage in developing countries – including the possibility of an international mechanism – at COP 19 in Warsaw, Poland in late 2013 (UNFCCC, 2013).

progress in one country – in this case Bangladesh – can inform other least developed countries (LDCs) in developing potential pathways for understanding and addressing loss and damage

However, in order to benefit from international arrangements at the international level, countries will have to establish institutions to address loss and damage at the national level. Moreover, while discussions on loss and damage take place at the global level, responsibility for implementing approaches to addressing loss and damage within state borders ultimately lies with national governments. Therefore, there is a need to understand the national context and the range of implementation options available for loss and damage at the national level. In addition, progress in one country – in this case Bangladesh – can inform other least developed countries (LDCs) in developing potential pathways for understanding and addressing loss and damage.

1.2. Methodology

This technical paper addresses questions relating to thematic area 2 of the Work Programme on Loss and Damage: "A range of approaches to address loss and damage associated with the adverse effects of climate change, including impacts related to extreme weather events and slow onset events, taking into consideration experience at all levels" (UNFCCC, 2011). The paper will address the following research questions:

1. What are the needs for approaches to address loss and damage in view of historical and future exposures?
2. What are the existing approaches to address loss and damage in Bangladesh?
3. What are their respective gaps and challenges and what entry points and responsibilities exist at the sub-national, national, and international levels?

The research undertaken for the purpose of this paper was primarily secondary in nature. However, the authors have significant experience undertaking research on a range of issues related to climate change in Bangladesh and have worked with vulnerable communities throughout the country. The paper has borrowed the structure of the literature review on approaches to address loss and damage commissioned by the UNFCCC and undertaken by the United Nations University Institute for Environment and Human Security.

The paper will set the context by first providing a historical overview of loss and damage in the national context of Bangladesh. It will then proceed with an overview of approaches to address loss and damage associated with the adverse effects of climate change. Finally, the paper will draw on the previous chapters to provide a conclusion and recommendations. The goal is to provide policymakers and other decision makers in Bangladesh with information that will help them make decisions and implement approaches to address – and ultimately reduce – loss and damage in Bangladesh. However, given that the institutional arrangements to address loss and damage are being contemplated at the international level, this paper will also provide important information about the needs at the national level, at least in one context. Ultimately, the recognition and understanding of national capacities and needs can help inform the design of institutional arrangements to address loss and damage at the international level.

2. Loss and Damage in the Context of Bangladesh

Bangladesh is often characterised as one of the world's most vulnerable countries to climate change. Situated in the wide Ganges delta plain with a coastline about 700 kilometres long and with most of the country sitting at less than 12 metres above sea level, Bangladesh is extremely exposed to natural hazards. Floods, tropical cyclones, drought, and storm surges occur frequently. These, together with other negative environmental impacts such as deforestation, soil degradation, erosion, and salinisation - as well as social vulnerability due to extreme poverty, high population density, and a lack of safety nets - make Bangladesh extremely susceptible to climate change (Akter, 2012).

Moreover, it is expected that due to increasing climate change, the frequency and intensity of natural hazards will rise, affecting agriculture, water and food security, infrastructure as well as human health and especially impacting those populations already most vulnerable such as women, children, elderly, and the disabled (Ibid). The following chapter outlines historical loss and damage, trends - where possible - as well as future projections for Bangladesh.

2.1. Type of Events and Historical Loss and Damage

2.1.1. Flooding

Flooding is a regular occurrence in Bangladesh. On average, nearly one quarter of Bangladesh is flooded each year (Ahmed and Mirza, 2000). Bangladesh experiences four types of floods: flash floods, rain floods (due to poor drainage), monsoon floods, and coastal floods (IPCC, 2012: 254).

On average, nearly one quarter of Bangladesh is flooded each year

Analysis of past flood records indicates that every four or five years a severe flood occurs in Bangladesh, submerging more than three-fifths of the landmass (MoEF, 2009). Since 1954, the country has experienced 21 above-normal floods (World Bank, 2010). The most recent severe flood, which occurred in 2007, inundated 62,300 sq. km or 42 percent of total land area, causing 1,110 deaths and affecting 14 million people (BWDB, 2007). A total of 21,000 sq. km of agricultural land was submerged, 85,000 homes completely destroyed and 31,533 km of road damaged (Ibid). The estimated loss of assets from this one event totalled USD 1.1 billion (Ibid).

Nevertheless, the relative severity of impacts from above-normal floods in Bangladesh has decreased substantially since the 1970s as a result of improved macroeconomic management, increased resilience of the poor, progress in disaster management and the construction of flood protection infrastructure (World Bank, 2010). Despite flooding twice the area, a flood in 1998 produced significantly less damage with a loss of 4.8 percent of GDP compared to the 1974 flood, in which loss and damages were estimated to be equivalent to 7.5 percent of GDP (Islam and Mechler, 2007). Floods have significant repercussions for development in Bangladesh (Ahmed and Ahmed, 2003 in Nicholls et al., 2007:343). The impacts of increased flooding are especially significant in urban slums (IPCC, 2012).

the frequency of big flood events has been increasing

In recent years, the frequency of big flood events has been increasing (Rahman et al., 2011). Rain has a significant impact on flood levels, especially during monsoon season. While no substantial trends in annual and seasonal rainfall have been observed in Bangladesh (Rahman et al., 2011), above average rain anomalies have been occurring since the 1960s (Mirza and Dixit, 1997; Mirza, 2002).

Future Projections

A number of hydrological models (Mirza and Ahmad, 2005; Tanner et al., 2007; CCC, 2009a) have been used to assess the impact of climate change on the riverine flooding of Bangladesh and have shown that the frequency of monsoon floods in Bangladesh could nearly double with an increase in global temperature of 2^0C.

2.1.2. Cyclones

A severe tropical cyclone hits Bangladesh, on average, every three years (MoEF, 2009). These storms generally form during the pre (April-May) and post-monsoon (October-November) periods and are accompanied by high winds sometimes reaching 250 kilometres per hour or more, creating three to 10 metre high waves, causing extensive damage to life, property, and livestock (World Bank, 2010).

A severe tropical cyclone hits Bangladesh, on average, every three years

Bangladesh's vulnerability to cyclones is exacerbated by the shape of the coastline and low, flat terrain combined with high population density and poorly built infrastructure (World Bank, 2000). In fact, 60 percent of the cyclone-related deaths that occurred worldwide between 1980 and 2000 were in Bangladesh (Nicholls et al., 2007). In 1991, a devastating cyclone hit the coastal region, accompanied by a tidal bore, which was between five and eight metres high with winds of up to 240 kilometres per hour (Paul, 2009). This cyclone resulted in the loss of 150,000 lives as well as the death of 70,000 cattle, and a total economic loss of about BDT 60 billion – USD 761 million (Ibid). In comparison,

Cyclones Sidr of 2007 and Aila of 2009 resulted in similarly devastating economic loss and damage, but cost much fewer lives at 3,243 and 330 deaths, respectively (Shamsuddhoha et al., forthcoming).

Future Projections

The IPCC's Fourth Assessment Report – known colloquially as AR4 – indicated that cyclone activity has already increased and predicted that it would continue to increase in coastal areas (Nicholls et al., 2007:320). A study by Unnikrishnan et al. (2006) predicted an increase in both the frequency and magnitude of tropical cyclones in the Bay of Bengal by 2050, resulting in heavy precipitation in the region. However, more current research in the IPCC's Special Report on Extreme Events (SREX) states that "it is likely that the wind speed of cyclones will increase but that the global frequency of cyclones with likely either decrease or remain the same" (IPCC, 2012:13). That said, the extent of loss and damage a cyclone inflicts when it makes landfall depends on levels of exposure and vulnerability (IPCC, 2012:6).

2.1.3. Drought

In the last 50 years, Bangladesh has experienced about 20 drought events (Ramamasy and Baas, 2007), a few of which have led to famine.

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There are two critical dry periods in Bangladesh occurring from January to May and from June to October, with the north-western districts especially affected (Karim et al., 1990). During the first annual dry season, 12.000 sq. km of cropland experience drought, resulting in more than 40 percent losses of pre-monsoon rice crops annually (Ramamasy and Baas, 2007). On average roughly 23.000 sq. km are affected by drought each year during the second dry season (Ibid). In the 1990s, dry conditions in north-western Bangladesh led to a reduction in rice production of 3.5 million tonnes (Ibid). In the past, severe droughts have typically affected about 47 percent of the landmass and 53 percent of the population (Ibid).

Future Projections

Drought is yet another hydro-meteorological event that is expected to intensify in Bangladesh due to the effects of a changing climate. It is predicted that evapotranspiration will increase significantly, especially during the post-monsoon and pre-monsoon seasons (Mirza and Ahmad, 2005). Combined with diminishing rainfall in the winter months and already erratic rainfall patterns, this will increase moisture stress, particularly in the north-western districts and lead to more frequent and intense droughts (Huq et al., 1996). One estimate suggests that the area severely affected by drought during the first annual dry season could increase from 4,000 to 12,000 sq. km under a severe climate change scenario (Ibid). Climate change scenarios show that the western parts of the country will be at greater risk of drought (Ramamasy and Baas, 2007).

Under a severe climate change scenario the yield of winter rice could be reduced by between 55 to 62 percent

Under a severe climate change scenario the yield of winter rice could be reduced by between 55 to 62 percent (Ibid). A climate scenario with an increase in temperatures of 2°C and a reduction in precipitation of 10 percent would reduce runoff in the Ganges, Brahmaputra, and Meghna rivers by 32, 25, and 17 percent, respectively (Mirza and Dixit, 1997), which could lead to drought and threaten food security (Ahmed, 2006).

2.1.4. Rivers

The contours of the rivers in Bangladesh are in constant flux. The main rivers are formed by a number of interwoven channels that create a number of islands (chars), which are highly exposed to changes in river conditions (Sarker et al., 2003).

Many of the char inhabitants live in extreme poverty and their vulnerability is exacerbated by both a hazardous environment and challenging socio-economic conditions (Ibid).

Future Projections

Recently, the Center for Environmental and Geographic Information Services (CEGIS) completed a study on the impact of climate change on Bangladesh's rivers which showed that for the Jamuna River, a 10 percent increase in maximum discharge would result in a 25 percent increase in river bank erosion (CEGIS, 2010). In the case of the Padma River, a 10 percent increase in maximum

discharge would result in a nine percent increase in riverbank erosion (Ibid).

2.1.5. Sea Level Rise

Sea levels continue to rise due to climate change. It has already been observed that the mean annual water level in the south-west region is increasing by 5.5 millimetres per year (Rahman et al., 2011). The highest rise in water level, 7.4 millimetres per year, has been observed in the south-east, followed by 7.04 mm per year in the Sandwip area and 5.05 mm per year in Cox's Bazar (Ibid). The impacts of sea level rise are already visible and include salinisation of agricultural land and the resulting increase in pathogen and water borne diseases (Nishat et al., forthcoming).

Future Projections

Sea level rise is the slow onset process posing a significant threat to Bangladesh. A study by the Institute for Water Modelling (IWM) and the Center for Environmental and Geographic Information Services (CEGIS) conducted in 2007 showed that under the IPCC's A2 emission scenario[1] predicted that the sea level will rise 62 centimetres by 2080, which could lead to the flooding of 4,690 sq. km or 13 percent of the landmass of the coastal region.

with a sea level rise of 88 centimetres by 2100, saline water could penetrate up to 40 kilometres inland

Salinisation is another impact that can be partially attributed to sea level rise. A study by the Bangladesh Water Resources Planning Organization (2005) suggested that with a sea level rise of 88 centimetres by 2100, saline water could penetrate up to 40 kilometres inland, affecting a significant part of the coastal zone. Sea level rise also has significant implications for biodiversity. In addition, sea level rise will lead to the loss of coastal wetlands and subsequently of the biodiversity dependent on these ecosystems (McFadden et al., 2007 in Nicholls, 2007:328).

2.1.6. Summing up

As elucidated above, Bangladesh is vulnerable to a variety of climate impacts, from both extreme events and slow onset processes. Current trends and projections for the future indicate that climate change and the impacts that come with it will likely continue to worsen. In a country with 50 million people living below the poverty line (MoEF, 2009) climate change stands to impede development. Thus, it is important to develop, establish, and enhance a range of approaches to address loss and damage from both extreme events and slow onset processes. The following section will provide an overview of approaches already in place as well as those that are needed to address – and ideally reduce – loss and damage, reduce vulnerability, and help promote climate resilient, sustainable development.

3. A Range of Approaches to Address Loss and Damage

Despite adaptation and mitigation efforts, some climate impacts are inevitable and will ultimately culminate in residual loss and damage. Thus, managing loss and damage will require enhanced adaptation and mitigation efforts in order to reduce hazard, exposure, and vulnerability.

managing loss and damage will require enhanced adaptation and mitigation efforts in order to reduce hazard, exposure, and vulnerability

Approaches to address loss and damage can be grouped into four overarching categories including risk reduction, risk retention, and risk transfer approaches as well as specific approaches to address loss and damage from slow onset processes (UNFCCC, 2012b). Equally important is the existence of good institutional and governance arrangements (Ibid). This chapter analyses approaches to address loss and damage currently in place in Bangladesh.

[1] 'The A2 storyline and scenario family describes a very heterogeneous world. The underlying theme is self-reliance and preservation of local identities. Fertility patterns across regions converge very slowly, which results in continuously increasing global population. Economic development is primarily regionally oriented and per capita economic growth and technological change are more fragmented and slower than in other storylines' (Nakicenovic et al., 2000).

3.1. Approach 1: Risk Reduction

In 1970, a category 3 cyclone hit Bangladesh – leaving 500,000 dead (Paul, 2009). In response, the Government of Bangladesh (GoB) established the Cyclone Preparedness Programme in 1972 under the Ministry of Disaster Management and Relief and the Bangladesh Red Crescent Society, which has focused on developing early warning systems and providing cyclone shelters (Ibid). In the last few decades, risk reduction and adaptive capacity have helped reduce the number of deaths resulting from extreme events in Bangladesh (Murray et al., 2012). Traditional risk reduction approaches for addressing loss and damage primarily deal with reducing hazards, exposure, and vulnerability prior to the occurrence of extreme events. This paper will follow the definitions of these terms as laid out in the IPCC's SREX Report (IPCC, 2012). The report characterises exposure as "the presence of people, livelihoods, environmental services and resources; infrastructure; or economic, social or cultural in places that could be adversely affected" (Ibid:5). Vulnerability is defined as "the propensity or predisposition to be adversely affected" (Ibid). For the purposes of this paper, hazards will refer to those related to climate change and spanning a spectrum from extreme events to slow onset processes like sea level rise, with impacts like droughts falling somewhere in between.

Generally, risk reduction approaches can be divided into structural and non-structural measures. Structural risk reduction approaches are infrastructure-based and include the construction of dykes, polders (a low-lying tract of land enclosed by an embankment or raised bank) and the strengthening of buildings – among other approaches. Non-structural risk reduction measures, on the other hand, focus on planning, changing behaviour, and providing early warning. Traditionally, risk reduction efforts have often been conflated with adaptation strategies. However, under current and predicted future climate change scenarios loss and damage evolves when adaptation efforts are not enough, adaptation is not cost effective, no adaptation is in place, or when adaptation is happening at the cost of "erosive coping" (Warner et al., 2012).

3.1.1. Structural Risk Reduction Approaches

Structural Adaptation for Flood and Storm Surges

In Bangladesh, dykes have been built for the protection against flood and storm surges for thousands of years. Building dykes is one of the most economical means of flood control, requiring only basic technology and traditional knowledge (ADPC, 2005). Sand bagging is also a very common mechanism of flood proofing (Brammer, 2004). The Bangladesh Water Development Board is the main body responsible for building protective and water management infrastructure to provide flood-free secured land for agriculture and enhance the safety of human settlements. Over the last 50 years, the BWDB completed roughly 700 flood control, drainage, and irrigation projects – consisting of a total of 14,000 km of embankments, 13,000 ancillary structures and 3,500 km of drainage channels - at a cost of about USD 3 billion (BWDB, 2011). Despite being largely effective at reducing flood risk, there are concerns about environmental degradation caused by the construction of structural measures as well as the lack of capacity for maintenance (CCC, 2009d).

Integrated Land, Water, and Natural Resources Management

A notable land and water management initiative is the GoB's Char Development Sector Project (CDSP) to promote integrated development of char areas in the south-central coastal region of Bangladesh. Activities include the construction of embankments, multi-purpose cyclone shelters, rural roads and bridges, the drilling of deep tube wells, reforestation efforts as well as the building of river closures to reclaim land from siltation (BWDB, 2011).

In Bangladesh, traditionally natural resource management projects have focused on the agricultural and water sectors, which the authors contend does not necessarily promote social resilience. With this in mind, CDSP has introduced integrated land, water, and natural resource management projects, which have components on safe water supply and sanitation as well as education and health, among others. Apart from BWDB, several other departments under different ministries also worked jointly for integrated land development, including the Department of Public Health Engineering, the Department of Forests, the Department of Environment, the Public Works Department, the Local Government Engineering Department and the Department of Agricultural Extension. In the authors' opinion, this project is a good example of promoting resilience from a holistic perspective as it links disaster risk management, the provision of basic services and economic development projects.

Cyclone Shelters and Disaster Resilient Housing

As mentioned above, in comparison to the 1991 cyclones, Sidr and Aila – in 2007 and 2009 respectively – resulted in much less loss of life, which is in large part due to the government's Multipurpose Cyclone Shelter

Programme (Rahman and Mallick, forthcoming). Multipurpose cyclone shelters are designed such that they can accommodate people as well as their livestock. During normal periods the shelters are often used as schools or community meeting places. Programmes to build cyclone shelters have been undertaken by a number of different agencies and organisations including the Public Works Department (PWD), the engineering departments of local authorities as well as donors and NGOs. As of 2011, a total of 2,500 cyclone shelters had been built (Zimmerman and Stössel, 2011). The Swiss Development Agency has constructed 12 multi-purpose shelters – serving a total of 16,000 people – each of which can accommodate 900 small animals or 300 cattle (Ibid).

There are some challenges that can detract from cyclone shelter use, however, including high rates of non-evacuation that persist for a myriad of reasons. Many members of the middle and upper classes are reluctant to go to cyclone shelters as they wish to maintain their status and fear losing their assets[2]. Many women also choose not to use shelters as sometimes there is no separate space for men and women (Cutter, 2012) and there are also incidences of violence against women in shelters, which sometimes prevents poor and vulnerable women from making use of them. In addition, shelters are frequently not maintained properly as this involves technical capacity often not available in rural areas (Rahman and Mallick, forthcoming).

local knowledge is not always incorporated into the construction of cyclone shelters, which can make them less effective

Moreover, local knowledge is not always incorporated into the construction of cyclone shelters, which can make them less effective (ActionAid, 2005 in IPCC, 2012: 305).

In addition to these challenges and issues with cyclone shelters, people are not always willing to go to shelters because they are afraid of leaving assets and livestock behind (MoEF, 2009). The authors have observed that often other infrastructures are not safeguarded against destruction and thus once people leave the shelters many are confronted by extensive damage to their homes and other buildings. For those who choose to remain in their homes to protect their assets during cyclones and other extreme events, disaster-resilient housing has drastically reduced the loss of life during recent cyclones.

3.1.2. Non-Structural Risk Reduction Approaches

Risk Identification

The early identification of populations, environments, and infrastructure at risk allows the relevant institutions to take action needed to reduce loss and damage (Wilby et al., 2009). In recognition of this, the Comprehensive Disaster Management Programme (CDMP) of the GoB has carried out more than 550 local level community risk assessments and risk reduction action plans, positively affecting 15 to 20 million people.

More sophisticated risk identification techniques that would enable the assessment of risk at different climate change scenarios using more advanced climate models, however, have not been developed for use in Bangladesh. This is due to various factors such as uncertainties of future climate change as well as imprecision of the models themselves (Islam, 2008; Islam et al., 2008).

Early Warning Systems

The huge death toll – 500,000 – in the wake of Cyclone Bhola in 1970 was blamed on the absence of early warning systems and cyclone forecasts (Paul and Dutt, 2010). In the past two decades Bangladesh has made significant efforts to develop and enhance early warning systems for floods, cyclones and other climate-related events. The Bangladesh Meteorological Department (BMD) is responsible for providing forecasts and issuing warnings for severe weather phenomena such as tropical cyclones, tornadoes, violent thunderstorms, and heavy rainfall. The Cyclone Preparedness Programme's (CPP) headquarters in Dhaka, having being informed by the BMD about an approaching cyclone, circulates a warning to their six zone offices. From there the cyclone warning is disseminated to the Upazila[3] (sub-district) and subsequently Union level

[2] This information is based on the discussions of two of the authors with communities in the coastal region of Satkhira.

[3] Bangladesh is comprised of 7 divisions, 64 districts, which are further divided into 493 sub-districts or Upazillas.

(sub-district) offices and the corresponding CPP units. The unit team leaders, together with volunteers, immediately visit nearby villages, where they disseminate cyclone warnings using megaphones, hand sirens, and cyclone warning flags. Recently, early warning systems have had to be redesigned to reduce complexity, increase efficacy, and decrease the number of agencies involved in their delivery (Rahman et al., 2011). However, early warnings need to be communicated in language that is easier for end users to understand and disseminated more widely[4].

Enhancing Agricultural Resilience

Achieving higher agriculture productivity is a priority of the GoB, with the ultimate aim to meet the nutritional needs of the growing population (GoB, 2011). Reducing the vulnerability of the agriculture sector to climate change can be achieved by decreasing the sensitivity of crops and increasing the adaptive capacity of the agricultural system.

In an effort to decrease the sensitivity of crops to climate change impacts, researchers have successfully developed a species of rice that is saline-resistant (Sarwar, 2005). In addition, researchers are currently working to develop species that are tolerant to drought and floods (Reddy et al. 2009). In addition, the Bangladesh Rice Research Institute developed a short-duration rice called BR-33, which can be harvested within 110 to 115 days of planting. This rice crop will help reduce seasonal unemployment in drought prone regions (Finance Division, 2011). To increase the adaptive capacity of the agricultural system, the GoB has been pursuing the development of a modern agricultural system through the implementation of agricultural extension policies, simplification of the disbursement procedures for agricultural credit, and enhancing opportunities for investment in agriculture (GoB, 2011). Given that climate change impacts are already reducing agricultural yields and threatening food security, these programs are important and need to be enhanced.

3.1.3. Cost Effectiveness of Risk Reduction Measures

In general, investment in risk reduction measures is offset by the avoidance and reduction of loss and damage (UNFCCC, 2012a).

> *investment in risk reduction measures is offset by the avoidance and reduction of loss and damage*

For example, the estimated costs of structural adaption measures (e.g. coastal boulders, cyclone-resilient housing in the coastal region and multi-purpose cyclone shelters) together with non-structural measures (e.g. the strengthening of early warning systems) are USD 5.5 billion, which could save an estimated USD 9.2 billion in loss and damage in the occurrence of a single severe storm event (World Bank, 2010). In addition, an investment of USD 2.6 billion could protect infrastructure worth USD 2 billion or 4.8 percent of GDP in the case of a single extreme flood event (Ibid). This may not appear to be a sound investment; however, because benefits of the investment will accrue and multiply over a long period of time it will create a positive return rate. Risk reduction measures generally accrue higher rates of return than that of other risk management options or approaches. However, the operating and maintenance costs are also significant and often exceed the resources available to local authorities.

3.1.4. Foundational Requirements for Risk Reduction Measures

In order to successfully implement risk reduction measures to address loss and damage financial, technical and capacity building needs will have to be met. That said, there must also be a supportive environment including institutions that will help ensure that risk reduction measures take into account the needs of communities. The literature review undertaken by UNU (UNFCCC, 2012a: 12) found the following to be the most important foundational requirements: A strong institutional basis, the protection of critical public facilities, the collection and use of risk data, the integration of disaster risk reduction strategies into climate change policies, land-use planning, building codes and rural development plans as well as the addressing of underlying socio-economic risk factors.

Upazillas are further divided into Union Parishad's (4,451 in total), each of which has nine wards.

[4] This information is based on the lead author's discussions with communities throughout Bangladesh during field work undertaken to community-level responses to climate change impacts.

	Non-Structural	*Structural*
Financial Requirements	• Only one percent of the total investment (for risk reduction measures) is needed for non-structural risk reduction measures, requiring USD 390 million	• Water supply and sanitation: USD 25.8 billion • Irrigation and drought management: USD 3.6 billion • Flood management: USD 3.5 billion • Coastal protection: USD 3.1 billion • Urban drainage: USD 1.8 billion • Erosion control, dredging: USD 400 billion
Infrastructure or Equipment needed	• Awareness building in communities and establishment of community shelter committees	• Repair and reconstruction of cyclone shelters and approach roads/tracks • Repair and maintenance of existing coastal polders, planning and designing for new polders in coastal belts and islands • Plan, design and cost immediate repairs of existing dykes, based on projected sea level rises and storm surges • Improvement of urban drainage • Plan, design and construct flood management infrastructure (embankments and/or others as appropriate) in light of likely future flood levels • Installation of a telemetric network and weather and hydrological RADARS, and development of Digital Elevation Models • Plan and develop coastal green belts as a measure against storm surge
Information & Data	• Risk mapping • Flood warning • Flood vulnerability map based on future projected climatic parameters	• Risk mapping • Flood warning • Flood plain zoning
Technical Capacity (Experts, etc.)	• Knowledge on climate science and scenarios • Risk assessment capacity • Economic impact assessment capacity • Capacity to assess indirect loss and damage • Capacity to identify social vulnerability • Capacity to mainstream risk reduction in national planning, financial policies • Capacity to mainstream indigenous knowledge and community-level risk reduction measures into national-level adaption planning	• Capacity to implement pilot and demonstration projects (e.g. engineering)

Table 1: Foundational Resource Requirements for Risk Reduction Approaches in Bangladesh (UNDP, 2011)

3.1.5. Analysis of Risk Reduction Approaches in the Context of Bangladesh

Structural Approaches

- Structural adaptation currently in place in Bangladesh is not adequate to offset the risk of enhanced loss and damage. Particularly, the coastal defence infrastructure, including dykes and drainage systems, needs retrofitting and some unprotected areas should be brought under coverage (World Bank, 2010).
- Several studies have concluded that many of the flood and water management projects in Bangladesh were initiated without considering the needs of local beneficiaries (Mukherjee, 2004). Adaptation to climate change induced loss and damage needs to include the voice of communities as impacts will be felt most at the local level.

Non-structural Approaches

- While the National Water Management Plan initiated in 2001 proposed 84 portfolio projects, to date none of these recommended projects has been implemented due to a lack of resources (WARPO, 2001).
- Moreover, post-project monitoring and management of adaptation projects is a critical issue that is also often neglected (Mukherjee, 2004). Experience has shown that integrated land management projects often fail to build the resilience of local communities because due to a lack of awareness the general population does not prioritise disaster management activities (Ibid).
- Even though disaster resilient housing has been characterised as a positive risk reduction example in the coastal region of Bangladesh, a proper evaluation will only be possible after the occurrence of another extreme event.
- Comprehensive climate change risk assessment data is not yet available (MoEF, 2012). This is due to a lack of downscaled climate, hazard, exposure, and vulnerability scenarios (Ibid).
- To some degree, early warning systems work well, especially at the district level, however the extent to which these warnings reach the sub-district level is not yet adequate (MoEF, 2012).
- While the government provides much needed rehabilitation and relocation support to people in need, the main priority of the state should be ensuring the ability of communities to remain in their communities of origin by undertaking the necessary risk reduction measures.

3.1.6. Recommendations for Risk Reduction Approaches

- More uncovered areas need structural protection; especially along the coastal lines more than 1500 kilometres of unprotected areas need to be protected by embankments and ancillary structures (Mukherjee et al., 2011).
- The implementation of existing national plans is imperative as is the mainstreaming of DRR into development policies and programs.
- Integrated land management projects and land zoning need to focus more on disaster resilience, starting from reducing exposure through infrastructural options to a range of non-structural options for vulnerability reduction.
- Positive risk reduction examples like disaster-resilient housing need to be replicated. However, prior to mass replication in depth evaluations including environmental and social impact assessments are necessary.
- Comprehensive risk and vulnerability assessments should be undertaken as a prerequisite for effective risk reduction.
- Early warnings should be broadcast more widely and in a language that encourages appropriate action.

3.2. Approach 2: Risk Retention

Risk retention efforts currently underway in Bangladesh mainly centre on measures aimed at resilience building such as social protection programmes (UNFCCC, 2012a) with the goal of ensuring the ability of people and communities to absorb the shocks and impacts of loss and damage. While not directly aimed at addressing loss and damage from climate change impacts, these measures have nevertheless helped reduce the vulnerability of Bangladesh's poorest to both current and future climate change impacts (Yamin et al., 2005; Tanner and Mitchell, 2008; Heltberg et al., 2009). Some examples of risk retention measures include emergency support and asset transfers (Yamin, Rahman, and Huq, 2005; CCCD, 2009). The following section outlines the risk retention measures currently in place in Bangladesh that could be used to address loss and damage.

3.2.1. Risk Retention Approaches

Emergency Food Distribution

Climate-related events such as erratic rainfall and extreme flooding will further erode the food security of those populations that are already vulnerable to climate change. In an effort to cope, farmers have adopted strategies such as overgrazing, deforestation, and the

unsustainable extraction of water resources, all of which aggravate long-term disaster risks (Lal, 2012). Several food for work or feeding programmes have been implemented, which have thus far distributed wheat and other grains worth USD 114 million (MoEF, 2012). At present, these programmes are the most common method of offsetting loss and damage during post disaster periods in Bangladesh.

However, a 2006 study conducted by UNDP estimates that as much as 27 percent of the beneficiaries of these programmes are not by definition poor (Morshed, 2009). In fact, the study showed that programme beneficiaries usually owned significantly more land than non-beneficiaries (Ibid). That said, some programmes attempt to reduce poverty by specifically targeting food-insecure Upazillas. While such targeting increases the chances of reaching the poor, it also means that all households within less-poor Upazillas are denied assistance, including those individual households with a very high level of food insecurity (Ibid). In addition, Ahmed (2007) has shown that the benefits of these programmes are easily captured by elite community members, which serves to exclude marginalised and extremely poor community members. Using the now discontinued Food for Education Programme as an example, Galasso and Ravallion (2000) also found considerable evidence of capture by local elites that prevented benefits from reaching the children of female-headed, widowed, or landless families.

emergency aid needs to be linked with risk reduction and risk transfer approaches

In order to help people become self-sufficient in the long-term, emergency aid needs to be linked with risk reduction and risk transfer approaches that need to be put into place before the onset of a disaster. Moreover, the long-term, progressive impacts of slow onset processes such as sea level rise will need to be incorporated into the design of future projects.

Social Safety Nets

In general two types of social safety nets exist in Bangladesh: delivering food relief and post-disaster relief (UNDP-PCCC, 2012). In recent years, USD 1.64 billion – or 1.6 percent of GDP – has been spent on social safety net programmes in Bangladesh (Ibid). There has been a recent trend towards reducing the use of food transfers (Ahmed, 2013). For example, the Food for Education and Food for Work programmes are being phased out and Cash for Education and Cash for Work programmes are being introduced (Ibid). The rationale behind the change is that there is less wastage or leakage with cash transfer programs (World Bank, 2006 in Ahmed, 2013) and these programs tend to perform better (Ahmed, 2013). About 25 percent of Bangladeshis are covered by social safety net programmes with the coastal region of Khulna – the third poorest region in the country – having the highest coverage at 37 percent (Ibid). A World Bank study noted that social safety net programmes are especially important in areas prone to disasters (World Bank, 2011).

Post-flood subsidies to the agricultural sector are one of the most common risk retention strategies of the GoB. For example, in 2007, USD 12.7 million in emergency support were distributed after two floods as well as USD 4.6 million to recover from the severe damages of Cyclone Sidr (Finance Division, 2008). In the same year, the GoB also provided USD 2.9 million for agricultural rehabilitation (Ibid). The outcome was positive, even in comparison with the output of a normal year.

crop losses can be offset through technological and financial support

Post-flood rice production showed a notable 7 percent increase from the previous year, rising from almost 29 million metric tonnes in 2006-07 to over 31 million metric tonnes in 2007-08 (Ibid). This shows that crop losses can be offset through technological and financial support.

A project implemented by the GoB is the provision of housing for highly vulnerable communities, entitled Fund for Housing the Homeless. The fund provides housing credit to the rural poor at an interest rate of five percent for a period of up to 10 years. As of June 2011, a total of USD 16.2 million had been released supporting the construction of 50,252 houses (Ibid). This project helps reduce loss and damage by reducing exposure to climate change impacts and increasing resilience by providing funds, which can be used to purchase livestock, diversify livelihoods and purchase food.

A World Bank study (2011) found that social safety nets cannot be a stand-alone approach to alleviate seasonal hunger due to drought but need to be supplemented by livelihood and income diversification efforts. In order to

reduce poverty, Ahmed (2013) recommended adequate investment in infrastructure along with the above measures.

Microfinance

The provision of microcredit is another risk retention strategy for addressing loss and damage already underway in Bangladesh. In Bangladesh, many NGOs are operating microfinance programmes that target particularly vulnerable groups such as small and marginal farmers and destitute women through the provision of emergency loans (Agrawala and Carraro, 2010).

BRAC, the second largest microfinance institution in Bangladesh, has a department solely dedicated to disaster preparedness and climate change (Ibid). BRAC's Targeting Ultra Poor Programme builds capacity by providing sewing machines, cattle, and training to support livelihood diversification (PPRC and UNDP, 2012). Microfinance can help address climate change impacts by providing the poor with the means to purchase assets and undertaking activities that reduce vulnerability to climate change and weather related events such as strengthening housing infrastructure and diversifying livelihoods (Agrawala and Carraro, 2010). In addition to promoting risk reduction and livelihood diversification, microfinance can allow children to stay in school and provide resources that cushion the most vulnerable against climate-induced shocks[5].

in order to address climate change impacts microfinance programmes should have more flexible repayment terms – for example during droughts and floods – in addition to enhancing programmes that facilitate education and livelihood diversification

However, Agrawala and Carraro (2010) suggest that in order to address climate change impacts microfinance programmes should have more flexible repayment terms – for example during droughts and floods – in addition to enhancing programmes that facilitate education and livelihood diversification.

3.2.2. Cost Effectiveness of Risk Retention Approaches

Risk retention measures may seem to be cost effective as they involve relatively lower costs than risk reduction options. However, costs can easily increase exponentially with the sudden onset of an extreme event, requiring large amounts of emergency assistance (UNFCCC, 2012). Moreover, there is an opportunity cost that must be considered as the funds kept for emergency spending are not available for investment in on-going development programmes (Ibid). In Bangladesh, for example, the government keeps about 1.5 percent of GDP in emergency funds (Ahmed, 2007). In order to ensure better aid effectiveness emergency plans need to include better financial planning.

3.2.3. Foundational Requirements for Risk Retention Approaches

In order to retain risk from loss and damage it is important to understand what the risks are as well as the extent of a country's ability to use its own resources to retain those risks (UNFCCC, 2012a). Monitoring and evaluation programmes need to be in place to ensure that the most vulnerable benefit from risk retention strategies (Ibid). The table below outlines some of the financial and technical needs associated with building resilience through risk retention approaches to address loss and damage. To ensure that the funds are available, countries must plan accordingly and develop and implement appropriate legislation (Ibid). Ultimately, a balance between the attainment of social and economic goals must be struck (Ibid).

3.2.4. Analysis of Risk Retention Approaches in the Context of Bangladesh

- Several studies on risk retention measures have found that corruption and failure to target those who need support most can impede successful outcomes (Ahmed, 2007; Morshed, 2009).
- A lack of coordination can lead to mismanagement and increase loss and damage post-disaster. Ultimately, more effort should be made to reduce the risk of loss and damage and promote resilience before the onset of extreme events.

[5] This information is based on the authors' extensive experience working in communities and discussions with community members throughout Bangladesh (but mainly in the coastal region of Satkhira).

Programme	*Beneficiary Group*	*Requirement*	*Benefit*	*Key features*
Rural Maintenance Program (RMP)	Women able to work	Work	Cash	Public works programme; average payment of 43 BDT (USD 0.63) per day.
Primary Education Stipend Project (PESP)	Households	Attend school	Cash	Programme to promote school enrolment and attendance, reduce dropout rate, and improve educational quality.
Female Secondary School Assistance Program (FSSAP)	Households	Attend school	Cash	Programme to promote and encourage continuing education for females.
Old Age Allowance	Individuals able to work	None	Cash	Allowance to reduce vulnerability of households with elderly members in non-municipal areas; average payment is 165 BDT (USD 2.40) per month.
Test Relief	Individuals able to work	Work (mostly activities like cleaning ponds and bushes)	Food (grain)	Food transfer program to reduce food vulnerability among poor individuals and households in rural areas; much smaller program than FFW.
Vulnerable Group Development	Households	No work requirement	Food (grain)	Food transfer programme to reduce food vulnerability among poor individuals and households in rural areas; much smaller program than FFW.
Vulnerable Group Feeding	Households	No work requirement	Food (grain)	Food transfer program that trains vulnerable groups in life and work skills; as of June 2004, had provided food to some 480,000 households.
Gratuitous Relief	Households	No work requirement	Food (grain)	Food transfer program that offers post-disaster food relief to selected households; during the 1998 flood, about 6 million households benefited.
Food for Work	Individuals able to work	Work (mostly on infrastructure and development projects	Food (grain)	Food transfer program to reduce food vulnerability among the poor; in 2003, provided food in exchange for some 75 million hours of work.

Table 2: Major Social Safety Net Programmes in Bangladesh (World Bank, 2006 in Khandker et al., 2011).

- Risk retention measures are widely used in Bangladesh, but should be scaled up to ensure that the maximum benefit is derived by those most vulnerable to the impacts of climate change. Moreover, integration with other risk management tools is needed to adequately address loss and damage.

3.2.5. Recommendations for Risk Retention Measures

- Targeting the extreme poor through social safety net programs is critical and should be included in the GoB's policies and programmes. This targeting needs to take into account non-uniform exposure and the differential vulnerability of different population groups.
- Corruption in the social safety net programmes should be monitored and reduced.

3.3. Approach 3: Risk Transfer

Risk transfer shifts economic risks from an individual or organization to an insurer (UNFCCC, 2012a). This approach works well in managing residual loss and damage that cannot be prevented through mitigation or adaptation efforts. The following section outlines risk transfer measures currently in place in Bangladesh.

3.3.1. Risk Transfer Approaches

Microinsurance

Bangladesh is a pioneer of microinsurance schemes, through which insurance coverage is given to even very poor individuals. However the vast majority of Bangladeshis (94 percent) are still not insured (Werner, 2009). Moreover, the scale of microinsurance is extremely limited because it is focused on life and credit insurance, although limited health coverage for some microfinance clients has been initiated (Mamun, 2007).

the vast majority of Bangladeshis (94 percent) are still not insured

Several issues hinder further success of microinsurance. While microinsurance may provide adequate protection against loss and damage from less severe events (Cohen and Sebstad, 2003), more extreme or repeatedly occurring events can easily bankrupt the insurer due to large insurance payouts (Akter, 2012). Maybe most importantly, it has to be asked whether the poor should be expected to bear the responsibility of addressing loss and damage incurred by climate induced hazards, particularly when the government has not implemented adequate risk reduction or risk retention measures (Cohen and Sebstad, 2003). This question of responsibility has also been raised at the international level (Ibid). The role of microinsurance in addressing loss and damage from climate change impacts in Bangladesh has been explored in much more depth by Khan et al. (forthcoming), as part of the ICCCAD-led study on loss and damage in Bangladesh.

Crop Insurance

A crop insurance scheme initiated by the state insurer Sadharan Bima Corporation (SBC) in the early 1980s accrued extreme financial losses of about 500 percent (CCC, 2009c).

well-designed crop insurance can be considered an effective option for minimising vulnerability to loss and damage

This failure was mainly due to cost ineffectiveness as the sum insured and consequentially repayment was higher (at 80 percent of total production loss) than is financially sound, which is estimated to be 50 percent of the total production loss (Ibid). Other reasons include dishonesty or corruption and bad programme design including universal premium levels and a lack of integration of the project with the mainstream agricultural development strategy (Ibid). Nevertheless, well-designed crop insurance can be considered an effective option for minimising vulnerability to loss and damage, particularly when exposed individuals do not have the capacity to reduce their own vulnerability.

3.3.2. Cost Effectiveness of Risk Transfer Approaches

At both the global and national level, risk transfer approaches, as a standalone solution to address loss and damage, are neither adequate nor cost effective (Warner et al., 2012). In Bangladesh, especially health microinsurance schemes are not operating in a cost-effective manner and thus need to be supported by external funding (Werner, 2009). Moreover, risk transfer approaches are not appropriate for addressing loss and damage from slow onset processes as they are much harder to measure and quantify (Nishat et al., forthcoming). That said, risk transfer can prevent shocks from climate change impacts and promote development by enabling risk taking behaviour. Thus, it is imperative that risk transfer measures be linked to other loss and damage approaches such as risk reduction and risk retention and be made cost effective.

Financial Requirements	• Building resilience against river bank erosion • Investments in alternative income generation projects • Investment for saline-resilient seed distribution is needed before, not after the onset of climate change impacts, especially in the coastal regions • More public and private finance is required to be invested for building social resilience before, not after disasters as part of relief and rehabilitation as at those times severe corruption occurs.	• International funds are required as LDCs do not have adequate funds to self-finance loss and damage
Infrastructure or Equipment needed	• The existing Climate Resilience Fund of Bangladesh needs better financial planning and forecasting • Distribution of drought-resilient seed varieties • Distribution of saline-resilient seed varieties • Surveillance systems at national and regional scale for existing and new disaster risks • Scaling up of social safety net programmes to meet future loss and damage	• International mechanisms for addressing loss and damage • Strengthening government and civil society capacity to manage social safety net programmes • Ensuring that appropriate policies, laws and regulations are in place
Information and Data	• Vulnerability profiles and risk assessment data	• Past footprint of loss and damage
Technical Capacity (Experts, etc.)	• Expert knowledge on how to build the social resilience of vulnerable groups (e.g. community-level adaptation, livelihood diversification, better access to basic services and social protection) • Technical knowledge on developing and efficiently distributing crop cultivars as well as fisheries and livestock protection • Technical knowledge for drinking water and sanitation programmes in areas at risk from loss and damage	• Measurable, Reportable and Verifiable (MRB) capacity in planning and allocating social safety net funds

Table 3: Foundational Resource Requirements for Risk Retention Approaches in Bangladesh

3.3.3. Foundational Requirements for Risk Transfer Approaches

In order to implement risk transfer approaches to reducing loss and damage, the risks and the level of exposure of assets must be known (UNFCCC, 2012a). Along with risk assessments, vulnerability assessments must be undertaken and the probability of climate change impacts understood (Ibid).

For risk transfer instruments targeting the poor, financial backstopping or re-insurance will be required

To establish "risk profiles" and determine the cost of transferring risk relative to the coverage offered, a mixture of data from the ground and satellite imagery must be obtained. A system through which to issue payments – such as financial and banking institutions – must be in place or developed. For risk transfer instruments targeting the poor, financial backstopping or re-insurance will be required to ensure there will be enough financial resources to cover pay outs when needed (Ibid).

3.3.4. Analysis of Risk Transfer Approaches in the Context of Bangladesh

- In Bangladesh, most microinsurance options cover only life, credit, and health insurance.

- Microinsurance is a form of self-insurance, which defeats the principle of wider risk pooling by other parties such as reinsurers. Existing microinsurance delivery takes place under the Full-Service Model, where the insurer carries out the designing, risk assessment, marketing, and distribution of their products, creating a system lacking mutual insurance and reinsurance (CCC, 2009b).
- There is a lack of risk pooling measures such as catastrophe bonds in Bangladesh.
- Most risk transfer measures are implemented by NGOs, whose insurance funds are often not sufficient to meet large or unexpected losses (Khan et al., forthcoming); therefore, the sustainability of microinsurance is a big challenge.
- Moreover, **where insurance is applied without adequate risk reduction it can be a disincentive for adaptation** as individuals may rely on insurance to manage their risks and are consequently left overly exposed to impacts (Surminski and Oramas-Dorta, 2011).
- A regulatory framework and better policies standardising the insurance market in Bangladesh are needed (Akter, 2012).

3.3.5. Recommendations for Risk Transfer Measures

- Microinsurance institutions should link with risk reduction and risk retention measures to develop and provide a more holistic and comprehensive package of approaches that together better address – and reduce – loss and damage.
- Risk pooling instruments like catastrophe bonds need to be in place, where state or development partners and the end users jointly share and reduce the risk of investment.
- Instead of ring-fencing money in emergency funds, the government could use these funds for issuing catastrophe bonds, which can accumulate profit to be disbursed to vulnerable communities.
- International mechanisms should be in place to protect insurers and reinsurers.

3.4. Approaches to Address Slow Onset Processes

Slow onset processes such as sea level rise or drought are already visible in Bangladesh and are expected over the coming decades (Nishat et al., forthcoming). As slow onset processes unfold slowly over time, approaches to address them need to be based on long-term and transformational strategies (IPCC, 2012).

Migration

In Decision 3/CP.18 Parties recognised the need to understand more about how climate impacts affect "patterns of migration and human mobility" (UNFCCC, 2013). According to the Bangladesh Strategy and Action Plan (BCCSAP) (2009), climate change impacts could lead to the displacement of 20 million people in Bangladesh. Walsham (2010) estimates that between 13 and 40 million people will be displaced by a one-metre rise in sea level by 2100. It should be noted that migration is not dependent on a sole driver, but caused by a complex interplay of various factors such as socio-economic, political, and environmental (Black et al., 2011).

Climate change induced migration has many faces in the context of Bangladesh. In May of 2009, Cyclone Aila made landfall in coastal Bangladesh displacing 297,000 people (Shamsuddoha et al., 2012). In early 2010 an estimated 100,000 were still living in temporary dwellings on embankments (IOM, 2010). During economically lean times, some people – mostly men – choose to temporarily migrate from rural to urban areas in search of increased livelihood opportunities (Shamsuddoha et al., 2012). Climate change induced loss and damage will likely lead to a rise in forced migration and especially slow onset events such as sea level rise will prevent individuals from returning home again.

The GoB has been undertaking a pilot initiative, the Asrayan Project, which is aimed at rehabilitating homeless and landless families affected by river erosion. During the first project phase, from 1997 to 2010, a total of 58,703 families were provided with new housing and employment opportunities (Finance Division, 2011). A second phase of the project, Ashrayan II, was launched in July 2010, with the goal of assisting an additional 50,000 home- and landless families (Ibid). While this project has had largely positive results, the relocation of large population groups can have negative impacts such as pressure on economic and environmental resources (Bonao et al., 2007).

Planned relocation efforts should consider land use and zoning concerns

Planned relocation efforts should consider land use and zoning concerns at both the local and national level. In addition, migration policies and programmes need to consider the different relocation needs of individuals

	Resilience-building	**Financial Risk Retention (Paying for the Impact)**
Financial Requirements	Building resilience against river bank erosion Investments in alternative income generation projects Investment for saline-resilient seed distribution is needed *before*, not after the onset of climate change impacts, especially in the coastal regions More public and private finance is required to be invested for building social resilience *before*, not after disasters as part of relief and rehabilitation as at those times severe corruption occurs.	International funds are required as LDCs do not have adequate funds to self-finance loss and damage
Infrastructure or Equipment needed	The existing Climate Resilience Fund of Bangladesh needs better financial planning and forecasting Distribution of drought-resilient seed varieties Distribution of saline-resilient seed varieties Surveillance systems at national and regional scale for existing and new disaster risks Scaling up of social safety net programmes to meet future loss and damage	International mechanisms for addressing loss and damage Strengthening government and civil society capacity to manage social safety net programmes Ensuring that appropriate policies, laws and regulations are in place
Information and Data	Vulnerability profiles and risk assessment data	Past footprint of loss and damage
Technical Capacity (Experts, etc.)	Expert knowledge on how to build the social resilience of vulnerable groups (e.g. community-level adaptation, livelihood diversification, better access to basic services and social protection) Technical knowledge on developing and efficiently distributing crop cultivars as well as fisheries and livestock protection Technical knowledge for drinking water and sanitation programmes in areas at risk from loss and damage	Measurable, Reportable and Verifiable (MRV) capacity in planning and allocating social safety net funds

Table 4: Foundational Requirements for Risk Retention Approaches in Bangladesh

affected by either extreme events or slow onset processes.

policies should facilitate anticipated migration by promoting resilience and reducing loss and damage as much as possible

In the case of slow onset processes like sea level rise and salinisation, policies should facilitate anticipated migration by promoting resilience and reducing loss and damage as much as possible (Nishat et al., forthcoming). In the case of those displaced temporarily by extreme events, the GoB should take steps to ensure that these individuals can return home as soon as possible.

national and international protocols should be in place to address the issue of loss and damage induced migration

For those who migrate across borders, national and international protocols should be in place to address the issue of loss and damage induced migration with the aim to increase the ability of communities and ecosystems to absorb shocks.

Addressing Non-Economic Losses

As discussions on loss and damage mature and evolve, focus on the importance of understanding and addressing non-economic losses is increasing. There remains confusion about what non-economic losses are, let alone how to address them[6]. Those that have been discussed include loss of culture and sovereignty as well as damage to social, psychological, and mental well-being, among others. The uprooting of those from their homes induces untold mental anguish and psychological stress and separates families. Those left behind can also experience an array of non-economic losses[7]. Addressing these impacts will not be easy. The impacts of extreme events on mental health are mounting (Neria et al., 2008; Berry et al., 2010 in IPCC, 2012) and can take the form of traumatic stress, which can lead to anxiety and depression (IPCC, 2012).

more research on non-economic losses is needed

Given the importance of non-economic losses the authors did not want to ignore this important area of loss and damage but confess to not having many answers as to how to best address these complex losses. Nevertheless, it is clear that more research on non-economic losses is needed.

3.5. Institutions and Governance

Good governance structures (policies, laws, and programmes) are needed to ensure appropriate responses to current and future climate change induced loss and damage (UNFCCC, 2012). This section discusses relevant institutions and governance structures to address loss and damage in Bangladesh.

The Existing Institutional Setup for Climate Change Adaptation and Mitigation

A National Steering Committee on Climate Change has been established, which is chaired by the head of Ministry of Environment and Forests (MoEF), with secretaries from all relevant ministries as well as civil society and private sector representatives sitting on the committee.

these institutions will require strengthening through capacity building as well as technical and financial support

The steering committee reports to the National Environmental Committee, chaired by the Prime Minister. In addition, a Climate Change Unit has been established under the MoEF (MoEF, 2012). However, in order to be capable to adequately address climate change induced loss and damage, these institutions will require strengthening through capacity building as well as technical and financial support.

Mainstreaming Climate Change into the National Planning Process

Because the risks posed by climate change can affect the long-term efficiency with which development resources can be invested and development objectives be achieved, studies indicate that it is important to integrate or mainstream disaster risk management and climate change adaptation into a range of development activities (Agrawala and Aalst, 2008; Heltberg et al., 2009; Mitchell et al., 2010). A lack of awareness within the development community of the many implications of climate change as well as limited resources for implementation are frequently cited as challenges to mainstreaming adaptation and disaster risk management into policies and programmes (Agrawala and Aalst, 2008; Heltberg et al., 2009).

Climate change is an important item on the political agenda, which is evidence of the GoB's efforts to mainstream climate change into several development policies and plans. The GoB has developed Vision 2021 (2007), a policy to help Bangladesh transition to the year 2021, based on the principle of sustainable development. Vision 2021 outlines proposed adaptation measures to combat the adverse impacts of climate change. For example, research and development goals include the design of appropriate adaptive activities to manage climate change impacts in the water sector and rehabilitation of coastal embankments to help adapt to climate change (Ibid). In addition, the plan suggests supportive measures like strengthening regional and

[6] This information is based on the participation of some of the authors in both international and national discussions about loss and damage. The complexity of addressing non-economic losses often arises during these discussions but there is as yet no consensus on how they should be addressed.

[7] This information is based on discussions with communities throughout Bangladesh during fieldwork undertaken by the research team at C3ER at BRAC University.

national mechanisms for scientific assessment, forecasting, and information sharing while building national and local capacities for greater ecological literacy and agro-ecosystem monitoring for assessing and managing risks (Ibid). However, the propositions made in Vision 2021 are in response to currently anticipated levels of loss and damage due to climate change. Thus, the recommended activities may not be sufficient to address the expected rising scale of loss and damage, which will likely require action beyond the level of adaptation and mitigation.

Bangladesh Climate Change Strategy and Action Plan

The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) – first developed in 2008 - is part of the overall development strategy of the country (MoEF, 2009). Following COP 13 in Bali in 2007 the GoB developed the BCCSAP through consultation with civil society organisations, research organisations, the private sector and development partners. Based on the National Adaptation Programme of Action (NAPA) and further revised in 2009, the BCCSAP outlines the core policy, strategy, and action plan to address climate change impacts in Bangladesh (MoEF, 2005). The BCCSAP established a 10-year programme (2009-2018) for capacity building and resilience to meet the challenges of climate change over the next 20 to 25 years. So far, 66 projects have been approved for implementation (MoEF, 2012). One of the priorities of the BCCSAP is to establish climate change focal points in all ministries and to date sixteen focal points have been established[8]. Proposals made in the BCCSAP include risk reduction and risk retention approaches; however, risk transfer option are not included. In general, the scale of approaches discussed in the BCCSAP needs to be enhanced to adequately address the extended dimension of climate change induced loss and damage.

[8] The ministries in which focal points have been established include the Ministry of Environment and Forests, Ministry of Water Resources, Ministry of Agriculture, Ministry of Land, Ministry of Fisheries, Local Government Engineering Department, Ministry of Local Government and Rural Development, Ministry of Education, Ministry of Women Affairs, Ministry of Disaster Management, Ministry of Food and Relief, Ministry of Foreign Affairs, Ministry of Finance, Economic Relations Division, Ministry of Health, Power Department, Ministry of Mineral Resources (Personal Interview with Key Informant, 27th February 2013)

Mainstreaming DRR into the National Development Process

The Sixth Five Year Plan (SYFP) (GoB, 2011) lays out provisions for mainstreaming DRR into development policy. The SFYP is carrying out the National Disaster Management Plan, which has set a number of goals for 2010 to 2015, including a) strengthening institutional capacity of government ministries and departments to mainstream both DRR and CCA into policies and plans; b) empowering at risk communities risk reduction and livelihood support initiatives at the household and community level and c) reducing the vulnerability of at-risk communities through social safety nets – among others (Ibid).

Integration of Disaster Risk Reduction and Climate Change Adaptation

In most instances, DRR activities and policies are implemented during the pre-impact or ex-ante period (Mercer, 2010). Adaptation measures, on the other hand, aim at building long-term resilience (Shamsuddhoha et al., forthcoming b). Due to the tendency of working in "silos", not much integration between the two exists (Ibid).

framing and implementing risk-integrated development remains challenging as emphasis is often still placed on physical infrastructure approaches

Bangladesh's National Disaster Management Plan (2010) is integrating DRR and CCA to some extent through including the goal of establishing an integrated approach to disaster risk management by factoring in the impacts of climate change. Conversely, the BCCSAP (2009) lists disaster management as one of its pillars, with projects aiming at strengthening communities in disaster-prone parts of the country as well as the government's capacity to manage disaster risk and early warning systems. However, framing and implementing risk-integrated development remains challenging as emphasis is often still placed on physical infrastructure approaches. In the medium term the focus should shift towards non-structural interventions as used in adaptation programmes. This might be difficult as political leaders concerned with re-election often prefer short-term activities. However, loss and damage can be

seen as having the potential to create a new space for linking CCA and DRR (Shamsuddoha et al., forthcoming).

The following points have been identified by the authors as required for an effective integration of DRR and CCA in Bangladesh:

addressing the root causes of poverty and vulnerability through good governance

- The future challenge lies in addressing the root causes of poverty and vulnerability through good governance and increased access of vulnerable communities to power structures and resources.
- Greater coordination and learning between the climate change and disaster risk management sectors is needed.
- A major focus should therefore be placed on designing, piloting, and promoting institutional arrangements that integrate DRR and CCA within the national development planning process.
- The availability of technical and baseline data is also needed to provide information towards the integration of vulnerability and risk assessments.
- Investment to overcome funding gaps at both the local and national level.

There is significant interest in integrating DRR and CCA in Bangladesh, both in theory and practice. A recent paper by Shamsuddoha et al. (forthcoming) provides more information for how this can be done.

3.5.1. Analysis of Institutions and Governance Structures to Address Loss and Damage in Bangladesh

- Financing the adaptation and mitigation programmes outlined in the BCCSAP is a challenge for the ministries concerned. In spite of calls to target assistance to the countries most vulnerable to climate change, international funds made available have been limited so far (Yamin et al., 2005; Ayers, 2009; Heltberg et al., 2009). It is estimated that USD 500 million will be needed in years one and two and the total cost of the programmes to be implemented under the BCCSAP for the first five years could be USD 5 billion.
- While mitigation and adaptation are the main aims of the BCCSAP, technology and finance are the means to achieve them. In this regard, appropriate and adequate funding and technology need to be ensured so that LDCs and other vulnerable countries can address loss and damage.
- The Ministry of Planning, Ministry of Finance and Ministry of Science and Technology, which have the largest influence on policies and programmes in Bangladesh, should increase their level of synergy with the MoEF in order to mainstream climate change and facilitate knowledge exchanges. The mainstreaming of loss and damage into national and local policies and strategies should be led by these ministries. In addition, more cooperation between the planning level ministries and implementing authorities is required.
- Bangladesh has established the Bangladesh Climate Change Trust Fund as well as the Bangladesh Climate Change Resilience Fund to facilitate efforts to address climate change but the implementation of the programmes under BCCSAP has not progressed efficiently mainly due to inadequate funding at the global and national level.
- Efforts to mainstream climate change into policies and programs needs to be enhanced to address loss and damage and promote climate resilient development.

3.5.2. Recommendations for Governance and Institutions

Appropriate institutional mechanisms should also be in place to enable finance and technology transfers a swell as capacity building

- Appropriate institutional mechanisms should also be in place to enable finance and technology transfers a swell as capacity building as expected loss and damage will exhaust the technical and human resource capacities of Bangladesh.
- Mainstreaming approaches to address loss and damage into national development programmes is a prerequisite to effective implementation of the above discussed approaches and policies.

Measureable, reportable and verifiable indicators should be established and properly monitored to ensure that those most negatively affected by climate change induced loss and damage actually benefit from aid efforts

- The role of good governance is crucial. Measureable, reportable and verifiable indicators should be established and properly monitored to ensure that those most negatively affected by climate change induced loss and damage actually benefit from aid efforts. An independent auditing and monitoring protocol may help to ensure transparency and accountability.

4. Conclusion and Recommendations

This paper has provided an overview of what types of climate change impacts Bangladesh is facing as well as an overview of those approaches in place for addressing loss and damage stemming from those impacts. This mostly desk based study found that there are a number of risk reduction approaches under way in Bangladesh – including early warning systems and cyclone shelters – which have successfully reduced deaths from extreme events over the past few decades. However, structural measures like cyclone shelters need to be properly maintained and local knowledge incorporated into their design in order to ensure they are available for use and utilised by those who need them.

The most work needs to be done in improving and scaling up risk retention programmes and ensuring that the most vulnerable are targeted

The most work needs to be done in improving and scaling up risk retention programmes and ensuring that the most vulnerable are targeted. Risk transfer approaches like microinsurance have not been widely employed in Bangladesh and those that have been employed have not been successful. Many are wary whether these approaches can work to address loss and damage. Therefore public awareness is needed along with carefully designed microinsurance programmes that are backed up by reinsurance or other means of financial support. Ultimately risk transfer is not a useful instrument for addressing slow onset processes, however. One approach to address slow onset processes covered in this paper is migration. Migration strategies span a spectrum from forced displacement to voluntary migration to seek better livelihood opportunities. On governance DRR and CCA policies should be mainstreamed into development plans and policies and there should be efforts to integrate or harmonise the DRR and CCA agendas.

No one approach can effectively address loss and damage on its own

No one approach can effectively address loss and damage on its own. In order to develop and implement the right package of approaches to address loss and damage in Bangladesh, a number of steps will need to be taken. First, the climate risks of loss and damage and who is most vulnerable to those risks must be better understood. Their needs must be established and institutions must be in place to meet those needs. A comprehensive risk management portfolio for Bangladesh must be designed and developed. Good governance in local, national, regional, and international forums is required. Finally, funding, technology, and capacity at the national level must be available in order to implement approaches that successfully address – and ideally reduce – loss and damage and create a more resilient Bangladesh.

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The Loss and Damage in Vulnerable Countries Initiative

Accepting the reality of unmitigated climate change, the UNFCCC negotiations have raised the profile of the issue of loss & damage to adverse climate impacts. At COP-16, Parties created a Work Programme on Loss and Damage under the Subsidiary Body on Implementation (SBI). The goal of this work programme is to increase awareness among delegates, assess the exposure of countries to loss and damage, explore a range of activities that may be appropriate to address loss and damage in vulnerable countries, and identify ways that the UNFCCC process might play in helping countries avoid and reduce loss and damage associated with climate change. COP-18, in December 2012, will mark the next milestone in furthering the international response to this issue.

The "Loss and Damage in Vulnerable Countries Initiative" supports the Government of Bangladesh and the Least Developed Countries to call for action of the international community.

The Initiative is supplied by a consortium of organisations including:

Germanwatch

Munich Climate Insurance Initiative

United Nations University – Institute for Human and Environment Security

International Centre for Climate Change and Development

Kindly supported by the Climate Development and Knowledge Network (CDKN)

For further information: **www.loss-and-damage.net**

International Centre for Climate Change and Development (ICCCAD)

Based in the Independent University, Bangladesh (IUB), the International Centre for Climate Change and Development's aim is to develop a world-class institution that is closely related to local experience, knowledge and research in one of the countries that is most affected by climate change. ICCCAD supports growing capacity of Bangladesh stakeholders, as well as enabling people and organizations from outside the country to benefit from training in the field, where they are exposed to the adaptation "experiments" and increasing knowledge. Through the expertise and research outputs of ICCCAD and its local partners, international organizations will be able to continue to share and transmit knowledge of climate change and development challenges around the world for the benefit of other LDCs, and their governments, donors and international NGOs. ICCCAD has begun running regular short courses for NGOs, donors, the media, government staff, private sector, etc. As well as initiating courses for local participants and Bangladeshi stakeholders, it provides tailor-made courses for organizations and departments that are seeking to enhance their capacity in regard to climate change.

For further information:

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