

Non-Economic Loss and Damage Caused by Climatic Stressors in Selected Coastal Districts of Bangladesh

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Based on evidence gathered during a preliminary visit conducted 1-4 August 2014 and a main field visit conducted 9-16 September 2014.

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Images on the front cover: (top left) Man herds his sheep along embankment near Munshiganj; (top right) Focus group in Shinghortoli; (bottom left) Women in Shinghortoli embrace each other following the focus group discussions; (bottom right) Children checking outside to see if the rains have started.

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Executive Summary

Climate change poses a significant threat to human security not only by exacerbating existing patterns of social vulnerability but also by exposing communities to new and more severe risks. Vulnerable communities around the world have already started experiencing losses and damages however research has been slow to capture community experiences particularly with regards to non-economic losses.

This report aims to respond to this gap in knowledge by presenting findings from the community level in South-West Bangladesh. The main goal of this research study was to begin deconstructing what non-economic losses and damages might entail and evaluate qualitative methods for its research. The research was conducted in partnership with the International Centre for Climate Change and Development (ICCCAD) and the Bangladesh Center for Advanced Studies (BCAS) and made possible by the Asian Development Bank (ADB). This report feeds into ADB's projects to support the implementation of the Bangladesh Climate Change Strategy Action Plan (BCCSAP) and in particular, items related to loss and damage.

It is now widely accepted that mitigation and adaptation will not be sufficient to prevent all adverse impacts due to climate change (IPCC, 2014; UNEP, 2014). Developing countries will be most affected not just because of their geography but also because of their lack of resources to respond to many of these stressors. In many cases this will undermine future sustainable development goals and adaptation efforts however data remains the largest barrier to understanding how households manage climatic stressors, both due to sudden onset events and slow-onset processes. Impacts will be direct and indirect and also economic and non-economic. While the former has been widely explored in environmental assessments by insurance companies, governments, and organizations, non-economic losses and damages has been a particularly difficult concept since items are not captured in market values. Using Bangladesh as a case study, this project has attempted to better understand the components of non-economic losses in South-West Bangladesh.

Data was collected in eight villages between August and October 2014 across the area. Research was conducted using a combination of scientific methods, including a comprehensive literature review of research and policy as well as field research at the local level. In terms of the data collection, the study used qualitative methods to better understand how climatic and environmental stresses had affected these communities and what non-economic losses and damages appeared. Climatic stressors were not differentiated for and included extreme weather events as well as slow onset processes that were caused by natural and anthropogenic factors. A checklist was created based on feedback from the pilot study that contained a list of questions spanning from individual, societal and environmental impacts. Focus group discussions (FGDs) and key informant interviews (KIIs) from the eight villages were conducted of which contained 8 mixed FGDs, 2 all-female FGDs, 8 male KIIs,

8 female KIIs, and 3 KIIs with government officials. By the end, several stories were collected that could be compared and contrasted between the villages.

The evidence provided here demonstrates the challenges of exploring non-economic losses and damages associated with climate change and the danger of using market values to capture the importance of these items. Research collected suggests several villages in South-West Bangladesh have experienced significant loss of crops and livestock over the years that has led to a loss of traditions as well as a decline in social bonds. For mixed and Hindu communities a loss of grazing land for cattle was particularly concerning since it meant a loss of daily traditions that could not be passed down throughout the generations. Other stories included the loss the fresh water species over the years due both to natural and human-induced reasons. At an individual level, stories related to loss of education following cyclones or skin disease due to salinity intrusion in some of the villages. The report goes into detail about these stories and more and suggests possible ways for the government to better address future non-economic losses and damages.

Developed with support from researchers from the Loss and Damage in Vulnerable Countries Initiative, recommendations from this study also point to the urgency of developing a National Mechanism within Bangladesh so as to provide data and information for better assessing and addressing loss and damage. Additionally, efforts must be enhanced to build regional and international collaborations on loss and damage due to climate change. Bottom-up approaches need to inform future policies so as to prevent avoidable losses and damage in particularly vulnerable communities.

It is the first attempt, known to its researchers, to disaggregate non-economic losses and identify components and questions related to its research. We hope this will help inform future loss and damage research in the country and abroad and help raise awareness on why enhanced mitigation ambitions are necessary.

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The Abul Kasem Gazi from Chunkuri village shares with us his stories on immeasurable loss. He mentions he was previously an agricultural farmer but, since his field was inundated with saline water years back, he has started cultivating shrimp.

1. Introduction

With strong agreement, climate change will cause adverse impacts to the livelihoods of millions of individuals. As the global temperature continues to rise, significant losses and damages will result in particular in places that face high vulnerability and challenges in adaptation. It is predicted that losses will occur either because coping strategies were not sufficient, costs of coping were not recovered, short-term relief turned out to be erosive in the long-term, no measures were adopted whatsoever, or due to a combination of these effects (Warner and van der Geest, 2013). As recognised in the fifth assessment report (AR5) of the International Panel of Climate Change (IPCC), these impacts will be imminent and will pose a significant threat to natural as well as human systems (2014a). They will test societies' abilities to adapt (Adger et al., 2009) and will bring many communities beyond their limits (Preston et al., 2013).

Such impacts will cause significant monetary losses to the countries affected while other countries stand to benefit financially with warmer climates and increased precipitation. Most concerning however is that in present-day estimates of costs, some of these impacts will not be accounted for since they cannot easily be assigned monetary values. For instance loss of life and livelihoods, cultural heritage, cultural beliefs, norms and ecosystem goods and services pose challenges to assessments of loss and damage ex ante and ex post environmental stressors. While this might appear an obvious finding, there have been few efforts to disaggregate such impacts and raise awareness on, what we consider, non-economic losses and damages.

Over the years, Bangladesh has made remarkable progress in both economic and social development. It has invested a lot to reduce the negative impacts of environmental impacts as well. However despite this, climate change remains a barrier to the country in achieving all development targets including overall socio-economic growth. It is extremely challenging in some parts of the country especially in the coastal zone (Southern Bangladesh) where climate induced hazards cause tremendous losses and damages nearly every year. In addition to economic losses experienced in the region, communities and households experience significant non-economic losses and damages. These impacts are otherwise perceived as immeasurable and are not easily calculated using market values (Morrissey and Oliver-Smith, 2013). Backed by a plethora of research on climate change in Bangladesh, this study specifically looks into the causes and pathways of non-economic loss and damages due to climate variability and change in selected coastal districts of Bangladesh.

2. Approach and Methodology

The main purpose of the study was to explore non-economic losses and damages caused by climatic stressors at the household level in the selected districts. The study also aimed to understand perceptions on underlying causes, types and nature of non-economic loss and damages through qualitative research with local communities. A qualitative study was preferred for several reasons, the most prominent being that quantitative values are subjective and might not accurately demonstrate the value of the loss to the community, let alone to individuals. Also any attempt to do so may suggest that compensation is a viable way to address future losses and may justify an unwillingness to reduce future emissions in the international arena. Since non-economic losses and damages were defined as 'goods and services not accounted for in formal accounting procedures' (Morrissey and Oliver-Smith, 2013) it was also problematic to separate values from one another. For instance, the loss of crops directly affected communities cultures, traditions and bonds between individuals – items that would otherwise be unaccounted for by estimating the price of the crop. Following the completion of this study however there is potential to itemize responses and to return to the communities to decipher which values are most important to individuals. Similarly, there is potential to complement the findings in this study with economic estimates of structural and material losses both from sudden-onset events and slow-onset processes.

From the data collected, researchers analysed the findings and finally provided a set of recommendations as potential measures for reducing losses and damages in the future. It is expected that the findings of the study and the final report will be used to change national and international climate change policy discourse.

This study involved the participation of a field team comprising of six members. These individuals were in the field to collect the field data/information during the preliminary and main field visit. In addition, three local field staff (from the Local Environment Development and Agricultural Research Society (LEDARS)) assisted the research team when visiting the villages, identifying the focus group discussion (FGD) participants and other logistical support on the field.

The following steps were taken for the study:

2.1 Literature Review

The literature review aimed to consolidate existing research and publications on loss and damage, including academic journals and grey literature. Additionally, the literature review identified existing policies in Bangladesh so as to identify gaps and potential future actions. Important to note since non-economic losses is a relatively new topic in the literature, research on how to evaluate and address it has only started to emerge.

2.2 Preliminary Visit

The research team made a preliminary visit to vulnerable communities in one village in each of the selected districts (Khulna and Satkhira) and discussed the relevant issues and ideas related to non-economic loss and damages. The major criteria for selecting the villages for the study was the level of exposure to different types of climatic hazards and socio-economic vulnerabilities. Specifically, the basis for selection of the two villages for the preliminary visit was based on their perceived exposure to cyclone and storm surges, sea-level rise, riverbank erosion, and salinity intrusion as well as the socio-economic situation in the community (for more information see Section 4). The team, during the preliminary visit, also conducted four KIIs (two in each village) to test out questions and better inform the main checklist. This discussion at individual and group level helped to finalize the tools of the study. The study villages were also finalized in consultation with local communities and following a review of the literature on aquaculture in the region.

2.3 Development of Data Collection Tools (ie. Checklist)

The research team developed checklist (see Annex 1) for FGDs and interviews. The checklists for both FGDs and KIIs include topics such as the socio-economic status of the respondents, livelihoods, problems and challenges of livelihoods, history and trend of non-economic loss and damages, types, factors and causes of non-economic loss and damages, awareness on climate change etc. The checklist was shared among the key experts for comments and suggestions. The draft final version was used for the training sessions. Some minor issues were identified during the training. However, these issues were addressed and finalized the tools for field visits.

2.4 Training Session for Researchers

A one-day long pre-filed review session was organized for all the team members at BCAS on 8 September 2014 before departing for the main field visit. The Principal Investigator and Co-Principal Investigator of the study team conducted the review sessions to explain the objectives and field research methodologies including FGDs and in-depth interviews. The checklists and related issues for FGDs and interviews were discussed in detail during the day. The Co-Principal Investigator explained the guidelines of conducting FGDs as well as the components of the checklist.

2.5 Focus Group Discussions (FGDs)

To collect data and information regarding non-economic loss and damages, 10 FGDs were conducted from 8 villages of the two selected districts (see Table 1). The study conducted 5 FGDs in each of the districts (four FGDs with mixed groups and one FGD with women only). The participants for the women FGD were invited from all four villages of the respective Upazilla. Mixed group FGDs were conducted in the selected villages and the women FGDs were conducted in one of the selected villages that was easily accessible for the women in the Upazilla.

The FGD participants were identified in consultation with local experts and community leaders. The research team consisting of six-members with multi-disciplinary expertise and professional experiences considered the households affected by recent Cyclone Aila for FGD participation. The team members conducting the FGDs included climate change and DRR experts, a sociologist, a anthropologist, an environmental lawyer, as well as a communication expert. A range of 10-20 people participated in each FGD. The details of the FGDs are provided below.

The research team for the mixed FGDs had at least one man and one women present during the entire session. The entire team was present at the start of every FGD (approx. three men and three women) after which everyone introduced themselves to the focus group (FG). After approximately 15 minutes, a female and male from the FG was selected and one male and one female from the research team went to conduct an individual KII. For the female FGD, only females from the research team were present.

During the FGD a checklist of questions was used with a set of five introductory questions based on hazards (daily and historical), changes to livelihoods, changes to agricultural/livestock cultivation, migration and childhood memories. After this, open-ended questions were asked related to non-economic losses and damages. Here we categorized questions based on individual, society, and environment (see **Annex 1**) – sometimes there were overlaps between the sets of questions. All of the interviews were voice recorded with the consent of community members.

Table 1: Information of Focus Group Discussions (FGDs)

District	Upazilla	Union	Village	FGDs	
				Description	Total
Satkhira	Shyamnagar	Munshiganj	Singhortoli Chunkuri	<ul style="list-style-type: none"> 1 FGD with mixed group/village (8) 	10
		Gabura	Chakbara Dumuria		
Khulna	Koira	Uttar Betkhasi	Katmarchar Padma Pukur	<ul style="list-style-type: none"> 1 FGD with female/upazilla (2) 	
		DakhinBetkhasi	Patakhali Joursing		

2.6 Key Informant Interviews (KIIs)

To learn more about local socio-economic settings of the study Unions, history and trend of climate-induced hazards and associated non-economic loss and damages at local level, the team interviewed 19 locals on the issues (8 men, 8 women and 3 government officials). Two KIIs were conducted in each of the study villages along with three government officials. Thus, the

study was informed by 19 KIIs from the two districts (as indicated in Table 2). For the majority of interviews, the research team paired female KIIs with a female interviewer and male KIIs with a male interviewer.

An experienced facilitator led the FGDs in both mixed and all female groups. A male member of the research team led the mixed group FGDs while a female member led the FGDs with women. For the majority of KIIs, the research team ensured that a male member of the research team conducted KIIs with men and women member did the same with women. However, as mentioned before, time constraints made this difficult. During the FGDs and KIIs other members of the study team translated key messages, took notes and ensured all sessions were voice recorded. The facilitator followed a set of guiding points to conduct the session

Table 2: Information of Key Informant Interviews (KIIs)

District	Upazilla	Union	Village	KIIs	
				Description	Total
Satkhira	Shyamnagar	Munshiganj	Singhortoli Chunkuri	2 KIIs/village (1 male and 1 female per village) & 3 KIIs with Government Officials	19
		Gabura	Chakbara Dumuria		
Khulna	Koira	Uttar Betkhasi	Katmarchar Padma Pukur		
		DakhinBetkhasi	Patakhali Joursing		

2.7 Guiding Points for FGDs and KIIs Conduction

✓ Note Taking

In each FGD, one of the team members was responsible for recording information, issues and responses of the participants during the session. Relevant and interesting comments related to any topic of the checklist were captured with direct quotes.

✓ Tape Recordings

The study team arranged a voice recording of every FGD and KII to capture discussions/interviews only after having acquired permission from the participants prior. This helped the team summarize field reports and write the final report. The writing team of the final report used the voice recordings for clarification and to ensure all quotes were not taken out of context.

✓ Session Summary and Field Reports

First of all, the team prepared a session summary immediately after each of the FGDs based on the notes and tape recordings. The outline of the session summary included 1) Number and gender of participants; 2) Location and length of the session, and; 3) Key findings from the discussion on topics as

included in the checklist. Once all the FGDs and the preparation of the session summaries were complete, the team started preparing the final report.

✓ **Data/Information Observation, Cleaning and Clarifying**

The checklist that was developed prior and following the pilot study included mainly questions for qualitative research. While some of the information such as 'months/years of school lost following Cyclone Alia' and 'proportion of land cultivated' was quantitative, not all values identified by the communities were easily quantifiable. As previously mentioned, it was neither the main purpose of this study to quantify non-economic losses these communities have had to cope with.

Following field-work, a small team guided by the Principal Investigator and Co-Principal Investigator reviewed all the field materials including field notes, summary of sessions, reports, keeping all the questions/issues/topics of the checklist in mind. The frequency of the opinions, objections, and different opinions on the same subject were observed and noted. Any new issues were noted very carefully. For example, in analyzing the data concerning non-economic losses and damages, every time a participant mentioned non-economic losses and damages/social and cultural loss and damages, the team marked this in the section and asked respondents to clarify and elaborate on the background and details of the loss. New issues/areas under different topics were mentioned separately. These notes were then elaborated and verified using the audio recordings of the sessions.

✓ **Writing the Report**

The study team reviewed field notes, summaries of the sessions, summary drafts of the final report and the list of story entries to prepare the report. The important responses, comments and quotations were captured for the study report. Attempts were made to explain majority and minority feelings especially on the non-economic losses and damages, type and nature of damages, and correlation with environmental stressors. The first draft report will be shared with the stakeholders for their immediate feedback on the report.

✓ **Consultation Workshop**

Drawing to the end of the study, the research team presented their findings to a group of stakeholders which included practitioners, government officials, researchers and members of other non-governmental organisations (NGOs). The consultation workshop was a half-day event held on Monday, 27 October 2014. Feedback was noted in a separate section in the final report, for a programme of the workshop please see **Annex 3**.

2.8 Limitations of the Study

The study did not attempt to quantify non-economic losses and damages due to climate change. It was clear following the preliminary visit that the contingent valuation method would have been inappropriate given the formal relationship between the research team and each village. Without sufficient time to form trusting relations with community members, asking personal questions as to the monetary value of certain items would have been perceived as offensive. For example, as the findings will demonstrate, the issue of early childhood marriage can be framed as a situation where girls' families felt pressured into giving their daughters hand in marriage at a young age in the hope of providing them with a better life. While such decisions were made taking into consideration economic costs and benefits, it has psychological and health impacts particularly for the daughters – factors which cannot be easily quantified and even so, are extremely personal and inappropriate to raise questions about.

This raises an additional limitation of the study namely that there was no attempt to forecast what future non-economic losses and damages from climate change might entail. Instead, an effort was made to account for sudden and slow onset events since attribution of certain events to climate change has not yet been fully realised. Moreover, it is important to note that issues such as salinity intrusion are due to multiple factors such as anthropogenic and natural factors, including but not limited to SLR, storm surges, number of cyclones, etc. that are difficult to differentiate and, given the purpose of the study, it was determined that separating these climatic events was not essential to analyse the non-economic losses and damages.

While the checklist that was developed was tested during the pilot study, consultations with government officials and experts revealed that a future assessment could include more questions. For example, a future assessment on non-economic losses and damages could complement this study by also collecting information on existing types of adaptation measures by communities, willingness to pay for items such as health and education, collection/ranking of values, details of migration flows, mapping of climatic events, and climate scenario mapping.

Similarly, while the team aimed to collect information on all areas of the checklist, some questions were more relevant to some communities than others. As such, some KIIs were focused on specific stories of immeasurable loss. Also, it should be taken into consideration that since several respondents were accustomed to answering specific questions related to development and relief, some of the questions were easier to answer than others. The level of comfort of the respondents to specific interviewers also determined how many details they were willing to share.



The picture depicts the morning low tide by Shinghortoli village. Commuters by boat are forced to walk up a very steep and slippery embankment to reach the market.

3. Conceptualizing “Loss and Damage”

3.1 Defining the Term

Losses and damages due to climate change have been used interchangeably within the literature. Although more severe irreversible impacts (‘losses’) and reversible impacts (‘damages’) pose incredibly different policy implications, there is agreement that these exist in a realm ‘beyond adaptation’. Some have gone further to argue this topic must be considered separately from discussions of mitigation and adaptation. While unlike mitigation and adaptation for which definitions were agreed upon early on in the process, there currently exist at least two working definitions of loss and damage. The first comes from Warner et al. that defines loss and damage as the “negative effects of climate variability and climate change that people have not been able to cope with or adapt to” (2012). The second definition is very similar but comes from Nishat et al. and states loss and damage are the “current or future negative impacts of climate change that will not be addressed by adaptation efforts” (2013). It should come as no surprise therefore that the only mention of the words ‘loss and damage’ in the IPCC AR5 come from Chapter 16 on ‘Adaptation opportunities, constraints and limits’ (2014b). The World Bank (2010) defines the damage as “total or partial destruction of physical assets existing in the affected area” and loss as “changes in economic flows arising from the disaster”.

To add to the complexity of the issue, loss and damage can be divided into economic and non-economic impacts. The two can be distinguished based on value judgments for which the latter cannot be easily assigned a market value (Morrissey and Oliver-Smith, 2013). In this report, non-economic losses and damages refer to ‘goods and services not accounted for in formal accounting procedures’ (ibid). Since they are calculated with great difficulty, they are often not accounted for in loss estimates. These impacts can be further subdivided into avoided, unavoidable and not avoided losses and damages (Verheyen, 2012). Avoided impacts are those that have been successfully addressed through mitigation and adaptation efforts. Unavoided losses and damage are those that have not been avoided while unavoidable impacts occur regardless of how ambitious our mitigation or adaptation efforts are (ibid). Unavoidable impacts are also known as residual losses and damages that require a range of other approaches. Although responses to address these impacts will vary significantly, mitigation and adaptation efforts are both essential to reducing the amount of losses and damages incurred in the future (Huq, Roberts and Fenton, 2013).

3.2 Loss and Damage at the International Level

Loss and damage at the United Nations Framework Convention on Climate Change (UNFCCC) negotiations is a term that has evolved and changed over the past two decades (Roberts et al., 2014). Starting from 1991 when the Alliance of Small Island States (AOSIS) put forth the notion of an ‘International Insurance Pool’ (UNFCCC, 1991), the concept of loss and damage began as a process by which developing countries sought out compensation and liability from developed countries on historical and current emissions that have contributed the most to global warming. At the international negotiations this

has been a cause of great contention between Annex I and Annex II countries and as such the concept in 1991 was not taken up.

It was only until the thirteenth Conference of the Parties (COP) in Bali, Indonesia, in 2007 – sixteen years later – that Parties called for an understanding of risk management, risk reduction and risk transfer. Three years later, at COP16 in Cancun, a Work Programme was established to consider approaches to address loss and damage from the impacts of climate change in developing countries that are particularly vulnerable to such adverse effects (Decision 1/CP.16, para. 25, 26).

In the following Conference in Durban (COP17), the work programme was further developed and Parties identified three thematic areas:

1. Assessing the risk of loss and damage associated with the adverse effects of climate change and the current knowledge on the same;
2. 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, and;
3. The role of the convention in enhancing the implementation of approaches to address loss and damage associated with the adverse effects of climate change (Decision 7/CP.17).

From this point forward, compensation and liability became a matter of loss and damage research instead. The inclusion of ‘international mechanism’ in the COP17 decision also marked an important window of opportunity for the development of an institutional structure for addressing loss and damage. Consequentially, Parties of the Convention, at COP18, acknowledged the necessity of strengthening institutional arrangements at the national, regional and international levels and also decided to establish institutional arrangements, such as an international mechanism, to address loss and damage in developing countries. The said decision also mandated to establish such institutional arrangements and its functions and modalities at COP19 (Decision 3/CP.18, para. 7-9. In accordance with this, Parties of the Convention established the Warsaw International Mechanism (WIM) to address loss and damage associated with impacts of climate change, including extreme events and slow onset events, in developing countries that are particularly vulnerable to the adverse effects of climate change, at its nineteenth session, held in Warsaw, Poland (COP19).

The WIM will remain under the Cancun Adaptation Framework until it comes up for review in COP22. This new mechanism will ensure Parties continue research on the topic. More generally, Parties agreed that efforts need to be enhanced so as to better understand risk management and gaps in current management approaches. This may include researching methods for addressing loss and damage, causes of loss and damage, and ways for evaluating different types of loss and damage. To guide this work, WIM established an Executive Committee that will report to the COP through both the Subsidiary Body for Implementation (SBI) and the Subsidiary Body for Scientific and Technological Advice (SBSTA).

3.3 Loss and Damage at the National Level

At the national level, loss and damage research has progressed throughout the last two years due to projects such as the 'Loss and Damage in Vulnerable Countries Initiative' that has heralded several papers on loss and damage for policy makers. The research itself has covered several topics some of which have been related to slow-onset processes (Roberts et al., 2013; Nishat et al., 2013a), sudden onset events (Shamsuddoha et al., 2013), approaches for addressing these impacts (Nishat et al., 2013b), legal and institutional responses (Faruque and Khan, 2013; Khan, Roddick and Roberts, 2013) and gendered impacts from loss and damage (Neelormi and Ahmed, 2012). This research has highlighted the need for comprehensive risk management frameworks, cross-sectoral collaboration and a better link between climate change adaptation (CCA) and disaster risk reduction (DRR) agendas (Huq, Roberts and Fenton, 2013).

From this research two empirical studies came out. The first study is entitled 'Loss and Damage from salinity intrusion in Sathkira District, coastal Bangladesh' that was produced from the research team at the Bangladesh Centre for Advanced Studies (BCAS) (Rabbani et al., 2013). The study found that households in the region have incurred 1.9 million USD for losses in harvests in the three years following Cyclone Aila in 2009. While farmers had previously adapted to rising saline levels in their fields by planting saline-tolerant rice varieties, Cyclone Aila pushed them to their limits and have since then been living in a compromised situation. Thus we can deduce losses and damages related to loss of harvests occurred because adaptation efforts were not sufficient.

The second study was conducted by the United Nations University Institute for Environment and Human Security (UNU-EHS) whereby researchers looked at local perspectives on loss and damage in nine countries (Bangladesh, Bhutan, Burkina Faso, Ethiopia, Kenya, Micronesia, Mozambique, Nepal, and the Gambia). According to the report, loss and damage associated with the negative effects of climate change varies between households and between countries or regions because of different levels of vulnerability (exposure and resilience) (UNU-EHS, 2012). The case studies show that limits to adaptation are already manifesting themselves – and where those limits are approached or surpassed, patterns of loss and damage become evident. The main findings revealed that losses and damage were incurred when either coping was not enough, coping strategies had costs that were not recovered, short term relief efforts became erosive in the long term and/or when no measures were adopted whatsoever (ibid).

3.4 Loss and Damage at the Local Level

Loss and damage encapsulates spatial (occurring and observed) manifestations of climate change impacts as well as temporal (present and future) aspects. The potential spatial distribution of negative consequences related to loss and damage—particularly those intangible elements that are not as easily quantified—will burden those countries that have historically contributed the least to global greenhouse emissions. These countries also have the most limited capacities to deal with the consequences. In contrast,

the temporal dimension of loss and damage lies in the fact that future generations could be left with significantly different and possibly constrained opportunities. This therefore reflects the more ethical issue related to climate change and loss and damage specifically.

Losses and damages span a spectrum of climate change impacts from sudden onset events (such as cyclones, flash floods and earthquakes) to slow onset processes (such as SLR and drought) (Warner et al., 2012). Although attribution of environmental stressors to climate change is difficult, if not impossible, research from the IPCC has provided evidence that such events are expected to increase as temperatures continue to rise (IPCC, 2014a). The impacts of this for local communities will be a combination of both economic and non-economic effects as mentioned previously. Here research has tended to lean more towards measuring economic losses and damages. This is mainly because attempts for evaluating non-economic losses and damages are difficult, methods face high uncertainties and otherwise go against economically-centered policy makers. This gap in the literature however needs to be better addressed since these could potentially be more important for local communities when addressing the impacts of climate change (UNFCCC, 2013a).

3.5 Non-Economic Losses and Damages

According to a technical paper on non-economic losses as prepared for Decision 3/CP.18, para. 10(b), non-economic losses and damages are classified as those “not commonly traded in markets” as opposed to economic impacts for which a market price can be attributed (UNFCCC, 2013a). As such, these types of losses and damages are a subset from the total damage cause by environmental shocks and climate change. Loss and damage has been framed as a ‘third’ pillar of negotiations, paralleling mitigation and adaptation. The report also makes clear that these ‘non-economic losses may be more significant for developing countries for which should become a central aspect of climate change policy’ (ibid: 3). To categorise items further, impacts can be divided as occurring in three different realms: within private, society and the environment as well as from slow onset impacts and/or extreme events. A distinction between items can also be made between use and non-use value as well as intrinsic and instrumental value for which vary across time and space. At the end of the day however, the key aim of this report was to identify methods for assessing non-economic losses. Here, four broad categories were analysed and examples for each were put forth. An important assumption here was that decision-making necessarily involves an economic judgment: “Incorporating non-economic values into economic decision-making is an important first step towards ensuring that non-economic systems are properly managed and are robust and healthy” (ibid: 53).

In another report written by James Morrissey and Anthony Oliver-Smith arising from the ‘Loss and Damage in Vulnerable Countries Initiative’ series, the authors very early on point out that non-economic losses and damages are those which are not accounted for in the formal accounting procedures. Research therefore is driven by “not knowing how much of something has been lost or damaged” and “not knowing the value of that which has been lost

or damaged” (2014: 1). Impacts such as changes in culture, religion, internal migration, ecosystems and biodiversity are items where limited records exist. These are also extremely difficult items to place value judgment on. Establishing values to these intangible items is not straightforward. Values derive from human experience and emotional attachment (ibid).

A more pragmatic way of thinking of value is to measure it in relative terms. This is how markets work, at least ideally- the more “valuable” an item is, the more expensive it is to be traded on the market. The rising price of oil is a simple example of how an item can grow to become more valuable over-time. Even in the market therefore, value is extremely dynamic. But not all things are easily traded. Psychological and symbolic values are extremely personal and cannot easily be valued in relative terms. The example that Morrissey and Oliver-Smith use is “one does not (and cannot) purchase emotional well-being after going through the trauma of an illness or the death of a loved one – both of which are potential impacts of climate change” (2014: 1). Still, there are methods from all around the world on how to assess non-economic impacts (please see Annex 2 for an abbreviated list).

Although there does not yet exist a definition of loss and damage, there is an understanding that non-economic losses constitute immeasurable impacts – those that otherwise cannot be assigned use value for. Instead, these are items for which indirect use value or symbolic value can be attributed. Since these items are influenced through both direct and indirect environmental impacts, they are extremely difficult to attribute to climate change.

Similarly, assigning monetary value to issues like loss of social cohesion, family bonds, health, education and ecosystems services is incredibly contentious. A central problem with attempting to monetize such goods is that it might suggest this is an acceptable way to address climate change impacts – an assumption that is simply inappropriate. The method for monetizing these immeasurable impacts is called contingent valuation. Information is gathered by determining ‘willingness to pay’ for items often not valued in markets. In other words, economic value is determined by asking questions such as “how much would you be willing to pay to ensure your son/daughter remains in school” or, alternatively, “how much could (we) pay you to take your son/daughter to leave school”. From this perspective, framing of the question is crucial since it is likely to affect responses. Furthermore, such questions may be considered inappropriate when applied to the valuation of lives and health.

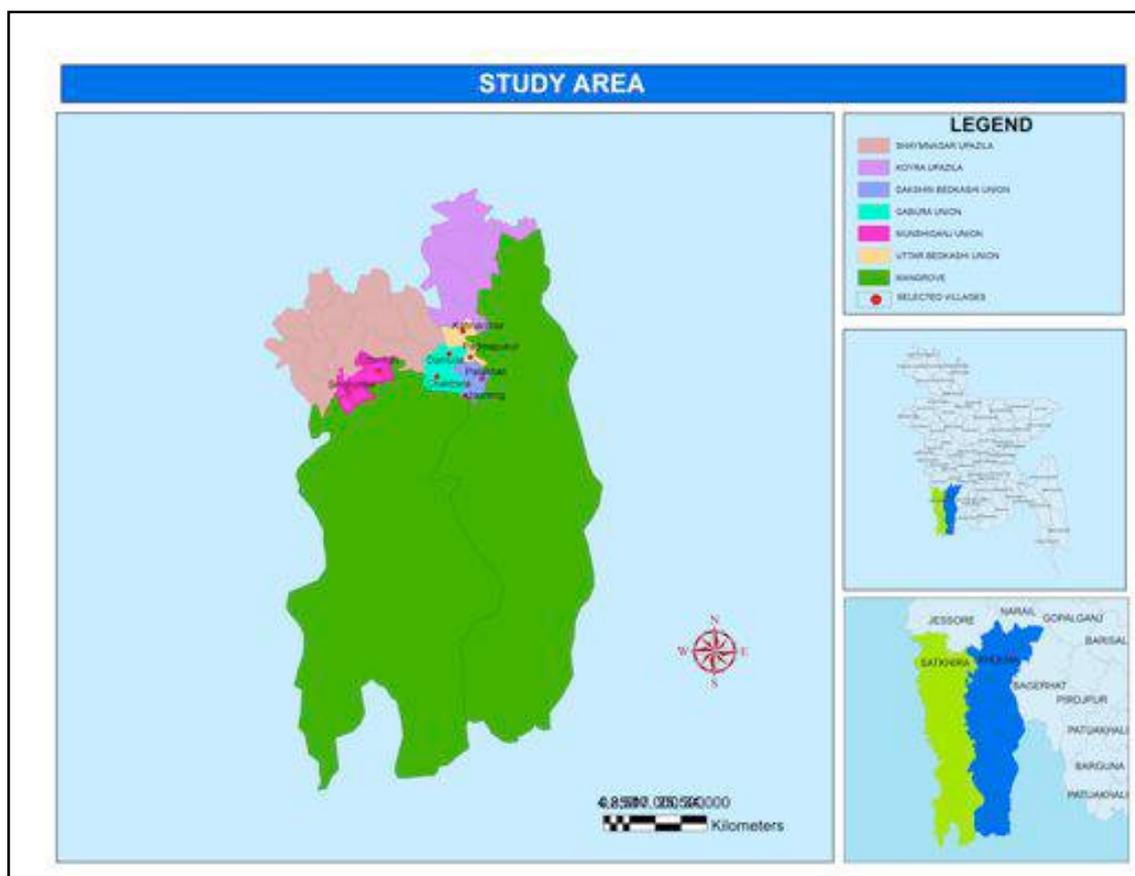
Faced with a potentially contentious value assessment, the research study conducted here did not attempt to quantify these immeasurable impacts. Instead, a checklist was developed, tested in the preliminary visit, reassessed and used to inform the FGDs and KIIs in the main field research. The final checklist that reflects the types of questions asked during the FGDs and KIIs can be found in Annex 1. Since the objective of the study was to capture stories and narratives of community members, the questions were open-ended. This helped prevent interviewers ‘putting words in peoples’ mouths’ and narrowing down responses.



A man in Chakbara Village repairs his boat from damages before the rainy season.

4. Description of the Eight Study Villages

As mentioned previously, the eight study villages were selected based on their proximity to the Sundarbans, vulnerability to climatic stresses, and existing socio-economic conditions. This section will give some geographic background as to the villages that were included in this study. Spanning across two districts (Satkhira and Khulna), two Upazillas (Shyamnagar and Koira) and four Unions (Munshiganj, Gabura, Uttar Betkhasi and Dakhin Betkhasi) the villages cover part of the South-West region in Bangladesh, just north of the Sundarbans. The livelihood of coastal populations is dependent on natural resources, agriculture, fishery, forestry and near-shore transportation (Mian, 2005). Over the past decades however, brackish-water shrimp cultivation and fish aquaculture has been increasingly adopted to deal with rising salinity levels in the region that were studied.



Singhortoli Village (Munshiganj Union, Shyamnagar Upazilla)

The village of Singhortoli is situated in Munshiganj Union of Shyamnagar Upazilla, Satkhira. The adjacent villages to Singhortoli are: Zelaykhali village in the north, Chunkuri village in the south, and Chato Vetkhali village in the west. East of Singhortoli is the Mangrove forest (Sundarbans). The population of the village is approximately 419 and, at present, 95 households live in the village (ie. each household is made up of approximately 4-5 members). Since there is no primary school in the village or clinic or health center, people are forced to go to Shyamnagar, Satkhira to receive medical treatment. Shyamnagar is approximately 15 km from Singhortoli village. Climatic hazards

faced in this village include cyclones, storm surges, riverbank erosion, increased temperatures, erratic rainfall and salinity intrusion due to both climatic and non-climatic stresses and exacerbated by shrimp farming.

Chunkuri Village (Munshiganj Union, Shyamnagar Upazilla)

Chunkuri village is situated in Munshiganj Union of Shyamnagar Upazilla, Satkhira. The village is located south of Horinagar village and east of Mirogoan village. It is also north of the Sundarbans and west of Burigoalini River. The total population of the village is 1634 and 365 households. There is a primary school, a high school and a community clinic in the village. When we visited the community in September 2014, the cyclone shelter in the village was still under construction. Similar to Singhortoli, people in Chunkuri go to Shyamnagar, Satkhira to get better health and education facilities. Shyamnagar is approximately 13 km from Chunkuri village. Climatic hazards faced in this village include cyclones, storm surges and high tides.

Dumuria Village (Gabura Union, Shyamnagar Upazilla)

The village of Dumuria is situated in Gabura Union of Shyamnagar Upazilla, Satkhira. Adjacent to the village of Dumuria is Chakbara village located in the north, Dumuria in the east, and Kholpetua River west of the village. With a population of more than 3500 with approximately 640 households, the village was the largest of the eight. As such there are approximately 5-6 people within each household. Despite its size, there is only one primary school in the village and, during the time of our visit, there were no medical/health centres. Instead people go to Shyamnagar, Satkhira, Khulna and Dhaka for medical treatment. The nearest town to Dumuria is Shyamnagar which is 22 km away from the village. Climatic hazards faced in this village include cyclones and salinity intrusion in which the latter that may be caused by human-induced factors as well as natural causes.

Chakbara Village (Gabura Union, Shyamnagar Upazilla)

Chakbara village is situated in Gabura Union of Shyamnagar Upazilla, Satkhira. The village is situated north-west of Dumuria village and south of Khalisabunia. It is also located close to the Kholpetua River. The total population of the village is 810 of which includes 180 households (ie. each household consists for 4-5 people). While there is no primary school or health facility, there are three Mosques. People go to Shyamnagar, Satkhira, Khulna and Dhaka for their medical treatments. The nearest town is Shyamnagar which is approximately 22 km away. This village was severely affected by cyclone Aila and over the years has experienced increasing levels of erratic rainfall that have the potential to dry out entire crops one season and drown them out the next.

Katmarchar Village (Uttar Bedkasi Union, Koira Upazilla)

The village of Katmarchar is situated in Uttar Bedkasi Union of Koira Upazilla, Khulna. Located north of the village is Koira which contains the closest medical facilities. To the south and west of the village is the Kopataxo River. The total population of the village is 1860 of which contains 410 households.

There is a primary school and a Madrasha however people mainly go to Koira and Paikgachato for better health and education facilities. Koira is the closest town and is located 9 km away from Katmarchar. Climatic hazards faced by this village includes riverbank erosion, storm surge, cyclones, heavy rainfall, drought, irregular rainfall and salinity intrusion.

Padapukur Village (Uttar Bedkasi Union, Koira Upazilla)

The village of Padapukur is situated in Uttar Bedkasi Union of Koira Upazilla, Khulna. Adjacent to the village is Horihorpur village in the north, Choramuna village in the south, Binapani village in the east and Kopataxo River in the west. Total population of the village is 2490 of which contains 553 households. There is a primary school and a large community market. For health facilities, people go to Koira, Kapilmoni, Paikgacha (sub-district) to receive medical care. The nearest town is 13 km away from Padapukur village. The village mentioned cyclones, storm surges and salinity intrusion as being major threats to their wellbeing but also norwester winds have been cited as a cause for devastation.

Joursing Village (Dakhin Bedkasi Union, Koira Upazilla)

The village of Joursing is situated in Dakhin Bedkasi Union of Koira Upazilla, Khulna. The village is located north of Anxihara village and east of Patakhali village. Bordering the northern and eastern side is the mangrove forest of Bangladesh. The total population of the village is 1980 of which contains 440 households. There is a cyclone center as well as a primary school in the village however people go to Koira, Kapilmoni (all sub-districts) to receive better health and education facilities. The nearest town is 14 km away. Housing in the community was provided by a CDMP and UNDP programme. Climatic hazards faced in this village include cyclones and riverbank erosion.

Patakhali Village (Dakhin Bedkasi Union, Koira Upazilla)

The village Patakhali is situated in Dakhin Bedkasi Union of Koira Upazilla, Khulna. The village is located south of Binapani village, north of Anxihara village, west of Shakbari and Joursing villages and east of Binapani and Choramukho villages. Total population is 2980 and 660 households live in the village. There is a single primary school and people mainly go to Koira, Kapilmoni, Paikgacha (sub-district) to get better health and education facilities. The nearest town is 15 km away from Patakhali village. The village faces extreme pressures from riverbank erosion, salinity intrusion and heavy rainfall.



The start of the second rice harvest in Uttar Betkhasi shows the importance of rice cultivation for the village. This village had one of the largest rice fields of the eight.



5. Key Findings

5.1 *Climate Hazards in Bangladesh*

Bangladesh is a low-lying country that is incredibly vulnerable to sea level rise and cyclones (Ali, 1999; Paul, 2009; Murray et al., 2012; Mallick and Rahman, 2013). With the majority of the population living in floodplain areas, climatic stressors often have catastrophic effects on agriculture, ecosystems, human health, mortality (Milojevic et al., 2012) and mobility (Saito, 2009; Bradshaw, 2010). Historically speaking, once every ten years severe floods have inundated 60% of the country for nearly 3 months of the year (CEGIS, 2010). Additionally, based on available statistics, more than 50% of worldwide deaths due to cyclones and induced surges occurred in Bangladesh (Ali, 1999).

It is predicted that by 2080, a 62 cm in SLR could affect 43 million people and inundate approximately 16 percent of the country (Conway et al., 2010). This will certainly exacerbate existing socio-economic vulnerabilities and put more pressure on the poorest and most marginalized communities. Future events however will also have adverse effects on salinity intrusion, siltation, rapid erosion, lack of freshwater sources, extreme heat, rainfall variability, water logging and drought in the dry season. Already salinity intrusion has drastically changed the geography, ecology and landscape of the region. As a livelihood adaptation therefore, aquaculture has been long championed as a strategy to enhance food security and promote economic development. According to available statistics, it is found that the total fish production of the country shows a consistently increasing trend during the last 25 years. This sector contributes 4.39% to the national GDP and almost one-fourth (22.76%) to the agricultural GDP (Bangladesh Economic Review, 2012). Still, future effects of climate change will likely compromise growth in this sector as well as many others.

The vulnerability of Bangladesh to climatic hazards, and particularly to cyclonic activity, has been thoroughly researched and has helped make the country the most widely cited least developed country (LDC) in the IPCC Fifth Assessment Report (Stott, 2014). Important to note here, research has also reflected that throughout Bangladesh, there are a number of successful examples of adaptation related to risk awareness, structural measures and disaster risk reduction measures (Martinez et al., 2011, Murray et al., 2012).

5.2 *Climate Hazards in the eight villages*

In the eight villages that were studied, respondents identified very similar climatic hazards. In nearly all the villages, cyclones/storm surges and salinity intrusion were identified as two of the top three hazards they faced. These responses were based on perceptions and therefore were likely influenced by events such as cyclone Sidr and cyclone Aila. Female FGDs in the Uttar Betkhasi and Munshiganj Unions also helped consolidate information that was received from each individual village as well as get a female perspective on hazards. In Bangladesh, research has demonstrated that females are more affected than males by a range of climate hazards, due to differences socio-economic levels, malnutrition and exposure to water-logged environments (Neelormi et al., 2009). Restricted mobility also makes women, elderly and

children the individuals most likely to be left behind (Saito, 2009; Bradshaw, 2010). With this background, it was important that female FGDs also included questions with regards to climate hazards regardless of the repetition.

The below table summarizes the feedback on climatic hazards for all eight villages in no particular order. Although none of the villages ranked the hazards in order of threat, the findings reinstate the fact Khulna and Satkhira are low-lying regions, making them highly susceptible to SLR and sudden onset events. Even daily many of these communities experience a large difference between high tide and low tide levels that are further exacerbated once a month due to the gravitational pull during a full moon (see Figure 1).

Table 3: Top Three Hazards in Eight Villages in Southwest Bangladesh

Upazilla	Union	Village	Top Three Hazards					
			Riverbank Erosion	Cyclone/ Storm Surges	Salinity Intrusion	Erratic Rainfall	Heavy Rainfall	Norwester
Shyamnagar	Munshiganj	Singhortoli	✓	✓	✓			
		Chunkuri		✓	✓	✓		
	Gabura	Chakbara		✓	✓	✓		
		Dumuria		✓	✓			
Koira	Uttar Betkhasi	Katmarchar	✓	✓	✓			
		Padma Pukur		✓	✓			✓
	DakhinBetkhasi	Patakhali	✓		✓		✓	
		Joursing	✓	✓			✓	

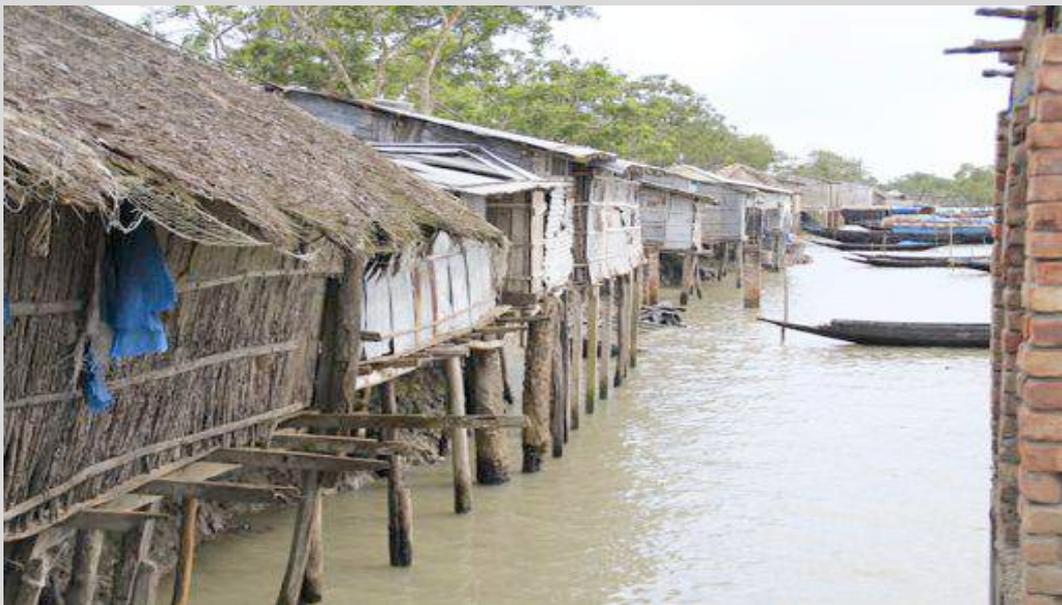
An interesting finding is that no two villages in the same Union identified the same three climatic hazards. This might be due to characteristics of the village such as size, distance from embankment, government/non-governmental organisation (NGO) support and/or adaptive capacity. Otherwise, respondents might have been influenced by their respective livelihoods, location of their homes and/or most recent events that might cloud respondents' judgment.

Riverbank erosion came third in the most frequently cited hazard for the villages analysed. Although not a climatic hazard, reliance on embankments was commonly cited. In Singhortoli for instance, the embankment/road clearly separated the village from the river, even during the low tides (see **Figure 1**). Any damage to the embankment therefore could prove fatal to the villagers and the infrastructure that is predominately constructed on mud foundations. Further taking into consideration that storm surges were identified as a threat in nearly all the villages, these embankments are likely not acceptable as an adaptation strategy to future climatic events. While this might change in the future, climate proofing the embankment will be necessary.

In the largest and most recent cyclone, cyclone Aila, all eight villages were significantly affected due to the extreme weather conditions and indirect

impacts such as salinity intrusion, waterborne diseases, loss of crop yields, impacts on fresh water supplies, etc. While some of these impacts have occurred due to natural and anthropogenic changes, cyclones and other extreme onset events have heightened these adverse impacts either temporarily or more permanently. The below table demonstrates the physical impacts the cyclone had on each of the communities.

Figure 1: Differences in the Daily High Tide/Low Tide in Gabura Union



The above pictures were taken on 11 September 2014 in Gabura near the boat docks that separated Chakbara village and Dumuria village taken at 10:00 AM and 15:00 PM, respectively.

Table 4: Physical and Educational Impacts due to Cyclone Aila

Upazilla	Union	Village	Cyclone Aila			
			Physical		Education Lost	
			Deaths	Injuries	0-6 Months	1+ Years
Shyamnagar	Munshiganj	Singhortoli	4-5	10-15		✓
		Chunkuri	0		✓	
	Gabura	Chakbara	60-65	200-250		✓
		Dumuria	100+	800		✓
Koirā	Uttar Betkhasi	Katmarchar	100			✓
		Padma Pukur	2		✓	
	Dakhin Betkhasi	Patakhali	15-20			
		Joursing	9			

Gabura was the most negatively affected Union of the four when cyclone Aila hit in 2009, killing over 165 people in both the villages we interviewed. In Chunkuri, a cyclone shelter was under construction when we visited. Lack of infrastructure and non-paved transportation routes were an enormous limitation for villagers attempting to escape from extreme weather systems. As the Union with largest population we visited, it was apparent that there was a lack of infrastructure to protect the entire population from a future cyclone and storm surge. In Dumuria village, lack of fresh water access demonstrated how extreme weather events might have exacerbated existing environmental sensitivities and/or how events of cyclone Aila brought communities beyond their tipping point. As we will see from the analysis, salinity has affected communities health, ability to grow crops and reliance on the market which has, in turn, led to a diminishing inability to practice certain traditions as well as allow individuals to be as hospital as they were in the past.

5.3 Migration (internal and external)

Migration and its relation to non-economic losses and damages was a point of intense deliberation throughout the entire research study. With the exception of forced migration, migration has been primarily used as a strategy for households to diversify their incomes. It was therefore primarily seen as measure for avoiding future losses and damages. Yet still, it was argued amongst team members that the act of migration entails a non-economic loss that is experienced by individuals that are left behind. While such a point was valid, given the methodology of the study it was not certain participants in our focus group would have experienced the 'loss' of a family member due to migration. Secondly, the checklist did not include questions related to reasons why people migrated. Lastly, in consultation with external experts, the decision was made to keep migration as an overarching issue rather than as a non-economic loss and damage per say.

What is interesting to note is that in the village of Joursing, respondents went into detail about the permanent migration of Hindus from the village to India. During their story respondents in the FGD indicated the village had longed for

them since they were valued members to the community – providing agricultural support to the farmers for their cultivation and daily labour. Migration not only came at a loss of labour, however, it was also mentioned they had traditional knowledge that was lost once they left the village.

Migration was also mentioned during the final consultation workshop. Specifically, a respondent asked about professionals such as teachers and nurses who had left these villages in search of employment in cities. Although the ‘loss’ of professional labour had not been raised during the FGDs, such an element should be considered in future methodologies as a societal loss.

In Patakhali village during the male KII, the respondent mentioned “Due to the migration of relatives, friends, and neighbours, our society, community and family have broken down. I feel sorrow for them who are not now with us. We had a close connection with each other.” A similar story was shared in Dumuria where the male KII explained: “one of my younger uncles and my sister left here to settle in Jessore, They left the village with their family but sometimes they come to visit. When we remember them, we feel sorrow for them, they also feel unhappy for us. We had a strong relationship.” Such stories were common in all the eight villages however the correlation with environmental impacts was far removed and/or was one of several factors encouraging them to leave.

5.4 Framing the Issue at the Local Level

Tracking non-economic losses and damages is difficult because it requires us to understand values and, more importantly, the reasons why people act the way they do. While in economics we learn that people act with the intention of making a profit, such thinking might conform to Hobbes’ conclusion that the life of man is ‘solitary, poor, nasty, brutish and short’. This pessimistic account necessarily fails to take into consideration ‘positivist’ values for which have guided the actions of millions in the past. Values such as admiration, love, devotion, pride, and affection are some of the many reasons we act the way do. It is for this reason that measuring the non-economic is like measuring love: whilst they are both important in our daily lives, they are impossible to quantify.

Attempting to gather such information was difficult for multiple reasons. Firstly, since community members became naturalized to development measures of ‘quantifying and delivering’ it was difficult to move beyond, what we consider, economic losses and damages. It was therefore important to provide a detailed explanation of what non-economic damages entail at the beginning of every interview. Secondly, since the research aimed to address qualitatively non-economic impacts, certain vocabulary was used to draw out stories. For instance, ‘losses’ were better translated as ‘harms’ since harm also included physiological impacts that would otherwise have been overlooked. Box 1 includes a list of Bangla words that were helpful in our research and that might help inform future research in this field. Furthermore, questions such as ‘how does that make you feel’, ‘how does this differ from what you remember in your childhood’, and ‘what does this mean for you’ were used to help probe deeper into stories.

Box 1: Useful Bangla Terms and English Translations

Bangla	English
Gher	Plots of land in which shrimp is cultivated
Monerkoshto	Pain in my heart
Khoti	Harm
Harano	To lose
OpuronioKhoti	Immeasurable loss
Jamaishommelon	Gathering of son-in-laws
PithaUtshob	Rice cake festival
Musulmani	Boys' circumcision ceremony
Manobota	Affection/humanity
Mela	Fair or Festival
Kabaddi	Tug of war
Jheel	Impurities found in rice
Payesh	Rice pudding
Dushchinta	Stress, thinking about the worst
Jon mojur	Wage labourer or day labourer
Pukur	Small pond
Panirkoshto	Scarcity of water
ChaitMaash	March-April
BaishakhMaash	April-May
Ghamachi	A skin condition that causes redness and itching
ShoronShokti	Memory, ability to retain information
Astha	Belief

The image illustrates the overflow of rivers/canals during high tides in Chunkuri village.

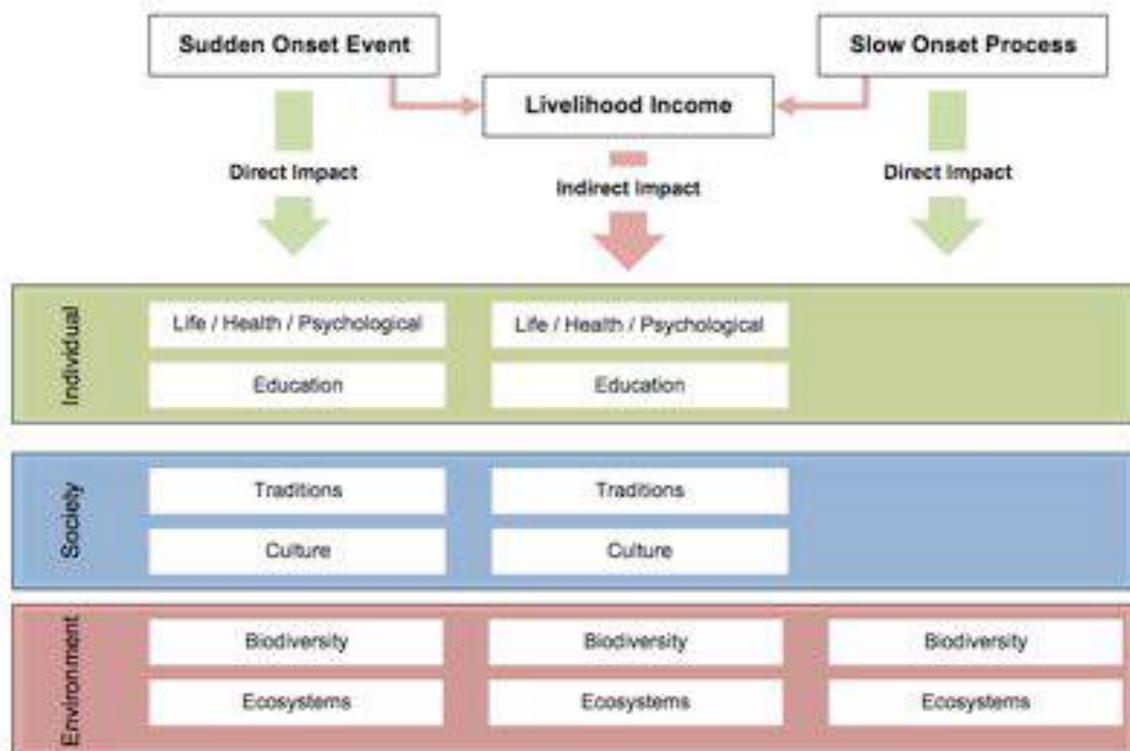


6. Non-Economic Losses and Damages in South-West Bangladesh

Identifying aspects of non-economic losses and damages related to slow and sudden onset events is important to identify and prioritise future research and policy actions. Without other primary research on non-economic losses and damages, the categorisation of impacts for this study was based on feedback from two villages during the preliminary study. As such, three types of non-economic losses and damages could be identified: individual, societal and environmental non-economic impacts. While responses were subjective and limited to perceptions of local people, these categories were useful in helping to categorise responses and analyse the FGDs and KIIs. These categories will also help to organize the findings in this section.

An important point for clarification is that non-economic losses and damages came up as both direct and indirect effects of climatic impacts. These distinctions were made ad hoc for the purpose of better understanding how non-economic impacts arise. The following flow diagram attempts to capture this.

Figure 2: How Non-Economic Losses and Damages Ensur from Slow and Sudden Onset Events



6.1 Individual Level

Non-economic impacts at the individual level were determined based on education and physical/psychological wellbeing of individuals/households. Since impacts varied across villages and households and also between slow and sudden onset processes, it was difficult to generalise the individual level findings. Instead, it could only be demonstrated that following the most recent

sudden onset event, cyclone Aila, children in villages located in Munshiganj, Gabura and Uttar Bedkhasi were unable to go to school for up to one year following the cyclone (see Table 5). Similarly, all the villages faced significant psychological impacts due to recent cyclones that have affected their wellbeing in a number of ways.

6.1.1 Education

The linkages between education and climate change have primarily focused on using education as a tool to raise awareness on climate change. While this is important in its own right, the effects of climate change on children's access to education has not been central in this debate. Instead impacts to education have often been included as part of infrastructure calculations. In the aftermath of Cyclone Sidr, which struck Bangladesh in November 2007, 74 government primary schools were destroyed and another 8,817 damaged (UNESCO, 2012). It has been estimated that 103,664 children were affected as a result. According to Das, the estimated cost of reconstruction and refurbishment was more than US\$82 million (2008).

Table 5: Education Lost due to Cyclone Aila

District	Upazilla	Union	Village	Cyclone Aila	
				Education	
				0-6 Months Lost	1+ Years Lost
Satkhira	Shyamnagar	Munshiganj	Singhortoli		✓
			Chunkuri	✓	
		Gabura	Chakbara		✓
			Dumuria		✓
Khulna	Koira	Uttar Betkhasi	Katmarchar		✓
			Padma Pukur	✓	
		DakhinBetkhasi	Patakhali		
			Joursing		

Since Sidr, Bangladesh has become one of the first countries to start constructing cyclone shelters that also double as schools for children in nearby villages. While this has advantages as well as disadvantages, the focus on education as an individual level impact in this study was concerned with immeasurable loss that comes with children not having access to school either due to environmental factors or due to insufficient household incomes. Although all the communities had mentioned an increasing trend of sending their children to school, beyond primary school most households could not afford to continue sending their children to school. This was mainly due to tuition fees and due to the distance of secondary schools from the villages. While only two villages had no primary school, only one village we visited had a high school.

Furthermore, immediately following cyclone Aila, four villages mentioned their children had lost a year or more of school while another two villages had lost

between one and six months. Many of these respondents in the FGDs expressed concern that their children had fallen behind in comparison to children in other villages.

6.1.2 Physical and Psychological Wellbeing

One of the most evident relationships between vulnerable communities and environmental impacts is the effects on individuals' physical and psychological wellbeing. In the case of cyclone Aila in 2009 that hit this region in May 2009, seven of the eight villages reported that they experienced deaths of community members directly because of this event. The two villages in Gabura were the hardest hit of the villages studied with over 160 deaths and over 1000 injuries between the two communities alone. Of those at highest risk of death and injury due to cyclones were elderly, women and children who were often found drowned due to the storm surges that ensued. The below table demonstrates the feedback from respondents during the FGDs (Table 6).

Table 6: Number of Deaths and Injuries due to Cyclone Aila

District	Upazilla	Union	Village	Cyclone Aila	
				Physical	
				Deaths	Injuries
Satkhira	Shyamnagar	Munshiganj	Singhortoli	4-5	10-15
			Chunkuri	0	
		Gabura	Chakbara	60-65	200-250
			Dumuria	100+	800
Khulna	Koirā	Uttar Betkhasi	Katmarchar	100	
			Padma Pukur	2	
		Dakhin Betkhasi	Patakhalī	15-20	
			Joursing	9	

Additional issues related to the physical well-being of communities included various other injuries related directly to cyclonic events such as hearing loss, broken bones and loss of limbs. But challenges did not end here. In all eight villages, respondents expressed that they have experienced an upsurge of uterus infections, skin diseases and appendicitis over the years. While this might have been due to factors such as hygienic practices, changes in water supplies, nutrition levels, fertilizers/pesticides, etc. this study is not able to draw any conclusions from this finding. Instead, it is suggested that additional research is needed.

The case of skin ailments was the most pronounced in Dumuria village in Gabura Union where skin issues were prevalent in a number of young children we saw as well with the female KII. Common here was the explanation that skin ailments were the result of increasing salinity in the fresh water sources. Given the time constraints of this study however, the analysis

could not fully establish causality between salinity and skin ailments. It is therefore a suggestion of this study that salinity intrusion and common health conditions in South-West Bangladesh be researched so as to improve the living standard and reduce the rate of occurrences of these ailments.

Box 2: The Struggles of Living with a Skin Disease in Dumuria Village

Musammat Nurjahan is a housewife who lives in Dumuria Village in Gabura Upazilla. She is 50 years old and is unable to work due to her skin ailment on her hands and body. She is dependent on her daughter-in-law for support but she expressed guilt stating “I cannot keep asking [my family] for everything”. Her ailment has also taken away the pleasures of feeding her husband who is now retired. She explained “I cannot serve my husband any food or water. That hurts me. The doctor has forbidden me. My daughter-in-laws serve his meals, but he is elderly now, if we don’t serve him food on time, isn’t he going to lose his health?... Imagine how I feel. I cannot even serve my own grandchildren any food.”

After Aila destroyed their home they took shelter outside in tents by the roads. They used to use water for showers, washing dishes, from a deep tube well that she claims had iron in it. The skin diseases started from using that water. She has been living with this disease for 5 years, started with just the palms of her hand and has now spread to her whole body. She goes to the doctor regularly who has prescribed creams, pills and medicine which makes her medical expenses significant. Due to her condition she is also unable to take on other duties such as raise her homestead garden to grow spinach and other vegetables for her family. She explained that this task has become the responsibility of her daughter-in-laws who do not have the knowledge or time to support her vegetable garden. She has in turn found herself a burden to her family for which everyone must work to provide subsistence.

Here, the immeasurable loss she has experienced was at least in part due to salinity intrusion is her health and her inability do household chores and take care of her family since her skin ailment is so pronounced.

In a number of the villages we spoke to, respondents had revealed they allowed their daughters to get married as young as thirteen. In Chakbara village in Gabura one woman explained that she was under financial pressure when she allowed her daughter to marry an older man. She explained: “my daughter was married at thirteen. Within one or two years, she had a baby and fell ill immediately. She is still severely sick”. When she was asked why she allowed her daughter to marry at a young age she told us: “I was facing food and income insecurities and therefore felt pressured to give her away”. Not only was it unclear whether this was a cause for contention within the community, this research study did not reveal how the average age of marriage has changed over the years. Rather, it was demonstrated that there

were much higher pressures on females to get married than for males. In Katmarchar village these pressures were revealed during the female FGDs where respondents explained salinity levels in the water was darkening their skin tone. Respondents mentioned that this was particularly troublesome for young girls who were of marriageable age since families had to spend more money to get their daughters married off if they had darker skin tones. One respondent stated: “boys don’t like dark girls.”

Moving on to psychological wellbeing of individuals due to climatic events, the impact of sudden and slow onset events is incredibly complex and includes a variety of individual and societal impacts. While events such as cyclones have left severe psychological scars on all the villages we researched, many people admitted to living in constant fear that another cyclone might hit overnight which would leave most families helpless. Even from the research team’s experience, several of these villages were incredibly difficult to access due to the thick mud and the slipperiness of the paths. One would expect this to be even more difficult in the dark and in stark terror.

Some of the fears that respondents mentioned during the FGDs and KIIs included:

- Fear of another cyclone
- Fear of migration (ie. unforeseen unemployment, guilt about leaving family members behind)
- Fear of remaining/being left behind
- Fear of being robbed (ie. due to scarcity of crops many households have become fearful of other families stealing what they have managed to cultivate, pirates in the Sundarbans)
- Fear of losing their land completely (ie. since most farmers have started leasing out their land, they feel trapped in terms of being ‘bought out’ by richer farmers and also in terms of being pressured to convert their land to gher if they have not already)
- Fear of buying market produce that is laced with fertilizers/pesticides
- Fear of declining health (ie. due to fertilizers/pesticides, malnutrition, declining fresh water supplies)
- Fear that will not be able to pay for their children’s tuition due to rising food costs, household repairs, medical bills, etc.
- Fear of losing cultural traditions
- Fear of embankments breaking

Psychological impacts can be further differentiated within three categories: direct and acute impacts, psychosocial impacts and indirect impacts for which can arise both because of sudden and slow onset events (Doherty and Clayton, 2011). In all eight villages, chronic environmental stress had significant impacts on why people made the decision to not invest in assets such as livestock. While many villages explained that the lack of grazing fields had forced them to sacrifice the option of owning cattle, there was a general fear that an investment in livestock would be lost if another cyclone hit. The disinterest to own livestock was further aggravated by the scarcity of grazing land and the cost of fodder. Since cyclone shelters also do not include shelter for individuals to bring their livestock, most villages could only justify rearing

ducks. In turn, this has had impacts on culture and traditions especially in the Hindu communities we visited, however this will be explained in more detail in the following section.

In terms of indirect psychological impacts, a common fear prevalent in all eight communities was the consumption of market fruits and vegetables. Since increasing salinity intrusion has cost households the greater portion of the crops they once cultivated, families are being forced to buy their produce in the market. The perception here was that since produce was being sold in the market, it necessarily had a greater number of chemicals and pesticides. As such, people claimed to be getting more ill. In Katmarchar a woman expressed "we buy all our fruits and vegetables. It's full of formalin. It's nothing compared to the fruits that used to grow here, they were so tasty, so delicious, you cannot imagine." Similarly, another respondent claimed: "I bought jackfruit from the market and got an extreme stomach ache, I couldn't even stand straight." Although these types of responses may be due in part because of perception, the use of chemicals in fruits and vegetables in Bangladesh has been on the rise (Hossain, Heinonen and Islam, 2008) and news media has also helped inform the population. However without additional research as to the use of chemicals in the local markets we interviewed, this study cannot confirm or deny these allegations.

Box 3: The Psychological Impacts that Cyclone Aila Left Behind

"More than the storm in the sky, I feel like the storm that starts to brew in our hearts is bigger" – Respondent in the Female FGD in Singhortoli Village

Imagine you are forced to evacuate your home in minutes and cannot carry anything with you. The pathway is slippery and you will need your hands for balance. You feel terrified as you see people you know struggle to get to the cyclone shelter. When you finally arrive, you search for your close relatives for comfort as you all await the storm to climax and the cyclone to pass. You likely do not have time to process what has just happened and when the clouds open and the sun appear, you don't feel the same relief – you don't know what you will return to, what has been destroyed and who has survived. Although you know many of your neighbors have experienced the same losses as you, you internalize this and try to accept what has happened and hope that one day you will be able to recover and move on where you left off.

This trauma is very difficult to imagine especially to someone who hasn't visited Khulna or Satkhira but the stories from the communities were all very similar. In Chakbara, the male KII told us: "Many pregnant women and children died because of cyclone Aila. If the cyclone would have happened in the night time we would have expected so many more people to have died". Nearby in Dumuria a man told us "Many people were injured permanently because of the cyclone. Some people lost limbs, others lost their eyesight and many others became deaf. For those men who severely damaged their hands, they became disabled and unable to work. [New hands] are not items we can purchase in the market". The same man also explained that his grandmother died two years following Aila because she became 'mad' about what she had witnessed. His father-in-law additionally passed away following Aila due to water borne diseases.

In Chunkuri, the male KII told us his father due to psychological trauma became mentally sick and is now paralyzed. He also shared with us another case he heard of in the village where the same thing happened to another man. Although no one died in his village, many people have become paralyzed due to fear. "All these hazards are keeping us in an isolated box from where we cannot plan our future. Whenever we start to plan, we feel like another hazard may come and take it all away," stated a respondent from Singhortoli.



A young girl in Joursing enjoys the nice weather by showing off her favourite camis that matched her twin sister and was sewn by her mother.

6.2 Societal Level

In this study, societal level impacts were considered based on whether changes went beyond the household level (ie. whether more than just a single household experienced these changes). Impacts were further differentiated between traditions, religion and customs and social bonds/relations (previously considered culture/heritage). Here questions pertaining to changes in traditions over the years or over generations were asked as well as whether they were generally missed by the people. In terms of the latter, questions were raised as to the social cohesion between people and bonds between families, friends and neighbors. Since relationships are also incredibly dynamic by nature, differentiating from organic changes and environmental pressures was done by asking questions as to why these changes occurred.

Before beginning to understand how the villages have been experiencing changes at a societal level, it is important to understand the religious dynamics between the eight villages. Only four of the villages we visited were completely Muslim while one was predominately Hindu and another three were mixed. The below table explains which villages identified to which religion.

Table 7: Religious Associations with each Village

District	Upazilla	Union	Village	Religion		
				Hindu	Muslim	Mix
Satkhira	Shyamnagar	Munshiganj	Singhortoli	✓		
			Chunkuri			✓
		Gabura	Chakbara		✓	
			Dumuria		✓	*
Khulna	Koira	Uttar Betkhasi	Katmarchar		✓	
			Padma Pukur			✓
		DakhinBetkhasi	Patakhali		✓	
			Joursing			✓

* In Dumuria, the population was mixed but over the years, the portion of Hindus in the village has decreased since many of them have migrated permanently to India

A common response in all the eight villages was that since rice production has drastically decreased over the years due to salinity intrusion as well as due to the decision to convert paddy fields into gher, traditions that involve rice cakes [‘pitha’] have also decreased. While this more greatly affected harvest festivals such as Pitha Push Parbon, such changes were noted in both the Hindu and Muslim communities (see Table 7).

Additionally in all the villages we visited, respondents mentioned that hospitality within the community has drastically decreased over the years which has had direct impacts on social cohesion and ties between families,

friends and neighbors. As anyone who has visited Bangladesh would know, hospitality is vital to Bangladesh culture. Invitations for dinner, tea, or a casual chat are often extravagant occasions for any foreigner and it would almost seem unnatural if you are not invited at least once a year to a meal by your friends and families. It is also very common that decisions made by a household extend far beyond just immediate family – aunts, uncles, cousins, second cousins and grandparents are often also involved. On multiple occasions during our field study however we heard of grandparents not being able to extend the invitation to have their entire families come over for dinner.

Box 4: Declining Hospitality and Bangladeshi Traditions

In all the eight villages we visited, people told us that food and financial insecurities had made them unable to accept family members, friends and neighbors into their home. Below are some of the quotes we pulled out from our conversations:

“We lost the long historical tradition of peace among the people... We had a very good time with the relatives but now people do not talk nicely among each other, we do not share food and we do not invite others into our home. The happiness no longer exists” -Elder in Chabara Village

“I have nine daughters and sons-in-law and we used to invite all of them over once a year. The other villagers used to call this gathering ‘jamaishommeloni’ [‘gathering of son-in-laws’]. This has stopped, we cannot afford to do this anymore” – Father in Patakhali Village

“My mother used to invite all of my sisters and brothers and partners for ‘pithautshob’ [‘rice-cake festival’] but this does not happen anymore since she cannot afford this” – Daughter from a large family in Dumuria Village

“My family used to arrange to have our extended family come over three times a year for ‘pithautshob’ [‘rice-cake festival’] but we have been forced to stop due to financial insecurity” – Male KII in Dumuria Village

"Before I used to serve the pithas to my neighbours in a platter, now I can only hand them a pitha each." - Female KII in Singhortoli

According to what respondents shared with us, declining hospitality was due to a number of reasons both directly and indirectly linked to environmental pressures:

- 1) Since salinity intrusion has made it impossible to grow fruits and vegetables, people cannot afford to invite people over;
- 2) Due to the amount of hours worked in the ghers, people do not have time to devote to acting in a hospitable fashion;
- 3) Food insecurity has made people apprehensive to inviting others into their home (see Box 4).

6.2.1 Traditions/Religion/Customs

The effect of environmental stressors on traditions, religions and customs in the eight communities was incredibly diverse and not all villages expressed the same concern as to these changing traditions. The most feedback we received on changes to customs came from Singhortoli village likely since we had conducted our preliminary visit here as well as a main field visit and a female FGD. The fact this village was majority Hindu might also have played a factor as to why the decline of festivals was particularly troublesome since they likely also faced other pressures by Muslims in nearby villages.

In Chunkuri, Singhortoli and Joursing villages, respondents in the FGDs and KIs mentioned that the loss of cattle and particularly milk at home was extremely missed. As two Hindu and one mixed community, respectively, this is likely due to the fact cows are sacred in Hinduism. In Chunkuri, the female respondent recollected “we used to have cows milk that our parents gave us to drink when we were small and we tried to do the same for our children, but we no longer have cows... we can buy it from the market but the kind of happiness we got from rearing the goats and cows is gone.” According to her, she cannot happily celebrate ‘puja’ [a festival for Hindus] because they no longer have cows of their own to celebrate with. Alternatively, the daily routine of using cow dung in the home both as fuel and as a disinfectant has greatly diminished over the years. Such feedback is fascinating since it demonstrates the symbolic value of cattle in these particular communities: although they might be able to afford to buy milk and other cow products in the market, they do not do so routinely since it is the importance of owning the cow and worshipping the cow that is most sacred. As one woman mentioned in the KI in Chunkuri: “since we cannot fully practice Hindu traditions in our homes, we fear that one day our children will not properly follow Hindu traditions when they move away”.

Table 8 summarizes the feedback we received from all eight FGDs and sixteen KIs. Just because changes to some festivals were not mentioned however, it does not necessarily mean that they are still practiced. Likewise just because the loss of a certain tradition was mentioned by a single respondent and there were no objections does not mean it may not still be practiced by some.

Table 8: Traditions/Customs that have Declined Over the Years

District	Upazilla	Union	Village	Traditions (Increasingly unable to practice)			
				Different Festivals			Religious Festivals
				Pitha Push Parbon	Jatra/Circus	Jarigan	Lakshmi Puja
Satkhira	Shyamnagar	Munshiganj	Singhortoli	✓	✓		✓
			Chunkuri	✓		✓	✓
		Gabura	Chakbara	✓			
			Dumuria	✓		✓	✓
Khulna	Koira	Uttar Betkhasi	Katmarchar				
			Padma Pukur	✓			
		Dakhin Betkhasi	Patakhali	✓		✓	✓
			Joursing		✓		

One important factor that should be taken into consideration is that all villages with the exception of Joursing have converted from cultivating rice to shrimp and fish which is more labour intensive in terms of the production process. Far more women are involved in this process as well which has meant families have far less time to prepare for festivals and ceremonies. This has also made it increasingly difficult for families to work on their relations between neighbours and improve the social bonds with relatives and friends.

6.2.2 Social Bonds/Relations

The correlation between social bonds and climate change is complex to say the least. As mentioned previously, culture and relationships are incredibly dynamic and may change regardless of increased environmental pressures. Yet on a number of occasions throughout our field research, direct links to food scarcity were mentioned as reasons why bonds between individuals had diminished. In Singhortoli village one respondent told us “when we had enough things, for example adequate fish, rice, fruits, we did not depend on anything for their food. Social ties were strong since they could share everything.”

Another interesting note to be added is that in all FGDs and nearly all the KII, respondents told us about the fact there has been an increase in pirates in the Sundarbans. When asked for more details several respondents mentioned that many of the pirates themselves were people from their communities or aided by people from their communities. A particular story came from the male KII in Joursing that recalled the story of his brother who was kidnapped by the pirates during dinner and held for ransom. Despite the families effort to

Box 5: Uncertainty, Distrust and Theft

The correlation between climate and conflict is not new but often it takes form as a trans boundary issue often between the ‘haves’ and ‘have not’s’. Furthermore it often fails to find correlation between an environmental stressor and climate change. As such, this superficial assessment of climate change often fails to see climate change as an issue in need of a much more complex set of solutions. In our research study, conflicts were limited to social tension and occasional instances of theft between community members.

Given the methodology for our research, FGDs did not create a safe haven for individuals to share with us such personal details about their neighbours. Despite this, issues of distrust and theft were mentioned in Singhortoli village where on multiple occasions people had told us about their neighbours stealing the vegetables from their homestead gardens. Since salinity intrusion in the soil has made it almost impossible to grow fruits and vegetables outside the home, women have taken up homestead gardens as an alternative. Yet plants are scarce and as **Figure 3** depicts, the homesteads are quite small. Some families have thus reached their limits, especially in the dry season, and have reverted to doing unneighbourly things such as stealing from others. As the male KII in the village told us “another issue in the village is theft – we always think we may fall in danger of being robbed by our neighbours. We lose social connections and respect for one another.” This feeling was shared among the women during the female FGD whose tension broke out in an argument during our discussions.

Figure 3: Example of Homestead in Singhortoli Village



This picture is of the female KII in Singhortoli Village presenting to us her homestead garden. Not located close to her home it is clear that security of her crops is dependent on trust of other members in the community.

lose our land to the river, what if the pirates come and kidnap us again?" It was clear from his recount that social ties within the community were being broken due to a variety of factors but extreme poverty was mentioned as the key driver at least for individuals joining the organized crime group. Whether this poverty has been as a result of climatic factors affecting people's land, wealth and livelihood was not clearly established.

If time would have permitted, the research study could have included an analysis on place attachment. This would have helped to gain a better understanding of the cultural attachment to these villages. This would have given the research team a better understanding of whether more invasive recommendations such as relocation would have been possible.

6.3 Environmental Level

Discussions as to the effects of climate change on the environment have commonly been expressed in terms of ecosystem services. Here, the IPCC reports that, with very high confidence, climate change will put incredible pressure on ecosystems around the world, especially coastal regions and low-lying areas (2014). While this is not a new finding, it is with incredible difficulty that researchers have been able to differentiate natural impacts from manmade impacts in these ecosystems.

In Bangladesh, the Sundarbans mangrove forest is the largest mangrove forest in the world and has experienced various changes in the past decades. The forest is approximately 6017 km² of which about a quarter has been declared a world heritage site by UNESCO. The area which our research was conducted was located in the tidally active part whereby the environment is dominated by coastal tidal currents. The delta is undergoing rapid ecological changes both due to SLR and sudden onset events as well as due to human activity. Already in 1994 it was estimated that 45% of the Bangladesh mangrove wetlands had been destroyed due in part to anthropogenic influences and also due to shrimp farming (Khan et al., 1994).

6.3.1 Biodiversity/Species

In all the villages analysed, biodiversity and species loss was mentioned to some extent. While this might be the result of a number of factors such as salinity intrusion, deforestation, overfishing, poaching, sudden onset events, extreme heat, and loss of ecosystems, this study was not able to go beyond the descriptive accounts.

More than any other sector, the changes to fish species was the most commonly mentioned loss of species. Here the loss of fresh water species was mentioned in every village. Since we did not have a list of species at the time we conducted our study, whatever species of fish that were gone came from recollections and various conversations. As such, the below table may not be entirely correct as we would expect more species to have gone extinct in more villages mainly since these were all fresh water fish varieties.

The loss of these species to a certain extent has had additional costs on people's livelihoods. For instance, on health, the introduction of salt water varieties of fish has had significant negative effects since, as was mentioned before, exports have been well protected and have discouraged day labourers from sharing with their families the fruit of their labour. Therefore, for example, in Khulna although shrimp is widely available for export use, it is not common for local communities to consume shrimp in their daily diets. With limited livestock therefore, this raises an important question as to protein intake and malnutrition more generally. Aquaculture has also had a negative effect on reducing biodiversity in the region. Salinity intrusion into fresh water paddies can occur in several different ways, to name a few: through burst embankments, soil penetration, and overflowing of salt-water paddies during the rainy season. This has expedited the process of SLR in the region with

Box 6: Food, Family and Fond Memories

Part of our exercise to get individuals to share with us their story was to ask individuals what their favourite memories of their childhood were. In a number of cases we had memories of food of which came up because such foods/fish no longer existed.

This particular story came from the female KII in Chunkuri who told us a story about the rice pudding her mother used to make:

"My dad used to cultivate many kinds of rice – Parne Dhaan, Boran Dhaan, Paizaan Dhaan, Chini Gani Dhaan. We were a big family, so we didn't used to sell much of the rice in the market, but Paizaan Dhaan was stored separately. Whenever I would want to eat payesh (rice pudding), my mom used to make it with Paizaan Dhaan or Chini Gani Dhan, because the kernels are smaller, it makes for good pavesh. We can't find these varieties anymore. I would ask my mom to make me pitha or payesh and out of love my mom used to always fulfill that request. I can't fulfill that kind of a request for my children, I'm unable to show that love. If I want to make payesh made with Chini Gani Dhan for example, I have to go very far to get it, its not available and very expensive, but when I was growing up, if I wanted to eat payesh, the moment I mentioned it, it was made for me. It's a tradition I can't pass on to my children."

6.3.2 Ecosystem Services

The transition to shrimp and saltwater fisheries in the region over the past 30 years has exacerbated the natural salinity of the region. This has, in turn, accelerated food and fresh water insecurity in the region. Although this conversion of Khulna's landscape can be seen as a positive change for economic development, others have argued that industrial shrimp farming has created tensions and greater opportunities for conflict (Stonich and Vandergeest, 2001). Even from our discussions with local fisherman and day labourers, it was revealed that powerful landowners forced many smallholders to either sell or lease their land for shrimp production. As such, across all the villages that predominantly practiced shrimp cultivation, there was resentment towards the industry for destroying the ecosystem (see **Box 7**).

While aquaculture and food security has been heavily researched in this area, they were not the main focus of this study. Precaution therefore must be taken as to reading the remainder of this section since our field research was not able to differentiate natural changes in the ecosystem from man made changes (ie. changes that were triggered due to shrimp cultivation). For this reason, this section is mostly descriptive, explaining which species have become extinct and what effects this has had on the wellbeing of locals.



The extreme low tide in Joursing Village. In the rainy season the water in the afternoon from the river came close to reaching the top of the platform.

Box 7: Tension Between Local Communities and the Shrimp Industry

The shrimp industry in Bangladesh has brought the country great economic growth at the expense of forcing thousands of people out of their traditional livelihoods. While from one perspective this can be seen as an adaptation strategy as individuals have learned to generate a profit from salinity intrusion that once upon a time cost them their rice harvest, many people have expressed their discontent with shrimp cultivation.

In Dumuria village, the male KII, who was a crab and shrimp farmer himself, explained that there is now a general unhappiness in the community: “we all prefer working as agriculturalists more than shrimp cultivators. When we used to cultivate rice, we could share our harvest with the poor people in the village. Shrimp cultivation has changed this, it has changed our culture.” Across the river in Chunkuri another male KII told us: “we used to have plenty of fruits trees. In our childhood, we always sat on the tree branches picking away at its fruits. Now shrimp cultivation and salt water has destroyed the ecosystem. Our lifestyle has changed. We can no longer arrange festivities Kobigan, jarigan, zatrapala.”

Even amongst the women in Singhortoli and Chunkuri there was resentment towards shrimp farming. One female KII in Chunkuri told us: “Gher should be stopped so we can recover our natural ecosystem here. Once it is stopped then you protect the land. It would take a few years for the land to be rinsed of saline water but when the salinity has decreased sufficiently you can grow rice again and other species can be recovered as well.” In Singhortoli, during the female FGD, women agreed “if we collectively organize to remove these ghers, things will go back to the way it was before.”

The all-women focus group in Shinghortoli shared with us very personal experiences of theft between neighbours and families in the village.



7. Consultation Workshop

The half-day consultation workshop on October 27th 2014 was organized by the Ministry of Environment and Forests (MoEF) in support from the ADB. The event took place at the ADB Resident Mission in Dhaka, Bangladesh. Altogether approximately 50 participants attended ranging from government officials, researchers, professors, young professionals and practitioners. The workshop was geared to present knowledge gap assessments of climate change mitigation, adaptation as well as on this study, 'non-economic loss and damage caused by climatic stressors' (for full agenda see **Annex 3**).

On behalf of this study, Golam Rabbani and Stephanie Andrei presented findings from the research team during their time on the field. The feedback was greatly appreciated and participants were actively engaged in discussions following the presentation. With a combination of comments and questions the following points were raised:

- Loss and damage is a vehicle for insurance/compensation however it is very difficult to associate a loss to particular event. For instance in the coastal region, salinity intrusion is caused by farakka barrage, gher practices, sea level rise and storm surges. Although we know the situation will further diminish with future climate change impacts, they all work together in creating challenges for local communities.
- What kind of psychological impacts is climate change having? What did you notice with regards to the impacts on pregnant women?
- The report has heavily focused on the negative impacts, what about achievements in those communities?
- Out-migration can also be traumatic especially when skilled individuals leave the community. How can we differentiate regular migration from climate change induced migration?
- What consideration was placed on projects in the region? What CDMP projects did you find?

Responses from the presenters reflected stories from the field-work. Two important take-home messages from the consultation workshop was to look at the impacts of migration on those that have been left behind and to include research on preexisting adaptation programmes in these communities. This feedback should be considered in follow-up research. This feedback should be included when developing an updated checklist (see **Annex 1**).

8. Policy Recommendations

To explore the policy approaches to a particular complex issue like non-economic loss and damage associated with climate change, it requires assessing each case, taking into account different contexts including geographical location. Understanding and effectively assessing a particular case of climate change related non-economic loss and damage would suggest the required policy approaches for dealing with such a loss. Thus, the identification, measurement and characterisation of loss and damage are primary requirements for developing local, national, regional and international policy frameworks. Against this backdrop, this study attempted to understand the nature and extent of non-economic loss and damage associated with climate change in the context of a particular geographical location and considered two coastal districts from Bangladesh.

Community consultations revealed that, losses and damages resulting from climatic events including sudden onset events and slow onset processes include; loss of lives, impacts to health including mental health, loss of education, loss of territory, values, religion and cultural heritage, loss of local knowledge and leadership, damages to community resilience, and loss of biodiversity and ecosystems. In response to these types of non-economic losses and damages, this section of the report, aims to identify existing policy responses in order to explore the potential policy approaches at the local, national and international levels and puts forward some policy recommendations.

8.1 International Level

Non-economic loss and damage associated with climate change is an emergent policy discourse in climate change measure. Parties of the Convention, acknowledged at its decision (Decision 3/CP.18, para 7 (a) (iii)) the necessity of understanding and expertise on loss and damage, including non-economic loss and damage and the same decision (para 10 (b).) requested the secretariat of the Convention to prepare a technical paper on non-economic losses. The technical paper responds to aforesaid request (FCCC/TP/2013/2), noted that “in many developing countries, non-economic losses may well be more significant than economic losses and recognizing and managing the risk of non-economic loss should therefore be a central aspect of climate change policy”.

However, the issue of non-economic loss and damage needs to be understood so as to explore the required policy responses within the broader context of loss and damage associated with climate change. Loss and damage associated with climate change was incorporated into UNFCCC policy regime in 2010, through the decision of establishing a work programme at COP 16 (Decision 1/CP.16). Activities of the work programme on loss and damage provided further knowledge base and influenced the Parties of the Convention to agree at COP 18, in 2012 (Decision 3/CP.18) to establish “institutional arrangements” for addressing loss and damage at COP19. The Warsaw International Mechanism (WIM) was established at COP 19 held in Warsaw in 2013 (Decision 2/CP.19) to deal with loss and damage associated

with climate change in a comprehensive, integrated and coherent manner under the guidance of the Convention.

While Parties of the Convention are working to develop the comprehensive structures and functions of WIM for loss and damage, the Interim Executive Committee of WIM recently drafted the initial two-year workplan of the Executive Committee of WIM in accordance with the decisions 3/CP.18 and 2/CP.19 for consideration and adoption at COP 20 to be held in December, 2014. It helped identify some working areas on non-economic loss and damages. One of the actions identified in the workplan of WIM particularly on non-economic loss and damage mentioned that parties should “enhance data and knowledge on non-economic losses associated with the adverse effects of climate change and identify ways forward on reducing the risk of and addressing non-economic losses with specific focus on potential impacts within regions”. The workplan also identified activities to raise awareness of the nature and extent of non-economic losses and how to integrate measures to reduce risk in comprehensive approaches.

This workplan is drafted for an initial two-year period for the executive committee of WIM for loss and damage and the further activities of the workplan would provide a knowledge base for future policy interventions at the international level. The Warsaw International Mechanism (WIM) will help adopt potential policy frameworks for addressing non-economic loss and damage associated with climate change in collaboration with other concerned stakeholders. Yet still a work in progress, this report puts forth some additional policy interventions at the international level. These include:

- **Developing standard tools and methods for identifying, monitoring, and assessing different non-economic losses and damages taking into account the challenges of direct and indirect impacts;**
- **Identifying the appropriate risk management approaches to reduce non-economic losses and to facilitate national governments to adopt such approaches at the country level;**
- **Developing guidance for institutional and policy approaches at international, regional and national levels for identifying, monitoring, assessing, and managing non-economic losses and damages so as to *redress* such impacts.**

8.2 National and Local Levels

In Bangladesh, there is no specific legal and policy frameworks to address the non-economic loss and damage associated with climate change. Hence this part of the report examines other related policies and legislations to help identify the scope and gaps in order to make some future policy recommendations.

The policy regime on environmental harm has been developed in many national jurisdictions including in Bangladesh. The 1992 Environment Policy of Bangladesh proposed to conduct Environmental Impact assessment (EIA) to avoid and to mitigate environmental damage (Section 3.2 of the Policy). Consequentially, environmental legislations enacted in Bangladesh, namely the Environment Conservation Act, 1995 adopted the provisions for EIA and also on ecological damage and to take remedial measures including compensation and corrective measures (sections 7 and 12). The Environment Conservation Act was supplemented by the Environmental Conservation Rules, adopted in 1997, which provides detailed rules for addressing environmental harm. In addition, the Environmental Court Act of 2010 established special environmental courts to deal with environmental harm. Thus, administrative and judicial mechanisms exist in Bangladesh to address loss and damage caused by environmental injury.

However, existing mechanisms related to addressing environmental harm is found inadequate to deal with environmental damage since there is no comprehensive mechanism to assess the environmental damages and to determine compensation and corrective measures. Loss and damage associated with climate change is more complex of an issue and requires a different set of mechanisms to assess and to determine compensation and corrective measures. Moreover, although policy and legal frameworks on disaster management cannot are not directly able to address loss and damage associated with climate change, they can provide important avenues.

The Standing Order on Disasters, adopted in 2010 by the Ministry of Food and Disaster Management identified the detailed roles and responsibilities of different government agencies for disaster risk reduction (DRR) and emergency response management. It also suggested establishing several institutional arrangements from local levels to the national in order to deal with disaster management. The Disaster Management Act adopted in 2012 in Bangladesh recognised climate-induced loss and damage within the ambit of the definition of disaster (Section 2(11)). The Act also adopted the provisions for the resettlement and planned relocation of disaster-affected people. It also provided provisions for the establishment of a Disaster Management Fund, which will operate at both national and district levels and will be utilised to support disaster management efforts and provide humanitarian assistance to affected people (Section, 32).

The Act of 2012, also allows a person or organisation negatively affected by a disaster to sue for compensation from a person or organisation responsible for such disaster before a competent court in accordance with the Civil Procedure Code. The court will determine the amount of compensation to be

paid out and pass the order on accordingly (Section 49). However, this provision needs to be elaborated and further rules or guidelines adopted on the assessment of loss and damage, determination of compensation, and liability for related loss and damage and linked with the aforementioned disaster management fund.

Bangladesh prepared a National Adaptation Plan of Action (NAPA) in 2005, which outlined 15 priority activities and identified some important project ideas for adaptation. These identified adaptation projects can reduce the avoidable loss and damage however there still remains the issue of residual loss. The NAPA process has been advanced through the adoption of the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) of 2008 (reviewed in 2009). The BCCSAP identifies adaptation and mitigation measures based on six pillars: (1) food security, social security and health, (2) disaster management, (3) infrastructure, (4) research and knowledge management, (5) reducing greenhouse gas emissions and a conversion to low-carbon development, (6) capacity development.

Loss and damage associated with climate change is addressed in the BCCSAP, under its different programmes, for example, the strategy proposes for livelihood protection in ecologically fragile areas and the protection of livelihoods of vulnerable socioeconomic groups in order to ensure equitable and sustainable development. In some cases, the activities are aimed at providing protection for the loss of employment and income and property from various sources to persons, households, and enterprises through devising an effective insurance system by the government. Moreover, the Bangladesh Climate Change Trust Fund was established under the Climate Change Trust Fund Act in 2010, which aims to provide financial support for activities to address the adverse impacts of climate change in Bangladesh. Although the Act does not contain any explicit provisions to address loss and damage associated with climate change, it has a mandate to address loss and damage within the context of adaptation.

Through community consultations this study identified that people are not only faced with economic losses and damages resulting from climatic stressors but also non-economic losses and damages. Existing policy instruments as discussed in this section provide the scopes to address loss and damage but taking into account the challenges of residual losses and damages demonstrates that a national mechanism is needed. While the global community is structuring an international mechanism, the government of Bangladesh (as one of the most vulnerable countries to climate change) should take initiative to adopt a national mechanism so as to address loss and damage beyond the realm of adaptation. Specifically related to a measure on non-economic losses and damages, the following approaches can be considered under a national mechanism:

- **Thorough analyses are needed to understand the immeasurable losses at the local level as well as create a library so as to collect future data on economic and non-economic losses and damages;**

- **Based on these findings, a strategy and action plan should be developed and related pilot projects and programmes need to be undertaken at the field level (such projects should include structural and non-structural components);**
- **Pilot projects and programmes would provide the related data and information, including on financial and technical aspects, for assessing and addressing loss and damage, which will ultimately create a knowledge base for providing guidance to adopt the policies at the national level;**
- **It is important to take initiative for regional and international collaborative efforts to deal with loss and damage resulting from climate change. This bottom-up approach will also be useful for designing regional and international policy frameworks;**
- **All these aforesaid processes for adopting policies, legislations and institutions to address loss and damage including non-economic loss and damage could be delivered by a National Mechanism. A scoping report needs to be undertaken without further delay.**

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Annex 1: Checklist

ADB Loss and Damage Study KII/FGD Checklist/Questionnaire

Central Question: How does climate induced hazards lead to non-economic loss and damages among households in selected coastal districts (Khulna and Satkhira) of Bangladesh?

Key Climate Hazards: Variations in temperature and rainfall, cyclone and storm surge, excessive rainfall/tidal surge caused water logging and sea level rise

IMPORTANT: Please be sure to explain to the focus group the purpose of the visit, key expected outcomes of our research and to get consent from members as to whether we can use the photographs and names of people in village in our report and any related materials.

Questions/Checklist

1. What are the climatic hazards that affect your village?
 - a. How has this changed over the years?
 - b. How have these changed your outlook on life?

2. What kinds of livelihoods did you have twenty/ten/five years ago? How did this change? Why?

3. What types of fish/crops are you cultivating this year? Has this changed over the years?
 - a. How is this difficult to adjust
 - b. What proportion of the communities land was cultivated this year (excluding fallow land)?
 - c. Are there any fruits/vegetables/fish species/etc. you used to be able to eat that are no longer available?

4. Are people in the village engaged in migration? Is this seasonal?
 - a. Who is engaged in migration? (men/women, age, status in the village)
 - b. What kind of jobs did they have? Where do they go and what do they do?
 - c. How do you feel because they left?
 - d. Do you want to leave too? Why/why not?

5. What is your fondest memory from your childhood?
 - a. How have things changed? Why?

6. Do climate related hazards cause losses and damages for your household? Please provide examples.
- What kinds of losses and damages are difficult to measure/calculate? Please give examples.
 - How have these changed over the past twenty/ten/five years?

Individual

- **Life/Health/Psychological** (death, pain/injuries, fears)
 - How many people died during cyclone Aila? Did cyclone Aila affect your health?
 - What are your current health concerns?
 - What are your fears?
- **Education**(access, services, materials)
 - How has education changed in the past twenty/ten/five years?
 - Are your children able to go to school? If yes, until what age? If no, why?

Society

- **Traditions/Religion/Customs**
 - What traditions did you have twenty/ten/five years ago that you cannot practice now? Why? What do you miss?
 - How are your traditions different from your parents' traditions?
 - What kind of religious practices have changed? Why?
- **Culture/Heritage** (standard of living, social cohesion, relationships, etc.)
 - What in your life do you miss that was different twenty/ten/five years ago?
 - How have the bonds between your family, friends, and neighbours changed? Why?

Environment

- **Biodiversity/Species** (local species and livestock)
 - How has the biodiversity in the area changed in the past twenty/ten/five years?
 - What impact does this have on your livelihood?
 - What do you miss? Why do you miss these?
- **Ecosystems** (land, water bodies/wetlands, forestry)
 - How has the ecosystem in the area changed in the past twenty/ten/five years?
 - How does this make you feel?

Annex 2: Methods for Assessing Non-Economic Losses and Damages

The UNFCCC report identifies four broad methods for assessing non-economic losses and damages: 1) Economic valuation; 2) Multi-criteria decision analysis (MCDA); 3) Composite risk indices, and; 4) Qualitative/semi-qualitative methods. The remainder of this section will summarize each of these methods (UNFCCC, 2013a).

Economic valuation of non-economic losses and damages aims to put into monetary terms immeasurable items. This is useful for helping prioritise items within both economic and non-economic categories using the same measure. This can be done through revealed or stated preference models from either observation and/or surveys. The stated preference model is otherwise known as contingent valuation method. This is controversial and has been greatly debated (summary of the debate is provided in Portney, 1994). Since in this model people are asked to reveal what they would hypothetically spend on an immeasurable item, it is possible that when push comes to shove, they might react differently. For instance, if you ask a mother what her child's health is worth, she must reveal she would spend whatever her assets are worth. In reality however if her child got sick, she might consider taking up another job, asking relatives for support, revert to the informal market, steal, and do anything else in her power to pay for her child's medical bills.

In contrast, MCDA is a method by which multi-criteria are considered, of which a monetary component may be included. This often involves sorting or classifying alternatives so as to gather sets of preferences. The results therefore are completely subjective but often times identifying the criteria alone can provide enough information to decision-makers. This method can be effective but can also involve unjustified assumptions. Finally, application of this method often involves a numerical analysis to a performance matrix that scores and adds weighting to the options. This can help assess how each option is being appraised. In a composite risk index, vulnerability is scored using multiple criteria and then weighted in a single index value. Unlike MCDA that is usually used to describe various alternative courses of action, risk indices such as the WorldRiskIndex weigh different criteria and assign each a percentage point. The WorldRiskIndex use exposure to natural hazards, susceptibility, coping capacities and adaptive capacities to determine risks of a particular country.

Finally, qualitative/semi-qualitative methods often also include a criteria assessment but often time evaluation does not go beyond a summary table. The United Kingdom's climate change risk assessment is a good example of this. In this particular case climate risks are scored but not compared or combined. Rather criteria may be assigned a qualitative/semi-qualitative scale (for instance, "low", "medium", and "high"). Trade-offs are therefore made and biases may be introduced in the process. The benefit of this method however is that it allows researchers to be more transparent about their findings and is relatively less resource-intensive compared to the previous methods mentioned.

Annex 3. Consultation Workshop Programme



Consultation Workshop

Preparing Knowledge Gap Assessment on Climate Change

TA8084-BAN: Supporting Implementation of BCCSAP
Date: Monday, 27 October, 2014 (09:00 -13.15 hrs)
Venue: Conference Room, ADB Bangladesh Resident Mission, Plot # 31,
 Sher-e-Bangla Nagar, Agargaon, Dhaka



The Ministry of Environment and Forests (MoEF) with support from the Asian Development Bank (ADB) is organizing a half-day consultation workshop to present knowledge gap assessment of climate change and findings of the study on 'non-economic loss and damage caused by climatic stressors'.

Abdullah Al Mohsin Chowdhury, Joint Secretary, Ministry of Environment and Forests has kindly consented to be the Chief Guest to inaugurate the workshop. Dr. Saleemul Huq, Director, International Centre for Climate Change and Development (ICCCAD) has kindly given his consent to chair the workshop.

You are cordially invited to attend the workshop and contribute to make it a success.

Monirul Huda
**Deputy Secretary and
 Project Director**
 TA-8084 BAN: Supporting Implementation of Bangladesh Climate Change Strategy and
 Action Plan (Subproject 2)
 Ministry of Environment and Forests
 Bangladesh Secretariat, Dhaka

RSVP: 9540141, 7171898, and 8156000-6016, Ex 253
 Workshop Program Overleaf



Consultation Workshop

Preparing Knowledge Gap Assessment on Climate Change

Programme



Inaugural Session

0900 - 0930 : Registration and guest taking seats
 0930 - 0945 : Welcome Address by Project Director, Monirul Huda, Ministry of Environment and Forests
 0945 -1000 : Speech by Chairperson, Dr. Saleemul Huq, Director, International Centre for Climate Change and Development (ICCCAD)
 1000-1015 : Speech by Chief Guest, Abdullah Al Mohsin Chowdhury, Joint Secretary, Ministry of Environment and Forests and formal declaration of Opening of Workshop
 1015-1030 : Tea/ Coffee Break

Technical Session

Chairperson : Dr. Saleemul Huq, Director, International Centre for Climate Change and Development (ICCCAD)
 Facilitator : Dr. A. Atiq Rahman, Executive Director, Bangladesh Centre for Advanced Studies (BCAS)
 1030-1050 : Knowledge gap assessment of climate change adaptation- Dr. Saleh Ahmed Chowdhury, ADB Consultant
 1050-1110 : Knowledge gap assessment of climate change mitigation - Dr. M. Eusuf, ADB Consultant
 1110-1140 : Open discussion and recommendation by participants
 1140-1215 : Non-economic loss and damage caused by climatic stressors in selected South-West Coastal districts of Bangladesh - Stephanie Andrei and Golam Rabbani
 1215-1245 : Open discussion and recommendation by participants
 1245-1300 : Synthesis of open discussion by Facilitator
 1300-1315 : Concluding remarks by Chairperson and closing of the workshop
 1315 : Lunch