



Barriers to addressing climate change-related losses and damages in low- and middle-income countries

A Rapid Evidence Assessment

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Key messages

This Rapid Evidence Assessment (REA) identifies nine different barriers to addressing climate-related losses and damages in low- and middle-income countries and assesses the strength of evidence in relation to each.

Economic and financial barriers are those most frequently reported and analysed in the literature – specifically, the lack of sufficient, predictable, timely and accessible funding for countries, communities and subnational institutions.

Even when funding is available, policies and delivery mechanisms have often overlooked the importance of addressing all types of losses and damages, and have neglected the needs of the most vulnerable.

Knowledge barriers underpin almost all other types of barriers. Challenges in recognising and assessing non-economic losses and damages, in particular, contribute to their diminished perceived importance.

There is a clear need to advance collective knowledge on how to address current and future climate-related losses and damages.



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Acronyms

COP	Conference of the Parties
IPCC	Intergovernmental Panel on Climate Change
L&D	Loss and Damage
LDC	Least Developed Country
NGO	Non-governmental organisation
REA	Rapid Evidence Assessment
SIDS	Small Island Developing States
UNFCC	United Nations Framework Convention on Climate Change

Executive summary

Since 2015, the increasing number and intensifying nature of the impacts of climate change worldwide and the lack of progress on both the mitigation and adaptation goals outlined in the Paris Agreement (UNEP, 2022b; 2022a) has heightened attention on addressing climate-related losses and damages, particularly in countries in the Global South. Actions and mechanisms for addressing losses and damages are numerous, from measures to preserve lives, livelihoods and dignity, and minimise loss of biodiversity, to the replacement or repair of assets that were lost or damaged, to supporting livelihood recovery and population resettlement to safer locations. However, there is no international policy framework to guide and organise these measures for addressing losses and damages, resulting in partial measures and insufficient financial arrangements.

Nations took a momentous decision at the 27th Conference of the Parties (COP27) to establish a new Loss and Damage Fund and new funding arrangements to assist developing countries particularly vulnerable to the adverse effects of climate change in addressing climate-related losses and damages. A Transitional Committee was mandated to design and operationalise these new funding arrangements, including on institutional arrangements, modalities, structure and governance, as well as elements, sources of funding and coordination with other funding mechanisms, to make recommendations for adoption at COP28. For the proposed financing mechanisms to be effective, the Transitional Committee will need to find solutions to barriers that are already preventing the channelling of resources and support to where they are most needed, and other barriers preventing effective action.

This Rapid Evidence Assessment (REA) begins to identify different barriers and assess how they are constraining efforts to address climate-related losses and damages in low- and middle-income countries. It also analyses how frequently these barriers are reported and analysed in the policy and academic literature, and highlights variations across contexts.

The findings of this assessment are valuable for stakeholders engaged in the United Nations Framework Convention on Climate Change (UNFCCC) process and beyond. They can be used to help shape action and support for vulnerable countries and communities. An understanding of the barriers in addressing losses and damages experienced to date should inform the design of the Loss and Damage Fund and be used to enhance coordination across all financing arrangements – to avoid replicating or compounding the barriers. This report can also inform the Terms of Reference that are being drawn up for the new host of the Santiago Network – which will catalyse technical assistance for the implementation of relevant approaches for averting, minimising and addressing losses and damages at the local, national and regional level in developing countries that are particularly vulnerable to the adverse effects of climate change.

Findings

The REA finds nine categories of barriers that have had significant effects on addressing climate-related losses and damages. These nine categories have had three major effects on the quantity, quality and pace of efforts to address climate-related losses and damages:

- 1 Barriers have prevented sufficient, predictable, timely and accessible funding for countries, communities and subnational institutions to address climate-related losses and damages that are already occurring, let alone those that may occur due to the warming already 'baked in' the climate system and its associated impacts.
- 2 Existing financial, policy and delivery mechanisms at international and national levels have not addressed losses and damages effectively or equitably. This has come at the expense of those most vulnerable to the impacts of climate change, including in Least Developed Countries (LDCs) and Small Island Developing States (SIDS), and among vulnerable and marginalised groups, including women, children, ethnic minorities, people with disabilities, elderly people and poor people.
- 3 Barriers have slowed down collective, national and community action to address losses and damages, failing to heed the urgency caused by the climate crisis and the losses and damages already occurring.

Perception and narrative barriers

The lack of international consensus on the definition and practical implementation of 'Loss and Damage' at national and local levels hampers progress (*strong evidence*). Meanwhile, disagreements over attribution of losses and damages to anthropogenic climate change have slowed the international agenda on Loss and Damage (*moderate evidence*).

Economic and financial barriers

The literature concurs that the current levels of financing are inadequate in relation to the scale of losses and damages experienced by vulnerable populations, resulting in limited responses when impacts occur (*strong evidence*). While sources of finance outside the UNFCCC, such as humanitarian and development aid and domestic budgets, are primarily relied on to address losses and damages, they are deemed inadequate compared to the needs (*strong evidence*). It is also evident that relying solely on humanitarian funding is unsuitable to effectively address losses and damages (*moderate evidence*). Furthermore, domestic finance for losses and damages can be constrained by destructive cycles of debt and disasters, particularly in vulnerable countries with limited resilience and high exposure to hazards, including middle-income SIDS (*moderate evidence*). The challenges of accessing financial resources to address losses and damages are more pronounced in SIDS compared to other vulnerable country groups (*moderate evidence*). In general, there is a particular and significant lack of funding for losses and damages caused by

slow-onset events and recurrent disasters, as well as the necessary long-term finance for reconstruction and rebuilding (*moderate evidence*). Moreover, existing financial mechanisms fail to provide timely resources to address losses and damages once they have occurred (*strong evidence*).

Insurance

Insurance can play a role in addressing losses and damages, but there are significant challenges. Disaster insurance outcomes consistently reveal inadequate coverage for policyholders (*strong evidence*), and the increasing climate risks make previously insured assets uninsurable (*strong evidence*). There are numerous limitations to using insurance or risk transfer instruments in low- and middle-income countries. These limitations include high transaction costs (*moderate evidence*), lack of regulatory and policy frameworks (*moderate evidence*), lack of data on disaster risks (*moderate evidence*), and low familiarity with insurance concepts (*limited evidence from one study*).

Institutional barriers

There are significant institutional barriers to accessing existing financial mechanisms, including the UNFCCC multilateral climate funds and insurance instruments (*strong evidence*). Moreover, these mechanisms often fail to consider the unique needs of the most vulnerable (*strong evidence*). Local and community action to address losses and damages is hindered by inadequate delivery mechanisms (*strong evidence*). Additionally, national and local administrations face severe capacity constraints in collecting, interpreting and assessing data, as well as coordinating actions, all of which contribute to delays in addressing losses and damages (*strong evidence*).

Knowledge barriers

The lack of urgency in addressing non-economic losses and damages can be attributed to the limited understanding and lack of targeted funding or technical know-how in assessing these impacts (*strong evidence*). Additionally, even when data is collected through post-disaster needs assessments (PDNAs), the specific needs of vulnerable groups, including women, children, ethnic minorities, people with disabilities, elderly people and poor people, at the community level are often overlooked (*strong evidence*). The absence of gender mainstreaming in national disaster risk management and climate change policies and plans further hampers the incorporation of gender considerations in interventions addressing losses and damages (*moderate evidence*). This gender and inclusion gap is particularly notable in Caribbean and African countries (*limited evidence*). PDNAs also tend to ignore the specific needs of children, as well as those working in the informal sector who experience significant overall well-being impacts (*limited evidence*). To drive effective action, a better understanding of the limits of soft adaptation is needed, so actions can be targeted where these limits are already being breached (*strong evidence*).

Political barriers

Policy-makers underestimate and under-prioritise the less visible slow-onset climate impacts (*strong evidence*). They have been increasingly engaged in political discussions around insurance as a mechanism for addressing losses and damages, but insurance can only provide limited support, and an excessive focus on insurance diverts attention away from other more equitable and effective mechanisms (*strong evidence*). Domestic funding for losses and damages is constrained due to competing priorities and other political considerations (*moderate evidence*), and the flow of aid from the Global North to the Global South is driven by donor interests and preferences, geopolitical concerns and domestic media attention, rather than concerns of climate justice or humanitarian principles (*strong evidence*).

Policy and regulatory barriers

While policies do exist in most countries setting out responses to climate-related events, there is a notable lack of plans and policies to guide resettlement in response to such events, as well as a dearth of explicit solutions to address non-economic losses resulting from resettlement or planned relocation (*moderate evidence*). There are no dedicated ‘climate-related Loss and Damage’ policies or plans at the national and local level, although some responses are covered in climate resilience and disaster risk reduction policies (*limited evidence*).

Social and environmental barriers

Effective governance measures for climate relocation and resettlement are lacking in many contexts (*limited evidence*). Without government support and dedicated policies and plans, climate relocation and resettlement can lead to increased non-economic losses and damages (*moderate evidence*). Environmental factors, such as low land elevation and limited land availability, hinder efforts to address losses and damages, particularly in SIDS (*moderate evidence*). The lack of attention to slow-onset processes also has environmental ramifications, undermining the ecosystem services that support recovery from rapid-onset events (*limited evidence*).

Recommendations

Based on these findings, the Transitional Committee will need to pay adequate attention to the following policy issues in its work:

- Clarify and build consensus around an operational definition of ‘addressing Loss and Damage’ to better define its scope.
- Heed the shortcomings of existing mechanisms and instruments, such as insurance, humanitarian funding and UNFCCC climate funds, while designing the new fund and creating linkages with other existing funding arrangements.
- Ensure that funding arrangements account for losses and damages from slow-onset events and smaller disasters, for long-term rehabilitation and reconstruction (past the initial six months), and for assistance for countries to better assess needs arising from losses and damages.

- Ensure that solutions for cross-border and national relocation and resettlement due to climate-related losses and damages are worked into the design of the fund and financial arrangements.

The findings also reveal a clear need to advance the collective knowledge on how to address current and future climate-related losses and damages, including:

- better quantification of Loss and Damage needs
- shared standards to assess non-economic losses and damages and long-term impacts
- better understanding of soft limits to adaptation in relation to climate-related losses and damages
- more evidence on how risk retention mechanisms, such as social protection, can help address climate-related losses and damages
- more case studies at the national and local level to identify different, context-specific barriers to addressing losses and damages
- greater focus on barriers at the individual scale (e.g. mental health and coping mechanisms) and 'meso' scale (e.g. congregations, networks, associations).

1 Introduction

Climate change-induced extreme weather events, such as hurricanes and floods, and slow-onset processes, such as droughts and rising sea levels, are causing widespread damages and increasingly irreversible losses to individuals, communities and societies (IPCC, 2023). The *Sixth Assessment Report* of the Intergovernmental Panel on Climate Change (IPCC) emphasises how climate-related losses and damages will increase with every increment of global warming, escalating in severity at 1.5°C and worsening at 2°C (IPCC, 2023). Currently the world has already experienced a warming of 1.1°C compared to pre-industrial levels, and without drastic reductions in emissions, it is on track to reach a temperature increase of 2.4-2.8°C by the end of the century (UNEP, 2022b).

The IPCC's *Sixth Assessment Report* makes clear that there are limits to climate change adaptation, and adaptation measures cannot prevent all losses and damages (IPCC, 2023). Even under ideal conditions with perfect information and resources, there are limits to how much human systems and ecosystems can adapt to external changes. The 2°C threshold, established in the Paris Agreement, recognises the historical temperature change that civilisation can reasonably adapt to. However, vulnerable countries increasingly highlight that even a 1.5°C increase poses serious threats to their societies and ecosystems. Recent research suggests that by 2030, climate change could drive between 32 million and 132 million people into poverty (Jafino et al., 2020). Vulnerable populations, especially in Least Developed Countries (LDCs), Africa, Small Island Developing States (SIDS), Central and South America, Asia and the Arctic, will be disproportionately affected due to their geographical location, heightened exposure, structural vulnerabilities and limited capacity to respond effectively (IPCC, 2023). International organisations, governments of countries in the so-called Global South¹ and their development partners will need to significantly enhance policy-making and programming to address these impacts.

Box 1 Definitions of Loss and Damage, and losses and damages

In this report, the term 'Loss and Damage' (L&D, capital letters) is used to refer to political negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) and the wider connected policy agenda to 'address loss and damage associated with impacts of climate change, including extreme events and slow onset events, in developing countries that are particularly vulnerable to the adverse effects of climate change'. The term 'losses and damages' (in lower case)

¹ The 'Global South' is an increasingly common term used to categorise many countries around the world. Often it is employed as a substitute for referring to nations that have been historically exploited through colonisation. The authors would like to acknowledge current international debates on the usefulness of this term, which question whether another generalising and binary framework (Global North-Global South) is productive for reconstituting and challenging global power relations.

is used to refer broadly to harm from (observed) impacts and (projected) risks from climate change.

Despite the absence of a universally agreed definition, interpretations of climate-related losses and damages abound, and are widely discussed in the literature (see, for instance, Pill, 2022; Mechler et al., 2019). Among a multitude of concepts, policy-makers and the international community are converging around a few:

Avoided, unavoided and unavoidable losses and damages (Mechler et al., 2019):

Avoided losses and damages can and will be averted or minimised with adaptation, mitigation and/or disaster risk reduction measures (for example, building a sea wall or planting disaster-resilient crop varieties).

Unavoided losses and damages are risks that could not or have not been avoided due to resource and capacity constraints, but options exist to do so (for example, lack of finance hinders the ability of a small island State to build a sea wall).

Unavoidable losses and damages are risks and impacts that go beyond existing adaptation and mitigation measures (for example, already happening glacier melt or sea-level rise).

Economic and non-economic losses and damages (IPCC, 2023):

Economic losses and damages can be understood as losses of physical assets, goods and services that are commonly traded in markets and can be quantified in economic or financial terms (for example, loss of income, damage to infrastructure and property).

Non-economic losses and damages are impacts and risks that are not commonly traded in markets. These include issues related to social resilience, livelihoods, food security, loss of cultural identity, loss of territory, human mobility (migration, displacement and planned relocation), loss of health, mental health disorders and generally risks to well-being and loss of assets and goods not commonly traded in the market.

Quantifying these in economic or financial terms is technically challenging or ethically impossible (for example, human losses [loss of life and health], societal losses and damages [loss of cultural heritage, territorial loss and loss of indigenous knowledge] and environmental losses [loss of biodiversity and ecosystem services]). However, certain industries such as insurance do attempt quantifications such as with 'the value of a statistical life' (which does not measure a dollar value of individual lives, but people's willingness to pay for reductions in mortality risks).

Losses and damages from slow-onset events or sudden-onset extreme weather events (UNFCCC, 2014):

Slow-onset events include increasing mean temperatures, desertification, decreasing precipitation, loss of biodiversity, land and forest degradation, glacial retreat and related impacts, ocean acidification, sea-level rise and salinisation (IPCC, 2022).

Sudden-onset extreme weather events include cyclones, floods, storms, heatwaves, droughts, wildfire, cold waves and tornadoes.

Limits to adaptation (IPCC, 2022):

For many, the concept of L&D is focusing on losses and damages ‘beyond adaptation’ and limits to adaptation: in other words, unavoided or unavoidable impacts beyond what can be achieved with adaptation efforts (van der Geest and Warner, 2015a). Limits to adaptation can be understood as a stage at which an actor's objectives or system requirements cannot be adequately protected from unacceptable risks through adaptive measures (IPCC, 2022).

According to the IPCC (2022), hard limits to adaptation are where no adaptive actions can effectively mitigate intolerable risks. Soft limits to adaptation are where potential options exist but are currently inaccessible for mitigating intolerable risks through adaptive action.

The political issue of L&D was first introduced by the Alliance of Small Island States (AOSIS) in 1991, during the establishment of the UNFCCC, with the unsuccessful proposal of a global compensation fund paid by ‘industrialised’ nations to address losses and damages caused by rising sea levels (Ashe, Lierop and Cherian, 1999). Over the past three decades of United Nations climate negotiations, the issue of Loss and Damage has been increasingly discussed outside the UNFCCC system (Schäfer and Künzel, 2019), while slowly gaining traction in official negotiations (Gabbatiss, 2022). At the 19th Conference of the Parties (COP19), the issue eventually found footing within the UNFCCC through the establishment of the interim Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts under the Cancun Adaptation Framework. Subsequently, Loss and Damage was incorporated in the Paris Agreement in 2015 as a standalone article – Article 8 (United Nations, 2015).

The dedicated article and the language introduced in the Paris Agreement of ‘averting, minimising and addressing’ climate-related losses and damages established L&D as the ‘third pillar’ of climate action, separate from adaptation (United Nations, 2015). The understanding by some but not all Parties is that certain losses and damages can be *averted* by reducing greenhouse gas emissions (mitigation), and *minimised* by taking pre-emptive actions to adapt to the impacts of climate change (adaptation), but that impacts that cannot be reduced by adaptation should be *addressed* – and funded – on their own merit. While the term ‘addressing’ is not well defined in the climate accords, the literature uses definitions to include actions, finance and other arrangements to cope better, avoid negative coping strategies, minimise secondary impacts, help recover from impacts and compensate impacts from climate change.

Since 2015, the increasing number and intensifying nature of the impacts of climate change worldwide and the lack of progress on both the mitigation and adaptation goals outlined in the Paris Agreement (UNEP, 2022b; 2022a) have heightened attention on addressing climate-related losses and damages, particularly in countries in the Global South. Financing L&D became a key negotiation issue at COP26 in 2021, resulting in the momentous decision at COP27 in 2022 to ‘establish new funding arrangements for assisting developing countries that are particularly

vulnerable to the adverse effects of climate change, in responding to loss and damage, including with a focus on addressing loss and damage by providing and assisting in mobilizing new and additional resources, and that these new arrangements complement and include sources, funds, processes and initiatives under and outside the Convention and the Paris Agreement' and 'to establish a fund for responding to loss and damage whose mandate includes a focus on addressing loss and damage' (/CP.27 and -/CMA.4).²

At the time of writing, there is no agreed international policy framework focused on guiding or organising measures for addressing the range of losses and damages that countries and communities are experiencing. Similarly, existing finance provided by international organisations and governments to address and recover from climate impacts are partial and insufficient (UNFCCC, 2019).

COP27 mandated a new Transitional Committee that was tasked with fleshing out and operationalising the new funding arrangements and fund. The Transitional Committee is responsible for designing the fund and is considering the institutional arrangements, modalities, structure and governance, as well as elements, sources of funding and coordination with other funding mechanisms.³ However, for the fund and other financing mechanisms to be effective, the Transitional Committee will need to find solutions to barriers that are already preventing the channelling of resources and support to where they are most needed, and other barriers preventing effective action. Understanding these barriers and the extent to which they constrain efforts in different contexts and at different scales is key to creating a mechanism that is fit for purpose. However, there has not been a structured review of these barriers so far. This is a major gap in the existing scientific and policy literature.

This Rapid Evidence Assessment (REA) begins to fill this gap by answering four questions:

- 1 What barriers constrain efforts to address climate change-related losses and damages during and once they have occurred in low- and middle-income countries?
- 2 What is the prevalence of the various barriers identified?
- 3 To what extent, and how, do the barriers identified affect efforts to address climate change-related losses and damages?
- 4 To what extent do 'barriers' to addressing climate-related losses and damages vary with contextual factors, such as geography, country income status, organising scale (international, regional, local), type of climate-related event (fast- vs. slow-onset), and other contextual factors?

By 'barriers' to addressing losses and damages we refer to all financial, institutional, political-economy, knowledge and technological impediments that hamper the ability of different actors to take appropriate action to prepare for impacts, respond effectively and enhance recovery, rehabilitation, build back/forward better, protect livelihoods and lives, and undertake transformations after or as impacts are felt.

² See https://unfccc.int/sites/default/files/resource/cp2022_L18_cma2022_L20E_0.pdf.

³ See <https://unfccc.int/topics/adaptation-and-resilience/groups-committees/transitional-committee>.

The findings from this REA are intended to support the work of the Transitional Committee, the operationalisation of the Santiago Network for Loss and Damage – which will catalyse technical assistance for the implementation of relevant approaches for averting, minimising and addressing L&D at the local, national and regional level in developing countries that are particularly vulnerable to the adverse effects of climate change (Decision 2/CMA 2, para. 43) – and the discussions around climate-related losses and damages more in general.

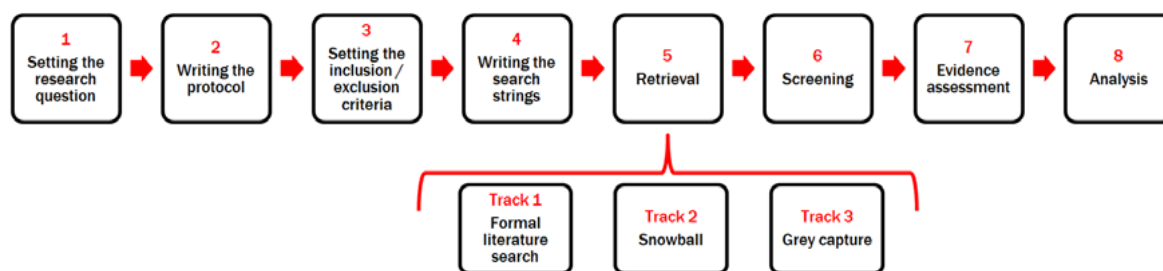
2 Methodology

An REA provides a means to systematically gather available research and information pertaining to a specific topic in a comprehensive and unbiased manner. Its objective is to generate conclusions and summary statements supported by an audit trail that leads back to the original studies. While the REA offers a more structured and rigorous approach, ensuring higher quality compared to a literature review, it is not as exhaustive as a full systematic evidence review (SR). The comprehensiveness of the REA versus the SR depends on factors such as available time and resources, as well as the scope and depth of the results produced. Typically, an REA can take 3–6 months to complete, while an SR requires more than a year, depending on the volume of literature.

The research and analysis for this REA were conducted from January to May 2023. The assessment sought to include all academic and policy literature published between 1991, at the inception of the discussion on L&D, and 2022. This time frame covers a span of 31 years. The assessment covered evidence from low- and middle-income countries, the SIDS and LDCs. It included academic journal articles, relevant books and book chapters that were readily accessible, expert studies from international organisations, think tanks and non-governmental organisations (NGOs), as well as policy briefs based on research evidence. Blogs and newspaper articles were also considered to incorporate additional evidence. However, student papers, dissertations, conference papers and unpublished papers were excluded to limit the number of publications to be reviewed. This exclusion is due to the preliminary nature of these findings, which can be revised or updated when submitted for publication in journals. Furthermore, the assessment focused exclusively on publications in English.

2.1 REA approach

To conduct the assessment, the research team devised a comprehensive methodology to systematically search, identify, analyse and synthesise literature that specifically addresses the complexities of the ‘information architecture’ within the humanitarian, development and climate change domains. Alongside academic literature, the methodology placed significant importance on sourcing grey literature and resources that may not be accessible through traditional, peer-reviewed channels. This emphasis on grey literature is particularly relevant when considering practitioner-generated studies on climate-related L&D (see Figure 1).

Figure 1 Steps in the REA

Source: Based on Hagen-Zanker and Mallett (2013).

Annex I provides a detailed explanation of each step of this approach.

Search protocol and search strings

The research team developed an initial series of search strings based on keywords relating to barriers to addressing (e.g. ‘emergency response’, ‘compensation’, ‘resettlement’, ‘debt relief’) losses and damages (e.g. ‘life’, ‘health’, ‘cultural identity’, ‘income’, ‘livelihood’, ‘electricity’) (see Annex I for a full list of these search strings). The search strings were reviewed from different sectoral perspectives based on the expertise in the research team, including on climate adaptation and resilience, public finance, humanitarian and emergency response, disaster risk finance, and resilience of SIDS. The research team conducted a pilot of this search strategy in the academic database Scopus and in Google Scholar. This required multiple iterations where designated researchers quickly reviewed subsets of search results (up to 15 studies) to judge the relevance of the studies identified, assess the effectiveness of the search strategy and identify challenges, to refine keywords and search strings. The search logs for this iterative process that contributed to the final search strings is documented in the scoping report of this REA.

Once the final set of search strings was established, it was used in three online aggregators, namely Scopus, Web of Science and the 3ie Development Evidence Portal. These aggregators encompass a wide range of academic journals and databases and were instrumental in identifying relevant academic publications. The final search strings were also employed in Google Scholar to discover pertinent grey literature. Additionally, the research team conducted manual searches on the websites of major think tanks, United Nations agencies, multilateral organisations and NGOs actively engaged in the field of L&D (for a comprehensive list of these organisations, please refer to Annex I). As part of the manual screening, the research team reached out either via direct email to or by monitoring the social media of known specialists working on climate L&D. This process aimed to identify any additional relevant grey literature. The search returned the results presented in Table 1.

Table 1 Results from search of academic and grey literature

Source	Returned results (number of documents)
Scopus	1,054
Web of Science	1,443
3ie	3
Google Scholar	600
Manual search	142

Screening of search results for inclusion or exclusion

To ensure the exclusion of irrelevant studies, the research team established inclusion and exclusion criteria (see below). The screening process involved two steps: evaluating the titles of publications, and assessing the abstracts (for academic papers) or executive summaries (for grey literature). Annex I provides examples for the inclusion and exclusion criteria that guided the research team in their application.

Step 1: Title screening

Included	-
Excluded	<ul style="list-style-type: none"> Exclude if title clearly does not address research objectives or questions; AND/OR Exclude if purely quantitative study (numerical, econometric studies, modelling, etc.) that does not include analysis of barriers to addressing losses and damages, AND/OR addresses research questions
Uncertain	<ul style="list-style-type: none"> If the title does address research objectives and research questions, or if uncertain, proceed to reviewing the abstract/executive summary

Step 2: Abstract/executive summary screening

Included	<ul style="list-style-type: none"> Research using primary data and review of studies using primary data that include barriers to addressing losses and damages once an event has occurred; AND Include if abstract/executive summary addresses research objectives OR research questions
Excluded	<ul style="list-style-type: none"> Exclude if purely quantitative study (numerical, econometric studies, modelling, etc.) that does not include analysis of barriers to addressing losses and damages, AND/OR addresses research questions; OR Exclude if purely theoretical and conceptual research on climate losses and damages

Uncertain	<ul style="list-style-type: none"> • Include the paper for the following cases of uncertainty, provided that the other inclusion criteria are met: • When the abstract/executive summary does not include analysis of barriers, but it seems that the full text might; OR • If it is unclear whether the measures taken aim to reduce climate risks and adapt to climate impacts before an event has occurred, or they address losses and damages after an event has occurred <ul style="list-style-type: none"> ○ The measures also include ‘anticipatory action’ designed to reduce negative impacts, but implemented before or during an event. This is particularly relevant with slow-onset events (no need to wait until the end until losses and damages are addressed, but actions not aimed at longer-term adaptation or risk reduction).
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As part of the inclusion or exclusion screening of the search results, the research team eliminated first duplicate search results with the support of the reference software Zotero. After spending a day doing so, the team noticed an almost complete overlap between the search results produced by the academic aggregators Scopus and Web of Science (after spending one day merging search results to eliminate duplication), and therefore decided to proceed only with the screening of the academic literature identified through Scopus. This was done to manage time and resources for the REA and because Scopus indexes more journals than Web of Science and has a more refined search function to produce more relevant results.

The screening for the results from Google Scholar and manual search were carried out together by merging duplicates first, as both sources identified grey literature, which resulted in considerable duplication. The screening produced a total of 224 studies for inclusion for further coding and analysis (see Table 2).

Table 2 Included academic and grey literature

Source	Returned results (number of documents)	Included
Scopus (academic)	1,054	70
3ie	3	0
Google Scholar (grey)	600	154
Manual search (grey)	142	

A final screening step occurred during the full-text review and coding of these 224 studies (see below), generating the final number of 106 studies from the grey literature and 69 academic papers.

Coding of included studies

The research team prepared an initial coding schema for the in-text, line-by-line coding of documents, which was expanded iteratively as the evidence assessment proceeded. Besides bibliographic and other qualitative information about the

documents themselves, the coding schema included two key categories of codes to collect evidence on the barriers to address losses and damages, and pathways through which these barriers influence the addressing of losses and damages (see Table 3). Annex I reports the coding schema in full.

Table 3 Types of barriers to addressing losses and damages and influencing pathways

Types of barriers	Influencing pathways
Economic-financial	Inadequacy of financial resources
Technology	Suboptimal allocation of limited financial resources
Social	Unavailability of financial resources
Environmental	Limited access to available financial resources
Political	Timeliness of financial resources
Institutional (within individual organisations)	Nature of measures
Perceptions and narratives (e.g. perceived high costs of doing something vs. reality and cost of inaction)	Little consideration of gender and inclusion
Policy and regulation	Inadequate community action
	Issues challenging L&D displacement and resettlement
	Inadequacy of insurance
	Under-prioritisation of slow-onset events
	Pace and urgency of action
	Lack of national policies and governance
	Disagreement on definition of L&D
	Coordination
	(Others)

Two researchers from the team ran a test on the application of the coding schema by coding five documents independently and then comparing results. This improved alignment of interpretation between the two researchers, who continued with the coding of documents in the assessment.

Adjustment of included studies

Through the process of document coding, which involved a more in-depth review of the included studies, the research team further identified 48 studies from the grey literature and 9 academic papers that were not relevant for the purpose of this REA or did not provide evidence to answer the research questions. This resulted in a final number of 106 studies from the grey literature and 69 academic papers for coding. Qualitative coding was carried out in MAXQDA.

Analysis and appraisal of individual studies

To appraise the strength of the research evidence assessed, the team developed a simple framework that took into account the emerging nature of the evidence sought and acknowledged the largely subjective nature of assessing evidence quality (see Table 4). The appraisal framework has two components: one to assess the strength of the individual study, and another to be used during aggregation of evidence to generate generalisable findings, which assessed the quality of the synthesised findings.

Table 4 Quality of studies and findings

Quality of individual studies	
Strong	<ul style="list-style-type: none"> Barriers or claims are supported by research evidence analysing primary data, practitioner experience/data (where the relationship between the claim and the practitioner experience is clear and apparent), case studies. Review studies must contain studies based on research evidence that analyse primary data, practitioner experience/data, case studies.
Limited	<ul style="list-style-type: none"> Barriers or claims are not based on research evidence or practice evidence, or where the evidence underpinning claims is not made clear/explicit in the study
Quality of synthesised findings	
Strong	<ul style="list-style-type: none"> If studies underpinning claim are five or more, of which at least three must be a high-quality individual study
Moderate	<ul style="list-style-type: none"> If studies underpinning claim are two to four, of which at least one high-quality individual study
Limited	<ul style="list-style-type: none"> If there is only one high-quality study underpinning the claim; OR There are several low-quality individual studies and no high-quality individual study underpinning the claim

2.2 Synthesis of evidence

The research team used thematic synthesis to systematically identify patterns in the data to explain and answer the assessment's first and third research questions (*What barriers constrain efforts to address climate change-related losses and damages during and once they have occurred in low- and middle-income countries?* and *To what extent, and how, do the barriers identified affect efforts to address climate change-related losses and damages?*). This analysis involved three steps: in-text, line-by-line coding of the evidence; development of 'descriptive themes' (which remained 'close' to the analysed studies); and the generation of 'analytical themes' to explain how barriers are affecting efforts to address climate-related losses and damages. The last step involved going beyond the descriptive themes to rely on the research team's own interpretation of the information and the generation of interpretive constructs and explanations.

We also used content analysis to identify recurring empirical themes, which we linked and grouped into categories to structure the findings and answer the second

and fourth research questions (*What is the prevalence of the various barriers identified?* and *To what extent do 'barriers' to addressing climate-related losses and damages vary with contextual factors, such as geography, country income status, organising scale (international, regional, local), type of climate-related event (fast- vs. slow-onset), and other contextual factors?*). For each finding, we explain the strength of the evidence supporting it based on the rubric developed to assess the quality of individual studies and synthesised findings. The synthesis of evidence was largely qualitative and narrative in nature given the nature of the underlying literature.

2.3 Limitations of the REA

There are several limitations to this REA. As mentioned, a key limitation has been the short time frame in which to carry out the whole project. Given the novelty of the research questions, the research team had to bound the scope of the review during the search phase, to include the existing climate literature on climate losses and damages and evidence from the disaster risk management and disaster risk reduction fields. Yet the literature on climate-related losses and damages is skewed towards representing the experiences of those in high-income countries, due to a higher number of research institutions and more funding located in these countries, and to some extent on low-income economies; there is a dearth of research focusing on or from middle-income countries (Tschakert et al., 2019). Nevertheless, there is a much wider environmental change literature within the social sciences that has evidence on these barriers but is not framed using a climate lens. Looking at this literature would have been beyond what was feasible for this REA. Finally, the literature search was carried out for sources in English language. This was partially mitigated by the research team reaching out to specialists in the Loss and Damage Collaboration (which is a network of climate policy practitioners, researchers, activists, lawyers, advocates and decision-makers from both the Global North and the Global South) to seek suggestions for relevant literature.

3 Findings

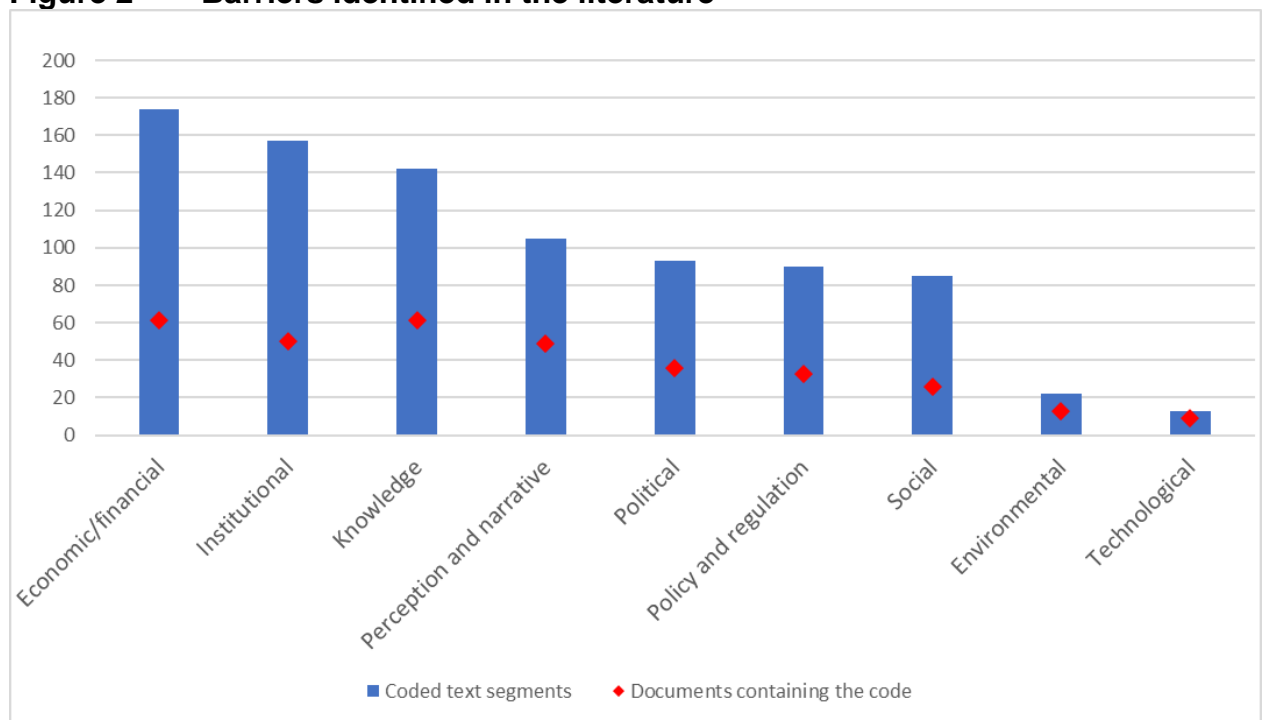
3.1 Analysis of the body of literature

A total of 89 studies were coded, including peer-reviewed academic journal articles, books or book chapters, technical reports, working papers, policy briefs, discussion notes, blogs and opinion pieces (see Annex 2 for a full list of these documents). Altogether, 1,462 segments of text were coded across the 89 documents.

This section presents an analysis of the evidence in relation to nine categories or types of ‘barriers to addressing losses and damages’:

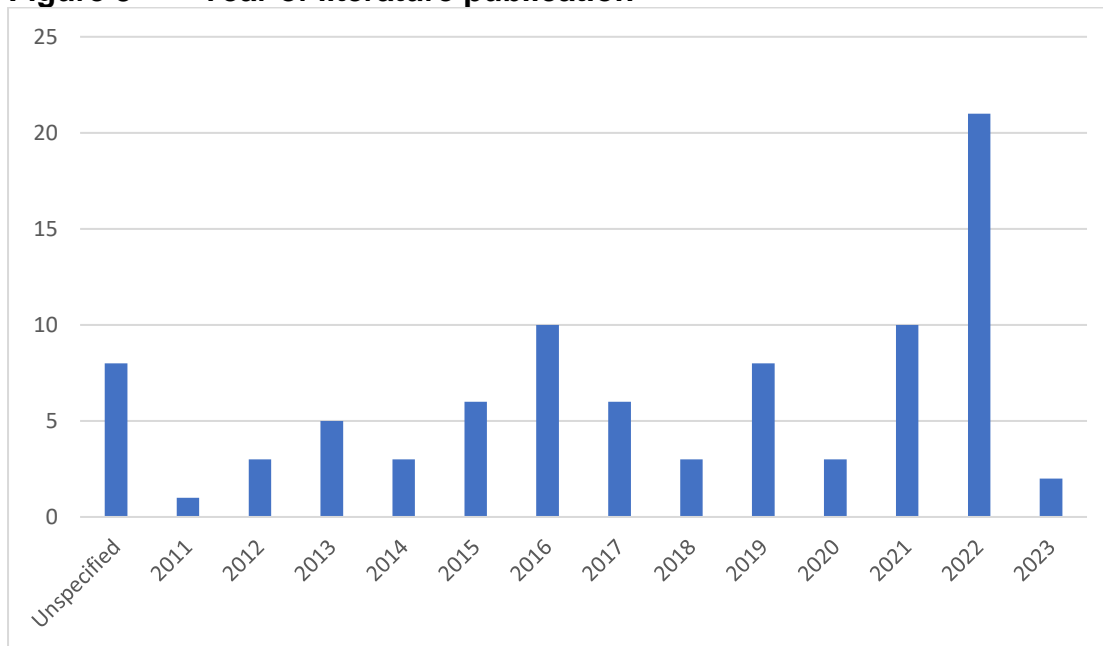
- knowledge barriers
- economic and financial barriers
- environmental barriers
- institutional/organisational barriers
- perceptions and narrative barriers
- policy and regulatory barriers
- political barriers
- social barriers
- technological barriers.

Figure 2 Barriers identified in the literature

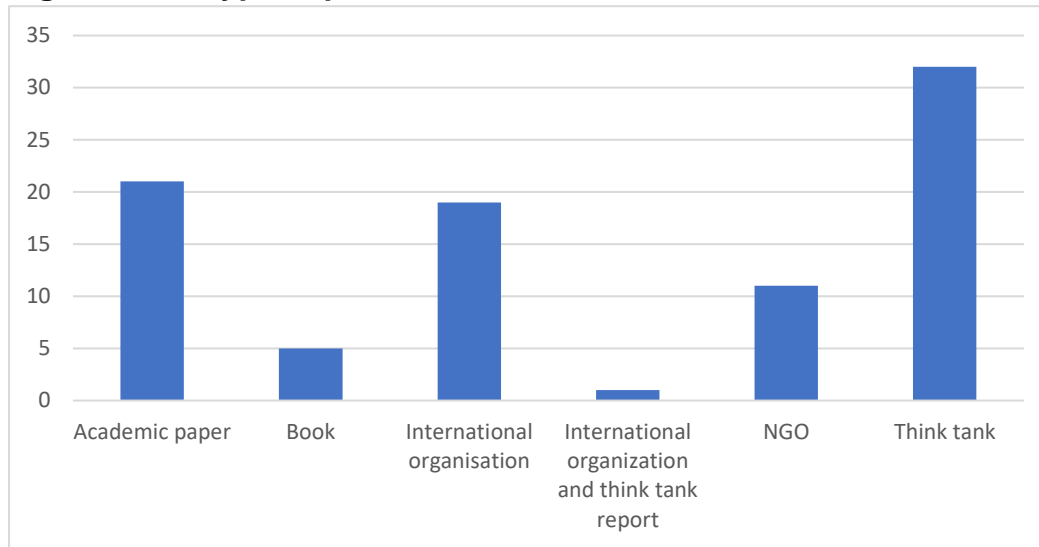


The most frequently mentioned barriers in the reviewed body of literature were economic/financial barriers, with 174 coded text segments in 61 documents. Institutional barriers were also prominently discussed, with 157 segments in 50 documents, followed by knowledge barriers with 142 segments in 61 documents. On the other hand, environmental barriers were less frequently addressed, with only 22 segments in 13 documents, and technological barriers received the least attention, with 13 segments in 9 documents. This highlights the predominant focus of academic and policy discussions on losses and damages on economic/financial and institutional challenges.

Figure 3 Year of literature publication



Although this REA aimed to cover literature spanning from the beginning of the L&D debate in 1991, most of the relevant identified evidence was published after 2011, with a notable concentration in 2016 and 2022. This is in line with other review studies looking at the climate L&D literature (McNamara and Jackson, 2019). This temporal pattern can be attributed to the international policy developments surrounding L&D, particularly the negotiations leading up to COP27 in 2022, which prompted a surge in research to support the establishment of the new Loss and Damage Fund. Similarly, 2016 was one year after the creation of the Paris Agreement, which also spurred research and publication on this topic.

Figure 4 Type of publication

The evidence in the analysed literature predominantly comes from think tanks, international organisations and NGOs. This is indicative of the novelty of the research questions in this REA, and practitioners have played a significant role in generating relevant evidence. The academic literature, on the other hand, has focused on conceptual debates, such as discussing the guiding principles for insurance schemes and the balance between compensatory and distributive approaches within L&D mechanisms.

The body of research is currently focused at the global level, whereas less evidence is available at the national and regional levels. This reflects in part the dominance of the L&D agenda at the multilateral level, as well as the fact that a lack of an agreed scope of L&D at the international level has made it more difficult for national efforts to focus on addressing losses and damages (see also Calliari and Vanhala, 2022; Vanhala, Robertson and Calliari, 2021). The literature contains few case studies examining losses and damages specifically at the national and local levels.

While there is a lack of national and local case studies, those available have tended to focus on a few countries or groups of countries. These include Bangladesh and the SIDS as a general group of countries vulnerable to climate-induced losses and damages. This focus can be explained by the existential climate risks these countries or country groups are facing, which in turn explains the greater roles they have played in the international debates on L&D.

Figure 5 Scale of research

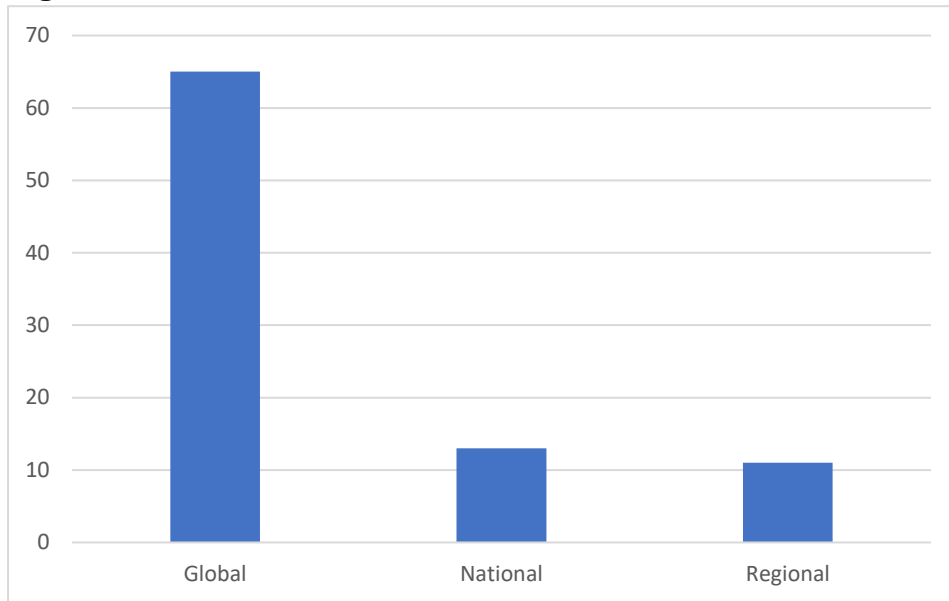
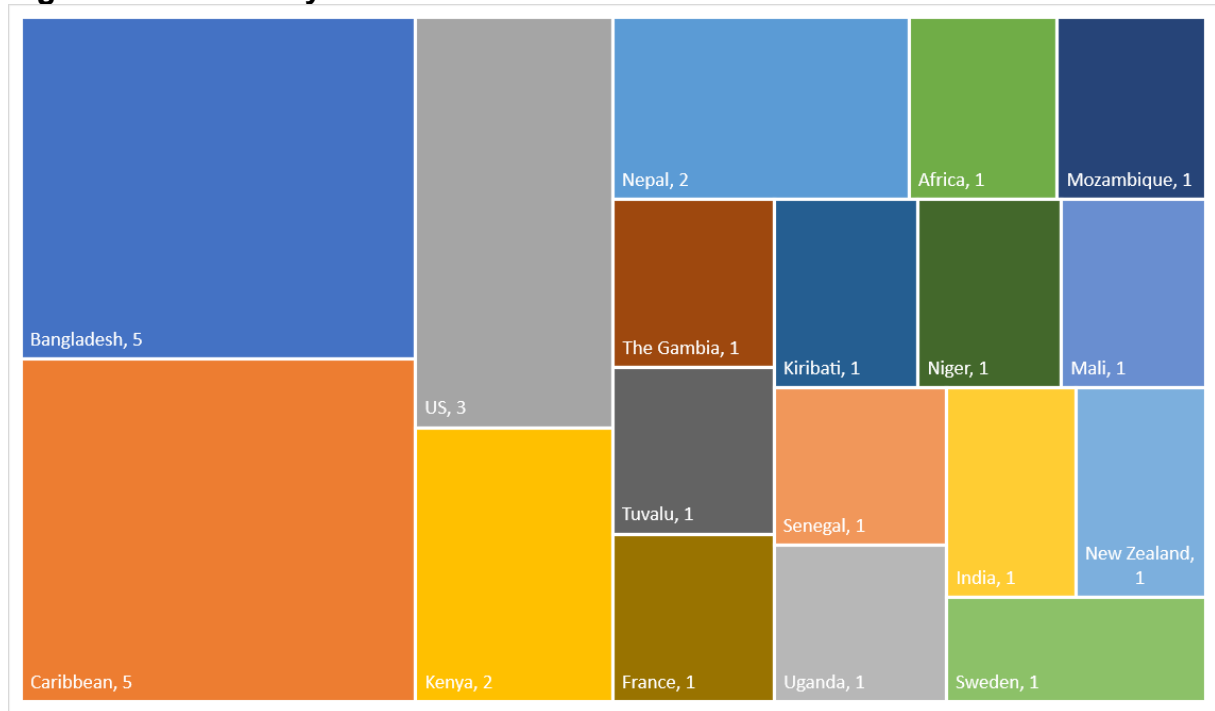


Figure 6 Country focus



3.2 Barriers in the literature

This section examines in depth each of the nine types of barriers to addressing losses and damages found in the literature. It reports the frequency of each category and the extent to which, and how, different barriers affect efforts to address losses and damages as and when they occur. For each type of barrier the authors assess the strength of evidence underpinning findings.

These barriers have had three major effects on the quantity, quality and pace of efforts to address climate-related losses and damages:

- 1 Barriers have prevented sufficient, predictable, timely and accessible funding for countries, communities and subnational institutions to address climate-related losses and damages that are already occurring, let alone those that may occur due to the warming already 'baked in' the climate system and its associated impacts.
- 2 Existing financial, policy and delivery mechanisms at international and national levels have not addressed losses and damages effectively or equitably. This has come at the expense of those most vulnerable to the impacts of climate change, including in LDCs and SIDS, and among vulnerable and marginalised groups, including women, children, ethnic minorities, people with disabilities, elderly people and poor people.
- 3 Barriers have slowed down collective, national and community action to address losses and damages, failing to heed the urgency caused by the climate crisis and the losses and damages already occurring.

The nine types of barriers are presented below in order of frequency. While the categories of barriers are helpful to disaggregate issues for analytical purposes, they do overlap and are interconnected with each other. We have highlighted these connections where relevant.

3.2.1 Economic and financial barriers

Frequency and types of economic and financial barriers found in the literature

The literature emphasises the lack of climate finance for L&D within and outside UNFCCC processes, at both international and domestic levels. Current instruments and mechanisms to tackle losses and damages are insufficient, and they often fail to align their objectives and mandates with the timely provision of resources needed at national and local levels. An example highlighted in the literature is insurance, which frequently offers inadequate coverage and is becoming progressively unfeasible as assets and hazards become increasingly uninsurable as climate risks escalate.

Economic and financial barriers were the ones reported the most in the coded literature. There are a total of 174 segments on economic and financial barriers across all the documents reviewed, out of a total of 1,462 coded segments.

At the most fundamental level, insufficiency of climate finance for L&D is seen as a major issue across the policy and grey literature. Specifically, the literature points to the insufficiency of funds at the international level due to the lack of an L&D finance facility at the UNFCCC, the complex, laborious, cumbersome and time-consuming application processes to secure available financing, and even unfair and inefficient allocation of bilateral and donor funding. Particular mention is made of SIDS, many of which are middle-income countries and are increasingly being locked out of concessional finance and Official Development Assistance.

The literature finds economic and financial barriers also at the national level, in LDCs and SIDS in particular, which lack liquidity and savings, and are unable to make investments to adapt to slow-onset climate events in particular, due to competing, more immediate demands such as economic growth and employment.

At the household level, economic and financial barriers present themselves where households are unable to afford insurance or build adequate savings to recover from increasingly recurrent disasters and losses and damages to assets and livelihoods, pushing them into poverty spirals.

The literature mentions insurance as an inadequate measure to cover the costs of climate-related disasters at the national level. A lack of enabling environments to further expand insurance coverage is often the cause, making the instrument ineffective at the household and business sector level. This is compounded in some contexts by a lack of developed financial services systems, which leave poorer sections of the population without access to banking services and even limit the ability to access loans to rebuild after disasters.

How economic and financial barriers are affecting efforts to address losses and damages

The literature concurs that current levels of financing are inadequate in relation to the scale of losses and damages experienced by vulnerable populations, and that this is limiting responses when impacts occur (*strong evidence*). This relates to both sudden- and slow-onset climate events. No specified percentage of international climate finance is assigned to averting, minimising or addressing L&D, and most dedicated finance for L&D under the UNFCCC is restricted to insurance instruments (Carty and Walsh, 2022). A recent study estimates that global climate action financing averaged \$632 billion annually in 2019–2020, with 90.3% allocated to mitigation and 7.2% to adaptation. Of the remaining 2.4% covering activities in both domains, some has likely addressed losses and damages, though no precise estimation is available (Bhandari, Warszawski and Thangata, 2022). While COP27 saw a handful of countries making pledges of millions of US dollars for L&D finance, the needs will likely be in the billions to trillions (Hayes and Smith, 2022).

Finance for non-economic losses and damages (such as loss of culture) is likely to be extremely low, and in some cases non-existent (Niyitegeka and Mukayiranga, 2023; Schäfer et al., 2021; Bakhtaoui and Shawoo, 2022). A lack of economic and financial resources to address losses and damages is also evident at the household, community and national levels.

Sources of finance outside the UNFCCC for addressing losses and damages come mainly from humanitarian and development aid and domestic budgets, but these are inadequate compared to needs (*strong evidence*). A recent study shows that humanitarian funding appeals related to extreme weather events have increased eightfold compared to 20 years ago, but almost half of these appeals were not met in the past five years, resulting in a shortfall of up to \$3 billion (Oxfam in Anticipation Hub, 2022). **Humanitarian funding alone is also considered unsuitable to address L&D (*moderate evidence*).** It is delivered in a reactive manner through a fragmented, complex, discretionary, project-based and unpredictable system. Funding is driven by specific events and relies on charity rather than stable and long-term funding, predicated on principles of climate justice

which underpin the UNFCCC system (Carty and Walsh, 2022). The literature also points out that international post-disaster assistance covers only a fraction of total costs associated with losses and damages, is targeted at emergency assistance to save lives and is often late or non-existent in providing funding for reconstruction activities (Carty and Walsh, 2022; OECD, 2021; Bakhtaoui and Shawoo, 2022). National governments and households end up absorbing most of the costs. To cope, households engage in erosive strategies such as selling assets or removing children from school (see Kunreuther and Lyster, 2016; Carty and Walsh, 2022).

Domestic finance to address losses and damages may also be limited by destructive cycles of debt and disasters, especially in vulnerable countries with limited resilience and high exposure to hazards, such as middle-income SIDS (*moderate evidence*). Following a disaster, the combination of increased spending needs and reduced revenues from economic slowdowns strains fiscal sustainability, making sovereign debt financing for rehabilitation and reconstruction costlier. It weakens countries' ability to repay debt in the long term (OECD, 2021). The use of concessional finance, with even below-market-level interest rates, can overburden vulnerable countries with debt (Buhr et al., 2020). When losses and damages are experienced, low-income countries are faced with small and exhausted tax bases, depleted reserves and declining credit ratings, making external borrowing difficult (MCII, 2013; OECD, 2021). Disaster risk reduction measures are often not implemented, as they compete with other, more immediate domestic priorities (Stephanie et al., 2016), leaving many countries, but particularly SIDS and LDCs, with significant liquidity constraints.

A recent study shows that due to higher climate risks, interest rates paid by vulnerable governments within the V20 (a group of countries highly vulnerable to climate change) are higher than they would otherwise be. This has resulted in more than \$40 billion in additional interest payments on external sovereign debt for the V20. This estimate is projected to be between \$146 billion and \$168 billion by 2030 (Buhr et al., 2020).

The challenges of accessing financial resources to address losses and damages in SIDS are captured more than for other vulnerable country groups (*moderate evidence*). This could be explained either by SIDS actually facing greater access barriers than other countries, or by their prominence on this issue in international forums. SIDS face particular problems accessing dedicated climate funds and other sources of finance due to the high level of fragmentation in development and climate finance (*moderate evidence*) (Addison et al., 2022; OECD and World Bank, 2016; Gallagher and Addison, 2022). More SIDS are likely to lose access to concessional finance as they move to high-income status and graduate from the Development Assistance Committee's list of countries eligible for Official Development Assistance, and overall concessional finance has been shrinking in aggregate terms for SIDS. SIDS have also less access to market-based resources due to a lack of clear revenue streams to underpin the business case (*limited evidence from one study*) (OECD and World Bank, 2016).

In general, funding for losses and damages caused by slow-onset events and smaller, more recurrent disasters, as well as more predictable long-term finance for reconstruction and rebuilding, is markedly lacking (*moderate evidence*). In 2016, the Forum of the Standing Committee on Finance recognised a

lack of financial instruments to address slow-onset events, noting that existing approaches, including insurance, were more suited to extreme weather and rapid-onset events (Bakhtaoui and Shawoo, 2022). Furthermore, with the exception of parametric insurance, **existing financial mechanisms do not provide timely resources to address losses and damages after they have occurred (*strong evidence*)** (Kunreuther and Lyster, 2016; Carty and Walsh, 2022; Lindegaard, White and Shawoo, 2022; MCII, 2013; Richards and Schalatek, 2018). As mentioned earlier, international aid operates on a project basis, and its availability can be unpredictable (Addison et al., 2022; OECD and World Bank, 2016). Domestic funding sources such as budget reallocation, domestic and external borrowing, and tax increases also involve significant time delays, and countries may not have enough fiscal space to use these instruments (Kunreuther and Lyster, 2016; Buhr et al., 2018; Schäfer et al., 2021).

Insurance

Disaster insurance outcomes consistently reveal inadequate coverage for policyholders (*strong evidence*). Recent studies have highlighted that entire sections of the population within poorer countries – typically the most vulnerable – are locked out of insurance (see, for example, Mayer, 2014; and Prabhakar et al., 2016). Examples from Pakistan (Practical Action, n.d.), China (Practical Action, n.d.), Thailand (Kunreuther and Lyster, 2016), the US (Kunreuther and Lyster, 2016), Malawi (Carty and Walsh, 2022), Dominica (Richards and Schalatek, 2018) and Barbados (Schäfer and Künzel, 2019) all show the very small percentage of losses covered by insurance. Richards and Schalatek (2018: 6) conclude that ‘even a doubling or tripling of insurance coverage for poor countries would have only scratched the surface of the losses and damages associated with the major climate events analysed’. In each case, most support came from public finance sources, both domestic and international public finance (not insurance). Future support for low- and middle-income countries will still rely heavily on international public finance to subsidise insurance premium payments (Richards and Schalatek, 2018).

The problem of inadequate insurance coverage is particularly evident in parametric insurance schemes, where there is a high risk of basis risks.⁴ The issue of defining risks precisely will be further complicated by climate change, as extreme events are expected to increase in frequency, and risks become more unpredictable due to multiple cascading factors and are harder to anticipate. **As climate risks increase, assets that were previously insured are becoming uninsurable (*strong evidence*)** (Hirsch et al., 2015; Schäfer and Künzel, 2019; Thomas et al., n.d.). Relative scientific certainty around some processes, such as sea-level rise, will make them uninsurable (Hirsch et al., 2015; Carty and Walsh, 2022). The insurability of events will also depend on the capacity of the industry to model new and growing climate risks (Schäfer and Künzel, 2019).

Other barriers to using insurance mechanisms to address losses and damages include high insurance premiums, and the complex models used behind parametric insurance schemes making it difficult to challenge decisions of non-payment. This is seen in the case of Malawi, where the Africa RiskView model used by the African Risk Capacity (ARC) inaccurately estimated the duration of the maize growing

⁴ This occurs when the insured risk does not accurately match the actual damages or when different risks are insured.

period, and there was no timely payout despite the crop failing.⁵ The underlying issue was that the ARC model was only accessible and comprehensible to the ARC technical experts, who erroneously assessed the maize growing period, but not to the beneficiaries of the insurance scheme, who are more familiar with crop growing seasons (Richards and Schalatek, 2018). **There are many limitations for the use of insurance or other risk transfer instruments in low- and middle-income countries, including high transaction costs (*moderate evidence*)** (MCII, 2013), **lack of regulatory and policy frameworks (*moderate evidence*)** (Practical Action, 2021; Prabhakar et al., 2015; MCII, 2013), **lack of data of disaster risks (*moderate evidence*)** (Osuteye, Johnson and Brown, 2016; MCII, 2013; Practical Action, 2021), **and low familiarity with insurance as a concept (*limited evidence from one study*)**. In Bangladesh, for example, financial illiteracy and a lack of affordability contribute to the low uptake of insurance – only 0.16% of the Bangladeshi population are covered by non-life insurance (McQuistan, Mechler and Jacobson, 2022). Similarly, insurance schemes to address losses and damages exist only at limited scale in Nepal (Practical Action, 2021).

A survey of small businesses in Kenya and Ghana revealed that 39% of businesses surveyed were not insured because they could not afford insurance but also due to a lack of knowledge on how insurance works. Some businesses viewed disasters and their consequences as ‘Acts of God’ that therefore cannot – or should not – be prevented (Red Cross Red Crescent Climate Centre, n.d.).⁶

3.2.2 Knowledge barriers

Frequency and types of knowledge barriers found in the literature

The literature highlights a lack of information or a lack of understanding of information needed to take decisions to address losses and damages. This includes a limited understanding of the specific needs of vulnerable groups, such as women, children, ethnic minorities, people with disabilities, and the economically disadvantaged. This translates to post-disaster assessments frequently overlooking these vulnerable groups. There is also a lack of technical expertise and resources to assess non-economic losses and damages, which contributes to insufficient attention paid to them and their disproportionate impacts on vulnerable groups.

Knowledge barriers were the second most commonly coded barrier in the analysed literature, with 142 segments identified in 61 documents, out of 1,462 total segments identified.

Knowledge barriers refer to the lack of information, or lack of understanding of information, needed to take decisions on addressing losses and damages. This was identified for all stakeholders, including national governments, communities, funding

⁵ While farmers cultivated maize with a 90-day growing period, the model erroneously assumed a longer period of 120–140 days.

⁶ This cultural/social barrier is not unique to businesses. Some households may not get insurance due to their expectation that governments provide assistance after a disaster (OECD, 2021).

agencies and practitioners. The lack of information on non-economic losses and damages, as well as on differential impacts of climate events on vulnerable groups such as women, children, elderly people and individuals with disabilities, was noted in the literature, as was limited information on the full extent of damage caused by disasters.

The literature also noted uncertainty regarding the attribution of destructive weather patterns to anthropogenic greenhouse gas emissions or natural climate variability, and insufficient understanding of what contributes to vulnerabilities, such as improper building codes.

Knowledge can also be lost as a result of climate change. Werkheiser (2017) posits that climate change challenges communities' ability to maintain their own ways of knowing (i.e. methods of knowing and maintaining knowledge), in addition to their bodies of knowledge. This can endanger communities' 'epistemic self-determination', which is a social value that is not captured by individualistic approaches or international political approaches to L&D.

Knowledge barriers intersect with economic and financial barriers outlined in section 3.2.1, in that all decision-makers (including insurers, regulators, and individuals at risk) have limited experience of providing protection for, or coping with, low-probability, high-consequence events.

Knowledge barriers are also linked to social barriers (see section 3.2.7): where gender assessments and analysis have not been conducted in climate policies, and there is a lack of involvement of women in policy-making generally, then understanding of gender issues in addressing losses and damages is found to be limited.

Other barriers relate to the complex terminology used in reports and analysis produced about losses and damages. Farmers, for example, struggle to transfer meteorological language into practical action (UNDRR, 2022).

How knowledge barriers are affecting efforts to address losses and damages
Limited understanding of, funding for and technical know-how to assess non-economic losses and damages have contributed to the lack of urgency in addressing these issues (*strong evidence*). A lack of understanding of non-economic losses and damages related to 'social resilience, livelihoods, food security, loss of cultural identity, loss of territory, and human mobility (migration, displacement, and planned relocation)' was observed by Roberts et al. (2013), and more recent literature suggests that these barriers remain, as well as losses and damages pathways from psychological effects through to educational attainment. Data on non-economic losses and damages is not typically collected or reported on after an event, and it is difficult to identify, measure and estimate, due to the complex pathways through which different types of non-economic losses and damages manifest (Chiba et al., 2019). The process is also very tedious (van der Geest and Warner, 2015a). In Nepal, it was found that 'authentic data is not available on the real impact of floods on the lives of children and their education...' (Practical Action, 2021: 17).

More generally, governments commonly underestimate the number of people affected by losses and damages after an event, and mis-categorise the types of

losses and damages suffered, resulting in the wrong type of support to households (van der Geest, 2018). Indeed:

there is currently a lack of empirical evidence of the circumstances under which households manage climate stressors, the resulting societal impacts, and the loss and damage that results from not being able to adjust sufficiently. Policymakers need better information, empirical data and analysis of both the challenges and potential solutions (Collins et al, 2014: 122).

The extent to which the most vulnerable are neglected often hinges on whether assessments focus on absolute or relative losses or damages. While relative assessments require more time and resources, they are more effective in identifying those who are in the greatest need of support (Sapkota, 2017). However, there is a deficiency in this regard.

At the community level, post-disaster assessments often overlook the specific needs of vulnerable groups such as women, children, ethnic minorities, people with disabilities, elderly people and poor people (*strong evidence*). These groups are more exposed and sensitive to disasters and climate change due to existing patterns of inequality and vulnerability within society, including inequalities in health, social protection, education, economic opportunities and decision-making capacities, making them systematically more vulnerable to the impacts of disasters and climate impacts (OECD, 2021; World Bank, 2021). These groups are marginalised from discussions about losses and damages and often excluded from financial considerations (Practical Action, 2021; OECD, 2021; Carty and Walsh, 2022; World Bank, 2021). This presents a significant barrier, as their concerns and needs are inadequately addressed in responses to climate change impacts (Carty and Walsh, 2022).

The failure to incorporate gender considerations in on-the-ground interventions to address losses and damages is due to the absence of gender mainstreaming in national disaster risk management and climate change policies and plans (*moderate evidence*). Several issues contribute to this. There is a notable absence of systematic and standardised collection of sex-disaggregated data and other important variables, along with a lack of gender considerations in vulnerability assessments, hazard analyses, risk assessments and sector-specific evaluations (Carty and Walsh, 2022; World Bank, 2021). Women remain inadequately represented in decision-making roles pertaining to disaster risk management and climate change, and they are excluded from decision-making at the political level, including in disaster response (World Bank, 2021; Practical Action, n.d.). There are also disparities in knowledge, attitudes, and behaviours related to climate change, as well as limited gender-responsive public information and education campaigns for disaster preparedness and recovery (Practical Action, n.d.). Furthermore, NGOs and civil society organisations working on issues relevant to women and marginalised groups receive insufficient support. **The absence of gender and inclusion considerations in policies and plans appears to be pronounced in Caribbean countries (*limited evidence from one study*)** (World Bank, 2021) **and African countries (*limited evidence from one study*)** (Chakma, Rigg and Ramsay, 2022).

Post-disaster assessments fail to consider women's particular needs, including those related to menstrual health, gender-based violence, asset

sales, unpaid care and domestic work, which tend to increase after a disaster (*limited evidence from one study*). During disasters and immediately after, women can be disadvantaged. According to Islam et al. (2022: 225), women in Bangladesh suffer from a lack of privacy and security in cyclone shelters. There are usually no separate toilets for women. Carty and Walsh (2022) highlighted similar situations in Timor-Leste, where shelters did not cater to women who were menstruating or had other gender-specific concerns.

Impact assessments do not adequately address the specific needs of children (*limited evidence*). Loss and damage assessments focus mainly on short-term impacts and miss the long-term impacts on children's education, as well as children being forced into labour and even early marriage, denying them their childhood and their right to education, and ignoring the mental, physical and social effects (Practical Action, 2021). There is no tool or practice of collecting data on these long-term and indirect impacts (Practical Action, 2021: 16). A gap in assessment of long-term impacts is also due to the usually limited available time frame to collect data (Thomas, Menke and Serdeczny, 2018b).

Assessments also neglect those living in poverty and working in the informal sector, as their economic losses may appear low, but their overall well-being is significantly affected (*moderate evidence*). Exclusion of vulnerable groups can be attributed to various factors, including narrow definitions of 'victims' (Sapkota, 2017), lack of consultation with affected households (Practical Action, 2021), inadequate support for women-led committees (Carty and Walsh, 2022), and corruption or bureaucratic inefficiencies (Practical Action, 2021), among others. The literature points out that losses and damages incurred by the most marginalised groups often go undocumented and undervalued. In both cases, this prevents sufficient and timely support after an event (King-Okumu, 2021).

Better understanding of soft adaptation limits could spur action where these are already being breached (*strong evidence*) (Mechler et al., 2019; Warner, van der Geest and Kreft, 2013; Warner et al., 2012). The limits to adaptation represent a stage at which an actor's objectives or system requirements cannot be adequately protected from unacceptable risks through adaptive measures. These limits have been categorised as either 'hard limits', where no adaptive actions can effectively mitigate intolerable risks, or 'soft limits', where potential options exist for reducing intolerable risks through adaptive action, but these are currently inaccessible (technologically or financially) (IPCC, 2022). Soft limits are strongly shaped by social processes, and early evidence shows they are already being breached in many geographies, including Vanuatu, Marshall Islands, Bangladesh, Nepal, India, Peru, the Sahel, East Africa and the Arctic (Mechler et al., 2019). A recent large-scale evidence synthesis on the limits to adaptation shows that out of 1,239 academic papers, only 1% provided detailed information about the socioeconomic and environmental thresholds that may lead to breaching soft (and hard) limits (Thomas et al., 2021). Improved understanding around the dynamics of breaching soft limits would spur more timely action.

3.2.3 Institutional barriers

Frequency and types of institutional barriers found in the literature

The complex access and due diligence requirements of funding organisations, as well as limited capacities of national institutions to navigate these requirements, pose important barriers to accessing financial resources and coordinating actions to address losses and damages.

Institutional barriers were the third most commonly identified barrier, with 157 segments identified in 50 studies, out of a total of 1,453 coded segments.

Institutional barriers relate to the mandates and procedures of regional and international funding agencies that prohibit or limit countries from accessing (climate) finance to address losses and damages after they occur, as well as the fragmentation of funding mechanisms at the international level. This is highlighted as a major institutional barrier in the literature, and one that is not necessarily overcome even with the use of intermediaries (such as international or regional accredited entities).

The lack of institutional capacity in developing country governments to tap into these and other resources, including from the private sector, is also noted in the literature, and results in inadequate government responses when losses and damages occur. This is partly due to the fragmented institutional landscape in countries, with gaps and overlaps in responsibilities for addressing losses and damages.

Weak institutional capacity at the local level, including technology and human resource limitations in the public sector, are other important obstacles.

How institutional barriers are affecting efforts to address losses and damages
Existing financial mechanisms to address losses and damages present access barriers to vulnerable countries with limited capacity to navigate such barriers, including the UNFCCC multilateral climate funds (*strong evidence*) and insurance (*strong evidence*). Climate funds generally have complex and different accreditation and project proposal requirements that pose significant challenges for vulnerable low-income countries, particularly SIDS, with small, overly stretched public services. Several papers point out that vulnerable countries face ‘an intricate web of eligibilities’ and complex processes and procedures when trying to access funding (OECD and World Bank, 2016; Bakhtaoui and Shawoo, 2022; OECD, 2021; World Bank, 2017). Coupled with limited administrative/human and technical capacities, this represents a serious barrier.

Not all multilateral climate funds have a mandate to address losses and damages. The Green Climate Fund (GCF) does, but only 16% of its funded projects include L&D-related terminology in their main activities (27 out of 165 projects) (Kempa et al., 2021). There are also arguments that these funds are not appropriate for covering all losses and damages – particularly for addressing impacts of extreme weather events – as it takes an average of 5.5 years for an LDC that is not yet accredited to access GCF funding (Djabare et al., 2021: 8).

Countries can use multinational development banks as intermediaries to access funding, but researchers point out that ‘intermediation also reduces resources available for implementation (due to implementation fees) and can limit the ability of national institutions to have a greater say over the allocation of funding’ (OECD and World Bank, 2016: 55). Indeed, ‘climate finance is often associated with conditionalities and not distributed and utilised according to the needs of recipients’ (Bakhtaoui and Shawoo, 2022: 5). Furthermore, ‘intermediation can increase fragmentation and the administrative and monitoring burdens on SIDS’, particularly when different intermediary agencies are operating simultaneously in the same country (OECD and World Bank, 2016).

Existing financial mechanisms may fail to consider the unique needs of the most vulnerable (*strong evidence*). The UNFCCC has a mandate to provide preferential support to vulnerable countries, but there is no clear approach to determine which countries are the most vulnerable.⁷ The lack of guidance avoids the political-ethical dilemma of ranking the vulnerability of countries, but this contributes to ineffective action to address losses and damages. This is a major issue that the design of the new Loss and Damage Fund is contending with.

The literature highlights inequalities in the allocation of resilience financing across and within countries, including after disasters. It also points to inefficiencies in allocation. Multinational development banks tend to spread small amounts of funding across numerous SIDS (OECD and World Bank, 2016), while bilateral donors place significant funding in one or two SIDS, at the exclusion of others. One project in Cabo Verde accounted for almost 50% (\$158 million) of Japan’s resilience funding for SIDS between 2011 and 2014. The remaining \$166 million was distributed among 30 other SIDS, with 17 of them receiving less than \$800,000 each, representing less than 1% of Japan’s climate and disaster resilience financing for SIDS (OECD and World Bank, 2016).

There are also institutional barriers at the domestic level. **Local and community action to address losses and damages are often ineffective because of inadequate delivery mechanisms (*strong evidence*)** (Bharadwaj and Shakya, 2021; Islam et al., 2022; Warner, van der Geest and Kreft, 2013; UNEP, 2014; Practical Action, 2021; Addison et al., 2022). Often only a small share of the money channelled through international NGOs reaches the grassroots level (*limited evidence from one study*) (Bharadwaj and Shakya, 2021). Local governments do not have sufficient resources and feel disempowered to drive local responses (*limited evidence from one study*) (Vivanco et al., 2020). Social protection systems are affected by problems such as failure to reach the most vulnerable, problems of benefit leakage, inadequate support provision, lack of responsiveness to shocks, and lack of transparency in distributing social benefits (*strong evidence*) (Islam, 2022; Warner et al., 2013; Roberts et al., 2014; Warner et al., 2012). In some cases, corrupt practices disempower vulnerable households. According to Practical Action (2021: 9), relief is not always distributed evenly after disasters in Bangladesh, as ‘personal and political interests play a role in determining which households are

⁷ The UNFCCC and the Paris Agreement do include certain country groups, such as the SIDS, the LDCs and African States (in the Green Climate Fund), but there are also other groups that have formed, such as the Climate Vulnerable Forum and the V20, seeking prioritisation for financial support.

selected'. Households may also lack awareness of the existence of social protection mechanisms that could provide them with support after a disaster.

Capacity constraints in national and local administrations to collect, understand and assess data, as well as to coordinate actions, have contributed to delays in addressing losses and damages (*strong evidence*). At the national level, many SIDS have small administrations, with the primary responsibilities for climate and disaster risk management straddling different ministries and departments (Practical Action, 2021; UNDRR, 2022). This creates challenges for adopting coordinated and effective approaches to deal with climate change impacts. Case study work in Nepal shows that government departments have assigned roles and responsibilities that often overlap with each other, and none has a clear mandate for addressing losses and damages (Practical Action, 2021). There is also limited capacity in overly stretched public services to understand, internalise, assess, keep records on and enforce measures to address losses and damages (Practical Action, 2021). This is found in SIDS as well as LDCs in Africa: the primary responsibilities for climate and disaster risk management straddle different ministries and departments (OECD and World Bank, 2016). All countries lack institutional mechanisms for recognising and addressing non-economic losses and damages and slow-onset processes (Lindegard, White and Shawoo, 2022).

Only losses from larger climate-related events are recorded by the major disaster databases, ignoring the importance of smaller and more frequent events such as localised flooding (Osuteye et al., 2017). Local entities, such as aid agencies, hospitals, fire stations and news media outlets, may have this information, but it is fragmented and not aggregated into national databases for policy-making purposes (Osuteye et al., 2017). Calliari and Vanhala (2022: 185) emphasise that:

L&D governance has focused almost exclusively on the international climate regime. We have a much less well-developed understanding of how countries are grappling with L&D policy-making because the national scale of analysis has been largely overlooked.

There is also a difference in climate change monitoring between developed and developing countries, particularly as it relates to slow-onset processes. Many developing countries have not had their climate risks assessed to the same extent as developed countries, due to the lack of data (GIZ and Climate Analytics, 2021). Furthermore, capacity constraints, particularly in SIDS, mean that there is no active, ongoing monitoring of slow-onset events such as sea-level rise (Thomas, 2017).

3.2.4 Policy and regulatory barriers

Frequency of policy and regulations as barriers found in the literature

Policy and regulatory barriers have an effect similar to institutional barriers, in that they produce incentives and actions that fail to target the needs of the most vulnerable. However, they differ from institutional deficiencies because these barriers are created intentionally through policy decisions that are made – or deliberately not made. These barriers include the absence of dedicated L&D policies and plans, but also inadequate consideration of climate-related losses and

damages and how to address them in broader disaster risk management instruments, and, in particular, the lack of policies to guide (cross-border) relocation and resettlement in response to climate-induced events.

Policy and regulation barriers were identified 90 times, representing the fifth most commonly identified barrier in the literature.

These barriers refer to deficiencies in the policies of funding institutions and multilateral organisations – most notably when finance and support to address losses and damages do not adequately consider the needs of women, children, elderly people, those with disabilities, and other marginalised groups (Practical Action, 2021).

Other barriers relate to how donors classify countries eligible to receive Official Development Assistance, whereby some highly vulnerable countries have reached a threshold level of gross national income (GNI) per capita and are no longer able to access sufficient concessional finance to address losses and damages (OECD and World Bank, 2016; Bouhia and Wilkinson, 2021).

At national, regional and international levels, policy instruments developed for disaster risk management do not adequately consider actions needed to address climate-related losses and damages (see section 3.2.2).

Countries are lacking dedicated instruments and policies to guide (cross-border) resettlement in anticipation of slow-onset climate change impacts that are eroding land and livelihoods, and making certain places dangerous and/or uninhabitable (Thomas and Benjamin, 2019).

How policy and regulatory barriers are affecting efforts to address losses and damages

Most countries lack plans and policies to guide resettlement in response to climate-induced events, as well as explicit solutions to address non-economic losses resulting from resettlement or planned relocation (*moderate evidence*) (Thomas and Benjamin, 2019; Boston et al., 2021; Pill, 2020; Roberts, 2014). Kiribati has seemingly developed the most concrete international migration strategy to date, engaging in international negotiations to secure an international labour programme with countries in the region. The government is also investing heavily in education and English language skills to increase the chance of people from Kiribati to migrate with dignity, and it is seeking to purchase land abroad to resettle its citizens (McNamara et al., 2018).

Slow progress has also been caused by a lack of dedicated L&D policies and plans at the national and local level to address losses and damages despite climate and disaster risk reduction policies mentioning the issue (*limited evidence*). A recent study of how L&D is considered in Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs) shows that it is prioritised in only 14 out of 47 NDCs analysed, with 35 NDCs not mentioning L&D at all (Bharadwaj et al., 2022). According to Boston et al. (2021: 159):

the effective management of slow-onset impacts such as coastal erosion, desertification and sea level rise and their often-transformative impacts on

communities and countries has remained relatively unexplored in terms of policy...responses.

The authors also highlighted an unwritten policy within the donor community and humanitarian agencies to take a short-term view on climate adaptation, which does not serve affected countries with regard to the effects of slow-onset events.

Thomas and Benjamin (2019) observed that in the Bahamas, non-economic losses and damages and climate-induced displacement are left out of policies, plans and legislations. They outlined how the absence of dedicated policies resulted in ad hoc, inadequate and ill-informed support to affected populations after a disaster. This extends beyond this single country. They cited a study (Internal Displacement Monitoring Centre, 2018) showing that 'on a global scale, while over 140 countries and territories were affected by displacement in 2017, only 31 currently have dedicated policies or strategies focused on internal displacement' (Thomas and Benjamin, 2019: 9). Calliari and Vanhala (2022) observed that, similarly, in Pacific SIDS, there is an absence of specific policies or mechanisms to address losses and damages holistically.

3.2.5 Perceptions and narrative barriers

Frequency and types of perceptions and narrative barriers found in the literature

The literature points to a lack of a common definition and conceptualisation of L&D at international, national and local levels, which has hindered progress in addressing this issue. Challenges arise regarding what should be considered losses and damages, questions of liability, the attribution of climate-related hazards to anthropogenic emissions, and the perception and prioritisation of risks.

Barriers related to perceptions and narratives were coded 105 times in 49 documents.

The literature focuses mainly on the lack of definition and conceptualisation of L&D at multilateral (UNFCCC), country and local levels; as well as confusion over issues of liability and attribution; and different normative views of where authors feel attention *ought* to be paid – for example, to address different non-economic losses. There are significant differences in perceptions and narratives inside and outside the negotiations, and within policy and academic communities, on what L&D is and how it should be defined, interpreted and applied. In particular, disagreement over whether and how to attribute losses and damages to anthropogenic climate change has slowed progress on addressing losses and damages (Shawoo et al., 2021; Thomas et al., n.d.; Bakhtaoui and Shawoo, 2022; Mathew and Akter, 2017).

Perception barriers are often interlinked with economic (section 3.2.1) and knowledge (section 3.2.2) barriers. Narratives around finance and volumes of finance needed, which are rooted in a focus on quantification, for example, help explain why non-economic losses and damages are not seen as more urgent at

international and national levels. Similarly, slow-onset events are perceived to be less urgent than rapid-onset ones (Schäfer et al., 2021).

The literature also points to cultural factors that dictate ‘what risks are perceived and valued, what risks are prioritised for action, and how they are addressed (i.e. what approaches are included or excluded from consideration and implementation)’ (OECD, 2021: 207–208).

How perception and narrative barriers are affecting efforts to address losses and damages

The lack of international consensus on what L&D is affects views of how it can be tackled in practice at national and local levels (*strong evidence*). The literature points to a lack of common understanding of slow-onset processes, and a lack of clarity on how countries currently deal with these losses (Schäfer et al., 2021). The development of an effective funding mechanism may be hindered by differences in how Parties understand these phenomena and apply terminology (Roberts et al., 2017).

The concept of L&D is not defined within the UNFCCC, and there is no consensus around its scope, how dealing with it differs from climate adaptation and mitigation, or where synergies lie with humanitarian and disaster risk reduction action, and sources of funding. Earlier major disagreements in climate negotiations concerned the political framing of climate-related L&D (Vanhala and Hestbaek, 2016). In particular, the Global South held strong views that L&D had to include compensation, thus creating legal liability, for losses and damages created by those that contributed the most to anthropogenic climate change. This has been strongly opposed by ‘Annex II’ high-income countries, and the issue has been held in check since the Paris Agreement, with the decision text adopting the Paris Agreement (-/CP.21) stating that ‘Article 8 of the Agreement does not involve or provide a basis for any liability or compensation’ (UNFCCC, 2015: /CP.21:7 para. 52).

Different framings also affect the urgency with which efforts are thought to be needed, with many high-income countries preferring to link L&D to mitigation and adaptation approaches – so no need for dedicated efforts – or framing it as a problem to be tackled in the future (Boyd et al., 2017). This was supported by the scientific literature, which considered climate-related losses and damages a future threat. Indeed, in the IPCC’s *Fifth Assessment Report*, the word most often used in connection to L&D was ‘risk’ (a future potential threat) (van der Geest and Warner, 2015b). This is no longer the case, with both the scientific literature (the IPCC’s *Sixth Assessment Report*) and the outcomes of COP27 highlighting the urgency of L&D.

Consensus is also lacking at the domestic level. Vanhala, Robertson and Calliari (2021) found that in Antigua and Barbuda, policy-makers were stalled in advancing policy on L&D by a lack of shared heuristics on what L&D is and how to address it, and by the lack of relevant data as well as political tensions around its collection and disclosure.

L&D is still a relatively new field, and not fully understood as a policy arena (Lindegaard, White and Shawoo, 2022). This helps explain the absence of a shared understanding and consensus on definitions and practical implementation of L&D. Another issue is that silos exist within the research community:

while there is expertise available in national think tanks and local universities, there is limited collaboration and few efforts towards collective research. Loss and Damage research is primarily conducted by a handful of experts in the global South who largely operate in silos (Bharadwaj et al., 2023: 2).

Disagreements over the necessity to attribute losses and damages to anthropogenic climate change before taking action have been used to slow progress in international negotiations (*moderate evidence*). The lack of a clear causal relation between anthropogenic warming, climate change hazards and subsequent losses and damages has delayed some Parties' firm commitments on L&D (Roberts et al., 2013; Mechler et al., 2019; Mathew and Akter, 2017; Thomas, Menke and Serdeczny, 2018; Mayer, 2014). Numerous methodologies have been devised in the literature to establish this causal relationship, but there is currently no single approach that is widely accepted (Mechler et al., 2019). The climate attribution research agenda has made fast progress and is now able to determine the extent to which anthropogenic emissions affect the probability and intensity of individual extreme weather events, such as heatwaves or heavy rainfall. However, climate science is not able to evaluate the next step of linking the individual hazard's effects on human systems to determine attribution of losses and damages. The reason is that human systems are highly complex, created through the interplay of people and assets' vulnerabilities and exposure to climate change hazards – these vulnerabilities and exposure are not static but in constant evolution due to ongoing efforts to reduce them (Mechler et al., 2019). Therefore, climate change attribution science may never be able to determine such causal relationships. Consequently, some have proposed for attribution not to be a precondition to address losses and damages, but to adopt other, more inclusive principles, such as providing support based on needs rather than attribution (Mayer, 2014).

3.2.6 Political barriers

Frequency and types of political barriers found in the literature

Political barriers exist at both the international and national levels, impeding the effective and equitable allocation of resources to address losses and damages. Certain types of losses and damages are deprioritised, particularly those caused by slow-onset climate hazards, and political actors focus too much on certain instruments, such as insurance, at the expense of other equally necessary mechanisms to address losses and damages.

Political barriers were coded 93 times in 36 documents, so they were not as prevalent in the literature as other types of barriers. However, some of these barriers overlap quite strongly with 'perception and narrative' barriers, particularly over issues such as the need to establish liability and deciding which impacts count as losses and damages. Different views and political statements on these issues reflect the broad split between high-income countries (which are mostly UNFCCC Annex I countries and required to provide financial and technical support) and low- and

middle-income countries (non-Annex I countries, which are recipients of financial and technical support).

The political interests of donor countries, whose agendas may not align with the needs of recipient countries, are clearly influential in the international negotiations on L&D. But there are also political barriers at the local level in all countries, including short election cycles and changes in government priorities, disagreements among different political groups, and issues pertaining to migration, among others (Boston et al., 2021; Hirsch et al., 2015; Schäfer et al., 2021; Selby and Perez-Dalena, 2020).

How political barriers are affecting efforts to address losses and damages

The political underestimation and under-prioritisation of slow-onset climate impacts at all levels leaves losses and damages unaddressed (*strong evidence*)

The impacts of slow-onset events are commonly ignored by politicians, as they do not typically generate the same level of public and political engagement as highly destructive and sudden disasters (Schäfer et al., 2021: 36). These losses and damages are less noticeable than those caused by extreme weather events, despite their cumulative effects being potentially more severe. In theory, if early warning signs are acknowledged, slow-onset stresses could be managed more effectively than sudden shocks, because they are gradual, so there is more time to give advance notice and plan and implement responses. In reality this does not happen unless potential impacts are recognised at the highest political level and difficult decisions are taken on how to account for them (e.g. a common methodology to value life) (Lindgaard, White and Shawoo, 2022; Kurukularuriya and Jackson, 2022).

At the local level, short election cycles lead governments to prioritise more immediate concerns than disaster risk reduction measures that could reduce losses and damages and make recovery easier (Warner et al., 2012; Warner et al., 2013). Where preventive actions are taken, they can be politically controversial; for example, central and subnational governments often disagree on decisions related to planned relocation, and the appropriate balance of public and private funding (Boston et al., 2021: 160), delaying appropriate action. Some countries even face legal obstacles when it comes to addressing slow-onset hazards, as the release of funds often requires the declaration of an emergency. These losses and damages are often undiagnosed until their effects have worsened, sometimes irreversibly (Schäfer et al., 2021).

Insurance dominates discourse on finance for L&D, diverting the focus away from more equitable and effective mechanisms (*strong evidence*)

(Richards and Schlatek, 2018; Bakhtaoui, 2022; Richards et al., 2022). Insurance is considered inequitable because it does not align with the UNFCCC's principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC). For instance, in Bangladesh climate risk insurance is controversial due to the belief that the poorest and most vulnerable should not be held responsible for the impacts of climate change, a crisis that they ultimately did not create (Practical Action, 2021). The risk is that insurance coverage primarily targets individuals who can afford to pay premiums, as the current international support for insurance premiums for poor people is insufficient. This is perceived as a privatisation of social safety nets,

placing the responsibility of paying premiums on the most vulnerable individuals, who may not have the financial means to afford them. Consequently, this creates a less effective safety net compared to government-provided systems that ensure a fair distribution of risks across society (McQuistan, 2022; Martyr-Koller et al., 2021; Richards and Schalatek, 2018; Schäfer and Künzel, 2019; Mayer, n.d.). There are also arguments that international climate finance could be used instead to support social safety nets, which do reach poor people. As climate risks increase, extending coverage to a level that adequately addresses the needs of poorer countries and communities may result in prohibitively expensive premiums (Mayer, n.d.; Prabhakar et al., 2016; Thomas et al., n.d.). Additionally, there are concerns that payment of premiums by poor people could be politically exploited by funding governments and international aid providers to reduce solidarity mechanisms, shifting the entire financial burden of disaster recovery onto the affected populations (Mayer, n.d.).

Aid flows for L&D from the Global North to the Global South, like all aid, are determined by donor interests, preferences, geopolitical concerns and domestic media attention, rather than climate principles (justice and responsibility) and humanitarian principles (neutrality and needs) (*strong evidence*) (Schäfer et al., 2021; UNDP, 2020). Some papers assert that development finance allows Western donors to exercise their agendas in developing countries, while trapping them in debt (Shawoo et al., 2021: 6–7). Donor interest and finance flows can wane as a result of domestic, trade and geopolitical interests (Carty and Walsh, 2022; Lindegaard, White and Shawoo, 2022; Addison et al., 2022). Overall, the international climate finance architecture is seen to lack comprehensiveness, coordination and predictability in the provision of financing. Stable, long-term funding is needed to counter these tendencies, as well as the challenges of humanitarian finance, which is often based on media cycles reporting on the latest disaster (Schäfer et al., 2021).

L&D competes with other development, economic and environmental priorities (*moderate evidence*), and is seen as an opportunity or political cost (*limited evidence from one study*), limiting the allocation of resources. This may be the case for slow-onset climate events, where governments with limited finances prioritise more urgent and politically palatable issues, such as economic growth and employment, over measures to address future losses and damages (Warner et al., 2013; Schäfer et al., 2021; Selby and Perez-Dalena, 2020). Countries may decide to set aside part of the budget in a contingency fund that can be accessed quickly, such as the national Disaster Management Fund in Mozambique, but this carries an opportunity cost, as the funds cannot be allocated to other needs, and a political cost if other spending needs are unmet (OECD, 2021). A contingency fund is also at risk of diversion due to elite political interference. Many low-income countries do not have the fiscal space to capitalise a contingency fund.

3.2.7 Social and environmental barriers

Frequency and types of social and environmental barriers

Social barriers to addressing losses and damages are strongly linked to knowledge and institutional challenges. They include gender disparities and societal neglect of non-economic losses, such as psychological impacts on children and cultural identity. Societal issues and processes influence how losses and damages – and measures to address them – are conceptualised.

Social barriers were identified in 85 segments, with the literature highlighting issues such as population growth, political strife, financial crises and other immediate concerns that result in policy-makers postponing or deprioritising adequately addressing losses and damages.⁸

Knowledge and institutional barriers, outlined in sections 3.2.2 and 3.2.3, are closely connected with social barriers. In particular, the lack of understanding of how women are affected differently by climate-related events, or how social norms influence how women are able to recover from climate events. Other social barriers include the lack of societal attention to non-economic losses and damages, including the long-term psychological impact of climate disasters on children and their educational and social development (Practical Action, 2021). Cultural and religious identity can influence efforts to reduce impacts – for example, where planned relocation is being considered as a response, groups may resist because of their connections with land, ancestral burial grounds and locations of religious significance (Hirsch et al., 2015).

Environmental barriers were coded 22 times across the literature. In particular, some studies focus on the complex topography and spatial aspects of vulnerable countries. As noted by the United Nations (2019: 8), ‘addressing loss and damage encompasses a wide range of approaches and actions that vary depending upon the circumstances, which include the demography, geography and socioeconomic status of the region, country or community experiencing the impacts and the types of impacts experienced’. This may make it difficult to reach affected populations and communities during and after climate-related events to address impacts. In low-lying countries and SIDS in particular, the availability of suitable land is considered a major barrier to relocation (Martyr-Koller et al., 2021) – a measure which, in itself, is fraught with social and economic issues, including generating conflict between old and new residents, and a lack of economic opportunities in new locations. Issues of soil quality also determine the success of climate-induced relocations, such as whether farmers are able to continue agricultural activities (Brida and Owiyo, 2013).

How social and environmental barriers are affecting efforts to address losses and damages

There is no international mechanism under the UNFCCC with the power to govern the relocation of those displaced due to climate-induced events. Earlier drafts of the Paris Agreement introduced such a coordination facility, but it was ultimately rejected for a ‘downgraded’ Taskforce on Displacement that was included in paragraph 50 of

⁸ The decision to prioritise other immediate concerns is also driven by domestic political considerations, especially election cycles and media cycles, as outlined in section 3.2.6 (political barriers).

the agreement text (Burkett, 2016). The role of the Taskforce is that of evidence review, convening, knowledge-sharing and enhancing cooperation; it has provided recommendations to the Warsaw International Mechanism for Loss and Damage for integrated approaches to avert, minimise and address displacement related to the adverse impacts of climate change. There are also no dedicated financial mechanisms to support climate-induced relocation – the UNFCCC climate funds could provide funding, but it has not yet happened, and their operating modalities are not suited to providing such support (i.e. long accreditation and project proposal processes) (Boston, Panda and Surminski, 2021). Furthermore, international ‘hard’ law has yet to provide legal status and therefore protection to ‘climate migrants’, while the 1951 Geneva Refugee Convention and the United Nations High Commissioner for Refugees offer such protection to refugees (Hirsch et al., 2015).

Climate-induced relocation and resettlement can prove unsuccessful, resulting in various forms of losses and damages involving both economic and non-economic aspects (*limited evidence*).

In Bangladesh, a study of three communities vulnerable to riverine and flash floods, coastal flooding and salinity intrusion shows that the soil in the relocated area was not fertile enough for the communities to produce food, leading some families to commute long distances to cultivate their old land (Bhowmik, Irfanullah and Selim, 2021). Furthermore, planned relocation of at-risk or affected populations carries ramifications, such as loss of culture and tradition, a refusal to abandon religious or otherwise sacred locations (ancestral burial grounds), and clashes between those relocated and the original inhabitants of a location. These and other social factors dissuade households from moving to less vulnerable locations (Bhowmik, Irfanullah and Selim, 2021; OECD, 2021; Hirsch et al., 2015). Additionally, a lack of social capital, such as family members and other support structures in new locations, and limited access to support programmes and education, means that many households remain in vulnerable locations. To survive when a climatic stressor strikes, they are often forced to use erosive coping measures, which can trap them on a downward slope of declining well-being and security, so households experience diminishing coping and adaptive capacity and increasing losses and damages (Warner and van der Geest, 2013).

Planned relocation can act as a barrier to addressing losses and damages if not conducted in consultation with community members. Pill (2020: 143) finds that if relocation projects are undertaken within a short time frame and rushed, important belongings that could be saved might be overlooked. Necessary infrastructure in the new location may not be set up to meet residents’ needs, which often disadvantages already marginalised and vulnerable community members. Furthermore, as found by McNamara et al. (2016: 4) ‘...relocation does not mean that people do not suffer loss and damage...the extent of the loss and damage will depend on whether relocated populations are able to maintain or improve livelihoods, cultural and kinship connections, as well as have access to the basic necessities that enable people to live dignified lives in the new place’.

Without government support and dedicated policies and plans, climate-induced relocation and resettlement can result in increased non-economic losses and damages (*moderate evidence*) (Boston, Panda and Surminski, 2021; Bhowmik, Irfanullah and Selim, 2021; Thomas and Benjamin, 2019; Pill, 2020). For instance, hurricane Maria struck the Bahamas in 2017, leading to the displacement

of residents in Ragged Islands. However, despite promises from the government, no significant reconstruction efforts took place in the subsequent year due to assessed high costs. As a result, the residents autonomously returned to the islands against the government's advice, due to their strong attachment to and sense of identity with the land, but they lacked essential services such as running water, electricity, health clinics and educational facilities. The potential adverse health and social effects resulting from these conditions have likely gone undocumented. The high costs the government calculated for reconstruction did not take into account the non-economic losses and damages that the inhabitants would experience by leaving their land (Thomas, Menke and Serdeczny, 2018).

Environmental factors, such as limited availability of suitable land, constrain efforts to address losses and damages, especially for SIDS (*moderate evidence*). Many SIDS lack elevated land for communities experiencing losses and damages from sea-level rise and flooding to relocate to higher grounds. The loss of land to sea-level rise and this inability to relocate is a significant element of the 'existential threat' that climate change poses for SIDS, with some geographies having already lost some islands, and others experiencing severe coastal erosion (Martyr-Koller et al., 2021). Even where highland areas exist, they may not support agriculture, forcing people to move back to their original locations despite adverse conditions (Brida, Owiyo and Sokona, 2013).

The lack of attention to slow-onset processes has environmental ramifications, especially in relation to ecosystem services supporting recovery from losses and damages (*limited evidence from one study*). Slow-onset events gradually erode livelihoods and assets, and when a rapid-onset event then occurs, individuals dependent on agriculture are unable to independently recover from those losses and damages. This is mirrored at the national level, where 'the small size of SIDS and lack of economic diversification (many SIDS rely heavily on tourism, fisheries, and agriculture) also mean that when one disaster strikes, a large share of the economy is affected, reducing the country's ability to respond and rebuild quickly' (World Bank, 2017: 3).

3.2.8 Technological barriers

Frequency and types of technological barriers found in the literature

Technological barriers refer to the general lack of technical and technological capacity of institutions to address economic and non-economic losses and damages.

Technological barriers were coded 13 times across the reviewed documents.

One technology and set of capacities that is critical for addressing losses and damages is early warning systems, and these have improved significantly overtime. Nonetheless, in some contexts, technological upgrades are much needed to improve the ability of governments and communities to anticipate impacts and put measures

in place to minimise losses and damages, which would also make recovery easier (Bhowmik, Irfanullah and Selim, 2021).

Technology barriers can also be seen in data collection and management around addressing losses and damages. Limitations affect governments' ability to manage risks and to properly support marginalised groups, such as women, elderly people, and those with disabilities.

How technological barriers are affecting efforts to address losses and damages

Institutional and technological factors, such as inadequate access to information and communication technology (ICT) and computing infrastructure and a lack of trained personnel, hamper data collection and processing on L&D (UNDP and UNDRR, 2022). According to UNDP and UNDRR (2022: 10):

some countries continue to use spreadsheets for data collection and management, which poses significant challenges in extracting, integrating and incorporating data into disaster databases. A few countries mentioned that while disaster databases capture the details of casualties caused by disasters, they seldom incorporate such details as economic impacts/losses, which, in turn, has implications for future disaster management and planning.

The lack of technological ability to attribute climate disasters to major polluting countries, and to differentiate between anthropogenic climate change and naturally occurring climatic events, is also seen in the literature as a technological barrier. This is seen to have stalled progress in the negotiations, as noted previously.

4 Discussion

This REA identifies the main barriers, the frequency with which they are discussed in the published literature, and the pathways through which they are affecting efforts to address climate-related losses and damages. Some evidence of how climate-related losses and damages vary with contextual factors is provided, but these findings are limited. While evidence abounds on the consequences of fast- versus slow-onset events, and the barriers to addressing losses and damages at different scales (global, regional and local), there is insufficient evidence to draw any conclusions as to whether geographical or income levels affect L&D efforts in middle- and low-income countries. Much of the literature focuses on the global scale, with evidence from country or local case studies mostly focused on the experiences of SIDS and a handful of other countries.

The literature on barriers to addressing losses and damages is strongly biased towards certain barriers and issues. These are discussed below, alongside a reflection on how different barriers interact to limit progress on L&D.

4.1 How barriers interact with each other to influence efforts to address climate-related losses and damages

This REA employed a thematic analysis approach to identify and synthesise evidence regarding how barriers are impacting efforts to address climate-related losses and damages. Additionally, content analysis was used to quantify the frequency and categorise individual barriers into nine distinct categories. As with any qualitative thematic evidence assessment, the analysis was influenced by how individual barriers were themselves described in the literature (during the development of descriptive themes) and based on the subjective choices and interpretation of the research team (during the generation of the analytical themes). In fact, in many cases, the same segment of text was assigned multiple codes, highlighting the interconnected nature of different barriers and categories of barriers.

Among the identified barriers, economic barriers exhibit the most interconnectedness and overlaps with other types of barriers. Financial mechanisms, such as multilateral climate funds, that can potentially support addressing losses and damages often have excessively burdensome access requirements for highly vulnerable countries, lacking rapid disbursement capabilities or intervention suitability. Governments and national organisations of low-income countries, especially the LDCs and SIDs, do not have sufficient, human, technical and financial capacity or systems to navigate these complex requirements (institutional barrier). Perception barriers also contribute to reinforcing economic barriers, as the quantifiable nature of losses and damages is given more importance, therefore downplaying the importance and urgency of addressing non-economic losses and damages at international and national levels.

Limited and difficult-to-access finance for losses and damages can be further aggravated by political barriers, as high-income countries often prioritise insurance solutions and categorise losses and damages within existing mitigation and adaptation efforts, thereby avoiding the need for additional financial commitments.

Knowledge barriers underpin almost all other types of barriers. This relationship is particularly evident with perception and narrative barriers, where limitations in knowledge influence perceptions, and vice versa, creating reinforcing feedback loops. Challenges in recognising and assessing non-economic losses and damages (knowledge barrier) contribute to their diminished perceived importance, resulting in neglect and hindering data collection efforts and the development of understanding (perception/narrative barrier). Slow-onset events present a similar challenge, as their gradual nature makes them less conspicuous and of lower political significance (political barrier). Due to their extended time frame, these events often receive inadequate political attention, resulting in a lack of investment and effort in understanding and addressing them. Due to their extended time frame, these events often receive inadequate political attention, resulting in insufficient investment and effort to understand and address them. Knowledge barriers also manifest in policy and social barriers, where a lack of understanding and assessment of the needs of the most vulnerable populations leads to emergency response and recovery plans neglecting them. Political considerations, such as policy-makers prioritising immediate concerns such as employment, political strife or financial crises over climate impacts, can also result in inadequate response to the losses and damages experienced by vulnerable communities.

All these barriers have intertwined and interacted, impacting the quantity, quality and pace of actions taken at global, national and local levels to address losses and damages. Insufficient, unpredictable, untimely and inaccessible financial resources have hindered States and communities in effectively responding to and recovering and rehabilitating from climate impacts. Even when funding is available, the delivery mechanisms, as well as the policies and plans of financial providers and governments, have often overlooked the importance of addressing all types of losses and damages, thereby neglecting the needs of the most vulnerable. The magnitude of losses and damages caused by climate change is already significant, yet efforts to address them have not kept up with the pace of impacts. This poses a serious problem, particularly when considering the current trajectory of global warming and the projected future impacts that are already ingrained in human systems without adequate climate mitigation, adaptation and the necessary attention to L&D.

4.2 The literature exhibits a bias towards barriers that are closely aligned with issues prioritised in international negotiations

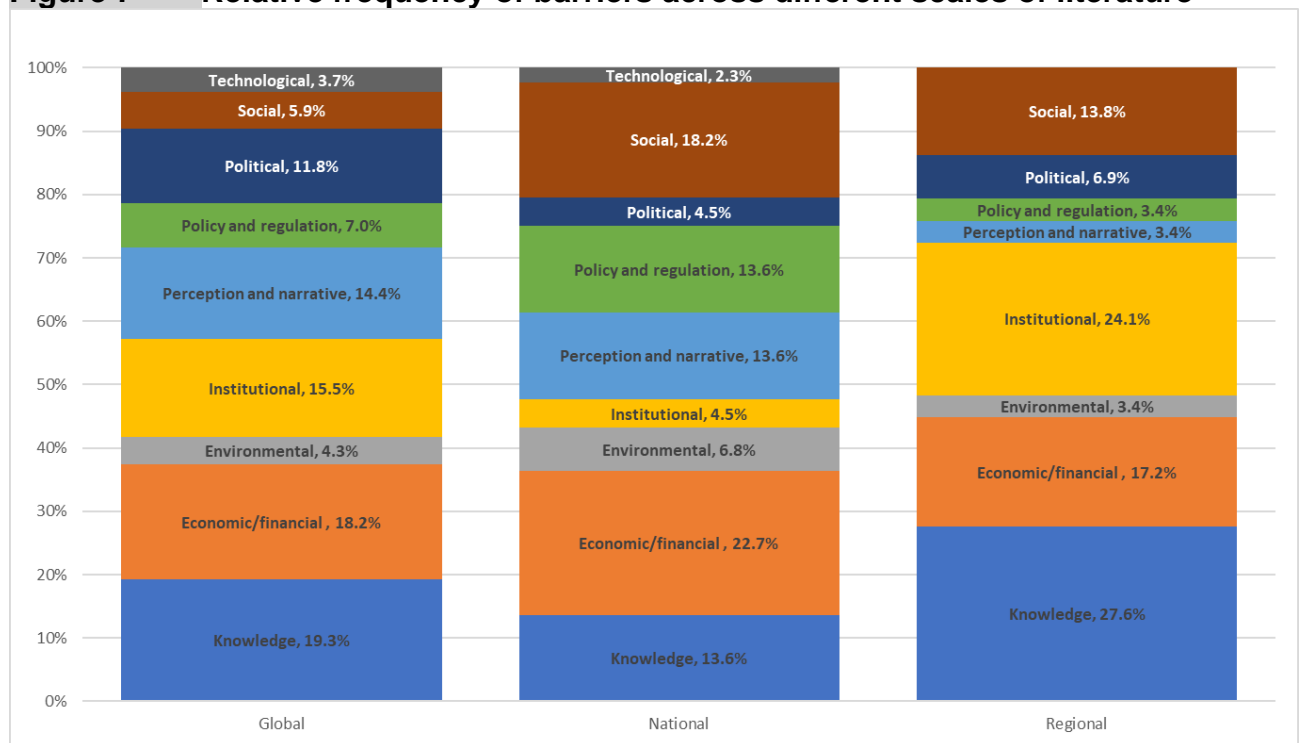
Noticeably, economic and financial barriers are those most frequently reported and analysed in the literature. This can be explained by a number of reasons. First, research interests are often influenced by available funding opportunities, which are themselves shaped by prevailing policy or political interests. Additionally, the majority of institutions and researchers contributing to the literature analysed in this report are based in the Global North or affiliated with Global North institutions. Given the responsibilities of richer nations to provide financial support for losses and damages in low- and middle-income countries, it is understandable why economic and

financial barriers have received more attention in the literature. Furthermore, finance for losses and damages has been a contentious issue in international climate negotiations, amplifying its significance within the literature. Considering that the literature has primarily focused on the global scale (see Figure 4 in section 3.1), the attention given to economic aspects is in line with this broader perspective.

4.3 The limited focus of the literature on certain barriers or issues does not imply their limited importance or significance

This REA also found that environmental and technological barriers appeared least frequently in the body of literature assessed. Figure 7 depicts the frequency of barriers discussed in the literature across different scales of evidence, namely global, national and regional. Notably, environmental barriers receive the least attention in the L&D literature at both the global and the regional scale.

Figure 7 Relative frequency of barriers across different scales of literature



Note: The sum of each column is 100%. The graph shows the relative frequency of reported barriers within the literature at each scale.

While at first glance this may indicate little importance of these barriers, it may not always be the case, as it may only indicate that they are less frequently studied. Similarly, issues that are more frequently studied are not necessarily more common or more important. For instance, we have seen how evidence for Bangladesh and the SIDS is more prevalent in the literature, which may suggest that these actors suffer increased challenges with addressing losses and damages compared to other country groupings. However, this trend may also be explained by these countries' more active engagement and advocacy in international climate negotiations around the L&D agenda. Linked with this, there is the recognition in the broader L&D

literature of a dearth of evidence about losses and damages in African countries (Chakma, Rigg and Ramsay, 2022).

Other understudied barriers include social barriers created by climate-related resettlement. Evidence from the SIDS shows that resettlement is often unfeasible due to limited available land within SIDS and the absence of international mechanisms to facilitate cross-border resettlement to other countries. As climate impacts intensify, cross-border resettlement will increasingly emerge as a significant challenge, yet this topic remains comparatively limited in the existing literature. Similarly, technological barriers, such as the absence of early warning systems in many regions, is also underreported within the literature assessed. The co-occurrence of barrier codes in the REA (analysed with MAXQDA) shows how the limited discussion of technological barriers related to early warnings may stem from the recognition that early warning systems are not solely technical in nature but also involve issues of institutional capacity and financial resources required for their establishment.

Other underreported or overlooked issues include: the limited quantification of countries' and communities' needs related to climate-related losses and damages (not the same as quantifying the losses and damages themselves); the soft limits to adaptation, and how they can be better anticipated; how risk retention mechanisms (such as social protection) can be used to address climate-related losses and damages; and the particular barriers faced at the 'meso' scale (see section 5). These barriers and issues may be understudied or neglected, but they are equally important and need to be overcome to adequately address climate-related losses and damages on the ground.

5 Conclusions and recommendations

This REA has identified key barriers according to the extant literature, which are influencing efforts at different scales to address climate-related losses and damages in low- and middle-income countries after they have occurred. The assessment points to the lack of financial resources as being a critical obstacle – but not the only one – to adequately addressing the needs of those most likely to be affected by climate change impacts. The existence of policy, institutional and political, knowledge and technological, social, perceptions and narratives, and even environmental-physical barriers means that tackling losses and damages due to climate change will require a huge commitment of financial, political, social and intellectual capital. This will need input from across but also way beyond the multi-lateral system.

These findings will be of use to all stakeholders engaged within and beyond the UNFCCC process in enhancing action and support to address the devastating impacts of climate change in vulnerable countries and communities. In 2023 and beyond, these barriers will need to be considered under the COP and Paris Agreement processes as the Transitional Committee concludes its work on the design of a Loss and Damage Fund and makes recommendations for other financing arrangements, and as Terms of Reference are drawn up for the new host of the Santiago Network.

Specifically, based on the findings of this report, the Transitional Committee should give adequate consideration to the following:

- **Clarify and build consensus around an operational definition of ‘addressing Loss and Damage’ to better define its scope.** While it may never be possible to create an exhaustive taxonomy of the specific types and duration of activities that count as climate-related losses and damages under all circumstances, at a minimum there should be greater clarity of the objectives of addressing L&D (e.g. saving lives, protecting livelihoods, decreasing disease and morbidity). This will also require clarifying other important principles such as providing financial support based on attribution or needs, and for absolute or relative losses and damages (compensation vs. solidarity).
- **Heed the shortcomings of existing mechanisms and instruments while designing the new fund and creating linkages with other existing funding arrangements.** This concerns insurance, which can be part of the solution but not the only nor the principal solution, humanitarian funding, which is discretionary and not stable, and UNFCCC climate funds, which are slow in delivering finance and hard to access. Regarding who should fund L&D, considerations will be important to create interconnected and layered funding

systems for addressing losses and damages that can maintain a balance between the polluter pays, altruism and market-based principles underpinning financial mechanisms in the global system.

- **Ensure that funding arrangements account for losses and damages from slow-onset events and smaller disasters, for long-term rehabilitation and reconstruction past the initial six months, and assistance for countries to better assess needs from L&D and access resources.**
- **Ensure that solutions for cross-border and national relocation and resettlement due to climate-related losses and damages are worked into the design of the fund and financial arrangements.** No UNFCCC mechanism and dedicated finance with the power to govern the relocation of those displaced associated with climate-induced events exists at present, and humanitarian assistance does not address the issue directly.

Moving ahead, there is clearly a need to advance collective knowledge on how to address current and future climate-related losses and damages to support L&D beyond the immediate work of the Transitional Committee. Gaps in the current literature point to directions for future academic and policy research. These include:

- **Better quantification of L&D needs.** As mentioned, this has been used in climate negotiations as an argument to delay making firm resource commitments to address the problem. Better quantification will be predicated on a clearer definition of L&D and its scope, which will require consensus-building to reach such an agreement. It will also require equitable and inclusive processes to identify needs that reflect participation of all stakeholders, representation, diversity of views and so on.
- **Shared standards to assess non-economic losses and damages and long-term impacts.** The literature is clear regarding the under-diagnosis and under-reporting of non-economic losses and damages. To advance the L&D agenda and devise adequate financial mechanisms, shared standards and methods will need to be agreed to assess non-economic losses and damages.
- **More attention should be paid to understanding soft limits to adaptation.** While considerable research exists to understand the hard limits to adaptation, there is much less information on understanding the soft limits. This is important because some evidence argues that these soft limits are already being breached in several geographies. A deeper understanding of these dynamics may reveal that climate-related losses and damages are occurring at a frequency higher than currently understood, highlighting further the gravity and urgency of the problem, and inspire actions to address them.
- **More evidence on risk retention mechanisms in the context of climate-related losses and damages.** The reviewed literature provided considerable evidence on the workings and limitations of risk transfer mechanisms, in particular insurance, but there has been far less evidence understanding the challenges that risk retention mechanisms face in the context of climate change. For instance, the integration of social protection within the climate policy agenda is currently limited. While traditionally used as a tool to help individuals and households to manage risks linked to income and livelihoods, Costella et al. (2023) show new roles that social protection can play in climate change, including

reducing climate vulnerability at large in a way that reduces climate risks; responding to specific climate shocks and disasters; compensating for negative impacts of climate change responses; and supporting livelihoods transformations. These are all roles fundamental to addressing climate-related losses and damages.

- **More case studies at the national and local level to discern potential geographical differentiations of the effects of barriers to address losses and damages.** This REA has identified a restricted body of country and local case studies to enable reliable inference on geographical variation of barriers and how they are influencing the addressing of losses and damages. There is a particular scarcity of case study evidence concerning African countries, whereas the majority of research pertains to countries in Asia (e.g. Bangladesh and Nepal) and SIDS. However, even for the countries that receive more attention, there are still gaps, such as limited research on the challenges faced by SIDS in terms of climate-related internal and cross-border displacement or relocations (Thomas and Benjamin, 2019).
- **Greater focus on barriers at the individual and ‘meso’ scale.** The literature review has highlighted a focus on global-scale barriers, as well as evidence concerning specific low-income countries and communities. However, there is a lack of evidence at the individual scale, particularly regarding the experiences of individuals dealing with non-economic losses and damages, such as mental health impacts and coping mechanisms. It is important to note that while this literature may exist, it may currently be located within other disciplinary fields and has not yet been integrated into the discourse on climate-related L&D. Additionally, there is a knowledge gap at the ‘meso’ scale, which refers to the institutions that bridge the gap between the national and local levels, such as congregations, churches, associations and sporting organisations, to name a few. Currently, the narrative on communities is somewhat homogeneous, whereas a deeper understanding of different communities, their identities and their functions can aid in assessing and addressing their climate-related losses and damages.

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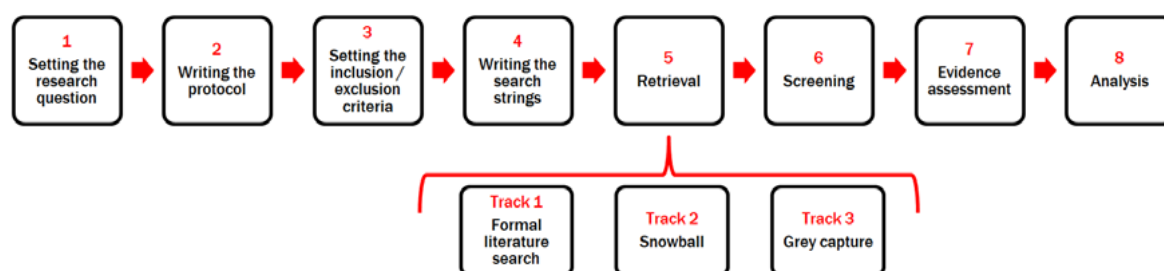
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Appendix 1 Methodology

The approach for the REA is based on an effective methodology devised by ODI researchers⁹ that has been widely used in systematic and rapid evidence reviews for the Climate Investment Funds,¹⁰ those building the evidence base for the PRISE and BRACED programmes, and work undertaken for the Rockefeller Foundation,¹¹ among others.

The approach has been designed specifically to manage the realities of the 'information architecture' found within the humanitarian, development and climate change fields. In addition to academic literature, the approach placed a strong emphasis on locating grey literature and resources not found within standard, peer-reviewed channels, such as practitioner-generated studies on climate losses and damages (see Figure 8).

Figure 8 Steps in a rigorous, evidence-focused review



Source: Hagen-Zanker and Mallett (2013).

Search strategy

The REA looked at all academic and policy literature from 1991, at the inception of the discussion on L&D, up to 2022. This covers the span of 31 years.

The assessment includes academic journal articles, relevant books and book chapters that are readily accessible, expert studies from international organisations, think tanks and NGOs, and policy briefs based on research evidence. Blogs and newspaper articles were used to integrate this evidence. Student papers, dissertations, conference papers and unpublished papers have been excluded, to limit the number of publications to be reviewed and because they present preliminary findings which can be overturned or updated when submitted for publication in journals.

⁹ Hagen-Zanker, J. and Mallett, R. (2013) *How to do a rigorous, evidence-focused literature review in international development*. ODI Working Paper, September. London: ODI.

¹⁰ See <https://odi.org/en/publications/transformational-change-in-the-climate-investment-funds-a-synthesis-of-the-evidence/>.

¹¹ See <https://odi.org/en/about/our-work/resilience-scan/>.

The assessment is limited to publications in the English language.

To mitigate biases associated with a focus only on English-language academic literature and expert studies, the research team contacted a number of key experts working in low- and middle-income countries in the field of L&D to request relevant publications to include in the assessment.

The search strategy is articulated around three avenues:

- academic databases in the field of geography and climate change
- Google Scholar (GS) to capture relevant grey literature
 - manual searches of major think tanks, international organisations and NGOs working in the losses and damages field.

Academic databases

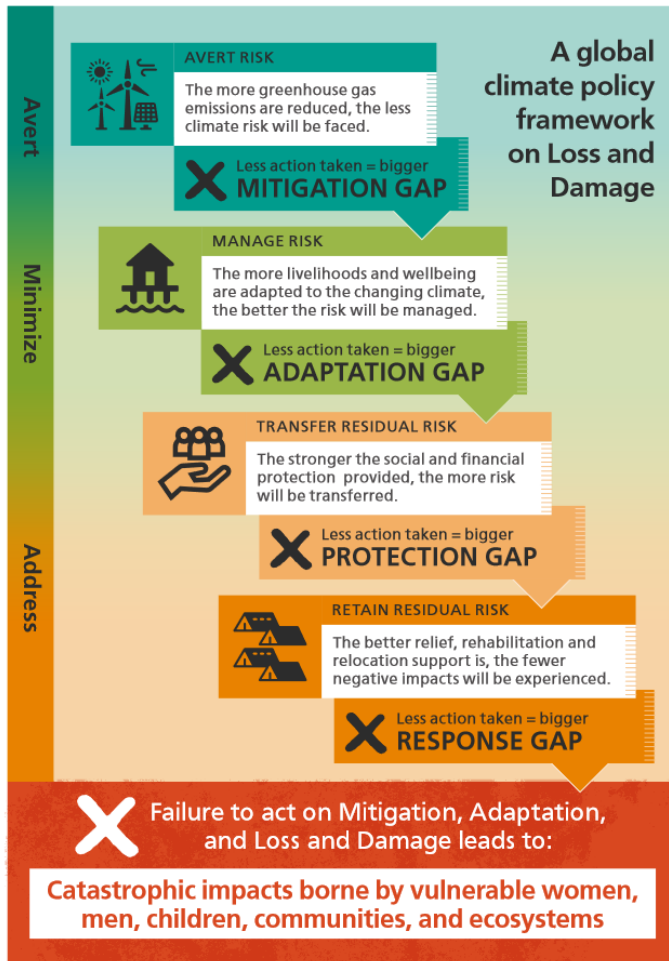
The research team selected three online aggregators (gathering many journals and databases) to identify relevant academic publications: Scopus, Web of Science and the 3ie Development Evidence Portal. This selection was based on the understanding of key sources relevant to the topic from prior research engagement.

Selected academic databases and aggregators

Database	Description
Scopus	A key aggregator in the field of climate change, geography, physical and life sciences, and generally the social sciences
Web of Science	A major interdisciplinary aggregator spanning multiple academic disciplines, including the sciences, social sciences, the arts and the humanities
3ie Development Evidence Portal	An open-access repository of international development research (studies, impact evaluations, systematic reviews) on low- and middle-income countries

The research team developed a set of search strings based on keywords related to barriers to addressing climate-related losses and damages. Although there is no universally accepted definition for the term ‘addressing losses and damages’, the framework developed by McQuistan, Mechler and Jacobson (2022) offers guidance on narrowing down its scope. This framework adopts a risk management perspective and links the addressing of losses and damages to mechanisms to transfer risk and retention of residual risk. These mechanisms aim to protect against and respond to climate impacts, focusing on interventions that occur during and after a climate event or disaster. This approach differs from ex ante interventions, which aim to avert the risks of losses and damages through climate mitigation or manage the risks through climate adaptation (see Figure 9 for a visual representation).

Figure 9 Framework to avert, minimise and address losses and damages risks



Source: McQuistan, Mechler and Jacobson (2022).

Based on the above, the research team used the following keywords to develop search strings:

Keywords related to barriers to addressing climate-related losses and damages

Climate	climate, 'loss* and damage*'
Types of losses and damages	<p>Non-economic losses and damages life, health, mobility, migration, displace*, territory, land, heritage, indigenous, 'cultural identity', ecosystems services, biodivers*, forest, crop*, livestock*, 'food *security'</p> <p>Economic losses and damages income, livelihood, energy, electricity, transport, water, telecom*, 'ICT', waste, wastewater, home, hous*, apartment, flat, condo*</p>

Countries and regions	<p>LDCs ‘least developed countries’, ‘low-income countries’, Angola, Benin, ‘Burkina Faso’, Burundi, ‘Central African Republic’, Chad, Comoros, ‘Democratic Republic of the Congo’, Djibouti, Eritrea, Ethiopia, Gambia, Guinea, ‘Guinea-Bissau’, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, ‘S?o Tom? and Principe’, Senegal, ‘Sierra Leone’, Somalia, ‘South Sudan’, Sudan, Togo, Uganda, ‘*Tanzania’, Zambia, Afghanistan, Bangladesh, Bhutan, Cambodia, ‘Lao People’s Democratic Republic’, Laos, Myanmar, Nepal, Yemen, Bahrain</p> <p>SIDS SIDS, ‘Small Island Developing States’, ‘Antigua and Barbuda’, Guyana, Bahamas, ‘*Kitts and Nevis’, Jamaica, ‘S* Lucia’, Barbados, ‘*Vincent and the Grenadines’, Belize, Maldives, Seychelles, ‘Cabo Verde’, ‘Marshall Islands’, ‘Federated States of Micronesia’, Suriname, Cuba, Mauritius, Dominica, Nauru, Tonga, ‘Dominican Republic’, Palau, ‘Trinidad and Tobago’, Fiji, ‘Papua New Guinea’, Grenada, Samoa, Vanuatu, ‘Timor-Leste’, Kiribati, ‘Solomon Islands’, Tuvalu</p>
Addressing losses and damages	‘emergency response’, humanitarian, ‘disaster recovery’, compensation, reparation, memorialisation, relocation, resettlement, preparedness, ‘anticipatory action’, ‘early warning*’, ‘recovery and reconstruction’, ‘early recovery’, ‘social protection’, ‘cash transfer*’, debt relief, insurance
Barriers	barrier*, challenge*, obstacle*, limit*

Two types of search strings were used in the academic databases to capture as many relevant results as possible while seeking to avoid the very extensive literature on economic quantification of infrastructure and social losses following natural hazards or disasters:

- **String using the general keywords ‘climate’ and ‘loss* and damage*’ in addition to keywords for countries and regions:**

e.g. ABS (‘loss* and damage*’) AND ABS (LDC OR ‘least developed countries’ OR ‘low-income countries’ OR Angola OR Benin OR ‘Burkina Faso’ OR Burundi OR ‘Central African Republic’ OR Chad OR Comoros OR ‘Democratic Republic of the Congo’ OR Djibouti OR Eritrea OR Ethiopia OR Gambia OR Guinea OR ‘Guinea-Bissau’ OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mozambique OR Niger OR Rwanda OR ‘S?o Tom? and Principe’ OR Senegal OR ‘Sierra Leone’ OR Somalia OR ‘South Sudan’ OR Sudan OR Togo OR Uganda OR ‘*Tanzania’ OR Zambia OR Afghanistan OR Bangladesh OR Bhutan OR Cambodia OR ‘Lao People’s Democratic Republic’ OR Laos OR Myanmar OR Nepal OR ‘Timor-Leste’ OR Yemen OR Kiribati OR ‘Solomon Islands’ OR Tuvalu)
- **More specific strings using keywords representing types of losses and damages in addition to keywords from the categories addressing losses and damages, barriers and countries and regions:**

e.g. ABS (climate AND health AND ‘emergency response’ OR humanitarian OR ‘disaster recovery’ OR compensation OR reparation OR memoriali?ation OR relocation OR resettlement OR preparedness OR ‘anticipatory action’ OR ‘early

warning' OR 'recovery and reconstruction' OR 'early recovery' OR 'social protection' OR 'cash transfer' AND barrier* OR challenge* OR obstacle* OR limit*) AND ABS (LDC OR 'least developed countries' OR 'low-income countries' OR Angola OR Benin OR 'Burkina Faso' OR Burundi OR 'Central African Republic' OR Chad OR Comoros OR 'Democratic Republic of the Congo' OR Djibouti OR Eritrea OR Ethiopia OR Gambia OR Guinea OR 'Guinea-Bissau' OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mozambique OR Niger OR Rwanda OR 'S?o Tom? and Principe' OR Senegal OR 'Sierra Leone' OR Somalia OR 'South Sudan' OR Sudan OR Togo OR Uganda OR '*Tanzania' OR Zambia OR Afghanistan OR Bangladesh OR Bhutan OR Cambodia OR 'Lao People's Democratic Republic' OR Laos OR Myanmar OR Nepal OR 'Timor-Leste' OR Yemen)

See the end of this section for a list of all the search strings used in academic databases.

Google Scholar

A modified search approach and strings were used for GS due to its known limitations compared to academic databases:

- While GS is not transparent about how the algorithm runs its searches, it is better at finding keyword synonyms.
- GS automatically includes the search operator 'AND'.
- It searches directly into the body/text of documents.
- It has a limit of 256 characters (around 32 words) for search strings.

Therefore, simpler search terms tend to yield more relevant results.

The geographic scope of the search was focused on African LDCs and Caribbean SIDS to keep the number of results manageable. In addition, GS orders search results by relevance, where results further away from the top result pages become rapidly less relevant to irrelevant. Therefore only the first 200 search results were included for screening (further below) in the study. The search strings used in GS were:

Caribbean SIDS

Barriers addressing 'loss and damage' Belize OR Dominica OR 'Dominican Republic' OR Grenada OR Guyana OR Haiti OR Jamaica

Sahel and Horn of Africa LDCs

Barriers addressing 'loss and damage' 'Burkina Faso' OR Djibouti OR Eritrea OR Ethiopia OR Gambia OR Mali OR Mauritania OR Niger OR Senegal OR Somalia OR 'South Sudan' OR Sudan

Other African LDCs

Barriers addressing 'loss and damage' Angola OR Benin OR Burundi OR 'Cabo Verde' OR 'Central African Republic' OR Comoros OR 'Democratic Republic of the Congo' OR Guinea OR 'Guinea-Bissau' OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mozambique OR Rwanda OR 'Sierra Leone' OR Togo OR Uganda OR Tanzania OR Zimbabwe

Manual searches

Manual searches on the institutional websites of major organisations working in the climate L&D field were performed to capture relevant grey literature, in addition to the searches in GS. The search started with the specific objective of this study as keywords: ‘barriers to addressing loss and damage’ and ‘challenges to addressing loss and damage’. However, it yielded a handful of results (and in some case no results). More general terms, namely ‘climate change’ and ‘loss and damage’, yielded a relatively larger number of relevant results. The results of these searches were manually screened using publication title, abstract or executive summary, and table of contents. In addition to the Caribbean SIDS and African LDCs, publications pertaining to the global level and other developing countries were also included in the initial screening process. Below is a list of organisations screened:

Organisations working on climate L&D

Organisation
The Loss and Damage Collaboration
International Centre for Climate Change and Development
International Institute for Environment and Development
Institute du Développement Durable et Relations Internationales (IDDRI)
Zurich Flood Resilience Alliance
Red Cross Climate Centre
Mercy Corps
Practical Action
World Resources Institute
Germanwatch
The World Bank
Heinrich Böll Stiftung
Institute for Social and Environmental Transition–International (ISET-International)
International Centre for Integrated Mountain Development (ICIMOD)
ENDA Energie
Stockholm Environment Institute (SEI)
Third Generation Environmentalism (E3G)
International Institute for Applied Systems Analysis (IIASA)
United Nations Development Programme (UNDP)
United Nations Office for Disaster Risk Reduction (UNDRR)
United Nations University (UNU)
United Nations Environment Programme (UNEP)
PreventionWeb
United Nations Framework Convention on Climate Change (UNFCCC)
V20 Group
Climate Analytics
Grantham Research Institute – London School of Economics

Inclusion and exclusion criteria

Screening for inclusion or exclusion of relevant studies was carried out in two steps: (1) screening of the title of the publication; and (2) screening of the abstract (for

academic papers) or executive summary (for grey literature). A few general inclusion/exclusion criteria for all publications screened are included below, followed by more detailed criteria for the two steps.

General inclusion/exclusion criteria for all publications

	Included	Excluded
Year	1991-2023	Prior to 1991
Sources	Academic journals, books and book chapters, reports from international organisations, think tanks and NGOs, expert studies, policy briefs based on research evidence Blogs and newspaper columns included but considered in a different category to integrate evidence	Student papers, conference papers, unpublished papers, dissertations
Geographic focus	Low- and middle-income countries, SIDS and LDCs	

Step 1: Title screening

Included	-
Excluded	<ul style="list-style-type: none"> • Exclude if title clearly does not address research objectives or questions e.g. [Title] <i>A serious game creation project as teaching method for geography</i> AND/OR • Exclude if purely quantitative study (numerical, econometric studies, modelling, etc.) that does not include analysis of barriers to addressing losses and damages, AND/OR addresses research questions e.g. [Title] <i>A numerical study of hypothetical storm surge and coastal inundation for AILA cyclone in the Bay of Bengal</i> The paper title shows fairly clearly it is a study to find/provide quantitative effects of storm surges and coastal inundation, but if in doubt, a quick scan of the abstract can confirm this:

	<p><i>[Abstract] The head Bay region bordering the Bay of Bengal is highly vulnerable to tropical cyclones. Catastrophic risks from storm surge and associated inundation are quite high due to high population density in coastal areas, socio-economic conditions, and shallow bathymetry. It features the world's largest deltaic system comprising of 'Sunderbans' bordered by West Bengal and Bangladesh. In a geomorphologic sense, the head Bay region is a low-lying belt comprising several barrier islands and river drainage systems, numerous tidal creeks, and mud flats having a high risk for widespread inundation. In addition, the high tidal range together with low-lying topography leads to high risk and vulnerability from storm surge inundation. During May 2009, a severe cyclonic storm Aila struck West Bengal causing enormous destruction to life and property along coastal belts of West Bengal and Bangladesh. It was the strongest pre-monsoon cyclone in the past two decades that had landfall in West Bengal. This work reports on a numerical study for hypothetical storm surge and associated inundation from Aila using the ADCIRC model. The study covers a comprehensive qualitative analysis on water level elevation and onshore inundation for West Bengal and Bangladesh regions. The estimated peak storm surge was about 4 m in the Sunderban region that propagated into all major riverine systems, inundating the river banks as well the inland areas. Numerical simulations indicate an average inland penetration distance of 350 m with a maximum of 600 m at various coastal locations in West Bengal and Bangladesh. The study emphasises the need and importance of inundation modeling system required for emergency preparedness and disaster management.</i></p>
<p>Uncertain</p>	<ul style="list-style-type: none"> • If the title does address research objectives and research questions, or if uncertain, proceed to reviewing the abstract/executive summary

Step 2: Abstract/executive summary screening

<p>Included</p>	<ul style="list-style-type: none"> • Research using primary data and review of studies using primary data that include barriers to addressing losses and damages once an event has occurred; AND • Include if abstract/executive summary addresses research objectives OR overarching research questions and questions 3 to 6: <ul style="list-style-type: none"> ○ <i>Overarching question: What barriers constrain efforts to address climate change-related losses and damages once they have occurred in low- and middle-income countries?</i> ○ <i>Q3. What are the types of barriers discussed and assessed within the published body of the literature?</i> ○ <i>Q4. What is the prevalence of the various barriers identified?</i> ○ <i>Q5. To what extent, and how, do the barriers identified affect efforts to address climate change-related losses and damages?</i> ○ <i>This should also include papers that reflect on decisions that have been taken or not taken as a result of barriers to address losses and damages from previous events.</i>
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	<ul style="list-style-type: none"> ○ Q6. <i>To what extent do geography, country income status, organising level (international, regional, local), type of climate-related event (fast- vs. slow-onset), and other contextual factors create or constitute ‘barriers’ to addressing climate-related losses and damages?</i>
Excluded	<ul style="list-style-type: none"> ● Exclude if purely quantitative study (numerical, econometric studies, modelling, etc.) that does not include analysis of barriers to addressing losses and damages, AND/OR addresses research questions; OR ● Exclude if purely theoretical and conceptual research on climate losses and damages
Uncertain	<ul style="list-style-type: none"> ● Include the paper for the following cases of uncertainty, provided that the other inclusion criteria are met: <ul style="list-style-type: none"> ○ When the abstract/executive summary does not include analysis of barriers, but it seems that the full text might; OR ○ If it is unclear whether the measures taken aim to reduce climate risks and adapt to climate impacts before an event has occurred, or they address losses and damages after an event has occurred. ○ The measures also include ‘anticipatory action’ designed to reduce negative impacts but implemented before or during an event. This is particularly relevant with slow-onset events (no need to wait until the end until loss and damage is addressed, but actions not aimed at longer-term adaptation or risk reduction). <p>e.g. [Title] Barriers or enablers? Chiefs, elite capture, disasters, and resettlement in rural Malawi</p> <p>[Abstract]: Chiefs are at the centre of household and community development efforts in most low-income countries around the world. Yet, researchers and scholars have paid limited attention to the institution of chieftaincy and to understanding its role in the management of climate change adaptation and disaster risk reduction. This paper draws on a micro ethnographic evaluation conducted in two predominantly rural districts of Malawi in southeast Africa to assess two different manifestations of elite control. In the first case, a resettlement programme was implemented where chiefs were co-opted and took the lead. In the second case, a food insecurity response programme was designed to exclude chiefs. The study finds that neither co-opting nor countering chiefs prevents elite capture. Rather, the majority of chiefs oscillate between malevolent and benevolent capture. The findings require that states focus on the cultural and political dimensions of rural life when designing climate change adaptation and disaster risk reduction programmes.</p>

Coding schema

The studies included following screening were coded in MAXQDA, using the coding schema below, which was refined and expanded as the evidence assessment proceeded.

Component	Description				
Author(s)	Name(s)				
Year of publication	Year				
Publication type	Peer-reviewed journal article or book/book chapter Government report International NGO/think tank report/policy brief International organisation report/policy brief Blog Newspaper article				
Research type	Primary research study Secondary review study (including blogs and newspaper articles)				
Research method	Qualitative Mixed methods				
Scale	Global Regional (with region named) National (with country named) Subnational/local (with locality named)				
Country group	Low income Lower-middle income Upper-middle income High income SIDS LDCs				
Hazard		Temperature-related	Wind-related	Water-related	Solid mass-related
	Stresses (slow-onset)	Changing temperature (air, freshwater, marine water)	Changing wind patterns	Changing precipitation patterns and types (rain, hail, snow/ice)	Coastal erosion
		Heat stress		Precipitation and/or hydrological variability	Soil degradation
		Temperature variability		Ocean acidification	Soil erosion
		Permafrost thawing		Saline intrusion	Solifluction

				Sea-level rise	
				Water stress	
	Shocks (fast-onset)	Heatwave	Cyclone, hurricane, typhoon	Drought	Avalanche
		Cold wave/frost	Storm (including blizzards, dust and sandstorms)	Heavy precipitation (rain, hail, snow/ice)	Landslide
		Wildfire	Tornado	Flood (coastal, fluvial, pluvial, groundwater)	Subsidence
	Environmental degradation			Glacial lake outburst	
Barriers	<p>Economic-financial</p> <p>Technological</p> <p>Social</p> <p>Environmental</p> <p>Political</p> <p>Institutional (within individual organisations)</p> <p>Perceptions and narratives (e.g. perceived high costs of doing something vs. reality and cost of inaction)</p> <p>Policy and regulation</p>				
Type of finding	<p>Estimate (current)</p> <p>Projection (future)</p> <p>Mechanisms/processes (i.e. qualitative findings)</p> <p>Conceptual framework</p>				
How do the barriers identified affect efforts to address climate change-related losses and damages (pathways)	<ul style="list-style-type: none"> • Inadequacy of financial resources <ul style="list-style-type: none"> ○ Suboptimal allocation of limited financial resources ○ Unavailability of financial resources ○ Limited access to available financial resources ○ Timeliness of financial resources • Nature of measures <ul style="list-style-type: none"> ○ Little consideration of gender and inclusion 				

	<ul style="list-style-type: none"> ○ Inadequate community action ○ Issues challenging L&D displacement and resettlement ○ Inadequacy of insurance ○ Under-prioritisation of slow-onset events • Pace and urgency of action <ul style="list-style-type: none"> ○ Lack of national policies and governance ○ Disagreement on definition of L&D ○ Coordination • (Others)
Others to be determined	

Quality appraisal framework

Given the emerging nature of the evidence sought, elaborate frameworks to appraise the strength and quality of research evidence, including the UK Department for International Development's Assessing the Strength of Evidence (DFID, 2014) and the International Development Research Centre's Q+ (McLean et al., 2018), would be unfit for the goals of this study. Moreover, this study is not an impact assessment, but a mapping exercise of the barriers to addressing losses and damages from climate change. Therefore, a simple framework, which accounts for these issues and acknowledges the largely subjective nature of assessing evidence quality, is proposed below to assess the strength of evidence:

Quality of individual studies

Strong	<ul style="list-style-type: none"> • Barriers or claims are supported by research evidence analysing primary data, practitioner experience/data (where the relationship between the claim and the practitioner experience is clear and apparent) and case studies
	<ul style="list-style-type: none"> • Review studies must contain studies based on research evidence that analyse primary data, practitioner experience/data or case studies
Limited	<ul style="list-style-type: none"> • Barriers or claims are not based on research evidence or practice evidence, or where the evidence underpinning claims is not made clear/explicit in the study

To assess the quality of findings synthesised from individual studies, a few additional criteria are proposed:

Quality of synthesised findings

Strong	<ul style="list-style-type: none"> • If studies underpinning claim are five or more, of which at least three must be a high-quality individual study
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Moderate	<ul style="list-style-type: none"> If studies underpinning claim are two to four, of which at least one high-quality individual study
Limited	<ul style="list-style-type: none"> If there is only one high-quality study underpinning the claim; OR There are several low-quality individual studies and no high-quality individual study underpinning the claim

List of academic search strings

The search strings below have been run in the abstract (ABS) of articles, whereas the exclusion terms using the Boolean 'NOT' were used in the paper title (TITLE).

The different parts of the search strings in the first example below are highlighted in different colours for reference:

- Blue:** type of losses and damages
- Red:** terms for 'addressing' losses and damages
- Green:** countries, which are either SIDS or LDCs
- Orange:** terms to capture challenges, obstacles and barriers to addressing losses and damages
- Purple:** terms to exclude papers that are not relevant for the research, which were searched in the paper title.

LDCs search strings

- 1 ABS (climate AND life AND 'emergency response' OR humanitarian OR 'disaster recovery' OR compensation OR reparation OR memoriali?ation OR relocation OR resettlement OR preparedness OR 'anticipatory action' OR 'early warning' OR 'recovery and reconstruction' OR 'early recovery' OR 'social protection' OR 'cash transfer' AND barrier* OR challenge* OR obstacle* OR limit*) AND ABS (LDC OR 'least developed countries' OR 'low-income countries' OR Angola OR Benin OR 'Burkina Faso' OR Burundi OR 'Central African Republic' OR Chad OR Comoros OR 'Democratic Republic of the Congo' OR Djibouti OR Eritrea OR Ethiopia OR Gambia OR Guinea OR 'Guinea-Bissau' OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mozambique OR Niger OR Rwanda OR 'S?o Tom? and Principe' OR Senegal OR 'Sierra Leone' OR Somalia OR 'South Sudan' OR Sudan OR Togo OR Uganda OR '*Tanzania' OR Zambia OR Afghanistan OR Bangladesh OR Bhutan OR Cambodia OR 'Lao People's Democratic Republic' OR Laos OR Myanmar OR Nepal OR 'Timor-Leste' OR Yemen OR Kiribati OR 'Solomon Islands' OR Tuvalu) AND NOT TITLE ('remote sensing' OR GIS OR geoinformatics OR bioinformatics OR multivariate OR regression OR OLS OR evapotranspiration OR algorithm OR 'machine learn*' OR proteins OR abiotic OR sediment OR mathematic*) AND PUBYEAR > 1991
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SIDS search strings

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- 8 ABS (climate AND crop* OR livestock* OR 'food *security' AND 'emergency response' OR humanitarian OR 'disaster recovery' OR compensation OR reparation OR memoriali?ation OR relocation OR resettlement OR preparedness OR 'anticipatory action' OR 'early warning' OR 'recovery and reconstruction' OR 'early recovery' OR 'social protection' OR 'cash transfer' AND barrier* OR challenge* OR obstacle* OR limit*) AND ABS (SIDS OR 'Small Island Developing States' OR 'Antigua and Barbuda' OR Guyana OR Bahamas OR '*Kitts and Nevis' OR Bahrain OR Jamaica OR 'S* Lucia' OR Barbados OR '*Vincent and the Grenadines' OR Belize OR Maldives OR Seychelles OR 'Cabo Verde' OR 'Marshall Islands' OR 'Federated States of Micronesia' OR Suriname OR Cuba OR Mauritius OR Dominica OR Nauru OR Tonga OR 'Dominican Republic' OR Palau OR 'Trinidad and Tobago' OR Fiji OR 'Papua New Guinea' OR Grenada OR Samoa OR Vanuatu) AND NOT TITLE ('remote sensing' OR GIS OR geoinformatics OR bioinformatics OR multivariate OR regression OR OLS OR

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- 9 ABS (climate AND income OR livelihood AND 'emergency response' OR humanitarian OR 'disaster recovery' OR compensation OR reparation OR memoriali?ation OR relocation OR resettlement OR preparedness OR 'anticipatory action' OR 'early warning' OR 'recovery and reconstruction' OR 'early recovery' OR 'social protection' OR 'cash transfer' AND barrier* OR challenge* OR obstacle* OR limit*) AND ABS (SIDS OR 'Small Island Developing States' OR 'Antigua and Barbuda' OR Guyana OR Bahamas OR '*Kitts and Nevis' OR Bahrain OR Jamaica OR 'S* Lucia' OR Barbados OR '*Vincent and the Grenadines' OR Belize OR Maldives OR Seychelles OR 'Cabo Verde' OR 'Marshall Islands' OR 'Federated States of Micronesia' OR Suriname OR Cuba OR Mauritius OR Dominica OR Nauru OR Tonga OR 'Dominican Republic' OR Palau OR 'Trinidad and Tobago' OR Fiji OR 'Papua New Guinea' OR Grenada OR Samoa OR Vanuatu) AND NOT TITLE ('remote sensing' OR GIS OR geoinformatics OR bioinformatics OR multivariate OR regression OR OLS OR evapotranspiration OR algorithm OR 'machine learn*' OR proteins OR abiotic OR sediment OR mathematic*) AND PUBYEAR > 1991
- 10 ABS (climate AND energy OR electricity OR transport OR water OR telecom* OR 'ICT' OR waste OR wastewater OR home OR hous* OR apartment OR flat OR condo* AND 'emergency response' OR humanitarian OR 'disaster recovery' OR compensation OR reparation OR memoriali?ation OR relocation OR resettlement OR preparedness OR 'anticipatory action' OR 'early warning' OR 'recovery and reconstruction' OR 'early recovery' OR 'social protection' OR 'cash transfer' AND barrier* OR challenge* OR obstacle* OR limit*) AND ABS (SIDS OR 'Small Island Developing States' OR 'Antigua and Barbuda' OR Guyana OR Bahamas OR '*Kitts and Nevis' OR Bahrain OR Jamaica OR 'S* Lucia' OR Barbados OR '*Vindes and the Grenadines' OR Belize OR Maldives OR Seychelles OR 'Cabo Verde' OR 'Marshall Islands' OR 'Federated States of Micronesia' OR Suriname OR Cuba OR Mauritius OR Dominica OR Nauru OR Tonga OR 'Dominican Republic' OR Palau OR 'Trinidad and Tobago' OR Fiji OR 'Papua New Guinea' OR Grenada OR Samoa OR Vanuatu) AND NOT TITLE ('remote sensing' OR GIS OR geoinformatics OR bioinformatics OR multivariate OR regression OR OLS OR evapotranspiration OR algorithm OR 'machine learn*' OR proteins OR abiotic OR sediment OR mathematic*) AND PUBYEAR > 1991

General climate losses and damages search strings

- 1 ABS ('loss* and damage*') AND ABS (LDC OR 'least developed countries' OR 'low-income countries' OR Angola OR Benin OR 'Burkina Faso' OR Burundi OR 'Central African Republic' OR Chad OR Comoros OR 'Democratic Republic of the Congo' OR Djibouti OR Eritrea OR Ethiopia OR Gambia OR Guinea OR 'Guinea-Bissau' OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mozambique OR Niger OR Rwanda OR 'S?o Tom? and Principe' OR Senegal OR 'Sierra Leone' OR Somalia OR 'South Sudan' OR Sudan OR Togo OR Uganda OR '*Tanzania' OR Zambia OR Afghanistan OR Bangladesh OR Bhutan OR Cambodia OR 'Lao People's Democratic Republic' OR Laos OR Myanmar OR Nepal OR 'Timor-Leste' OR Yemen OR Kiribati OR 'Solomon Islands' OR Tuvalu) AND NOT TITLE('remote sensing' OR GIS OR

geoinformatics OR bioinformatics OR multivariate OR regression OR OLS OR evapotranspiration OR algorithm OR 'machine learn*' OR proteins OR abiotic OR sediment OR mathematic*) AND PUBYEAR > 1991

- 2 ABS ('loss* and damage*') AND ABS (SIDS OR 'Small Island Developing States' OR 'Antigua and Barbuda' OR Guyana OR Bahamas OR '*Kitts and Nevis' OR Bahrain OR Jamaica OR 'S* Lucia' OR Barbados OR '*Vincent and the Grenadines' OR Belize OR Maldives OR Seychelles OR 'Cabo Verde' OR 'Marshall Islands' OR 'Federated States of Micronesia' OR Suriname OR Cuba OR Mauritius OR Dominica OR Nauru OR Tonga OR 'Dominican Republic' OR Palau OR 'Trinidad and Tobago' OR Fiji OR 'Papua New Guinea' OR Grenada OR Samoa OR Vanuatu) AND NOT TITLE('remote sensing' OR GIS OR geoinformatics OR bioinformatics OR multivariate OR regression OR OLS OR evapotranspiration OR algorithm OR 'machine learn*' OR proteins OR abiotic OR sediment OR mathematic*) AND PUBYEAR > 1991



Appendix 2 Analysed included literature

Document name	Authors	Year of publication	Publication type	Research type	Research method	Type of findings	Strength of individual study
Acting Today for Tomorrow	World Bank and Global Facility for Disaster Reduction and Recovery (GFDRR)	2012	International organisation report	Primary and secondary research study	Qualitative	Estimate (current) and projection (future)	Strong
Addressing Loss and Damage at the National Level: Lessons from Bangladesh	Erin Roberts	2015	International organisation report	Secondary research	Qualitative	Estimate (current) and projection (future)	Limited
Addressing Loss and Damage: Critical steps to a UNFCCC response	La Ruta Del Clima	2022	NGO policy brief	Secondary research	Qualitative	Conceptual framework	Limited
Addressing non-economic loss and damage associated with climate change	Yohei Chiba, Sivapuram Venkata and Rama Krishna Prabhakar	2019	Peer-reviewed journal article	Primary research	Mixed	Conceptual framework	Strong
Addressing the Harms of Climate Change Making Sense of Loss and Damage	Kenneth Shockley and Marion Hourdequin	2017	Peer-reviewed journal article	Primary research	Qualitative	Conceptual framework	Limited
Assessing/Addressing climate-induced L&D in Bangladesh	Practical Action	2021	International think tank	Primary research	Qualitative	Estimate (current) and projection (future)	Strong
Assessment of adaptation potentials in the context of climate change	GIZ and Climate Analytics	2021	International organisation and think tank	Primary and secondary research study	Qualitative	Estimate (current)	Strong
Can social protection tackle emerging risks from climate change?	Cecilia Costella, Maarten van Aalst and Yola Georgiadou	2023	Peer-reviewed journal article	Secondary research	Qualitative	Conceptual framework	Limited
Climate and Disaster Resilient Transport in SIDS	World Bank, Resilient Transport Community of Practice and GFDRR	2017	International organisation report	Primary and secondary research study	Qualitative	Estimate (current)	Strong
Climate Finance for Addressing Loss and Damage	Thomas Hirsch et al.	2019	International NGO report	Primary and secondary research study	Qualitative	Estimate (current) and projection (future)	Strong

Climate Risk Adaptation and Insurance – Reducing Vulnerability and Sustaining the Livelihoods of Low-Income Communities	Munich Climate Insurance Initiative (MCII)	2013	International think tank report	Primary and secondary research study	Qualitative	Estimate (current)	Strong
Climate-related 'loss and damage' in cities...	Diane Archer (IIED)	2014	International think tank blog post	Primary research	Qualitative		Limited
Climate-Related Loss and Damage: Finding a solution...	Act Alliance, Germanwatch and Brot für die Welt	2015	International organisation and think tank	Primary and secondary research study	Qualitative	Estimate (current) and projection (future)	Strong
Closing the gaps: A framework for understanding policies and actions to address losses and damages	Colin McQuistan, Barbara Jacobson and Reinhard Mechler	2022	NGO policy brief	Primary research	Qualitative	Estimate (current)	Limited
Contributions and Challenges of Disaster Risk Financing...	Shakira Mustapha	2022	Think tank report	Primary and secondary research study	Qualitative	Estimate (current) and projection (future)	Strong
COP27 and Loss and Damage: only one side of the coin...	IDDDRI	2022	International think tank blog post	Primary research	Qualitative	Estimate (current) and projection (future)	Limited
COP27 Call to Action A Call for Enhanced Implementation...	World Resource Institute	0	International think tank	Primary research	Qualitative	Conceptual framework	Strong
Coping measures not enough to avoid loss and damage from drought	Sidat Yaffa	2013	Peer-reviewed journal article	Primary research	Mixed	Estimate	Strong
Data and digital maturity for disaster risk reduction: Informing the next generation of disaster loss and damage databases	UNDP and UNDRR	2022	International organisation report	Primary research	Qualitative	Estimate (current)	Strong
Defining loss and damage: The science and politics...	Stockholm Environment Institute	0	Think tank discussion brief	Primary and secondary research study	Qualitative	Estimate (current) and projection (future)	Strong
Designing a funding framework for the impacts of slow-onset climate change – insights from recent experiences with planned relocation	Jonathan Boston, Architesh Panda and Swenja Surminski	2021	Peer-reviewed journal article	Secondary research	Qualitative	Mechanisms/processes	Limited
Developing an Institutional Framework to Address Loss and Damage	Erin Roberts et al.	2013	Thin tank report	Primary and secondary research study	Qualitative		Strong
Direct Access to Climate Finance: Experiences and Lessons...	Neil Bird, Simon Billet and Cristina Colón	2011	International organisation report	Secondary research	Qualitative	Conceptual framework	Limited
Economic and non-economic loss and damage to climate change	Mohammad Monirul Islam, Tanjila Akter Nipa and Mohammad Sofiqul Islam	2022	Peer-reviewed journal article	Primary research	Mixed	Estimate	Strong

Empirical evidence from Bangladesh of assessing climate hazards	Joy Bhowmik, Haseeb Mohammad Irfanullah and Samiya Ahmed Selim	2021	Peer-reviewed journal article	Primary research	Qualitative	Conceptual framework and mechanisms/processes	Strong
Financing Instruments and Sources to Address Loss and Damage	Laura Schäfer, Pia Jorks and Emmanuel Seck	2021	International organisation and think tank	Primary and secondary research study	Qualitative	Estimate (current) and projection (future)	Strong
Financing loss and damage: four key challenges	IIED and ICCCAD	2022	International think tank	Primary research	Qualitative	Estimate (current) and projection (future)	Strong
Footing the Bill: Fair finance for loss and damage in an era of escalating climate impacts	Tracy Carty and Lyndsay Walsh	2022	International NGO report	Secondary research	Qualitative	Estimate (current) and projection (future)	Strong
Gender-Responsive Disaster Preparedness and Recovery in the Caribbean	World Bank and GFDRR	0	International organisation report	Secondary research	Qualitative	Estimate (current)	Strong
Harnessing Nationally Determined Contributions to Tackle Loss and Damage in Least Developed Countries	Ritu Bharadwaj, Simon Addison, Devanshu Chakravarti and N. Karthikeyan	2022	Think tank report	Primary research	Mixed	Estimates and mechanisms/processes	Strong
Higher Losses and Slower Development in the Absence...	Stephane Hallegate, Mook Bangalore and Marie-Agnes Jouanjean	2016	International organisation report	Secondary research	Qualitative	Conceptual framework	Limited
How can we stop the slow-burning systemic fuse of loss and damage	Caroline King-Okumu, Daniel Tsegai and Diaminatou Sanogo	2021	Peer-reviewed journal article	Secondary research	Qualitative	Mechanisms/processes	Limited
How to ensure solutions really work...	Olivia Serdeczny, Inga Menke and Adelle Thomas	2018	Think tank policy brief (blog post)	Secondary research	Qualitative	Estimate (current) and projection (future)	Limited
How Will We Pay for Loss and Damage?	J. Timmons Roberts, Sujay Natson, Victoria Hoffmeister, Alexis Durand, Romain Weikmans, Jonathan Gewirtzman and Saleemul Huq	2017	Peer-reviewed journal article	Secondary research	Qualitative	Mechanisms/processes	Limited
International finance to address loss and damage	Lucy Hayes and Oliver Smith	2022	Think tank blog post	Secondary research	Qualitative	Estimate (current) and projection (future)	Strong
Into Unknown Territory: The limits to adaptation...	Actionaid, Care, Germanwatch and WWF	2012	International NGO report	Secondary research	Qualitative	Estimate (current) and projection (future)	Strong
Is climate insurance a global shield, or does climate-related loss and damage require a different approach?	Julie-Anne Richards and Eva Peace Mukayiranga with Erin Roberts	0	NGO discussion paper	Primary and secondary research study	Mixed	Estimate (current)	Strong
Island states need better data to manage climate losses	Adelle Thomas	2017	Think tank blog post	Primary study	Qualitative	Estimate (current) and mechanisms/processes (qualitative findings)	Strong
Landslide Loss and Damage in Sindhupalchok District, Nepal	Kees van der Geest	2018	Peer-reviewed journal article	Primary research	Mixed	Estimate	

Living on the edge: how climate tipping points will reshape...	Taylor Dimsdale, Carolina Cecilio and Inès Benomar	2022	Think tank report	Secondary research	Qualitative	Estimate (current) and projection (future)	Strong
Loss and Damage from Climate Change	Reinhard Mechler, Laurens M. Bouwer, Thomas Schinko and Swenja Surminski	2019	Book	Primary research	Mixed	Conceptual framework, mechanisms/processes and estimate	Strong
Loss and Damage Associated with Climate Change: What and Why, Stakeholder Perspectives, and a Way Forward	Sivapuram V.R.K. Prabhakar, Ketaki Kamat, Aibek Hakimov, Yohe Chiba and Muneyuki Nakata	2016	Book chapter	Primary research	Mixed	Mechanisms/processes	Limited
Loss and Damage Associated with Climate Change Impacts	Linta M. Mathew and Sonia Akter	2017	Book chapter	Secondary research	Qualitative	Mechanisms/processes	Limited
Loss and damage case studies from the frontline...	IIED and ICCCAD	2021	International think tank report	Primary research	Mixed	Estimate (current) and projection (future)	Strong
Loss and Damage Costing and Financing Mechanisms: Caribbean Outlook	Adelle Thomas, Inga Menke and Olivia Serdeczny	0	Think tank report	Secondary research	Qualitative	Estimate (current) and projection (future)	Strong
Loss and Damage from Flooding In Lower Nyando Basin, Kisumu County	Alice Masese, Edward Neyole and Nicholas Ombachi	2016	Peer-reviewed journal article	Primary research	Mixed	Estimate	Strong
Loss and damage from the double blow of flood and drought in Mozambique	Ange-Benjamin Brida and Tom Owiyo	2013	Peer-reviewed journal article	Primary research	Mixed	Estimate	Strong
Loss and damage implications of sea-level rise on Small Island Developing States	Rosanne Martyr-Koller, Adelle Thomas, Carl-Friedrich Schleussner, Alexander Nauels and Tabea Lissner	2021	Peer-reviewed journal article	Secondary research	Qualitative	Mechanisms/processes	Limited
Loss and damage in the IPCC Fifth Assessment Report	Kees van der Geesta and Koko Warner	2019	Peer-reviewed journal article	Primary research	Quantitative	Estimate	Strong
Loss and Damage in Vulnerable Countries Initiative...	Koko Warner et al.	2012	United Nations University report	Primary and secondary research study	Qualitative	Estimate (current) and projection (future)	Strong
Loss and damage, vulnerability and constraints to adaptation	Kees van der Geest, Koko Warner and Sönke Kreft	2014	International organisation report	Primary and secondary research study	Qualitative	Estimate (current)	Limited
Loss and Damage: The Role of Ecosystem Services	Z. Zommers et al.	2016	International organisation report	Primary and secondary research study	Qualitative	Estimate (current) and mechanisms/processes (qualitative findings)	Strong
Loss and Damage: When adaptation is not enough	UNEP	0	International organisation report	Secondary research	Qualitative	Estimate (current) and projection (future)	Limited
Making headway on loss and damage Identifying key gaps and char	DIIS	2022	Think tank policy brief	Primary research	Qualitative	Estimate	Limited

Managing Climate Risks, facing up to Losses and Damages	OECD	2021	International organisation report	Primary and secondary research study	Qualitative and Quantitative	Estimate (current) and projection (future)	Strong
Mapping Loss and Damage Activities: Who Is Doing What And Where And What Are The Gaps?	Hyacinthe Niyitegeka and Eve Peace Mukayiranga	0	Think tank discussion brief	Primary research	Qualitative	Estimate (current) and projection (future)	Strong
Meeting the global challenge of adaptation by addressing...	Magnus Benzie et al.	2018	International think tank report	Primary research	Qualitative	Estimate (current) and projection (future)	Strong
National and International Approaches to Address Loss and Damage from Slow-Onset Processes	Laura Schäfer, Pia Jorks, Emmanuel Seck, Oumou Koulibaly and Aliou Diouf	2021	International organisation and think tank	Primary research	Qualitative	Projection (future)	Strong
Non-Economic Loss and Damage in the Context of Climate Change	Olivia Serdeczny, Eleanor Waters and Sander Chan	2016	Think tank discussion brief	Secondary research	Qualitative	Conceptual framework	Limited
Non-economic Loss and Damage: Addressing the Forgotten Side...	German Development Institute	0	International organisation report/policy brief	Primary research	Qualitative		Limited
Non-Economic loss and damage: closing the knowledge gap	IIED and ICCCAD	2023	International think tank report	Primary research	Qualitative	Estimate (current) and projection (future)	Strong
Non-economic loss and damage: lessons from displacement in the Caribbean	Adelle Thomas and Lisa Benjamin	2019	Peer-reviewed journal article	Secondary research	Qualitative	Mechanisms/processes	Strong
Operationalizing finance for loss and damage: from principles to modalities	Iñes Bakhtaoui and Zoha Shawoo	2022	Think tank report	Primary research study	Qualitative	Estimate (current) and projection (future)	Strong
Opportunities and barriers to the access and use of climate information for small and medium enterprises (SMEs) in Uganda and Kenya	Red Cross Red Crescent Climate Centre	0	International think tank	Primary research	Qualitative	Estimate (current)	Strong
Planned Relocation from the Impacts of Climate Change in Small Island Developing States: The Intersection Between Adaptation and Loss and Damage	Melanie Pill	2020	Book chapter	Secondary research	Qualitative	Conceptual framework and mechanisms/processes	Limited
Pushed to the limit: evidence of climate change-related loss and damage when people face constraints and limits to adaptation	Koko Warner, Kees van der Geest and Sönke Kreft	2013	United Nations University report	Primary and secondary research study	Qualitative	Estimate (current) and projection (future)	Strong
Reading Between The Red Lines: Loss and Damage and The Paris Outcome	Maxine Burkett	2016	Peer-reviewed journal article	Secondary research	Qualitative		Strong
Resilient Transport in Small Island Developing States	Dung Anh Hoang et al.	2022	International organisation report	Primary research	Qualitative	Estimate (current) and projection (future)	Strong

Risk-informed development: a strategy tool for integrating disaster risk reduction and climate change adaptation into development	Sarah Selby and Maria Gemma Perez-Dalena	2020	International organisation report	Primary and secondary research study	Qualitative	Estimate (current)	Strong
Roadmap for Progressing on Loss and Damage: From the G7 Summit	Lucy Hayes and Taylor Dimsdale	2022	Think tank policy brief	Secondary research	Qualitative	Conceptual framework	Limited
Spotlighting the finance gap...	S. Ayeb-Karlsson	2020	International think tank	Secondary research	Qualitative	Estimate (current) and projection (future)	Limited
Steps toward closing the Loss & Damage finance gap: Recommendations for COP25	Germanwatch	2019	Think tank report.	Primary and secondary research study	Qualitative	Estimate (current) and mechanisms/processes (qualitative findings)	Strong
Stocktaking of climate risk assessment approaches related to loss and damage	Laura Schäfer and Kehinde Balogun	2015	United Nations University report	Secondary research	Qualitative	Estimate (current) and projection (future)	Strong
Tackling loss and damage risks: seven key action areas	Anna Carthy and Simon Addison	2022	Think tank blog post	Secondary research	Qualitative	Conceptual framework	Strong
Technical Guidance on Comprehensive Risk Assessment...	United Nations Office for Disaster Risk Reduction	2022	International organisation report	Primary and secondary research study	Qualitative	Estimate (current) and projection (future)	Strong
The complex decision-making of climate-induced relocation	Karen E. McNamara, Robin Bronen, Nishara Fernando and Silja Klepp	2016	Peer-reviewed journal article	Primary research	Qualitative		Strong
The data gap: An analysis of data availability on disaster loss	Emmanuel Osuteye, Cassidy Johnson and Donald Brown	2017	Peer-reviewed journal article	Secondary research	Mixed	Mechanisms/processes	Strong
The Ethical Challenges in the Context of Climate Loss and Damage	Ivo Wallimann-Helmer, Lukas Meyer, Kian Mintz-Woo, Thomas Schinko and Olivia Serdeczny	2019	Book chapter	Secondary research	Qualitative	Conceptual framework	Limited
The EU and the Glasgow Dialogue...	Ariadna Anisimov et al.	2022	Think tank policy brief	Primary and secondary research study	Qualitative	Conceptual framework	Limited
The Loss and Damage Finance Facility: How and Why	Sindra Sharma-Khushal et al.	2022	Think tank discussion brief	Secondary research	Qualitative	Conceptual framework	Limited
The national turn in climate change loss and damage governance	Elisa Calliari and Lisa Vanhala	2022	Peer-reviewed journal article	Primary research	Qualitative	Mechanisms/processes	Strong
The role of public and private insurance in reducing losses from extreme weather events and disasters	Howard Kunreuther and Rosemary Lyster	2016	Peer-reviewed journal article	Primary research	Qualitative	Mechanisms/processes	Limited
Toward a solid science base: Loss and Damage...	Impact	0	International NGO report	Primary research	Qualitative	Estimate (current) and projection (future)	Strong

Unpacking finance for Loss and Damage: Why do developing...		0	International NGO/think tank report/policy brief	Secondary research	Qualitative	Conceptual framework	Strong
What is loss and damage, why is it critical...	Sunil Acharya	2019	Think tank blog post	Primary research	Qualitative	Conceptual framework	Limited
What the IPCC 5th Assessment Report has to say about loss and damage	Kees van der Geest and Koko Warner	2015	United Nations University report	Secondary research	Qualitative	Estimate (current) and projection (future)	Strong
What the new 'loss and damage' fund needs for successes	Pradeep Kurukulasuriya and Ronald Jackson	2022	International organisation blog post	Primary research	Qualitative	Conceptual framework	Limited
Whose 'loss and damage'? In defence of the agency of beneficiary states	Benoît Mayer	2015	Peer-reviewed journal article	Secondary research	Qualitative	Conceptual framework	Limited
Why technology justice is critical for climate negotiations	Colin McQuistan	2015	International think tank	Secondary research	Qualitative	Conceptual framework	Strong