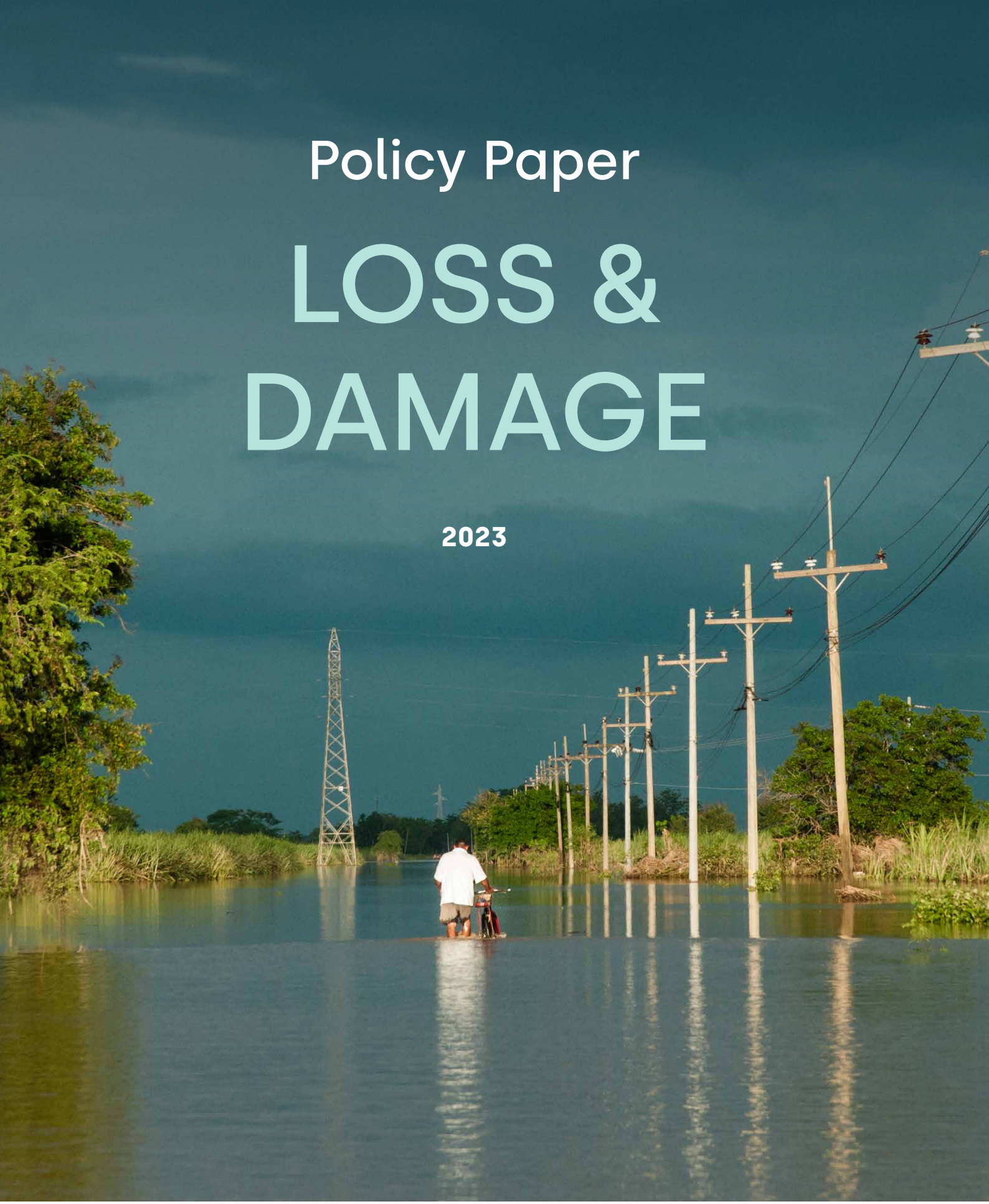
Policy Paper

LOSS & DAMAGE

2023



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DANISH RED CROSS

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Executive Summary

In 2022, Parties to the UN Framework Convention on Climate Change agreed[1] to establish new funding arrangements and a fund to assist developing countries that are particularly vulnerable to the adverse effects of climate change to respond to loss and damage. The establishment of the fund is pending final negotiations that are expected to be held at COP28 in 2023. Despite the fact that an agreement has not been reached yet, the need for funding is significant and rising in light of increased occurrence of climate disasters in recent years and the ongoing rise of greenhouse gas emissions. Furthermore, research presented in this paper demonstrates that climate disasters are becoming more difficult to manage due to the fact that cascading impacts and risks are being compounded by other adverse events.

Loss and damages of climate induced disasters

The term 'Loss and damages' is often used as one concept when addressing the negative residual impacts of climate change. However, **losses** indicate irreversible harm (like loss of land), while **damages** indicate reparable harm (like damage to infrastructure).

Climate-induced disasters refer to disasters caused by extreme weather or attributed to climate change.

Explore more definitions and methodology in Annex I and II

Effective responses to climate disasters are rooted in the needs, values, and social norms of local people, especially the most vulnerable. Locally led and multifaceted solutions for climate resilient recovery are critical for effective implementation and to secure safer futures for vulnerable communities. International humanitarian actors are already actively engaging local communities and first-responders in preparedness and locally led solutions. However, much more can be accomplished with adequate finance covering the full cycle of preparation, response, and rebuilding.

The cases presented in this paper allude to the most frequent impacts of climate disasters and examine both the economic and non-economic losses and damages as well as the responses provided. As an overview, table 1 covers disasters resulting from both sudden and slow-onset events. The paper presents the cases through a narrative description and an accompanying table where available data have been collated for each disaster. The analysis of each case also builds on qualitative data collected through interviews with key informants and desk research. The mapping of the disasters aims to provide a humanitarian perspective on the impacts, the responses and the risks linked to pre-existing vulnerabilities.

As the overview table 1 demonstrates, available data varies in terms of coverage and quality. The overview table also shows that the identified funding needs are by far greater than the financial resources received. In addition, as per the analysis, the identified financial needs often do not include long term recovery efforts that address non-economic damages such as negative impacts on mental health, or the drop out of young children from schools.

Overview table 1: Disasters covered in the report categorised by type and country.

The report presents a set of findings based on specific case studies. These findings include:

The significant disproportionate impact on vulnerable people. Unsurprisingly, the analysis indicates that vulnerable and marginalised communities are disproportionately affected by climate disasters and have fewer coping mechanisms to face these impacts in the short and long term. The deterioration of the physical, social and economic environments results in constant challenges and limits recovery strategies. This is evident across the cases presented.

Greater attention is needed for resilient recovery. The relentless cycle of climate change impacts is trapping communities in a constant struggle for recovery and is delaying the rebuilding process. Communities are capable of coping and finding solutions to immediate and longer-term needs whenever they are provided with adequate and targeted support. More holistic approaches aimed at long-term recovery and prioritising resilience would further prepare communities for future challenges and continued impacts.

Addressing losses and damages necessitates multifaceted solutions. Climate impacts are complex, and require locally-led and multifaceted solutions. A lot can be done to minimise the losses

and damages from climate impacts. This includes: increased proactive planning, anticipatory action and preparedness; establishing localised strategies, which comprise a strong community engagement to ensure that they are tailored to local needs; developing and implementing systematic tangible interventions such as pre-arranged finance or heatwave plans.

Communities, local organisations and humanitarian actors are first responders and increasingly support recovery and anticipatory actions. The efforts of both local communities and humanitarian actors increasingly span the various phases of climate disasters from anticipatory actions to long term recovery and support. Collaboration between multiple stakeholders at various stages of disaster response is essential. The case studies represent examples of effective, locally led and community driven initiatives, aimed at addressing challenges resulting from disasters. They also demonstrate the importance of anticipatory and proactive actions including building local capacities to prepare for disasters.

Current finance is insufficient. Almost all case studies demonstrate that when impacts are quantifiable, the amount of finance received is not commensurate with the identified needs. This is also illustrated in the overview table 1. On average, UN appeals were funded by a meagre 20% by mid-2023 and only targeting immediate needs. They fall short from addressing disaster preparedness and long-term sustainable recovery. International finance is also proving to be incommensurate especially for slow-onset events that often occur over several consecutive years. Finally, finance in the form of loans or credits is creating debt burdens.

Gaps in data, evidence and reporting. Data analysis in this report clearly points to significant gaps in both quantitative and qualitative data. None of the examined case studies present a comprehensive data set covering all economic and non-economic losses and damages. The gaps render it difficult to provide a coherent assessment of the impacts on people, communities, ecosystems and societies. In addition, it makes it challenging to assess the level of finance needed to repair the damages and address the irreparable losses.

The case studies underscore the complexity of fully capturing non-economic losses and damages in diverse contexts. This is particularly true for non-quantifiable losses and damages such as the erosion of cultural heritage or ecological degradation

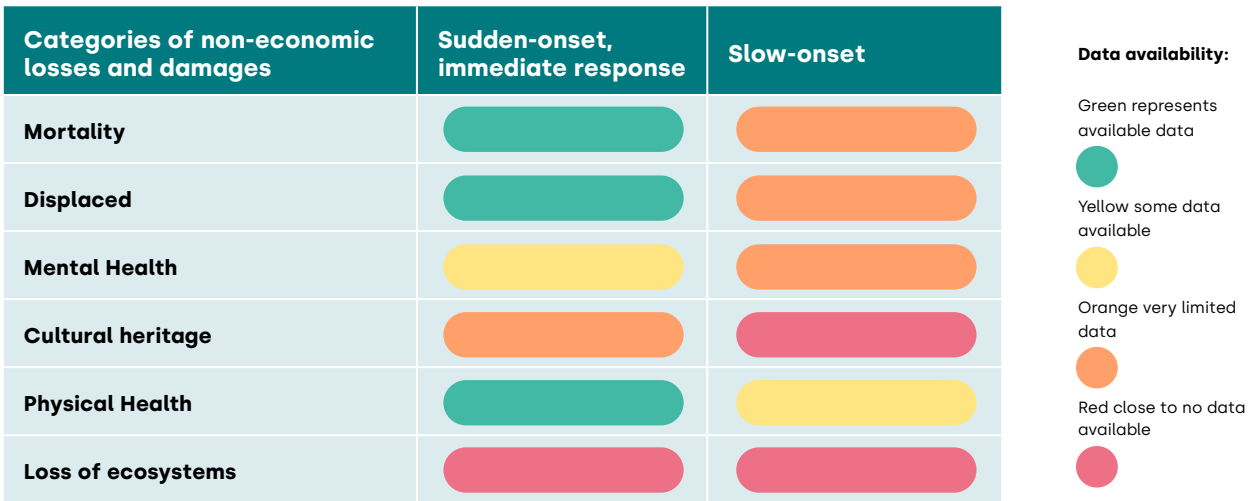

Figure 1: Categories of non-economic losses and damages and level of data availability.

as well as loss of traditional knowledge, which are not systematically monitored or reported on. Furthermore, there is a notable deficit in addressing the long-term mental health implications especially for vulnerable communities such as children, youth and women. Figure 1 categorizes the typically available data for the different case studies.

Figure 1 categorizes the typically available data for the different case studies.

Based on the case studies and the above findings, the report presents the following recommendations for actions needed to address the impacts of climate disasters in the context of the new fund and funding arrangements.

Recommendations

Finance needs to be significantly increased and many-fold to achieve long-term resilient recovery.

Local actors and at-risk-communities need to be engaged and capacitated in co-creating solutions and mechanisms for preparing and dealing with climate disasters.

Scale up anticipatory and early action to minimize loss and damage.

National, institutional, and legal frameworks, which guide a resilient, coordinated, and decentralised recovery, need to be strengthened.

The funding arrangements for a comprehensive approach to loss and damage need to be designed in a way that addresses the need for collaborative, systematic, targeted, and decentralised planning and recovery, that builds integration across timelines.

Introduction

This paper is a contribution by the Danish Red Cross and CARE Denmark to the ongoing discussions on the climate change driven losses and damages. It aims to deepen the understanding of economic and non-economic loss and damage, the way it is experienced by people and communities, and the approaches adopted by the international and local community to respond to climate induced disasters.

Loss and damages of climate induced disasters

The term 'Loss and damages' is often used as one concept when addressing the negative residual impacts of climate change. However, **losses** indicate irreversible harm (like loss of land), while **damages** indicate reparable harm (like damage to infrastructure).

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The paper is structured around 10 climate disasters that have occurred across the global south and affected people and planet both socially and economically. The paper concludes with a set of findings and policy recommendations. Reflections on the methodology, definitions, and data limitations are presented in Annex I-III.

In 2022, the Intergovernmental Panel on Climate Change (IPCC) published a report on Climate Change Impacts, Adaptation and Vulnerability[2]. This report provided a comprehensive analysis of the economic and non-economic losses and damages resulting from climate change impacts that occur despite or in the absence of adaptation action.

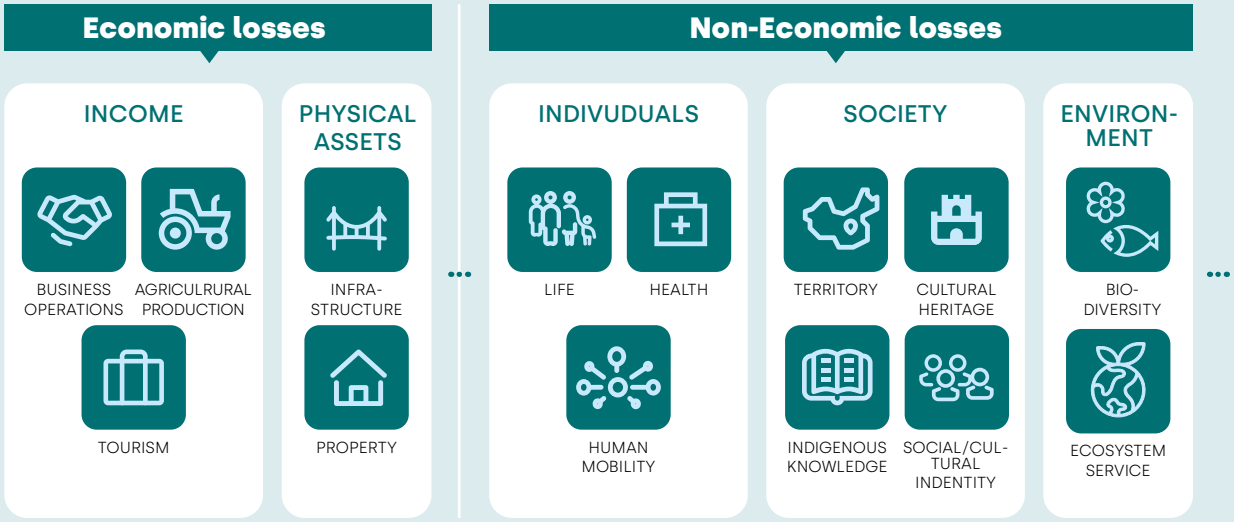
Compared to previous assessments, the sixth assessment report portrays a bleak scenario, emphasizing the complex, compounding and cascading impacts already resulting from climate change and will continue to occur in a warmer world. The economic damages will be felt across various sectors, including agriculture, forestry, tourism, and energy. Damages in these sectors directly impact people, based on the fact that they are interlinked and reinforce each other. For instance, food production will face greater challenges, leading to increased food insecurity, impacting livelihoods, affecting health, and exacerbating poverty, especially for communities least able to cope with climate change impacts. In addition, there are non-economic losses to consider, such as the fading and loss of cultural legacies, indigenous and local knowledge, the decline in biodiversity, and increasing mental and physical health impacts. Figure 1 in box 2 provides an overview of the definition of economic and non-economic losses.

Economic and non-economic losses and damages

Economic losses and damages: The primarily damage and loss of resources, goods and services commonly traded in markets such as agricultural production, infrastructure, or property. Often reparable.

Non-economic losses and damages: The primarily losses and damages that can impact individuals, society and/or the environment (e.g., loss of life or health, loss of territory, cultural heritage and identity, indigenous knowledge, loss of biodiversity or loss of ecosystems). Often irreparable. See also Puig, D. (2023) for a deeper explanation[3].

Figure 1 UNFCC's guide on economic and non-economic loss and damages[4]



Vulnerable communities play a key role in deepening the understanding of climate impacts. While they have contributed the least to climate change, they are often the ones enduring significant losses and damages that are either irreparable or costly to rectify. Moreover, vulnerable communities are pivotal in the immediate response and instrumental in restoring existing adverse effects. The most climate vulnerable countries and communities with the least capacity to manage risks, are not receiving the support they need[5]. The cases presented in this report highlight the impacts felt by communities and their role in preparing for and responding to climate impacts.

The report also builds on the understanding that loss and damage is not a linear phenomenon. There is a clear need to accelerate climate action and ambition to mitigate the harms of more severe impacts. In parallel, adaptation, resilience building, and disaster risk reduction should be diligently pursued as they can help minimise impacts. Furthermore, loss and damage must be viewed through the lens of a full disaster management cycle to maximise opportunities that reduce it, as well as build resilience and preparedness as part of response measures and recovery mechanisms[6]. In slow onset events, the full scale of the disaster is only evident after a tipping point has been reached, which demands a risk assessment that

goes beyond the short-term. The cases presented in this paper, whether they are sudden or slow onset events, attempt to capture the scale and scope of losses and damages of the specific and individual disasters.

At the 27th UNFCCC Conference, Parties reached an agreement[7] to establish new funding arrangements and a fund to assist developing countries that are particularly vulnerable to the adverse effects of climate change to respond to loss and damage. The establishment of the fund is still pending final negotiations that are expected to be held at COP28. While we await an agreement on the form of the funding arrangements and fund or the amount of finance needed and for what elements of loss and damage, the needs remain significant and are rising. This is due to the absence of the deep and immediate emissions reductions, which as per the IPCC sixth assessment report,[8] are necessary for a climate safe present and future and to mitigate against increasing, irreversible impacts for current and coming generations. Relief and aid actors have indicated that humanitarian needs related to extreme weather have been significantly increasing. For instance, the IFRC's Disaster Response Emergency Fund (DREF) provided 15% more funding in the period 2016-2021 compared to 2009-2015 to respond to extreme weather events[9].

The case studies in this paper present the full range of losses and damages, economic and non-economic as experienced by communities and the international humanitarian organisations working in the affected areas before, during and after disasters. The losses and damages include and reach beyond the remit of humanitarian and disaster financing and therefore need scale up action to respond to gaps with new and additional sources[10]. Humanitarian assistance is focused on saving lives, alleviating suffering, and maintaining human dignity. It is needs based and supports people to prepare, respond and recover from all types of disasters. It is important to note that beyond humanitarian actors, engaging, recovery and reconstruction actions are also handled by development actors[11]. The degree of assistance, which an impacted country and people may receive is uncertain, and funding is often unequal across different emergencies, as it is evident in the following case studies. The humanitarian system is increasingly overstretched and underfunded, while also responding to more complex, multiple and overlapping crises. Despite the rising need, funding levels have stagnated. In 2021, UN-coordinated appeals requested a total of USD 38.4 billion, but 44% of this amount remained unprovided.

Key indicators

In the case studies you will encounter indicators used to measure the magnitude of a disaster. The aggregating key indicators follow the below definitions:

Total estimated damages: An estimated value of all damages and economic losses directly or indirectly related to the disaster.

Total affected population: Covers the number of people requiring immediate assistance during an emergency, people injured by the disaster, and people who became homeless (destroyed or damaged houses) due to the disaster.

Explore limitations of the indicators in Annex I.

AFRICA

– Tropical Cyclone Freddy in Malawi, 2023

– Drought in East Africa, 2020-2023

– Floods in the Sahel, 2022

Tropical Cyclone Freddy in Malawi, 2023

Tropical Cyclone (TC) Freddy hit Malawi harder than the early warning systems had anticipated. The event developed into the longest-lived cyclone recorded in history. Communities, which were previously spared from climate disasters, now faced damages from the flooding and mudslides that followed the cyclone.

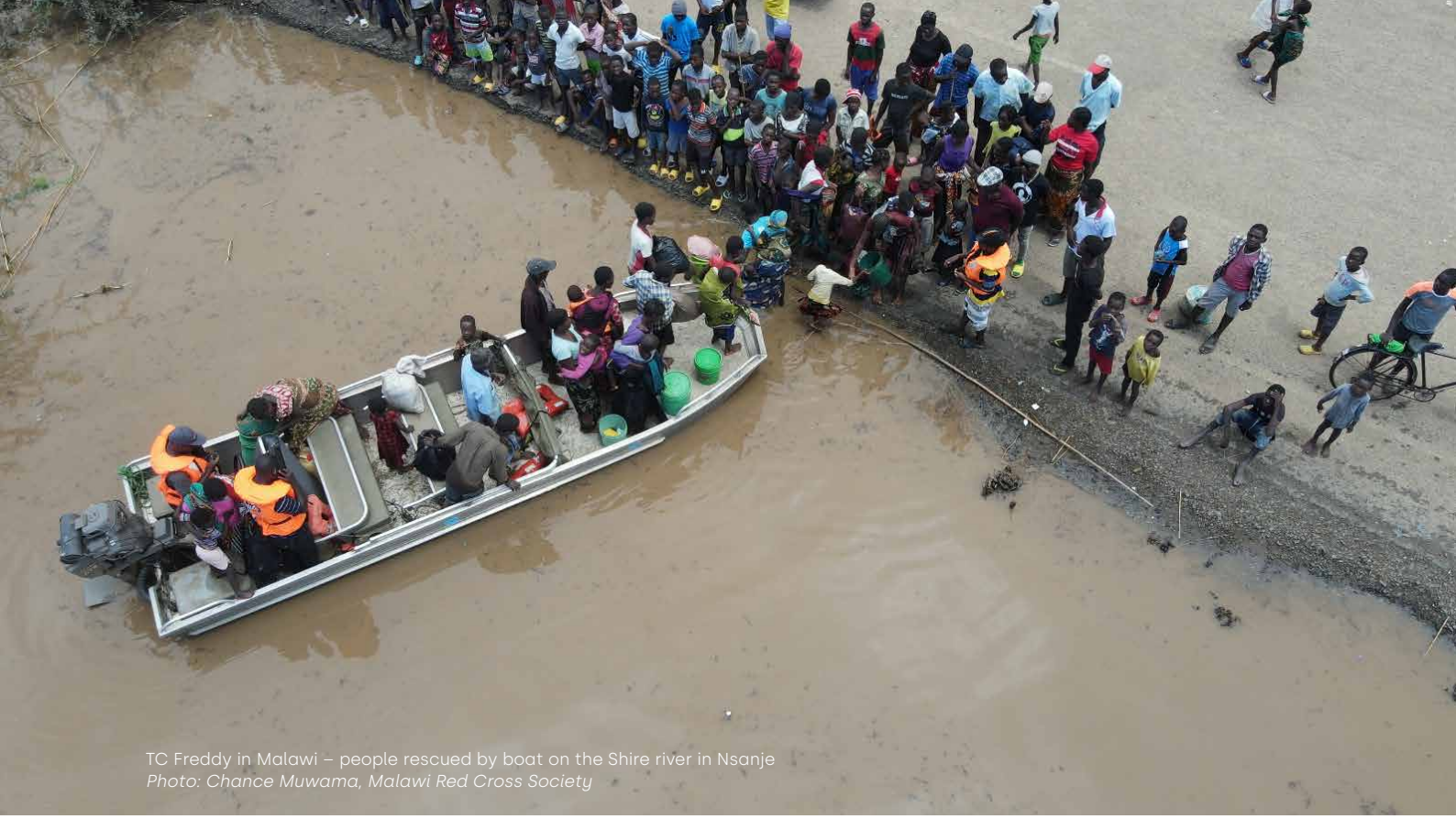
Tropical cyclone (TC) Freddy was a record-breaking phenomenon. It became the longest-lived tropical cyclone recorded in history, and it set the record on the highest accumulated cyclone energy (ACE) ever. The ACE of Freddy was equivalent to an average full hurricane season in the North Atlantic. Freddy caused widespread damages over the region of Malawi, Mozambique, and Madagascar, where it made landfall after originating northwest of Australia[1]. TC Freddy brought devastating storms, rains, floods, and landslides. The disaster was particularly severe in the districts of Chikwawa, Mwanza, and Mangochi and had significant impacts on 11 other Malawian districts. The cyclone led to unprecedented mudslides and flooding, especially in the southernmost districts[2].

The consequences of the disaster were grave, with impacts on food security, health, infrastructure, and livelihoods. People were displaced, and whole communities were wiped away due to landslides that followed the cyclone. Compared with earlier cyclones in Malawi, landslides following Freddy accounted for most fatalities, whereas in previous disasters, flooding was the main culprit[3]. The damages from the cyclone were traumatizing for the Malawian people. During and after the disaster, communities and first responders pulled together to react to the emergency across the impacted areas. However, the magnitude of the disaster was overpowering as the mudslides had destroyed whole villages, 679 lives were lost, and more than 650,000 people were displaced[4]. As one interviewee said: *"The whole country gives what they can. You are talking about whole livelihoods gone. Whole heritages gone." – CARE International*[5]

Compounding crises enhanced the severity of the damages.

All aspects of Malawian society were affected by TC Freddy. However, in light of the magnitude of the disaster and existing vulnerabilities, it is difficult to distinguish the effect of Freddy from the impacts of other crises in the country. Malawi already had one of the highest rates of food insecurity in the World before TC Freddy. In 2020, more than 80% of the population faced moderate or severe food insecurity[6]. TC Freddy added to this crisis by destroying fields, crops, food stocks, and cooking material, affecting more than 1.6 million people in Malawi with food insecurity[7].

Before TC Freddy, Malawi witnessed one of the worst cholera outbreaks in years. In March 2022,



TC Freddy in Malawi – people rescued by boat on the Shire river in Nsanje
Photo: Chance Muwama, Malawi Red Cross Society

an official cholera outbreak was declared, peaking in early 2023. TC Freddy disrupted the response to the outbreak in 2023 as it damaged health facilities, water systems, and sanitation facilities. In the weeks following TC Freddy (13-26 March 2023), the IFRC recorded 1,110 new cases and 23 new deaths from cholera (out of a total of 58,000 cases and 1,700 deaths)[8]. The indirect losses and damages from TC Freddy thus added to the direct impacts.

Tropical Cyclone Freddy was not a lone event. In preceding years, several compounding climate-disasters occurred and had significant impacts on communities. The effects of TC Freddy were multiplied by the fact that many people were already displaced or had lost access to clean water due to storms Ana and Gombe in 2022, adding to the existing health crisis in the country[9].

In April 2023, it was estimated that the cyclone had affected more than 2.2 million people. Around 660,000 people had been displaced, 679 people lost their lives and 530 people remained missing. The early warning systems proved to be effective. Warnings about the cyclone were broadcasted on the radio, which saved many lives. They enabled people in rural areas for example to move to higher grounds. However, in urban areas, where TC Freddy reached unprecedented and unanticipated intensity and pockets populated by people displaced by last year's cyclones,[10] many people died.

Losses reached more than USD 500 million across sectors

The disaster had a significant impact on various sectors, including education, healthcare, transport, WASH, tourism, agriculture, and fisheries. Vulnerable groups, such as women and people with disabilities, were disproportionately affected. The disaster significantly increased food insecurity and disrupted lives and livelihoods including farming, housing, and education. To date, the government of Malawi has estimated losses and damages in the social, productive, infrastructure, and cross-cutting sector that reached more than USD 500 million. Economic damages and losses of housing (USD 124 million) and transport (USD 111 million) were the largest. However, crops and irrigation infrastructure (USD 100 million in total) were also severely hit. The losses and damages to these sectors impact people's lives directly as they are not only losing their homes, but they are also witnessing the destruction of their livelihoods and income bases. The reconstruction

costs in Malawi will be substantial – not all costs have been captured yet[11].

The rebuilding efforts in Malawi are hampered by the reluctance of donor countries to provide financial support to a seemingly endless chain of disasters. The rebuilding after Ana and Gombe in 2022 was disrupted by the impacts of TC Freddy[12]. UN OCHA reported almost USD 11 million in response to TC Freddy, USD 700,000 went to logistical support and USD 1.2 million to Shelter NFI. However, this only covers a small fraction of the damages.

The mental health and educational effects on children

Cyclone Freddy resulted in 25 days of school closures. More than 400 schools were used to house displaced people and almost 725,000 school children stopped attending classes. According to the post-disaster needs assessment (PDNA), the risk for gender-based violence and violence against women and girls increased, highlighting the marked vulnerability of these groups[13]. In general, the cyclone has particularly affected children´s mental health as they endured recurrent cyclones. However, addressing the mental well-being of impacted people has not been the priority in Malawi, especially as physical health is deteriorating simultaneously. The health sector is focusing on injured people, the cholera outbreaks, pregnancies, and HIV while simultaneously facing the reality that entire medical centers have been completely washed away by the cyclone[14].

Biodiversity and cultural loss as a result of TC Freddy

The cyclone also resulted in non-economic losses including in ecosystems, biodiversity, and cultural heritage. As farming and crop failure ensued, communities turned to Lake Malawi for food[15], which led to overfishing. UNDP investigated the effect of TC Freddy on biodiversity loss in Malawi. Despite the fact that findings are not published yet, they point to several impacts. Damaged farmland leads to environmental degradation as mudslides wash away valuable topsoil. TC Freddy also hit national parks. The severity of the cyclone put animal diversity at risk. The damages produce more solid waste and wastewater. Debris from destroyed houses are washed into rivers and water bodies increasing the risk of contamination. Finally, rebuilding efforts place extra demand on sometimes scarce natural resources. People need to rebuild their communities, they will use natural resources (e.g., trees) to build back houses, bridges, and basic infrastructure[16].

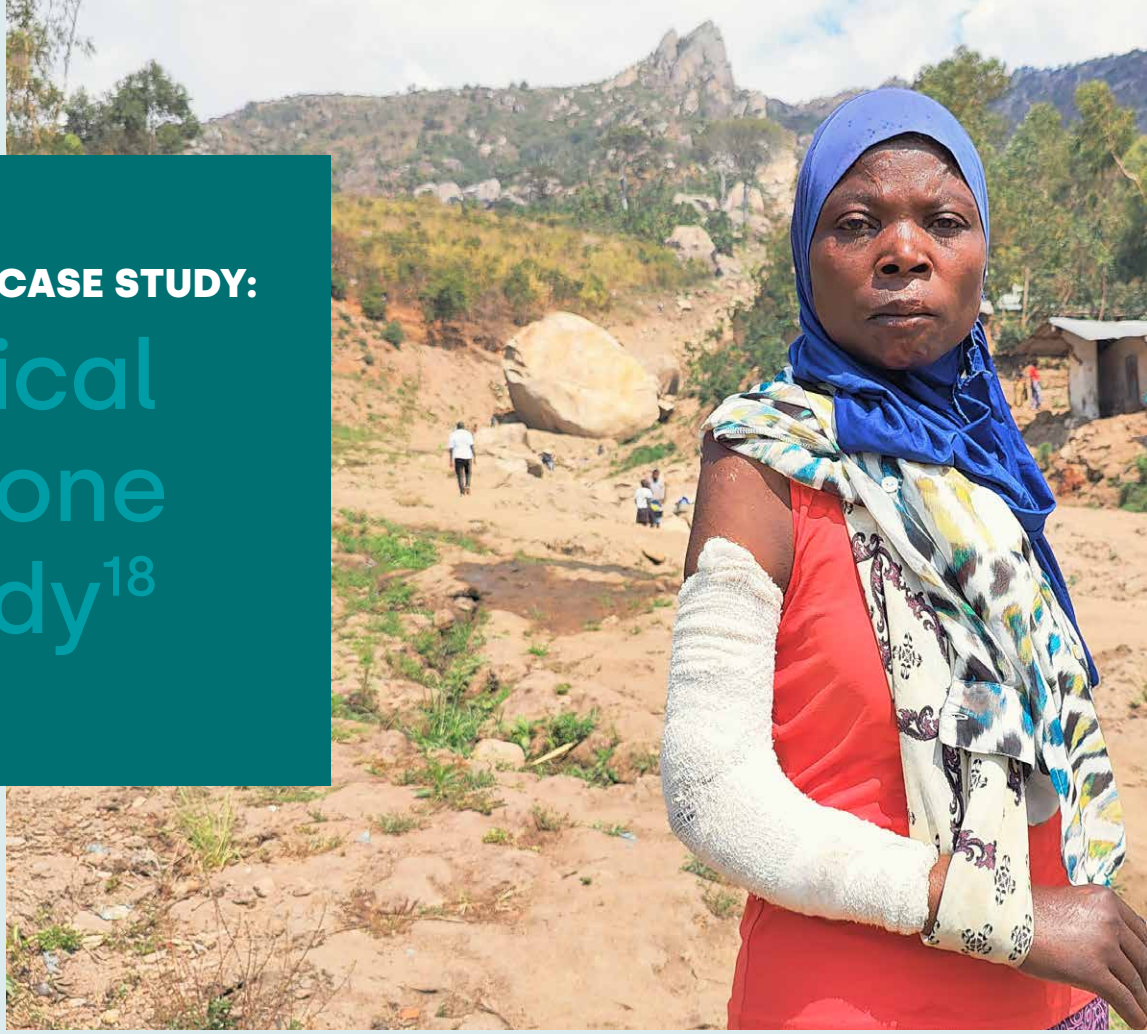
TC Freddy resulted in both non-economic and economic losses and damages in the cultural heritage sector. The sector has suffered both directly and indirectly. Water and structural damages directly affected historic monuments, raising costs to more than USD 750,000. Meanwhile, the indirect costs from loss of visitors, market access, and decreased revenue amounted to USD 500,000. Further, non-economic (and non-quantifiable) losses such as the loss of knowledge holders, practitioners, and significant impacts to the living heritage of particularly displaced people were observed and are impacting social cohesion[17].

TC Freddy in Malawi picture: Chikwawa broken bridge
Photo: Chance Muwama, Malawi Red Cross Society

Malawi Lake
Photo: Jakob Dall/Danish Red Cross

DEEP DIVE CASE STUDY:

Tropical Cyclone Freddy[18]



Lukia Nachamba from Nkulimba village;

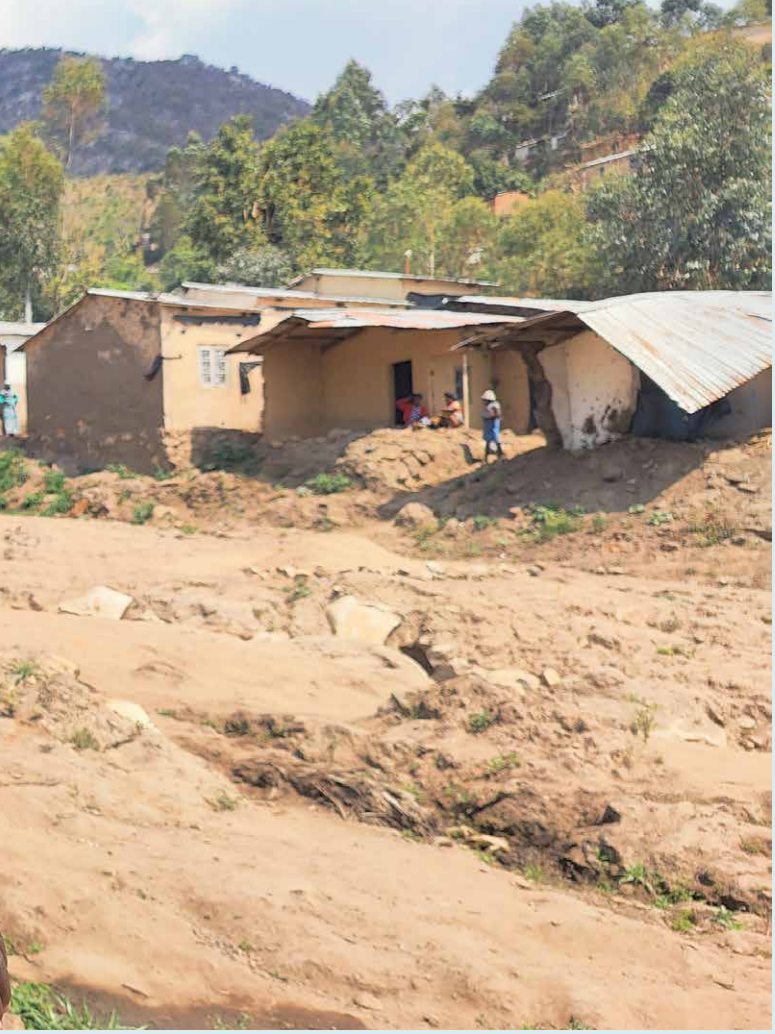
Surviving a mudslide

In the village of Nkulimba, located in Blantyre City in Malawi, Lukia Nachambe and her family continue to live with the devastating consequences of Tropical Cyclone Freddy. Living at the foothill of Soche Mountain, Lukia and her family were directly impacted by a catastrophic mudslide triggered by the relentless rains accompanying the cyclone.

With a sombre voice Lukia recounts how she heard a warning on the radio where they announced a cyclone called Freddy. "As many of us, I thought that the cyclone would not hit where I live but hit other areas further south like it has done previously." However, relentless rains resulted in a massive mudslide from Soche Mountain. Lukia remembers how she was shouting for her children and her husband, before being hit by the mudslide herself and losing consciousness. She recounts the sound from the mountain and how "the mud came, moving like an earthquake". While Lukia and two children ran out in the middle of the night, her oldest child tried to save the house and her husband tried to save their youngest child. Tragically, the enormous force of the mudslide washed away the house and family. Her husband was later found buried in the mud while clutching onto their youngest child, both dead. Her oldest child has never been found. Lukia herself suffered severe chronic injuries and relies on the support of family and community members for the most basic tasks, further compounding the tragedy and loss of self-sufficiency.

The difficult path of recovery and repair

In the aftermath of Tropical Cyclone Freddy, Lukia, faced severe challenges in her path to recovery. Lukia's brother recounts the difficult journey she endured, including a week-long coma and three months of hospitalisation to recover from her severe



Lukia Nachamba stands where her house used to be. Here she lost two children, her husband, and was chronically injured. In the background is Soche Mountain and a 6x6m boulder that descended with the mudslide.

injuries. She is still struggling with a traumatic brain injury and her mental health following the experiences and the losses she endured.

Lukia's struggles extend beyond her immediate injuries and loss of loved ones. She has also lost her source of income from the houses she used to rent out, which were washed away during the cyclone. The entire village bears the scars of the mudslide, with the once-thriving market reduced to just a few stalls. Lukia explains: “we now use the market at the foot of the mudslide, but it is just a few small stalls”. When asked about the future, Lukia responds "There is no hope."

The village nursery schools have been either buried under the mudslide or washed away, further exacerbating the challenges faced by the community. Villagers still sometimes discover clothing buried in the mud, serving as a painful reminder that those items belonged to individuals who lost their lives in the mudslide.

The impact of the disaster goes beyond physical damage. Besides the mental health impact on individuals that have lost family members, homes and their livelihoods, the bonds that once held the community together have frayed, leading many to leave in search of safer environments. Those who remain in the village live in constant fear, particularly for the safety of their children, who are no longer allowed to run around freely to play, as adults tell them to not leave their side whenever there is a thick cloud in the sky. The surviving children are left wondering about the whereabouts of their friends, as parents and adults try to shield them from the traumatic truth.

It is evident that the cyclone has left a lasting impact on Lukia and the entire village. About 500 families lost their homes, and an equal number were declared dead or missing. In the chaos that ensued, many, including Lukia, couldn't bid a deepfelt farewell to their loved ones as proper burial ceremonies could not be held. The community feels abandoned as no reconstruction efforts have been initiated. The lack of assistance adds to their frustration and sense of being forgotten.

Yet, amidst the despair, there is also a show of resilience. Lukia's sister, Malliam, reveals the determination to rebuild their lives and community. "We are working for a place where we can be together, to start a small business like before," she explains. Lukia's brother echoes this sentiment, emphasizing the need for support not only for their own families but for the entire community that has suffered.

The story of Lukia and her community reflects the harsh reality faced by many in the aftermath of Tropical Cyclone Freddy. It sheds light on the urgent need for support and reconstruction efforts to help these communities rebuild their lives and restore hope for a better future.

Tropical Cyclone Freddy (Malawi), 2023[19]

Type of event: Sudden onset.
Vulnerability: Malawi ranks no. 161 on the ND-GAIN score, showing high vulnerability to climate change and low readiness for making effective use of investments for climate adaption
Affected population: 2,514,913 (children: 1,408,351; women: 1,308,064; men:1,206,849)
1.1 million people with disabilities (Women:132,837 Men: 127,628)

<table>
<tr><th colspan="2">Economic</th><th colspan="2">Non-Economic</th></tr>
<tr><td colspan="2">Damages: USD 347.2 million
Losses: USD 159.5 million
Total Estimated Losses and Damages: USD 506.7 million
GDP effect: 0.5% slowing growth by 2.2%</td><td colspan="2">Food Security:
20% of the population face acute food insecurity</td></tr>
<tr><td colspan="2">Funding Received:
Malawi Government appeal: USD 143.6 million (USD 36.3 million or 25% funded as of April 2023).
UN OCHA request USD 116 million for cholera and TC Freddy response; 25% has been received. UN OCHA funding to TC Freddy equals USD 10.8 million as of 30 April 2023.</td><td>Mortality
Total: 679 (as of March 2023) – expected to rise as 537 missing.</td><td rowspan="2">Physical Health
2,186 injured.
1,033 Malnourished Children in camps.
2,385 chronically ill people displaced and living in camps.
Cholera was already an issue in the affected areas with 5,191 cases in February 2023.</td></tr>
<tr><td>Damage to public buildings
Primary Schools: 550
Secondary Schools: 74
Hospitals: 63</td><td>Loss of Land:
Houses damaged: 260,681;
Destroyed: 120,394.</td><td>Displaced
Total: 659,278
Women: 336,252
Children: 371,512</td></tr>
<tr><td>Damage to infrastructure:
405 km of roads.
Energy subsector is estimated at USD 11.43 million in damages through impaired transmission and distribution lines; Partial damage to about 63 solar photovoltaic installations.</td><td>Agriculture & Fisheries:
Agriculture: 54,949 Ha affected, equivalent to 26.8% of total hectares planted during the 2023/24 agriculture season.
545,734 farming households (Women: 322,081; Male 223,653).
Livestock sub sector: 285,569 livestock owned by 104,565 households.
Fishing and aquaculture: 1,483 affected fish farmers</td><td>Mental Health Impacts:
Increased emotional and physical distress.
Reduced ability to lead a healthy life.
Reduced physical and mental wellbeing.</td><td rowspan="2">Loss of ecosystem services
Soil erosion causing ormation of deep gullies including on the roads and as well as damage to forestry and water points, fertile topsoil buried in sand land degradation.

Siltation and change of river lines.</td></tr>
<tr><td>Damage to telecommunications:
No data available</td><td>+ Sectors
17,704 business premises for MSMEs were partially destroyed; 6,741 premises for MSMEs fully destroyed; 93 large industries affected.</td><td>Cultural heritage sector:
Damages of USD 756,125 (to structures, sites, monuments, etc.).
Losses of USD 529,575 (loss of economic revenue etc.).
Significant unquantifiable impact to living heritage.</td></tr>
<tr><td colspan="2">Access to Water/WASH:
994,784 people in need of WASH services.
89,476 household latrines collapsed (460 in public, 693 in schools).
2,695 boreholes damaged.
37 gravity fed water schemes damaged.</td><td colspan="2">Freddy will likely lead to food insecurity, loss of income, and increased poverty.
Sense of place and social cohesion is affected, including the ability to solve problems collectively and social bonds and relations.</td></tr>
<tr><td colspan="4">Pre-existing vulnerabilities
Poverty in Malawi is high and persistent 51.5% of the population is living below the poverty line (measured in 2016/17 as ISH4 approach).
The country is highly dependent on rainfed agriculture.
Cholera outbreak 2022-2023.
Successive climate events – Tropical Cyclones in 2015, 2019, and 2022.
Housing and infrastructure construction and materials are not resilient.
Environmental degradation increases risk from climate shocks.</td></tr>
</table>

Drought in East Africa, 2020-2023

The prolonged drought in the East African region (Kenya, Somalia and Ethiopia) has impacted 32 million people and led to reduction of agricultural productivity and food insecurity. Through concerted efforts, almost 16 million people received humanitarian assistance. In addition to immediate needs, Pastoralist communities experience losses related to their own value systems such as human mobility practices, cultural heritage, sense of place and social cohesion as well as the loss of territory. Unfortunately, the international donor community responded more slowly to the drought in comparison to other sudden disasters and emergencies. So far, the East African region received only 24% of the needed funding. The International Rescue Committee (IRC) has named Somalia and Ethiopia as the two most urgent humanitarian crises partly due to underfunding.

The drought affecting the region is the worst since over 40 years following five consecutive below-average rainy seasons. The March-May 2022 rainy season was the driest one recorded in 70 years[20]. Despite the fact that this case study focuses on the drought, it is important to mention that the region is impacted by a complex mix of drought and flooding, where rain falls unpredictably and is non-aligned with the agricultural season[21]. The geographic landscape is composed of mountains, coastal areas, rivers, ridges, lakes, and desert. Droughts and flooding are serious disasters and have impacted the area since the 1970s[22]. In addition to climate change and extreme weather; the region is prone to conflict, and unstable economic shocks like high food prices, which compound climate change driven disasters[23].[1]

The drought has been the subject of intensive climate attribution research. The research from World Weather Attribution found that *"climate change has made events like the current drought much stronger and more likely. A conservative estimate is that such droughts have become about 100 times more likely."* [24]

The difficulty of attracting funding to a slow onset event

In the humanitarian definition, drought is a slow onset event. Whilst the systemic contributors of the drought make for worse effects, the international donor community typically reacts with a certain

[1] For the purposes of this report, the following case covers impacts in Somalia, Kenya, and Ethiopia.

level of inertia to slow onset events compared to sudden crises. Slow onset climate induced disasters thus face the difficulty of attracting sufficient attention and financial support from the international community. Without personal stories that bring a sense of urgency, or scientific evidence that early preventive support reduces the necessary aid, it is difficult for NGOs to attract the necessary financial support[25].

Financial support is dependent on monitoring impacts and prioritizing funding allocation between different crises. Slow onset events often get deprioritized as they attract less attention and visibility (e.g., slow onset droughts vs cyclone disasters). Furthermore, the local population can find it equally difficult to react in a timely manner despite the use of early warning systems either because they have nowhere to move, are awaiting the crisis to worsen (and then *reacting* to it), or because affected populations already living in poverty have low levels of coping capacities[26].

So far, 24% of the requested funding has been received. The IFRC focusses the use of financial aid on directly supporting communities in taking early action, reduce their own risk to the effects of the drought and improve livelihoods. This is achieved through actions that are aimed at, for example, preventing the loss of livestock; WASH interventions such as reducing the incidences of water-borne diseases and adaptation activities that improve food savings, water harvesting and climate smart agriculture. These initiatives are aimed at increasing the resilience of vulnerable local communities.

The humanitarian consequences of the drought

The drought has resulted in approximately 32 million people in need of humanitarian assistance across Kenya, Somalia, and Ethiopia. Of these, humanitarian assistance targeted almost 25 million and reached 16 million from January to March 2023, corresponding to a coverage of around 50%[27].

The area is characterized by a complex climate with multiple shocks worsening the situation of an already vulnerable population. The most prevalent effect from the drought is the scarcity of water, making farming, agriculture, and livestock almost impossible to continue. Agriculture is the largest sector in the region, employing up to 80% of the people in Somalia and almost 70% in Ethiopia (data was not available for Kenya). Large areas of farmland are dependent on rain, and the drought continues to affect the ability to continue farming and herding. It is estimated that 13.2 million livestock have died across the region, which in Kenya alone is estimated to reach an astounding USD 1.5 billion[28].

NGOs respond to the drought disaster with food distribution and cash transfers, which are lifesaving since it is difficult for the affected people to move away from the drought-stricken areas. For pastoralist communities moving is difficult because the drought is so comprehensive that it is simply too far to reach an area with water, while sedentary small-holder farmers do not have access to land in other areas. Relocation is further difficult

Ethiopia
Photo: Jakob Dall/Danish Red Cross

because the conflict in the region has intensified. According to informants from Ethiopia and Somalia, many cities are under siege and people are unable to relocate to safer areas[29].

Hunger, food instability, and corresponding malnutrition are the worst consequences of the ongoing drought. Official reporting estimates that 23.5 million people are in *crisis, emergency,* or *famine* level (IPC3+) of food insecurity across the Horn of Africa. Furthermore, there are 4.3 million acutely malnourished children[30].

The disproportionate impact on Vulnerable Groups and Communities

Vulnerability in drought-stricken areas is most apparent for people without access to water, and because of the prolonged drought, the region's water resources are starting to be rationalized. According to OCHA, 25 million people are living with daily household water insecurity[31]. As mentioned above, the current drought covers such a large area that pastoralist communities are not in a position to migrate to non-impacted areas. Furthermore, pastoralist people who used to rely on migration routes now risk finding their routes closed or their resource agreements changed because the water deficiency increases the tendency to enforce land rights that are not harmonious with a nomadic culture[32].

As a result, the nomadic lifestyle is challenged by the prolonged and extensive drought. As a coping mechanism people are increasingly migrating from rural to urban areas in search for better economic and livelihood opportunities. The number of internally displaced poor people living in urban areas has increased. However, this section of the population is particularly vulnerable as their income is minimal, and the drought reduces the amount of food grown locally, which further drives food prices upwards,[33] adding to the already strenuous situation. UNHCR has estimated that 1.1 million Somalis and 590,000 Ethiopians have been internally displaced due to the drought[34].

Future prospects for the rural areas and for restoring agricultural productivity seem bleak. The drought has resulted in land and soil degradation through washed away soil nutrients and trees, leaving agricultural land barren and unfertile. According to informants, it would take the drought-stricken, degraded areas 20 years to revive conditional adequate investments in irrigation and planting techniques[35].

Against this backdrop, it becomes imperative to identify and develop long term coping mechanisms in close cooperation with impacted communities. These must focus on resilient recovery that enables communities to better withstand future climate impacts.

Drought in East Africa, 2020-2023[36]

Type of event: Slow onset.

Vulnerability: The countries in East Africa (Kenya, Somalia, Ethiopia) rank number 150, 178, and 163, respectively on the ND-GAIN score. All countries show low readiness and high vulnerability to adapt to the negative effects of climate change.

Affected population: 31.9 million people in need across Kenya, Ethiopia, and Somalia (17% of the total population)

Economic

Estimated damages:
USD 2 billion (reported value of damages from Kenya 2020, Somalia 2020, and Ethiopia 2021).

Funding Received
Response to government-led efforts: USD 1.2 billion funded across Ethiopia, Kenya, and Somalia (24% funded of combined drought appeals as of March 2023).
Somalia: USD 2.6 billion appeal (26% funded)
Kenya: USD 451.8 million appeal (21% funded)
Ethiopia: USD 2.05 billion appeal (20% funded)

Damage to public buildings:
No available data.

Loss of Land:
No available data.

Damage to infrastructure:
No available data.

Agriculture & Fisheries:
Damages in crops: 89,198 Ha (Ethiopia; April and May 2020).
13.2 million livestock deaths.

Damage to telecommunications:
No available data.

+ Sectors
No available data.

Non-Economic

Food insecurity:
23.5 million people in crisis, emergency & catastrophe levels (IPC3+)

Mortality
Children: 2
Adult: 3

Physical Health
- 4.3 million acutely malnourished children
- 743,000 acutely malnourished pregnant and lactating women
- 40,700 suspected/ reported cases of cholera/ AWD
- 38,600 suspected/ reported cases of measles

Displaced
2.7 million people internally displaced by drought

Mental Health
No available data.

Loss of ecosystem services
Land degradation resulting from the drought and following floods.

Access to Water/WASH:
25 million people living with daily household water insecurity.

Cultural heritage:
Pastoralist communities lose ability for seasonal migration.

Pre-existing vulnerabilities
Conflict prone areas.
Food and water insecurity was already prevailing before the current drought.
High food prices due to inflation and geopolitical factors
Recurring drought and floods.
High poverty rates.

Floods in the Sahel, 2022

The flood in the Sahel occurs in a region characterised by a high level of pre-existing vulnerabilities and an ongoing polycrisis spanning conflict, food insecurity, economic distress, and fragile governance systems. The displacement caused by the flooding has been massive and has led to further conflict potential between displaced and host communities.

The case shows that early warning systems need to be complemented by effective coordination and sufficient capacity to react and respond to the warnings. The role and burden on communities and first responders is high and the impacts on the mental health of affected people is significant. The case further demonstrates that coordination between countries is key, especially in situations where they share transboundary river systems. The data available for this transboundary case is sparse and greatly varies between countries making it difficult to compare impacts.

During the rainy season in 2022, West Africa and the Sahel were hit by the most intense floods in years. The floods affected several countries including Nigeria, Chad, Niger, and Mali[1]. To the extent possible, the following case study will examine the effect of the disaster across all countries, with emphasis on Nigeria and Niger.

The rainfall, which triggered the flooding across countries in the Sahel has been subject to substantial research on the ways climate change has affected the intensity of the disaster. A study by the World Weather Attribution concluded that one part of the flood (around the lower Niger Basin) was made *twice as likely* by climate change and approximately *5% more intense*. Whereas climate change has made the flood that occurred over the Lake Chad region *80 times more likely* and *20% more intense*[2].

The flooding affected an area, which was already grappling with conflict, food insecurity, an economic crisis, socio-economic consequences of COVID-19, and other climatic shocks like the earlier inundations of 2021 as well as droughts[3].

Mental and physical health impacts

The 2022 floods affected nearly 5.5 million people particularly in Chad, Nigeria, Niger, and Mali. Displacement of people was the main challenge as houses in both rural and urban areas were completely flooded and people needed relocation. In Nigeria, several affected areas were only accessible by boat and the coordination of the flood response was a huge task for NGOs and government alike[4]. It was impossible to establish the total number of displacements. However, the

flood displaced 1.4 million people in Nigeria and 158,000 in Chad[5]. In Nigeria, 2.8 million people were affected, with more than 600 lives lost and 2,500 injured. In Niger, 322,000 people were affected including 195 lives lost and 185 injured[6].

The loss of livelihood associated with the disaster has been immense. When people returned to their communities after the flood their belongings were damaged. During the flood, people lacked access to their lands, livestock, and other assets that make up the basis of their livelihoods[7]. Moreover, roads and infrastructure were damaged, leaving some communities completely isolated and unable to reach markets, which limited income from sale of products[8]. The flooding of latrines and poor latrine coverage (especially for displaced people) contaminated water for domestic use. Cases of diarrhoea and cholera have been reported, especially in Nigeria[9].

Following the flood, the region, which was already facing a multidimensional crisis, is witnessing the worst food insecurity crisis since 1999. Food insecurity affected 40 million people in the region (phase 3+) before the floods, and 80-90% of the population is dependent on the agropastoral sector which is particularly vulnerable to floods and other climate disasters. The flood destroyed croplands across the region. In Nigeria alone, more than 500,000 hectares of cropland was destroyed corresponding to food feeding 3.3 million people for a year[10].

In Niger, post-flood negative mental health impacts have been observed. The affected population is anxious about the future due to uncertainty and the increased likelihood of climate disasters in the absence of sufficient coping mechanisms that enable meaningful reactivity. As a response, the Danish Red Cross provides a community safe space for children, offering recreational activities. For adults, the situation is more complicated in light of challenges to meet their own and their families´ basic needs (hunger, sanitation, shelter, education). The Danish Red Cross notes the psychological impacts for both males and females as they experience the need to protect their families without the tools and opportunities to do so. The Danish Red Cross therefore also supports affected people in advocating for their basic human needs[11].

Locally and nationally anchored support for loss and damage

The support from international organizations, and the IFRC in particular, has focused on building capacity in local communities to better prepare for future floods. Ideally, there would be a focus on rebuilding the damaged villages in a more resilient and sustainable manner, but often, it is the villagers' own limited resources that are used to rebuild. Therefore, humanitarian and relief organizations focus on capacity building, e.g., training the locals in maintaining the villages and cleaning drains to prepare for future floods and reduce their impact on the villages themselves[12].

Support for anticipatory action within government structures have been in focus in Niger, e.g., with systems linked to anticipate, prevent, and respond to river flooding[13].

Many factors contribute to the impact and the intensity of flooding in the region. Climate change is one of them. In general, early warning systems can increase the effectiveness of disaster response, and save lives if people react to the warnings. However, the technical systems alone are insufficient. Capacity building for governments and local commitment is needed to react efficiently, save livelihoods, and rebuild communities better after a climate disaster[14]. With regards to the flood in Sahel and in Nigeria in particular, intergovernmental coordination did not work well as the devastation of the disaster was further driven by the release of the Lagdo Dam in Cameroon, sending more water into the overflowing rivers. The dam in Cameroon was designed to be accompanied by a dam in Nigeria that was never built. Therefore, Nigeria was not equipped to deal with the increased river flow.

Sahel floods (Niger)
Photo: Zouloukalleyni Dourfaye

Further, proximity of villages, infrastructure, and agricultural land to flood plains have increased the devastating impact of the flood[15].

Communities and biodiversity suffer from the flood

The main issue in Niger is that people rely on their communities for social support. When floods happen and people are displaced, they lose their social structures in the host community and thereby their social security net. This issue is bigger for people who are already internally displaced, which makes them even more vulnerable[16].

In Nigeria, it is not just the people moving away from their communities that are vulnerable, it is also the people left behind. Rural-urban migration affect the people (often women and children) left behind in the rural areas, and these rural areas are more vulnerable to flooding as they are often located closer to the river basins. After a flood, people often return to their villages, drawn by their social or cultural ties to the places, and get exposed and affected by floods over and over. However, cultural or religious differences between displaced people and their host communities can often lead to conflict and poverty which is a serious barrier to relocation[17].

It was not possible to identify quantitative data on the non-economic losses and damages to biodiversity and ecosystems. However, respondents interviewed for this case offered the following observations: 1) The river-systems and the development of these are key to understanding climate change impacts. The rivers in Nigeria are becoming wider and creating new paths because of the intensity of the flood. This affects the rebuilding of communities as bridges need to be bigger, and some communities are surrounded by water and only accessible by boat. 2) Land degradation increases the impact from the flood as increased runoff can lead to land- and mudslides. Nature-based solutions can be used to reduce impact from future floods. 3) Often when people are displaced, they are evacuated to open, agricultural land where they cut down trees and vegetation to build houses and temporary shelters. Apart from impacting the ecosystems, this creates tension and conflict between the displaced people and the host communities[18].

Floods in Sahel, 2022[19]

Type of event: Sudden onset.
Vulnerability: The countries in Sahel (Niger, Nigeria, and Chad) rank number 169, 154, and 185, respectively on the ND-GAIN score. All countries show low readiness and high vulnerability to adapt to the negative effects of climate change.

Affected population: 5.5 million people, particularly in Nigeria, Niger, Chad, and Mali.

Economic

Estimated damages:
Damages of USD 4.2 billion in Niger alone.

Funding Received
No detailed information on the appealed emergency funding from the affected countries have been found.

- 30% of requested funding from IFRC 2022 flood appeal in Nigeria as of October 2023.
- OCHA's situation report in Nigeria shows a total funding requirement in 2022 of USD 1.1 billion with 57% funded (highlights cover the flood, cholera outbreak, and food insecurity).

Damage to public buildings:
No available data.

Loss of Land:
See Agriculture & Fisheries below.

Damage to telecommunications:
Disrupted communication lines in Nigeria and Chad.

Agriculture & Fisheries:
1,084,060 hectares of cropland lost across Nigeria, Niger, Chad, and Mali.

Damage to infrastructure:
Loss of roads, bridges, access to markets and to rural communities. Loss of agricultural storage facilities.

+ Sectors
Not possible to access trade markets because of damaged roads and infrastructure.

Access to Water/WASH:
No available information.

Non-Economic

Mortality
603 in Nigeria,
195 in Niger

Physical Health
Increased reporting of diarrhoea and cholera after the flood.

Food insecurity was already high (40 million people suffered from food insecurity phase 3+) and the damaged cropland led to destroyed food that could have fed 3.3 million people for a year.

Displaced
1.6 million people in Nigeria and Chad.

Mental Health
Heavy mental health issues about uncertain future, especially in Niger..

Loss of ecosystem services
Changes of river systems.
Land degradation as result of the flood.

Cultural heritage:
Pastoralist communities lose ability for seasonal migration.

Pre-existing vulnerabilities
Conflict
Food security crisis
Economic crisis

ASIA

Refugees from Myanmar arrive in Bangladesh
Kathleen Prior/CARE

– The Flood in Pakistan, 2022

– The Drought in Afghanistan, 2021-2023

– Flood in Bangladesh, 2022

– Heatwave in India, Thailand, and Bangladesh, 2022-2023

The Flood in Pakistan, 2022

The 2022 flooding in Pakistan affected 33 million people and disrupted livelihoods, intensified food insecurity and led to large-scale displacements. The case shows the way people, particularly women and children, have been affected. The flooding and subsequent impacts have led to high levels of children dropping out of the educational system, and increased risks and inequalities for women. Cases of gender-based violence and forced early marriages have risen in the aftermath of the disaster. Lack of access to sanitation and health services particularly impacts women and girls, especially during pregnancy and birth. This case also highlights the key role that local communities play in responding and rebuilding efforts. In addition, it also tackles the eroding effects that the flood has had on socially rooted values such as community cohesion and cultural heritage. The donor community has provided approximately 67% of the requested funding for the emergency response; while 90% of the funds for rehabilitation have been provided as loans.

Record rainfall made more intense in warmer world

In 2022, Pakistan experienced record-breaking monsoon rainfall that led to flooding, urban flash floods, and landslides. August 2022 was the wettest month recorded since 1961 throughout Pakistan, and in two provinces (Sindh and Balochistan), receiving 7 to 8 times more rain than usual1. Scientists examined the monsoon rains through the 5-day maximum rainfall in the Sindh and Balochistan provinces and 60-day maximum rainfall over the Indus River basin, both were found to be more intense (75% and 50% respectively) than they would have been at our current rate of warming. Scientists' models do not give a clear answer to whether human induced climate change caused the intensity of extreme rainfall, but they indicate that the rainfall has become heavier as Pakistan warmed. It was also concluded that Pakistan has an urgent need to reduce vulnerability to extreme weather[2].

Close to 8 million people displaced

The humanitarian consequences of the flood change over time. The first response is targeting the need for shelter as people lost their homes to the flood. There were 7.9 million people displaced[3], amongst whom 421,000 are refugees[4]. The immediate effect of to the affected population and displacement of people is, according to the IOM, seen in several aspects. *"Climate disasters always lead to displacements"* one interviewee

said. Displacements can be temporary between districts for people who quickly move back to their communities or long-term. Rural-urban migration is also a frequent response, where people move to urban areas in search of jobs[5].

Lack of funding and risks of increasing debts

The Humanitarian Outcomes under the Humanitarian Rapid Research Initiative (HRRI) noted that Pakistan's governmental and civil society organizations have been grappling to provide an adequate humanitarian response.

The Pakistan 2022 Floods Response Plan was jointly launched on Aug. 30, 2023, by the government of Pakistan and the UNDP. As of August 2023, only 67% of funding was received[6]. According to the IOM, their appeal was heeded by 30% of funding. The primary form of international assistance appears to be debt-based financing rather than direct humanitarian aid[7]. At a pledging conference for flood rehabilitation, close to USD 10 billion in pledges were raised. However, Pakistan's Finance Minister, Ishaq Dar, said that 90% of these pledges were in the form of project loans. The majority share is from the Islamic Development Bank (USD 4.2 billion); followed by the World Bank (USD 2 billion); the Asian Development Bank (USD 1.5 billion); and the Asian Infrastructure Bank (USD 1 billion). Bilateral donors included Saudi Arabia (USD 1 billion), the US (USD 100 million), China (USD 100 million). Pledges also came from the European Union, Canada, France, Qatar, and others[8].

Following the disaster, the World Bank was able to quickly repurpose existing loans to fund the Benazir Income Support Programme (BISP) for immediate cash payments to vulnerable populations, this was a one-time measure[9]. A large part of building back the Pakistan society has been to involve local communities in deciding how to rebuild their villages. This was achieved through grants and technical guidance on rebuilding houses, and by establishing climate change committees in local communities to provide training on better preparing for the next monsoon season. An indirect effect of including local communities in building back better is the improvement of their mental health, which comes as they access hands-on tools and opportunities to improve their lives after a disaster[10]. The IOM highlights that sustainable rebuilding of communities relies on engagement of local people, and that *"reinforcement and capacity building of locals and government"* is essential for sustainability when addressing climate induced losses and damages[11].

Loss of commodity crops impacts local livelihoods and global stockpiles

The floods heavily impacted the production of commodity crops such as wheat, rice and cotton. About 45% of the cotton crop was damaged in Sindh. Rice production was estimated to fall by 2 million metric tons (mt) for 2022-2023, and wheat output by 1 million mt[12] . As Pakistan is a food basket for Asia and the World, the impacts are not just localized in the country. When commodity crops like rice, wheat, and cotton are lost, they threaten global stockpiles and supply chains[13].

The production of these crops which are essential for livelihoods, also face ongoing stressors from heat, leading to continued decreased productivity. In general, vegetation and plants were damaged by the heavy rainfall as waterlogged crops have reduced light availability, lower oxygen levels, and changes to soil chemistry. These changes can greatly affect plant growth, strength, and production[14]. A year on from the flood, an estimated 10.5 million people are facing food insecurity[15].

The wellbeing of women and children are particularly impacted

The interviewees noted that disasters such as the flood in Pakistan exacerbate gender inequalities, mental health issues, tribal conflicts, and educational disparities. Vulnerable groups,

Angbeen Sohail/ IFRC

including women, pregnant/lactating mothers, and children are disproportionately affected. It was reported that in some areas, women and children were the last to evacuate because of cultural norms. Elders prevented them from evacuating to preserve their honour[16].

The burden of care also increases for women and with it their vulnerability due to increased cases of violence against them and forced or early marriages for young girls as loss of livelihood means that families cannot care for them[17]. The flood disasters have destroyed sanitary infrastructure and services. As women and girls lack access to sanitary services, they wait until sundown to relieve themselves, especially under conditions of reduced privacy and travelling in groups for protection. This erodes their dignity and wellbeing. The lack of proper WASH services is disproportionally affecting children, adolescent girls, and women at increased risk of shame and harm when defecating outdoors[18]. Roads were washed away. As a result, access to healthcare facilities was impeded. In addition, fragile health systems were strained, and an increase in maternal and child health issues, abortions, and miscarriages occurred[19].

More than 3.5 million children witnessed disruption to their education, with fears of increased dropouts[20], particularly for girls and children from tribal areas. Increased incidence of tribal conflicts has meant that some parents opt for not sending their children to school. In addition, as livelihoods are lost, parents resort to their children for help with subsistence.

The non-economic losses related to cultural heritage

As people were displaced, they not only lost assets, but also experienced losses related to their personal and community level values. They were torn from their communities and lost their personal attachment to the land affecting their sense of belonging and social cohesion. People experience this loss even after flood water has receded and they return to their lands and as they witness the way floods have torn their villages, homes and social networks apart.

Displaced communities lose elements of their culture and tradition. Indigenous knowledge tied

to the lands and key moments of social cohesion during cultural festivals, which determine identity and heritage, are lost. For instance, the flood in Pakistan came during the time of Diwali which is celebrated by the minority Hindu communities. Also, cultural celebrations like Eid Al-Adha have been affected as the price of sacrificial animals have increased almost 100%[21]. It was noted by the interviewee that the toll of livestock loss is also deeply personal as they are raised with care by communities.

The flood caused damage to UNESCO world heritage sites including archaeological ruins at Moenjodaro, and historical monuments at Makli Thatta. Traditional irrigation systems in Karez in Balochistan, the Amri site museum and the Sehwan folk and craft museum were also damaged[22].

Lasting impacts on the mental and physical well-being of people

Based on previous disasters, long-term impacts are expected to lead to mental health challenges[23] due to trauma, displacement, and loss of community networks. Children are particularly vulnerable to the loss of community networks and the mental health effects such loss has. In Pakistan, the stigmatization and lack of awareness around mental health has worsened the situation. Post-traumatic stress disorder, anxiety, and grief are expected to appear in the years following the flood[24].

It was reported that over 12,000 people were injured including over 4000 children. Furthermore, as of May 2023, a third of children, whose age ranged between 6-23 months in 15 flood affected areas were reported as suffering from moderate to acute malnutrition and 14% from severe malnutrition[25].

Furthermore, physical health has suffered due to inadequate access to safe water, sanitation, and healthcare facilities which persist a year on from the flood[26]. Acute diarrhoea, skin and eye infections, and leptospirosis have been reported, as well as subacute malaria, leishmaniasis, respiratory infections, and hepatitis[27]. The flooding has also been linked to outbreaks of water and vector-borne diseases including cholera[28].

Deep Dive: Pregnancy in a flooded Pakistan

The flood in Pakistan in 2022 was the worst ever recorded in the country with 33 million people affected and pushing an additional 1.9 million into multi-dimensional (non-monetary) poverty. Among the 6,4 million people in need of humanitarian assistance, nearly 130,000 were pregnant and in need of urgent healthcare, and 42,000 women were due to give birth within 3 months of the disaster. Not only were 13% of health facilities damaged by the flood with total damages to the health sector of [29]109 billion, but displacement of people also caused women to relocate from their villages to areas without access to healthcare[30]. All women in the story below were forced to flee their villages due to the floods. Women who returned to their village and to destroyed homes, experienced stress and trauma connected to their (upcoming) births. The following personal stories are based on interviews and case material provided by the IOM Pakistan[31].

The story takes place in the district Shikarpur in the Sindh province in Pakistan. Shikarpur received 5 times more rainfall than the average in the period from July 1st to August 31st 2022[3]. The Sindh province was one of the three hardest hit provinces by the flood in 2022. In Sindh alone, multidimensional poverty was projected to increase by 10.2%. IOM Pakistan was one the organisations providing relief work for flood victims. Their work in Sindh province reached more than 3,000 households including 1,600 pregnant or lactating women affected by the flood. They also provided antenatal care to almost 1,500 patients during the flood response. IOM coordinated with other organizations that were co-leading health-related activities, to avoid duplication of services and patients and to reach as many affected people as possible.

DEEP DIVE CASE STUDY:

The flood in Pakistan

The Story of Bashira, Gul Khatoon, Samina, and Gul Jan:

Pregnancy during the flood

Bashira, Gul Khatoon, Samina, and Gul Jan were interviewed by IOM Pakistan after the flood in 2022. Their stories represent mothers and mothers-to-be in the flood-stricken country, where damaged health facilities and destruction of homes affected pregnant and lactating women disproportionately. IOM Pakistan supported vulnerable households during the response to the flood in 2022. Maha Akbar, a Communications Officer visited District Shikapur and met the three pregnant women and the new mother in a community severely impacted by the floods. As supporting staff, the damages from the flood left a deep impression on Maha Akbar, and she was determined to advocate for the women's needs on a broader scale. The women lost everything to the flood, and the Communications Officer realized that awareness raising was necessary. *"When I inquired about their preparations for childbirth, one woman disclosed that she did not even have an extra cloth to swaddle the baby once it is born, and she would likely have to tear a portion of her own 'kameez' to comfort the baby."*

In the flood-stricken areas of Pakistan, there were 650,000 pregnant women like Samina, Gul Jan, Gul Khatoon, and Bashira who needed maternal health services. When Maha Akbar's talked with Samina, she was seven months pregnant and hadn't received any medical check-ups since the flooding.

Bashira 9 months pregnant standing with her family in front of her shelter provided by USAID, district Shikarpur, Sindh.
© Muhammad Zeeshan Siddiqui/ IOM 2022

After the floodwaters receded, she returned to her village, but like many other pregnant women in her community, she was anxious about giving birth without a midwife or medical professional. Samina couldn't afford to travel the long distance to the nearest hospital. As her pregnancy was nearing its end, she was experiencing severe abdominal pain, but had no way to consult a medical professional.
Gul Jan faced a similar situation; she was five months pregnant and had no access to medical care during her pregnancy. *"Sometimes I can't even see due to the pain. I wish I could consult a doctor,"* she said, highlighting the shortage of medical supplies, maternity health services, and the damage to hospitals caused by the flood.

The lack of medical check-ups wasn't just an issue for pregnant women. Gul Khatoon was seven months pregnant when the flood hit and ended up giving birth in a makeshift roadside shelter after being displaced from her village. She too had no medical assistance during childbirth because she couldn't afford to reach a hospital, and the flooded roads made it impossible for a midwife to reach her. What's more, her two children, including the newborn, have never seen a doctor even when there were concerns about their health.

Due to the extensive damages caused by the flood, many returning families had to live in temporary shelters. Bashira, who was 9 months pregnant during the interview and about to give birth any day, stood in front of a shelter provided by USAID. She explained, *"I do not even have a sheet or cloth to wrap my newborn baby. I lost everything I had during the floods. The only clothes I own are the ones I am wearing right now".*

After her visit with the pregnant women in Pakistan, Maha Akbar felt responsible to share the disastrous impact the flood had on the women. *"Their stories underscored the urgent need for immediate assistance on the ground, highlighting the crucial role that organizations like IOM played in providing life-saving support during the 2022 floods."*

Flood in Pakistan, 2022[32]

Type of event: Sudden onset.
Vulnerability: Pakistan ranks number 150 on the ND-GAIN index. This indicates low readiness and high vulnerability to adapt to the negative effects of climate change.

Affected population: 33 million people affected (5.1 million children, 940,000 over 65, 650,000 pregnant women). 20.6 million people in need. 9.5 million people targeted.

Economic

Estimated damages: SD 14.9 bn.
Losses: USD 15.9 bn.
Rehabilitation and Reconstruction estimate: USD 16.3 bn.
Effect of GDP: loss of around 2.2% for FY22 GDP.

Funding Received
Flood Response Plan (jointly launched by UNDP and the Government Pakistan): USD 816 million requested (USD 546 million USD or 67% funded as of August 2023)
Pledged USD 10 billion (90% as loans) in rehabilitation at the International Conference on Climate Resilient Pakistan, co-hosted by the Government of Pakistan and the UN.

Damage to public buildings:
Schools: 17,205 (at least 6,225 education institutions were assessed as fully damaged and 10,980 as partially damaged) impacting 2.4 million students.
Hospitals: 13% of health facilities.

Loss of Land:
Houses destroyed: 780,000.
Partially damaged: +1,7 million.

Damage to telecommunications:
Includes damage to fibreoptic transmission lines, feeder cables, and in some cases transmission towers.

Agriculture & Fisheries:
4,410 million acres of agricultural land and 0.8 million livestock have perished.

Damage to infrastructure:
8,330 km of roads (about 3.2% of total in-service roads) and 3,127 km of railway track (around 40% of total in-service railways) .

+ Sectors
Not possible to access trade markets because of damaged roads and infrastructure.

Access to Water/WASH:
Damage to 4,344 water supply schemes and 2,716 sanitation (including drainage, pavement, and solid waste) schemes.

Non-Economic

Mortality
1,600 deaths including 615 children

Displaced
7.9 million
421,000 refugees living in flood-affected areas

Loss of ecosystem services
Damages: USD 18 million
Losses: USD 30 million
The estimation includes damage and loss in forestry, protected areas, and from landslides. Forestry accounts for approximately 60% of total environmental damages and almost 99% of losses. Protected areas, wildlife, and infrastructure in national parks account for around 11% of overall damages.

Cultural heritage:
At least 149 sites, including two World Heritage Sites in Sindh, have suffered damage.
Numerous Buddhist stupas, Hindu temples, and tombs of pre- and post-Islamic dynasties have suffered extensive damages. As have religious sites in active use, including mosques, shrines, and dargahs.

Physical Health
More than 12,850 injuries since mid-June, including over 4,000 children.

650,000 pregnant women facing challenges in accessing maternal services. 130,000 pregnant women in need of humanitarian assistance. Nearly 4 million children lack access to health services.

One-third of children aged 6-23 months suffer from moderate acute malnutrition, 14% suffer from severe acute malnutrition in 15 flood affected areas

Mental Health
School closures have impacted children's mental health, reduced their access to a regular source of nutrition, and increased their risk of abuse. Increased vulnerabilities for young girls' and chances of unintended pregnancy and early and forced marriages..

Other
National poverty rate projected to increase by 3.7 to 4.0%, leading between 8.4 and 9.1 million people into poverty.

Pre-existing vulnerabilities
Persistent fiscal deficits.
Mud and unbaked brick homes vulnerable to flooding.
Lack of systems for infrastructure maintenance.
Limited disaster risk reduction capacity.
Limited private investment.
Poor urban planning and water resource management.
Structural inequalities.

The Drought in Afghanistan, 2021-2023

The protracted drought in Afghanistan has to date impacted 11 million people and intensified hunger and health issues. The case shows that it is close to impossible to single out the effects of climate disasters from those of other crises such as political insecurity and conflict. Segregating financial aid towards climate disasters from humanitarian aid and development funding is thus difficult as impacts and responses are multifaceted and interlinked. The case however also shows that the drought has further worsened an already dire situation and has deeply impacted the agricultural sector that sustains 80% of the population, pushing many Afghans below the poverty line and leading to the displacement of 1.8 million people. Overall, humanitarian needs are critically underfunded with merely 11% of funding needs met.

Afghanistan has experienced droughts since 2021. The impacts on nature and people worsen with each consecutive year and are multifaceted. So far, it has been estimated that the drought has affected 11 million people[1]. Furthermore, Afghanistan is experiencing other climate disasters, earthquakes, COVID-19, and a political shift together with collapsing financial institutions, conflicts, fragility, and overall security challenges that affect the coping mechanisms of the country and its people. Thus, the long-term impact of the drought is difficult to distinguish from other contributing factors. In this case study, findings presented relate to the humanitarian situation in general[2] and elaborated in the context of the drought.

The effects of the drought on the Afghan people

The drought's most visible impact on the Afghan people is hunger. Crops can't grow when water resources are scarce. Furthermore, the agricultural sector is the cornerstone of the Afghan economy as it is the main source of food production and basic income. Moreover, the drought killed livestock due to lack of water and fodder, further adding to the food insecurity of the Afghan people[3].

In 2022, nearly 20 million people were acutely food-insecure in Afghanistan, which corresponds to almost half of the Afghan population. Also, 4 million people (10% of the population) were acutely malnourished, including 3.2 million children under the age of five. The disproportionate share of children underlines that they are extremely vulnerable and prone to the impacts of climate

Herat, Angel District
Zia films/CARE

disasters. The drought was one of the key drivers of famine in the country, as 30 out of 34 provinces reported extremely low water quality and levels. Without water neither crops nor livestock can grow or survive. Further, the agricultural sector supports income for 80% of the population[4] and it is heavily impacted by the drought as crops and pastures are rainfed. Across Afghanistan, the monthly household income has decreased with 17% from 2021 to 2022. The decline further adds to poverty in the country in light of the fact that the average income per person is equivalent to half the poverty line (33 AFG or USD 0,40 per day compared to the poverty line of USD 1 per day)[5].

As the drought is ongoing, the impacts increase every year, and the proportion of households impacted by the drought in 2022 is 6 times greater than in 2020[6].

The drought also contributes to the declining health of the population. Lack of clean and available water has severe consequences as it leads to an increase in water borne diseases, acute diarrhoea, higher risks of cholera outbreaks and malnutrition[7]. The lack of water availability is especially pronounced in rural areas. In 2023, one quarter of rural households suffered from insufficient access to water sources. This number has doubled since 2021, indicating the exacerbation of the drought effects.

The drought forced people to flee their homes and move away from affected provinces in search for better livelihoods. This led often led to conflicts between communities. Afghanistan is a traditional society with customs and cultural norms that vary between geographical regions. Displaced populations are therefore not easily integrated, and children are affected as they are often not accepted in schools or social activities. For this reason, the Danish Red Cross focus their activities on the psychosocial impact of the drought and other crises in the country by working on children's mental wellbeing, building resilience, and raising awareness on the issue[8].

The multifaceted humanitarian crisis including three consecutive years of drought, rising poverty, and conflict, makes it impossible to disaggregate the financial aid targeting each of the crises. However, OCHA reports that the overall funding for Afghanistan is drying up and only 23% of the total required funding for the humanitarian situation has so far been met. Within the sectors most impacted by the drought (food security & agriculture, nutrition, and WASH), OCHA requested a combined figure of USD 2.3 billion and received only USD 246 million– a meagre response of 11%[9].

Afghanistan is heavily dependent on humanitarian assistance to address basic humanitarian needs. A worsening of the drought will require further assistance from the international community[10].

Displacement and conflict following the drought

Displacement caused by the drought in Afghanistan is considerable. It is estimated that 124,000 people were displaced during the first half of 2022 because of climate and natural disasters (drought, flooding, and earthquakes). In fact, 2022 was the first year where climate and natural disasters caused more displacements than conflict (124,000 vs. 7,400). In 2022 5.9 million people or 14% of the Afghan population were internally displaced, of which 1.8 million people were displaced due to climate or natural disasters (flooding, drought, and earthquakes)[11]. It has not been possible to disaggregate the causes for displacement into a more detailed manner.

Displaced populations often face discrimination. According to our informant, they often face difficulties in starting a business as well as accessing jobs and the educational system in the host areas. This situation has further worsened as the resident populations in the large cities are also economically stressed, and won't "accept" that minority refugees pursue a better livelihood[12] than them.

Continuing droughts increase the impact on ecosystems

Ecosystems are directly impacted by the drought in Afghanistan. This has economic impacts to sectors such as agriculture, but it also offers examples of non-economic losses from the drought. Lakes and other water bodies are drying up, vegetation is drought-affected, and water resources are diminishing. As the drought continues year after year, it results in prolonged soil moisture and runoff deficits and water shortages. It is estimated that Afghanistan requires 5-10 years of average or above average consecutive rain seasons to recover groundwater levels that existed before the 2021-2022 droughts[13]. As ecosystems, rivers, soils, and groundwater reservoirs are impacted, so are the people dependent on them.

These resources provide critical ecosystem services. Any impacts on these natural resources will diminish people´s income from agriculture and fishing and affect their access to clean and safe water.

Angbeen Sohail/ IFRC

Drought in Afghanistan, 2021-2023[14]

Type of event: Slow onset.
Vulnerability: Afghanistan ranks number 179 on the ND-GAIN index. This indicates low readiness and high vulnerability to adapt to the negative effects of climate change

Affected population: 11 M people affected (27% of population)

Economic		Non-Economic	
Estimated damages: *No available data:*		**Food Security:** 20 million people are acutely food insecure.	
Funding Received OCHA: USD 3.23 billion required for the humanitarian situation (2023), USD 744 million received (23% funded). USD 246 million of above amount received for the sectors Food Security & Agriculture, Nutrition, and WASH		**Mortality** *No data available.*	**Physical Health** 4 million people are acutely malnourished, including 3.2 million children under the age of five.
Damage to public buildings: *No data available .*	**Loss of Land:** Degradation of fertile land. *No data available*	**Displaced** 1.8 million people (due to drought and other climate and natural disasters).	
Damage to telecommunications: No direct effect.	**Agriculture & Fisheries:** The wheat production deficit is expected to be 16-27% in 2023. The main drivers of acute food insecurity include drought and its impacts on crops and livestock (no food or water for livestock).	**Mental Health** Food insecurity and insecurity in terms of knowing when the drought will end impacts the mental health of families. Displaced populations mental health is impacted due to lack of integration and lack of opportunity to earn a living. Children's mental health is affected by lack of education and social inclusion.	**Loss of ecosystem services** Ecosystems including soils, water bodies and vegetation cover are severely affected by the drought. No data available.
Damage to infrastructure: No direct effect	**+ Sectors** *No data available*	**Cultural heritage:** *No data available*	
Access to Water/WASH: Afghanistan is currently facing the second drought in four years and consequent water scarcity which is impacting a third of the country. 60% of the population have limited access to safe water. 25% of the rural households were found not to have sufficient water sources.		**Multifaceted crisis in Afghanistan** The drought is one disaster out of many in Afghanistan. The recurring nature of the drought year after year increases impact and concern in the population.	
Pre-existing vulnerabilities Preceding events – floods, droughts, earthquake. Social economic impact from COVID-19 pandemic. Political shift. Conflict, fragility, and security challenges.			

Flood in Bangladesh, 2022

The 2022 flood in Bangladesh, the worst monsoon rains since 122 years, affected 4.2 million people. Half a million people were displaced and critical sectors like agriculture suffered significant losses with over USD 12.5 million in crops lost. The cyclical nature of worsening floods is resulting in frequent population displacement and migration, causing further challenges for affected communities. The case study unveils the longer impact on the country's growth with setbacks to education. A generation of children is incurring learning losses. Over 1.5 million students in two impacted districts and many children are not able to return to education. They are instead compelled to support their families in rebuilding lost livelihoods. Female children are falling the traps of child marriages. Whilst funding was received, the case study indicates that it has not reached the most vulnerable.

The north and north-eastern region of Bangladesh was hit by an unprecedented flood during the monsoon months of 2022. Much of the monsoon-rainfall came in May which is earlier than the standard monsoon season (June to October). Scientist have found that climate change has doubled the likelihood of extreme pre-monsoon rainfall over North-eastern Bangladesh[1]. Whilst the flood can be examined in isolation, it is important to note the cumulative effects of preceding and recent climate change related disasters. These have a considerable impact on people. Various reports[2] underscore the losses and damages incurred by compounding disasters in Bangladesh.

Resilience building included in financial aid and support

The UN in Bangladesh launched a coordinated appeal of USD 58.4 million, of which USD 13.73 million were mobilised[3]. The government responded to the flood by releasing 1.2 million USD from the Prime Minister's Relief and Welfare Fund. A further USD 18.9 million were raised from international development partners through various channels such as pool funds, publicly raised funds and private funds. Financial aid was channelled to both immediate relief efforts and longer-term resilience building[4].

The interviewees for this case explained that the government engages in infrastructure needs, while the ADB and World Bank provide support that encompasses grants and loans, depending on the magnitude of infrastructure loss. The World Bank[5] approved USD 500 million in credit to help Bangladesh improve disaster preparedness. The ADB[6] approved a USD 230 million loan to help restore damaged infrastructure, improve livelihoods, and build community resilience. However, applying the principle of build-back-better and aligning with the national adaptation plan[7] needs assessment, showed that USD 19 million were raised[8] of the total response need amounting to almost USD 60 million.

Around 2 million people were displaced

The cyclical nature of floods results in frequent population displacement and migration, causing further challenges for affected communities. As the flood impacted critical infrastructure, including roads, bridges, houses, and schools, particularly in rural areas, the disruption of livelihoods forced individuals and families to move in search for necessities[9]. Over 760,000 women, 880,000 men, 360,000 children and 49,000 people with disabilities were displaced[10]. In addition, at the village level

Bangladesh
Communications Manager- Population Movement Operation

it was reported that mosques and temples were damaged. This compounds the situation as these places of worship are considered important for mental wellbeing and social cohesion[11], enabling communities to cope in the face of such disasters.

Impacts on communities

The flooding has had a catastrophic impact on income generation. This was particularly severe for farming communities. Over USD 12.5 million of crops were damaged affecting 24,000 farmers[12]. The total damage to agricultural land was reported at around USD 178 million[13]. The loss of crops, damage to agricultural land, and the disruption of farming practices contributed to a drastic decline in income for vulnerable populations and increased food insecurity.

The flooding disproportionately affected vulnerable groups within society. These groups include women, the elderly and people with disabilities, landless communities, and residents of slum areas[14]. The limited availability of coping mechanisms exacerbates the challenges faced by these groups. Those residing in resource-constrained environments have endured the harshest impacts, including disrupted livelihoods and increased isolation. There has been a rise in mental health incidences, such as anxiety, depression, and trauma with studies showing women being particularly impacted[15]. Violence against women and children was greater in flood affected areas, including an increase in calls to the Child Helpline[16].

It was reported that many students have not returned to school. They have instead turned to earning a living to help families who have lost their livelihoods. Female students were also prevented from enrolling in schools due to child marriages[17]. Further, the floods damaged educational facilities. More than 3,000 primary and secondary schools in Sylhet and Sunamganj districts were closed for reconstruction resulting in learning loss for over 1.5 million students[18].

As a result of the flood, it was estimated that 4.2 million people experienced disruption to water, sanitation, and hygiene (WASH) services leaving people without potable water[19]. For women and girls, the lack of WASH services compromises their health, dignity, and well-being[20]. In addition, the burden of finding and collecting water - often in perilous terrain - falls on women and children[21]. Floods also facilitate the spread of waterborne diseases and stagnant water-related health issues, including dengue outbreaks and diarrhoea. After the flood, Bangladesh experienced the highest number of annual deaths related to the dengue virus since its first appearance in the country. The virus claimed just over 280 lives. It is hypothesised that a driver of the severity of the outbreak was the uncharacteristically heavy rainfall[22].

Bangladesh, Flood, 2022[23]

Type of event: Sudden onset.

Vulnerability: Bangladesh ranks number 163 on the ND-GAIN score. This indicates low readiness and high vulnerability to adapt to the negative effects of climate change

Affected population: 7,200,000 people

Economic

Estimated damages: USD 722.24 million
Effect on GDP: 9% potential.

Funding Received
WB USD 500 million credit.
ADB USD 230 million loan

United Nations Bangladesh Coordinated Appeal:
USD 58.4 million (USD 13.73 million or 23% funded as of October 2022.)
Government response via Prime Minister's Relief and Welfare Fund: USD 1.23 million.

18.9 million USD response raised from international development partners as follows:
Institutional Fund: USD 5.74 million.
Microcredit: USD 0.04 million.
Pool Fund: USD 7.40 million.
Private Fund: USD 2.34 million.
Publicly Raised Fund: USD 3.37 million.

Damage to public buildings:
Educational infrastructure: USD 5.96 million.
Health infrastructure: USD 0.56 million.

Loss of Land:
Homes damaged: 186,703.

Damage to telecommunications:
USD 0.10 million

Agriculture & Fisheries:
Agriculture: USD 178.1 million.
Fisheries: USD 18.7 million.
Livestock: USD 2.9 million.

Damage to infrastructure:
USD 312.8 million.

+ Sectors
Forestry: USD 0.63 million.
Water resources: USD 19.47 million

Access to Water/WASH:
4.2 million people suffered disruption to water, sanitation, and hygiene (WASH) services.
106,727 water points and 283,355 latrines were damaged.

Non-Economic

Food Security:
20 million people are acutely food insecure.

Mortality
141 deaths.

Physical Health
Fever, skin disorders, and diarrhoea were reported as the most prevalent diseases following the flood.

There was a surge of dengue fever - the second largest outbreak since 2000 with 52,807 cases as of November 2022.

Displaced
Women: 768,137.
Men: 887,228.
Children 360,960.
Persons with disabilities 49,326

Mental Health
Suicidal behaviour and suicide not uncommon, Severe and extremely severe depression, anxiety and stress reported in women.

Loss of ecosystem services
Erosion and sedimentation from heavy rainfalls negatively affects the habitats of indigenous fish species, and in turn, local fisheries.

Cultural heritage:
USD 1.39 million of damages to religious infrastructure.

Pre-existing vulnerabilities
Lack of inclusive action from policy to practice.
Failure of Early Warning System.
24% social protection coverage.
Communities lack financial and service assets.

Heatwave in India, Thailand, and Bangladesh, 2022-2023

In 2022 and 2023, the intensifying heatwaves in India, Thailand and Bangladesh have been exacerbated 30-fold due to climate change. It was estimated that the South Asia heatwaves in total affected 1 billion people. The health impacts are significant with the human body at a heightened risk at temperatures above 35 degrees Celsius. Heatwaves can be seen as an inequality exacerbator, particularly affecting resource-constrained communities, disrupting daily routines, and cultural practices. Vulnerable groups, including slum dwellers and women, experienced extreme heat and disruptions to daily activities more acutely. Local impacts, such as disruptions to agriculture and food production and fluctuations in food prices, have wider implications, affecting global food security. The impact of key commodity crops like rice saw a global inflation by up to 16%. In Bangladesh, the textile industry witnessed productivity losses from heat and humidity amounting to USD 6 billion. Financial assistance to these nations in the wake of the heatwaves has been sporadic, despite the presence of emerging solutions. The absence of post-disaster assessments highlights obvious gaps in understanding and further complicates identifying adequate long-term solutions.

South Asia Heatwaves intensified 30-fold by Climate Change

In 2022 and 2023, the intensifying heatwaves in India, Thailand and Bangladesh have been exacerbated 30-fold[1] due to climate change. As a testament to this, on April 15th, 2023, Thailand recorded a temperature of 45.4 degrees Celsius, while Dhaka experienced a temperature of 40.6 degrees Celsius[2]. In its most recent report, the IPCC 6AR warns further increase in the intensity and frequency of heat extremes throughout the 21st century[3]. Everyone is at threat from extreme heat. The human body, when exposed to extreme temperatures that exceed 35 degrees Celsius, is at a heightened risk of severe kidney and heart failure, as well as potential brain damage[4]. However, the implications of these heatwaves are particularly pronounced in urban areas, with the poor people facing the most significant risks[5].

The heatwave led to a range of challenges like school closures in India and Bangladesh[6], increased hospitalizations with nearly 170 people losing their lives in two states of India[7], and associated dangers especially for outdoor workers, like farmers, construction workers and street vendors [8]. The overarching consequence of these heatwaves remains the gradual decline in people's well-being and the erosion of community livelihoods. Detailed data on community-level impacts is notably

CARE Bangladesh has been distributing cooked food - often door to door - to over 3500 people, especially women and children, living in different makeshift camps.
Communications Manager- Population Movement Operation

absent. However, preliminary estimates suggest that the heatwaves might have affected around 1 billion people across South Asia.

Impact on sectors lead to direct and indirect losses and damages

The heatwave has had a widespread effect on multiple sectors. For instance, the frequency of power outages has increased, affecting both industries and the workforce. Notably, in 2022, a significant rise in air conditioning usage resulted in the most severe power crisis in India in over six years[9]. Power cuts and school closures have also been reported in Bangladesh, with power cuts especially impacting the apparel sector[10]. In Bangladesh, labour productivity losses from heat and humidity are greater than 8% of annual output generated in Dhaka today amounting to around USD 6 billion[11]. Its labour-intensive economy and low rates of cooling make Dhaka especially vulnerable. The indirect effects of this reduced output would have wider impact on the economy as overall spending declines.

Pushing up the global inflation in rice by 16%

The agriculture sector is especially vulnerable to heatwaves. Yields of wheat from initial assessments indicate a 20% drop in production in India in 2022. This has significant implications for rural livelihoods[12] . In Thailand, the heatwave has led to drought and decreased rice yields, significantly impacting farmers' resources and livelihoods. Also here, farmers have faced increased expenditures and cycles of indebtedness in their struggle to survive. Farmers were directed to limit 2023 rice planting to only the summer/autumn season in order to conserve water and avoid loss, and swap to drought-tolerant crops[13]. The impact of the heatwave on rice production in Southeast Asia has pushed its price to a two year-high[14] and contributed to global inflation up to 16%[15].

Some financial support exists but data is limited

There is limited data on the financial support provided for the current heatwaves. In India market-based models have been developed such as Cooling-as-a-Service to facilitate the affordability of cooling technologies[16]. The Government of India has also determined agriculture credit disbursement targets for the banking sector[17]. In Thailand the government provides loans through the Bank of Agriculture and Cooperatives[18]. However, as noted by the interviewee, this system perpetuates farmers' dependence on loans and favours chemical companies over sustainable farming practices[19]. The conditions attached to the loans often require farmers to adopt practices that are not aligned with their traditional methods. In Bangladesh financial support and international aid are primarily focused on anticipatory actions and early warning systems. However, efforts are being made to expand the scope to include heatwaves, recognising their growing impact. The IFRC Disaster Response Emergency Fund (DREF) for example, has approved a total of USD 565,656 for Heatwave Early Action Protocol (EAP) for the Bangladesh Red Crescent Society[20].

Among these countries, only India has a National Heat Action Plan in place, while local authorities in Dhaka have taken the initiative to appoint a Chief Heat Officer[21]. As noted by the interviewees, long-term financing is essential to support community initiatives and provide resources for adaptation and resilience-building. No data was available on the financial support provided to address the impacts of the heatwave on a country or regional level.

Heatwaves expose societal inequality

Thermal inequality is evident in our warming world. Low-income countries, despite minimal contributions to greenhouse gas emissions, bear the brunt of escalating temperature extremes. Additionally, specific segments of society, lacking resources to mitigate heat exposure, are at an increased risk. The prolonged challenges of heatwaves in an increasingly warm climate can lead to disruptions in livelihoods, additional strain on social services, increased food insecurity, and shifts in long-established living patterns[22].

This case study found that the heatwaves particularly in affected resource-constrained communities, are disrupting daily routines, and cultural practices[23]. Vulnerable groups are disproportionally affected by extreme heat. For instance, in poorer households, heat absorbed by roofing materials like concrete or tin make indoor temperatures higher than in the outdoors[24] . Whilst cool roofing materials are available, they are hardly implemented in areas where marginalised groups live – such as slums and informal settlements[25].

Women are particularly at risk as they often have greater care duties and informal work which exposes them further to heat related stressors[26]. Furthermore, cultural norms in some countries mean that coping strategies like sitting outdoors and enjoying public spaces are not always available to women as they would need to be accompanied by men[27]. It was noted that the slow deterioration of people's wellbeing and livelihoods is the most significant consequence of the heatwave[28].

Heatwave in India, Thailand, and Bangladesh (Transboundary), 2022-2023[29]

Type of event: Sudden onset.
Vulnerability: The countries affected by the heatwave (India, Thailand, and Bangladesh) rank number 116, 71, and 163, respectively on the ND-GAIN score. India and Thailand show high vulnerability to adapt to the negative effects of climate change but medium readiness. Bangladesh shows high vulnerability and low readiness.

Affected population: At least 1 billion people across Bangladesh, India, China, Thailand, and Lao PDR.

Economic

Estimated loss and damage in India: Lost productivity and health effects caused by heat wave exposure could put over 4.5% of India's GDP at risk by the end of the decade.
In Dhaka: USD 6 billion loss in labour output every year due to heat stress.

Funding Received
No detailed information on the appealed emergency funding from the affected countries have been found.
India / Thailand – farmers could access loans.
In Bangladesh: The IFRC Disaster Response Emergency Fund (DREF) approved a total of USD 565,656 for Heatwave Early Action Protocol (EAP) for Bangladesh Red Crescent Society.

Damage to public buildings:
Hospitals: impacted by power cuts..

Loss of Land:
Farmers abandoning land from compounding climate events including heatwave

Damage to infrastructure:
Widely reported burden on power systems as demand for air conditioning surged.

Agriculture & Fisheries:
20% drop in wheat yield due to terminal heat and heat waves in India. India is the second-largest wheat producer in the World. Faced with shortages, India banned wheat exports reducing wheat supplies and spiking prices globally. Throughout Southeast Asia heatwaves have severely hampered the yields of rice fields. 141 hectares of rice ruined in Bangladesh.

Damage to telecommunications
No data available.

+ Sectors
Dhaka: Heat impact on worker productivity has led to a loss of 10% of income in sectors like garment production, transportation, and retail commerce.

Access to Water/WASH:
No data available.

Non-Economic

Food security:
Food security is impacted due to loss of agricultural products and water scarcity. Comprehensive data is not available.

Mortality
13 deaths and about 50-60 hospitalizations due to heat stroke were reported in Navi Mumbai, Maharashtra, other sources mention 650 hospitalizations.
Casualties also reported in Thailand – no data on numbers.

Displaced
No data available

Physical Health
Increased risk of water-borne and insect borne diseases.
Heat stroke.
Heat related warning over several districts of West Bengal in all but a few of India's states.
In Chuadanga, Bangladesh, 260 patients were admitted for heat related illnesses and a further 1,000 treated in outdoor chambers.

Mental Health
IIncreased risk of interpersonal violence, group violence, and exacerbates pre-existing psychiatric illness.
Schools: 1,000's of schools shut in Dhaka

Loss of ecosystem services
300 major forest fires in India.

Forest fires in Thailand also reported however no quantitative data is available.

Ecosystems have also suffered due to the heatwave's adverse effects, with mass fish die offs due to plankton blooms which may have been stimulated by the heatwave and rising sea temperatures.

Cultural heritage:
Festivals and religious holidays marking harvest and seasons changing are disrupted.

Other
National poverty rate projected to increase by 3.7 to 4.0%, leading between 8.4 and 9.1 million people into poverty.

Pre-existing vulnerabilities
Multiple compounding hazards and policy contexts not always tailored to local context.
Planning and preparedness: Whilst Heat action plans have been implemented, education is crucial for their success.
No heat action plans in Bangladesh and Thailand.
Bangladesh has Early Action Protocol (EAP) pilot which provide cash transfers to poor residents in Dhaka however it was not operational during the heatwave event.

PACIFIC ISLANDS

CARE/Tom Perry

Sea Level Rise in Vanuatu, Ongoing

Tropical Cyclone Yasa and Ana, Fiji, 2020-2021

Sea Level Rise in Vanuatu, Ongoing

The case study on sea level rise in Vanuatu paints a complex picture of the multivariate impacts of sea level rise. With a sea level rise rate of 6mm per year since 1993 in Vanuatu—nearly double the global average—the impacts are felt across diverse aspects of life in Vanuatu, intensifying the risks from tropical cyclones and resulting in significant financial losses and human displacement. The crisis not only affects the natural environment but also cultural and linguistic diversity, threatening traditional ways of life. Financial aid often fails to reach the most vulnerable communities, and the lack of centralised tracking exacerbates this issue. From severe impacts on women and traditional livelihoods to the degradation of coastal ecosystems and tourism. The significant lack of data on the economic and non-economic elements of sea level rise is a critical gap.

Sea level rise is a risk multiplier

The sea level around Vanuatu has risen by around 6mm per year since 1993, a rate nearly twice the global average[1]. Sea level rise is closely linked to the health of reefs[2]. However, the climate change related drivers of sea[3] make it difficult to draw out singular sets of impacts. Sea level rise has thus been shown to worsen the flooding impacts of Tropical Cyclones and storm surges[4]. Furthermore, the consequences of sea level rise extend beyond livelihoods and well-being, they are impacting the very social fabric of the communities and their way of life.

Low-lying coastal ecosystems are both impacted by continued and accelerating sea level rise as well as by increased incidences of severe cyclones. This effect has been observed repeatedly in Vanuatu. In 2015 the severe category 5 Tropical Cyclone Pam[5] caused an estimated USD 271 million in damages, about USD 178 million in losses, and displaced approximately 65,000 people. In 2020, another category 5 Tropical Cyclone Harold[6] made landfall causing USD 617 million in losses and damages, affecting 188,000 people, and severely damaging 60% of croplands[7]. In March 2023, two back-to-back severe Tropical Cyclones (Judy and Kevin) made landfall once more in Vanuatu. Both were severe Category 4 cyclones. More than 197,000 people or close to 60% of the population of Vanuatu were affected causing an estimated USD 433 million in losses and damages[8].

For clarity, the following case study only presents loss and damage data that is related to sea level rise. However, the polycrisis that a low lying, small island like Vanuatu is experiencing due to compounding disasters has significant impacts on the humanitarian responses and recovery efforts.

This case study is based on desk research, documentary evidence, articles, and interviews with impacted communities and a key interview[9] with experts from the region. The interviews highlight the fact that Vanuatu has exceptional cultural and linguistic diversity which is closely linked to biodiversity. The effects of biocultural collapse are thus significant. The consequences of sea level rise around Vanuatu are described in the following sections and in the below factual table.

Coastal economies and the costly loss of reefs

Sea level rise is projected to have a profound impact on coastal economies. Vanuatu's marine and coastal biodiversity contribute to generating goods and services with a value totalling over USD 39 million[10]. Tourism is a mainstay of Vanuatu's economy and a key foreign exchange earner. The impacts of sea level rise on the rich reef ecosystems and the intangible losses of places of beauty have implications for sectors like tourism. The subsidence of reefs results in coastal erosion, leading to the loss of beaches, narrowing of habitable areas, and impacting coastal infrastructure[11]. There was no data available on the quantitative losses and damages resulting specifically from sea level rise on the economy of Vanuatu. However, the adaptation costs for coastal protection are projected at USD 42-161 million a year or between 2 to 8% of projected GDP in 2040[12]. The Asian Development Bank projected that in a 2 degrees Celsius scenario, the annual GDP losses for Vanuatu would be 6.2% by 2100.[13]

As coastal areas are eroded and submerged, important habitats for various species are lost[14]. This loss of habitat disrupts ecosystems and reduces the availability of suitable environments for many organisms. The loss of productivity in reefs, exemplified by the coral eating crown-of-thorns invasion whose survivability is enhanced by rising seas temperatures[15], creates a food and livelihood[16] crisis for communities heavily reliant on fishing. Local fisherfolk have resorted to overfishing turning to one-inch nets as catch size is smaller. However, such practices strip more species off the reefs, further exacerbating[17] environmental degradation.

Sea level rise has led to the intrusion of saltwater into freshwater sources, resulting in salination of soil and water. This has adverse effects on potable water, vegetation, and freshwater-dependent species, impacting their survival and contributing to biodiversity loss. To further illustrate the threat multiplication of sea level rise, coastal erosion also makes communities more vulnerable to floods, storm surges and tropical cyclones[18].

Financial aid and support does not always reach communities

In the key informant interview[19] it was noted that aid and financial support often don't reach the communities as intended. Efforts are focused on larger-scale projects, and remote islands receive less attention due to transportation challenges. The distribution of resources and decision-making power is a significant concern, and local empowerment and sovereignty are goals that require careful navigation. There is a paucity of data and no central mechanism through which to track the projects that have been funded in Vanuatu to address sea level rise. As illustrated in the table below, available funding seems to come foremost in the form of project finance.

The impact of sea level rise on women and girls

Existing inequalities and harmful societal norms enhance the vulnerability of women and girls to climate change impacts in Vanuatu. Rothina Ilo Noka, Director of Women's Affairs in Vanuatu[20], notes that the workload of women and girls can intensify

Destruction after cyclone, Vanuatu
CARE/Tom Perry

after climate related disasters, as they are expected to continue providing and caring for their families. She notes that in rural and coastal communities, women's income often comes from harvesting and selling food to their communities and beyond.

These livelihoods are disrupted by sea level rise and its consequences. In addition, as traditional livelihoods are threatened, women experience greater strain on their time. We see this in the example of Wanita Kalpoi a 40-year-old mother, fisherwoman, and shell artisan from the Pango Village on Efate Island. She relayed her experience of sea-level rise in a workshop submission by the government of Vanuatu to the Loss and Damage Transitional Committee as follows: *"Sea level rise is degrading the reef flats where I collect shells. It's harder to get to the shells. Mud from the land is completely killing some species. I have to spend many extra hours fishing and collecting shells."*[21]

Sea level rise is unravelling the rich cultural tapestry of the ni-Vanuatu

The connectiveness of lives to the land and sea, is visceral in small islands where cultural identities, mythologies and religion are intertwined with the land and sea and traditional ways of knowing and being. Sea level rise and its associated impacts pose a threat to traditional knowledge and practices that have been passed down through generations. Vanuatu, known for its cultural diversity and languages (with around 106 indigenous languages[22] it is considered the country with the highest linguistic diversity in the world[23]), is under dire threat due to the impact of sea level rise. The loss of livelihoods and wellbeing associated with the decline of reefs and coastal areas is interlinked with cultural preservation. The loss of ancestral graveyards and

displacement from traditional lands disrupts the cultural connection to the environment and affects the transmission of ecological knowledge.

The changing environment disrupts the stories and traditions passed down to future generations, leading to a loss of cultural heritage. The interviewees[24] noted that the clash between traditional values and urban environments, coupled with poverty and unemployment, have contributed to mental health challenges. The impact of sea level rise on the loss of language as communities are displaced has been described as catastrophic by linguists[25].

Sea level rise is a driver of the increased urbanization in the Pacific. In Vanuatu a quarter of the country's population lives in Port Vila on urban state land in permanent or informal settlements. It is expected that the move to urban areas will continue[26], putting further demands on inadequate urban infrastructure.

Deep Dive: Community Preparedness in Vanuatu[27]

Communities engage in rear guard actions such as reef husbandry and organic gardening[28], which provide cultural and food security benefits. These practices help mitigate the immediate impacts of sea level rise. Functional agroecology, including seed saving and soil building, is seen as crucial for community preparedness, along with enabling smallholders to make decisions and build resilience internally. Proactive measures include advocating for compensation, supporting local-level initiatives, and promoting adaptive solutions tailored to specific communities. Agroecology and adaptive crops are suggested as long-term solutions for food security.[29] The inclusion of Pacific women, who are often marginalised in decision making spaces[30], is also crucial in the effective response to addressing the crisis caused by sea level rise.

The crisis[31] in Vanuatu is not a recent phenomenon but stems from a longer history of colonization and systemic issues. Ni-Vanuatu women who are often marginalized and greatly impacted by sea level rise and all its multivariate impacts are able to uniquely understand the experiences of those most affected and can vitally craft solutions that are appropriate[32].

Margaret Rasai participates in CARE's Leftemap Sista project and took part in the Community Disaster Climate Change Committee (CDCCC) training, which helped her learn the importance of preparing for disasters.
Georgina Ishmael/CARE

DEEP DIVE CASE STUDY:

Sea Level Rise in Vanuatu, Ongoing

The Story of Willie Kenneth of Worasiviu Village, Pele Island

The islands of Nguna and Pele lie north of the larger island of Efate, which houses the capital city of Port Vila. According to Vanuatu's 2009 National Population and Housing Census, Pele Island had a population of 330 people and 63 households across the four villages of the island: Piliura, Worasiviu, Loanamoa and Worearu. This is **a story about the loss of the bones of ancestors, the loss of ancestral lands and the reefs** that have sustained communities for generations in the village of Worasiviu. This is the story of Willie Kenneth.

Willie relays his story in a documentary as he stands on the eroding shores of Pele Island. He notes that the once vibrant coral reefs that served as natural barriers against the sea were now subsiding, weakened by the invasion of the Crown of Thorns starfish. *"If you look at the rapid erosion activity that we have today, the coastline is only four meters away from here. Our coral reefs are natural barriers against this. They protect us from the heavy swell that would come up and dig out our coastline – and which caused all this erosion."*

Willie recounts how the community had come together to fight the invasion of the Crown of Thorns. Every man, woman, and child had gone to the ocean, pulling out the starfish and burying them onshore. They had cleaned their reefs, a collective effort to save their island.

But then, cyclone Pam hit the island.

Willie points to where the graveyard once stood: "If you look from here, a large part of the graveyard has been washed out already. You can't see it anymore, but the coconut trees that used to line the coast are gone. This is really strong proof to us that climate change is very real. It's affecting us right now."

The reality for the community was stark as they were faced with the task of relocating the graves of their ancestors before the ocean washed them away. Plans were made for a family gathering to discuss how to move the bones of their grandfathers and relatives inland.

Willie's words are a call to action: "It's possible that in the next ten years, our community will be completely washed away. In terms of climate change though, sure we can have trainings and make coastal adaptations to slow erosion, but here in the islands, we can't do too much about the root cause. These climate change impacts are a reality that we're going to have to face. We can minimize them, but we can't stop them...*our small islands are getting smaller now."*

His story is not just a tale of loss and despair; it is a testament to the **resilience and unity of the community** of Worasiviu. It is a reminder of the very real and immediate impacts of climate change, a challenge that they are facing head-on, even as the world around them continues to debate the impacts of climate change.

Willie's narrative is a call to the world, a plea for understanding, empathy, and action. The loss of graveyards is not just a loss of land; it is a loss of heritage, a loss of connection to the past, and a forewarning of a future that could be lost if the world does not heed the lessons of Worasiviu.[33]

Sea-level Rise in Vanuatu, Ongoing[34]

Type of event: Slow onset.
Vulnerability: Vanuatu ranks number 139 on the ND-GAIN index. This indicates high vulnerability to adapt to the negative effects of climate change but high readiness.

Affected population: All low-lying coastal communities – 64% of Vanuatu's population (204,247 people of a total of 319,137).

Economic

Estimated damages:
No estimates available

Funding Received
No detailed information on the appealed emergency funding from Vanuatu has been found.
GCF: Grant – USD 32.7 million for community-based project for climate-resilient agriculture and effective coastal resource management techniques
GCF: Grant – USD 28.3 million Water security
ADB: Technical Assistance (TA) - $5mn across Pacific Island States for climate resilient investment pathways
ADB and GEF: TA – USD 2 million across Pacific Island States for building coastal resilience through nature-based solutions.
ABD GEF: TA – USD 2.684 million across Pacific Island States for blue economies.
World Bank: Grant – USD 25 million Vanuatu Affordable and Resilient Settlements Project.

Damage to public buildings:
No data available..

Loss of Land:
Shrinking coastal habitable areas, reduced crop efficiency from saltwater intrusion.
Between 1990 and 2010 sea-level rose by around 6mm pr. year.

Damage to infrastructure:
No data available.

Agriculture & Fisheries:
Decreased productivity of reefs due to shifting thermal conditions has implications for food security.
Sea-level rise has implications for agriculture as well. From salination to erosion and loss of fertile coastal lands.

Damage to telecommunications
No data available.

+ Sectors
No data available.

Access to Water/WASH:
No data available.

Non-Economic

Food security:
No data available.

Mortality
No data available

Displaced
Third National Communications to the UNFCCC reports forced relocation of entire communities, citing the examples of planned retreat in the northern island of Tegua, and communities on Aniwa and Torres islands.

64% of the population of Vanuatu lives with 1km of the coast – the majority are at risk of displacement.

Physical Health
No available data.

Mental Health
IElevated stress, tension, and domestic violence, particularly affecting women.

Loss of ecosystems
Crown of Thorns invasion as thermal conditions change, loss of reef systems, loss of indigenous fish and marine species, loss of coastal protection from storm surges.

Cultural heritage:
Language, burial sites, loss of indigenous practices and ecological heritage and stories.

Future prospects: As the sea level rises and the ocean warms, the consequences of tropical cyclones and coastal flooding may escalate, making coral bleaching worse and reducing the protective capacity of coral reefs.

Pre-existing vulnerabilities
Debt as percent of GDP: 48.4%.
57.4% social protection coverage.

Tropical Cyclone Yasa and Ana, Fiji, 2020-2021

As the case study shows the aftermath of the cyclones has significantly strained social structures. Vulnerable groups, especially women and the LGBTQI community, face amplified challenges, emphasizing the need for inclusive recovery strategies. Despite aid, key sectors remain in a constant cycle of recovery, underscoring the vital need for sustained support and a comprehensive understanding of the multifaceted impacts of such disasters. Notable gaps in data on support provided, disaggregated impacts and non-economic damages remain.

Tropical Cyclone Yasa a severe category 5 cyclone struck in December 2020. Yasa was hit in the midst of the Covid 19 pandemic, and a few months after tropical cyclone Ana had made landfall. The total damages from Yasa and Ana were estimated at USD 250 million. For communities already struggling with the global shock of the pandemic, the cyclones dealt a heavy blow. Cyclone Yasa affected 17% of Fiji's population (app. 160,000 people) and displaced more than 23,000. Just before Yasa, in April 2020 Cyclone Harold barrelled through the South Pacific, hitting Fiji. As people were displaced into evacuation shelters, lockdown restrictions had to be lifted with Fiji having to face the risk of contamination resulting in more illnesses and deaths[1]. Following Yasa and Anna, the incidence of Leptospirosis, Typhoid, Dengue fever, Diarrhoea (LTDD) and other communicable diseases, common after floods, were escalated[2].

As stated by the key informant[3]: "we are often called resilient people, but this is not because we are resilient, it is because we have no other choice. People are caught in a constant cycle of recovery and are not able to pursue development for their communities. There is a weakened social structure because people are being displaced. The social fabric is beginning to tear apart."

Communities are trapped in a constant cycle of recovery. This case study is based on desk research and an interview with the regional coordinator of Pacific Island Climate Action Network (PICAN)[4]. As with other case studies, the lack of information on the lived experience and non-economic loss and damage is a gap.

Financial aid and support were received, though traceability remains an issue

Financial support for recovery and rehabilitation came from bilateral and multilateral aid sources. There is no central mechanism through which to trace the funding received. The Prime Ministers Tropical Cyclone Yasa Relief Fund received donations upwards of USD 203,000 but there is no total amount available. Donations were received from local actors, expatriates and donors such as China[5]. Australia[6] and New Zealand[7] provided budgetary support. Loans from the Asian Development Bank (ADB) assisted sectors severely affected by the disaster. Australia also generally directs a portion of their support to Civil Society Organisations for response work and preparedness. The response activities ranged from providing seedlings, to cash and voucher assistance, livelihoods, building materials, water sanitation and hygiene kits. The DREF cyclone allocations for Fiji in 2020 was about USD 870,000 and in 2021, USD 311,000[8].

Communities are responding to the finance gaps that they experience in the face of compounding and increasingly complex disasters. In 2023, the Kato Pacific Community Climate Fund[9] was created as a mechanism that is simple, clear and accessible, removing barriers for vulnerable communities to access finance.

Discrimination against the LGBTQI+ community

As with the other case studies highlighted in this paper, the impacts of the disaster are felt differently by men and women[10]. Women, who carry the household burden often have to walk long distances to gather water, and their mental health is more affected due to various factors such as limited access to resources and an increase in gender-based violence[11].

This case study also particularly highlighted the vulnerability of the LGBTQI+ community who frequently faced discrimination, and stigmatization, with little targeted mental health and psychosocial support. Some who had left unsafe communities for urban centres had to move back to these same communities because their urban livelihoods disappeared. It was noted that LGBTQI+ communities are blamed for climatic events, driven by biblical narratives. They face continued persecution and find it difficult to access aid services[12] as they are discriminated against by government workers as well.

The non-economic loss of ecosystems and culturally important sites

Pacific Islanders cultural identities are interwoven with the land and the seas. The impact of the cyclones on biodiversity and ecosystems was significant. Trees and plants were uprooted, and livestock killed on coastal arable land and farms. In the outer islands of Beqa and the Yasawa Group, sources of livelihood from traditional plants were destroyed. Cultural heritage sites, from graveyards to temples and native species important for traditions, such as the Yaqona crop[13], were also damaged in the Cyclones.

Fiji_Farmer Saimoni Ramatau & sons in destroyed banana farm, Kese Village, Yasawa Islands
Dylan Quinnell/CARE

Children's education is at risk with some schools still not reconstructed three years later

It was noted that as people are continually being displaced, there is a weakened social structure especially in light of migration into urban centres and away from traditional lands. Children's education is being hampered and pupils are falling behind in school. They are studying in makeshift shelters, or are pulled out of school entirely to assist families in rebuilding livelihoods and homes. Nearly 10%[14] of schools were damaged by the Tropical Cyclones, and now, nearly three years later, some schools are still operating in makeshift tents[15].

Tropical Cyclone Yasa and Ana, Fiji 2020-2021[16]

Type of event: Sudden onset.
Vulnerability: Fiji ranks number 77 on the ND-GAIN index. This indicates high vulnerability to adapt to the negative effects of climate change but high readiness.

Affected population: 159,336 people, Men: 81,902 Women: 77,434

Economic

Estimated damages:
Almost USD 250 million (estimate only available for TC Yasa)
Effect on GDP: 4.5% OF 2019 GDP

Funding Received
No detailed information on the appealed emergency funding from Fiji has been found.
DREF Appeal: USD 1.181 million
UNDP: Grant, USD 50,000.
European Union: Humanitarian Funding, USD 0.88 million.
Australian Government: Humanitarian Relief, USD 2.83 million.
NZ Government: Humanitarian Funding, USD 1.48 million.
ADB: Grant, USD 0.92 million.
JICA: Loan draw down, USD 24.11 million.

Damage to public buildings:
Schools: 90 (out of 918)
Hospitals: 25 (out of approx.200)

Loss of Land:
Homes destroyed: +8,000

Damage to telecommunications:
Data not available

Agriculture & Fisheries: USD 72.5 million including 94% damage to crops which will create challenges to food security for affected areas. The five most cultivated food crops include dalo (taro), cassava (manioc), kumala (sweet potato), vudi (plantain) and eggplant and all of them reported extensive damage ranging from 54-73%
Rice farmers in the Northern Division alone incurred losses of $171,700.

Damage to infrastructure:
317 items of Fiji Roads Authority (FRA) infrastructure was affected by TC Ana, 185 for TC Yasa

+ Sectors
Tourism was already severely impacted by COVID-19..

Access to Water/WASH:
25,000 people affected.

Non-Economic

Mortality
4 People

Displaced
23,479 displaced.

Mental Health
Increased discrimination of marginalised communities such as LGBTQ+ who were blamed for the disaster.
Little mental health support.

Cultural heritage:
Culturally communities are spiritually connected to the land and reefs – these incurred significant loss and damage

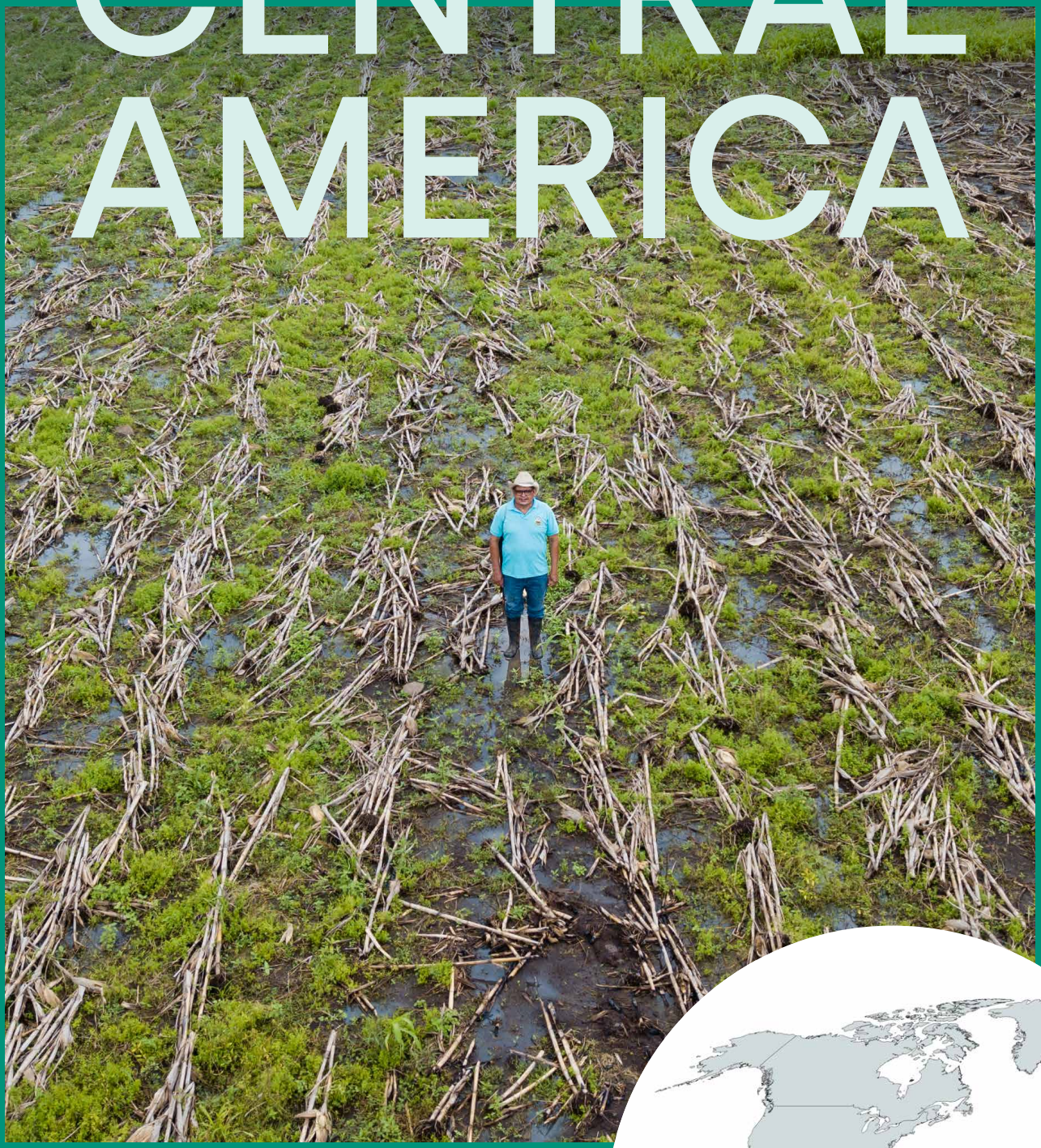
Physical Health
Escalated the incidence of Leptospirosis, Typhoid, Dengue fever, and Diarrhoea (LTDD), communicable diseases.
Government was unable to increase spending to respond to the health or the economic impacts of the COVID-19 pandemic and repeated cyclones

Loss of ecosystems
Livelihoods from traditional plants and reef systems destroyed.

Coastal arable land and farms, saw trees and plants uprooted and livestock killed.

Pre-existing vulnerabilities
Debt burden: Fiji's debt-to-GDP ratio 'jumped 32% to 81%' in the financial year 2020-2021.
Inadequate access to climate finance
Lack of Early warning systems
Compounding extreme sudden onset event: Severe Tropical Cyclone Harold (2019-2020)
Global Pandemic: COVID-19

CENTRAL AMERICA



Storm number 28 of the 2020 Atlantic hurricane season called ETA began to affect northern Honduras as a Category 4 hurricane as it approached the coast of Nicaragua on November 3, causing torrential rains that, according to the forecast of the United States National Hurricane Center (NHC), left up to 635 mm of rain and caused winds of up to 275 km/h, flooding much of Honduras and causing the level of rivers, floods and landslides to rise throughout the country.
Photo: ETA IOTA

Hurricanes Lota and Eta in Central America, 2020

Hurricanes Eta and Iota exacerbated existing challenges in Central America, which range from COVID-19 to economic struggles, and are further deepened community traumas. Despite a substantial economic loss of USD 1.6 billion and subsequent international aid efforts, funding needs were not fully met. The agriculture sector, vital to the region, suffered extensive damages, and gender-based risks, especially for women, heightened post-disaster. The importance of ecosystems in disaster risk reduction was evident, even if biodiversity impacts remained underexplored.

Hurricane Iota hit Central America in mid-November 2020 just weeks after hurricane Eta caused disastrous damages in the region in beginning of November. As the two hurricanes occurred just after each other, they are categorised as one disaster. The two hurricanes hit Central America including Belize, Mexico, Honduras, Guatemala, El Salvador, Nicaragua, Costa Rica, Colombia, and Panama, affecting almost 9 million people. They brought along heavy rains, flood, land- and mudslides[1].

The year 2020 marked a record-breaking hurricane season in the Atlantic, and the hurricanes Eta and Iota landed in Nicaragua as a category 4 and 5 respectively within two weeks from each other. Before 2020, only four category 4 or 5 hurricanes had ever made landfall in Nicaragua. Iota was the strongest hurricane in the Atlantic since modern record-keeping began. One of the main climate factors contributing to the record-breaking season was rising sea temperatures in the Atlantic Ocean[2].

Unpredictable climate disasters affected a vulnerable region

Hurricane Iota hit just after Eta meaning that people affected by Eta had just begun their recovery. However, Iota, was an even stronger storm and further compounded the impacts from Eta especially for people displaced by Iota. It is estimated that the two hurricanes triggered 1.7 million displacements in November 2020. In addition, soils were still saturated after the heavy

The rains will affect large areas of the country and affect remote areas hampering evacuation efforts. Eta will remain a challenge for Central America as it moves through the region which is already battling, food insecurity, COVID-19 and other socio-economic issues.
Photo: Norman Camal / CARE

rains from Eta, increasing the risk from floods and landslide. Furthermore, the hurricanes led to overflowing rivers and brought down trees and powerlines, which had cut off whole communities from the rest of the country. The hurricanes also destroyed entire communities such as the indigenous community, Wawa Bar, in Nicaragua[3].

At the time of the hurricanes the region was already struggling with other crises such as COVID-19 and the economic consequences hereof, intense patterns of gang violence as well as internationally organised crime. The region was also recovering from drought and an outbreak of dengue fever. This is important to note, as government-led responses were stretched in capacity and resources. The responses to early warning systems were limited by lack of dissemination of warnings, plans, protocols, and finance to execute anticipatory action[4].

In Nicaragua, Honduras, and Guatemala, the quarantine measures from COVID-19 contributed to weakened businesses and livelihoods which then were impacted further by the damage of houses, key infrastructure, communication lines, drinking water systems, health systems, and access to food. To this day, the full scale of the losses and damages are yet to be determined. In December 2020, UNICEF alerted that 3.5 million people across Central America (Nicaragua, Honduras, Guatemala, El Salvador) were in need of food assistance (IPC phase 3)[5].

The population affected by Eta and Iota further suffer from trauma related to the unpredictability and reoccurrence of climate disasters. Eta and Iota are two different incidences that impacted almost the same group of people within two weeks. The mental stress related to not knowing if everything you and your family have built will be lost again to another hurricane is a continuous mental health stressor for many communities, as one key informant[6].

Economic losses affected millions especially in the agricultural sector

It is estimated that Eta and Iota caused economic losses of USD 1.6 billion across Colombia, Guatemala, Nicaragua, and Panama. It affected almost 9 million people and caused 444 deaths[7]. The agricultural sector across Central America

Central America is currently facing the toughest storms in the last two decades. ETA has hit Honduran soil and destroyed infrastructure, flooding cities and displacing more than one and a half million people as of November 6, 2020.
Photo: Norman Camal / CARE

has been disrupted by the hurricanes. Small-scale fishing and farming were affected by the destruction of farmland through flooding and sea-water intrusion[8]. It is estimated that in Honduras 220,000 ha of basic food delivering crops were lost or damaged. In Guatemala, 75% of the cultivated area was damaged, and in El Salvador up to 60% of the harvest was affected by Eta and Iota[9].

The damages from the hurricanes along with the multifaceted crises in the region, make it difficult for the affected population to sustain their livelihoods. Early reports after the disaster indicated that small businesses' infrastructure and access routes to markets are among the economic losses (apart from loss of agricultural production activities) that complicated the restart of economic activities[10].
The response to the disaster across Central America (El Salvador, Guatemala, Honduras, Nicaragua) covered 71 organizations that reported 1,600 response activities in 12 sectors. The WASH sector was the primary recovery sector. Food security, protection, shelter, and health were also highly prioritized in the response[11]. It has not been possible to identify the total amount of funding across the whole region from all actors, but IFRC reports a donor response of almost USD 15 million (an appeal coverage of 59%)[12] while UNICEF reported a donor response of also USD 15 million (an appeal coverage of 35%)[13].

Women were highly vulnerable after hurricanes

The level of violence in the region and in Honduras especially increased the risk of post-disaster gender-based violence (GBV). Women who were forced to leave their community were in higher risk for GBV due to lack of protection. Increased poverty and pressure from gangs factored into the multidimensional magnitude of the climate disaster[14].

CARE in Honduras and ONU Mujeres (UN Women) further estimated the impact on displaced women following Eta and Iota. Both organisations found that women lacked access to health services in the shelters (62% did not have access to services related to pregnancy and delivery, 78% did not have access to services for elderly or disabled women, and 66% did not have access to medicines for chronic diseases for women, girls, and adolescences). Furthermore, the income gap between males and females was estimated to have widened from 14% to 36% even when the share of men not generating income increased from 8 to 19% after the hurricanes[15]. In the longer term however, the representative of CARE Honduras gathered evidence that more women start entrepreneurial businesses to support their families to mitigate the loss of their families' livelihoods (e.g., agriculture or small businesses) to the hurricanes. This has been witnessed in several communities and supports women in achieving more economic independence[16].

Hurricanes Eta and Iota, Central America 2020[17]

Type of event: Sudden onset event.
Vulnerability: Honduras ranks number 142 on the ND-GAIN index. This indicates low readiness and high vulnerability to adapt to the negative effects of climate change.

Affected population: 9.3 million people (of where 3.6 million are children) across Guatemala, Honduras, and Nicaragua.

Economic		Non-Economic	
Estimated losses: USD 1.7 billion across Honduras, Guatemala, and Nicaragua. **Estimated damages:** USD 738.6 million in Nicaragua, **Effect of GDP:** Honduras' GDP suffered a loss of 9% in 2020 and compared to neighbouring countries the 2021-rebound was slower.		**Food security**: 3.5 million people (Nicaragua, Honduras, Guatemala, El Salvador) faced food insecurity crisis (IPC phase 3+)	
Funding Received USD 180 million required for the 2020 hurricane season. *No numbers are found on the corresponding received funding.* Honduras received USD 30 million from IFRC and UNICEF.		**Mortality** 444 deaths (not possible to gender disaggregate)	**Physical Health** *No data available.*
Damage to public buildings: *No data available..*	**Loss of Land:** 220,000 Ha. of damaged land in Honduras. 75% of cultivated land in Nicaragua.	**Displaced** 1.7 million (not possible to disaggregate)	
Damage to telecommunications: Damaged communication lines.	**Agriculture & Fisheries:** 60% of the harvest in El Salvador was affected by the hurricanes.	**Mental Health** Trauma from reoccurring climate disasters.	**Loss of ecosystems** Land degradation following the hurricanes.
Damage to infrastructure: Damaged roads to market, damaged agriculture infrastructure. In November 2020 188,000 people in Honduras remained cut off from access.	**+ Sectors** Tourism was already affected by COVID-19.	**Cultural heritage:** Entire indigenous communities were de-stroyed.	
Access to Water/WASH: 1.6 million people require urgent access to WASH services in Honduras.			

Pre-existing vulnerabilities
COVID-19 pandemic.
Preceding droughts.
Dengue fever outbreaks.
Economic crisis.
Violence.

Key Findings & Recommendations

Key Findings and Recommendations

The case studies presented in this report show that there are significant losses and damages, both economic and non-economic, in the wake of climate disasters. A few key findings can be extracted from the case studies and are presented in the following section.

Key findings

1. Disproportionate impacts on vulnerable populations

Across all examined cases, **marginalized groups**, including the poor, women, children, the elderly, Indigenous People, and displaced individuals, **bear the brunt of climate-related impacts,** including through higher levels of loss of income, food insecurity, malnutrition, impacts on mental and physical health and labour productivity. Additionally, there is a significant loss of traditional knowledge and cultural heritage leading to a decline in intergenerational learning and social cohesion as exemplified by the cultural impact drought has on pastoralist communities in Eastern Africa. Globally, between 3.3 to 3.6 billion people are highly vulnerable to climate change. Nearly all case studies demonstrate an unequal burden on women and girls.

2. Greater attention needed on resilient recovery

The relentless spiral of disasters **traps communities into a constant struggle for recovery**, which has significant implications on their well-being and growth, as exemplified by the case study on Tropical Cyclones Yasa and Ana in Fiji. The resulting displacement, disrupt the educational systems and take a toll on mental and physical health. Three years after these cyclones in Fiji, some schools were still operating in makeshift tents. These losses and damages are persistent and not limited to a single event.

The Malawi case highlights the risk of **losing entire generations of children and youth** who fall behind or drop out of education. The aftermath of sudden climate events presents a **challenging road to recovery. Communities are faced with profound changes and must rapidly evolve to cope**. In the absence of sustained support, people often turn to measures like taking loans such as in the case study on the South Asian heatwave, where recurring crop failures have pushed farmers into a cycle of debt.
As the focus shifts from immediate relief to longer-term recovery, the strategies must evolve. In a recent study, using data from 100 countries, it has been highlighted that only 16 per cent of the countries have disaster management legislations containing detailed provisions on disaster recovery. Plans must prioritize resilience, ensuring that communities are better prepared for future challenges and can address long-term impacts.

3. Addressing losses and damages necessitates multifaceted solutions

While international humanitarian efforts have become increasingly proficient, there is a pressing need to support and enhance national and local systems, in preparedness, response, recovery and rehabilitation. As the case studies show **climate impacts are complex and solutions need to be multifaceted**. Additionally, **one climate disaster can intensify the impacts of another**. For example, in Vanuatu, rising ocean temperatures escalate sea level rise, ocean acidification, and cyclone severity. Similarly, the East African drought occurs against the backdrop of five consecutive below-average rainy seasons.

Drawing from the case studies, a comprehensive risk management approach is essential to mitigate a significant portion of the damage. This would entail specific emphasis on **anticipatory action and general preparedness** measures that incorporates social protection mechanisms Relocation strategies can prepare communities for the upheaval they will eventually face, and local planning and community engagement is imperative. Locally-led initiatives need to be amplified as they are more likely tailored to the unique needs of local communities. This not only ensures that solutions are contextually relevant but also expedites the response time.

4. Communities, local organisations and humanitarian actors are first responders and increasingly support recovery and anticipatory actions

Communities and humanitarian actors are at the forefront of disaster response, with their efforts spanning various phases of intervention, from anticipatory actions to long-term recovery and support. **Multiple stakeholders are essential at various stages of disaster response**, including pre-disaster anticipatory actions and early warning systems, immediate post-disaster efforts, and the long journey of reconstruction and rehabilitation. Community- and local capacity are vital when building resilience and preparedness to minimize loss and damage to lessen humanitarian impacts.

The case study of the floods in the Sahel sees international organizations, particularly the IFRC, building local capacities to anticipate and prepare for future floods. In Niger, systems are specifically designed to anticipate and counter river flooding. In Vanuatu, nature-based solutions, such as organic gardening and reef husbandry, are employed as proactive measures against sea level rise, emphasizing community empowerment and inclusion of marginalized groups in decisions. Whilst in Fiji, the inception of the Kato Pacific Community Climate Fund in 2023 is a testament to community-driven solutions addressing financial challenges from escalating disasters. For the drought in East Africa the case study showed the importance of CSOs' immediate interventions, like food, cash transfers, and shock responsive social protection measures were essential factors contributing to increased lifelines amidst drought disasters.

5. Current finance is insufficient

Almost all case studies illustrate that when impacts are quantifiable, **the amount of finance received is not at a level that meets the needs identified**. On average UN appeals were funded 20% by mid-2023. This leaves significant gaps in funding the immediate response mechanisms as well as in areas such as disaster preparedness, building resilience and longer-term recovery. Financial support is often delivered as humanitarian assistance, and disaster risk financing, which would not address the funding needs that fall outside of this category (such as addressing cultural losses and deteriorating social values). Some of the development support comes as loans as in the case of the Pakistan flooding, which can result in a cycle of debt for the recipient country. Some post-disaster responses come with developmental support that may inadvertently create debt vulnerabilities. In the South Asia heatwaves, for example, the Bank of Agriculture and Cooperatives in Thailand, pushes farmers towards loans that favour chemical companies and diverge from traditional farming methods. Such loans can perpetuate dependencies and misaligned practices. Contrastingly, in the case study of the Bangladesh flood, it was found that notable financial support included a $500 million USD credit from the World Bank for disaster preparedness and a $230 million USD loan from the ADB for infrastructure and resilience.

As several of the cases illustrate **international finance is too slow**. This was specifically apparent in the slow-onset events such as the drought in East Africa, the heatwave in South Asia and the drought in Afghanistan. A rapid financial response is key for minimising suffering and long-term impacts. This can be a particular challenge in fragile states. The case study on Cyclone Freddy showcases a community feeling neglected, with reconstruction efforts being non-existent, leading to heightened frustration and feelings of abandonment. Also, the case study of Vanuatu notes that funding does not reach the impacted communities. It is clear, that there is a difficulty in addressing disasters promptly and to access funding at the local level. The very restricted access to finance for climate-related loss and damage in fragile and conflict-affected areas, creates an high dependency on humanitarian access, making the most vulnerable even more vulnerable.

6. Gaps in data, evidence and reporting

The report shows that there are **significant gaps in terms of both quantitative and qualitative data, economic and non-economic.** None of the case studies are comprehensive in terms of data availability with regards to all economic and non-economic losses and damages. These gaps make it difficult to provide a coherent assessment of the impacts on people, communities, ecosystems, and societies. The financial aid and support needed to repair the damages that are reparable and address the irreparable losses is equally difficult to assess. There is a notable gap in evaluating the financial aid necessary for resilient recovery and recovery. It is clear from several of the cases, including the flooding in Malawi and the heat wave in South Asia that many people and communities were not only immediately impacted on their health and lives, but also lost their source of income that could have contributed to their recovery. In such situations, the emphasis should be on rebuilding livelihoods and ensuring sustainable futures. Publicly accessible documents, like the Post-Disaster Needs Assessments, often does not provide comprehensive data on longer-term recovery needs.

Some case studies include disaggregated data on how impacts affect population groups differently, depending on pre-existing exclusion or marginalisation. However often these are not complete. Women, already displaced people, and minorities are not often represented adequately. Tropical Cyclone Yasa and Ana in Fiji mentions LGBTQI+ qualitatively but there is no quantitative data. For the flood in Bangladesh, we see disaggregated data for the number of people displaced but no such data for the drought in

Afghanistan. There is a need for disaggregated data to enable a granular understanding of impacts and potential coping strategies as different population groups are impacted differently.

The case studies underscore the complexity of fully capturing non-economic losses and damages, particularly in diverse contexts. While the immediate consequences garners significant attention especially in the context of immediate humanitarian responses, the enduring aftermath poses challenges in assessment and redressal.

The humanitarian sector has made strides in recognizing immediate needs, but there remains a **deficit in assessing the long-term mental health implications**, particularly for vulnerable demographics like children, youth, and women. These challenges are often sidelined in both vulnerability assessments and longer-term adaptation planning.

The case studies have attempted to collect quantitative and qualitative data in relation to the non-economic losses and damages however it was not possible to collect comprehensive qualitative or quantitative datasets for any of the cases on the non-economic losses and damages that have occurred due to a specific climate disaster.

The illustration below shows a categorisation of which data was typically available for the different case studies.

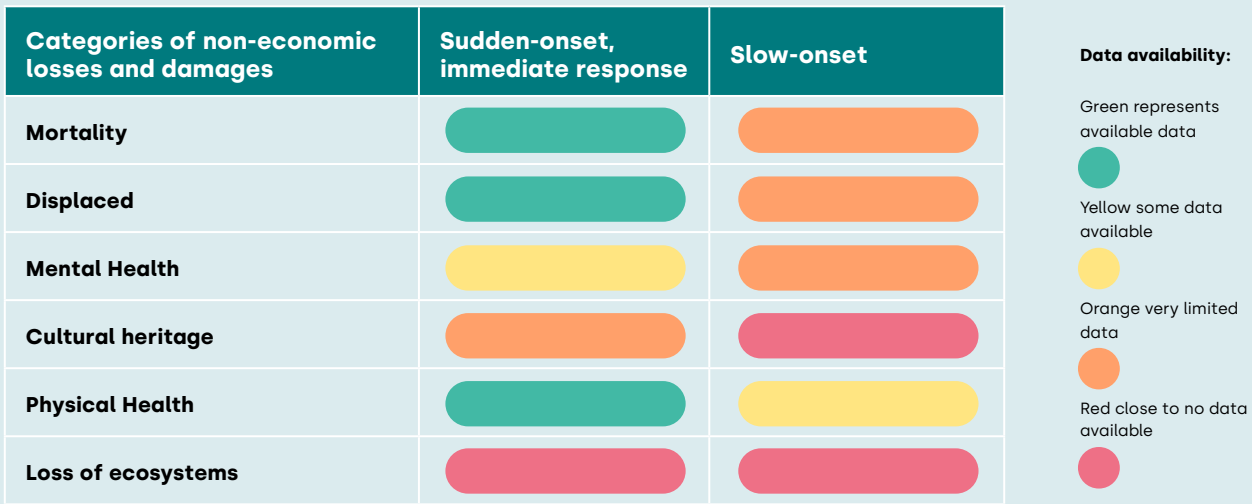


Illustration 1: Data availability for different categories of non-economic losses and damages

Policy Recommendations

While climate disasters and losses and damages from these disasters are significant and increasing in severity, there are actions that can be taken to: (i) reduce the impacts of climate change, (ii) ensure better and more effective responses to climate disasters and finally (iii) build back better. The below policy recommendations point to what needs to be done to address the impacts of climate disasters in the establishment of the new loss and damage fund and funding arrangements.

RECOMMENDATION 1:

Finance needs to be increased significantly and many-fold and include the need for support of long-term resilient recovery.

Laws, policies and plans provide the foundations of a strong recovery system which provides timely and appropriate recovery assistance to disaster-affected people and communities, but disaster recovery is often overlooked in national disaster laws, policies and plans.

The most climate vulnerable countries and communities with the least capacity to manage risks, are not receiving the support they need. Responding to losses and damages will require significant long-term funding at a much greater scale than what we currently see. The protracted journey from emergency response to recovery, rehabilitation and reconstruction represents a step change in need, the long-term funding needs post-disaster are consistently not being met and sourcing new, additional funding - not exacerbating the debt crisis of countries and individuals - to effectively tackle loss and damage, is critical. It is thus imperative to identify innovative sources of funding that can enable and facilitate the needed preparation and response to climate disasters in a flexible manner. Assessing funding needs should therefore also include needs for resilient recovery and "building back better" to prevent future impacts.

RECOMMENDATION 2:

Local actors and at-risk-communities need to be engaged and capacitated in co-creating solutions and mechanisms for preparing and dealing with climate disasters.

Minimising, averting, and addressing losses and damages from climate disasters in a comprehensive manner is enabled by inclusive and coordinated efforts that place the affected populations at the very centre. Frontline communities are first responders, and they are the carriers of solutions, hopes and capacity to rebuilding that is contextually appropriate, sustainable and inclusive. Dealing with losses and damages better is enabled by inclusive processes, locally led solutions and by drawing on local knowledge. This requires significant investment in designing a context specific, local needs driven and responsive system. There is great potential of establishing international response to climate-related losses and damages such as the Loss & Damage Fund, for this to reach its maximum effect, this must be combined with locally led national plans that prioritize long-term damage, that offer support for a more resilient future. When funding arrangements support locally led solutions, measures are tailored to local needs and will reach the most vulnerable.

RECOMMENDATION 3:

Scale up anticipatory and early action to minimize loss and damage.

New and innovative funding arrangements should be designed with flexibility to support and enhance pre-arranged funds in anticipation of disasters and support anticipatory action where appropriate.

Efforts to avert and minimise losses and damages through mitigation, adaptation, resilience building and disaster risk reduction have so far been critically insufficient and inadequate. Change from climate disasters is continual and has deep implications for the physical, economic, and social contexts of people and communities. Disasters like the ones described in this report result in losses and damages that are profound, unprecedented

in terms of scale and depth and more complex and difficult to manage. Minimising the losses and damages by acting before a climate disaster is key. The international humanitarian community has decades of experience in preparing for disasters and has focused intensively on optimising its anticipatory action saving lives and livelihoods. Humanitarians play a crucial role but cannot be the solution alone. The potential to do more and achieve results is high when scaling up action to avert, minimize and address loss and damage.

RECOMMENDATION 4:

National, institutional and legal frameworks that guide a resilient, coordinated, and decentralised recovery need to be strengthened.

It is important to develop laws, policies and plans for recovery in advance rather than hastily improvising after disasters. Having appropriate laws, policies and plans in place can enable rapid recovery assistance, adequate funding, and effective coordination. Governments and institutions should adopt and implement the locally-led resilient recovery to enhance efforts to build back better. The losses and damages as described in the case studies are of a magnitude that imply considerable rehabilitation, recovery, and reconstruction efforts in the mid and long-term. Such efforts must include scaling up of innovative and locally adapted delivery systems and addressing mental health impacts through Mental Health and Psycho Social Support programmes targeting the most vulnerable. Furthermore, addressing the basic needs of local communities, rehabilitating key ecosystems, livelihoods, and core economic sectors such as the agricultural sector are all key first steps in recovery and restoration while societal shifts and transformations are needed to prepare for future climate change. It is foremost important that support is given to countries to capture and communicate their loss and damage needs, only by doing so we can strengthen coordination and frameworks at the national level. Too often, recovery assistance dries up long before communities have fully recovered, leaving them staggered. Recovery laws, policies and plans need to address the long-term, by providing for coordination mechanisms, funding, and programs to continue for many years after a disaster.

RECOMMENDATION 5:

The funding arrangements for a comprehensive approach to loss and damage need to be designed in a way that addresses the need for collaborative, systematic, targeted, and decentralised planning and recovery, that builds integration across timelines.

Improving, collaborative planning for climate disasters is crucial, and comprehensive efforts, working together at multiple levels, are needed to minimise, address, and avert the losses and damages from climate disasters. It requires the availability of useful data for both short and long-term responses and reconstruction. As well as it requires scaling up investments across full disasters continuum from preparedness to recovery. Fund management should be coordinated at country level involving all relevant actors across the humanitarian and development sectors, as well as operational actors on local levels. Furthermore, to ensure effective long-term recovery planning is targeted at the most vulnerable and their needs, impact data should be compiled locally and aggregated in terms of most affected communities and population groups. The assessment of non-economic losses and damages (realised or potential) need to be included into climate risk and vulnerability assessments and data from monitoring should be captured to the extent possible in post-disaster needs assessments.

ANNEX I: Definitions

In this policy paper **Loss and Damage** (capitalised) refers to the United Nations Framework Convention on Climate Change's (UNFCCC) political discourse and negotiations post-2013. In contrast, **losses and damages** (lowercase) broadly denotes the harm from observed impacts and projected risks. This definition is based on the Intergovernmental Panel on Climate Change's (IPCC) terminology[1].

Throughout the paper the following definition of **loss and damage** is applied: "losses and damages are the adverse effects of climate-related stressors that cannot be or have not been avoided through mitigation or managed through adaptation efforts[2]".

Thus, losses and damages occur when adaptation measures are unsuccessful, insufficient, not implemented, or impossible to implement; when adaptation measures have unrecoverable costs; or when measures are maladaptive, making ecosystems and societies more vulnerable[3]. Losses and damages are often used as *one concept* when talking about the negative impact of climate change disasters. However, according to the European Parliament, **losses** refer to *irreversible* harm such as loss of land or loss of resources, while **damages** involve *reparable* harm such as damages to infrastructure[4].

Other terms used in this policy paper include:

- **Economic losses and damages**: refers to the loss of resources, goods and services commonly traded in markets such as agricultural production, infrastructure, or property.[5]

- **Total estimated damages:** An estimated value of all damages and economic losses directly or indirectly related to the disaster[6].

- It should be noted that the total estimated damages of a disaster is difficult to assess and can change as damages can evolve over time. In interpreting economic losses and damages this report uses data from international databases like EM-DAT which have proven to be most useful when attempting to assess losses and damages from disasters [7].

- **Non-economic losses and damages**: refers to losses and damages that can impact individuals, society and/or the environment (e.g. loss of life or health, loss of territory, cultural heritage and identity, indigenous knowledge, loss of biodiversity or loss of ecosystems).[8]

- **Total affected population**: Covers the number of people requiring immediate assistance during an emergency, people injured by the disaster, and people who became homeless (destroyed or damaged houses) due to the disaster. This report primarily uses data on a number of affected people from the EM-DAT database.

- The Centre for Research on the Epidemiology of Disasters (CRED) publishes the EM-DAT database where most of the data on affected population is collected. CRED notes that the indicator for affected people is widely used and ambiguously defined, which is why different methods used by different actors is expected to produce different results. They argue that numbers are rarely comparable 1:1 and they cannot guarantee the quality of data, but they do make every effort to ensure "accuracy, accessibility, integrity and timeliness" of the published data, e.g. by including multiple sources in their data collection[9].

- **Post Disaster Needs Assessment (PDNA):** A PDNA is the first opportunity to assess the losses and damages of a disaster and calculate the number of affected people. It consists of two parts, a damage and loss assessment, and a needs assessment, where the needs assessment follows the conclusions from the loss and damages assessment. The responsible for the PDNA conducts surveys to determine impact from the disasters. Data from PDNAs are as example inputted in other databases like the global EM-DAT database[10].

- **Slow onset event**: A slow onset event gradually intensifies over several seasons. Different international organisations assign 'slow onset event' to different climate types, and in the current paper 'slow onset events' cover droughts and sea-level rise[11].

- **ND-GAIN score:** The ND-GAIN Country Index summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. It aims to help governments, businesses and communities better prioritize investments for a more efficient response to the immediate global challenges ahead[12].

- **Food insecurity**: Severity of food insecurity is categorized in 5 levels, where level 3 and above cover *crisis*, *emergency*, and *famine*[13].

Annex II: Methodology

The paper explores the economic and non-economic losses and damages that have occurred in 10 recent climate disasters. These include Cyclone Freddy in Malawi (2023); the drought in the East of Africa (2020-2023); the floods in the Sahel (2022); the flood in Pakistan (2022); the drought in Afghanistan (2021-2023); the flood in Bangladesh (2022); the heatwave in India, Thailand, and Bangladesh (2022-2023); sea-level rise in Vanuatu, (ongoing); Tropical Cyclone Yasa and Ana in Fiji (2020-2021); and Hurricane Eta and Iota in Central America (2020).

It presents these cases through a narrative description of the economic and non-economic losses and damages; and an accompanying table where available data have been collated for each disaster. The data across cases differ in availability and quality, affecting the possibility for consistently measuring the impact of the disasters. The analysis of each case is based both on available quantitative data as well as qualitative data derived through interviews, and desk research of existing studies, reports, and databases. The paper contains a mapping and analysis in relation to the economic damages resulting from climate disasters. It also maps and reflects on the non-economic losses and damages with a view to providing a humanitarian perspective on the impacts; as well as it points to risks that are linked to pre-existing vulnerabilities and exposure.

The 10 case studies were identified based on a series of parameters including the disaster's *magnitude* in terms of affected people, on relevant *geographical representation*, and on the disaster being *related to climate change* or *caused by extreme weather*. The 10 cases and their possible attribution sources are presented in table 1 below.

Table 1 Selected cases and their potential attribution to climate change.

Case	Attributed to climate change
Tropical Cyclone Freddy in Malawi, 2023	No study available
Drought in East Africa, ongoing	Yes, see available study[14]
Flood in Sahel, 2022	Yes, see available study [15]
Flood in Pakistan, 2022	Yes, see available study [16]
Drought in Afghanistan, 2020-2023	No study available
Flood in Bangladesh, 2022	Indicative yes, but no direct study available.[17]
Heatwave in India, Thailand, and Bangladesh, 2022-2023	Yes, see available study[18]
Sea-Level Rise in Vanuatu, ongoing	Yes, see available study[19]
Tropical Cyclones Yasa and Ana in Fiji, 2021-2022	No available study for Fiji, but Ana was attributed to climate change in Madagascar, Malawi, and Mozambique[20]
Hurricanes Eta and Iota in Central America, 2020	No study available

Following the selection of the case studies the consultants collected and triangulated both quantitative and qualitative data. This process focused on a deeper background analysis on each of the cases in terms of the humanitarian impacts and included an assessment of the data availability of both economic and non-economic losses and damages to individuals, societies, and ecosystems. The data analysis has been further supported with key informant interviews for each case to further shed light on the humanitarian impacts of the climate disasters.

Data Availability

The primary quantitative data sources used in the assessment are the Sendai Framework (presented in the DesInventar database) and the EM-DAT framework, both described in more detail below. Further quantitative data have been extracted from Post Disaster Needs Assessments (PDNA), humanitarian overviews, humanitarian situation analyses, or other relevant documents published in relation to each disaster. Key indicators of impact from a disaster (such as people affected and displacements) are available across all case studies, but disaster-specific indicators (such as damaged cropland or effect on mental health) are only presented where relevant and available.

Qualitative data, human stories, and recommendations were accessed via desk studies, interviews with key humanitarian personnel working with the disasters, and in-depth interviews with community members performed by external personnel.

Sendai Framework

The Sendai Framework is a quantitative assessment with internationally agreed indicators, where officials can report verified impact indicators from a disaster. The data behind the framework is currently accessible through the DesInventar reporting system[21] and a new tracking system is underway to replace DesInventar[22]. Since the Sendai framework – and hence the DesInventar tool – is based on verified indicators, it is a challenge to obtain data on the most recent disasters as verification takes time. Further, there is no commitment to submit data on all indicators, hence the data coverage varies across disasters. The Sendai Framework is used by e.g., UN agencies and governments for disaster management, policy development, and monitoring. The DesInventar database has not proven useful for this specific policy paper as data on the selected recent cases have simply not been verified and published by officials yet.

EM-DAT Framework

The EM-DAT framework has a better coverage of disasters than the Sendai Framework, as the data sources are a combination of official reporting, UN agencies, NGOs, insurance companies, research institutes, etc. However, the available data is limited to type, time, and place of the disaster and a few impact indicators like affected people, deaths, injured, homeless (non-economic indicators), as well as reconstruction costs, insured damages, and total damages in USD (economic indicators). The data coverage varies across disasters[23].

Data for Climate Attribution

Climate attribution studies are often mentioned in the discussion of losses and damages, although they are not a prerequisite for the discussion. We have included climate attribution studies whenever they were available. The attribution studies are of a technical nature and rely heavily on accessible historical weather data in the affected regions. This data might not always be available. An example is the rainfall around Lake Kivu with devastating associated floods and landslides in Rwanda and the Democratic Republic of Congo, where researchers were not able to estimate and single out the effect of climate change because historic and current meteorological data amongst others were sparse[24]. This example illustrates how data availability is critical for attribution studies.

A range of climate attribution studies have among others been published by Carbon Brief[25] or World Weather Attribution[26], but there is no system or coordinated decision making process of when an attribution study is carried out for a climate

disaster. According to an expert, there is a board connected to Carbon Brief, which suggests the events to be studied. However, in the end, it is up to the individual researcher to decide whether she/he conducts the study [27] or not. To the extent possible, all disasters examined in this report have been investigated for association with climate change through external sources like World Weather Attribution or World Meteorological Organization. However, since an attribution study takes time and demands high data quality, it has only been possible to attribute five cases to human induced climate change.

Limitations and Risks

As climate change intensifies, the number and amount of climate disasters is increasing and affects all regions of the world[28]. This policy paper focuses on climate disasters that have occurred within the recent years in the global south and which have been intensified by the changes in climate. The amount and quality of the quantitative data available on each of the cases varies considerably in terms of quality and availability. Some data is available to assess the costs and the support needed to address climate change impacts. However, a large part of the data is scattered across various databases, not gender disaggregated and lacks depth. It has also been difficult to gather data on the financial support that has been provided to address these emergencies, data is thus partly uneven across the cases. The impact data of the non-economic losses and damages such as the loss of social fabric in societies and local communities, the loss of traditional knowledge and religious rituals, impact on biodiversity ecosystems, and the impact this has on mental health cannot always be assessed in numbers and facts but must be understood based on the values of the very same communities that are experiencing such a loss.

As the analysis for this paper progressed it became clear that the loss and damage related databases do not cover all disasters, and that data quality of the included disasters remains low and in the best cases of varied quality. This limitation poses the **risk that the presented impacts for each case do not cover all effects from a disaster**. The consultants made efforts to minimise this risk by triangulating the data with published impact data from external documents like PDNAs and Humanitarian Situation analysis and with reflections and experiences from involved key stakeholders.

Another limitation from a data perspective is the quality of data covering financial aid and support. Donor reports on humanitarian aid are often of very high quality with sector desegregations or other relevant details. However, the reports only cover donations from the responsible organization – e.g., IFRC, UNICEF, IOM, etc. Financial support to countries who have experienced climate disasters is not an easy task to investigate, as support comes in many forms. Humanitarian aid, international support to resilience building, and national or even local efforts to help affected communities are just some of the types of support found in this analysis[29]. The lack of a total financial overview supporting each disaster poses **the risk that the financial support is being understated in the case studies**. The consultants have minimized this risk by including financial reports from several sources and from government officials where available and triangulating with interviews. If an official government report was available, it often covers all humanitarian aid, but there is still a remaining uncertainty that the data is not complete in terms of all types of financial support a country received.

Finally, it is worth mentioning that the quality of data covering total affected population for each disaster is **comparable across cases**. This data is used to describe the magnitude of the impact each disaster has on the affected population in terms of injuries, housing, and emergency assistance. The indicator is internationally agreed upon even though its definition is not clearly defined. However, the EM-DAT database which is the primary source for the indicator is well received in international organisations (UNDRR) and proves extremely useful for researchers as data is as homogeneous as can be expected[30].

ANNEX III:
List of Abbreviations

ADB	Asian Development Bank
AWD	Acute Watery Diarrhoea
BISP	Benazir Income Support Programme
BRRI	Bangladesh Rice Research Institute
CCCM	Camp Coordination and Camp Management
DREF	Disaster Response Emergency Fund
EAP	Early Action Protocol
EM-DAT	The International Disaster Database - Center for Research on the Epidemiology of Disasters
EWS	Early Warning Systems
FAO	Food and Agriculture Organization of the United Nations
GBV	Gender-Based Violence
GCF	Green Climate Fund
GEF	Global Environment Facility
GDP	Gross Domestic Product
GLIDE number	Global Unique Disaster Identifier number
HRRI	Humanitarian Rapid Research Initiative
IFRC	International Federation of Red Cross and Red Crescent Societies
IOM	International Organisation for Migration
IPCC	Intergovernmental Panel on Climate Change
JICA	Japan International Cooperation Agency
LGBTQI	lesbian, gay, bisexual, transgender, queer and intersex
NDMA	National Disaster Management
ND-GAIN	Notre Dame Global Adaptation Index
NGO	Non-Governmental Organization
ONU	Organización de las Naciones Unidas
OCHA	Office for the Coordination of Humanitarian Affairs
PDMAs	Provincial Disaster Management Authorities
PDNA	Post-Disaster Needs Assessment
PICAN	Pacific Island Climate Action Network
TA	Technical Assistance
TC	Tropical Cyclone
UN	United Nations
UN CERF	United Nations Central Emergency Response
UNICEF	United Nations International Children's Emergency Fund
UNFCCC	United Nations Framework Convention on Climate Change
WASH	Water, Sanitation, and Hygiene

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Introduction

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