



LUND UNIVERSITY

Passed the point of no return: a non-economic loss and damage explainer

Jackson, Guy ; van Schie, Douwe; McNamara, Karen; Carthy, Anna; Ormond-Skeaping, Teo

2022

Document Version:

Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for published version (APA):

Jackson, G., van Schie, D., McNamara, K., Carthy, A., & Ormond-Skeaping, T. (2022). *Passed the point of no return: a non-economic loss and damage explainer*. Loss and Damage Collaboration.

Total number of authors:

5

Creative Commons License:

CC BY-ND

General rights

Unless other specific re-use rights are stated the following general rights apply:

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00



PASSED THE POINT OF NO RETURN

A Non-Economic Loss and Damage Explainer

lossanddamagecollaboration.org



FOREWORD

The recent 2022 monsoon flooding in Pakistan has been described as a “monster monsoon” and one-third of the country is still underwater at the time of writing. The Government of Pakistan estimates that around 33 million people across the country are affected, and 6.3 million people are in dire need of assistance. While Pakistan contributes a small fraction of the global greenhouse emissions, the country is among the top ten most vulnerable countries to climate change. The poor bear the brunt of the climate impacts in Pakistan, despite their minimal contribution to emissions.

The 2022 monsoon season has devastated Pakistan, which was already beset by COVID-19 and ongoing political and economic challenges. The 2022 flooding combines climate injustice, mismanagement, and corruption. International aid is still a drop in the ocean, and the focus is more on economic losses and damages. In many countries, including Pakistan, the economic losses and damages from climate change are often assessed and reported after disasters; however, non-economic losses from climate change are often overlooked. The importance of non-economic losses and damages (NELD) has been neglected at United Nations climate negotiations. There are losses and damages which cannot be quantified in monetary terms, in terms of loss of ecosystems, cultural heritage, life, etc. By ignoring NELD, inequalities among vulnerable communities will increase and efforts to build climate-resilient communities will be impeded. As climate change impacts intensify, the vulnerable countries will face more NELD. And if ten or twenty years down the road are considered, NELD will pile up.

The failure to fund a loss and damage mechanism has been adroitly described as a “gaping hole” in the international climate change governance structure. As the climate negotiators prepare for COP27 in Egypt, in November 2022, the images of Pakistan’s massive human suffering will be prominent in everyone’s minds. The climate crisis unfolding in Pakistan provides an exhibit that serious consideration must be made to operationalize the Santiago Network on Loss and Damage (SNLD) and Loss and Damage Finance Facility (L&DFF), with a particular focus on NELD. It is the best time to walk the climate talks, as reactive, ad hoc pledges are insufficient, especially given that climate consequences are felt throughout the Global South.



“ The importance of non-economic losses and damages (NELD) has been neglected at United Nations climate negotiations. There are losses and damages which cannot be quantified in monetary terms. ”

IRFAN ULLAH

UNFCCC Non-Economic Losses
(NELs) Expert Group Member

THE TEARS OF THE VILLAGE RIVER AND ITS POPULATION

This is the story of a young man who was forced to leave his village of residence to live in the city: this is my story, I am Paul Lodry.

I was born in Yaoundé but I spent part of my life in a village called Mfueng before having to return to the city of Yaoundé. My matenelle village is in Baleveng, a district located in the west of Cameroon. This beautiful village is mostly home to farmers like my family who cultivated corn, peanuts and beans. Having no water supply network, we relied on rain-water and rivers for water to irrigate our fields and supply us with drinking water. We were a family of eight people. We lived well and practised agriculture. Our crops were sold on market days which allowed us to provide for our needs.

In 2019, the river that supplied us with water for drinking and our crops began to gradually dry out. The name of this river was "Ndou Dem", which means the river of God. It was called this because we believe that it was a gift from God. Within two years the Ndou Dem river was completely gone. The drought that made our river run dry was happening because our rains were becoming increasingly scarce due to climate change.

Faced with this threat to our family, my parents decided to send me back to the city of Yaoundé to escape the crisis. I was not alone, there were several young people in the village who escaped the drought by seeking a future in the city.

Unfortunately, we had no choice but to migrate to the city to escape from famine and poverty. The way of life and culture in the city was so different from that of my village. I was forced to accept that I was abandoning my agricultural knowledge, a symbol of our cultural identity associated with other customs such as the practice of "ntio" and "congres" which are gatherings where we would receive advice from our parents and ancestors of the village through their stories.

The more time passes, the more the Yemba, which is my local language, is substituted by French and English, which are the languages spoken in the city. I can see my cultural roots disappear, like we saw the Ndou Dem river disappear.

My lived experience of climate change is one that many others around the world are facing. Therefore, we call on developed countries to provide new and additional funding to support developing countries and communities like mine to address loss and damage from climate change.



“ I was forced to accept that I was abandoning my agricultural knowledge, a symbol of our cultural identity associated with other customs such as the practice of "ntio" and "congres". ”

PAUL LODRY DONGMO

Loss and Damage Youth Coalition

ACKNOWLEDGMENTS

© Loss And Damage Collaboration

Written by **Guy Jackson**, Lund University Centre for Sustainability Studies; **Douwe van Schie**, International Centre for Climate Change and Development; **Karen McNamara**, The University of Queensland; **Anna Carthy**, International Institute for Environment and Development; **Teo Ormond-Skeaping**, Loss and Damage Collaboration.



Guy Jackson was supported by funding from the Swedish Research Council (Formas) grant 2018/0010 Recasting the Disproportionate Impacts of Climate Change Extremes (DICE). Karen McNamara was supported by funding from an Australian Research Council Future Fellowship (FT190100114).

The Loss And Damage Collaboration acknowledges the thoughtful comments and suggestions from the following peer reviewers, Kees van der Geest, Demet Intepe, Guy Ngay Kalasi, Olivia Serdeczny, and Ioannis Tsipouridis.

We also thank the Loss and Damage Youth Coalition (LDYC) for allowing us to present Paul Lodry Dongmo's story which was first published by LDYC's Loss and Damage Storytelling Cohort in October 2022.



WHAT IS NON-ECONOMIC LOSS AND DAMAGE?

Due to a failure of rapid mitigation and effective adaptation, climate change negatively affects human societies and the natural systems they rely on for material and immaterial wellbeing. This abject failure of countries, particularly in the Global North, to stabilise their greenhouse gas emissions and enable sufficient and effective adaptation financing means we have passed the point of no return, with climate change leading to ever worsening impacts. Those impacts that cannot, or will not, be adapted to have been termed losses and damages^{1,2}. On the other hand, Loss and Damage (L&D*) is a political and legal object of international climate governance linked to action to avert, minimise, and address the very worst climate impacts that disproportionately affect vulnerable developing countries (i.e., the three pillars of mitigation, adaptation, and loss and damage)³.

The Intergovernmental Panel on Climate Change (IPCC)¹ recently defined L&D—scientifically—as “adverse observed impacts and/or projected risks and can be economic and/or non-economic”. Indeed, it has become common to differentiate between economic and non economic L&D. The economic dimension is understood as the L&D to resources, goods and services that are commonly traded in markets. Examples include wages, crops, cars, electronics, and buildings. Non-economic loss and damage (NELD) refers to the things of value—intangible or tangible—that are not commonly traded in markets. Non-economic losses are associated with irreversible impacts such as fatalities or permanent destruction of nature, whereas non-economic damages are associated with impacts that can be alleviated or repaired, such as decreased social cohesion or soil quality⁴. It is important to underline that NELD occurs in almost all cases of L&D. NELD is the focus of this explainer.

The United Nations Framework Convention on Climate Change (UNFCCC) has adopted the terminology “non-economic loss” instead of “non-economic loss and damage”. However, we argue that non-economic losses and damages are inextricably linked. Perpetual damages to an object can lead to a loss. For example, a drought can adversely affect a plant species in a region, causing damage. Perpetual droughts over a longer period of time can cause this species to disappear from the area, causing a loss. In this example, a series of damages lead to a loss. Moreover, damages from

“**Non-economic loss and damage refers to the things of value—intangible or tangible—that are not commonly traded in markets.**”

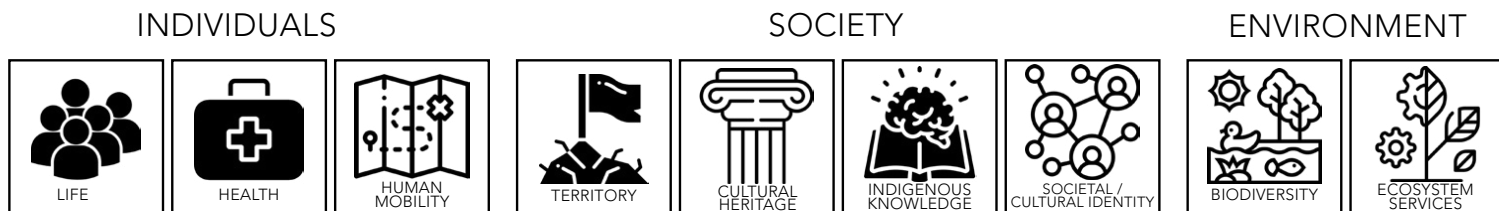


Lone palm tree atop of a coastal defence destroyed by Cyclone Aila on the bank of the Meghna river on Bhola Island in Bangladesh.

* Despite there being differences between the political object of Loss and Damage and the scientific concept of losses and damages, we have decided to use L&D throughout the document for consistency and readability. See Boyd et al., (2021)³ for more information on this distinction.

climate change are also a severe consequence that undermines livelihoods and sustainable development and inflicts harm on vulnerable people and as such need attention in both policy and practice spheres. We therefore use the term “non-economic loss and damage” throughout this explainer.

Figure 1: UNFCCC non-economic loss categories



NELD impacts individuals, societies, and the environment. Figure 1 outlines the UNFCCC’s categories of non-economic losses. While these nine categories are instructive, researchers have identified far more ways to experience loss⁵, drawing from over 100 case studies from around the world that show how the things that people value can be eroded or obliterated from their lives. Examples ranged from NELD to traditions and culture, to physical and mental health, to sense of place and social fabric, and to identity and dignity. Given the almost infinite number of different ways people assign value to things, capturing all types of NELD is immensely challenging. Despite this, it is imperative that assessments of L&D ensure that there is coverage of the non-economic dimensions. Failing to do so can distort our understanding of climate change impacts, discount and exclude the experiences of some, and skew future decision-making^{6,7}. Examples 1 and 2 further illustrate the concept of NELD.

“ Given the almost infinite number of different ways people assign value to things, capturing all types of NELD is immensely challenging. ”

EXAMPLES

1.1

SADNESS AND GRIEF FROM 'BLACK SUMMER': Drawing from a study in Mount Barney in the World Heritage Gondwana area in Queensland, Australia, following the 2019/2020 ‘Black Summer’ bushfires that burnt more than eight million hectares of vegetation, the emotional, mental, and psychological burdens were very prominent⁸. Sadness and grief were clearly evident: “I have laid awake at night thinking about all the biodiversity loss, climate change and wept” (participant #16, 2021). This grief also emerged in anticipation of the loss of normality and a stable and certain future: “Forests I’d grown up walking in were burning, including ancient old rainforests which won’t get a chance and a strong sense of being cut off from the future... When I was little, I thought of the world as kind of guaranteed—it would always be there—and having that certainty taken away, knowing that a lot of the things I love about the world won’t be there any more, knowing that the world might not be survivable for a lot of people by the time I’m a grown-up – it’s grief, and anger, and fear of how much grief is still to come” (participant #9, 2021).



Mt Barney burning at the beginning of the ‘Black Summer’ bushfires in Australia, in 2019.

LOSING INDIGENOUS LOCAL KNOWLEDGE: In another study in the Pacific Islands region, L&D to Indigenous and local knowledge have been noted as a key dimension of NELD⁹. As study participants explained: “The changing climate conditions will affect the reliability of some of the local knowledge which can lead to their disappearance as locals will find them to be useless. For example, the use of flora and fauna as climate and weather indicators” (participant #36, 2020). Participants expressed significant concerns around these losses and damages due to climate change impacts: “ILK [Indigenous local knowledge] is extremely important, in particular for isolated Pacific communities in rural areas or on remote islands. Some aspects of this knowledge, in particular local knowledge will be affected by changes in the environments linked to increasing temperatures and change in rainfall. For example, traditional agriculture seasonal calendars are changing and that affects food security for these communities” (participant #31, 2020). The life sustaining tools that emerge from these knowledge systems, such as techniques for fishing and planting, as well as cultural and social norms, are also severely affected, causing cascading impacts on life itself. As one participant expressed with deep sorrow: “Entire ways of life collapse when the material manifestations of deeply grounded Indigenous knowledge, science, and philosophy are deleted by the effects of climate change” (participant #1, 2020).

The examples show how one NELD ‘type’ overlaps, intersects and can have cascading effects for additional L&D to transpire. For example, the extinction of a species of flower that was used in a specific religious ceremony could contribute to a loss of identity, or the experience of, or fear for future, loss of territory may contribute to undermining people’s agency.

WHY AND HOW DOES NON-ECONOMIC LOSS AND DAMAGE OCCUR?

In this section, we consider the processes and factors that lead to NELD. We do this by exploring why and how NELD occurs.

WHY IS NELD HAPPENING?

Capitalism emerged in 18th-century Britain and then spread throughout Europe and across the world through colonialism and imperialism¹⁰. Capitalism is dependent on growth and capital accumulation. Mass consumer markets were established as peasants were dispossessed of their means of production (e.g. land, communal resources) and became wage earners¹⁰. Capitalism drove revolutions in the production process through industrialisation which have

“**Entire ways of life collapse when the material manifestations of deeply grounded Indigenous knowledge, science, and philosophy are deleted by the effects of climate change.**”



While a variety of factors wreak havoc on subsistent food systems in the Bedamuni tribe of Western Province, Papua New Guinea causing loss and damage to critical food crops, changing local climatic conditions such as precipitation regimes have increasingly had the most impact.

2

2.1

been linked to, among other things, the burning of fossil fuels, increased deforestation, intensive crop cultivation and livestock production, and the production of cement, which have significantly raised atmospheric CO₂. For over 6,000 years CO₂ levels were relatively stable at 280ppm or less. However, since the mid-18th century, they have risen by over 50% to 418.3ppm in 2022¹¹. Over the last 60 years, CO₂ has increased 100 times faster than any previous natural increase, such as the rapid increase of CO₂ at the end of the last ice age 11-17,000 years ago¹². The earth has entered a dangerous new era of climate impacts now that global warming is reaching 1.1°C above pre-industrial levels.

Emissions have been disproportionately produced by the wealthiest countries. The U.S. is estimated to be responsible for 26% of historical emissions followed by EU nations with 23%¹³. Although China is now the largest emitter of CO₂ with 29%, historically it has only emitted around 11% of total emissions¹³. Moreover, much of the emissions tied to consumption have been exported to the Global South, which is home to most factories that make consumer products for wealthy citizens in the North and South¹⁴.

Climate change is supercharging many climatic extremes, making them more intense and frequent¹⁵. This includes sudden-onset events such as cyclones, wildfires, and floods, and slow-onset events such as droughts¹⁵. Climate change-linked processes such as sea level rise, desertification, and the melting of glaciers are also accelerating with devastating consequences¹⁵. Moreover, heatwaves and increasing extreme wildfires are other common causes of NELD¹⁵. When these kinds of climate-exacerbated events and processes interact with exposed and vulnerable societies, NELD can occur.

The contribution “Impacts, Adaptations, and Vulnerability” by working group 2 to the IPCC’s sixth assessment report¹ was released in February 2022. The report made it crystal clear that ‘unequivocal’ impacts, including NELD, are currently happening across the world. Climate change can no longer be considered as a future threat, its effects are being felt today.

Together with increasing cumulative emissions, vulnerability to climate change is worsening around the world¹. Processes such as uneven development, unequal exchange (imperial core countries expropriating wealth from peripheral countries), increasing inequality within and between countries, the degradation of ecosystems and the loss of biodiversity, poor land use planning, and more extreme rapid onset and slow onset events¹, are causes of why NELD is increasing.

Vulnerability is much higher in Least Developed Countries, but it can be high in all developmental contexts. Those particularly marginalised in affluent countries should be acknowledged in NELD discourse going forward¹⁶. While NELD is a universal phenomenon, it is not experienced equally. In this sense, NELD is potentially a powerful



Holms Western Oil Corporation, Pump Jack Number 13, Midway-Sunset Oil Field, Pentland Road, Maricopa, Kern County, California, USA.

“**The earth has entered a dangerous new era of climate impacts now that global warming is reaching 1.1°C above pre-industrial levels.**”



The Imja-Lhotse Shar Glacier in Soukhumbu, Nepal, is one of the glaciers experiencing the highest rate of loss in the Mount Everest region.

“**It is important to note that NELD could have largely been avoided if concerted mitigation action was taken when climate change risks were first recognised.**”

narrative that may encourage societal transformations. It is important to note that NELD could have largely been avoided if concerted mitigation action was taken when climate change risks were first recognised. Thirty years of inaction on climate mitigation¹⁷, inadequate finance for climate adaptation¹⁸, and evidence of maladaptation (i.e. adaptation that increases vulnerability to climate change)¹⁹ have resulted in worsening NELD¹.

Additionally, while adaptation can reduce the burden of climate impacts on societies, vulnerable nations are increasingly reaching adaptation limits. This means that they are in no position to prepare for foreseeable, and even less for unforeseeable, climate impacts. Poverty, debt, overburdened bureaucracies, lack of technical skills are all examples of factors that make effective and sustainable adaptation impossible. Where mitigation and adaptation fail, L&D is inevitable. Warner and van der Geest²⁰ suggest that L&D, including NELD, occurs when: 1) existing coping and adaptation measures are not enough; 2) measures have costs (including non-economic) that cannot be regained; 3) measures have negative effects in the longer term, despite short-term merits; or 4) no measures are adopted—or possible—at all.

HOW IS NELD HAPPENING?

We will now introduce several examples of how NELD occurs to make this more concrete.

NELD may occur from slow onset events and processes, for example, when the loss of territory to sea-level rise leads to L&D to something of value to those affected. This may be loss of cultural heritage (e.g. burial sites, important artefacts) which impacts sense of place and/or identity. Yet, understanding the way vulnerability to sea level rise is created is important. For example, in Vanuatu historical colonial governments and missionaries encouraged coastal settlements for trade and population management purposes, which has led to increased exposure to coastal hazards, and together with economic, social, and political marginalisation vulnerability to sea level rise is very high²¹.

NELD may result from extreme events, for example, the loss of life during a cyclone, loss of ecosystem services from a major wildfire, or damage to housing and possessions with significant mental health impacts after a flood²².

It is essential to distinguish between direct and indirect impacts. NELD may be directly linked to an adverse climate impact, for example, when a cultural site is lost to wildfire. They can also occur indirectly, for example, when malnutrition is experienced as a consequence of the loss of crops due to drought²².



Sandbags being laid for the foundation of a river bank defence, at Elisha Ferry Ghat, on the bank of the Meghna river on Bhola Island, Bangladesh where as much as 18% of the countries land mass could be inundated by sea level rise.

2.2

“NELD may be directly linked to an adverse climate impact, for example, when a cultural site is lost to wildfire. They can also occur indirectly, for example, when malnutrition is experienced as a consequence of the loss of crops due to drought.”



The ongoing drought in East Africa has led millions of people to face extreme hunger and left many on the brink of famine as livestock have died and crops have failed.

NELD may unfold sequentially such as when a cyclone causes saltwater intrusion that leads a farmer's crops to die resulting in their family suffering malnutrition. It can also happen all at once when, for example, a landslide takes human lives, destroys a heritage site and leaves survivors with mental health impacts⁵.

NELD may be experienced retrospectively, when a loss has actually occurred. But, increasingly, studies have been identifying anticipatory loss and grief from climate change impacts²³. For example, young people are feeling like they have lost their future and many are subjectively experiencing climate- or eco-anxiety, defined by the American Psychological Association as "a chronic fear of environmental doom"²⁴. Retrospectively, the concept of solastalgia has been used by NELD scholars to articulate the sense of loss experienced when climate change changes a cultural landscape to the point of unfamiliarity²⁵.

Lastly, the distinction between non-economic and economic L&D can be blurry. For example, L&D to natural ecosystems is primarily non-economic, since ecosystem services like the production of oxygen by trees are rarely traded on the market. However, there may be market impacts if one of the services the ecosystem provides is, for instance, food, the provision of which has, in recent centuries, become part of the market economy in most societies²². Even the L&D to cultural heritage and Indigenous knowledge, which appears completely distinct from economic L&D, can also affect communities economically, by impacting tourism revenue and the development of marketable products.

WHERE IS NELD HAPPENING AND WHO IS AFFECTED?

In this section we will consider the geography of NELD by considering where it is occurring and who is most affected.

WHERE IS NELD HAPPENING?

NELD are occurring all over the world (Figure 2). Yet, NELD are being disproportionately experienced by those in the Global South due to a range of historical, geographic, structural, and socio-political factors. Moreover, the NELD experienced by different people in different places is highly context-specific and influenced by intersectional identities, values, and lived experiences. We start with one example from the Global South and North to illuminate the context-specific nature of NELD.



In the village of Dalbanga South in Bangladesh, cyclones have caused fatalities, whilst riverbank erosion has destroyed heritage sites and saltwater intrusion has impacted livelihoods affected the health of the community.

“**The distinction between economic loss and damage and non-economic loss and damage can be blurry.**”

3

3.1

“**NELD is being disproportionately experienced by those in the Global South.**”

Figure 2: Examples of climate change-driven NELD around the world (adapted from Boyd et al., 2021 and reproduced with permission).³



NUMBER	EXAMPLE	ICON
1	The Louisiana floods in August 2016 led to loss of quality of life and lasting mental health impacts due to losses of homes, security and memories among vulnerable people and groups.	
2	Hurricane Maria in 2017 led to extreme rainfall over Puerto Rico which resulted in loss of safety networks when people were displaced thus eroding community capacity and actions.	
3	Increased outburst flood hazards from Lake Pacocha coupled with season water scarcity poses a threat to highly exposed and vulnerable communities and their livelihoods.	
4	Urban drought and lack of water in urban informal settlements in Bangladesh have led to negative health consequences among people and groups in vulnerable situations.	
5	The wildfires in Sweden in 2018 exacerbated the loss of cultural way of life among Sami reindeer-herding communities. The ecosystems are under threat and this is coupled with contentious claims to land rights.	
6	Devastating impacts of early examples of extreme events, such as storm "Desmond" in 2015 in the UK has led to concerns about the loss of cultural heritage and tensions with how to manage heritage in the future.	
7	The unprecedented European heat wave in June - August 2022 led to substantially reduced summer crop yields, excess deaths and to wild fires wich impacted ecosystems and destroyed buildings.	
8	The loss of local and cultural knowledge and loss of homes and places that are culturally and socially important is occurring in the pacific due to sea level rise.	
9	Australian bushfires, 2019-20 is an example where researchers documented, multiple losses. This includes loss of lives, mental health impacts, and loss of biodiversity. This is not the only example of multiple losses experienced in a disaster but it is a good example of where researchers rapidly asses multiple losses in different studies in a short time.	
10	The ongoing east Africa drought in Tanzania, Ethiopia, Kenya and Somilia has resulted in devistating loss of lives, the loss of livestock and to large scale displacement.	
11	Floods and Landslides in South Africa in April 2022 led to the loss of life, displacment and to the loss of homes.	
12	Floods in Pakistan in August - September 2022, led to the loss of life, health impacts resulting from water and mosquito bourne disease, loss of houses, the interruption of education, the loss of crops and live stock and large scale displacement.	

GLOBAL SOUTH: INDIA AND PAKISTAN SPRING HEATWAVE OF 2022

India and Pakistan experienced an early spring heatwave between March and April 2022. World Weather Attribution suggests this heatwave was made 30 times more likely due to climate change²⁶. The true cost to, among other things, human health, productive sites, ecosystem services, and biodiversity cannot be known without reliable data. However, 280 direct deaths, massive crop losses, and a doubling of the number of wildfires are estimated²⁷. Extreme heat and elevated night time temperatures cause significant physical and mental health impacts²⁸. Massive crop losses increased food insecurity and impacted human health. The prolonged heat also impacted glaciers in the north of India with the government saying that climate change is an “existential crisis” and many people feeling anticipatory loss in regard to their childrens’ futures²⁹. Those farmers already in debt were pushed to the brink by the extended heat and dying crops, with many likely to have been dispossessed of their land and other livelihood assets. When people are forced to leave their homes, often moving to urban areas, this displacement causes impacts to cultural heritage, sense of place, and identity³⁰. Concerningly, the IPCC¹⁵ reports that it is almost certain (i.e. highest probability they use) that heat extremes are becoming more intense, lasting longer, and will further worsen around the world, especially in low latitudes.

GLOBAL NORTH: WESTERN EUROPE FLOODS OF 2021

Major flooding occurred in Germany, Belgium, the Netherlands and Luxembourg between 12-15 July 2021³¹. World Weather Attribution ascertains that there is high confidence that human-induced climate change increased the likelihood and intensity of this flooding³². No studies have yet calculated the full range of NELD. However, 200 people died³³ and a significant loss of crops and grain quality was reported^{34,31}. Economic losses are estimated to be €3 billion³¹. There was widespread coverage of the emotional toll of the flooding. In particular, this related to the trauma of those who experienced the floods, those who were evacuated, those who lost loved ones, and those whose missing loved ones’ bodies were never recovered³⁵. Belgium declared a day of mourning³⁶ and one political commentator said that “the impact on the total economy stands in no comparison with the human suffering”³⁷. All twelve residents on the ground floor of a German care home were trapped and drowned³⁸. The health system and early warning systems did not manage to protect this group, demonstrating that different groups experience NELD in different ways based on intersectional marginalisation. In addition, many people lost their homes and all their belongings which brings a range of intangible and emotional losses^{37,39}, as well as the loss of things with



Homeless people sleep in the shade of an overbridge in in New Delhi. At least 2,000 people died in India during the heat wave in 2015, when temperatures hovered near 50 degrees C. In Pakistan in 2022, the death toll stood at 1,200, with some local estimates putting it at around 3,000.

“**Extreme heat and elevated night time temperatures cause significant physical and mental health impacts.**”



German Chancellor Angela Merkel and Rhineland-Palatinate State Premier Malu Dreyer (C) talk as they visit the flood-ravaged village of Schuld near Bad Neuenahr-Ahrweiler, Rhineland-Palatinate state, Germany July 18, 2021.

sentimental value. One individual explained: “We couldn’t bring anything—not the very old furniture, not even photos that are highly emotional, just our phones”⁴⁰. Another loss described was that survivors were left ‘reeling’ from the loss of a sense of relative safety and security in the face of climate change⁴⁰. The death toll in Germany was the highest from an extreme weather event since 1962³⁶. The intensity and frequency of extreme events like this is projected to escalate¹.

WHO IS MOST AFFECTED BY NELD?

3.2

Those who experience NELD are not a singular homogeneous group of people. Understanding who is disproportionately affected by NELD requires interdisciplinary research that is sensitive to the multiplicity of worldviews, ethical systems and values people hold⁵. It demands an understanding of the intersectional (e.g. race, class, gender) factors and structural determinants (i.e. political economy) that create uneven vulnerability to climate change in different contexts^{41, 42}. Differentiated vulnerability to NELD relates to unequal power relations between groups, along intersectional lines, which create privilege and security for some and create vulnerability and marginalization for others⁴³.

Considering the complexity of measuring NELD, which is explored further in the next section, we outline a few examples of social groups that are recognised as being disproportionately affected by NELD.

INDIGENOUS PEOPLES

Relationality between people, land, water, and non-human life are recurring principles of different Indigenous communities⁴⁴. Climate change, in addition to the immense losses already incurred during the colonial and post-colonial eras, is further eroding Indigenous Peoples’ cultural and spiritual obligations⁴⁵. The loss of a forest from a wildfire may be distressing for a non-Indigenous person, but for Indigenous Peoples of that area, it may lead to a sense of failure due to more-than-human responsibilities and the loss of (inter) connections, totem species, sacred places, medicines, and knowledge⁴⁶. Many Indigenous Peoples see the material world as a “web of relations”⁴⁷.

Biodiversity is declining due to a reduction in water sources in Chitrakoot, India⁴⁸. The Indigenous Kol community use their traditional knowledge of medicinal plants to treat humans and livestock, however, many of these plants are now disappearing. This represents not only the functional loss of medical treatment now and in the future but also the more fundamental loss of Indigenous knowledge and cultural practices⁴⁸. In addition, Indigenous people are more exposed to NELD due to marginalisation and exclusion⁴⁶.

“Survivors were left ‘reeling’ from the loss of a sense of relative safety and security in the face of climate change.”

“NELD requires interdisciplinary research that is sensitive to the multiplicity of worldviews, ethical systems and values people hold.”



A woman from the Khmu minority ethnic group picking greens in community forest at Ban Tha Se, Luang Natha Province, Lao People’s Democratic Republic. Longer dry seasons and drought are leading to food insecurity.

The Kol community are poor and marginalised, living in the forest fringe areas without a legal land title. Their main livelihood is subsistence agriculture on leased land. The young generation of Kols is increasingly migrating to urban centres in search of opportunities, and leaving behind the traditions and culture of their community⁴⁸.

Indigenous people have contributed the least to emissions historically. Yet, they have disproportionate vulnerability to NELD because of their marginalisation and the connection for them between culture, identity, place and nature⁹.

ECONOMICALLY, SOCIALY, AND POLITICALLY MARGINALISED PEOPLE

Decades of climate change and disaster research show that those who are most marginalised in societies are most vulnerable to shocks and stressors^{49,50}, this is also true for NELD⁵¹. Those who are marginalised (based on, for instance, class, caste, disability, or membership of sexual/gender minority) often have limited access to resources, own few assets, have low incomes and rely on natural resources for their livelihoods. Dependence on nature for subsistence in the context of an increasingly unpredictable changing climate puts these groups at high risk of NELD. As noted by Practical Action⁵², when land is lost or unsuitable for agriculture, “[f]or the marginalized communities [it] often becomes the determining factor between a life with dignity and security, and exposure to different vulnerabilities and uncertainties”.

WOMEN

Gender can significantly shape experiences of NELD. Gendered power dynamics often determine one’s access to, and ownership of, resources, mobility, caring responsibilities, income-generating opportunities, and access to services such as climate information, health and education. These factors can exacerbate women’s experiences of NELD⁴⁸. Women’s care burden is increased to provide for dependents when there is climate stress. For example, they might have to travel long distances to access water or skip meals in favour of others due to climate-related impacts. They also face a disproportionate amount of health-related NELD⁵³. Moreover, in households where male members migrate, women report “increased exhaustion, poverty and hunger, and some communities report that the absence of their husbands means that are at greater risk of harassment and sexual and violent assault outside of their homes”⁵⁴.

Women can also face NELD such as exposure to exploitation and abuse due to climate stress. For example, women and girls have become exposed to new forms of slavery, trafficking, forced labour and forced marriage once affected by climate shocks⁵⁵. Moreover, “young women in South Asia driven to rural-urban migration are vulnerable to trafficking and exploitation”⁵⁴. Climate-induced displacement or migration can drive this vulnerability⁵⁶.

“**Indigenous people are more exposed to NELD due to marginalisation and exclusion.**”



Bricks placed under a bed frame by a family living in Kallyanpur Basti, in Dhaka Bangladesh, to avoid getting wet at night when flooding occurs. Being continuously immersed in dirty water can lead to the development of skin conditions which can lead to infection.

“**Gender can significantly shape experiences of NELD.**”



Cyclone disaster preparedness courtyard meeting in the village of Dalbanga South, Bangladesh, which was hit hard by category 5 Cyclone Sidr in 2007. In Bangladesh, women are the most likely to be killed or injured during a cyclonic event, due to their socially constructed roles which make it harder for them to leave their homes and livestock without the permission of their husbands for fear of stigma.

CHILDREN AND FUTURE GENERATIONS

Children are often most affected by climate-related disasters (e.g. malnutrition, missed school days, post traumatic stress disorder⁵⁷). There are a range of examples of children facing NELD. Almost 93% of children who frequently face tidal floods in the Tirta Districts in Indonesia experience moderate anxiety, and 29% of them have mild depression⁴⁸. Children face a loss of education because of climate-related displacement in Urir Char, Bangladesh⁴⁸. Flooding has a range of impacts on children in Nepal: "There are scores of children forced into labour and even into early marriage that denies them their childhood, their right to education, and affects them mentally, physically, and socially"⁵². Children also face a range of other NELD risks including health and nutrition impacts and exposure to violence and abuse⁴⁸.

Children also face a future of escalating NELD beyond the immediate impacts. The world they inherit is in a state of multiple intersecting social, political, economic, and environmental crises. Impacts from climate change are already beyond the limits to adaptation. This will worsen without transformational changes. Children alive today will never know a stable climate, their futures have been stolen by those most responsible for the climate crisis. Evidence shows that many young people are experiencing ecological grief⁵⁸. Although it is impossible to observe and measure, future generations should also be acknowledged in NELD research and policy.

HOW CAN WE RESPOND TO NELD?

Now that we have explored what NELD is, why and how it occurs, where it is happening, and who is most affected, we turn to the most critical aspect: how can we respond?

DOCUMENTING

With NELD occurring every day and with little research available, there is an urgent need to better document them. This is important scientifically (as a historical record) and politically (for affected people to pursue legal avenues).

Various empirical case studies have documented NELD in South Asia, Japan, the Pacific Islands, and Africa^{59,60,61,9,53}. However, studies that explicitly focus on NELD are still rare⁶². Given this, information on NELD can also be found in various other fields. For example, there is significant research on the psychological impacts of environmental change or biodiversity loss, both of which are typically included in NELD categorisations. There is a need to continue to identify and utilise relevant data and knowledge beyond the NELD literature.

“**Children alive today will never know a stable climate, their futures have been stolen by those most responsible for the climate crisis.**”



Derrick (17) explained that his tattoo commemorating the 2018 Camp Fire represented not only the impact the fire has had on his life, having lost his family home and access to education, but also rebirth and new beginnings. The fire which largely destroyed the town of Paradise in Northern California's Butte County caused 85 deaths and destroyed 18,000 buildings.

4

“**With NELD occurring every day and with little research available, there is an urgent need to better document them.**”

Documenting NELD requires a thorough understanding of local culture and practices, as they vary depending on environmental, cultural, social, and economic factors⁶³. The high context-dependency, combined with the fact that NELD are highly subjective, means that research must include bottom-up, locally-led and participatory approaches to ensure a sufficient overview of NELD that communities face⁵. Moreover, gathering information on NELD comes with various ethical challenges. It inevitably means asking communities to talk about loss and disclose deeply personal information. Recalling losses of lives can be traumatic. Therefore, ethical issues must be thoroughly considered prior to documenting NELD to avoid causing further harm.

MEASURING

The UNFCCC proposed four different ways to measure NELD: economic valuation, multi-criteria decision analysis, risk indices, and qualitative and semi-quantitative assessments⁶⁴. Most NELD-related case studies use the latter⁵.

Approaches proposed by the UNFCCC require weight to be attached to loss⁶⁵. However, NELD is inherently challenging to measure and quantify⁶⁵. First, the fact that they are not commonly traded in markets means they cannot easily be expressed in monetary terms. Moreover, there is no common unit to measure NELD on the same scale⁶³. Second, the value of NELD is highly subjective and incommensurable. Items or feelings can hold different values among cultures or even individuals. This also means that only items that are perceived as valuable will be registered as a loss. Third, attributing loss to anthropogenic climate change is an additional challenge, as loss can have multiple drivers⁶⁶. For example, vulnerability to climate impacts also exists due to intersectional marginalisation and colonial histories⁶⁷.

Currently, the literature is at an impasse in regards to how to best measure NELD. The UNFCCC nine categories of NEL introduced in section 1 (Figure 1) do serve to highlight key themes in the almost infinite number of possible NELD. As empirical case studies on NELD begin to increase, there is a need to draw from these to further refine the kinds of NELD people are experiencing, their causes, and the ways they can be addressed in a manner that is socially, culturally, economically, and politically acceptable.

ADDRESSING

McNamara et al.⁹ explored approaches that can be used to address NELD in the Pacific Islands. Preferred approaches included education and training to create awareness and understanding, documenting Indigenous and local knowledge, and engaging with the natural environment. Communities that are already experiencing climate-related hazards have also created practices for addressing NELD. Van Schie et al.⁵³ explored how communities in Southwest Bangladesh are currently addressing NELD with observed



Eid al-Adha prayer is performed in a flood affected area near Dhaka, Bangladesh, during monsoon floods that displaced upto 1.1 million people in 2020.

“**The value of NELD is highly subjective and incommensurable. Items or feelings can hold different values among cultures or even individuals.**”



Sea level rise, saltwater intrusion and subsidence is causing the Cheniere Caminada Cemetery on Grand Isle in Louisiana, USA, to sink leading graves to list, collapse and sink into the ground.

“**As vulnerable communities do not have adequate resources to adequately address NELD, they struggle to uphold their well-being.**”

community efforts to replant mangrove forests, homeschooling, and migration. However, as vulnerable communities do not have sufficient resources to adequately address NELD, they struggle to uphold their well-being. Other responses to NELD include recognition and repair of damage, financial compensation, enabling access/safe visits to abandoned sites, active remembrance (e.g. through public ceremonies, museums, schools), counselling, and official apologies.

The challenges that arise when documenting and measuring NELD also appear when addressing them. First, the high context-dependency complicates addressing NELD through an international mechanism, as international efforts likely require universal standards of recognizing and addressing impacts⁶³. Second, material and immaterial values affected by NELD, often hold emotional or cultural significance and are highly subjective, complicating compensating what is lost. For example, people attach different kinds of value to items such as heirlooms or photographs. When lost, these can never be restored to their original form. Referring to these permanent losses, Serdeczny⁶³ notes that “the mere acknowledgement of loss is an important first step towards achieving a sense of recognition and agency for those affected”. However, acknowledgement has to be paired with concrete action such as adaptation measures to avoid future loss or financial compensation, to hold significance⁶⁸. Third, adaptation measures can include interventions that further harm communities¹⁹. For example, a study has shown that two sea walls that were built to protect communities on Vanua Levu Island in Fiji created negative environmental consequences by threatening the health of the marine ecosystem⁶⁹. Approaches that prioritise local perspectives are preferred to avoid causing harm⁷⁰.

To avert, minimise and address NELD, root causes of vulnerability must be central to any direct intervention or wider development practices⁷¹. A strong critique of disaster risk reduction and climate change adaptation interventions is that they have been reactive instead of anticipatory⁵⁰. Whilst current NELD must be addressed and compensated today, minimising future NELD must be a priority. This requires, among other things, transformational changes to the global political economy to rapidly reduce emissions and address historical-structural processes that produced uneven development, which demands concerted multi-scale action to reduce vulnerability.

NELD IN THE UNFCCC

As early as 1991, when the UNFCCC was being drafted, the Alliance of Small Island States (AOSIS)—a negotiating group of small island nations facing the worst climate change risks—highlighted the need to address L&D for vulnerable countries. At the time, the group proposed establishing an international insurance pool that could, for example, compensate victims of projected sea level rise, But the idea was rejected. It took another 16 years for L&D to be included in a formally negotiated UN text (the 2007 Bali Action Plan).



A woman takes part in a ceremony to mark the 'death' of the Pizol glacier (Pizolgletscher) on September 22, 2019 above Mels, eastern Switzerland.

“**Whilst current NELD must be addressed and compensated today, minimising future NELD must be a priority.**”



A patient suffering from dengue fever receives medical treatment at an isolation ward of a hospital in Karachi, Pakistan, 04 October 2022. The unprecedented flooding in Pakistan has led to outbreaks of diseases such as diarrhea, dysentery, dengue fever and malaria.

“**No substantial progress has been made to address NELD under the UNFCCC.**”

The first NELD milestone was the 2012 technical paper on non-economic loss⁵⁹. The year after, the establishment of The Warsaw International Mechanism on Loss and Damage (WIM) also included NELD. Subsequently, NELD became an action area in the WIM Workplan and the WIM Expert group has worked on non-economic loss⁵⁹. However, no substantial progress has been made to address NELD under the UNFCCC. Most recently in 2021 at COP26, the G77 & China negotiating bloc proposed that a Loss and Damage Finance Facility (LDFF) be established to provide new financial support under Article 9 of the Paris Agreement, in addition to adaptation and mitigation finance, to developing countries to address L&D including NELD⁷². However, an agreement could not be reached and the LDFF was not established. Instead, the Glasgow Dialogue was established which has yet to be defined with clear milestones and outcomes. COP27 in Egypt provides yet another opportunity to address NELD.

MORAL OBLIGATION

NELD is already occurring, all over the world⁵. The Northern Hemisphere summer of 2022 saw floods in South Africa, Bangladesh, India, and Pakistan, heatwaves in Pakistan, China, Europe, and the United States, and wildfires in Europe and the United States. All of these events inevitably caused NELD to the individuals and communities living in the affected areas. Those most vulnerable to climate change typically have a greater share of their needs met non-economically⁶⁵. It cannot be permitted that the many challenges that come with responding to NELD discourages or slows down research and policy to address it. The many challenges show how much work still awaits and should encourage everyone to take action and bridge the gap between lived experiences and current policies. This could mean undertaking more research focusing on NELD or advocating for a LDFF that takes NELD into account. This LDFF should be backed with substantial climate funds from countries in the Global North. These countries should feel obliged to facilitate funds to the Global South to address NELD. Not only because they have massively overshoot their fair share of greenhouse gas emissions¹³, exacerbating impacts from climate-related hazards. But also because through colonial-capitalism, imperialism, and neocolonialism they have actively underdeveloped countries in the Global South making them more vulnerable to climate change impacts^{67,73}. Recent climate-exacerbated disasters in all development contexts shows NELD is being experienced globally, but the disproportionate impacts from historically-produced vulnerability make visible the injustices of climate change. From solidarity in loss must come solidarity in action.



Ahmadou Seborny Touré, Guinea, on behalf of the G77 & China, expresses disappointment that the proposal to establish a loss and damage finance facility has been rejected by developed countries at COP26 in Glasgow in 2021.

“**NELD is already occurring, all over the world.**”



The bodies of six giraffes lie on the outskirts of Eyrib village in Sabuli Wildlife Conservancy in Wajir County, Kenya in December, 2021. A prolonged drought has created food and water shortages for the regions wild life, pastoralist communities and livestock.

REFERENCE LIST

1. IPCC (2022). Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Lösschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. <https://www.ipcc.ch/report/ar6/wg2/>
2. Van der Geest, K., & Warner, K. (2020). Loss and damage in the IPCC Fifth Assessment Report (Working Group II): a text-mining analysis. *Climate Policy*, 20(6): 729-742. <https://doi.org/10.1080/14693062.2019.1704678>
3. Boyd, E., Chaffin, B. C., Dorkenoo, K., Jackson, G., Harrington, L., N'Guetta, A., Johansson, E. L., Nordlander, L., Paolo De Rosa, S., Raju, E., Scown, M., Soo, J., & Stuart-Smith, R. (2021). Loss and damage from climate change: A new climate justice agenda. *One Earth*, 4(10), 1365–1370. <https://doi.org/10.1016/j.oneear.2021.09.015>
4. Boyd, E., James, R. A., Jones, R. G., Young, H. R., and Otto, F. E. L. (2017). 'A Typology of Loss and Damage Perspectives'. *Nature Climate Change* 7 (10): 723–29. <https://doi.org/10.1038/nclimate3389>
5. Tschakert, P, Ellis N.R., Anderson, C., Kelly, A., & Obeng, J, (2019). One thousand ways to experience loss: a systematic analysis of climate-related intangible harm from around the world. *Global Environ Change*, 55:58-72. <https://doi.org/10.1016/j.gloenvcha.2018.11.006>
6. Magee, L., Handmer, J., Neale, T., & Ladds, M. (2016). Locating the intangible: Integrating a sense of place into cost estimations of natural disasters. *Geoforum* 77, 61–72. <https://doi.org/10.1016/j.geoforum.2016.09.018>.
7. McShane, K. (2017). Values and Harms in Loss and Damage. *Ethics, Policy & Environment*, 20 (2), 129–142. <https://doi.org/10.1080/21550085.2017.1342960>.
8. Clissold R, McNamara KE and Westoby R (2022) 'Emotions of the Anthropocene across Oceania', *International Journal of Environmental Research and Public Health*, 19(6757), 1-16. <https://doi.org/10.3390/ijerph19116757>
9. McNamara KE, Westoby R, Clissold R and Chandra A (2021) 'Understanding and responding to climate-driven non-economic loss and damage in the Pacific Islands', *Climate Risk Management*, 33, 100336, <https://doi.org/10.1016/j.crm.2021.100336>
10. Wood, M. E. (2017). *The Origin of Capitalism: A Longer View* (Reprint). Verso. <https://www.versobooks.com/books/2407-the-origin-of-capitalism>
11. Met Office. (2021). Mauna Loa carbon dioxide forecast for 2022. <https://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/long-range/forecasts/co2-forecast>
12. Lindsey, R. (2022). Climate Change: Atmospheric Carbon Dioxide. NOAA. <https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide>
13. Hickel, J. (2020). Quantifying national responsibility for climate breakdown: an equality-based attribution approach for carbon dioxide emissions in excess of the planetary boundary. *The Lancet Planetary Health*, 4(9), e399–e404. [https://doi.org/10.1016/S2542-5196\(20\)30196-0](https://doi.org/10.1016/S2542-5196(20)30196-0)
14. OECD. (2020). CO₂ emissions embodied in international trade and domestic final demand: Methodology and results using the OECD Inter-Country Input-Output Database | en | OECD. <https://www.oecd.org/industry/co2-emissions-embodied-in-international-trade-and-domestic-final-demand-8f2963b8-en.htm>
15. Seneviratne, S.I., X. Zhang, M. Adnan, W. Badi, C. Dereczynski, A. Di Luca, S. Ghosh, I. Iskandar, J. Kossin, S. Lewis, F. Otto, I. Pinto, M. Satoh, S.M. Vicente-Serrano, M. Wehner, and B. Zhou, 2021: Weather and Climate Extreme Events in a Changing Climate. In *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1513–1766, <https://doi.org/10.1017/9781009157896.013>

16. McNamara, K. E., & Jackson, G. (2019). Loss and damage: A review of the literature and directions for future research. *WIREs Climate Change*, 10(2). <https://doi.org/10.1002/wcc.564>
17. Stoddard, I., Anderson, K., Capstick, S., Carton, W., Depledge, J., Facer, K., Gough, C., Hache, F., Hoolohan, C., Hultman, M., Hällström, N., Kartha, S., Klinsky, S., Kuchler, M., Lövbrand, E., Nasiritousi, N., Newell, P., Peters, G. P., Sokona, Y., . . . Williams, M. (2021). Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve? *Annual Review of Environment and Resources*, 46(1), 653–689. <https://doi.org/10.1146/annurev-environ-012220-011104>
18. Pauw, W. P., Moslener, U., Zamarioli, L. H., Amerasinghe, N., Atela, J., Affana, J. P. B., Buchner, B., Klein, R. J. T., Mbeva, K. L., Puri, J., Roberts, J. T., Shawoo, Z., Watson, C., & Weikmans, R. (2022). Post-2025 climate finance target: how much more and how much better? *Climate Policy*, 1–11. <https://doi.org/10.1080/14693062.2022.2114985>
19. Eriksen, S., Schipper, E. L. F., Scoville-Simonds, M., Vincent, K., Adam, H. N., Brooks, N., Harding, B., Khatri, D., Lenaerts, L., Liverman, D., Mills-Novoa, M., Mosberg, M., Movik, S., Muok, B., Nightingale, A., Ojha, H., Sygna, L., Taylor, M., Vogel, C., & West, J. J. (2021). Adaptation interventions and their effect on vulnerability in developing countries: Help, hindrance or irrelevance? *World Development*, 141, 105383. <https://doi.org/10.1016/j.worlddev.2020.105383>
20. Warner, K., & Van der Geest, K. (2013). Loss and damage from climate change: local-level evidence from nine vulnerable countries. *International Journal of Global Warming*, 5(4), 367-386.
21. Jackson, G., McNamara, K., & Witt, B. (2017). A framework for disaster vulnerability in a small island in the Southwest Pacific: A case study of Emae Island, Vanuatu. *International Journal of Disaster Risk Science*, 8, 358-373. <https://doi.org/10.1007/s13753-017-0145-6>
22. Fankhauser, S., Dietz, S., & Gradwell, P. (2014). Non-economic losses in the context of the UNFCCC work programme on loss and damage. 71. <http://eprints.lse.ac.uk/64554/1/Fankhauser-Dietz-Gradwell-Loss-Damage-final.pdf>
23. Cunsolo, A., & Ellis, N. R. (2018). Ecological grief as a mental health response to climate change-related loss. *Nature Climate Change*, 8(4), 275–281. <https://doi.org/10.1038/s41558-018-0092-2>
24. Clayton, S., Manning, C. M., Krygsmann, K., & Speiser, M. (2017). Mental health and our changing climate: impacts, implications, and guidance. Washington, D.C.: American Psychological Association, and ecoAmerica. www.apa.org/news/press/releases/2017/03/mental-health-climate.pdf
25. Albrecht, G., Sartore, G. M., Connor, L., Higginbotham, N., Freeman, S., Kelly, B., Stain, H., Tonna, A., & Pollard, G. (2007). Solastalgia: The Distress Caused by Environmental Change. *Australasian Psychiatry*, 15(1_suppl), S95–S98. <https://doi.org/10.1080/10398560701701288>
26. WWA. (2022). Climate Change made devastating early heat in India and Pakistan 30 times more likely – World Weather Attribution. Retrieved September 17, 2022, from <https://www.worldweatherattribution.org/climate-change-made-devastating-early-heat-in-india-and-pakistan-30-times-more-likely/>
27. Chaudhary, A., Parija, F. M., & Saliwar, I. (2022). Bloomberg - Are you a robot? <https://www.bloomberg.com/tosv2.html?vid=&uuid=8c13a306-3691-11ed-bfaf-6b427147574b&url=L25ld3MvZmVhdHVyZXNmMjAyMi0wOC0xOC9pbmRpYS1oZWFOlXdhdmUtZm9yY2VzLWNsaW1hdGUtYWRhcHRhdGlvbi1pbi1zb3V0aC1hc2lh>
28. Liu, J., Varghese, B. M., Hansen, A., Xiang, J., Zhang, Y., Dear, K., Gourley, M., Driscoll, T., Morgan, G., Capon, A., & Bi, P. (2021). Is there an association between hot weather and poor mental health outcomes? A systematic review and meta-analysis. *Environment International*, 153, 106533. <https://doi.org/10.1016/j.envint.2021.106533>
29. Ellis-Petersen, H., & Baloch, S. M. (2022). 'We are living in hell': Pakistan and India suffer extreme spring heatwaves. *The Guardian*. Retrieved September 17, 2022, from <https://www.theguardian.com/world/2022/may/02/pakistan-india-heatwaves-water-electricity-shortages>
30. Ayeb-Karlsson, S. (2020). 'When we were children we had dreams, then we came to Dhaka to survive': urban stories connecting loss of wellbeing, displacement and (im)mobility. *Climate and Development*, 13(4), 348–359. <https://doi.org/10.1080/17565529.2020.1777078>

31. He, K., Yang, Q., Shen, X., & Anagnostou, E. N. (2021). Brief communication: Western Europe flood in 2021: mapping agriculture flood exposure from SAR. *Natural Hazard and Earth System Sciences*. <https://doi.org/10.5194/nhess-2021-307>
32. WWA. (2021). Heavy rainfall which led to severe flooding in Western Europe made more likely by climate change – World Weather Attribution. World Weather Attribution. www.worldweatherattribution.org/heavy-rainfall-which-led-to-severe-flooding-in-western-europe-made-more-likely-by-climate-change/
33. AON. (2021). Global Catastrophe Recap 2021. In AON. http://thoughtleadership.aon.com/Documents/20211008_analytics-if-july-global-recap.pdf
34. Foote, N. (2021). EU farmers warn harvest will fail after floods, plea for aid. <https://www.euractiv.com/section/agriculture-food/news/eu-farmers-warn-harvest-will-fail-after-floods-plea-for-aid/>
35. Schmidt, N. F. P. (2021). More than 150 people still missing in German floods unlikely to be found, officials fear. CNN. Retrieved September 17, 2022, from <https://edition.cnn.com/2021/07/22/europe/germany-belgium-europe-floods-death-climate-intl/index.html>
36. Schlicht, M., & Sahl, D. (2021, July 16). Floodwaters still rising in western Europe with death toll over 120. Reuters. Retrieved September 17, 2022, from <https://www.reuters.com/world/europe/further-flooding-feared-western-europe-with-death-toll-over-100-2021-07-16/>
37. Ellyatt, H. (2021). Germany mourns after devastating floods which could be a political game-changer. CNBC. Retrieved September 17, 2022, from <https://www.cnbc.com/2021/07/19/germany-weighs-the-human-economic-and-political-damage-of-the-floods.html>
38. Erlanger, S. (2021). 'A Special Sadness': Floods Bring Death to a German Care Home. *The New York Times*. <https://www.nytimes.com/2021/07/17/world/europe/germany-floods.html>
39. Jacobsen, M. (2021). The lesson from German floods: prepare for the unimaginable. *Climate Home News*. <https://www.climatechangenews.com/2021/08/20/lesson-german-floods-prepare-unimaginable/>
40. Nugent, C. (2021). How Deadly Flooding in Germany and Belgium Exposed Europe's Climate Change Hubris. *Time*. <https://time.com/6081472/germany-flooding-climate-change/>
41. Kaijser, A., & Kronsell, A. (2013). Climate change through the lens of intersectionality. *Environmental Politics*, 23(3), 417–433. <https://doi.org/10.1080/09644016.2013.835203>
42. Sultana, F. (2022). The unbearable heaviness of climate coloniality. *Political Geography*, 102638. <https://doi.org/10.1016/j.polgeo.2022.102638>
43. Scoville-Simonds, M., Jamali, H., & Hufty, M. (2020). The Hazards of Mainstreaming: Climate Change Adaptation Politics in Three Dimensions. *World Development* 125: 104683. <https://doi.org/10.1016/j.worlddev.2019.104683>.
44. Simpson, L. B. (2017). 'KWE AS RESURGENT METHOD'. In *As We Have Always Done*, 27–38. Indigenous Freedom through Radical Resistance. University of Minnesota Press. <https://www.upress.umn.edu/book-division/books/as-we-have-always-done>
45. Whyte, K. (2020). 'Too Late for Indigenous Climate Justice: Ecological and Relational Tipping Points'. *Wiley Interdisciplinary Reviews: Climate Change* 11 (1). <https://doi.org/10.1002/wcc.603>
46. Pearson, J., Jackson, G., & McNamara, K. E. (2021). Climate-driven losses to Indigenous and local knowledge and cultural heritage. *The Anthropocene Review*, 205301962110054. <https://doi.org/10.1177/20530196211005482>
47. Meriläinen, E., Joseph, J., Jauhola, M., Yadav, P., Romo-Murphy, E., Marin, J. and Gadhavi, S. (2022). Examining relational social ontologies of disaster resilience: lived experiences from India, Indonesia, Nepal, Chile and Andean territories. *Disaster Prevention and Management*, 31(3), 273-287. <https://doi.org/10.1108/DPM-02-2021-0057>
48. Bharadwaj, R., Shakya, C. (2021). Loss and damage case studies from the frontline: a resource to support practice and policy. IIED, London. <https://pubs.iied.org/20551iied>
49. Jackson, G. (2021). Critical junctures, agrarian change, and the (re)production of vulnerability in a marginalised Indigenous society'. *World Development* 145: 105538. <https://doi.org/10.1016/j.worlddev.2021.105538>

50. Oliver-Smith, A. Alcántara-Ayala, I., Burton, I & Lavell, A. (2016). Forensic Investigations of Disasters (FORIN): A Conceptual Framework and Guide to Research. (IRDR FORIN Publication No.2). Beijing: Integrated Research on Disaster Risk. www.irdrinternational.org/uploads/files/2020/08/n0EpdlvgoGZuwbrhioKRFLQiw5XILfF1vIDE7tEB/FORIN-2-29022016.pdf
51. Thomas, A., & L. Benjamin. (2020). 'Non-Economic Loss and Damage: Lessons from Displacement in the Caribbean'. *Climate Policy*, 20 (6): 715–28. <https://doi.org/10.1080/14693062.2019.1640105>.
52. Practical Action (2021) Assessing and addressing climate-induced loss and damage in Nepal. Practical Action, Rugby. <https://lib.icimod.org/record/35313>
53. van Schie, D., Ranon, R. J. K., Mirza, A. B., & Anderson, S. (2022). Local Responses To Climate-Related Non-Economic Loss and Damage A Case study in Burigolani and Gabura Union, Bangladesh. In <https://www.iied.org/21161iied>
54. Anderson (2021) Avoiding the Climate Poverty Spiral: Social protection to avoid climate-induced loss & damage. Action Aid. <https://actionaid.org/publications/2021/avoiding-climate-poverty-spiral-social-protection-avoid-climate-induced-loss>
55. Bharadwaj, R., Bishop, D., Hazra, S., Pufaa, E., & Annan, J. K. 2021. Climate-induced migration and modern slavery: a toolkit for policymakers. Anti Slavery International; IIED. Climate-induced migration and modern slavery: a toolkit for policymakers - World | ReliefWeb <https://reliefweb.int/report/world/climate-induced-migration-and-modern-slavery-toolkit-policymakers>
56. Pegram, Joni & Oakes, Robert (2017). No Place to Call Home: Protecting Children’s Rights when the Changing Climate Forces them to Flee. London: UNICEF UK <https://www.unicef.org.uk/publications/no-place-to-call-home/>
57. Peek, L. (2008). Children and Disasters: Understanding Vulnerability, Developing Capacities, and Promoting Resilience — An Introduction. *Children, Youth and Environments*, 18(1), 1–29. <http://www.jstor.org/stable/10.7721/chilyoutenvi.18.1.0001>
58. Thompson, T. (2021). 'Young People’s Climate Anxiety Revealed in Landmark Survey'. *Nature* 597 (7878): 605–605. <https://doi.org/10.1038/d41586-021-02582-8>
59. ACT. (2017). Non-Economic Loss And Damage With Case Examples from Tanzania, Ethiopia, El Salvador and Bangladesh. ACT Alliance. <https://reliefweb.int/report/world/non-economic-loss-and-damage-case-examples-tanzania-ethiopia-el-salvador-and-bangladesh>
60. Andrei, S., Rabbani, G., & Khan, H. I. (2014). Non-economic loss and damage caused by climatic stressors in selected coastal districts of Bangladesh. Bangladesh Centre for Advanced Studies. <http://www.icccad.net/wp-content/uploads/2016/02/ADB-Study-on-Non-Economic-Losses-and-Damages-Report-Final-Version-Reduced-File-Size-compressed1.pdf>
61. Chiba, Y., Prabhakar, S., & Islam, M. (2019). Addressing non-economic loss and damage associated with climatic events: Cases of Japan and Bangladesh. *APN Science Bulletin*, 9(1). <https://doi.org/10.30852/sb.2019.740>
62. Serdeczny, S., Bauer, S., & Huq, S. (2017). Non-economic losses from climate change: opportunities for policy-oriented research. *Climate and Development*, 10(2), 97–101. <https://doi.org/10.1080/17565529.2017.1372268>
63. Serdeczny, O., Waters, E., & Chan, S. (2016). Non-economic Loss and Damage: Addressing the Forgotten Side of Climate Change Impacts. German Development Institute. https://climateanalytics.org/media/neld_bp_final_1.pdf
64. UNFCCC. (2013). Technical paper: Non-economic losses in the context of the work programme on loss and damage. UNFCCC. <https://unfccc.int/resource/docs/2013/tp/02.pdf>
65. Preston, C. J. (2017). Challenges and Opportunities for Understanding Non-economic Loss and Damage. *Ethics, Policy & Environment*, 20(2), 143–155. <https://doi.org/10.1080/21550085.2017.1342962>
66. Wrathall, D., Oliver-Smith, A., Fekete, A., Gencer, E., Lepana, M. & Sakdapolrak, P. (2015). 'Problematising Loss and Damage'. *International Journal of Global Warming* 8 (September): 274–94. <https://doi.org/10.1504/IJGW.2015.071962>
67. Carthy, A. (2022). Loss and damage does not happen in a vacuum – it relates to power and. International Institute for Environment and Development. <https://www.iied.org/loss-damage-does-not-happen-vacuum-it-relates-power-politics>

68. Olúfemi, T. O. 2022. Reconsidering reparations. Oxford University Press. <https://global.oup.com/academic/product/reconsidering-reparations-9780197508893?cc=gb&lang=en&>
69. Piggott-McKellar, Annah E., Patrick D. Nunn, Karen E. McNamara, and Seci T. Sekinini. 2020. 'Dam(n) Seawalls: A Case of Climate Change Maladaptation in Fiji'. In *Managing Climate Change Adaptation in the Pacific Region*, edited by W. L. Filho, 69–84. Climate Change Management. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-40552-6_4.
70. Addison, S., Bharadwaj, R., Carthy, A., Gallagher, C., More, C., Nisi, N., & Shakya, C. (2022). Addressing loss and damage: practical insights for tackling multidimensional risks in LDCs and SIDS. IIED, London. <https://pubs.iied.org/21046iied>
71. Roberts, E., & Pelling, M. (2019). Loss and damage: an opportunity for transformation? *Climate Policy*, 20(6), 758–771. <https://doi.org/10.1080/14693062.2019.1680336>
72. Sharma-Khushal, S., Schalatek, L., Singh, H., & White, H. (2022). The Loss and Damage Finance Facility: Why and How. <https://us.boell.org/en/2022/05/31/loss-and-damage-finance-facility-why-and-how>
73. Rodney, W. (2018). *How Europe Underdeveloped Africa*. Verso. <https://www.versobooks.com/books/2785-how-europe-underdeveloped-africa>

IMAGE CREDITS

Images are credited in order of appearance.

Cover image:

Burnt hill in the aftermath of the 2018 Camp Fire, Concow, Butte County, California (2019), from *Future Scenarios* (2020), by Lena Dobrowolska and Teo Ormond-Skeaping ©

Irfan Ullah:

Irfan Ullah (2019), by Irfan Ullah ©

Chapter Photographs:

1. Lone palm, Daulatkhana, Bhola Island, Bangladesh, (2017), from *Future Scenarios* (2020), by Lena Dobrowolska and Teo Ormond-Skeaping ©
2. Mt Barney burning at the beginning of the 'Black Summer' bushfires in Australia, (2019) by Ben Blanche via AusStockPhoto ©
3. Food systems in the Bedamuni tribe of Western Province, Papua New Guinea (2018), by Guy Jackson ©
4. Holms Western Oil Corporation, Pump Jack Number 13, Midway-Sunset Oil Field, Pentland Road, Maricopa, Kern County, California, USA (2019), from *Future Scenarios* (2020), by Lena Dobrowolska and Teo Ormond-Skeaping ©
5. The Imja-Lhotse Shar Glacier, Soukhumbu, Nepal, (2018), from *Future Scenarios* (2020), by Lena Dobrowolska and Teo Ormond-Skeaping ©
6. Sandbags being laid for the foundation of a river bank defence, at Elisha Ferry Ghat, on the bank of the Meghna River on Bhola Island, Bangladesh, (2017), from *Future Scenarios* (2020), by Lena Dobrowolska and Teo Ormond-Skeaping ©
7. [Drought in Ethiopia](#) (2022), by [UNICEF Ethiopia](#), licenced under [CC BY-NC-ND 2.0](#)
8. Riverbank erosion, Dalbanga South, Barguna, Bangladesh, (2017) from *Future Scenarios* (2020) by Lena Dobrowolska and Teo Ormond-Skeaping ©
9. Homeless people sleep in the shade of an overbridge in New Delhi. At least 2,000 people died in India during the heat wave in 2015, when temperatures hovered near 50 degrees C. By Manish Swarup/AP/Shutterstock ©

9. Homeless people sleep in the shade of an overbridge in in New Delhi. At least 2,000 people died in India during the heat wave in 2015, when temperatures hovered near 50 degrees C. By Manish Swarup/AP/Shutterstock ©
10. German Chancellor Angela Merkel and Rhineland-Palatinate State Premier Malu Dreyer (C) talk as they visit the flood-ravaged village of Schuld near Bad Neuenahr-Ahrweiler, Rhineland-Palatinate state, Germany July 18, 2021. By REUTERS / Alamy Stock Photo ©
11. Picking greens in community forest at Ban Tha Se, Luang Natha Province, Lao People's Democratic Republic, (2017), from Future Scenarios (2020), by Lena Dobrowolska and Teo Ormond-Skeaping ©
12. Bricks placed under a bed frame by a family living in Kallyanpur Basti, in Dhaka, Bangladesh, (2017), from Future Scenarios (2020), by Lena Dobrowolska and Teo Ormond-Skeaping ©
13. Cyclone disaster preparedness courtyard meeting, Dalbanga South, Barguna, Bangladesh, (2017) from Future Scenarios (2020) by Lena Dobrowolska and Teo Ormond-Skeaping ©
14. Derrick's Tattoo commemorating the Camp fire, Magalia Community Church Resource & Recovery Center, Butte County (2019), from Future Scenarios (2020), by Lena Dobrowolska and Teo Ormond-Skeaping ©
15. Eid al-Adha prayer is performed in a flood affected area near Dhaka, Bangladesh, during monsoon floods that displaced upto 1.1 million people in 2020, (2020), Anadolu Agency / Getty Images ©
16. Cheniere Caminada Cemetery on Grand Isle in Lousianna, USA, (2018), from Future Scenarios (2020), by Lena Dobrowolska and Teo Ormond-Skeaping ©
17. A woman takes part in a ceremony to mark the 'death' of the Pizol glacier (Pizolgletscher) on September 22, 2019 above Mels, eastern Switzerland (2019). By FABRICE COFFRINI / Getty Images ©
18. patient suffering from dengue fever receives medical treatment at an isolation ward of a hospital in Karachi, Pakistan, 04 October 2022. The unpresedented flooding in Pakistan has led to outbreaks of diseases such as diarrhea, dysentery, dengue fever and malaria, (2022). By SHAHZAIB AKBER/EPA-EFE/Shutterstock ©
19. UNFCCC COP26 13Nov21 ClosingPlenary KiaraWorth-72, Ahmadou Sebory Touré, Guinea, on behalf of the G77 & China, COP26 in Glasgow in 2021, (2021). By UNclimatechange, licenced under CC BY-NC-ND 2.0
20. The bodies of six giraffes lie on the outskirts of Eyrib village in Sabuli Wildlife Conservancy in Wajir County, Kenya in December, 2021, (2021). By Getty Images / Stringer ©

Paul Lodry Dongmo:

Paul Lodry Dongmo (2022). By Paul Lodry Dongmo ©