# Centring local values in assessing and addressing climate-related losses and damages

## A case study in Durgapur Upazilla, Bangladesh

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## About ICCCAD

The International Centre for Climate Change and Development (ICCCAD) is one of the leading research and capacity-building organisations working on climate change and development in Bangladesh.

The pictures in this paper are screenshots from the related videos (linked to throughout). The individuals featured in these videos gave their informed consent, please see page 15 for more information on the process followed.

There is a limited understanding of the intangible and subjective losses and damages from climate change people experience and how to address them. Fortunately, the number of studies explicitly focusing on 'non-economic' losses and damages is growing. However, these assessments are commonly shaped by top-down, standardised conceptualisations, resulting in incomplete depictions insensitive to local contexts. Therefore, we developed a loss and damage assessment methodology based on locally identified values, which we applied in Durgapur Upazilla to assess and find ways to address the losses and damages people in north-central Bangladesh face from multiple climate-related hazards.

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# Summary

In the summer of 2022, tremendous rainfall in the Indian Meghalaya hills contributed to flooding, resulting in widespread losses and damages in Durgapur Upazilla, north-central Bangladesh. People in the region already face droughts, riverbank erosion and unpredictable variability in rainfall and temperature. Climate change increases these hazards' frequency, timing and severity, resulting in increased losses and damages.

An example of loss and damage is a lower than normal rice yield due to drought, after which people face food insecurity and increased sickness. Here, the loss of rice yield is commonly labelled 'economic', as this impact can be valued on a monetary scale, and the loss of health is labelled 'non-economic'. The dichotomy between 'economic' and 'non-economic' impacts is often blurry and ambiguous at the local level. Still, it is prevalent within loss and damage discourse, which largely centres around easily quantifiable 'economic' impacts of climate change. The few reports that do analyse 'non-economic' losses and damages often use pre-determined typologies that do not reflect local experiences or beliefs, risking compartmentalisation, inaccurate assessments, and a disconnect between policies and on-the-ground experiences. Additionally, assessments commonly homogenise losses and damages for 'communities' and do not look at differentiated vulnerability and impacts based on gender, age or ethnicity.

This working paper reviewed segments of the adaptation literature and multiple post-disaster assessment models to create a comprehensive and culturally sensitive assessment methodology. This methodology was centred on local values — aspects of life essential to people's lives — to assess the losses and damages people experience and explore ways to address these impacts. First, scoping interviews and discussions were held to understand local dynamics and needs better. Second, the following ten local values were determined with participants: development, education, health, nature, religion, culture, family, serenity and mental health. Third, losses and damages were explored within each value, after which each value and the impacts observed within each value were ranked. Finally, existing and desired responses to losses and damages were observed; the latter were ranked by perceived usefulness. This was achieved by conducting a scoping literature review and a total of 101 semi-structured interviews, 12 participatory group discussions, 209 surveys and three debriefing sessions.

This study included 'types' of losses and damages that have not been explicitly examined before, such as family and religion, which participants perceived as most important. Nine out of the ten selected local values predominantly referred to 'non-economic' aspects of life, suggesting the relative importance of 'non-economic' losses and damages. However, all values included 'economic' and 'non-economic' aspects of life: education was connected to school buildings and books ('economic') and learning and a better future ('non-economic'). This further shows that the dichotomy between 'economic' and 'non-economic' losses and damages, often made unambiguously, is blurry and ambiguous at the local level.

Numerous losses and damages were administered within each value, indicating that climate-related hazards adversely affect everything people value most. The extent and intensity of these losses and damages differed per group or individual. Those people who are most vulnerable and marginalised experience more losses and damages: women, who

have less agency and possibilities to generate income, experience more health-related issues; lower-caste Hindus live in areas highly exposed to floods without funds to relocate; poor households have less capacity to recover from losses and damages than affluent households. Consequentially, existing social and structural inequalities are exacerbated. Moreover, many losses and damages cascade into one another: yield losses cause financial insecurity, resulting in the inability to buy fruits relevant to religious practices, affecting people's mental health. Losses and damages especially cascade from impacts regarding development and nature, making losses and damages on these values risk multipliers. The example above also shows that the cascading nature of losses and damages does not adhere to the 'economic' and 'non-economic' dichotomy. Thus, a full understanding of one is needed to fully comprehend the other.

Affected people in Durgapur Upazilla receive little external support, especially concerning impacts from slow-onset events and droughts. They therefore rely on their own capacities to cope with losses and damages. These coping mechanisms are often erosive and cause additional losses and damages: borrowing money can result in conflict or further debt, selling fruits and vegetables for additional income means increased food insecurity, and moving to urban areas for work means being away from family. Participants desired a wide range of responses to be implemented, most of which were mentioned in connection to minimising future losses and damages and addressing losses and damages that have already occurred. Measures minimising future losses and damages or addressing structural societal problems (eg, electricity supply or healthcare) were perceived to be most valuable. Conversely, compensation-based measures were perceived as less useful, as they do not address long-term vulnerabilities and are not deemed useful without proper protection from subsequent losses and damages.

This study shows how establishing local values with participants, instead of following pre-determined typologies, results in a deeper understanding of why affected societies value certain aspects of life and to what extent, and results in a contextually and culturally sensitive analysis of losses and damages. This approach, together with a focus on differentiated vulnerabilities and interconnections, can defy a dichotomy between what is 'economic' and 'non-economic' and give a comprehensive overview of the losses and damages experienced while emphasising the importance of subjective, intangible losses and damages. Moreover, this study shows how virtually any aspect of life is affected and how affected societies desire increased protection and responses that result in long-term vulnerability reduction to minimise and address losses and damages.

# 1

# Introduction

Climate change is affecting the frequency and intensity of extreme weather events, such as heatwaves, flooding and cyclones, and is causing slow-onset events like increasing temperatures, riverbank erosion and changing rainfall patterns or erratic rainfall. These all result in both economic and non-economic loss and damage. The term 'loss and damage' refers to the consequences of climate change that have not been avoided by mitigation or adaptation efforts (Barnett et al., 2016). Losses and damages occur when aspects of life that people value or depend upon are affected by climate change (Barnett et al., 2016; Richards, 2022). As the frequency, timing and severity of these climate-related hazards change and increase due to climate change (IPCC, 2021; IPCC, 2022), losses and damages will accelerate across the globe (IPCC, 2018), adversely affecting communities' livelihoods and the natural ecosystems they depend on. Losses refer to irreversible impacts such as fatalities or permanent destruction of nature; they arise when people are dispossessed of phenomena they value for which there are no commensurable substitutes (Barnett et al., 2016). Damages refer to impacts that can be repaired or alleviated, such as damaged buildings or decreased soil quality (Boyd, 2017). Climate impacts on items commonly traded in markets, such as houses or crops, are labelled 'economic'; impacts on aspects of life that cannot be expressed in monetary terms, such as culture or social cohesion, are deemed 'non-economic' (UNFCCC, 2013).

The agreement on establishing a loss and damage fund and independent funding commitments from several states at the 27th Conference of Parties (COP) in Sharm El Sheikh is a significant step towards making finance to address loss and damage available. However, in addition to the complex ethical and political debate of who should pay for losses and damages and who the payments should go to, there is also the question of what should be funded to address losses and damages effectively. This question is explored in various reports that assess losses and damages around the globe and give policy recommendations. However, these largely centre around the easily quantifiable 'economic'

impacts of climate change (McNamara and Jackson, 2019; Serdeczny et al., 2016), resulting in a limited in-depth understanding of how non-economic losses and damages can be alleviated, repaired or addressed (Westoby et al., 2022). The few reports that do analyse non-economic losses and damages often have a narrow understanding of the concept, leading to incomplete depictions of on-the-ground experiences. This is especially problematic as the lives of people living in subsistence conditions disproportionately depend on 'non-economic' aspects of life (Preston, 2017).

This technical report outlines research to develop a methodology that accurately portrays on-the-ground experiences and comprehensively depicts the losses and damages that affected societies' experience. By conducting a literature review, key informant interviews, focus group discussions, and surveys with people in three areas of Durgapur Upazilla, Netrokona District in north-central Bangladesh, researchers sought to understand what aspects of life are considered most important by those affected, and how they are being impacted by climate change. It also sought to better understand what steps can be taken to address losses and damages fairly and effectively. Thereby, this study provides a framework that challenges and moves Western epistemologies, which can be used in future empirical research on losses and damages. Moreover, it shows evidence of local-level losses and damages and potential ways to address them, which is useful for researchers and policymakers seeking to address losses and damages.

Chapter 2 includes a literature review of loss and damage and related discourses. A detailed assessment methodology based on this review is presented in chapter 3. The first step of this methodology is analysing relevant contexts, which is covered in chapter 4. The local values and losses and damages are outlined in chapter 5. Chapter 6 focuses on current and potential responses to the observed losses and damages. Finally, chapter 7 includes a deeper analysis of the results based on the literature review, giving policy- and research-related recommendations.

# 2

# Literature review

The discourse regarding losses and damages is rapidly developing as more evidence arises from different parts of the world. This literature review first examined this evidence base, focusing on non-economic losses and damages given the underrepresentation and importance of the concept (McNamara and Jackson, 2019). This review identified four limitations, after which authors examined post-disaster and adaptation literature to determine lessons to address these limitations.

## 2.1 Non-economic loss and damage

The term **non-economic loss** stems from medical law (Serdeczny et al., 2017) and entered climate change discourse at the 18th session of the United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties (COP) in Doha in 2012, where the COP also commissioned a technical report conceptualising non-economic loss (see UNFCCC, 2013). While the UNFCCC adopted the terminology of **non-economic loss**, practitioners and researchers have built a discourse about **non-economic loss and damage**. The inclusion of **damage** recognises that 'non-economic' aspects of life can sustain damage that is recoverable. This is important to accurately formulate measures addressing non-economic losses and damages (Scottish Government, 2023).

### 2.1.1 Assessing and addressing

**Assessing.** Assessing on-the-ground experiences of losses and damages before formulating a response is essential to ensure the efficacy and fairness of policies and interventions addressing losses and damages. However, most assessments of losses and damages primarily focus on impacts from rapid-onset events. Slow-onset processes, such as changes in rainfall or sea level rise, are less researched; possibly because they mostly result in invisible impacts (Niyitegeka and

Mukariyanga, 2023; van der Geest and van den Berg, 2021). The IPCC (2019) acknowledges this gap: "more work is required to explore the range of activities for responding to Loss and Damage resulting from slow-onset processes" (p. 630). Additionally, non-economic losses and damages are often unaccounted for in disaster-related assessments and policies, risking ineffective decision-making and an underestimation of the total losses and damages people experience (Chiba et al., 2017). Still, more than a dozen studies gathered evidence of non-economic losses and damages in different parts of the world (Table 1).

Almost half of these focus on Bangladesh's coastal regions and most are guided by a framework similar to the main types of non-economic loss proposed in the technical report by the UNFCCC (2013) (Figure 1). Dominant themes across the assessments are biodiversity and ecosystems, mental health and culture.

Figure 1: Eight types of non-economic losses from the technical paper commissioned by the COP (adapted from UNFCCC, 2013)
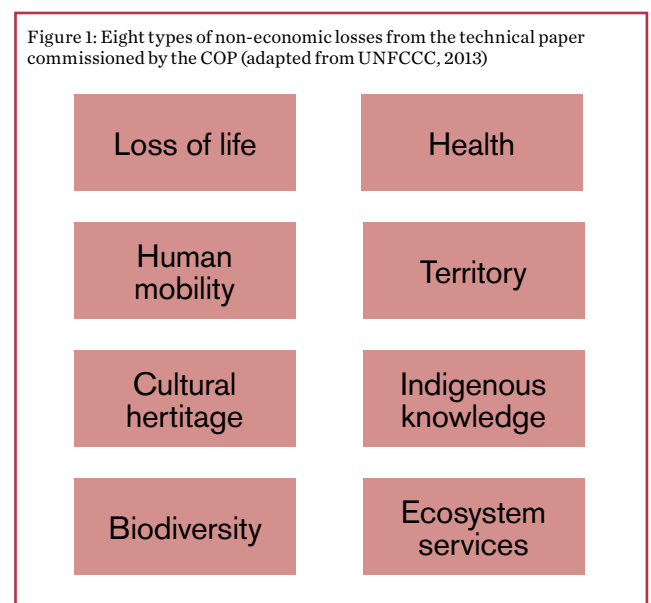
| | |
|---|---|
| Loss of life | Health |
| Human mobility | Territory |
| Cultural hertitage | Indigenous knowledge |
| Biodiversity | Ecosystem services |

Table 1: Assessments explicitly focusing on non-economic loss and damage

| LOCATION | FOCUS | SOURCE |
| --- | --- | --- |
| Bangladesh | Assessing | (Andrei et al., 2014) |
| Japan | Assessing, addressing | (Chiba and Prabhakar, 2017) |
| Bangladesh, Ethiopia, El Salvador, Tanzania | Assessing | (Hirsch et al., 2017) |
| Bangladesh, Japan | Assessing, addressing | (Chiba et al., 2017) |
| India | Economic valuation | (Bahinipati, 2020) |
| India | Risk management strategies | (Bahinipati, 2022) |
| Pacific Islands | Assessing, addressing | (McNamara, Westoby and Chandra, 2021) |
| Pacific Islands | Cascading loss | (Westoby et al., 2022) |
| Bangladesh, Fiji, Vanuatu | Mental wellbeing, women | (Ayeb-Karlsson et al., 2021) |
| Bangladesh | Assessing | (Islam et al., 2022) |
| Dominica, Barbuda | Reframing, policy | (Pill, 2022) |
| Bangladesh | Assessing, local response, gender | (Van Schie et al., 2022) |
| Ghana | Assessing, farmers | (Boafo et al., 2023) |
| Pacific Islands | Policy, challenges | (Chandra et al., 2023) |

The most common methods used in the assessments are key informant interviews, focus group discussions and questionnaires. Bahinipati (2020) quantified losses and damages using risk management techniques as a proxy and measured participants' willingness to pay. Chiba et al. (2017; 2019) used multi-criteria decision analysis to prioritise key non-economic losses and damages. Islam et al. (2022) analysed what percentage of participants experience a loss to display its prevalence. However, accurately quantifying non-economic losses and damages is challenging due to its subjective nature and dependency on worldviews and belief systems (Serdeczny et al., 2016). For example, a religious artefact or sacred place will mean more to those more attached to the religion. Tschakert et al. (2017, p. 3) write how quantifying loss "risks commodifying incommensurable values, and ignoring those that cannot be costed, thereby undermining meaningful practises for recovery and renewal". The use of personal, creative and participatory methods better portray the personal and emotional aspects of losses and damages (McNamara et al., 2021; Tschakert et al., 2019). Moreover, Preston (2017) states that narrative and first-person voice can also help reveal the underlying worldviews and future visions that inform and shape a community's sense of non-economic loss.

**Addressing.** Losses and damages can be averted, minimised and addressed. Here, averting equates to climate mitigation and minimising climate change impacts through adaptation, and addressing includes pre- and post-disaster interventions (Van Schie et al., 2022). Differentiating between what is lost and/or what is damaged is essential when deciding how to address losses and damages. **Losses** are irreversible and cannot be restored; they can be addressed through risk transfer (eg, insurance) and risk retention (eg, social safety nets) (Gall, 2015; Tschakert et al., 2017). **Damages**, being reversible, can be addressed through reparation or restoration (Tschakert et al., 2017). Moreover, the gradual nature of impacts from slow-onset processes allows for more historical-structural response strategies (Staupe-Delgado, 2019), and the number of individuals impacted by slow-onset processes will gradually increase over time. Focusing on slow-onset processes means accounting for long-term and structural solutions, which are needed to systematically address existing vulnerabilities as well as those arising from losses and damages (Eriksen et al., 2021; Fazey et al., 2010).

Addison et al. (2022) outline a diverse set of measures that can be used to address loss and damage. These include engineered interventions (eg, embankments), nature-based solutions (eg, mangrove restoration), emergency response plans, early warning systems, climate insurance, and (anticipatory) cash transfers. Moreover, they highlight that it is preferential to layer multiple context-relevant interventions to tackle both short- and long-term shocks and reach agreement among various stakeholders (Addison et al., 2022; Nisi, 2022). Cash transfers are more commonly mentioned as a way to address losses and damages. However, there is little empirical evidence that (anticipatory) cash transfers reduce vulnerability to climate change (Arena et al., 2023; Pople et al., 2021). Aleksandrova and Costella (2021) state that social protection can help

address losses and damages for poor and vulnerable groups, especially in connection to slow-onset processes.

Most interventions listed by Addison et al. (2022), however, predominantly minimise future losses and damages instead of addressing impacts that have already occurred. McNamara et al. (2021) created a list of 20 measures to address irreplaceable impacts by focusing on recovery, healing and maintaining people–ecology interactions. Participants in the Pacific Islands deemed education and training, documenting and recording traditional and local knowledge, and engaging with the natural environment most useful. Van Schie et al. (2022) and Clissold et al. (2023) identified a wide range of community-based efforts to cope with losses and damages in Bangladesh and the Cook Islands. Societies and institutions in Bangladesh have a long history of responding to climate-related disasters, resulting in coping mechanisms such as replanting mangrove forests, home-schooling and relocation (Van Schie et al., 2022). However, people lack sufficient resources to formulate effective adaptations to address the impacts they face. Increasing people's adaptive capacities will improve the efficacy of local responses (Van Schie et al., 2022). Both the Zurich Flood Resilience Alliance (Mechler et al., 2023) and the Scottish Government (2023) report case study evidence that demonstrates how in too many cases it is the people themselves, confronted with loss and damage, who have to take responsibility for decisions on how to recover from losses and damages using the resources available to them.

## 2.1.2 Challenges and gaps

Past assessments commonly follow Western conceptualisations of loss and damage. These conceptualisations can be useful for transnational governance and policymaking, but they do not always reflect on-the-ground experiences (Nand et al., 2023; Pill, 2022). Therefore, applying them in local-level assessments can result in incomprehensive or inaccurate accounts of how affected societies experience losses and damages, risking the implementation of ineffective policies and interventions

addressing losses and damages (Nand et al., 2023). Therefore, this section outlines four of the main limitations identified.

**Limitation 1: Pre-determined types.** The non-economic loss and damage assessments listed in Table 1 are often guided by a narrow set of pre-determined categories similar to the main types of non-economic loss. However, Boyd et al. (2021) emphasise that non-economic losses and damages are "potentially infinite, being dependent on diverse beliefs and worldviews that inform people's perceptions and experiences of loss" (p. 133), and Tschakert et al. (2019) found there are "thousands of ways" to experience loss. Using pre-determined types of loss and damage disregards these beliefs and worldviews, which could result in assessments of non-economic loss and damage that do not examine what people value most and discount voices and experiences of affected societies. This risks creating responses that do not account for impacts on local value systems and perceptions.

**Limitation 2: Dichotomisations.** The technical report by the UNFCCC states that the "distinction between non-economic loss and economic loss will sometimes be blurred" (UNFCCC, 2013, p. 4). Morrissey and Oliver-Smith (2013) identify two types of loss and damage, **loss of life** and **health**, which they deem both 'economic' **and** 'non-economic'. Pill (2022) found that in the Caribbean, people do not always distinguish between economic and non-economic losses and damages. A blurry line between 'economic' and 'non-economic' impacts was also observed in an earlier study in Bangladesh, where losses on income-generating activities also impacted mental health and sickness, due to flooding or heat waves that increased healthcare costs (Figure 2) (Van Schie et al., 2022). Moreover, deep entanglement and interdependency of different aspects of life inevitably mean that losses and damages will cascade into other impacts (Westoby et al., 2022). This cascading nature of loss and damage does not adhere to the dichotomy between economic and non-economic loss and damage, meaning that an integrated understanding of one is needed to comprehend the



Figure 2: Examples of cascading economic and non-economic losses and damage (data from Van Schie et al., 2022)
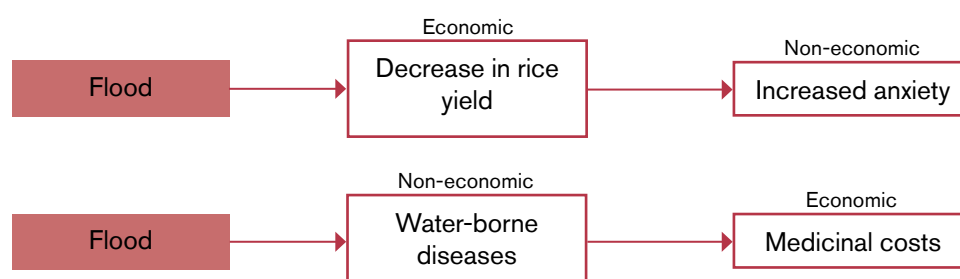
entirety of the other. However, economic and non-economic losses and damages are often portrayed as opposites in conversations and studies, leading to assessments focusing only on the 'non-economic' or the 'economic', thus, risking giving incomplete depictions of reality.

**Limitation 3: Interconnectedness.** The diagrams in Figure 2 show a linear process from hazard to impact. However, climate change impacts are deeply interconnected with natural, social and economic systems. In 1999, Professor Imtiaz Ahmed wrote that "both nature and humans have conjointly produced natural disasters in modern times…there is no scope for wholly naturalizing or de-humanizing the thing" (p. 4). An example of this is that soil and water salinity in southwest Bangladesh has increased due to floods, the promotion of saltwater shrimp farms, **and** the construction of the Indian Farraka Barrage, which reduces freshwater flows into Bangladesh (Figure 3).

Another example of interconnectedness is seen in the cascading nature of losses and damages. For example, Westoby et al. (2022) note that losses to biodiversity, ecosystems and the environment in the Pacific Islands translate to cascading impacts on knowledge, way of life and wellbeing (Figure 4).

The interconnectedness of losses and damages also means that some are risk multipliers; identifying these is essential to minimise loss and damage effectively. Westoby et al. (2022) identified that changes in biodiversity and ecosystem services can multiply risks as they "play a crucial role in supporting livelihoods, cultural heritage, and ways of life in the Pacific'' (p. 1244), meaning that protecting or restoring biodiversity is crucial in avoiding, minimising and/or addressing losses and damages related to livelihoods, cultural heritage and ways of life. However, most assessments do not extensively focus on the interconnected nature of losses and damages, meaning that risk multipliers may be overlooked.

**Limitation 4: Differentiation.** Táíwò (2022) writes how "the climate crisis is likely to shuffle increasing power and control into the hands of those in command of wealth, coercive force, or strategic resources" (p. 162), and Elliott (2018) writes that "climate change does not drive loss in a deterministic fashion […], the work of individuals, groups, communities, powerful interests, and institutions shape the course of loss, producing divergent outcomes in terms of who loses what, when, how much, and with what results, at multiple geographic scales" (p. 327). These divergent



Figure 3: Example of compounding loss (data from Paprocki, 2021; Shaibur et al., 2017; and Van Schie et al., 2022)
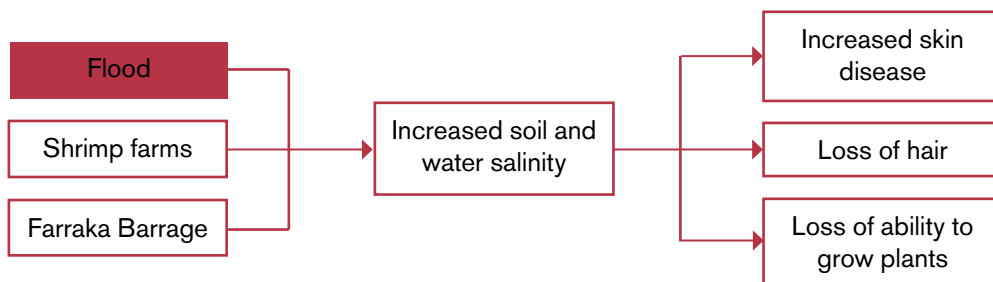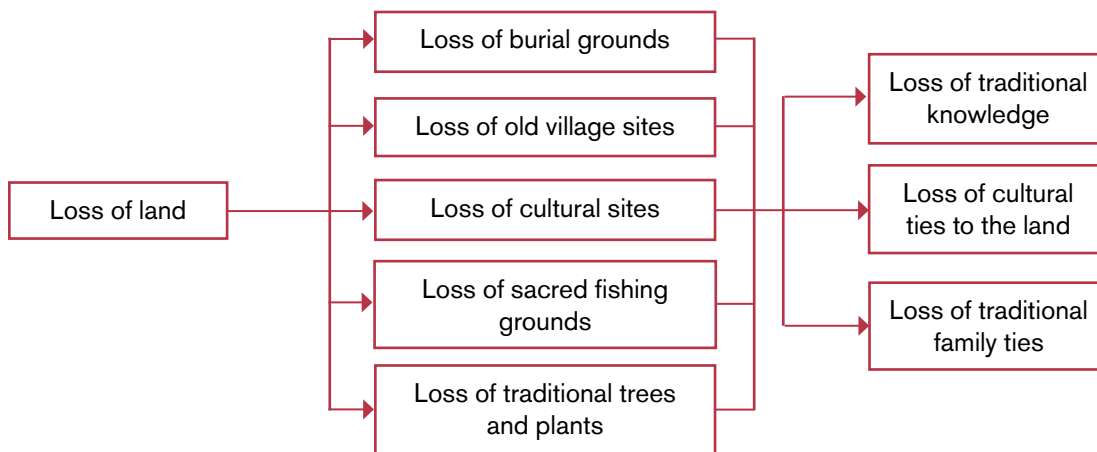


Figure 4: Example of cascading loss (data from Westoby et al., 2022)

outcomes can lead to further social and economic inequalities within societies, which can be exacerbated when compensation in the name of loss and damage does not reach those most vulnerable, but instead reaches those well-positioned socially and financially. However, assessments rarely focus on how impacts differ within communities and, instead, generalise results for entire communities. If they do differentiate, this is mainly focused on gender. For example, Van Schie et al. (2022) showed that women in coastal Bangladesh experience loss and damage to a greater range and extent, and Ayeb-Karlsson et al. (2021) looked at gendered impacts on wellbeing from climate change. Moreover, most assessments do not account for place-specific and culturally subjective drivers of vulnerability (Tschakert et al., 2017). Recognising differentiated experiences of losses and damages in assessments can help design responses that especially help those most vulnerable.

## 2.2 Existing post-disaster frameworks

Various assessment models exist that assess needs, vulnerabilities and impacts related to disasters from climate change. Eight models connected to key topics from the previous section were selected (Table 2) and summarised (Appendix A) to gain lessons for creating an assessment methodology.

**Phases.** Most assessments start with a preparatory phase in which the objective, research team and research area are decided methodologically. Afterwards, they gather secondary information on disasters and various contexts, such as social, environmental, historical, political and economic dimensions. More specific data is collected using a varying set of tools. The processes often end with a recommendation or action plan; few include a detailed implementation phase.

**Methods.** More than 30 data collection methods and tools were observed among the eight models (Appendix A). Most primary data collection tools are participatory, including calendars to map livelihood activities, matrixes to prioritise risk, and historical timelines. Secondary data is collected by analysing academic and grey literature. There are various degrees of community participation among the models. For example, two needs assessments gather information **from** the community in a rapid manner (IFRC, 2000; NAWG, 2020), both vulnerability analyses emphasise participatory methods and work **with** the community (Actionaid, 2004; Turnbull and Turnvill, 2012), and the Handbook for Community Assessment of Loss and Damage works **for** the community with outsiders being facilitators (Anderson et al., 2019). Tschakert et al. (2017) include local voices by centralising the concept of local values in the analysis.

**Time.** The timing and duration of assessments differ. The needs assessments stress immediate response while recognising longer-term reconstruction efforts (IFRC, 2000; NAWG, 2020; UN Women, 2017); the Post-Event Review Capability model takes three to six months from planning to publication (Venkateswaran et al., 2020); and the Loss and Damage assessment by ActionAid is said to be most effective when carried out in stages over at least a month (Anderson et al., 2019).

**Other.** Post-disaster models are predominantly promoted by organisations of the global North, such as the IFRC (International Federation of Red Cross and Red Crescent Societies), ActionAid, UN and Oxfam. This conflicts with the purpose of the models, which are to be conducted in the global South. The models focus on cross-sectoral approaches, they prioritise risks and existing local responses. Most of the models mention different experiences of loss and damage by different types of people, especially gendered differences. However, only the framework by UN Women (2017) emphasises gender transformative approaches throughout the process of recovery and rehabilitation.

Table 2: Assessed post-disaster response models

| MODEL | TYPE | SOURCE |
| --- | --- | --- |
| Needs Assessment | Needs | IFRC, 2000 |
| Joint Assessment Model | Needs | NAWG, 2020 |
| Participatory Vulnerability Analysis | Vulnerability | ActionAid, 2004 |
| Participatory Capacity and Vulnerability Analysis | Capacity, vulnerability | Turnbull and Turvill, 2012 |
| Post-Event Review Capability | Capability | Venkateswaran et al., 2020 |
| Handbook for Community Assessment of Loss and Damage | Loss and damage | Anderson et al., 2019 |
| Value-based assessment model for loss | Loss | Tschakert et al., 2017 |
| Post Disaster Needs Assessment (PDNA) guidelines: volume B – gender | Needs, gender | UN Women, 2017 |

## 2.3 Adaptation

The models assessing post-disaster impacts do not always address the limitations to climate adaptation noted in Section 2.1.2. Therefore, three critical lines of thought from the adaptation discourse are analysed here. Climate adaptation aims to minimise future losses and damages but can lack efficacy (Westoby et al., 2022) and create additional harm to affected societies (Schipper, 2020). Adaptation scholars and practitioners have responded to this by identifying ways to ensure effective, safe and just interventions.

### 2.3.1 Vulnerability-focused adaptation

One of the primary aims of adaptation is climate vulnerability reduction. However, Eriksen et al. (2021) show that adaptations can **reinforce existing vulnerabilities** when elite capture of adaptation interventions — often resulting from top-down processes — exclude the most vulnerable. Interventions in the name of adaptation can also **create new sources of vulnerability** (Eriksen et al., 2021). For example, embankments can create a false sense of security in high-risk locations and undermine local adaptation efforts (Paprocki, 2021). Atteridge and Remling (2017) show that climate adaptation actions can also **redistribute vulnerability**, as interventions reducing future harm for one group can increase the risk or vulnerability for other groups or ecosystems.

Overlooking local contexts and perceptions and not recognising different vulnerabilities can lead to additional harm, often to those most vulnerable. O'Brien et al. (2007) give two perspectives on vulnerability: the **scientific framing** can be depicted as a linear process, whereby society drives climate change and experiences its consequences; and the **human-security framing** depicts vulnerability as a convoluted process produced through demographic, economic, political, cultural and climatic factors (Barnett et al., 2016; O'Brien et al., 2007). Recognising these inter-related processes, the root causes of vulnerability, and centring differentiated vulnerability in assessments, helps to decide whether an adaptation will actually decrease vulnerability and prevent causing additional harm (Atteridge and Remling, 2017; Deivanayagam et al., 2022). This can be done by engaging with vulnerability contexts (Eriksen et al., 2021), researching relevant demographic, economic, political and cultural factors, and including thorough vulnerability analyses (eg, ActionAid, 2004; Turnbull and Turvill, 2012). Moreover, adaptation processes should evaluate ex-ante (in the planning process) and ex-post (in the evaluation process) whether the intervention causes harm (Atteridge and Remling, 2017).

### 2.3.2 Values-based adaptation

Adaptation disproportionately focuses on avoiding material impacts, such as land or housing, versus non-material phenomena that can contribute to meaningful lives (Graham et al., 2013). Centring vulnerability draws attention to various contexts around climate change impacts, but it does not necessarily account for the subjective factors that influence vulnerability, adaptive capacity and risks (O'Brien and Wolf, 2010). However, values significantly shape how people perceive risk and the causes of vulnerability, and effective adaptation is partly determined by what people perceive to be worth preserving and proofing against climate impacts (Wolf et al., 2013). Thus, knowing what people value in their everyday lives is crucial to achieving fair and effective adaptation (Graham et al., 2014). A value-based approach recognises that subjective, qualitative values are essential to individuals and that different people experience losses and damages differently (O'Brien and Wolf, 2010).

Graham et al. (2013) proposed the concept of **lived values**: "valuations that individuals make, in isolation or as part of a group, about what is important in their lives and the places they live" (p. 49). Schwartz and Bilsky (1987) identify five features of values that are common to all definitions: "(a) concepts or beliefs, (b) about desirable end states or behaviours, (c) that transcend specific situations, (d) guide selection or evaluation of behaviour and events, and (e) are ordered by relative importance" (p. 551). Examples of values within existing adaptation research are tradition, safety, belongingness, freedom, unity, harmony, identity, convenience, community cohesion, and a sense of place (Barnett et al., 2014; Graham et al., 2014; Wolf et al., 2013). Values can be articulated verbally or expressed through everyday activities and can be assessed in different ways. Wolf et al. (2013) examined values during in-depth interviews in which they explored participants' activities per season, what they value most about their way of life, what changes they have observed, and their views on a specific climatic change impact the community recently faced. After examining the data, these values were labelled using participants' terminology and by researchers. Graham et al. (2014) held scoping interviews to identify lived values, telephone surveys to determine if the wider community held these values, and finally, determined a final set of values using cluster analysis.

### 2.3.3 Locally led adaptation

Affected societies rarely have substantial decision-making power within adaptation processes (Eriksen et al., 2021). Marginalised groups need to have power within adaptation processes to reach effective and long-term vulnerability reduction (Eriksen et al. 2021). Instead, outsiders who often lack crucial on-the-ground information are seen as experts and control decisions, leaving those with most at stake little agency over potential drastic life changes (Falzon, 2021). Consequently, interventions can be insensitive to local needs, values and dynamics, resulting in a lack of efficacy — or worse, causing additional harm. Community-based adaptation addresses this issue by emphasising the importance of bottom-up processes, local knowledge, and the redistribution of power in decision making (Reid and Huq, 2007; Westoby et al., 2020). However, even within community-based projects, implementers have an agenda, and this can result in limited community ownership and performative engagement of local actors (Falzon, 2021; Westoby et al., 2020). In response, locally led adaptation further addresses this power imbalance with the central premise that projects should be **led** by local institutions and people (Westoby et al., 2020). Soanes et al. (2021) propose eight principles of locally led adaptation, which include "devolving decision making to the lowest appropriate level" (p. 17), "investing in local capabilities to leave an institutional legacy" (p. 23) and "collaborative action and investment" (p. 30). A locally led approach can transfer power to marginalised and vulnerable groups and, thus, ensure that climate impacts are minimised fairly and effectively. However, locally led adaptation is no panacea. Even when following the principles of locally led adaptation, one should still navigate the often complex power imbalances relevant to minimising climate impacts.

# 3
# Methodology

A values-based understanding of loss and damage that emphasises differentiated vulnerabilities and uses locally led methods can improve local ownership. The approach taken in this research consists of a wide range of qualitative and semi-quantitative data collection methods. This is complemented with first-person storytelling in three areas in Durgapur Upazilla, Netrokona District, north-central Bangladesh, to portray the relevant contexts, values, losses and damages, and responses. In doing so the research pays close attention to research ethics (Figure 5).

## 3.1 Research ethics

### 3.1.1 Extractiveness and harm

Inquiries about the losses and damages people experience can bring up painful and traumatic memories. Therefore, during this study, researchers briefed participants on the research aim before every survey, interview and group discussion, to gauge how comfortable participants were with the research topics. Moreover, they emphasised that participants were not obliged to answer every question and could indicate when they felt uncomfortable. Comfort levels were re-checked before asking particularly personal questions or addressing sensitive topics. Post-disaster research can also be extractive as it can take up significant time

for participants who sometimes, against expectations, do not see actions in return (Pacheco-Vega and Parizeau, 2018). Therefore, the research team first spoke with local leaders, including several women groups, and potential research participants about the project's aim and outcome to hear their opinions and gauge their willingness to participate. Many participants assumed that research team members were employees of a non-governmental organisation (NGO) delivering disaster relief. Thus, before every survey, interview and group discussion, researchers explained the research aim and potential outcomes. This often lead to conversations about their opinions on the research and its often extractive nature. Most participants showed appreciation, with one research participant sharing during a group discussion, "we are glad that you have come to our village and listened to our stories. We do not want anything from you but write about us. We are giving you time, so that you can show our stories to the people" (Focus Group Discussion (F) 5). Nearing the end of the research, a participant said: "I understand why you have been roaming through our village over the last months. You are gathering information about how, where, and what is going on. I want to ask you to write about us in detail, to show what we are going through" (key informant interview (K) 76). As per local research etiquette, participants were also given some compensation for participating in interviews, surveys

Figure 5: Steps of the methodology applied to assess local needs connected to losses and damages

Research ethics

Context → Values → Impacts → Responses → Debrief

First-person video stories

and focus group discussions. Additionally, the research team gained funds to donate to local organisations, for example by writing an article about a local story related to climate change. Lastly, the research team is actively seeking resources to implement actions on loss and damage in Durgapur Upazilla.

### 3.1.2 Accurate representations

The research team consisted of a mix of European and Bangladeshi researchers, the latter of whom primarily stay in Dhaka, where life differs vastly from rural regions. This significant cultural gap between researchers and participants can lead to inaccurate depictions of on-the-ground experiences, as a researcher's background affects their worldview, and how they formulate questions and filter information (Berger, 2015). The research team was aware of this gap during the research and actively listened to local perceptions and stories. Terminology and quotes used by participants are used in the report where possible, and a researcher from the Netrokona District was closely engaged from start to finish.

Local voices were amplified in ten video interviews where participants tell their stories. These show more personal aspects encountered through the research. The videos were discussed early in the research process with participants, who were enthusiastic about the possibility of sharing their stories with a larger audience. They were recorded at the end of the three-month research project. The researchers thoroughly explained the use and aim of the videos before recording and gained their consent. A local contact person also showed all the videos to all but one interviewee before publication, asking for their opinion on these final videos. All participants were positive about the usage of the videos, for example: "I like this video very much. It will inform people outside of our area. It can reach people who will come forward to help us", "people of other countries will see the video that was made. By watching the video, they might understand that we are suffering", and "no one has ever come to us and listened to our woes like this before. I cannot speak for everyone else, but I am speaking from my heart and so glad that you came and listened to us". These quotes show a rightful expectation that the video interviews will have significant impact and might lead to action in the form of relief or policy changes; the authors realise the urgency of showing them to those that can actually make an impact to the participants' lives.

## 3.2 Context

### 3.2.1 Research area selection

This study was conducted in Durgapur Upazilla, north-central Bangladesh. Bangladesh is one of the world's most exposed countries to climate-related hazards (Huq and Ayers, 2008) and attracts substantial attention in terms of development work and research on climate change. However, NGOs and researchers predominantly focus on the southern coastal regions, where societies face extensive losses and damages due to sea-level rise, cyclones and salinity intrusion (Van Schie et al., 2023). The northern areas, especially the Netrokona district, receive little attention. During the research, a participant mentioned the lack of NGO presence in Durgapur Upazilla and compared it to a city in the coastal south where he had worked as a day labourer: "In Barisal, there is an NGO in every house and they receive a lot of support" (K76). This lack of attention could be due to Netrokona's limited exposure to rapid-onset extreme weather events. However, in May 2022, northern Bangladesh was affected by unprecedented floods, primarily impacting the Sylhet, Sunamganj and Netrokona districts (IFRC, 2022; UNICEF, 2022). A local climate researcher informed the research team that Durgapur Upazilla was affected by the 2022 flood, given its proximity to the Someshwari river. Moreover, the people of Netrokona face severe weather changes such as droughts, increasing temperatures, and changing rainfall. Given the exposure to a wide range of climate-related hazards and the lack of climate-related data on the region, Durgapur Upazilla was selected as the research area (Figure 6).

Nine key informant interviews were conducted (Appendix B) (K1 to K9) with local leaders and affected societies in Durgapur Upazilla to better understand the main environmental and societal issues in Durgapur Upazilla. The research locations were selected on the basis of these interviews, as well as dozens of informal conversations with people throughout the region. Criteria for the selection were perceived exposure to climate-related hazards, social vulnerabilities, cultural diversity, and peoples' interest in cooperating in the research. Ultimately, two villages were selected in each of the three unions (the smallest rural administrative and local government unit in Bangladesh): Gaokandia and Kalikabor in Gaokandia Union, Boheratoli and Kamarkhali in Kullagora Union, and Baromari and Shyamnagar in Durgapur Union (Figure 6).

### 3.2.2 Local contexts

Six focus group discussions (Appendix C) (F1 to F6), two per union, were conducted to understand each location's situational context better; 51 people participated. The sessions were organised according to cultural identities and gender to include various perspectives and to ensure a safe space for discussion. Participants were recruited with the help of local leaders and using a snowballing approach.

Historical timelines and stakeholder maps were created during the three focus group discussions. A historical timeline can be used to map the incidence

Figure 6: A map displaying the location of the assessed unions in Bangladesh
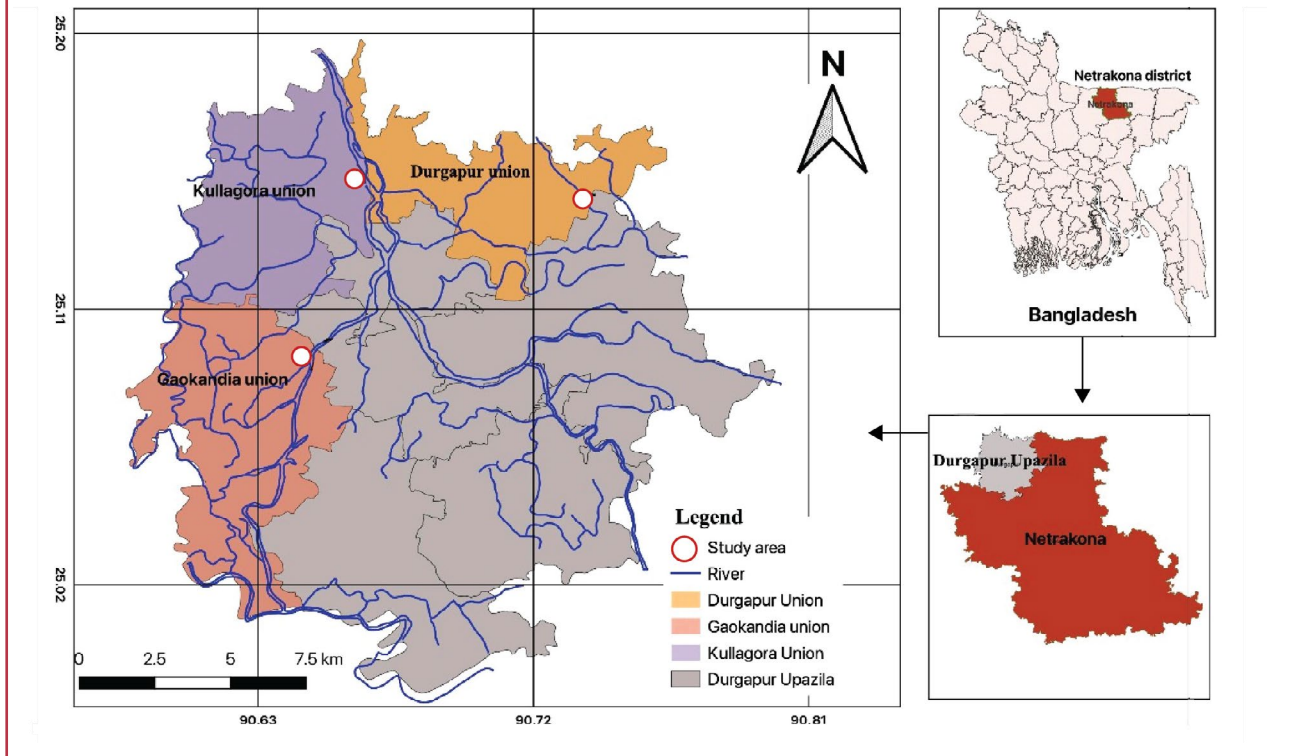


and frequency of climatic rapid-onset and slow-onset hazards over the past 25 years. This helped communities and researchers better understand past events, trends and changes (Turnbull and Turvill, 2012). Three focus group discussions created vulnerability maps and calendars of change. Vulnerability mapping enhances the understanding of hazards, vulnerabilities, geographical changes, resources and critical infrastructure per location (ActionAid, 2004; Anderson et al., 2019; Turnbull and Turvill, 2012). The calendar of change shows the changes in weather and key livelihood activities for communities during an annual cycle, comparing current circumstances with 25 years ago (Anderson et al., 2019; Turnbull and Turvill, 2012). Researchers identified five prominent climate-related hazards with these participatory methods. The perceived impact of these hazards was measured on a five-point Likert scale in a survey with 101 participants (Appendix G1).

## 3.3 Values

### 3.3.1 Exploring local values

The lived values held by people in the affected population were explored during key informant interviews (K10 to K37). Individual interviews were preferred over group discussions, as values can have personal significance, which participants may be uncomfortable sharing in groups. The questions were derived from other values-based studies (Barnett et al., 2014; Graham et al., 2014; Tschakert et al., 2017; Wolf et al., 2013) to guide participants in vocalising their values, which can be complicated due to the intangibility and subjectiveness of the concepts. The structure of the interviews (Appendix D) was threefold. First, participants were informed of the conclusions from the previous research step. Second, a daily time chart was completed to examine what people value most about their days. Third, place-based values were explored by asking questions such as "what are the things that make you stay in [*village*]" and "how does life in [*village*] compare to other places you have visited?".

A total of 28 individuals were interviewed, most of whom participated in the previous focus group discussions or interviews. Participants were selected with vulnerability, gender, age and cultural group in mind (Appendix D1). All interviews were recorded, transcribed and coded using an inductive approach, meaning codes do not predicate a theory, construct or concept (Chandra and Shang, 2019). Instead, they are derived from the data itself. For example, we coded "I enjoy my prayer time" (K27) as **prayer** and "If I was given the power, I would fix the roads and transportation system" (K35) as **communications system**. Multiple team members from various backgrounds conducted this process to ensure validity and cultural sensitivity. The coding process resulted in a set of 75 values (Appendix D2).

### 3.3.2 Determining local values

The 75 lived values were distilled to a smaller set of core values that could be used as a research framework. Most frameworks to assess non-economic losses and damages include up to ten types (eg, Chiba and Prabhakar, 2017; McNamara et al., 2021; Morrissey and Oliver-Smith, 2013; UNFCCC, 2013). To achieve this, the research team bundled similar values in groups. For example, **family**, **children**, **grandchildren** and **relatives** were grouped under **family**. These groupings were made by paying close attention to the context in which every value was mentioned, and when there was doubt, values were left as 'undecided'. This resulted in 11 groups and three undecided values (Appendix D3).

These groupings were presented to research participants during six focus group discussions (F6 to F12) with 35 participants (Appendix E1). The research team introduced the groups and asked participants: (i) if other groups should be added; (ii) if there were better terms to define the groups; (iii) where the undecided values fit in; (iv) if they agreed with the values and groupings; (v) if they would merge groups; and (vi) if they would split groups. Substantial changes were made. For example, **community** became **society**, as participants argued the latter refers to the broader population instead of separate religious communities; **harmony** and **caring** were moved into **family and society**; and **mental health** was positioned separately from **health**. This process resulted in ten local values (Appendix E2).

### 3.3.3 Rating values

Researchers conducted surveys to determine how important different participants deemed each value; 101 participants (Appendix G1) participated in a survey in which the researchers described each value and asked them to rate the importance on a five-point Likert scale (Appendix G2).

## 3.4 Losses and damages

### 3.4.1 Exploring losses and damages

The ten local values guided key informant interviews (K38 to K69) that examined the losses and damages experienced by people in Durgapur Upazilla. Researchers explained the definition of each value, inquired about climate-related impacts upon each value, and asked what specific climate-related hazards caused the impacts. 32 interviews were conducted (Appendix F1). Participants were selected using a similar process as in the previous step. All interviews were recorded, transcribed and coded (Appendix F2). A deductive coding method in which researchers categorised the data according to the ten local values was applied.

### 3.4.2 Rating impacts on values

The survey outlined in Section 3.3.3 was conducted after the losses and damages were explored and also included questions to assess the perceived impact on each value. The research team first explained the losses and damages observed within each value. Afterwards, all 101 participants (Appendix G1) were asked to rank the climate-related impact within each value on a five-point Likert scale (Appendix G2).

## 3.5 Addressing

### 3.5.1 Exploring measures

Existing and desired responses were examined during key informant interviews. The research team explained the observed impacts, asked if people experienced a particular impact, inquired if they currently respond to the impact, and asked about potential ways of addressing these impacts. 32 interviews were held (Appendix H1) (K70 to K101). All interviews were recorded, transcribed and coded (Appendix H2) using an inductive approach similar to the process used in Section 3.2.1.

### 3.5.2 Rating measures

Another survey was conducted to assess the perceived usefulness of potential measures addressing the losses and damages. Measures mentioned at least twice during the previous step were included in the survey, resulting in 22 measures. The research team explained every measure and asked participants to rate their usefulness on a five-point Likert scale. 108 participants took part in the survey (Appendix I1).

## 3.6 Debriefing

Finally, a debriefing session was organised in each research location to present preliminary findings and explain more about climate change and potential future developments. Approximately 110 participants joined across the three sessions (Appendix J).

# 4

# Context

By focusing on local perceptions of climate-related hazards and vulnerabilities, it is possible to better understand why losses and damages occur and for what reasons. Based on this information, specific environmental, socio-economic and cultural contexts are identified and analysed to deepen the understanding of local dynamics.

## 4.1 Local perceptions

People's perceptions of rapid- and slow-onset hazards and seasonal changes were examined to see which hazards are most impactful. A hazard and vulnerability map was then created per union to see how this differs per union. The hazards mentioned most were rated on a five-point Likert scale to see the exact differences in perceived impacts.

### 4.1.1 Rapid- and slow-onset hazards

Figures 7, 8 and 9 show how participants across three focus group discussions perceive weather changes. Most rapid-onset events (Figure 7) occurred in the past few years, possibly due to recency bias. However, participants noted they now experience new hazards, such as droughts and heatwaves (F2; F3). They "first got affected by drought in 2018 and since in 2019, 2021, and 2022. It has been increasing day by day" (F2). The most notable floods occurred in 1998, 2004, 2008, 2014, 2021 and 2022 (K9; F1; F2; F3; Hofer and Messerli, 2007; Wahiduzzaman, 2021). Spikes in riverbank erosion often accompany these floods (F1; F3). Figure 8 shows that participants perceive all slow-onset processes to be increasing: "now it rains in the months of *Agrahayana* and sometimes in *Paush*



Figure 7: A combined version of three timelines participants created displaying rapid-onset events over the last 25 years in Durgapur Upazilla (F1; F2; F3)
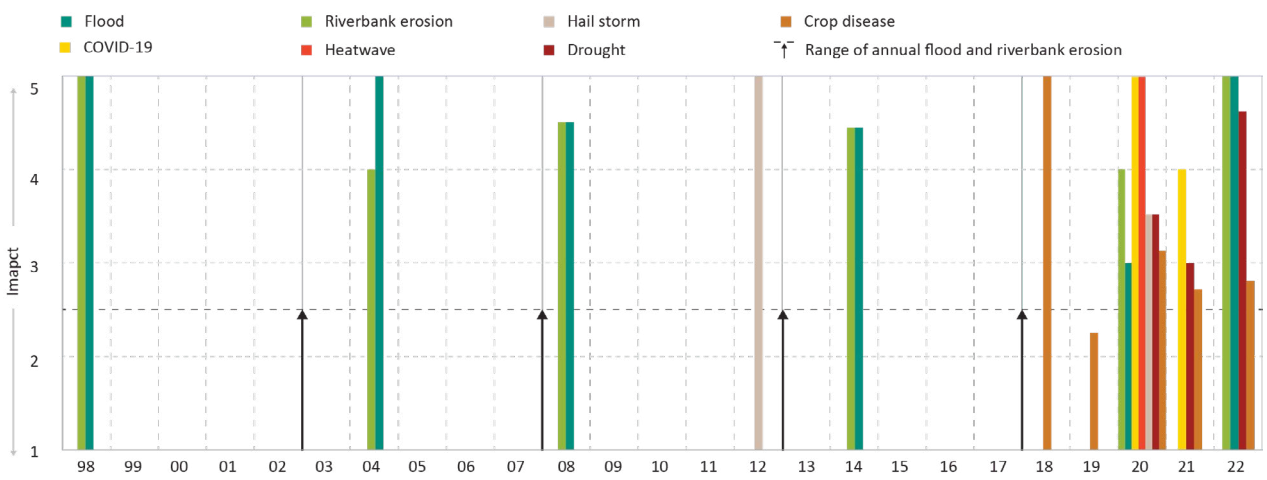
Figure 8: A combined version of three timelines participants created displaying slow-onset processes over the last 25 years in Durgapur Upazilla (F1; F2; F3)

Legend:
- Fish stock depletion
- Sand mining
- Deforestation
- Fish disease
- Change in rainfall
- Hot summers
- Temperature
- Thunderstorms
- Crop disease
- Groundwater depletion

(Y-axis: Impact, scale 1–5; X-axis: years 98–23)
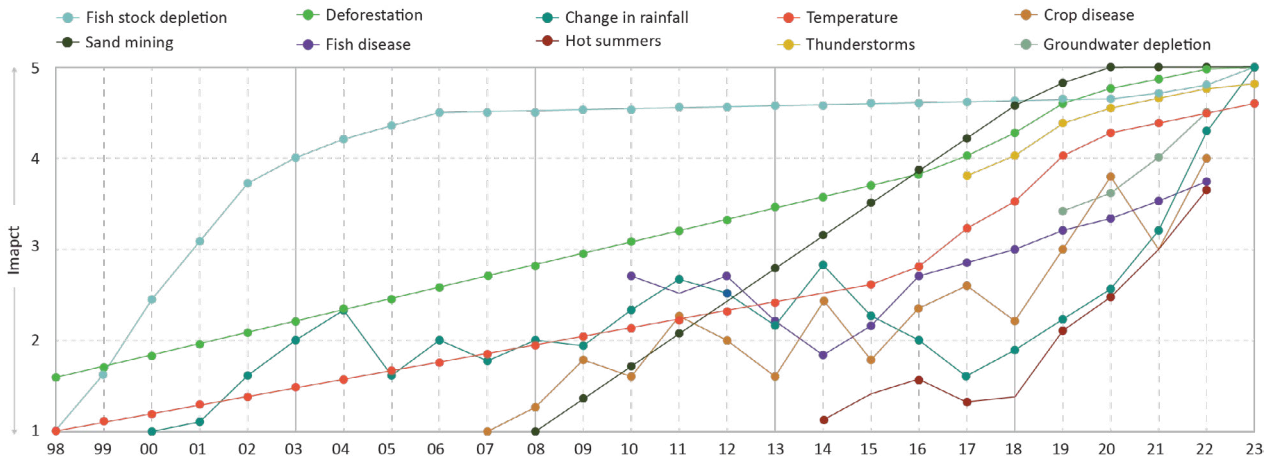
Figure 9: A combined version of three calendars participants created displaying seasonal change in Durgapur Upazilla between 1998 and 2022 on a 0–5 scale (F1; F2; F3)

| Season | | Grishmo (summer) | | | Bôrsha (monsoon) | | | Shôrot (autumn) | | Hemonto (late autumn) | | Šheet (Winter) | | Bôshonto (Spring) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr |
| | | Boishakh | Joishţho | Ashar | Srabon | Bhadro | Aash-shin | Kartik | Ôgrohaion | Poush | Magh | Falgun | Choitro | |
| Rainfall | 2022 | ••••◖ | ••••• | ••••• | ••••◖ | ••••◖ | •• | •• | ••◖ | •◖ | ◖ | •◖ | ••• | |
| | 1998 | ••◖ | ••• | ••••• | ••••◖ | •••◖ | •◖ | •◖ | ◖ | ◖ | | •◖ | ••• | |
| Temp-erature | 2022 | ••••◖ | ••••• | ••••◖ | •••• | •••◖ | ••• | ••◖ | ••◖ | •◖ | •◖ | ••• | ••••◖ | |
| | 1998 | •••◖ | •••◖ | ••• | •••◖ | •• | •◖ | •◖ | • | • | • | ••◖ | ••◖ | |

too. The beautiful weather that was in the spring is no more. Now, it is hot even in spring. Winter is not as cold as before. As you may have noticed, it is very hot throughout the day. Is it not unusual to feel hot during the day in winter?". Participants also perceived weather changes by season. Figure 9 shows how average temperature and rainfall increase in most months. The most notable difference is an increase in rainfall in summer.

## STORY 1: DECADES OF CHANGES IN WEATHER

Abdul explains how the weather has changed in his lifetime and the potential causes of this change.

**See video: https://youtu.be/eBA3BzHUPo8**

Abdul

## 4.1.2 Hazard and vulnerability maps

**Gaokandia Union** (Figure 10). The villages of Gaokandia and Kalikabor are home to Muslims, Hindus and Mandis. Mandis mainly live in Kalikabor, which was less affected by the flood of 2022 than many parts of Gaokandia Union. The Hindu community assessed in Gaokandia are Dalits (Hindus from the lowest caste). The union is not well connected to other places; the roads are mostly unpaved and ill-maintained, and no nearby bridges exist (F4), complicating access to healthcare and education services. A bend in the river upstream from the union directs floodwater at the union's mud embankment, on which people's safety and livelihoods greatly depend (F4). This embankment broke in several places during the floods of 2022, making it one of the most affected unions in Durgapur Upazilla

**Kullagora Union** (Figure 11). Kamarkhali is home to Mandis, Hindus and Muslims; while Boheratoli is home to Mandi, Hajong and Muslim people. The villages are mostly affected by riverbank erosion; participants estimate that approximately 90 feet of the land has been lost due to riverbank erosion since the flood of 2014. The people lost several key buildings and features of their villages, including the bazaar, a Hindu temple and a Banyan tree. In 2021, the people of Kamakhali convinced the government to build an embankment to protect their ancestral land (van Schie et al., 2023). They succeeded and did not lose any land during the flood of 2022. However, Boheratoli still needs a proper embankment to protect the village (K95). The riverbank on the opposite side of Kullagora Union is worked with machines dredging sand from the Someshwari river (K25; K26; K27).

Figure 10: A digitalised version of a map created with participants displaying hazards and vulnerabilities of two villages in Gaokandia Union (F4)



Figure 11: A digitalised version of a map created with participants displaying hazards and vulnerabilities of two villages in Kullagora Union (F5)
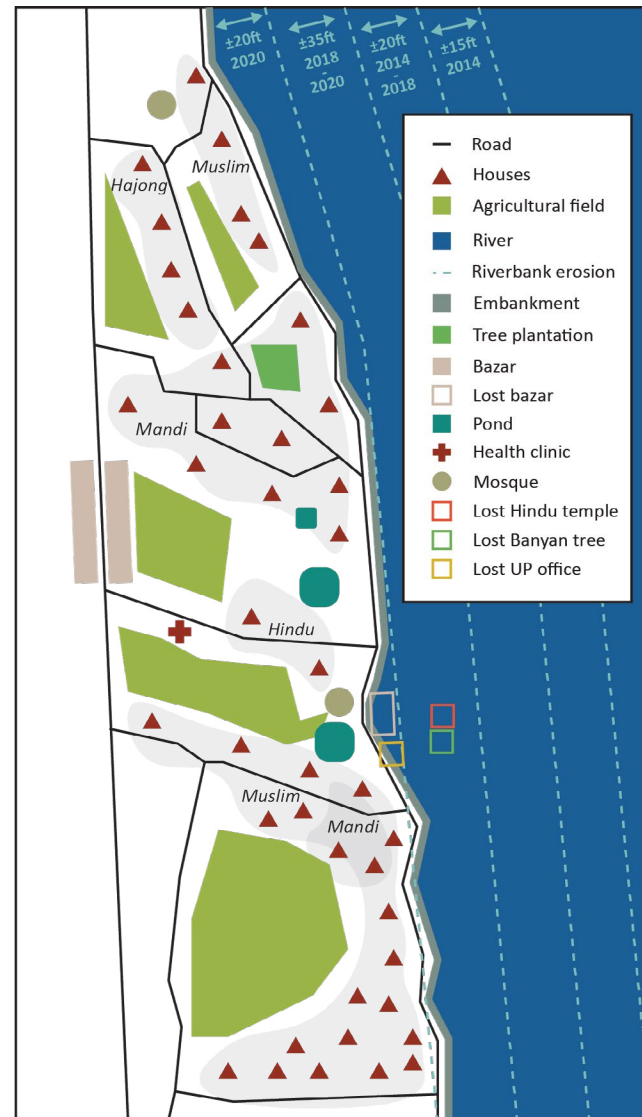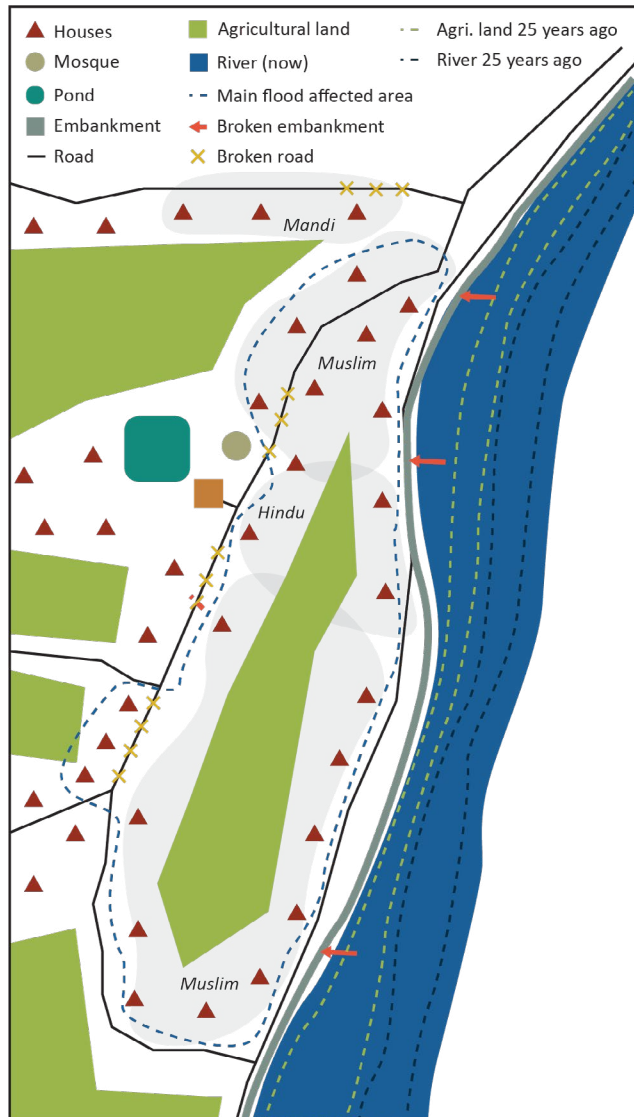


(F4).

**Durgapur Union** (Figure 12). Shyamnagar and Baromari are two villages located approximately 3.5 miles from the main channel of the Someshwari river. Baromari is home to only Muslims, who also live, along with Hajongs, in Shyamnagar. The flood of 2004 created a river channel just south of the villages (F6). The river channel is usually dry but sees vast volumes of water during floods. This causes the surrounding villages to flood as the relatively new river channel ends just after passing Shyamnagar and Baromari.

Figure 12: A digitalised version of a map created with participants displaying hazards and vulnerabilities of two villages in Durgapur Union (F6)



## 4.1.3 Rating

Participants deemed the effects of flooding the most severe, followed by drought and riverbank erosion (see Table 3). These are all rapid-onset events; slow-onset processes were perceived to be less impacting. This could be because slow-onset hazards and resulting impacts are more gradual and therefore less visible (Nelson et al., 2002). The impact of flooding and riverbank erosion is particularly high in Gaokandia and Kullagora Unions, illustrating their exposure to these hazards.

# 4.2 Environmental context

Historically, climate-related hazards are part of life in rural Bangladesh, especially riverbank erosion and flooding. However, these hazards are changing. Changes concerning the five climate-related hazards above are further examined using people's perceptions, meteorological data, satellite imagery and secondary data.

## 4.2.1 Floods

Durgapur Upazilla is located just below the Indian Meghalaya hills, which receives tremendous rainfall annually. A town on its southern slopes, Cherrapunjee, has the status 'rainiest place on earth' (Hofer and Messerli, 2007). Rainfall from the Meghalaya hills flows down into northeast Bangladesh (Hofer and Messerli, 2007), contributing to floods in Durgapur Upazilla (K3; K22). Floods are a necessary and desired component of the monsoon season in Bangladesh; 20–22% of the country is inundated during a typical flood year (Hofer and Messerli, 2007; Rasheed, 2008). Flooding can mean fertility and prosperity; the following passage reflects this:

"The people of Bangladesh, therefore, found ways to live with rivers. They respected rivers. Some even worshipped them. They knew that rivers gave birth to this land, and rivers would come periodically to nurture it. They realized that it was in their own interest to let this nurturing take place. Therefore, they struck a bargain with the rivers: instead of trying to prevent river inundation, they made best use of it." (Islam, 1999, p. 87)

However, when floods occur at unexpected times, last longer or are more severe than expected, they can cause widespread destruction. The flood of May 2022 was particularly damaging (UNICEF, 2022; UNOSAT, 2022) and was caused by record rainfall in the Meghalaya hills (IFRC, 2022). Participants said they "have not seen a flood like this in 50 to 100 years" (K2), that it was the "worst flood we ever experienced" (K13), and that "the losses we faced from this flood will take

Table 3: Perception of severity of main climate-exacerbated hazards driving losses and damages in Durgapur Upazilla per research area

| HAZARDS | RATE OF ONSET | MEAN | RESEARCH AREA | | |
|---|---|---|---|---|---|
| | | | GAOKANDIA UNION | KULLAGORA UNION | DURGAPUR UNION |
| | | N=101 | N=39 | N=33 | N=29 |
| **Flood** | Rapid | 4.41 | 4.56 | 4.42 | 4.17 |
| **Drought** | Rapid | 3.88 | 3.90 | 3.88 | 3.86 |
| **Riverbank erosion** | Rapid and slow | 3.86 | 4.59 | 4.42 | 2.24 |
| **Temperature variability** | Slow | 3.76 | 3.72 | 4.06 | 3.48 |
| **Rainfall variability** | Slow | 3.63 | 3.51 | 3.81 | 3.59 |

more than ten years to recover [from]" (F1). A 38-year-old participant from Gaokandia Union noted that "when we were younger, floods would come in the morning and leave in the afternoon. They were much smaller. The floods are higher now. Previously it would only reach the yard, now it enters the house" (K78). The IPCC (2021) writes that "human influence has contributed to the intensification of heavy precipitation" (p. 108) in Asia, which results in increased flood probability. Moreover, they state that "increases in precipitation and river floods are projected" (p. 138) in South Asia with high confidence (IPCC, 2021).

The government of Bangladesh, with support from international agencies and governments, has implemented large-scale adaptation projects to control nature and protect people from floods. More than 35,000km of embankments now confine river flows and permit intensified agriculture (Ministry of Environment, Forest and Climate Change, 2018). However, these embankments are not always well-maintained, can cause further waterlogging and have created a false

sense of security for the people dependent on them, causing further loss and damage (Dewan, 2020; Paprocki, 2021). Thus, the philosophy of 'living with floods' is not followed today.

## 4.2.2 Riverbank erosion

"The way the river eroded in 2020 was unprecedented; I have not seen that in my 60-year life", said a participant (K6). Riverbank erosion is coupled with floods (K22; F1; F3). Participants also indicate large-scale sand mining in the Someshwari river accelerates the process (K25; K35; K95; F3).

In Gaokandia (Figure 13) and Kullagora Union (Figure 14), the riverbank eroded five to 20m between 2004 and 2022. For Kullagora Union, this is less than the participants estimated (Section 4.1.2). Figure 15 shows the substantial change in the river course in Durgapur Union. Gradual riverbank erosion, like floods, is a natural process in Bangladesh. However, the rate of onset can be influenced by anthropogenic activities
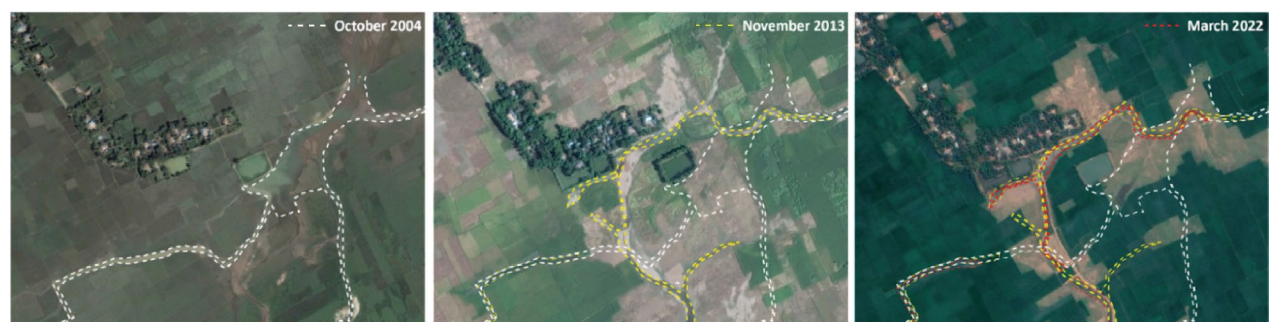


Figure 13: Riverbank erosion in Gaokandia Union (data from Google Earth Pro, 25°09'27.33" N 90°39'46.94" E)



Figure 14: Riverbank erosion in Kullagora Union (data from Google Earth Pro, 25°09'27.33" N 90°39'46.94" E)



Figure 15: Riverbank erosion in Durgapur Union (data from Google Earth Pro, 25°09'22.21" N, 90°43'58.75" E).

such as sand mining and climate-related hazards such as floods (Mallick and Mallick, 2021). The section above displays how floods in Bangladesh are exacerbated by climate change. However, the fact that riverbank erosion is a natural phenomenon and depends on various factors makes it complicated to attribute its impacts to climate change.

### 4.2.3 Temperature increase

Many participants mentioned an increase in temperature: "every year, the summer is becoming warmer" (F1) and "increasing temperature is getting more outrageous day by day. This year, we did not even get pleasure sitting under trees" (F5). Other participants indicated that they feel the temperature changes as they need more rest when working (K14; K30).

Figure 16 shows how the number of days where the temperature rose above 35°C in Mymensingh has increased from 1998 to 2021. This is especially true for the last three recorded years, from 2019 to 2021, which saw many days with extreme temperatures. Figure 17 shows how the daily highest recorded temperature heavily fluctuates but gradually increases over time. This is also the case for the daily lowest recorded temperature (Figure 18). These statistics align with findings from the IPCC (2021), which observed and projected "increases in mean temperature and a shift towards extreme heat characteristics" (p. 138) in Asia.

### 4.2.4 Rainfall variability

A participant from Kullagora Union noted: "The total amount of rainfall per month has not changed significantly, but the way and timing of rainfall have changed. When it starts raining, it rains for a couple of weeks. When it does not rain, it does not rain for several weeks" (F6). Other participants shared a similar sentiment: "The rainfall has been extraordinary these years. When it rains, it rains for a longer period, and when it is dry, it is dry for a longer period" (F1) and "the weather has changed. The seasons do not arrive in time. Everything is mixed up. When it is time to rain, there is drought. When it is winter, there is rain." (F2).

Figure 19 shows how the maximum number of consecutive days **with no** rainfall heavily fluctuates but has increased over time; the maximum number of consecutive days **with** rainfall also heavily fluctuates but has decreased over time (Figure 20). Figure 21 shows the average monthly precipitation. No clear trends can be observed. However, 2020 saw exceptionally high fluctuations, with May and July seeing significant rainfall and August being unusually dry. The IPCC (2021) notes that "South Asian summer monsoon precipitation decreased over several areas since the mid-20th century (high confidence) but is likely to increase during the 21st century, with enhanced interannual variability" (p. 136) and that the frequency of heavy precipitation has

increased. This aligns with the participants' perceptions and high fluctuations seen in Figures 8 and 9.

### 4.2.5 Drought

The quotes from participants mentioned in the section above also indicate increased droughts over the years. Figure 19 confirms this, as the maximum number of consecutive dry days has increased. Figure 21 shows little rain in August 2020; participants also noted a drought this year in the rapid-onset timeline (Figure 7). The IPCC (2021) reports low agreement on trends in drought in South Asia.

# 4.3 Socio-economic context

Non-climatic factors such as income or job opportunity greatly determine people's capacity to adapt to and recover from losses and damages. Moreover, developmental and societal issues can compound climate-related impacts. Therefore, this report examines the broad economic situation and developmental problems in Durgapur Upazilla.

### 4.3.1 Economic situation

Agriculture, especially rice cultivation, is the main income source for most people in rural Bangladesh. A significant agricultural threat is crop disease (K15; K38; F3). Population increase (K28; K53; K55) causes land fragmentation, resulting in lower agricultural yields per capita. Participants also state that an increase in the use of chemical fertilisers has resulted in crop diseases (K15; K38) and that an increase in agrarian technology decreases job opportunities for day labourers (K12; K26; F2). Other sources of income for people in Durgapur Upazilla include fish farming, which usually happens in small freshwater ponds close to people's houses, and keeping livestock, mainly goats, cows, chickens and ducks.

A lack of job opportunities in rural Bangladesh leads to significant rural–urban migration flows (Biswas et al., 2019). This is also the case for Durgapur Upazilla: "we do not have any workplaces, which makes us poorer every day. The local government does not take care of vulnerable populations" (K35). As a result, many people go to cities such as Dhaka or Mymensingh for work (K12; K30; K44; K95). Good education is seen as a way to escape intergenerational poverty (K12; K62). However, a significant gap and misalignment exist between education and the job market, resulting in highly educated graduates remaining unemployed or working in low-wage jobs (Abdullah, 2022; Islam and Salma, 2016; Uddin, 2020). Another factor hampering economic development is load shedding. There is no electricity for several hours a day, pausing household work, education or business (K44; K77; K68; Hossain and Hasan, 2018).

Figure 16: Annual count of days above 35º Celsius in Mymensingh from 1998 to 2021 (data provided by the Bangladesh Meteorological Department)

- - - = locally weighted linear regression
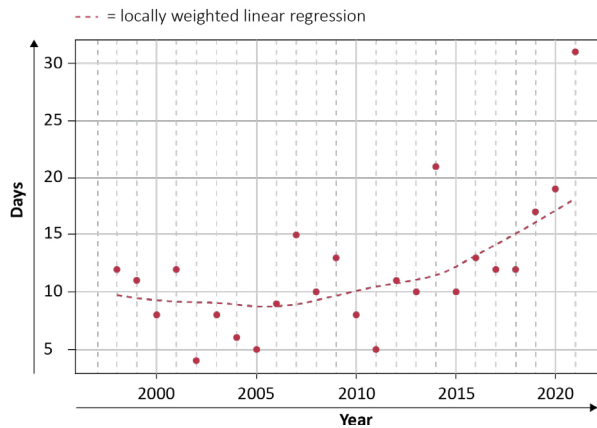
Figure 17: An average of the daily highest recorded temperature per year in Mymensingh from 1998 to 2021 (data provided by the Bangladesh Meteorological Department)

- - - = locally weighted linear regression
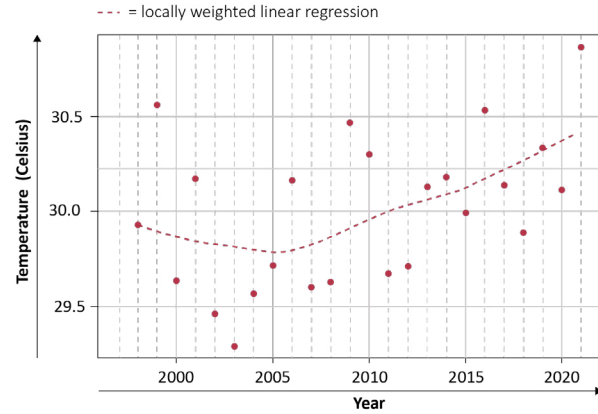
Figure 18: An average of the daily lowest recorded temperature per year in Mymensingh from 1998 to 2021 (data provided by the Bangladesh Meteorological Department)

- - - = locally weighted linear regression

Figure 19: The maximum number of consecutive days with <1mm rainfall per year in Mymensingh from 1998 to 2021 (data provided by the Bangladesh Meteorological Department)

- - - = locally weighted linear regression

Figure 20: The maximum number of consecutive days with >1mm rainfall per year in Mymensingh from 1998 to 2021 (data provided by the Bangladesh Meteorological Department)

- - - = locally weighted linear regression
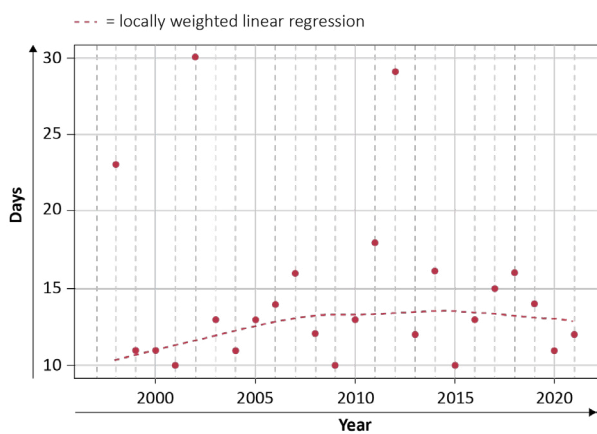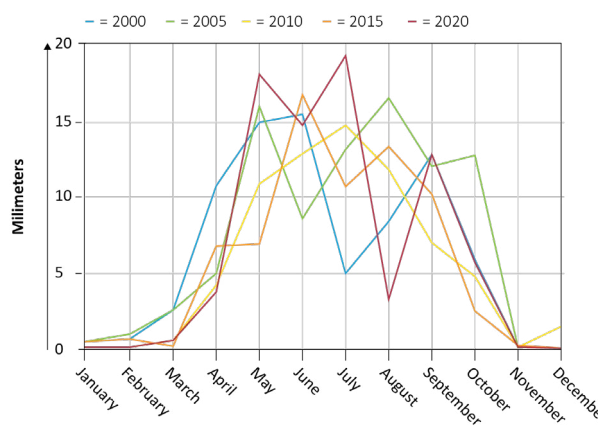
Figure 21: The average monthly precipitation in Netrokona with a 5-year interval (data from 2000 to 2020 and provided by the Bangladesh Meteorological Department)

— = 2000   — = 2005   — = 2010   — = 2015   — = 2020

## STORY 2: LIVING NEXT TO A SAND MINE

Sumon's house is located directly on the riverbank. From his garden, he sees hundreds of dredging machines mining sand from the Someshwari river. He explains how sand mining affects life of the people in his village.

Sumon

See video: **https://youtu.be/0miwBPH0t1s**

### 4.3.2 Environmental issues

Economic growth in Durgapur Upazilla can have significant impacts on nature. Deforestation and sand mining were two prominent causes of environmental damage observed in Durgapur Upazilla. A report by the Bangladesh Bureau of Statistics (BBS) lists various native forest tree species important to biodiversity in the Netrokona District (BBS, 2013). Durgapur Upazilla should be especially dominated by Sal trees (*Shorea Rabusta*). Additionally, the region is home to various fruit trees, such as mango, jackfruit, lychee, tamarind, guava and lemon trees. However, Durgapur Upazilla has been cleared of a significant share of its trees, as wood is used for fuel and construction materials. This practice has increased with human and livestock population growth (Rahman et al., 2020). Additionally, native species, such as Sal trees, are being replaced by invasive species, such as the Akashmonni tree (*Acacia auriculiformis*). The Akashmonni tree currently dominates many areas in Durgapur Upazilla (K3). They have been planted by people and the forest department due to their high wood value and fast-growing characteristics (Kabir, 2022; Siddique, 2014). However, the dominance of the Akashmonni tree causes further losses of native species and biodiversity. This can cascade into impacts on other species, such as birds, who do not build nests in Akashmonni trees (K49).

Hundreds of machines dredging sand from the river can be seen along Someshwari's river banks, particularly close to Kullagora Union. Participants estimate that between 2,000 and 5,000 sand trucks leave Durgapur Upazilla daily (K1; K7) and noted a wide range of adverse effects from sand mining: noise pollution (K1; F6; K39; K61; K100), air pollution (K22), environmental and ecological destruction (K3; K22; K35; K99; K100; F11), exacerbating riverbank erosion (K25; F3; K35; K95), reducing fish population (K17; F3), child labour (F3), unsafe working conditions (F3), reduction in

groundwater (K1; K38), reduction in river water level (K3; K63); temperature increase (K1; K69), destruction of roads (K8), and altering the river flow (K55). Sand mining does contribute to Durgapur's economic situation, with many people investing or working in sand mining (F1; K17; K22; K44). No official reports on sand mining in Durgapur Upazilla were found, complicating the validation of participants' views. However, various studies worldwide analysing the impacts of riverine sand mining confirm that it can have large-scale implications for river flow, ecosystems and water levels (Padmalal and Maya, 2014; Rentier and Cammeraat, 2022).

## 4.4 Cultural context

Durgapur Upazilla is home to four distinct cultural groups: Muslims, Hindus, Mandis and Hajongs. The first two can be called *Bangali*. The last two can be referred to as *Adivasi* (Indigenous). Each group has specific practices, beliefs and languages, resulting in different value systems. The most distinctive characteristics of each group are outlined below.

### 4.4.1 Bangalis

**Muslims.** Islam is the most prominent religion in Bangladesh, with 91.04% of Bangladeshis following Islam (BBS, 2022). Muslim men go to the mosque to pray; women pray at home. *Namaz*, the daily prayer, happens five times a day using a prayer mat. The Quran emphasizes the importance of the *Jumu'ah* (Friday) prayer at noon when people pray in a congregation (Huque and Akhter, 1987). The older generation especially are devout Muslims. Children will attend Quran education at *madrasas*, which as well as teaching new generations about Islam, teach a wide range of subjects (Ahmad, 2004).

**Hindus.** Hindus make up 7.95% of Bangladesh's total population (BBS, 2022). Hindus in Bangladesh follow a caste system similar to that of India. Bangladesh's dalits face discrimination, exploitation and marginalisation (Shrivastava and Tanchangya, 2015; Sultana and Subedi, 2016). A Hindu participant indicated that: "As we are lower caste Hindu, the chairman and Union Parishad members do not care about us" (K76). Hindus celebrate the Puja, their main religious ritual, where they sacrifice items such as fruit, light or flowers (Kolamkuzhyyil, 2016). Another practice in Hinduism is *Kirtan*, which is the act of chanting the name of Lord Krishna and is often sung in a congregation (Chanda, 2022). Cows are held in great reverence by Hindus. The sacredness of cows is deeply ingrained in their thoughts and feelings; the protection of cows can be considered a religious duty (Batra, 1986).

## 4.4.2 Adivasis

Indigenous rights activists claim at least 30 *lakhs* (3 million) Adivasis live in Bangladesh (Roy and Deshwara, 2022). The country is estimated to be home to between 50 and 90 distinct cultural groups (Gain, 2011; Rafi, 2006; Roy and Deshwara, 2022). Adivasis are not recognised on a legal basis within the constitution of Bangladesh (The Constitution of the People's Republic of Bangladesh, Amend. 15, Art. 6). Adivasi groups within Bangladesh are marginalised by the Bangali-dominated society as they have little political protection, minimal access to land, and face regular harassment and attacks (Gain, 2011; 2016). Weeks before our first visit to Durgapur Upazilla, a Hajong political leader was murdered (K8). A Hajong participant noted that "new leadership does not want to come from our society. After seeing these events, they think we must give our lives if we want to lead. They are afraid and by seeing this, fear that the majority can keep us under pressure" (K8).

However, research participants from different backgrounds emphasised how Adivasis and Bangalis lived harmoniously (K57; K59; K65). Moreover, the Mandi and Hajong households were often economically better off than their Bangali neighbours, as young adults were usually educated, people were jobholders instead of day labourers (K76), and most lived in stone houses. A Bangali man noted that ethnic groups receive more NGO support due to their Indigenous status (K17). Hajongs indicated that their sense of unity and the fact women also do agricultural work helps with their financial security (K12; K28). Historically, Mandi people have received support from the Christian church (Gain, 2016). This also gives them the opportunity to work with Christian NGOs in Durgapur Upazilla.

**Mandis.** Bangladeshis, Indians and foreigners use the word *Garo*. However, the Manidis have come to dislike the term as only outsiders use it (K8; Gain, 2011). Therefore, after deliberation with Mandi participants, the term Mandi is used in this report. More than 100,000 Mandis live in Bangladesh, mainly in the Mymensingh

district (Gain, 2011). Mandi society is matrilineal; women own property, and men move to the woman's house during the marriage (Burling, 1997); Gain, 2011). This is in sharp contrast with the patriarchal Bangali groups. The traditional Mandi religion, *Sangsarek*, is rarely practised (Burling, 1997; Gain, 2011), but they still use their traditional language while in their communities. Most Mandis in Bangladesh converted to Christianity after being encouraged by missionaries, who helped them with education and development (Gain, 2011). The Mandis that participated in this study were all Christians and take part in rituals such as Christmas and Easter (Gain, 2011). A Mandi participant indicated that the conversion reduced traditional practices: "Our community has embraced Christianity, but our roots lie in the worship of our ancestors. Since our fathers and grandfathers have become Christian, many cultural practices and traditions were lost over time and not passed down to younger generations. We, as Adivasi, need to keep these traditions alive and preserve our cultural heritage" (K100).

**Hajong.** The Hajong are a relatively small patriarchal community in the north-central region, which are said to have migrated from the Garo Hills in the Indian Meghalaya. Some speculate that their name originates from the Garo language, in which *Ha* means land and *Jong* means people who are experts at cultivation (Gain, 2016). A Hajong participant stated it can be translated to 'earthworms' (K12). Both names reflect the Hajongs' deep connection with agriculture (Gain, 2011; 2016). Hajongs follow Hinduism and descend from the *kshatriya*, the second caste of Hinduism. Cows, the Tusli tree, flowers and fruits also have great religious value for Hajongs (Gain, 2016; K55). The Hajongs also have a distinct spoken language.

# 5

# Losses and damages

Ten local values (Figure 22) were defined with the participants. The meaning that each value holds for participants is described below using quotes and the terminology used by participants. It is impossible to convey the full meaning of each value in words, given the subjectivity and differences in perceptions from person to person. The losses and damages within each value are also outlined. Finally, the importance of, and impact on, each value is quantified from the survey evidence.

## 5.1 Values and impacts

### 5.1.1 Development, *unnoyon* (উন্নয়ন)

The value **development** relates to income-generating activities, such as rice cultivation, fish farming and raising livestock. Participants also connected keywords concerning infrastructure, property and job-related terms to this value, as well as intangible aspects of life, such as future and justice. A participant mentioned that their "economic situation is connected to everything: health, roads, development, sound pollution, and riverbank erosion. We cannot live a developed life because of economic problems" (K61). Another participant also noted these interconnections: "having a stable source of income means that the family can take care of their needs and live a healthy life" (K99). Threats to people's economic livelihoods can overrule other issues; a participant noted that "when COVID-19 hit the nation, we did not care about it affecting our health, as our lives were under threat for the horrifying riverbank erosion that swept away our houses and valuable assets" (F3).

**Losses and damages.** Multiple participants indicated that all five identified hazards decrease agricultural yields, affecting farmers' and day labourers' incomes. Floods destroy rice fields and reduce soil fertility, riverbank erosion causes a loss in agricultural land, and temperature change, rainfall variability and droughts hamper the growth of crops. "Agriculture solely depends on rain, but rainfall has changed a lot. I do not know how to practise agriculture in the future", indicated a farmer (F6). A loss of crop yield also creates economic stress for non-farmer households, as it increases the price of products such as rice and vegetables (K19; K57; K61). Moreover, high temperatures complicate working in agricultural fields, causing a loss of productivity and/or wage (K38; K39; K40; K50; K62; K64).

The climate-related hazards also impact people's ability to rear livestock, farm fish and grow vegetables, forcing them to buy products at the market or in shops instead of growing them at home. One participant had to buy milk at the market after her cow died during a flood (K44); another lost "25 kilograms of fish due to the flood; ten years of hard work went in vain" (K56). Fish is a vital source of protein, which she now has to compensate for with fish or other products bought at the market (K56). People take out loans to offset their losses and invest in agriculture or livestock. They depend on good yields to repay their debts (K56; K60; K92; F7). Climate-related hazards can affect their investments, increasing the debt burden (Story 3).

Figure 22: The ten local values identified with participants



| Development | Education | Health | Nature | Religion | Culture | Society | Family | Serenity | Mental health |
| উন্নয়ন | শিক্ষা | স্বাস্থ্য | প্রকৃতি | ধর্ম | সংস্কৃতি | সমাজ | পরিবার | প্রশান্তি | মানসিক স্বাস্থ্য |

Moreover, multiple participants explained how waterlogging or the destruction of roads could prevent them from working. Floods can also impact people's material property, such as houses and latrines (K10; K11; K42; F3).

## STORY 3: THE IMPLICATIONS OF LOSING LIVESTOCK



Sharifa

Sharifa and her family took a loan to invest in fish and livestock. However, the flood of 2022 washed everything away, leaving her with a significant debt burden.

See video: https://youtu.be/Oj-L2_ye9J0

## 5.1.2 Education, *shikkha* (শিক্ষা)

"I first moved my books and stationeries to a safe place when the flood happened. I love studying, and if the books were destroyed, it would be too expensive to buy them again" a student said when talking about the flood of 2022 (K37). In rural Bangladesh, **education** signifies more than learning and knowledge; it is a path to a better future. Parents can put significant effort into educating their children; they pay for their books and tuition fees even though they have little financial resources (K34; K37) and spend time tutoring them at home: "My son is in class ten. I teach him every morning. Afterwards, I bring him to school. When I get back home, I teach my son again" (K12). Students doing well gives the family satisfaction: "my grandkids performed well in school; it gives me pleasure to see them successful" (K62). This can also pressure students, who feel stressed about performing well, which is common in Bangladesh (Anjum et al., 2022).

**Losses and damages.** Several participants noted how waterlogging and damaged roads after flooding could make schools inaccessible (Parvin et al., 2019; 2022). "The Nurani Madrasa, where around 300 students take religious education, was damaged by the flood this summer. All forms of teaching were halted for two to three months. It resumed after repairing the building" said a participant from Gaokandia (K44). Another participant from Gaokandia Union stated that destroyed roads made school inaccessible for a month (K40); a participant from Durgapur Union said that education was halted for a week after the floods of 2022, causing stress to his children (K57). Extreme temperatures can also prevent students from going to school (K39), or affect their concentration on studies (K39; K46; K57). Another impact related to **education** is damaged books due to floods (K40; K47).

## 5.1.3 Health, *shastho* (স্বাস্থ্য)

Participants mostly related **health** to food and water. Food-related terms included fresh food, diets, healthy food, food security, the ability to cook, and eating regularly. Water was often discussed in relation to fresh and clean water. "I can bear every suffering but the water crisis", told a participant when highlighting the importance of drinking water in her life. 'Cleanliness' was also regularly mentioned in relation to health, sometimes along with terms such as sanitation, latrines and sanitary pads (F7; F9). Moreover, women highlighted the importance of their menstrual cycles and pregnancies in their lives (K80; K81; K82).

**Losses and damages.** Rainfall variability and drought can cause groundwater depletion, which causes water scarcity (K15; K38; K74; F2). Floods can also cause water scarcity when they inundate water sources, such as submersible pumps and ponds, with polluted water (K39; K42; K60). Reduced access to clean drinking water increases the prevalence of water-borne diseases and symptoms such as dehydration, diarrhoea or dysentery, vomiting and fever (K15; K38; K39; K42; K50; K60; F2; Government of Bangladesh, 2022). Sickness inhibits people from working, leading to a loss of income (K39).

Changes in rainfall, floods and droughts adversely impact crop and vegetable production, causing food insecurity (K11; K40; K50; K54; K56; K58; K69): "we do not get fresh vegetables nowadays; now, we have to buy them. They do not grow well anymore" (K57). The inundation of cooking stoves after floods also causes food insecurity (K54; K60; K69).

Participants connected various diseases and symptoms to temperature changes and floods. Temperature changes were associated with increased colds, flu, diarrhoea, fever, belly ache, cough, headache, blood pressure, tiredness and darkening of skin colour. Floods were associated with water-borne diseases, colds, flu, diarrhoea and dysentery, fever, vomiting, coughing, itching, dehydration, skin diseases, eye infections and physical stress.

Bathing or latrine usage is often impossible when washrooms are submerged during floods, undermining people's hygiene and cleanliness (K13; K40; K56; K58). Hygiene issues are especially problematic for women: "my body was completely wet alongside my clothes, and I was menstruating as well. This disgusted me. I could not eat for three days", said a woman from Gaokandia Union (K80). Another woman from the union indicated that she "had to urinate in the stagnant water as there was no option for a bathroom; the water was up to knee level, even at the mosque where we took shelter" (K82).

The destruction of roads due to floods (Story 4) hinders access to healthcare services (K40; K47), complicating pregnancies. Women cannot always reach clinics or

hospitals to deliver babies or for medical check-ups (K43, K47, K60): "The roads are so bad that while crossing roads to get to the clinic or hospital, both mother and child can lose their lives", said a participant from Gaokandia Union (K81). Increased sicknesses due to climate-related hazards can also affect pregnancies; a woman from Durgapur Union indicated she greatly suffered, as hygiene issues and body conditions complicated her pregnancy (K56).

## STORY 4: FLOODS IMPACT ON ROADS



Durgapur Upazilla

A CNG driver working in Durgapur Upazilla explains how floods destroy the roads he has to drive on daily, impacting his physical health and financial security.

See video: https://youtu.be/vK_AWLuqHF0

### 5.1.4 Nature, *prokriti* (প্রকৃতি)

Participants mainly mentioned **nature** in terms of its contribution to society, especially trees, which can be instrumental to people's lives: "trees are friends. When working in the field, we always look for a tree where we can rest", said a participant emphasising the great value of the shade provided by trees (F8). Another participant talked about the importance of trees for biodiversity: "you can make 10 taka by cutting down a tree, but you will lose 500 taka. We get money after cutting down these trees, but it affects the wildlife, environment and the soil" (K49). Nature also provides people with food, such as mangos, jackfruits, coconuts and betel nuts. Flowers are for various rituals, such as the Puja and weddings: "For my daughter's marriage ceremony, I did not buy a single flower from the market. Every single flower was from my home garden" (F9). The inherent beauty of nature (F7; F8; F9; F11; F12) and fresh air (F7; F8; F9; F10; F11) are common aspects of **nature** that people value.

**Losses and damages.** Riverbank erosion (K38; K61) and floods (K58; K82; K69) cause tree loss, and temperature increases (K42; K44), rainfall variability (K49; K55) and drought (K55; K57) decrease tree health or their ability to grow (Basak et al., 2015; Islam et al., 2014; Islam and Ma, 2018). Younger trees struggle to survive, and this is a significant issue as it affects how effective replanting is against deforestation (K49; K55). Fewer trees lead to fewer ecosystem services such

as fruits and flowers (K38; K42; K55), shade (K38; K42; K61) and natural beauty (K42; K49; K55). A lack of shade is an increasing problem as temperatures increase (K38; K61). Multiple participants also state that temperature increases, drought and rainfall variability also hinder the growth of fruits and flowers (Van Schie et al., 2022), causing a further decrease in natural beauty (K59; K67).

Another impact concerning **nature** is a decrease in bird populations (Hasan et al., 2020): "Earlier, we used to wake up in the morning hearing the birds chirping. The chirping of birds is no longer heard in the morning" (K100). Participants say local hunting practices (K38), a decrease in bird habitat and food options (K38; K55; K67; K100), and sounds from dredging machines in the riverbank (K100) might cause this. Finally, grasslands are also disappearing due to rainfall variability and drought (K59; K63).

### 5.1.5 Religion, *dhormo* (ধর্ম)

**Religion** is central to life in Durgapur Upazilla. A Muslim participant said that "we are Muslims, Namaz defines us" (K56), and Puja is a prominent aspect of life for Hindus (Story 5). Religious buildings also hold great value; Muslims have mosques, Hindus have temples and Christians have churches. Each religion also has specific objects or entities of great value, such as the prayer mat for Muslims and cows in Hinduism: "cows are like mothers to us. We get milk from the cow. I nurtured it, raised it and touched it. I was more affectionate to the cow than to my child" (K40). Participants often pointed to God when asked why the weather is changing. "I am struggling and living life how the almighty wants" (K14) said a Muslim participant when explaining why people face hardship after floods and extreme temperatures. Another participant indicated that "if we can treat our parents nicely, God will be satisfied" (F8), showing that religion can be central to a person's value system.

## STORY 5: FLOWERS AND FRUITS FOR PUJA



Minoti

Minoti describes how the Hindu community struggles to grow fruit and flowers for the Puja, and how it impacts their lives.

See video: https://youtu.be/8rEoxlG0GL0

**Losses and damages.** Riverbank erosion caused the loss of a mosque and madrasa in Gaokandia Union (K38; F1). Building a new mosque takes a long time, as it must be completed by following religious rules and documents (K38). In the same union, a Hindu crematorium was washed away during the flood of 2022 (K38; K42; Story 6) and a temple was waterlogged for several weeks (K40), rendering it inaccessible. Mandis in Gaokandia Union could not attend church during the floods (K39). Hindus in Durgapur faced a similar situation, as they could not reach their temple for a week after the flood in 2022 (K48; K52; K54). In 2020, riverbank erosion caused the loss of a sacred Banyan tree and a Hindu temple in Kullagora Union (K59; K61; K64; F6). After losing the latter, the Hindu community "grieved for more than a month" (K64), and they have been unable to conduct a Puja at a local temple since (K60).

Another cause affecting people's ability to practise religion is the unavailability of items with religious value. The availability of fruits and flowers, which Hindus in all unions use, is affected by floods, rainfall variability and temperature increases (K42; K43; K50; K52; K53; K62). For example, Tulsi trees struggle to grow or no longer bloom (K59; K54; K62; K64), complicating the Puja: "We have a Puja which requires seven kinds of flowers and a garland put over the God. Now, we struggle to get these flowers" (K80). Another significant loss to Hindus is the loss of cows during floods, sickness from temperature increase, and disappearing grasslands (K40; K55).

## STORY 6: THE CREMATORY PLACE


Putul

Putul walks through the place where the Hindu community cremated their loved ones, showing how it was affected by the flood of 2022, and explaining the impact of this on them.

**See video: https://youtu.be/u4jT_AGp4FQ**

## 5.1.6 Culture, *songskriti* (স্বংস্কৃতি)

The value of **culture** encapsulates a wide range of practices, objects and rituals deeply ingrained in people's livelihoods. These can differ by cultural group. For example, Hajongs discussed specific rituals: *Bastu Puja*, *Prat Kirtan* and *Leoa Tana o Jakhamara* (F9), and Mandis spoke about their clothes, language, alcohol, rice wine (*Chu*) and festivals (F11; F12). Other components of **culture** are central in every cultural group, such as agricultural practices and growing vegetables (F7; F8; F9; F10; F11). People also talked about food habits, especially *Pitha*, a traditional cake which is commonly made from rice flour (F9; F11; F12). Other things connected to **culture** include festivals, music, hospitality and tea stalls.

**Losses and damages.** Rainfall variability and temperature rise affect food-related practices and rituals in Durgapur Upazila. For example, a reduction in products such as fruits, rice and milk make it difficult to make traditional foods such as Pitha or Chu (K39; K44). Decreases in livestock and financial insecurity also make it harder to share food and engage in hospitality (K49; K61; Van Schie et al., 2022). Traditional events or festivals are similarly impacted by financial insecurity (K45; K74): "our biggest festival is Durga Puja, for which we would give 2,000 taka per family. This year we could not arrange it and, instead, held another Puja which only cost 200 taka" (K74). Mandis usually donate a part of their harvest to the church during Christmas but cannot do this if their agricultural yield is impacted significantly (K39). A Mandi participant described these impacts on culture: "Environmental disasters often bring stress and reduce our ability to enjoy cultural celebrations. Our cultural traditions are important to us, and we strive to continue celebrating them despite economic challenges. If we forget our culture, it will not be a good thing (K99)".

The practice of keeping certain types of livestock and cultivating certain crops are disappearing due to climate-related hazards (K11; K39; K44; K49; K67). A man from Durgapur Union shared how people cannot grow crops such as pepper, potatoes and sesame due to the cost of irrigation and lack of rainfall (K67). A decrease in cows has led to the disappearance of the job of 'cowboy' (K38; K55): "before, people had 20 to 25 around their houses. Now, everyone has one or two cows" (K55).

## STORY 7: STRUGGLING TO MAKE PITHA


Shahana

Shahana explains the significance of making Pitha and how changes in temperature hinder their ability to make this traditional food.

See video: **https://youtu.be/1c-Con3VYDw**

### 5.1.7 Society, *somaj* (সমাজ)

The research team initially proposed the term 'community' for this value. However, almost all participants in all group discussions argued for the term **society**, as this reflects a broader group of various ethnicities instead of separate cultural groups. "With the morning sun, we women are all the same. No matter whether I am Muslim, Garo or Hindu. If I need betel leaves, I run towards a Hindu house without any hesitation" (F9) said a Mandi woman. This sense of harmony was not always the case: "I used to feel shy to go to Garos' (Mandis) house, they were afraid to go to our house, and Hindus were also afraid to come to this house. There was a distance between everyone. Coming together gradually became a habit, and the earlier fears disappeared. Now, we live in peace" (K65). When talking about **society**, many participants emphasised the importance of equality, harmony, unity and helping others: "the main thing is living in harmony in a society. Even if I got rich, I would not be happy. If everyone from this society is the same as me, only then could we be happy together" (K44). For men, the tea stall is a central feature of Bangladesh rural society: "we are together in the evening at the tea stall, we talk to each other which makes our bond stronger" (F7).

**Losses and damages.** Diverse perspectives concerning changes in social bonds were observed. Multiple participants mentioned how households help each other during and after hazards such as floods, riverbank erosion and drought (K40; K54; K56; K57; K58; K60; K62; Chowdhury, 2011; Van Schie et al., 2022). For example, a Hajong family donated rice to Muslim families after the flood of 2022 (K57). Some emphasised the fact that there was no intercommunity conflict (K40; K57; K65). Conversely, some participants mentioned a decline in connection, patience and love within society (K44). Poverty can cause people to focus more on economic livelihoods than social cohesion (K38; K49) and create conflicts (K39; K83; Sultana and Thompson, 2017). Moreover, people migrate to Dhaka, India or higher land for safety (K55; K59) or to find better economic opportunities (K42; K44); multiple participants noted how their family members moved to

Dhaka for economic reasons after a flood or drought impacted their rice yield (K42; K44).

A significant part of the Hindu community in Kullagora Union migrated to Durgapur due to riverbank erosion and the loss of their temple (K61; K64). Consequentially, Hindus became a minority within their village, which led to marginalisation (K61; K64): "We have coconut trees at our old house. Often, we cannot get the coconuts [as other people take them]. They also suppress us by gradually taking our land, but we are less in number, so we cannot fight back" (K61). Climate-related hazards also exacerbate inequalities, as poor, vulnerable households are disproportionally affected (F4; K26; K28; K49; K61; K73; Islam and Winkel, 2017), which can lead to a disconnect between poor and rich households (K61). When talking about how poor people are increasingly affected, a participant from Gaokandia Union said that "the poor and middle-class people cannot improve their status, but the rich people are improving" and that "the rich always help the rich, not the poor" (K73). A farmer noted how, during droughts, farmers without submersible pumps have to buy water from more affluent households, increasing financial disparities (K57)

## STORY 8: THE MEANING OF SOCIETY


Abdul

Abdul explains the meaning of **society**, and how the different cultural groups came closer over the years.

See video: **https://youtu.be/ToxynzoYqEI**

### 5.1.8 Family, *poribar* (পরিবার)

**Family** means grandchildren, children, spouses, parents, grandparents and other relatives. There are distinct gender roles within the household. Women focus on household work and cooking and commonly spend more time with children: "every day women spend time thinking about family, household work, children, their education, and their future" (F7). Women also rear livestock, cultivate vegetables and assist men in agricultural work. Men mainly focus on the families' economic situation and have the role of being a provider: "If I have money, I can care for everyone, including my parents and children. If I do not have money, I do not have value in the family" (F8). The elders within Bangladeshi family structures receive respect and expect to receive respect (K10; K22; K24). Participants also connect the value **family** to their homes. Other terms closely connected to **family** are caring, harmony and unity.

**Losses and damages.** Losses and damages can cause family members to relocate to safer places or areas with more economic opportunities (K42; K55), as job availability in Durgapur Upazilla is low. For example, a woman from Durgapur Union had to send her daughters to work in a garment factory in Dhaka after their economic situation was impacted due to the 2022 floods (K85); a man from Kullagora Union saw his relatives move to India due to economic constraints (K42); and the relatives of a man from Durgapur Union moved to the hills to decrease exposure to hazards (K55). Similarly, a participant mentioned: "my mother-in-law works in Dhaka. I feel terrible thinking she works in other people's houses, even at this age. I visit her twice a year but feel guilty for not being able to keep her with our family" (K79).

Various households have lost their homes and gardens due to flood or riverbank erosion (K14; K38; K47; K59; K61; K64). A participant in Gaokandia Union who lost his house during the floods of 2022 now stays with family members and mentioned that "after a long day, coming back to this house does not feel like coming home" (K38). Losing a house can also result in losing family belongings, such as furniture, important documents and memorable gifts (K47; Story 9): "I always think about the house and the memories we made there. When I close my eyes, I can picture where my sofas and other furniture were" (K47).

Climate-related hazards can also cause additional stress to (grand)parents, as they are worried about the future of their (grand)children. Participants indicated how disaster-related stress increased after becoming a parent (K56; K61; K99): "I first tried to save my toddler. I was in extreme fear that my kid might step into the water" (K56). Other climate-related concerns are how the weather will change in the future (K51; K61; K68), the impact on (grand)children's education (K51; K57; K68), and their safety during floods (K40; K54). A participant mentioned that "the tension and burden of disaster made it difficult for me to spend as much time with my family as I would like" (K99).

## STORY 9: LOSING A HOUSE IN 15 MINUTES

Rohit explains how losing his house in the flood of May 2022 affected him and his family.

**See video: https://youtu.be/dGAxvBMtidQ**

Rohit

### 5.1.9 Serenity, *proshanti* (প্রশান্তি)

Participants connected **serenity** with peace, silence and resting (F7; F8; F9; F10): "when everyone goes to sleep, I can enjoy the silence of the night, away from the household chores" (K11). They also recalled the various sources that gave them **serenity**, such as watching television, reading a book, riding a bike, interacting with music or playing sports (F7; F8; F9; F10; F11; F12); "playing sports keeps the mind fresh and body healthy" (K100). Moreover, a peaceful state can also be reached through various religious practices (F9; F10; F12): "I enjoy singing Kirtan together in the evening; this gives me inner peace" (K21); "I find peace while doing Puja three times a day" (K54).

**Losses and damages.** Increasing temperatures and rainfall variability disturb people's inner peace (K34; K39; K59; K61; K74): "now, [the] temperature is unbearable. When it is too warm, I cannot stay at home or outside" (K61). A 48-year-old participant connected peacefulness to the floods: "after I turned 40, this place is breaking a lot. Now, we cannot live in peace anymore" (K76). Another participant stated that he cannot play outside anymore with his kids given the increasingly high temperatures (K59); this also complicates playing cricket and football for the younger generation (K39). Floods can also make services such as libraries unavailable (K39).

Many participants indicated that extreme heat can invoke sleeplessness. A woman noted that "men go to the riverside for the breeze, we women stay at home" and "in my house, there is no breeze. I walk around in the yard, using a hand fan to keep myself cool. Sometimes, I cannot sleep and have to spend all night long sitting in the yard" (K44). Flooding also particularly impacts **serenity** as people cannot always practise religious and cultural rituals during these times (K52; K54).

### 5.1.10 Mental health, *manosik shastho* (মানসিক স্বাস্থ্য)

**Mental health** is not a commonly used or widely recognised term in Bangladesh. However, it came up multiple times during interviews, and when groups were asked where the terms fit, all groups decided it should be a separate local value. A participant noted that "our economic situation is important, but peace of mind is more important. If I have lots of money but do not have peace of mind, it will not make any sense" (K38). Another participant noted how "Mental health is very important as my brain controls my whole body" (K22). However, most conversations were centred around the causes of mental health issues, such as family-related problems, education and employment, or the economic situation.

**Losses and damages.** Responses concerning **mental health** can be divided into causes and symptoms. The causes are connected to every other value, as the loss of something valuable inevitably impacts mental health. All impacts participants explicitly connected with **mental health** are listed in Table 4. The causes of mental health impacts most mentioned by participants were: the safety of children, worry about the future of children, inability to afford education, a lack of income and, most prominently, stress related to potential future hazards and weather changes.

Participants also listed various symptoms related to impacts on wellbeing (Table 5). The most mentioned symptoms were stress, sleeplessness, anxiety and fear.

Participants emphasised some symptoms concerned with flooding: "we struggled a lot with food, medicine, accommodation, toilets and drinking water. Tears rolled down for 24 hours of days and nights" (K40). Another participant stated she was "in shock for 15 days and could not talk properly". Months later, she still cannot sleep well and is forgetful (K47). Another participant stated that they were "in great fear and could not sleep at night due to fear of snakes and insects biting" (K58). Multiple participants noted how, during flood season, people wake up at night to check the river to see the water level. A participant from Kullagora Union noted how the roads and lack of healthcare facilities cause problems: "for ten years, I have stressed about health [services] and state of the roads in this area. My stress has increased since I became a father". He later added: "We are suffering due to the weather; I wonder how my child will survive and about his future, whether he will have enough opportunities or not" (K61).

Table 4: Causes that impact **mental health** mentioned by participants

| | | |
|---|---|---|
| Loss of income | Gynaecological problems | No flowers available for rituals |
| Inability to provide for family | Sickness and disease | Inability to pray |
| Loss of crop yield | Water scarcity | Washing away of the cremated place |
| Loss of livestock | Food insecurity | Safety of children |
| Cannot afford education | No access to medicine | Future of children |
| Inaccessibility of school | No access to sanitation | Future hazards |
| Education of children | Inaccessibility of hospitals | Future changes in weather |
| Complications regarding pregnancy | | |

Table 5: Symptoms of **mental health** impacts mentioned by participants

| | | |
|---|---|---|
| Stress | Tension | Forgetfulness |
| Overthinking | Being scared | Loss of memory |
| Anxiety | Being upset | Loss of appetite |
| Worry | Depression | Trauma |
| Loneliness | Sleeplessness | Cannot talk |
| Sadness | Insomnia | High blood pressure |
| Fear | Stress-induced stroke | |

# 5.2 Rating

Participants value **family** and **religion** most (Figure 23). Conversely, these are perceived to be impacted the least by climate-related disasters. Participants deemed **nature** to be significantly impacted along with **development**. **Mental health** was valued least, which might be explained by the lack of awareness of mental disorders in Bangladesh (Nuri et al., 2018; Uddin et al., 2019). The subsections below focus on how people's valuations differ based on their beliefs and, where possible, give potential explanations for these differences.

## 5.2.1 Gender

Women perceive most values as more important and impacted than men do, especially **mental health**, **serenity** and **nature** (Figure 24). A study showed that awareness of mental health conditions is similar across genders in Bangladesh (Uddin et al.,2019). However, various reports indicate that, in Bangladesh, mental health disorders are more prevalent among women (Alam et al., 2021; Hossain et al., 2014; Mamun et al., 2019), which could explain the differences in perceived importance and impact. Moreover, women in disaster-prone areas are more vulnerable to sustaining injuries and are less likely to reach safety, which could play a role in their mental health problems (Mamun et al., 2019). There is little difference in the importance of, and impact on, **health**. However, stories from women did show how their health is more affected given complications related to pregnancy, menstrual

health and hygiene management. The differences with regards to valuing **serenity** could be explained by similar reasons to mental health, as the meaning of the two values is connected. Various studies show how the perception and derived benefits of ecosystems are highly gendered (Fortnam et al., 2019; Yang et al., 2018). This could be part of the reason for the dissimilarities concerning the values men and women have for **nature**. Moreover, participants often connected **nature** to livestock, which fall into the women's domain of responsibility. There is also a significant difference in impact on **religion** between genders. However, no plausible explanation was found for this.

## 5.2.2 Cultural groups

Cultural differentiation of the data is complicated as the Adivasi households in the research areas seemed in a better socio-economic position than Bangali households (Section 4.4), which might have an influence on their values. For example, it could be that Adivasi households value **education** more as they can better afford it for their children. All cultural groups attach great value to **family** and **religion** (Figure 25). Adivasi participants value culture more than Bangalis do, which could be explained by their strong connection to their cultural beliefs, heritage and practices (Gain, 2011; 2016). Other significant differences in data are found in **mental health** and **serenity**, which Hindus and Mandis value most. However, no plausible explanation was found. Moreover, the sample sizes of the groups, now split in four, are relatively small, limiting the value of the data.



Figure 23: The perceived importance of and impact on the local values (data in Appendix G2)



Figure 24: The perceived importance of and impact on the local values differentiated by gender (data in Appendix G2)
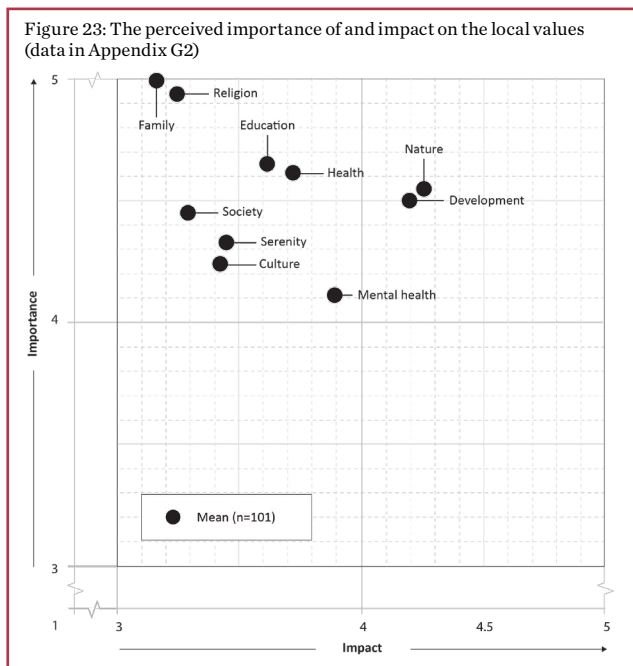
Figure 25: The perceived importance of and impact on the local values differentiated by cultural group (data in Appendix G2)
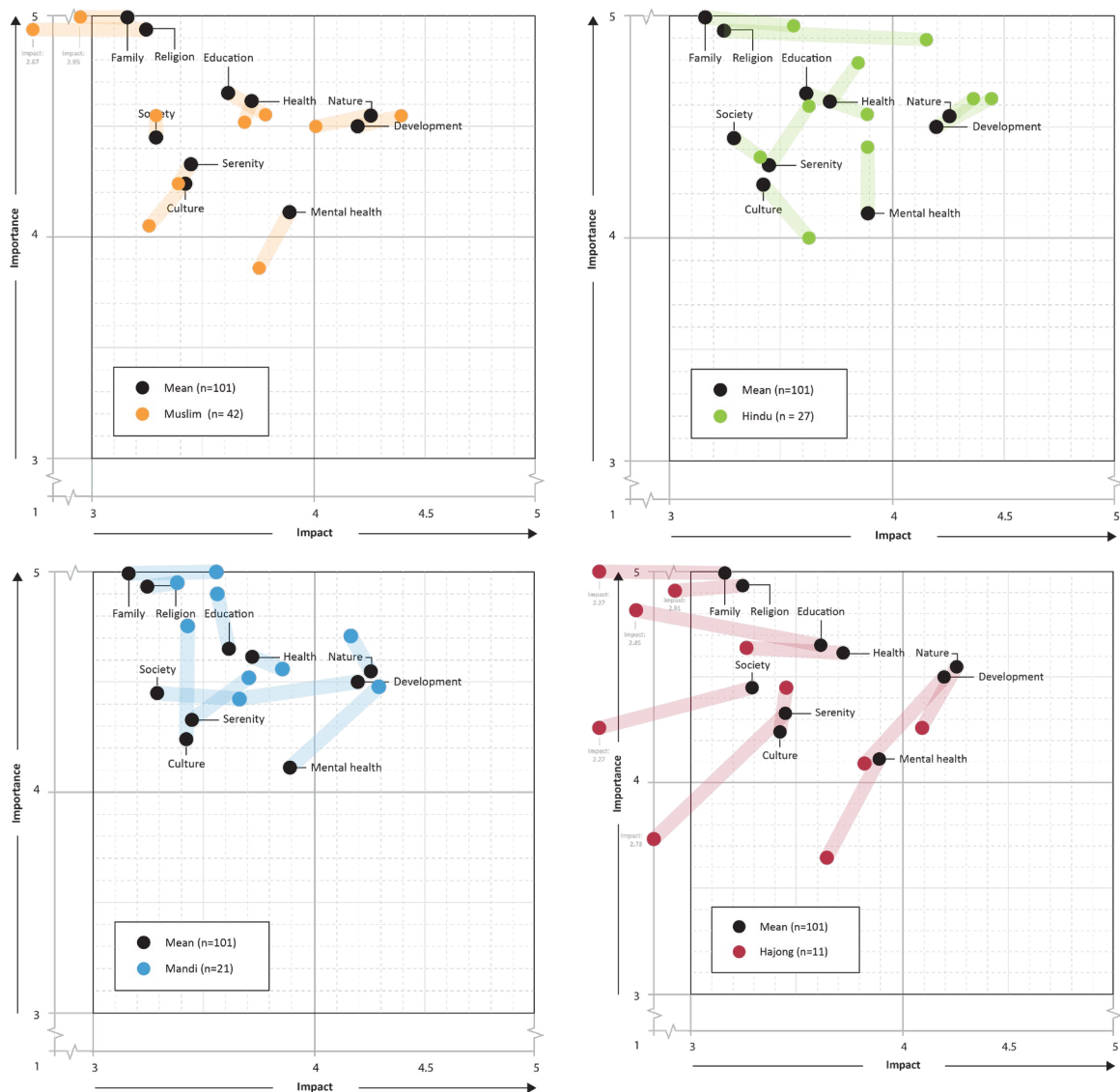


## 5.2.3 Age groups

The most significant difference among age groups concerns **education** (Figure 26). Participants under 40 attach more value to **education** and perceive it to be impacted more by climate-related hazards. This group includes students and younger parents who often have children in the education system. Participants over 40 attach more value to **health** and perceive it to be impacted more, which can be explained by increasing health issues at a later age.

Figure 26: The perceived importance of and impact on the local values differentiated by age group (data in Appendix G2)
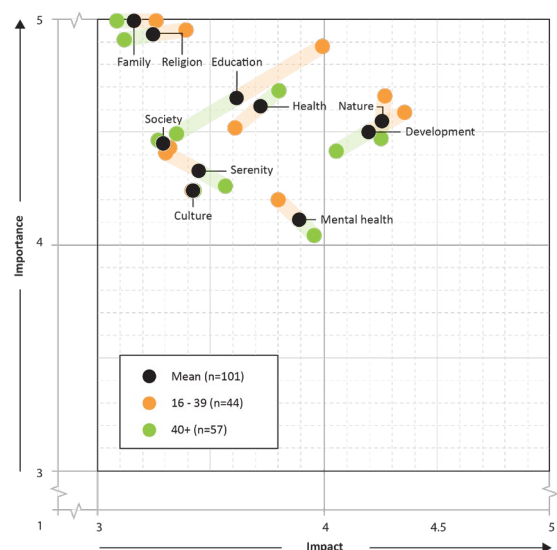
## 5.2.4 Locations

The results significantly differ by union, especially regarding impacts on values (Figure 27). Participants in Durgapur Union rated the impact and importance of almost every value below average. The relatively low impact could be explained by the fact that Durgapur Union is less prone to floods and riverbank erosion. However, no plausible explanation for the relatively low scores concerning importance was found.
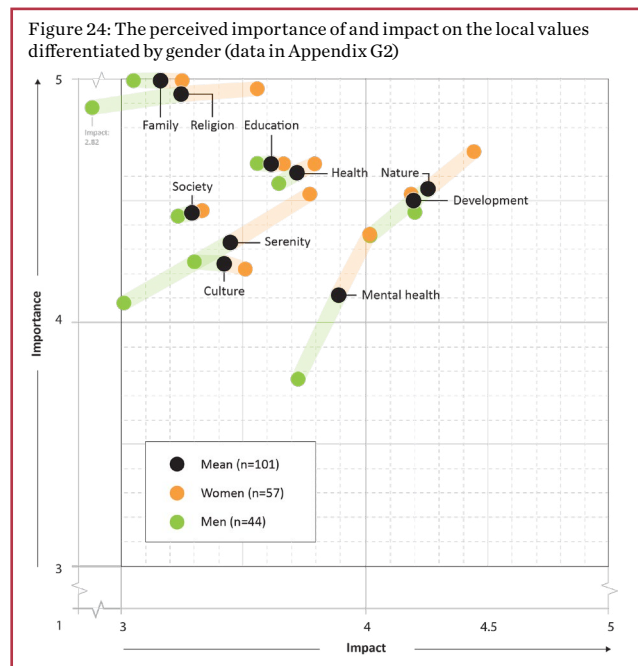


Figure 27: The perceived importance of and impact on the local values differentiated by research area (data in Appendix G2)
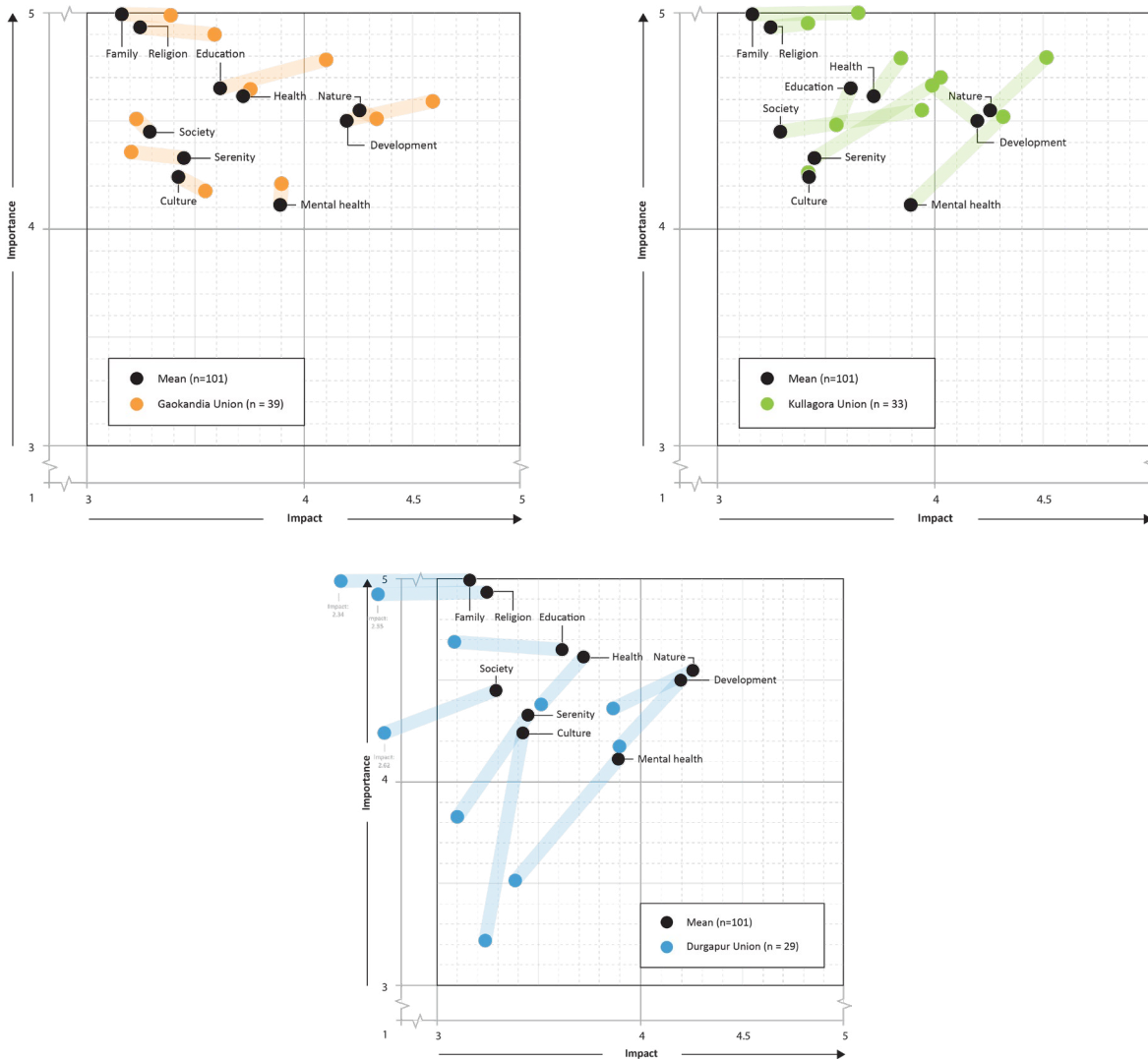
# 6

# Addressing

Societies in Durgapur Upazilla have long been affected by climate-related hazards, meaning they have already formulated responses to past and current losses and damages. Here we examine these responses, and explore what kinds of measures the people in Durgapur Upazilla prioritise to respond to impacts. Researchers also asked participants about the perceived usefulness of the measures, resulting in an overview of their preferred responses.

## 6.1 Existing responses

Affected societies in Durgapur Upazilla formulated responses to almost all identified losses and damages (Table 6). These responses occur at the individual level or happen because of support from society and institutions.

### 6.1.1 Individual

A typical response to losses and damages already initiated by participants is restoring what is affected by repairing it or buying replacements (Van Schie et al., 2022). For example, parents purchase school books for their children from the library (K71); buy fruits and vegetables at the market when they can no longer grow them (K89; K90; K91; K92); buy medicine as sickness increases (K70, K79, K90, K91, K93); and water during droughts (K83). A farmer indicated that now he has to buy more fertiliser: "Where we used one kilogram before, we now use three to four kilograms of fertiliser. It has increased as the flood water washes away the soil layer with the current, decreasing soil fertility" (K76). Moreover, participants worked more to compensate for the lost money, as agricultural yields decreased (K75). This can result in people travelling to Dhaka due to the lack of job opportunities in Durgapur Upazilla (K78; K79; K94; K98; Kartiki, 2011). Other options to increase financial security are selling fruits and vegetables at the market (K94), borrowing money from community members or banks (K77; K78; K83; Hayward and Ayeb-Karlsson, 2021), and marrying a daughter off at an earlier age, which increases the financial benefit families receive during the marriage (K94). People also accept impacts when there is insufficient financial capital (Van Schie et al., 2022). For example, by using less water during droughts (K80), eating less traditional food if products get too expensive (K70), or performing religious rituals with fewer items (K74; K80).

Table 6: Existing responses to losses and damages from climate change per value

| VALUE | LOSSES AND DAMAGES | EXISTING RESPONSES |
|---|---|---|
| Development | Decrease in economic stability | Move to Dhaka, work more, borrow money, sell fruits at the market, marry off daughters earlier. |
| | Impact on livelihood activities | Buy products in the market, fortify the embankment, use tubewell from others, put nets around the pond, buy medicine for fish, buy more chemical fertilisers |
| | Impact on roads and communication system | Fortify the embankment, repair the road |
| | Impact on material property | Repair the house, fortify the embankment, move in with family, relocate temporarily |

| | | |
|---|---|---|
| **Education** | Decrease in school accessibility | Receive information from fellow students, fortify the embankment |
| | Loss of school books | Receive books from the school, buy new books, dry out damaged books |
| | Decrease in concentration | Motivate children, do not study |
| **Health** | Water scarcity | Bring water from another place, use tubewell, use someone else's tubewell, bathe in the river, limit water usage, use water reserves |
| | Food insecurity | Receive dry food, consume dry food, receive meals from others, buy food at the bazaar, cook at a neighbours' house, temporarily live without food, eat at the bazaar |
| | Increase in sickness | Buy medicine, visit a doctor, visit the hospital, plant trees, use cosmetics, stay fit, keep wounds clean |
| | Loss of hygiene | Use the neighbours' latrine, bathe in the river, repair the latrine, stay at another house |
| | Impact on pregnancy | Keep pregnant women safe, borrow a boat to go to the hospital |
| **Nature** | Decrease in biodiversity and ecosystems | Plant trees, plant flowers, plant vegetables, use chemical fertiliser, water plants and trees, buy products at the bazaar, protect trees with fences, fortify the embankment |
| | Decrease in natural beauty | Plant trees, plant flowers |
| **Religion** | Loss of religious buildings | Repair buildings, perform ritual in another location, pray at home |
| | Decrease in items related to religion | Perform ritual with fewer items |
| **Culture** | Decrease in food-related practices | Practise ritual less, buy products at the market, water plants more, receive items from others, use fewer items for ritual |
| | Decrease in traditional practices | Borrow money, hold smaller festivals |
| **Society** | Decrease in social bonds | Borrow money |
| | Increase in marginalisation and inequality | N/A |
| **Family** | (Temporary) migration of family members | Talk over the phone, visit family |
| | Loss of family-related objects | N/A |
| | Increase in stress regarding (grand)children | Work more, fortify the embankment, pray |
| **Serenity** | Loss of entertainment | Spend time with grandchildren, play in another area |
| | Decrease in peacefulness | Be patient, pray, visit relatives, be hopeful |
| **Mental health** | Anxiety, fear, stress, depression and sadness | Talk with neighbours, talk with friends, talk with family, pray, take time alone, fortify embankments |
| | Sleeplessness and insomnia | Visit a doctor, take medicine |
| | Stress of future hazards | Talk with neighbours, talk with friend, talk with family, pray |

## 6.1.2 Societal

Affected households also rely on their social support networks after experiencing climate-related hazards (Jordan, 2015). After the flood of 2022, people moved in with relatives after their houses were lost (K71; K82), received meals from relatives or friends when they were unable to cook themselves (K82, K90, K91, K95), cooked at neighbours' houses (K92), borrowed money from them (K83), and used their washrooms (K91, K92). A participant stated, "we help and cooperate with our neighbours. Not everyone's crops are damaged to the same degree, so we work together to manage the

situation. Those losing fewer crops help the ones who face major losses" (K99). Many participants said by talking to and getting support from neighbours, relatives and friends, they could more easily cope with mental health impacts such as stress, depression and anxiety. Moreover, a garment factory owner from Dhaka donated money to former employees living in Gaokandia Union after the flood of 2022 so that they could build new houses (K4).

## STORY 10: THE KAMARKHALI RIVERBANK RESISTANCE COMMITTEE



Shebika tells the story of how the people in Kamarkhali united and successfully advocated for an embankment, protecting them from future riverbank erosion.

**See video: https://youtu.be/1SIpCTxBQRE**

Shebika

### 6.1.3 Institutional

Small-scale efforts from NGOs were noted in Gaokandia and Durgapur Unions after the flood of 2022 (K14; K70; K82). However, participants stated that this support did not always reach those most in need (K14; K67). Schools also handed out free books after the floods of 2022 (K71; K81), and participants relied on doctors and hospitals when facing health issues (K75; K88; K95; K98). The government was coordinating the reconstruction of parts of the embankment in Gaokandia when the research team visited and, in Kullagora Union, people from all cultural groups came together and successfully advocated for the construction of an embankment to prevent riverbank erosion (K25; K26; F3).

## 6.2 Prioritised responses

Participants mentioned various interventions they would like to see implemented by NGOs and governmental organisations to address the identified losses and damages. Table 7 shows 22 of these desired responses mentioned at least twice by participants and whether these avert, minimise or address loss and damage. It should be emphasised that this table is only based on participants' responses. The input of participants show that a significant share of the measures minimise **and** address losses and damages.

Table 7: Whether the identified responses avert, minimise or address losses and damages according to participants

| RESPONSE | TYPE | | |
|---|---|---|---|
| | AVERT | MINIMISE | ADDRESS |
| Early warning system | | x | x |
| Stable electricity supply | | x | x |
| Job opportunity | | x | x |
| Shelter | | x | x |
| Job training | | x | x |
| Concrete embankment | | x | x |
| Trees | | x | x |
| Roads | | x | x |
| Clinic/hospital | | x | x |
| Submersible pump | | x | x |
| Livestock | | | x |
| Awareness | x | x | |
| Latrine | | x | |
| Sanitary pads | | | x |
| Land | | | x |
| Seeds/seedlings | | | x |
| Cash transfer | | | x |
| Mental health support | | | x |
| Restricting sand mining | x | x | x |
| House | | | x |
| Fertiliser | | | x |
| Rebuild religious building | | | x |

**1. Early warning system.** Durgapur Upazilla has no early warning systems for floods. These would ensure the population's safety, especially children and pregnant women (K78). It would also reduce people's fear of future floods (K79).

**2. Stable electricity supply.** A stable electricity supply allows for better irrigation, increasing and restoring financial capacities and food security (K74; K89). It also ensures that people can use electric fans during heatwaves, increasing their serenity and ability to study (K72).

**3. Job opportunities.** Increased opportunities for employment in Durgapur Upazilla enable more people to build long-term financial capacities (K86; K88). More local jobs would allow people to stay in their village instead of moving away from their families for work (K78; K79; K81; K86). Participants state that a stable income also decreases stress (K79; K86), increases social bonds (K79) and restores people's ability to organise religious festivals (K79).

**4. Shelter.** Shelters increase safety during floods (K81; K89; K92), reduce the stress of future floods (K81), and can ensure washroom availability during floods (K92).

**5. Job training.** Learning new skills relevant to jobs (K79; K93) or receiving training on sustainable agriculture (K88) would increase financial capacities (K79; K88; K93).

**6. Concrete embankments.** Participants connected the construction of concrete embankments with minimising losses and damages within every value. This also addresses stress and sleeplessness concerning future risk (K70; K73; K77; K78; K79; K80). A participant from Gaokandia Union mentioned: "90 per cent of my stress would disappear if there were a proper embankment" (K70).

**7. Trees.** Planting trees means more shade, resulting in decreased temperatures (K72; K74), reducing sicknesses related to heat (K72), and increasing the comfort levels of people (K74). It can also restore the bird population (K75; K84; K88), increase fruit yields and food security (K74; K88; K96), provide flowers and fruits for rituals (K74), and restore natural beauty (K72).

**8. Roads.** Repairing, fortifying, or elevating roads would increase people's ability to reach valued locations, such as schools, hospitals and churches, during and after floods (K72; K75; K88). The accessibility of hospitals is essential to pregnant women (K80; K81). Roads would also increase connectivity with other villages, increasing development in the area (K73).

**9. Clinic/hospital.** Increased availability of clinics, hospitals and doctors is essential for people's health, especially during floods (K89; K95). It also helps to ensure safe pregnancies (K81; K87), reducing anxiety related to health (K73; K89; K92) and sleeplessness (K81).

**10. Submersible pumps.** Access to a motorised tubewell ensures water availability during droughts, allowing people to irrigate crops (K83), cultivate fish (K83), and access fresh water (K74; K80; K83). The latter enables people to wash prior to praying (K70) and decreases disease (K87). It also reduces the time it takes to get water from distant places, leaving people more time to spend with their families (K83).

**11. Livestock.** Receiving livestock enhances people's financial security (K85; K101).

**12. Awareness.** Raising awareness of climate change could incentivise people to plant trees, restoring natural beauty and ecosystem services (K72; K96). A participant said that "people should be more conscious and aware about nature; this would help to pollute less" (K72). Raising awareness of disasters increases people's ability to prepare and respond (K96) and reduces their mental stress during disasters (K80).

**13. Latrines.** Elevating latrines would increase their availability during floods (K70; K71), and replacing latrines built of tin with brick structures increases their resilience to floods (K82). Both help to improve women's hygiene and comfort levels (K82).

**14. Sanitary pads.** The distribution of sanitary pads helps women with gynaecological hygiene after floods (K80; K95).

**15. Land.** Access to land away from flood-prone areas enables households to grow fresh fruits and vegetables, increasing food security and income (K80; K81).

**16. Seeds/seedlings.** Receiving seeds helps households cultivate vegetables and agriculture (K88; K99).

**17. Cash transfer.** Receiving money gives people more financial stability, increasing their resilience. It can be used to rebuild homes (K71; K93), buy submersible pumps (K83), conduct religious rituals (K74), pay for education (K85), or invest in livestock (K93). Financial security also reduces stress (K75) and prevents people from lending money for high interest rates (K83).

**18. Mental health support.** Access to a social worker or doctor for mental health-related issues reduces anxiety and/or stress (K70; K72).

**19. Restricting sand mining.** Stopping (illegal) sand mining reduces noise pollution, improving humans' and animals' lives and serenity levels (K99; K100). It could also prevent riverbank erosion (K99).

**20. House.** Receiving a house, or the reparations of a house, compensates the costs people pay (K93) and reduces anxiety related to homelessness (K82). It also enables people to raise their children in a more stable and secure environment (K87).

**21. Fertiliser.** The distribution of fertilisers reduces farmers' agricultural costs, especially as farmers are having to use more due to reduced soil fertility (K76): "If anyone gives me fertiliser, it will reduce my fertiliser expenses" (K76). It can also help with (re)growing plants and trees (K75).

**22. Rebuild religious buildings.** Restoring religious buildings or sites, such as crematory places and temples, allows people to continue practising religion (K74; K79; K94).

# 6.3 Rating

The measures above can be broadly categorised in three groups: traditional adaptations (eg, embankments and shelters), compensation-based measures (eg, giving a submersible pump, livestock, cash or land), and increasing social protection (eg, healthcare, and job opportunities and training). Participants especially rate the usefulness of traditional adaptations and social security measures (Figure 28). Compensation-based interventions, such as receiving latrines, sanitary pads, cash transfers or houses, are rated relatively low. When receiving compensation, goods or material items such as latrines and livestock were preferred over cash. During the surveys, participants noted that receiving compensation would not help without protection, as their material property would only get damaged again. Additionally, participants indicated that they prefer job opportunities that result in longer-term financial security (K75; K80; K88). "Receiving money does not help for long; I should work if I want to improve my status", said a participant (K75).

## 6.3.1 Locations

Shelters and embankments are rated highly due to the need for increased protection and safety in unions highly exposed to floods (Figure 29). Likewise, here

latrines, roads and houses need to be repaired or built more robustly to withstand the water. Participants in Kullagora Union also perceive the construction of embankments to be useful, most likely due to their exposure to riverbank erosion. Participants here rated the usefulness of a submersible pump relatively low, most likely as the socio-economic status of most of the participants assessed in the union is relatively high. Restricting sand mining is deemed most useful in Kullagora Union as they are most affected by the sand mines. Participants in Durgapur Union attach relatively little value to embankments, presumably as they do not have a prominent river close to the village, and little value to rebuilding religious buildings, as these did not get damaged during the floods.

## 6.3.2 Cultural groups

The differences in perceived usefulness across cultural groups (Figure 30) are similar to those across the different unions. Hindus and Mandis most likely prefer embankments due to their exposure to floods and riverbank erosion in Gaokandia and Kullagora Union; the Muslims and Hajongs in Durgapur Union are less exposed to these hazards. The case is the same for other measures, for example sand mining, to which Mandi and Hindu people are exposed in Kullagora Union. Moreover, Mandi and Hajong participants rate



Figure 28: The perceived usefulness of the desired responses (data in Appendix I2)
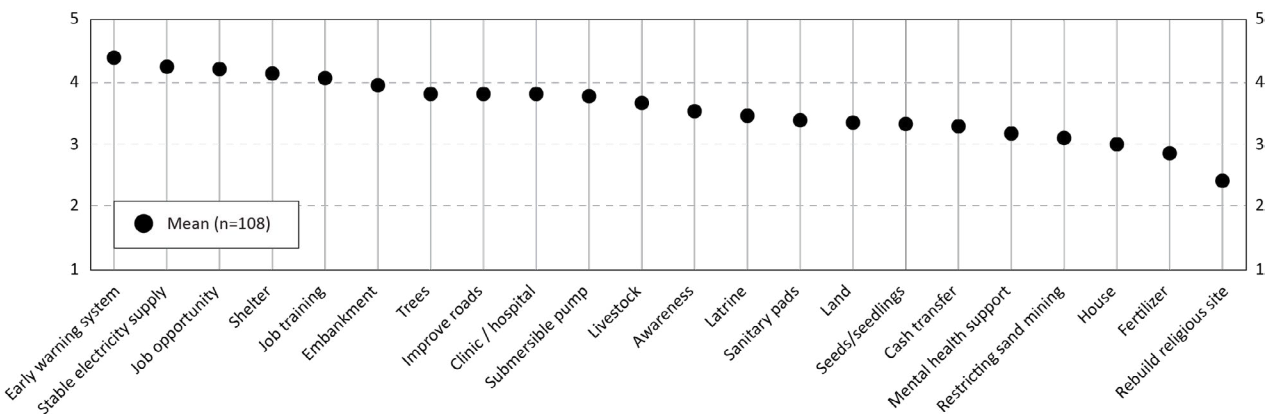


Figure 29: The perceived usefulness of the desired responses differentiated by location (data in Appendix I2)
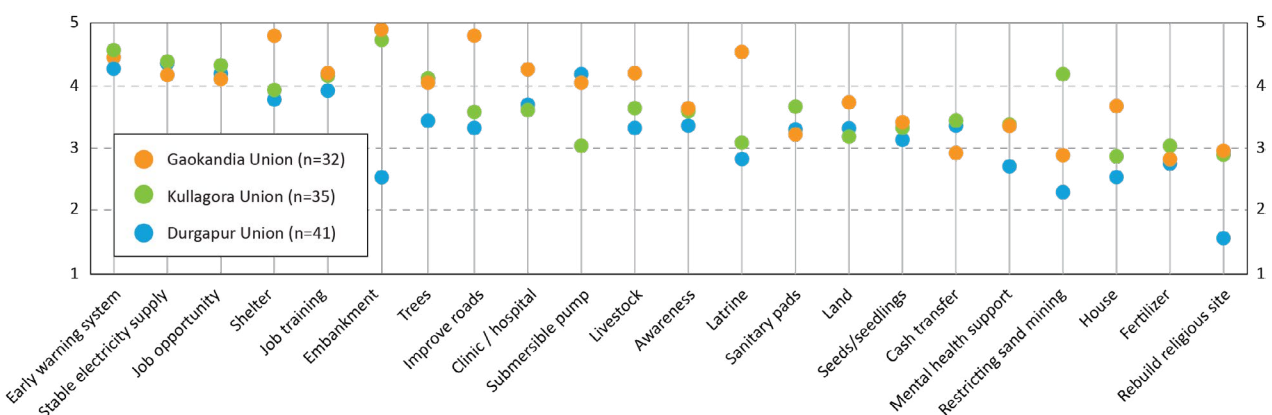
the usefulness of some kinds of material compensation, such as latrines, land and houses, lower. This could be due to their high economic security.

## 6.3.3 Gender

Men, in general, rated the usefulness of most responses higher than women (Figure 31). The only significant difference across gender concerns sanitary pads, which are only used by women.

## 6.3.4 Age groups

Younger generations rated the usefulness of most responses higher than older participants (Figure 32), especially sanitary pads. This may be because they are not used by older women.



Figure 30: The perceived usefulness of the desired responses differentiated by cultural group (data in Appendix I2)
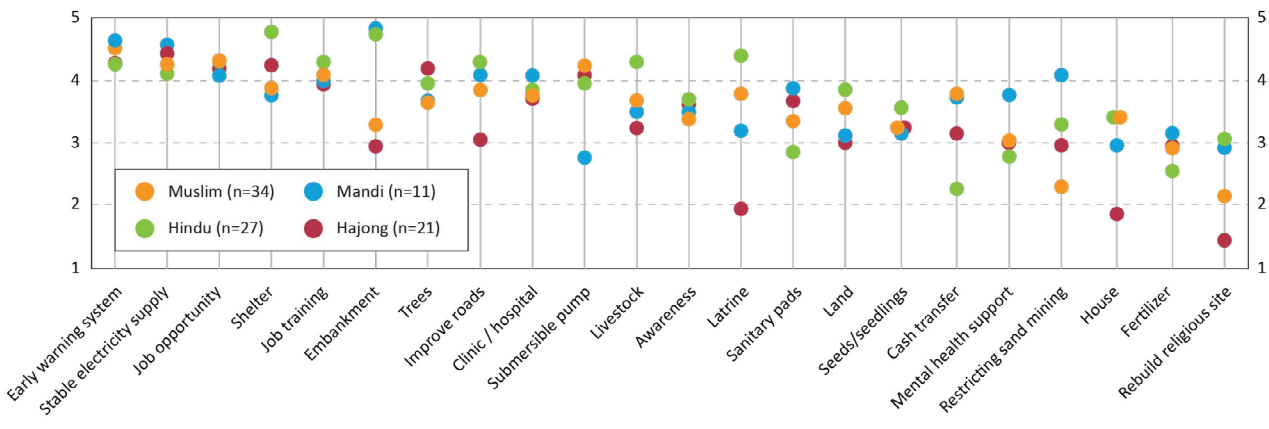


Figure 31: The perceived usefulness of the desired responses differentiated by gender (data in Appendix I2)
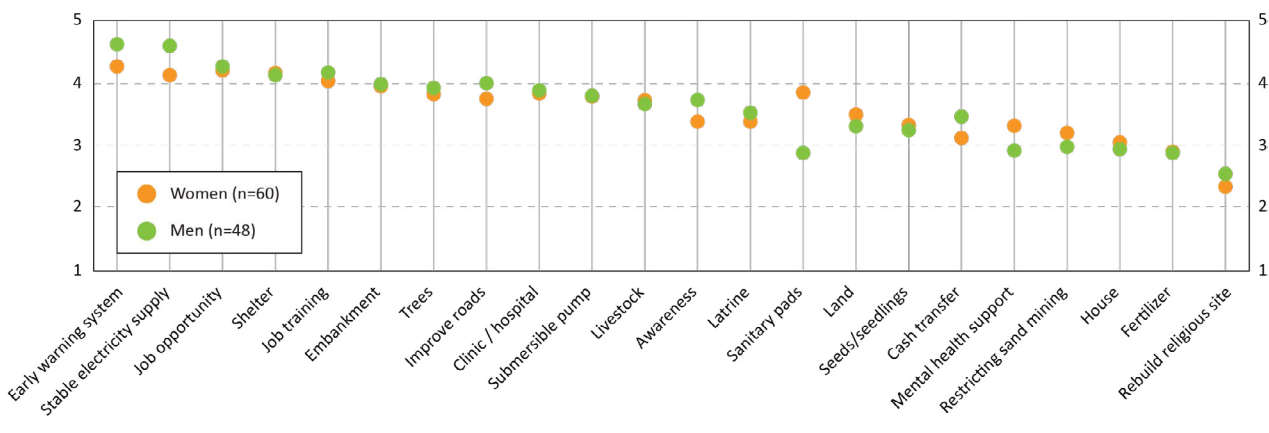


Figure 32: The perceived usefulness of the desired responses differentiated by age (data in Appendix I2)
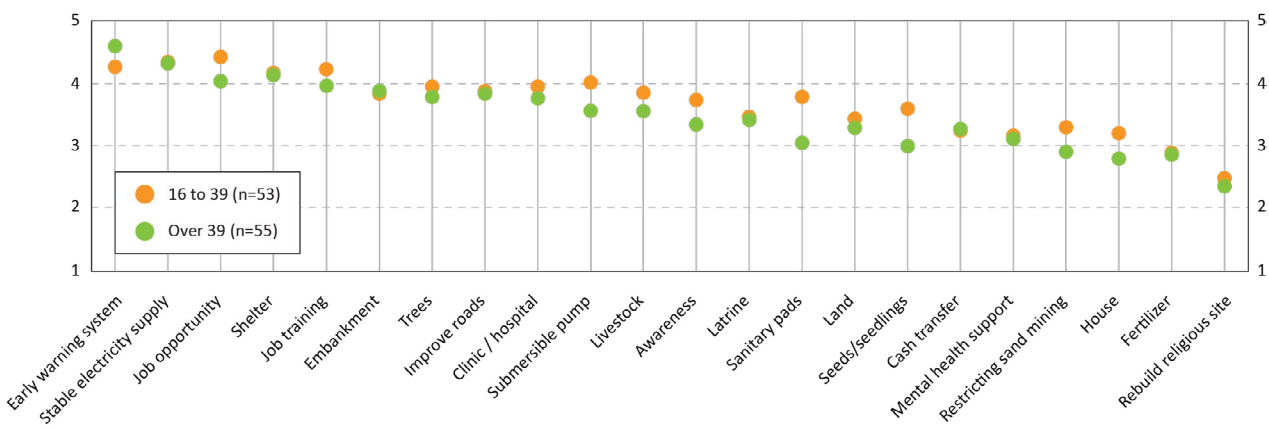
# 7

# Discussion

This section analyses the results from the previous three sections in relation to the literature review, in particular the four identified limitations. This is followed by a set of seven recommendations and suggestions for future policy and further research, based on the findings and limitations analysed during the research process.

## 7.1 Analysis

### 7.1.1 Values

**Defining local values.** The process of defining the values with participants resulted in assessments sensitive to local people's perceptions. For example, following participants' input, the value **society** was used instead of **community**, as participants indicated that **society** reflects the broader population instead of a smaller religious group. The local values show a broadly shared value system that is sensitive to local dynamics. The analysis also shows that different people in Durgapur Upazilla attach different meanings to various aspects of life; the perceived importance of each value differs by gender, age, location and cultural group. This shows that disturbances to people's values will result in different experiences. The ten local values that guided this study show similarities with the types of non-economic losses and damages used in past assessments. However, there are also significant differences among the types or values used. For example, the two values deemed most important by participants — **family** and **religion** — are not explicitly used in other assessments. Leaving these out would have resulted in an assessment that does not include essential changes in people's lives.

**'Economic' and 'non-economic' aspects of life.** The only local value that predominantly reflects 'economic' livelihoods is **development**, which contains keywords such as agriculture and income, but also more intangible terms such as future and justice. Participants ranked the importance of most other values

above **development**, showing the relative significance of 'non-economic' aspects of life. However, it is complicated if not problematic to use the dichotomous labels of 'economic' or 'non-economic' for people's value. Participants connected **health** to sleep and weather, but also to clothes and sanitation; **education** was connected to learning and a better future, but also to books and school buildings; and **religion** was connected to dancing and praying, but also to cows and rice. This further shows that the dichotomy between economic and non-economic losses and damages, often made unambiguously in reports and high-level conversations, is blurry and ambiguous at the local level (Pill, 2022; UNFCCC, 2013).

### 7.1.2 Losses and damages

**Differentiation of impacts.** An extensive range of losses and damages from both slow- and rapid-onset hazards were observed within each value, indicating that climate change affects all aspects of the life of people in Durgapur Upazilla. The many quotes and different first-person stories used throughout the report show that people have different perceptions and experiences, and that losses and damages differ from person to person. In the research areas, especially the community of lower-caste Hindus in Gaokandia, women experience a greater range of losses and damages, often to a greater extent (Van Schie et al., 2022). The lower caste Hindus in Gaokandia Union are marginalised, live in an area highly exposed to floods and do not have enough funds to relocate. Hindus also experience more losses and damages regarding religion, as various rituals in Hinduism are connected to the more-than-human world (Van Schie et al., 2022). Women have more limited livelihood options now that climate-related hazards complicate keeping livestock and growing vegetables. This exacerbates existing social and structural inequalities. There are fewer income-generating activities for women, which makes them more vulnerable. They perceive losses

and damages within **nature**, **serenity**, **religion** and **mental health** to be more impactful for them than for men. Qualitative data also suggests that they face a more comprehensive range of health complications (Van Schie et al., 2022) as climate-related hazards can make hygiene, menstruation and pregnancy harder (Khan et al., 2011; Shabib and Khan, 2014). The data also suggests that poor households face more impacts and have less capacity to recover from climate-related hazards than affluent households, thus deepening inequalities. Surprisingly, while there is substantial evidence that Adivasis in Bangladesh are marginalised economically, socially and politically (K8; Gain, 2011; 2016), the relatively higher economic status of Hajongs and Mandis in the assessed areas helps to make them more resilient to climate change impacts than their Bangali neighbours.

**Exacerbating inequalities.** Losses and damages act as multipliers of inequalities and other existing societal issues. A lack of job opportunities in rural Bangladesh leads to significant rural–urban migration flows (Biswas et al., 2019), separating communities and families. Losses and damages to financial security, to which economically vulnerable households are most prone, increase these migration flows as people are forced to move to the city to gain an income. Poor households rarely own submersible pumps, making them more prone to water scarcity. In turn, existing societal issues also worsen losses and damages. Sand mining exacerbates riverbank erosion, and load shedding on the electricity supply hinders people's daily life in rural Bangladesh as they cannot use electronic devices or equipment for several hours every day. This becomes a bigger problem during droughts when people need submersible pumps to get water for irrigation, bathing or cooking. There is an increasing problem with young (replanted) trees struggling to grow due to droughts and higher temperatures.

The cascading nature of loss and damage is prominent in this report, especially concerning **nature** and **development**. The more-than-human world contributes significantly to life in Durgapur Upazilla. As well as its inherent value, nature provides materials, food and shade, and has great cultural significance. Financial security means being able to afford education, medicines, food and items relevant to **religion**. Inevitably, losses and damages concerning nature cascade into impacts on food security and **culture**. Losses and damages concerning **development** cascade into impacts on **education** or **health**. The fact that many aspects of life are dependent on these two values makes loss and damage a risk multiplier. The importance of **nature** encountered in this work aligns with findings by Westoby et al. (2022) who stress the importance of biodiversity and ecosystem services in the lives of Pacific Islanders. This interdependency can be a reason for the high perceived importance of such

values by participants. Conversely, losing something you value and depend on inevitably impacts your mental health. Therefore, losses and damages cascade into impacts on **mental health**.

Just as with values, this cascading nature of losses and damages does not adhere to the dichotomy between what is labelled 'economic' and 'non-economic'. Changes in rainfall patterns cause a decrease in rice yields, adversely affecting the farmers' incomes and job opportunities for day labourers. Consequentially, those affected move away from their families to work or cannot pay for education or religious festivals. Floods destroy houses, forcing people to stay with friends or relatives in small spaces, impacting **serenity** and making people unable to receive guests. From this perspective, a stable income provides the ability to be with family, practise religion and educate the younger generation, and a house brings peacefulness and hospitality. This aligns with findings by Pill (2022), who notes that participants in the Caribbean state that "non-economic impacts are a direct result of an economic loss" (p. 777). The opposite also holds.

**Losses or damages.** The research team attempted to differentiate losses from damages, which proved complicated as many impacts can result in both a loss **and** damage. For example, people can recover from water-borne diseases after floods, but they cannot get back the time when they were unable to pray or spend time with children; and school buildings can be rebuilt, but students cannot regain the weeks of education they missed. However, more **damages** were observed than **losses**.

## 7.1.3 Existing responses

**External support.** Affected individuals and households mostly rely on their own capacities and agency to recover from the losses and damages they face, but they also receive assistance from the broader community or society (Jordan et al., 2015). The people in Durgapur Upazilla receive little external support, especially regarding the impacts of slow-onset processes and drought. This aligns with the notion that there is limited NGO presence in Durgapur Upazilla compared to, for example, the southern coastal regions of Bangladesh (K67).

**Coping mechanisms.** Most identified responses to loss and damage are short-term, reactive coping methods that can have significant trade-offs (Van Schie et al., 2022). For example, working in Dhaka means missing family (K78; K79), selling fruits and vegetables for additional income means having less food (K94), and borrowing money can result in conflict or further debt and mental stress when this cannot be repaid (K83; Hayward and Ayeb-Karlsson, 2021), and early marriage can lead to significant impacts on mental and physical health (Alston et al., 2014;

Ayeb-Karlsson et al., 2021). Coping mechanisms can also further exacerbate economic inequalities. Households living in subsistence conditions buy food, material or water to address the losses and damages they experience, often from affluent families who own submersible pumps or local shops (F1; K83).

### 7.1.4 Desired responses

**Types of responses.** The strongest determinant of the usefulness of a particular measure is exposure. The data suggests that another substantial factor could be socio-economic status. However, this cannot be validated as this study did not account for indicators such as income, wealth or landholder status. Overall, participants indicate that receiving compensation is not useful without proper protection from subsequent loss and damage. Compensation for losses and damages after a flood does not matter if entire livelihoods will be washed away in a subsequent flood. This aligns with findings by Arena et al. (2023) that there is little evidence that cash transfers effectively reduce vulnerability. The need for safety and protection from impacts shows the importance of effective climate adaptation when addressing losses and damages. Effective adaptation allows people to live without the stress of future hazards and gives them space to (re)build their lives safely.

However, participants did not acknowledge the physical limits to adaptation nor the harmful effects that can originate from large-scale adaptations, such as embankments (Schipper, 2020). Moreover, the adaptations listed by participants predominantly focus on minimising future impacts from floods and riverbank erosion. They do not have responses to temperature rise and precipitation changes. Participants also rated the usefulness of social protection measures — such as job opportunities and healthcare — highly as this addressed their problems in the longer term. This finding concurs with the perspective held by Aleksandorva and Costella (2021) that social protection should be a key risk retention management strategy when addressing losses and damages. Similar to the desired measures proposed by participants in this research, Aleksandorva and Costella (2021) also mention increasing livelihood options, job opportunities and healthcare. Improving healthcare should be undertaken with a focus on women, given they experience a broader range of health-related impacts. For example, in rural Bangladesh there are few women doctors, and this can lead to reluctance to seek support by women facing loss and damage (Ross et al., 2002; Van Schie et al., 2022). This means that only access to women doctors will fully address health-related losses and damages for women.

**Interconnections.** Most of the desired responses were mentioned in connection to minimising **and** addressing loss and damage, showing the overlap and connectedness of these two concepts. For example,

early warning systems and embankments minimise future losses and damages and address people's stress and anxiety regarding future hazards. Embankments are also vital infrastructure. Therefore, rebuilding or fortifying them can help enhance people's mobility. These examples also show that the impact of the measures can have cascading effects.

At first look, most of the desired responses seem to be 'economic' in nature, especially in comparison with potential responses provided by McNamara et al. (2021), which included healing, recovery and connection with nature. However, the results show that participants connected responses to various values. For example, an increase in local job opportunities means increased income, but also being able to stay with family; the construction of an embankment means better protection of houses, but also reduced stress and anxiety. On the other hand, better healthcare will lead to less sickness or quicker recovery, enabling people to work more. This interconnection means that responses to non-economic losses and damages will also address economic losses and damages, and that financial support can address non-economic losses and damages (Van Schie et al., 2022).

# 7.2 Recommendations

**Undertaking a values-based approach.** The decision to start this assessment by establishing local values with participants, instead of adopting pre-determined types of non-economic losses and damages, resulted in a deep understanding of why affected societies value certain aspects of life and to what extent. This gave the researchers insights into people's beliefs and value systems, building a connection between participant and researcher. Moreover, this approach, combined with participatory methodologies, gave participants the power to set the parameters of the study. Consequentially, centring local values in assessments of losses and damages from climate change results in a context-sensitive and comprehensive analysis that reflects on-the-ground experiences. A values-based approach to losses and damages can also overcome the often false dichotomy between 'economic' and 'non-economic' aspects of life, giving a more comprehensive overview of on-the-ground experiences and allowing an analysis of how these different losses and damages interact with each other. A values-based understanding of losses and damages, however, like most post-disaster assessments, centres around human experiences, leaving out more-than-human perspectives (Jackson, 2023; McShane, 2017). Integrating more-than-human perspectives in future assessments would give an enhanced overview of climate impacts.

**Context-dependency of non-economic losses and damages.** The high relative importance of non-economic losses and damages further indicates the need to thoroughly integrate non-economic losses and damages in post-disaster conversations, policies and assessments. Data on non-economic losses and damages are missing in many locations. Closing this knowledge gap is crucial, as the high context-dependency of non-economic losses and damages means there are currently ways to experience climate change that are still unaccounted for. However, it should be noted that as non-economic losses and damages greatly rely upon personal beliefs and worldviews, ways to experience climate change are 'potentially infinite' (Boyd et al., 2021, p. 133) and subjective. Therefore, a fully comprehensive assessment of losses and damages is impossible.

**Research team composition.** Including a forestry expert in the core research team resulted in a thorough understanding of deforestation, invasive species and biodiversity issues. The lack of a mental health expert, however, resulted in a shallow analysis of impacts on **mental health**, which mostly used the participants' terminology, such as stress, anxiety and sleeplessness. The research team suspected that they encountered cases of post-traumatic stress disorder, depression and aphasia, but no accurate diagnoses could be made. Engaging a wide range of experts in the assessment of loss and damage will result in a deeper and more accurate assessment of on-the-ground experiences.

**Differentiated vulnerability.** This study emphasised that people's experiences of losses and damages are influenced by pre-determined factors such as gender, cultural group and location. Awareness of differentiated vulnerability is essential to address losses and damages fairly and effectively. Doing so allows the opportunity to address structural economic and social inequalities. For example, in addition to raising household incomes, livelihood diversification training with women can increase their agency.

A lack of awareness of the different experiences and risks that address losses and damages can also cause additional harm and perpetuate social and economic inequalities. For example, if external support, such as compensation, was delivered to affluent households, they could further exert power over poorer households, such as the lower-caste Hindus. While this study accounts for different experiences and contexts, the absence of data regarding socio-economic class prevented a comprehensive analysis of different experiences related to class and income. Moreover,

this report primarily analysed differences using a single metric, resulting in a reductionist perspective on losses and damages. Not considering intersectional experiences in assessing and addressing losses and damages runs the risk that future interventions do not reach those in most need. Including a thorough intersectional analysis of vulnerability and losses and damages in future assessments can prevent this.

**False labels.** The dichotomy between economic and non-economic losses and damages proved to be ambiguous at the local level, given the overlapping and interconnected nature of different aspects of life. The same goes for other labels and distinctions in loss and damage discourse. Interventions intended to **minimise** losses and damages, such as embankments, will also **address** them. Moreover, the research team attempted to label the different impacts as 'losses' or 'damages' but did not succeed. The ambiguousness of these concepts in climate-affected regions calls for an evaluation of whether distinctions made in the literature, especially the dichotomy between non-economic and economic losses and damages and the typology of non-economic loss, are always politically and scientifically useful.

**Reducing harmful activities.** Losses and damages can be minimised and addressed by restricting harmful activities often conducted in the name of development. In Durgapura Upazilla, this includes stopping deforestation, the planting of invasive tree species, and sand mining. Stronger governmental regulation concerning these activities could decrease the losses and damages connected to hazards such as temperature increase and riverbank erosion, and it could increase people's resilience. These harmful activities will differ in different places. For example, in the south of Bangladesh, restricting shrimp farms will reduce people's losses and damages connected to salinity intrusion (Paprocki, 2021; Van Schie et al., 2022). Ensuring a stable electricity supply would also increase people's resilience to climate-related hazards. Another potentially harmful development is the construction of embankments to confine river flows. Scholars researching climate change impacts in Bangladesh's southern coastal regions indicate that embankment construction increases losses and damages instead of minimising them (Dewan, 2020; Paprocki, 2021). However, participants in Durgapur Upazilla indicated a strong need for embankments as floods breach riverbanks, making 'living with floods' very difficult. Added to this, riverbank erosion is increasing. This matter would need a more complete and detailed analysis.

**Long-term vulnerability reduction.** Affected societies in Durgapur Upazilla already put substantial effort into coping with losses and damages but receive little external support and lack the capacity to adapt. The fact that they repeatedly face countless losses and damages from various slow- and rapid-onset hazards means that only holistic measures can fully address losses and damages. Interventions targeting specific impacts will only address a fraction of people's problems. One way to do this is to minimise future losses and damages through comprehensive and effective adaptation. However, adaptation has physical limits, and common adaptations in Bangladesh, such as embankments and early warning systems, mainly minimise impacts from rapid-onset hazards. Social protection measures that do respond to losses and damage from slow-onset hazards are not bound to physical limits, reach the poorest and most vulnerable, and can have long-term impacts (Aleksandorva and Costella, 2021). Therefore, these could be key in effectively and fairly reducing vulnerability.

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# Appendices

## Appendix A. Models

### Exhibit 1. Needs assessment by the International Federation of the Red Cross and Red Crescent Societies (IFRC)

Figure 33: Disaster Emergency Needs Assessment by the International Federation of Red Cross (adapted from IFRC, 2000)
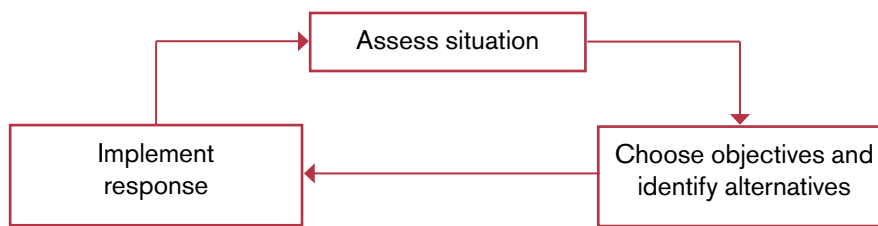


**Tools**

▪ On-site visual inspection

▪ Semi-structured interviews

▪ Secondary sources

▪ Checklists

▪ Gap identification charts

▪ Questionnaires

## Exhibit 2. Joint Assessment Model by the Needs Assessment Work Group (NAWG)



Figure 34: Joint Needs Assessment by the Needs Assessment Work Group (NAWG, 2020, p. 12, via CC BY 4.0)
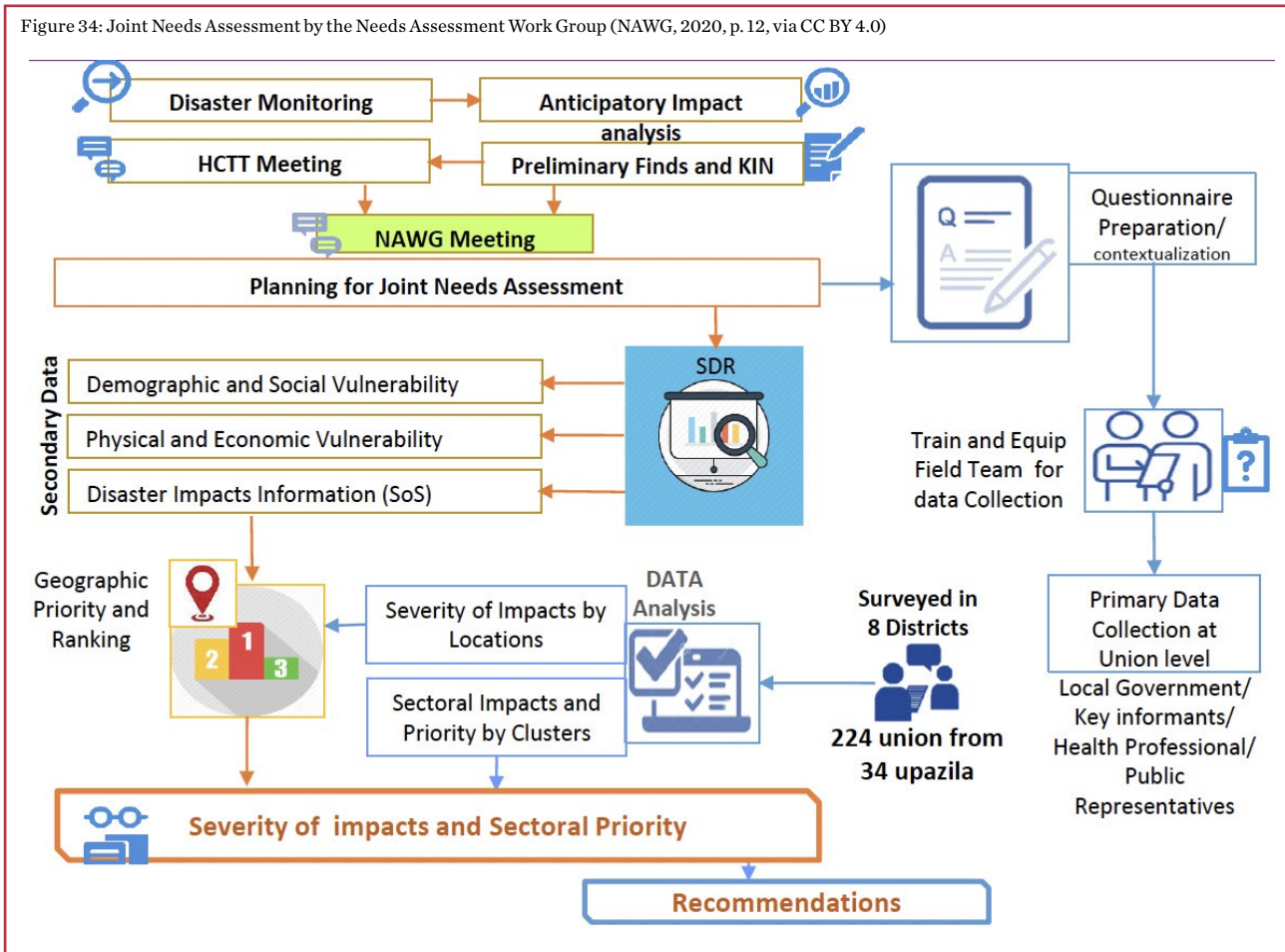
**Tools**

▪ Key informant interviews

▪ Questionnaire

▪ Geographic priority and ranking

▪ Data analysis

## Exhibit 3. Participatory Vulnerability Analysis by ActionAid

Figure 35: Participatory Vulnerability Analysis (PVA) by ActionAid (adapted from ActionAid, 2004)

**Phase 1: Preparation**

Country-level awareness raising

Defining purpose

Analysing secondary data

Stakeholder analysis

PVA team preparation

**Phase 2: Understanding the analytical framework**

Step 1: Situation analysis

Step 2: Analysing causes

Step 3: Analysing community action

Step 4: Drawing action from analysis

**Phase 3: Multi-levelled analysis**

Community-level analysis

District-level analysis

National-level analysis

International-level analysis

**Tools**

- Secondary data
- Stakeholder analysis
- Focus group discussions
- Historical profile
- Vulnerability mapping
- Seasonal calendar

- Livelihoods analysis
- Problem tree/objective analysis
- Concept mapping
- Coping matrix
- Venn diagrams

## Exhibit 4. Participatory Capacity and Vulnerability Analysis by Oxfam

Figure 36: Participatory Capacity Vulnerability Analysis by Oxfam (adapted from Turnbull and Turvill, 2012)

**1.** Making preparations

↓

**2.** Collecting secondary data

↓

**3.** Beginning work with the community

↓

**4.** Analysing hazards, the impacts of climate change, vulnerabilities and capacities

↓

**5.** Prioritising risk

↓

**6.** Developing a risk reduction action plan

↓

**7.** Putting the action plan into practise
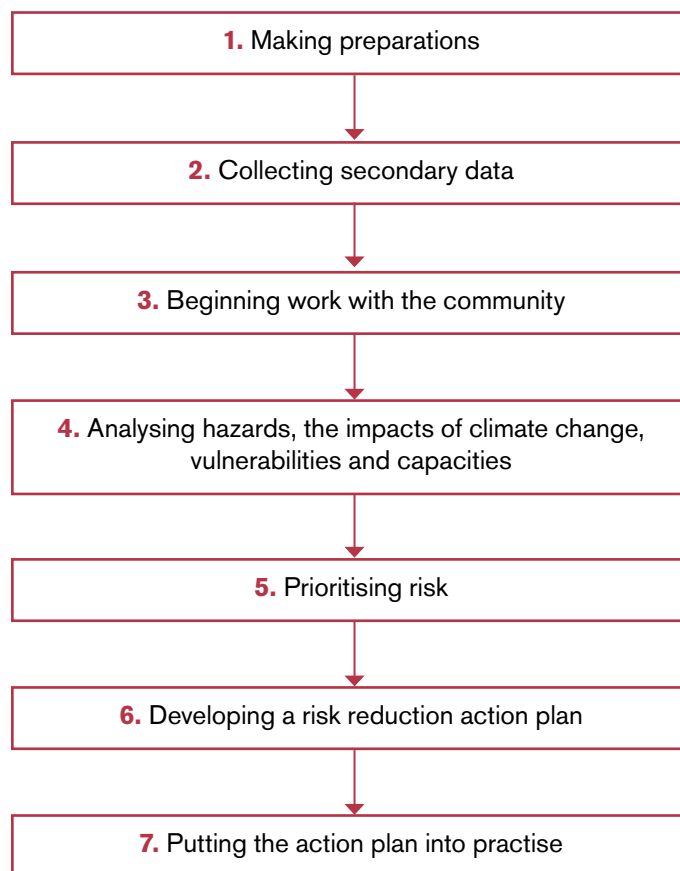
### Tools

- Secondary data
- Daily time chart
- Circle diagram
- Semi-structured interviews
- Annual livelihoods calendar
- Resource map
- Hazard map

- Historical timeline
- Problem tree
- Solutions tree
- Risk quadrant
- Validity quadrant
- Tree pruning

## Exhibit 5. Post-Event Review Capability by the Zurich Flood Resilience Alliance

Figure 37: Post-Event Review Capability by the Zurich Flood Resilience Alliance (adapted from Venkateswaran et al., 2020)

**Introduction**

↓

**I:** The physical context

↓

**II:** Socio-economic disaster landscape

↓

**III:** What happened?

↓

**4.** Key insights

↓

**V.** Recommendations

↓

**Conclusions**
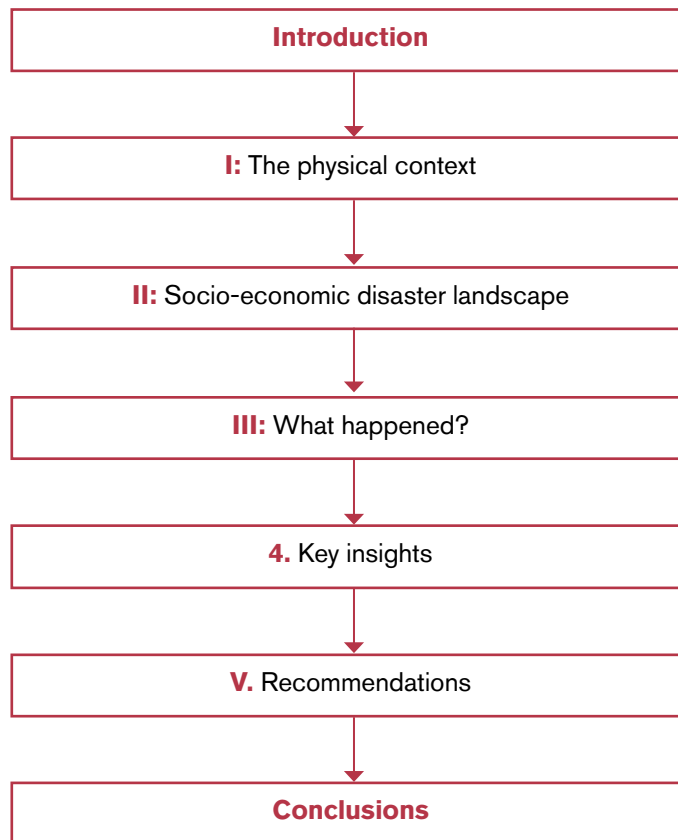
**Tools**

- Secondary data
- Personal observation
- Semi-structured interviews
- Institutional landscape map

## Exhibit 6. Handbook for Community Assessment of Loss and Damage by ActionAid

Figure 38: Handbook for Community Assessment of Loss and Damage (adapted from Anderson et al., 2019)

**1.** Mapping risks

↓

**2.** Calendars of change

↓

**3.** Identifying vulnerable households

↓

**4.** Understanding the impact of disasters and climate change

↓

**5.** Complementing community assessment of climate change impacts with external expertise

↓

**6.** Calculating and reporting loss and damage

↓

**7.** Advocacy and lobbying
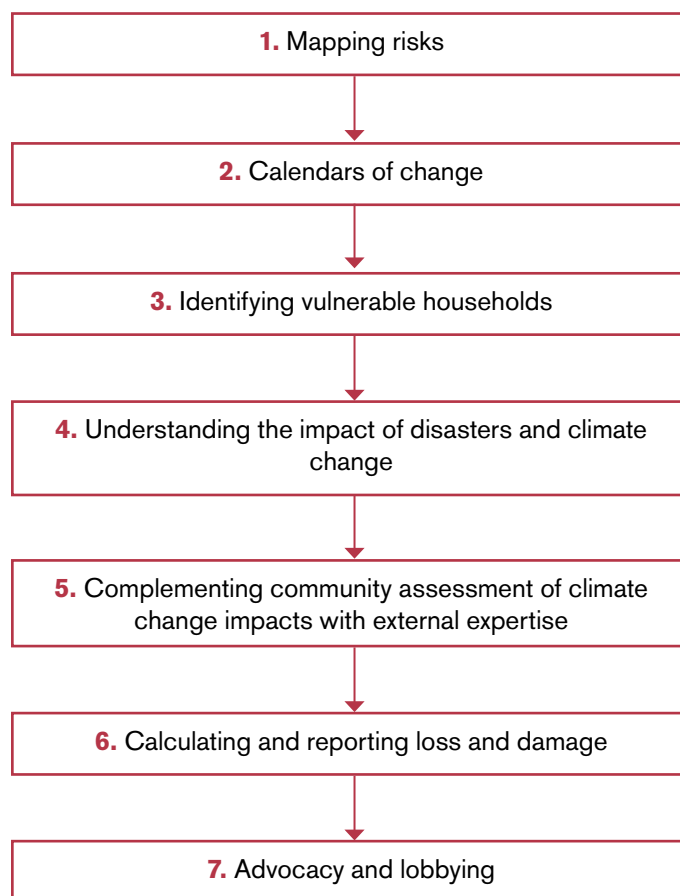
**Tools**

- Risk and resource mapping
- Seasonal calendar
- Hazard calendar
- Agricultural calendar
- Livelihood calendar
- Hazard risk index

- Trend analysis
- Key informant interview
- Calculating loss and damage
- Questionnaires
- Tables
- Matrix

## Exhibit 7. Value-based assessment model by Tschakert et al. (2017)

Figure 39: Values-based assessment model (from Tschakert et al., 2017, p. 12)
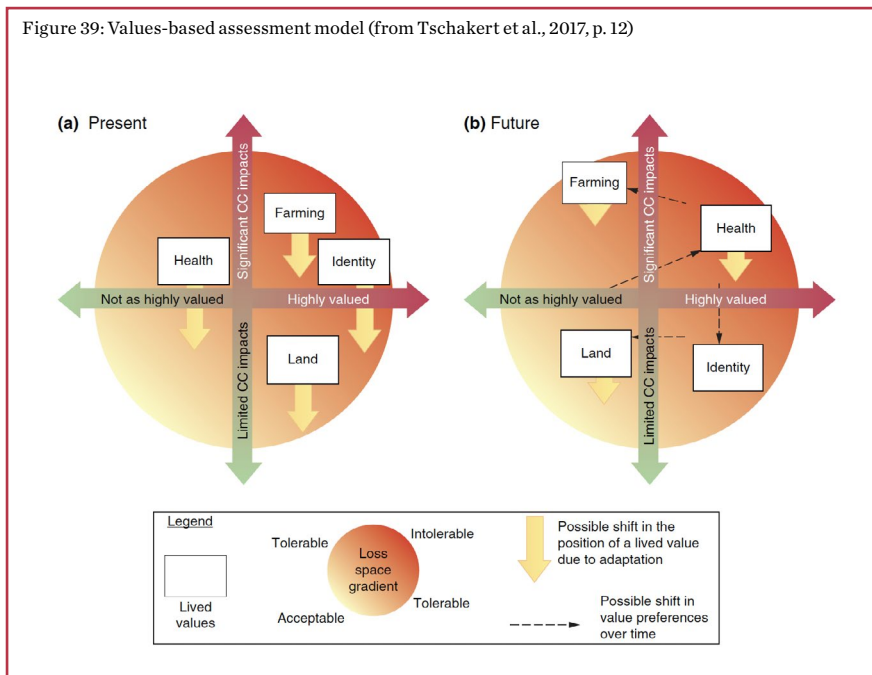


### Tools
This framework only includes the model displayed above.

## Exhibit 8. Post Disaster Needs Assessment (PDNA) guidelines: Gender, Volume B by UN Women

Figure 41: Post Disaster Needs Assessment (adapted from UN Women, 2017)
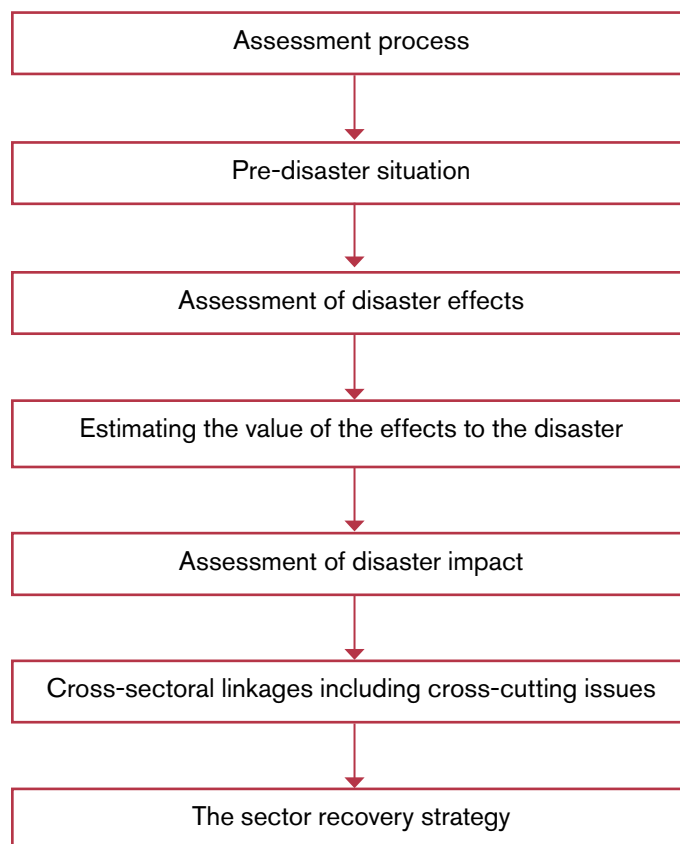


**Tools**

- Sample survey
- Desk review
- Key informant interviews
- Focus group discussions
- Observation
- Ethical considerations

# Appendix B. Key informant interviews: context

Table 8: Demographics of participants of the 'context' key informant interviews

| Age | 18–25 | 0 |
| --- | --- | --- |
| | 26–35 | 0 |
| | 36–45 | 3 |
| | 46–55 | 3 |
| | 56–65 | 1 |
| | 65+ | 1 |
| | Undisclosed | 1 |
| Gender | Man | 4 |
| | Woman | 4 |
| | Undisclosed | 1 |
| Ethnic group | Muslim | 1 |
| | Hindu | 1 |
| | Mandi | 2 |
| | Hajong | 4 |
| | Undisclosed | 1 |
| Union | Kullagora | 2 |
| | Gaokandia | 2 |
| | Durgapur | 3 |
| | Undisclosed | 2 |
| Occupation | Housewife | 2 |
| | Farmer | 2 |
| | Woman leader | 2 |
| | Day labourer | 1 |
| | Retired | 1 |
| | NGO worker | 1 |
| | Local political leader | 1 |
| | Government director | 1 |

# Appendix C. Focus group discussions: context

Table 9: Composition of the 'context' focus group discussions

| DISCUSSION | RESEARCH AREA | GENDER | ATTENDEES | RELIGION |
|---|---|---|---|---|
| 1 | Gaokandia | Men | 7 | Muslim, Hindu |
| 2 | Durgapur | Women | 10 | Muslim, Hajong |
| 3 | Kullagora | Women | 8 | Hajong, Mandi |
| 4 | Gaokandia | Women | 10 | Muslim, Hindu, Mandi |
| 5 | Kullagora | Men | 10 | Muslim, Hajong |
| 6 | Durgapur | Men | 6 | Muslim, Hindu, Mandi |

Table 10: Demographics of participants of the 'context' focus group discussions

| Age | 18–25 | 3 |
|---|---|---|
| | 26–35 | 14 |
| | 36–45 | 7 |
| | 46–55 | 12 |
| | 56–65 | 7 |
| | 65+ | 8 |
| Gender | Man | 23 |
| | Woman | 28 |
| Ethnic group | Muslim | 19 |
| | Hindu | 8 |
| | Mandi | 13 |
| | Hajong | 11 |
| Union | Kullagora | 17 |
| | Gaokandia | 20 |
| | Durgapur | 14 |
| Occupation | Housewife | 23 |
| | Farmer | 16 |
| | Day labourer | 4 |
| | Business | 2 |
| | Small trades | 2 |
| | Job holder | 2 |
| | Freedom fighter | 1 |
| | Teacher | 1 |
| | Retired | 1 |
| | Social worker | 1 |
| | Student | 1 |

# Appendix D. Key informant interviews: values

## D1. Demographics

Table 11: Demographics of participants of the 'values' key informant interviews

| | | |
|---|---|---|
| Age | 18–25 | 4 |
| | 26–35 | 6 |
| | 36–45 | 7 |
| | 46–55 | 3 |
| | 56–65 | 3 |
| | 65+ | 5 |
| Gender | Man | 13 |
| | Woman | 15 |
| Ethnic group | Muslim | 8 |
| | Hindu | 8 |
| | Mandi | 7 |
| | Hajong | 5 |
| Union | Gaokandia | 8 |
| | Durgapur | 11 |
| | Kullagora | 9 |
| Jobs | Housewife | 12 |
| | Farmer | 9 |
| | Student | 3 |
| | Day labourer | 2 |
| | Retired | 2 |
| | Other | 2 |

## D2. Coded values

Table 12: 75 coded values from key informant interviews 10 to 37

| VALUES | TOTAL | GENDER | | CULTURAL GROUP | | | | LOCATION | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MEN | WOMEN | MUSLIM | HINDU | MANDI | HAJONG | GOA. | DUR. | KUL. |
| Children/ grandchildren | 15 | 7 | 8 | 4 | 4 | 5 | 2 | 5 | 8 | 2 |
| Education | 12 | 8 | 5 | 3 | 4 | 2 | 4 | 4 | 6 | 3 |
| Family | 12 | 7 | 5 | 3 | 3 | 5 | 1 | 4 | 6 | 2 |
| Community | 11 | 5 | 6 | 3 | 3 | 3 | 2 | 4 | 4 | 3 |
| Economic situation | 10 | 3 | 7 | 2 | 2 | 4 | 2 | 4 | 6 | 0 |
| Clean water | 9 | 1 | 8 | 2 | 4 | 2 | 1 | 4 | 4 | 1 |
| Comm. system/ roads | 9 | 1 | 8 | 0 | 5 | 3 | 1 | 4 | 1 | 4 |

| VALUES | TOTAL | GENDER | | CULTURAL GROUP | | | | LOCATION | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MEN | WOMEN | MUSLIM | HINDU | MANDI | HAJONG | GOA. | DUR. | KUL. |
| Job opportunity | 8 | 0 | 8 | 2 | 2 | 3 | 1 | 4 | 4 | 0 |
| Health | 7 | 3 | 4 | 3 | 2 | 2 | 0 | 3 | 2 | 2 |
| Agriculture | 6 | 5 | 1 | 2 | 1 | 1 | 2 | 2 | 4 | 0 |
| Safety | 6 | 3 | 3 | 2 | 3 | 0 | 1 | 2 | 2 | 2 |
| Helping | 5 | 3 | 2 | 2 | 0 | 2 | 1 | 0 | 1 | 4 |
| Cooking | 4 | 0 | 4 | 1 | 1 | 2 | 0 | 0 | 2 | 2 |
| Fresh/clean (morning) air | 4 | 4 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| Harmony | 4 | 3 | 1 | 2 | 0 | 1 | 1 | 2 | 1 | 1 |
| Peace | 4 | 1 | 3 | 0 | 1 | 2 | 1 | 1 | 1 | 2 |
| Religious rituals / prayer | 4 | 0 | 4 | 0 | 1 | 1 | 2 | 0 | 2 | 2 |
| Watching television | 4 | 1 | 3 | 1 | 1 | 2 | 0 | 0 | 0 | 4 |
| Justice | 3 | 2 | 1 | 2 | 0 | 1 | 0 | 1 | 2 | 0 |
| Land | 3 | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 2 |
| Providing | 3 | 3 | 0 | 2 | 1 | 0 | 0 | 1 | 2 | 0 |
| Religion | 3 | 2 | 1 | 2 | 0 | 1 | 0 | 1 | 2 | 0 |
| Respect | 3 | 2 | 1 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| (Scenic) river | 3 | 0 | 3 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| Caring | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 0 |
| Clothes | 2 | 0 | 2 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| Connection | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 |
| Development | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| Doing good deeds | 2 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 |
| Friends | 2 | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| House | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 1 |
| Hygiene | 2 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 |
| Livestock | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 1 | 0 |
| Mental health | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 1 |
| Mutual understanding | 2 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 |
| Neighbours | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 1 | 1 |
| Next generation | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| Resting | 2 | 0 | 2 | 0 | 2 | 0 | 0 | 1 | 0 | 1 |
| Sanitation | 2 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 |
| Skill | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 |
| Surroundings | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 0 |
| Trees | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| Unity | 2 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 |
| Bangladesh | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Banyan tree | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |

| VALUES | TOTAL | GENDER | | CULTURAL GROUP | | | | LOCATION | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MEN | WOMEN | MUSLIM | HINDU | MANDI | HAJONG | GOA. | DUR. | KUL. |
| Career | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Clean house | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Cultural festival | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Culture | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Electricity | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Fishes | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| Food | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Food habit | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Fresh food | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Future | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Giving | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| Gossiping | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Home | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Job | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| Knowledge | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Leisure | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Mental development | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Natural beauty | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| Nature | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Parents | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| Peacefulness | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Relatives | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Religious building (temple) | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Roaming around | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| Serenity | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Sewing | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Silence | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| Social system | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Social work | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Walking barefoot | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |

## D3. Grouped values

Table 13: The initial grouping of values conducted by the research team

| FAMILY | | | | |
|---|---|---|---|---|
| Family | Grandchildren | Relatives | Next generation | Cooking |
| Children | Parents | Home | Providing | Future |
| **COMMUNITY** | | | | |
| Community | Friends | Neighbours | Gossiping | Connection |
| Next generation | | | | |
| **RELIGION** | | | | |
| Religion | Religious rituals/prayer | Religious buildings | | |
| **NATURE** | | | | |
| Nature | (Scenic) river | Surroundings | Trees | Natural beauty |
| Fresh (morning) air | Banyan tree | | | |
| **SERENITY** | | | | |
| Serenity | Silence | Resting | Peacefulness | Cooking |
| Walking bare feet | Gossiping | Watching television | Resting | Roaming around |
| Leisure | | | | |
| **HARMONY** | | | | |
| Harmony | Peace | Unity | Mutual understanding | Justice |
| Social system | Respect | | | |
| **CARING** | | | | |
| Caring | Helping | Doing good deeds | Giving | Providing |
| Social work | Cooking | | | |
| **HEALTH** | | | | |
| Health | Hygiene | Sanitation | Clean water | Fresh food |
| Food | | | | |
| **EDUCATION** | | | | |
| Education | Knowledge | Mental development | | |
| **CULTURE** | | | | |
| Culture | Cultural festivals | Banyan tree | Agriculture | Bangladesh |
| Food habit | Respect | Clothes | | |
| **DEVELOPMENT** | | | | |
| Development | Roads/comm. system | Education | Electricity | Economic situation |
| Jobs | Job opportunity | Career | Agriculture | Fishes |
| Future | House | Livestock | Next generation | Justice |
| Bangladesh | | | | |
| **UNDECIDED VALUES** | | | | |
| Land | Safety | Mental health | | |

# Appendix E. Focus group discussions: values

## E1. Demographics

Table 14: Composition of the 'context' focus group discussions

| FGD# | RESEARCH AREA | GENDER | ATTENDEES | RELIGION |
|------|---------------|--------|-----------|----------|
| 7 | Durgapur | Women | 6 | Muslim, Hajong |
| 8 | Durgapur | Men | 7 | Muslim, Hajong |
| 9 | Gaokandia | Women | 6 | Muslim, Hindu |
| 10 | Gaokandia | Men | 6 | Muslim, Hindu |
| 11 | Kullagora | Men | 5 | Mandi |
| 12 | Kullagora | Women | 5 | Mandi |

Table 15: Demographics of participants of the 'context' focus group discussions

| | | |
|---|---|---|
| Age | 18–25 | 5 |
| | 26–35 | 6 |
| | 36–45 | 11 |
| | 46–55 | 6 |
| | 56–65 | 5 |
| | 65+ | 2 |
| Gender | Man | 18 |
| | Woman | 17 |
| Ethnic group | Muslim | 16 |
| | Hindu | 3 |
| | Mandi | 10 |
| | Hajong | 6 |
| Union | Kullagora | 10 |
| | Gaokandia | 12 |
| | Durgapur | 13 |
| Occupation | Housewife | 17 |
| | Farmer | 11 |
| | Student | 6 |
| | Unemployed | 2 |
| | Other | 4 |

## E2. Data

Table 16: The local values selected by participants in each focus group discussion

| VALUE | FOCUS GROUP DISCUSSIONS | | | | | |
|---|---|---|---|---|---|---|
| | 7 | 8 | 9 | 10 | 11 | 12 |
| **Development** | x | x | x | x | x | x |
| **Education** | x | | x | | | x |
| **Health** | x | x | x | x | x | x |
| **Nature** | x | x | x | x | x | x |
| **Religion** | x | | x | x | x | x |
| **Culture** | x | x | x | x | x | x |
| **Society** | x | x | x | x | x | x |
| **Community** | | x | | | | x |
| **Family** | x | x | x | x | x | x |
| **Serenity** | x | x | x | x | x | x |
| **Mental health** | x | x | x | x | x | x |

Table 17: Keywords participants in the focus groups 7 to 12 associated with each value

### UNNOYON, উন্নয়ন, DEVELOPMENT

| | | | | |
|---|---|---|---|---|
| Gobadi poshu, গবাদি পশু, domestic animals | Rastaghat, রাস্তাঘাট, roads | School-college, স্কুল-কলেজে, school-college | Chakurir sujog, চাকুরীর সুযোগ, job opportunity | Biddyut, বিদ্যুৎ, electricity |
| Chikithsa, চিকিৎসা, treatment | Basosthan, বাসস্থান, residence | Shikkha, শিক্ষা, dducation | Chakuri, চাকুরি, job | Byabsha, ব্যাবসা, business |
| Khaddo, খাদ্য, food | Bostro, বস্ত্র, clothes | Subichar, সুবিচার, justice | Jomi, জমি, land | Obokathamo, অবকাঠামো, infrastructure |
| Shikkha bebostha, শিক্ষা ব্যবস্থা, education system | Krishir unnoyon, কৃষির উন্নয়ন, agricultural development | Career, ক্যারিয়ার | Mach chash, মাছ চাষ, fish farming | Gobadi poshu, গবাদি পশু, livestocks |
| Zatayot bebostha, যাতায়ত ব্যাবস্থা, communication system | Badh, বাঁধ, embankment | Porjton elaka, পর্যটন এলাকা, tourist place | Poribar porikolpona, পরিবার পরিকল্পনা, family planning | Technology unnoyon, টেকনোলজিউন্নয়ন, technologic development |
| Rice cooker, রাইস কুকার, rice cooker | Ghor, ঘর, house | Sompod, সম্পদ, property | | |

### SHIKKHA, শিক্ষা, EDUCATION

| | | | | |
|---|---|---|---|---|
| Vabishyath, ভবিষ্যৎ, future | Chakuri, চাকুরী, job | Structured Jibon, স্ট্রাকচারড জীবন, structured life | Valo school-college, ভালো স্কুল-কলেজে, good school-college | Durniti, দূর্নীতি, corruption |
| Ucchoshikkha, উচ্চশিক্ষা, higher eduction | | | | |

## SHASTHO, স্বাস্থ্য, HEALTH

| | | | | |
|---|---|---|---|---|
| Porishkar poricchonnota, পরিষ্কার পরিচ্ছন্নতা, cleanliness | Khabar, খাবার, food | Sothikvabe ranna, সঠিকভাবে রান্না, cooking properly | Abohaoa somporke sotorko thaka, আবহাওয়া সম্পর্কে সতর্ক থাকা, being aware about weather | Sanitation, স্যানিটেশন, sanitation |
| Sothik ghum, সঠিক ঘুম, proper sleep | Bishuddho pani, বিশুদ্ধ পানি, clean water | Bishuddho khabar, বিশুদ্ধ খাবার, clean food | Sanitary latrine, স্যানিটারলিয়াট্রিনি | Sanitary pad, স্যানিটারিপ্যাড |
| Niyomito khabar, নিয়মিত খাবার, regular Food | Diet, ডায়েট | Beyam, ব্যয়াম, physical exercise | Kheladhula, খেলাধুলা, sports | Poshak, পোশাক, clothes |
| Hata, হাঁটা, walking | Dhatri, ধাত্রী, midwife | Diabetes, ডায়াবেটেসি | | |

## PROKRITI, প্রকৃতি, NATURE

| | | | | |
|---|---|---|---|---|
| Gachpala, গাছপালা, trees | Nodi-nala, নদী-নালা, river-channel | Prakritik soundorjo, প্রাকৃতিক সৌন্দর্য, natural beauty | Hash, হাঁস, duck | Murgi, মুরগী, chickens |
| Goru, গরু, cow | Chagol, ছাগল, goat | Sokaler batas, সকালের বাতাস, Morning air | Ful, ফুল, flower | Fol, ফল, fruit |
| Chaya, ছায়া, shadow | Gachropon, গাছরোপন, tree plantation | Shaksobji, শাকসবজি, vegetables | Sobuj, সবুজ, green | Gach kata, গাছ কাটা, deforestation |
| Balu uttolon, বালু উত্তোলন, sand mining | koyla, কয়লা, coal | Pathor, পাথর, stones | Ritu, ঋতু, season | jomi, জমি, land |
| Vangon, নদী ভাঙ্গন, river bank erosion | Durjog, দুর্যোগ, disaster | Charpash, চারপাশ, surroundings | Chad, চাঁদ, moon | Surjo, সূর্য্য, sun |
| Bonoj sompod, বনজ সম্পদ, forest products | Hati, হাতি, elephants | | | |

## DHORMO, ধর্ম, RELIGION

| | | | | |
|---|---|---|---|---|
| Dhormiyo bishwas, ধর্মীয় বিশ্বাস, religious belief | Dhormiyo Niyom Kanun, ধর্মীয় নিয়ম কানুন, religious rules | Mosjid, মসজিদ, mosque | Mondir, মন্দির, temple | Puja, পূজা, Puja |
| Dhormiyo Uthsob, ধর্মীয় উৎসব, religious festivals | Kirtan, কীর্তন, no translation, Hindu ritual | Bot Gach, বট গাছ, banyan tree | Tulsi gach, তুলসী গাছ, tulsi tree | Ful gach, ফুল গাছ, flower tree |
| Namaz, নামাজ, Salat | Roja, রোজা, fasting | Iman, ঈমান, belief | Zakat, যাকাত, zakat | Madrasa, মাদ্রাসা, Madrasa |
| Dhormiyo ghor, ধর্মীয় ঘর, religious buildings | Dhormiyo onushilon, ধর্মীয় অনুশীলন, religious practices | Church, চার্চ | Nach, নাচ, dance | Gan, গান, song |

## CULTURE

| | | | | |
|---|---|---|---|---|
| Krishi, কৃষি, agriculture | Swangskritik Onushthan (baccha), সাংস্কৃতিক অনুষ্ঠান (বাচ্চা), cultural events (children) | Somman, সম্মান, respect | Bostro, বস্ত্র, clothes | Cha dokan, চা দোকান, tea stall |

| | | | | |
|---|---|---|---|---|
| Namaz, নামাজ, Salat | Roja, রোজা, fasting | Gan, গান, song | Bastu Puja, বাস্তুপূজা, no translation, Hajong ritual | Prat kirtan, প্রাতঃ কীর্তন, no translation, Hajong ritual |
| Prat kirtan, প্রাতঃ কীর্তন, no translation, Hajong ritual | Leoa tana O jakhamara, লওয়া তানা ও জাখা মারা, no translation, Hajong ritual | Nobnno, নবান্ন, no translation (means festival after harvesting new rice) | Shaksobji chash, শাকসব্জিচাষ, growing vegetables | Gobadi poshu palon, গবাদিপশু পালন, keeping livestocks |
| Khadyaovvas, খ্যাদ্যাভ্যাস, food habit | Pithapuli, পিঠাপুলি, pithapuli | Bangladeshi uthsob, বাংলাদেশীউৎসব, Bangladeshi festivals | Mandi Vasha, মান্ডিভাষা, Mandi language | Mandi uthsob, মান্ডি উৎসব, mandi festivals |
| Mandi poshak, মান্ডি পোশাক, mandi clothes | Mod, মদ, alcohol | Otithi porayon, অতিথি পরায়ণ, hospitability | | |

## SOMAJ, সমাজ, SOCIETY

| | | | | |
|---|---|---|---|---|
| Sobar Sathe valo Somporko, সবার সাথে ভালো সম্পর্ক, good relationship with everyone | Sahazya, সাহায্য, help | Bandhu, বন্ধু, friend | Protibeshi, প্রতিবেশী, neighbour | Shikkha Protishthan, শিক্ষা প্রতিষ্ঠান, educational institute |
| Dhormiyo protishthan, ধর্মীয় প্রতিষ্ঠান, religious institute | Zogazog, যোগাযোগ, connection | Chayer Dokan, চায়ের দোকান, tea stall | Nirapotta, নিরাপত্তা, safety | Ekota, একতা, unity |
| Niyom Kanun, নিয়ম কানুন, rules- regulation | Milemishe thaka, মিলিমিশে থাকা, living in harmony | zogazog bebostha, যোগাযোগ ব্যাবস্থা, communication system | Orthonoitik unnoyon, অর্থনৈতিক উন্নয়ন, economic development | Shikkha, শিক্ষা, education |
| Somman deoa, সম্মান দেওয়া, giving respect | Jouri Shasthoseba, জরুরিস্বাস্থ্যসেবা, emergency health service | Zotno neoa, যত্ন নওয়া, caring | Valo kaj kora, ভালো কাজ করা, doing good deeds | Subichar, সুবিচার, justice |
| Mimangsa, মীমাংসা, judgment | Golpogujob kora, গল্পগুজব করা, gossiping | Deoa neoa, দেওয়া নেওয়া, giving and taking | Daoat grohon, দাওয়াত গ্রহণ, accepting invitation | Jomi, জমি, land |
| Durniti, দূর্নীতি, corupption | Eksathe cholafera kora, একসাথে চলাফেরা করা, moving together | Kheladhula, খেলাধুলা, sports | Dhormoke somman, ধর্মকে সম্মান, respecting religion | |

## PORIBAR, পরিবার, FAMILY

| | | | | |
|---|---|---|---|---|
| Shontan, সন্তান, children | Shwami/stri, স্বামী/স্ত্রী, Husband/wife | Ma-Baba, মা-বাবা, parents | Nati/Natni, নাতি/নাতনি, grandchildren | Ghor, ঘর, house |
| Ghor, ঘর, house | Porishkar Poricchonnota, পরিষ্কার পরিচ্ছন্নতা, cleanliness | Vabishyath, ভবিষ্যৎ, future | Ekota, একতা, unity | Sobar motamot, সবার মতামত, everyone's opinion |
| Poroborti Projonmo, পরবর্তী প্রজন্ম, next generation | Atmiyo, আত্মীয়, relatives | Boroder shomman, বড়দের সম্মান, respect to elders | Chotoder Sneho, ছোটদের স্নেহে, affection to children | Jomi, জমি, land |
| Khadyer jogan, খাদ্যের যোগান, providing food | Orther Jogan, অর্থের যোগান, providing money | Shikkha, শিক্ষা, education | Chikithsar jogan, চিকিৎসার যোগান, providing medicines | Kormosongsthan, কর্মসংস্থান, employment |

| | | | | |
|---|---|---|---|---|
| Zotno neoa, যত্ন নওয়া, caring | Nirapotta, নিরাপত্তা, safety | Purushder krishi kaje sahazzo, পুরুষদের কৃষি কাজে সাহায্য, helping male in agricultural work | Mohilader rannar kaje sahazzo, মহিলাদের রান্নার কাজে সাহায্য, helping woman in cooking. | Milemishe thaka, মিলেমিশে থাকা, living in harmony |
| Eksathe thaka, একসাথে থাকা, living together | Paribarik somossa, পারিবারিক সমস্যা, family problems | Paribarik shanti, পারিবারিক শান্তি, family peace | Obivabok, অভাব, poverty | parosparik sohojogita, পারস্পারিক সহযোগীতা, helping each other |
| Gobadi poshu, গবাদি পশু, livestocks | sangsari alochona, সাংসারিক আলোচনা, family discussion | | | |

## PROSHANTI, প্রশান্তি, SERENITY

| | | | | |
|---|---|---|---|---|
| Nirabota, নীরাবতা, silence | Bishram Neoa, বিশ্রাম নওয়া, taking rest | Shanti, শান্তি, peace | Cholafera, চলাফেরা, movement (walking around) | Kheladhula, খেলাধুলা, sports |
| Porashuna, পড়াশোনা, study | Golper boi pora, গল্পের বই পড়া, reading story books | Poribarer sathe somoy katano, পরিবারের সাথে সময় কাটানো, spending time with family | Natir sathe somoy katano, নাতির সাথে সময় কাটানো, spending time with grand child | Binodon, বিনোদন, entertainment |
| TV dekha, টিভিদিখো, watching television | Gan shona, গান শোনা, listening song | Gan Gaoa, গান গাওয়া, singing | Dhormiyo onushilon, ধর্মীয় অনুশীলন, religious practices | Dhormiyo alochona, ধর্মীয় আলোচনা, religious discussion |
| Sontanke porte dekha, সন্তানকে পড়তে দেখো, watching children study | Golpogujob kora, গল্পগুজব করা, gossiping | Koutuk, কৌতুক, jokes | Nijeke somoy deoa, নিজেকে সময় দেওয়া, spending own time | Bike e ghora, বাইকে ঘোরা, riding bike |
| Cha khaoa, চা খাওয়া, having tea | Nodir pare hata, নদীর পারে হাঁটা, walking by the river | Bondhuder sathe adda, বন্ধুদের সাথে ঘোরা, hanging out with freinds | Prarthona, প্রার্থনা, prayer | |

## MANOSIK SHASTHO, মানসিক স্বাস্থ্য, MENTAL HEALTH

| | | | | |
|---|---|---|---|---|
| Chinta kora, চিন্তা করা, thinking | Ovab, অভাব, poverty | Sontan, সন্তান, children | Rrin, ঋণ, loan | Dushcinta, দুঃশ্চিন্তা, worry |
| Bekarotto, বেকারত্ব, unemployment | Cheleder neshay asokto, ছেলেদের নেশায় আসক্ত, drug addiction of boys | Vabishyath, ভবিষ্যৎ, future | Chakuri, চাকুরী, job | Paribarik somossa, পারিবারিক সমস্যা, family crisis |
| Bicched, বিচ্ছেদ, separation | Baba mar somossa, বাবা মার সমস্যা, problems in parents | premghotito somossa, প্রেমঘটিত সমস্যা, problem in love relation | Career, ক্যারিয়ার | Porashuna, পড়াশুনা, study |
| Bishonnota, বিষণ্ণতা, depression | | | | |

# Appendix F. Key informant interviews: losses and damages

## F1. Demographics

Table 18: Demographics of participants of the 'losses and damages' key informant interviews

| | | |
|---|---|---|
| Age | 18–25 | 6 |
| | 26–35 | 7 |
| | 36–45 | 6 |
| | 46–55 | 4 |
| | 56–65 | 5 |
| | 65+ | 4 |
| Gender | Man | 16 |
| | Woman | 16 |
| Ethnic group | Muslim | 11 |
| | Hindu | 8 |
| | Mandi | 7 |
| | Hajong | 6 |
| Union | Gaokandia | 10 |
| | Durgapur | 13 |
| | Kullagora | 9 |
| Jobs | Housewife | 15 |
| | Farmer | 6 |
| | Small trades | 3 |
| | Student | 3 |
| | Day labourer | 2 |
| | Other | 4 |

## F2. Coded impacts

More detailed information about the coded impacts are available upon request (douwe.van.schie@icccad.org).

# Appendix G. Survey: importance and impacts of/on values

## G1. Demographics

Table 19: Demographics of participants of the 'impacts' survey

| | | |
|---|---|---|
| Age | 18–25 | 19 |
| | 26–35 | 18 |
| | 36–45 | 19 |
| | 46–55 | 20 |
| | 56–65 | 14 |
| | 65+ | 11 |
| Gender | Man | 44 |
| | Woman | 57 |
| Ethnic group | Muslim | 42 |
| | Hindu | 27 |
| | Mandi | 21 |
| | Hajong | 11 |
| Union | Gaokandia | 39 |
| | Durgapur | 29 |
| | Kullagora | 33 |
| Jobs | Housewife | 47 |
| | Farmer | 21 |
| | Student | 10 |
| | Day labourer | 8 |
| | Unemployed | 4 |
| | Livestock holder | 3 |
| | Business | 3 |
| | Teacher | 2 |
| | Other | 10 |

## G2. Results

Table 20: The importance of the local value ranked from most important to least important on a five-point Likert scale

| VALUES | MEAN | GENDER | | CULTURAL GROUP | | | | AGE GROUP | | RESEARCH AREA | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | WOMEN | MEN | MUSLIM | HINDU | MANDI | HAJONG | 16–39 | 40+ | GAO | KUL | DUR |
| | N=101 | N=57 | N=44 | N=42 | N=27 | N=21 | N=11 | N=44 | N=57 | N=39 | N=33 | N=29 |
| Family | 4.98 | 4.98 | 4.98 | 4.98 | 4.96 | 5.00 | 5.00 | 4.98 | 4.98 | 4.97 | 5.00 | 4.97 |
| Religion | 4.93 | 4.96 | 4.89 | 4.95 | 4.89 | 4.95 | 4.91 | 4.95 | 4.91 | 4.90 | 4.97 | 4.93 |
| Education | 4.65 | 4.65 | 4.66 | 4.55 | 4.56 | 4.90 | 4.82 | 4.86 | 4.49 | 4.77 | 4.48 | 4.69 |
| Health | 4.61 | 4.65 | 4.57 | 4.52 | 4.78 | 4.57 | 4.64 | 4.52 | 4.68 | 4.64 | 4.79 | 4.38 |
| Nature | 4.55 | 4.70 | 4.36 | 4.50 | 4.63 | 4.71 | 4.27 | 4.66 | 4.47 | 4.51 | 4.82 | 4.31 |
| Development | 4.50 | 4.53 | 4.45 | 4.55 | 4.63 | 4.43 | 4.09 | 4.59 | 4.42 | 4.59 | 4.67 | 4.17 |
| Society | 4.45 | 4.47 | 4.41 | 4.55 | 4.37 | 4.43 | 4.27 | 4.43 | 4.46 | 4.51 | 4.55 | 4.24 |
| Serenity | 4.33 | 4.53 | 4.07 | 4.24 | 4.59 | 4.52 | 3.64 | 4.41 | 4.26 | 4.36 | 4.73 | 3.83 |
| Culture | 4.23 | 4.21 | 4.25 | 4.05 | 4.00 | 4.76 | 4.45 | 4.23 | 4.23 | 4.18 | 4.27 | 4.24 |
| Mental health | 4.11 | 4.37 | 3.77 | 3.86 | 4.41 | 4.48 | 3.64 | 4.20 | 4.04 | 4.21 | 4.52 | 3.52 |

Table 21: The impact of the local value ranked from most impacted to least impacted on a five-point Likert scale.

| VALUES | MEAN | GENDER | | CULTURAL GROUP | | | | AGE GROUP | | UNION | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | WOMEN | MEN | MUSLIM | HINDU | MANDI | HAJONG | 16–39 | 40+ | GAO | KUL | DUR |
| | N=101 | N=57 | N=44 | N=42 | N=27 | N=21 | N=11 | N=44 | N=57 | N=39 | N=33 | N=29 |
| Nature | 4.26 | 4.44 | 4.02 | 4.02 | 4.37 | 4.67 | 4.09 | 4.27 | 4.25 | 4.33 | 4.52 | 3.86 |
| Development | 4.19 | 4.18 | 4.20 | 4.38 | 4.44 | 3.67 | 3.82 | 4.36 | 4.05 | 4.59 | 3.97 | 3.90 |
| Mental health | 3.89 | 4.02 | 3.73 | 3.76 | 3.89 | 4.29 | 3.64 | 3.80 | 3.96 | 3.90 | 4.33 | 3.38 |
| Health | 3.72 | 3.79 | 3.64 | 3.69 | 3.85 | 3.86 | 3.27 | 3.61 | 3.81 | 3.77 | 3.85 | 3.52 |
| Education | 3.62 | 3.67 | 3.57 | 3.79 | 3.89 | 3.57 | 2.45 | 3.98 | 3.35 | 4.10 | 3.55 | 3.07 |
| Serenity | 3.45 | 3.77 | 3.02 | 3.38 | 3.63 | 3.71 | 2.73 | 3.30 | 3.56 | 3.21 | 4.03 | 3.10 |
| Culture | 3.42 | 3.51 | 3.30 | 3.26 | 3.63 | 3.43 | 3.45 | 3.41 | 3.42 | 3.54 | 3.42 | 3.24 |
| Society | 3.29 | 3.33 | 3.23 | 3.29 | 3.41 | 3.67 | 2.27 | 3.32 | 3.26 | 3.23 | 3.94 | 2.62 |
| Religion | 3.24 | 3.56 | 2.82 | 2.67 | 4.15 | 3.38 | 2.91 | 3.39 | 3.12 | 3.59 | 3.42 | 2.55 |
| Family | 3.17 | 3.26 | 3.05 | 2.95 | 3.56 | 3.57 | 2.27 | 3.27 | 3.09 | 3.38 | 3.64 | 2.34 |

# Appendix H. Key informant interviews: addressing

## H1. Demographics

Table 22: Demographics of participants of the 'addressing' key informant interviews

| Age | 18–25 | 5 |
|---|---|---|
| | 26–35 | 9 |
| | 36–45 | 3 |
| | 46–55 | 7 |
| | 56–65 | 2 |
| | 65+ | 5 |
| Gender | Man | 15 |
| | Woman | 17 |
| Ethnic group | Muslim | 10 |
| | Hindu | 9 |
| | Mandi | 7 |
| | Hajong | 6 |
| Union | Gaokandia | 13 |
| | Durgapur | 11 |
| | Kullagora | 8 |
| Jobs | Housewife | 15 |
| | Day labourer | 9 |
| | Farmer | 6 |
| | Student | 5 |
| | Other | 5 |

## H2. Coded responses

Table 23: Existing responses from key informant interviews 70 to 101

| VALUE | LOSSES AND DAMAGES | INTERVENTIONS |
|---|---|---|
| **Development** | Decrease in economic stability | Move to Dhaka (4), work more (1), borrow money (1), sell fruits at the market (1), marry off daughter earlier (1) |
| | Impact on livelihood activities | Buy products in the market (7), fortify the embankment (2), use kerosene to power the tubewell (1), use tubewell from others (1), put nets around the pond (1), give medicine to fish (1), increase chemical fertilisers (1) |
| | Impact on roads and communication system | Fortify the embankment (2), repair the road (1) |
| | Impact on material property | Repair the house (4), fortify the embankment (2), move in with family (1), temporary relocation (1) |

| | | |
|---|---|---|
| **Education** | Decrease in school accessibility | Receive information from fellow students (1), fortify the embankment (1) |
| | Loss of school books | Receive books from the school (2), buy new books (1), dry out damaged books (1) |
| | Decrease in concentration | Motivating students (1), do not study (1) |
| **Health** | Water scarcity | Bring water from the mosque, river, or another place (6), use the tubewell (3), use someone else's tubewell (1), bathe in the river (1), limit water usage (1), use water reserves (1) |
| | Food insecurity | Receive or consume dry foods (7), receive meals from others (4), buy food at the bazaar (1), cook at a neighbour's house (1), live without food (1), eat at the bazaar (1) |
| | Increase in sickness | Take medicine (5), visit a doctor (5), visit the hospital (1), plant trees (1), use cosmetics (1), stay fit (1), keep wounds clean (1) |
| | Loss of hygiene | Use the neighbours' latrine (3), bathe in the river (1), repair the latrine (1), stay at another house (1) |
| | Impact on pregnancy | Keep pregnant women safe (3), borrow a boat to go to the hospital (1) |
| **Nature** | Decrease in biodiversity and ecosystems | Plant trees, flowers or vegetables (7), use chemical fertiliser (5), water plants and trees (5), buy products at the bazaar (4), protect trees with fences (2), fortify the embankment (2) |
| | Decrease in natural beauty | Plant trees or flowers (2) |
| **Religion** | Loss of religious buildings | Repair buildings (1), perform ritual in another location (1) |
| | Religious buildings inaccessible | Pray at home (2), perform ritual at home (1) |
| | Decrease in ability to perform ritual/prayer | N/A |
| | Decrease in items related to religion | Perform ritual with less items (1) |
| **Culture** | Decrease in food-related practices | Practise ritual less (2), buy products at the market (2), water plants more (1), receive items from others (1), use less items for ritual (1) |
| | Decrease in traditional practices | Borrow money (2), hold smaller festivals (1) |
| **Society** | Decrease in social bonds | Borrow money (1) |
| | Increase in marginalisation and inequality | N/A |
| **Family** | (Temporary) migration of family members | Talk over the phone (4), visit family (1) |
| | Loss of family-related objects | N/A |
| | Increase in stress regarding (grand)children | Work more (1), fortify the embankment (1), pray (1) |
| **Serenity** | Loss of entertainment | Spend time with grandchildren (1), play in another area (1) |
| | Decrease in peacefulness | Be patient (2), pray (1), visit relatives (1), be hopeful (1) |
| **Mental health** | Anxiety, fear, stress, depression and sadness | Talk with neighbours, friends or family (13), pray (7), take time alone (3), fortify embankments (1) |
| | Sleeplessness and insomnia | Visit a doctor (1), take medicine (1) |
| | Stress of future hazards | Talk with neighbours, friends or family (1), pray (1) |

Table 24: Desired responses from key informant interviews 70 to 101

| VALUE | LOSSES AND DAMAGES | INTERVENTIONS |
|---|---|---|
| Development | Decrease in economic stability | Increase job opportunity (8), build a concrete embankment (5), improve roads (2), give job training (3), cash transfer (4), lower interest rates on loans (1), give fertiliser (1), give seedlings (1), give land (1), raise agricultural productivity (1), increase tourism (1), give building materials (1) |
| | Impact on livelihood activities | Build a concrete embankment (5), cash transfer (3), give livestock (2), give fertiliser (1), stable electricity (1), give help with irrigation (1), give a submersible pump (2), increase job opportunity (1), provide nets for ponds (1), provide medicine for fish (1), clean up sand from agricultural land (1), give land (1), give seeds (1) |
| | Impact on roads and communication system | Build a concrete embankment (3) |
| | Impact on material property | Build a concrete embankment (2), give houses (2), repair houses (1) |
| Education | Decrease in school accessibility | Build a concrete embankment (5), improve or repair roads (3), build more schools (2), build a bridge (1) |
| | Loss of school books | Give school books (1) |
| | Decrease in concentration | Give a scholarship (1), cash transfer (1), stable electricity (1) |
| Health | Water scarcity | Give a submersible pump (7), stable electricity (2), help storing water (1) |
| | Food insecurity | Plant trees (1), raise agricultural productivity (1), give land (1), lower the prices of vegetables (1), stable electricity (1), give food (1) |
| | Increase in sickness | Build or improve clinics (6), build a hospital (2), give medicine (1), build a pharmacy (1), provide free treatments (1) |
| | Loss of hygiene | Build or improve latrines (5), give a deep tubewell (2), distribute sanitary pads (2), build a concrete embankment (1), stable electricity supply (1), build a shelter (1), provide clean water (1) |
| | Impact on pregnancy | Build or improve clinics (3), give medicine (1), install a local nurse or doctor (3), improve or repair roads (3), build a concrete embankment (1), provide transport (1), cash transfer (1) |
| Nature | Decrease in biodiversity and ecosystems | Plant trees (7), build a concrete embankment (4), increase environmental awareness (2), receive chemical fertiliser (1), give a submersible pump (1), give land (1), create an animal sanctuary (1), stop sand mining (1) |
| | Decrease in natural beauty | Plant trees (1) |
| Religion | Loss of religious buildings | (Re)build religious building (2) |
| | Religious buildings inaccessible | Improve or repair roads (2), receive a concrete embankment (2) |
| | Decrease in ability to perform ritual/prayer | Build latrines (1), give a submersible pump (1), plant fruit trees (1), increase job opportunities (1) |
| | Decrease in items related to religion | Plant fruit trees (1) |

| | | |
|---|---|---|
| **Culture** | Decrease in food-related practises | Build a concrete embankment (1), implement agricultural technology (1), give chemical fertiliser (1), |
| | Decrease in traditional practises | Cash transfer (2), build religious building (1), |
| **Society** | Decrease in social bonds | Increase job opportunity (4), cash transfer (1), lower interest rates of loans (1), provide training in sustainable agriculture |
| | Increase in marginalisation and inequality | Give submersible pump (2), improve access to schools (2), improve social system (1), improve justice system (1), give latrines (1), provide medical services (1), build a concrete embankment (1), increase job opportunity (1) |
| **Family** | (Temporary) migration of family members | Increase job opportunity (7), build a concrete embankment (2), develop the area more (1), stable electricity (1), give a deep tubewell (1), give house (1) |
| | Loss of family-related objects | Cash transfer (3) |
| | Increase in stress regarding (grand) children | Build a concrete embankment (2), increase job opportunity (2), install an early warning system (1), |
| **Serenity** | Loss of entertainment | N/A |
| | Decrease in peacefulness | Plant trees (1), build a shelter (1), build concrete embankment (1) |
| **Mental health** | Anxiety, fear, stress, depression and sadness | Build a concrete embankment (5), provide access to a social worker, doctor, or psychologist (2), repair or rebuild houses (2), improve market (1), increase job opportunity (2), cash transfer (1), give land (1), build hospital (1), build latrines (1), improve education (1), build a school (1), build a clinic (1), |
| | Sleeplessness and insomnia | Build a concrete embankment (2), build a shelter (1) |
| | Stress of future hazards | Build a concrete embankment (4), build a shelter (1), install an early warning system (1), plant trees (1), build a hospital (1), build latrines (1), improve education (1), stop sand mining (1) |

# Appendix I. Survey: addressing losses and damages

## I1. Demographics

Table 25: Demographics of participants of the 'addressing' survey

| Age | 18–25 | 21 |
|---|---|---|
| | 26–35 | 26 |
| | 36–45 | 17 |
| | 46–55 | 19 |
| | 56–65 | 12 |
| | 65+ | 13 |
| Gender | Man | 48 |
| | Woman | 60 |
| Ethnic group | Muslim | 34 |
| | Hindu | 27 |
| | Mandi | 11 |
| | Hajong | 21 |
| Union | Gaokandia | 32 |
| | Durgapur | 41 |
| | Kullagora | 35 |
| Jobs | Housewife | 49 |
| | Farmer | 16 |
| | Day labourer | 11 |
| | Livestock holder | 6 |
| | Rickshaw puller/auto driver | 3 |
| | Business | 2 |
| | Housemaid | 2 |
| | Other | 10 |

## I2. Results

Table 26: The usefulness of the desired responses ranked from most useful to least useful on a five-point Likert scale

| | RESPONSE | MEAN | GENDER | | CULTURAL GROUP | | | | AGE GROUP | | LOCATION | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WOMEN | MEN | MUSLIM | HINDU | MANDI | HAJONG | 16–39 | 40+ | GAO | KUL | DUR |
| | | N=108 | N=60 | N=48 | N=34 | N=27 | N=26 | N=21 | N=60 | N=48 | N=32 | N=41 | N=35 |
| 1 | Early warning system | 4.44 | 4.28 | 4.63 | 4.53 | 4.26 | 4.65 | 4.24 | 4.26 | 4.60 | 4.47 | 4.57 | 4.29 |
| 2 | Stable electricity | 4.33 | 4.12 | 4.60 | 4.26 | 4.11 | 4.58 | 4.43 | 4.34 | 4.33 | 4.19 | 4.40 | 4.39 |
| 3 | Job opportunities | 4.23 | 4.20 | 4.27 | 4.32 | 4.30 | 4.08 | 4.19 | 4.43 | 4.04 | 4.13 | 4.34 | 4.22 |
| 4 | Shelter | 4.15 | 4.17 | 4.13 | 3.88 | 4.78 | 3.77 | 4.24 | 4.17 | 4.13 | 4.81 | 3.94 | 3.80 |
| 5 | Job training | 4.09 | 4.03 | 4.17 | 4.09 | 4.30 | 4.00 | 3.95 | 4.23 | 3.96 | 4.22 | 4.17 | 3.93 |
| 6 | Concrete embankment | 3.96 | 3.95 | 3.98 | 3.29 | 4.74 | 4.85 | 2.95 | 3.83 | 3.89 | 4.91 | 4.74 | 2.56 |
| 7 | Plant trees | 3.86 | 3.82 | 3.92 | 3.65 | 3.96 | 3.67 | 4.19 | 3.94 | 3.78 | 4.06 | 4.14 | 3.46 |
| 8 | Improve roads | 3.86 | 3.75 | 4.00 | 3.85 | 4.30 | 4.08 | 3.05 | 3.89 | 3.84 | 4.81 | 3.60 | 3.34 |
| 9 | Clinic or hospital | 3.85 | 3.83 | 3.88 | 3.76 | 3.85 | 4.08 | 3.71 | 3.94 | 3.76 | 4.28 | 3.63 | 3.71 |
| 10 | Deep motor tubewell | 3.79 | 3.78 | 3.79 | 4.24 | 3.96 | 2.77 | 4.10 | 4.02 | 3.56 | 4.06 | 3.06 | 4.20 |
| 11 | Livestock | 3.70 | 3.73 | 3.67 | 3.68 | 4.30 | 3.50 | 3.24 | 3.85 | 3.56 | 4.22 | 3.66 | 3.34 |
| 12 | Awareness raising | 3.54 | 3.38 | 3.73 | 3.38 | 3.70 | 3.50 | 3.62 | 3.74 | 3.35 | 3.66 | 3.60 | 3.39 |
| 13 | Latrine | 3.44 | 3.38 | 3.52 | 3.79 | 4.41 | 3.19 | 1.95 | 3.47 | 3.42 | 4.56 | 3.11 | 2.85 |
| 14 | Sanitary pads | 3.42 | 3.85 | 2.88 | 3.35 | 2.85 | 3.88 | 3.67 | 3.79 | 3.05 | 3.25 | 3.69 | 3.32 |
| 15 | Land | 3.42 | 3.50 | 3.31 | 3.56 | 3.85 | 3.12 | 3.00 | 3.44 | 3.29 | 3.75 | 3.20 | 3.34 |
| 16 | Seeds/ seedlings | 3.30 | 3.33 | 3.25 | 3.24 | 3.56 | 3.15 | 3.24 | 3.60 | 3.00 | 3.44 | 3.34 | 3.15 |
| 17 | Cash transfer | 3.27 | 3.12 | 3.46 | 3.79 | 2.26 | 3.73 | 3.14 | 3.26 | 3.27 | 2.94 | 3.46 | 3.37 |
| 18 | Mental health support doctor | 3.14 | 3.32 | 2.92 | 3.03 | 2.78 | 3.77 | 3.00 | 3.17 | 3.11 | 3.38 | 3.40 | 2.73 |
| 19 | No sand mining | 3.10 | 3.20 | 2.98 | 2.29 | 3.30 | 4.08 | 2.95 | 3.30 | 2.91 | 2.91 | 4.20 | 2.32 |
| 20 | House | 3.00 | 3.05 | 2.94 | 3.41 | 3.41 | 2.96 | 1.86 | 3.21 | 2.80 | 3.69 | 2.89 | 2.56 |
| 21 | Fertiliser | 2.89 | 2.90 | 2.88 | 2.91 | 2.54 | 3.15 | 2.95 | 2.90 | 2.87 | 2.84 | 3.06 | 2.78 |
| 22 | Rebuild religious building | 2.43 | 2.33 | 2.54 | 2.15 | 3.07 | 2.92 | 1.43 | 2.49 | 2.36 | 2.97 | 2.91 | 1.59 |

# Appendix J. Debriefing

Table 27: Approximate attendance of the debriefing per union

| LOCATION | ESTIMATED NUMBER OF ATTENDEES |
|----------|-------------------------------|
| Gaokandia | 70 |
| Durgapur | 25 |
| Kullagora | 15 |

There is a limited understanding of the intangible and subjective losses and damages from climate change people experience and how to address them. Fortunately, the number of studies explicitly focusing on 'non-economic' losses and damages is growing. However, these assessments are commonly shaped by top-down, standardised conceptualisations, resulting in incomplete depictions insensitive to local contexts. Therefore, we developed a loss and damage assessment methodology based on locally identified values, which we applied in Durgapur Upazilla to assess and find ways to address the losses and damages people in north-central Bangladesh face from multiple climate-related hazards.

IIED is a policy and action research organisation. We promote sustainable development to improve livelihoods and protect the environments on which these livelihoods are built. We specialise in linking local priorities to global challenges. IIED is based in London and works in Africa, Asia, Latin America, the Middle East and the Pacific, with some of the world's most vulnerable people. We work with them to strengthen their voice in the decision-making arenas that affect them — from village councils to international conventions.

# iied

Knowledge
Products