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Strengthening National Responses to Loss and Damage

A Practical Guide for Countries

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1. Introduction

This guideline provides a high-level, practice-informed resource for countries seeking to strengthen national responses to loss and damage. It synthesises current concepts, evidence, policy debates, and emerging good practices, and offers an overarching framework to support reflection on, scoping, and refinement of national loss and damage strategies and related processes. Rather than prescribing a single blueprint or detailed step-by-step procedures, it highlights key issues, choices, and illustrative options that policymakers and practitioners can adapt to their own institutional, socio-economic, and environmental contexts.

Climate-induced loss and damage has emerged as a central theme in global climate discourse, particularly following the Paris Agreement's recognition of loss and damage as distinct from mitigation and adaptation. The roots of this agenda trace back to 1991, when Vanuatu, on behalf of the Alliance of Small Island States (AOSIS), submitted proposals during the Intergovernmental Negotiating Committee (INC) process that led to the establishment of the United Nations Framework on Climate Change (UNFCCC), calling for a mechanism to compensate small island developing states (SIDS) for the effects of sea level rise. Despite this early recognition, loss and damage remained largely absent from formal climate negotiations for nearly two decades, and there have been varying views on what counts as loss and damage (Huq et al., 2013; Boyd et al., 2017; Mechler et al., 2019; Addison et al., 2022; Toussaint, 2024; Vanhala, 2025). This only re-emerged when the Intergovernmental Panel on Climate Change provided compelling evidence of the scale and irreversibility of climate impacts already unfolding.

For the purpose of this guide, Loss and Damage (L&D) refers to the policy processes, while loss and damage (l&d) refers to the observed negative impacts of climate change that occur despite, or in the absence of, mitigation and adaptation efforts (UNEP AGR, 2023), encompassing both economic loss (e.g. damage to infrastructure, loss of crops) and non-economic loss (e.g. loss of cultural heritage, biodiversity loss, impacts on mental health) (Morrissey & Oliver-Smith, 2013; Serdeczny et al., 2016). These impacts materialise through both rapid-onset extreme events and slow-onset processes, including sea-level rise, glacial retreat, ocean acidification, salinisation, biodiversity loss, and desertification, which unfold gradually but generate profound and often irreversible changes to ecological and social systems.

The concept of limits is central to understanding loss and damage (Schinko et al., 2019). Adaptation strategies face both soft limits (financial, institutional, or social constraints that could, in principle, be

overcome) and hard limits, which represent thresholds (e.g. ecological or physical) beyond which adaptation is no longer possible. These limits increasingly concern ecosystem thresholds, such as coral bleaching beyond thermal tolerance, forest dieback, or collapse of keystone species (Armstrong McKay et al., 2022), which reduce adaptive capacity and expand the space of unavoidable loss. When either set of limits is reached, residual impacts emerge, highlighting the boundaries of existing adaptation efforts and the growing need for dedicated loss and damage measures (Barnett et al., 2015; IPCC, 2022).

Unlike mitigation, which focuses on reducing greenhouse gas emissions (avoid or avert loss and damage), and adaptation, which enhances resilience (reduce or minimise loss and damage), loss and damage is concerned with environmental harms that cannot be avoided even under ambitious decarbonisation pathways (Huq et al., 2022; IPCC, 2022). In practical terms for countries, this can be understood by distinguishing between loss and damage that is avoided, loss and damage that is avoidable but remains unavoided, and loss and damage that is ultimately unavoidable and unavoided within the UNFCCC process (Verheyen, 2012). These include both economic loss and damage and non-economic losses, which often unfold across multiple spatial and temporal scales and can be difficult to capture through conventional assessment tools (van Schie, Mayer & Fereidooni, 2024; van Schie D et al., 2024).

Questions of justice lie at the heart of loss and damage (Boyd et al., 2021; Tschakert et al., Roberts & Pelling, 2018). Distributional justice concerns who bears losses and who receives support. Procedural justice concerns whose voices, knowledge systems, and decision-making power are considered. Recognitional justice concerns acknowledging experiences, identities, and worldviews, in particular Indigenous Peoples, local communities, and marginal people, especially those that have been excluded from climate-related decisions historically. These justice dimensions align with the need to streamline inclusive governance, community-led responses, and equitable outcomes across L&D responses at national level.

The progression of sustainable development strongly influences the potential to reduce, minimize, and address loss and damage. Integrating loss and damage into national development planning (such as National Adaptation Plans, Nationally Determined Contributions, disaster risk reduction frameworks, biodiversity strategies, and poverty alleviation plans) helps align climate resilience with broader social and economic priorities, protect vulnerable groups, and reduce long-term risks. Conversely, maladaptation, including poorly designed infrastructure, irrigation schemes that accelerate salinisation, urbanisation in flood-prone areas, or reconstruction in high-risk areas, can increase vulnerability and lock societies into future pathways of higher loss and damage (World Resources Institute, 2025).

Recent developments within the UNFCCC have amplified the political and institutional significance of L&D. Agreements on new funding arrangements, including the Fund for Responding to Loss and Damage (FRLD), the operationalisation of the Santiago Network under the Warsaw International Mechanism, and expanding roles for multilateral and regional institutions demonstrate the increasing recognition of L&D as a central component of global climate policy. The private sector, particularly insurance and private finance institutions, is becoming an important actor, shaping risk landscapes and innovative finance mechanisms. Parallel efforts by multilateral development banks, regional organisations, and civil society have broadened the actor landscape engaged in L&D, highlighting both the momentum and the complication of operationalising loss and damage responses at scale. National strategies will need to align public, private, and community-level action to manage loss and damage coherently.

Local and Indigenous knowledge systems play a critical role in understanding climate impacts (IPCC, 2022; McNamara & Prasad, 2014), identifying patterns of socio-economic and environmental change, and guiding culturally appropriate responses, in particular for non-economic loss and damage. These knowledge systems offer insights into community-adaptation limits, ecosystem changes, and perceptions of landscape transformations, often overlooked in formal risk assessments. Recognising and incorporating these systems is important to ensure national L&D strategies are both inclusive and grounded in lived realities.

This guideline has been developed to support countries in reflecting on, designing, and strengthening coherent national strategies and systems for L&D, rather than

providing a detailed implementation manual. Chapter 2 sets out the elements of a National Loss and Damage Plan, framed by Comprehensive Risk Management (CRM), including proactive measures, risk assessment, risk reduction, risk transfer, and risk retention, transformational approaches, and post-impact management. Chapter 3 examines the integration of L&D into national policy processes, addressing governance and institutional fragmentation, while suggesting options that may enhance coordination, transparency, and accountability. Chapter 4 considers finance as a crucial enabler of effective responses by exploring options for diversifying instruments, improving access to multilateral and regional funds, mobilising private sector funds, and strengthening transparency and local responsiveness. Chapter 5 addresses monitoring, reporting, evaluation, and learning (MERL), emphasising the need for gender-responsive, socially inclusive, environmentally attuned, and participatory approaches that can track both rapid-onset and slow-onset loss and damage. Chapter 6 is the "who and how" of making L&D systems work in practice, highlighting the central role of stakeholder engagement and capacity development, and emphasising multi-stakeholder partnerships, institutional strengthening, and locally led approaches as critical pathways toward equitable and context-specific outcomes.

Taken together, these chapters provide an evidence-based and practice-oriented framework that reflects recent advances in global climate policy while grounding L&D strategies in national and local realities. By clarifying definitions, concepts, and limitations, and by recognising the interplay between sustainable development, maladaptation, environmental change, and justice, this guideline offers structured guidance, examples, and reference points to inform efforts to address the full spectrum of loss and damage. As climate impacts intensify, adaptation limits will increasingly be exceeded, and slow-onset processes such as sea-level rise, ecosystem tipping points, land degradation, and biodiversity loss will continue to both amplify social and environmental vulnerabilities. The imperative for systematic, anticipatory, and context-specific responses is clear. This guideline aims to inform country-led efforts to safeguard development gains and advance climate-resilient and sustainable futures by embedding principles of equity and justice and by acknowledging the diverse ways in which economic and non-economic loss and damage are experienced.

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Comprehensive Risk and Response Management for National Loss and Damage Strategies

2.

Comprehensive risk management (CRM) is a holistic approach that enables countries to manage climatic and non-climatic hazards in an integrated manner. Rooted in international frameworks such as the Sendai Framework, the Paris Agreement, and the 2030 Agenda, it supports coherent long-term planning and resilience-building (UNDRR, 2025).

CRM is widely recognised under the UNFCCC process as an approach for responding to loss and damage, encompassing both past and future climate-related impacts (UNFCCC, 2015; UNFCCC, 2019). Its dual orientation, examining historical impacts, and anticipating future risks, provides the foundation for developing evidence-based, context-specific strategies. This forward- and backward-looking approach ensures that lessons from experience are integrated with foresight to guide effective planning and action.

As climate impacts become more frequent, severe, and widespread, CRM has evolved (UNFCCC, 2025). Initially, CRM included four core components, risk assessment, risk reduction, risk transfer and risk retention, mainly focused on anticipating and preparing for potential loss and damage (UNU, 2012; UNFCCC, 2015) However, as actual loss and damage has escalated globally, the framework also addresses realised impacts. These newer elements, such as transformational approaches and post-impact management, reflect the growing need to respond to ongoing and unavoidable climate risks (Huq et al., 2022; Verheyen, 2012). This broader framing aligns with emerging typologies distinguishing between avoided, avoidable but un-avoided, and unavoidable loss and damage, and underscores the need for CRM to integrate both prospective risk reduction and responses to realised impacts.

While different interpretations of CRM vary in how these components are categorised or sequenced, the overall framework underscores the importance of an integrated and flexible approach. This chapter provides an overview of each of the principal components, recognising that together they represent a continuum of strategies - from proactive risk reduction to post-impact recovery - that enable societies to more effectively reduce and manage the escalating risks and impacts of climate change.

Figure 1: Overview of Comprehensive risk and response management framework

2.1
Climate Risk Assessment

Climate Risk Assessment (CRA) identifies areas, communities, infrastructure, or sectors at risk by understanding hazard, vulnerability, exposure, and response as drivers of risk (Ara Begum et al., 2022; EEA, 2022). To inform effective and forward-looking CRM, CRAs can build on a broad and evolving body of practice, including lessons from National Adaptation Plans (NAPs) and sectoral toolkits, developed by international agencies and experts. CRA provides decision-makers with a solid analytical foundation to inform strategies, plans and policies that support effective CRM.

CRAs usually follow a cyclical, iterative process that involves data collection through qualitative (e.g. interviews and focus group discussions) and quantitative (e.g. numerical models) approaches and should be tailored to national and local contexts.

An initial *scoping* phase defines needs, objectives, and overall context of the CRA. This process aims at understanding the institutional, sectoral, resource, and actor environment and establishes a roadmap including goals, methodology, and timeframe. Early inclusion and engagement with decision makers, stakeholders, and vulnerable and marginalised groups is crucial as it increases risk ownership and enables needs- and people-centred assessments that account for equity and justice (EEA, 2022).

The scoping phase is followed by *risk identification*. During this phase existing knowledge on climate-related hazards, as well as connected exposures, vulnerabilities, and responses, may be explored and narrowed down to better understand the individual risk situation. This can be done by harnessing historical observations, local knowledge, or existing risk maps and explorers, thus preparing for subsequent risk analysis. The identification of hotspots - i.e. geographical area, sector, or communities where climate-related risks are expected to lead to particularly severe, recurrent, or unavoidable impacts - are particularly relevant when conducting CRA for loss and damage. The GIZ Global Programme on Risk Assessment and Management for Adaptation to Climate Change (Loss and Damage) included hotspot analysis (Table 1) within its six-steps methodology for CRA, which has been applied in Tanzania and India (*GP L&D, 2021)*[1].

1 This is relevant because it demonstrates that hotspot analysis can be practically integrated into national risk assessment processes, and other countries can adapt this tested approach to identify priority areas, sectors, and population groups for targeted adaptation and loss and damage interventions.

Table 1: Adapted from GP L & D (2021)

	Guiding questions	Expected outcomes	Tools, methods, sources
Hotspot and Capacity Analysis of System of Interest	Which sectors and livelihood strategies are crucial for the achievement of development objectives in the area of concern? Which communities/regions and sectors have already been identified as highly vulnerable to the impacts of climate change (including considerations of especially vulnerable groups such as youth, women, elderly, and minorities)? For which development objectives is information about impacts from projected climate change lacking? For which sectors and livelihood strategies are adaptation and risk management options still lacking?	Selection of a clearly defined sector /region based on criteria such as: potential climate (and disaster) risks; Socio-economic and ecological factors; Institutional factors and availability of data.	Compilation of climate change-related hazards and their potential impacts; Collection of spatial and historical data, such as socio-economic, exposure, weather, and climate data; Use of geographic information systems (GIS) where applicable; Stakeholder consultation; Local, national, international, and secondary sources.

Risk analysis Risk analysis integrates information on climate risk drivers, hazards, exposure, vulnerability, and response capacity to estimate potential climate impacts. Quantitative methods (e.g. probabilistic or model-based approaches) generate measurable outputs across climate scenarios, while qualitative tools (e.g. impact chains or storylines) capture diverse perspectives through participatory processes. Combining these approaches strengthens robustness, improves coverage, and reduces blind spots.

Risk outcomes are therefore to be contextualised in a risk evaluation phase to comprehend their severity in terms of socio-economic or environmental impacts. In a loss and damage context, it is essential to understand risk tolerance (GP L&D, 2021) to distinguish between risks that may be acceptable (requiring no further action), tolerable (manageable through incremental measures) or intolerable (demanding transformational responses). Methods for risk evaluation include field surveys or focus groups to capture community risk perceptions, and expert judgement to classify risks. Further engagement with relevant stakeholders and/or vulnerable groups ensures broad validation and relevance.

Finally, through a monitoring, evaluation, and learning (MEL) process, CRA outcomes, efficacy, usefulness, or impact may be tracked. New data, information/ knowledge, socio-economic developments, or adaptation mechanisms may have implications for future CRA iterations. Additional context- and objective-specific indicators support progress tracking and reflect on achievements or potential shortcomings.

Effective presentation and communication of CRA results support risk-informed decision-making and the selection of appropriate CRM measures. Risk ownership, supported by inclusion, engagement, and co-generation of knowledge with decision-makers, stakeholders, and vulnerable groups throughout the CRA process, is essential for effectively addressing climate-related risks. In doing so, a CRA becomes not only a technical exercise but also a socially grounded process that fosters equitable, resilient, and forward-looking CRM.

2.2
Risk Reduction

Risk reduction is a core pillar of CRM, aiming to reduce exposure and vulnerability to climate hazards through measures such as resilient infrastructure, land-use planning, sustainable resource management, and early warning systems. When embedded in development planning, risk reduction helps minimise both immediate and long-term loss and damage from extreme and slow-onset events.

Risk reduction is closely linked to adaptation, which seeks to reduce climate risks by adjusting to actual or expected climate impacts (IPCC, 2012; IPCC, 2024; UNFCCC, 2025). Measures operate at multiple scales and include both structural and non-structural approaches. Structural measures modify the physical environment, such as flood defences, elevated infrastructure, and nature-based solutions like mangrove restoration. Non-structural measures include policies and governance tools such as building codes, land-use regulations, early warning systems, and public awareness and training programmes.

Effective risk reduction also requires addressing structural inequalities that increase vulnerability, particularly for marginalised groups. Community-based adaptation, strengthened institutions, and the integration of local and Indigenous knowledge are essential for reducing risk and enhancing resilience. Importantly, risk reduction should also be incorporated into response, recovery, and rehabilitation processes, as building back better can reduce future loss and damage (see Section 2.6).

Box 1

Intersections with National Adaptation Planning

Role of NAPs: NAPs are nationally driven processes that strengthen adaptive capacity, reduce vulnerability, and integrate adaptation into policies and planning (UNFCCC, 2011).

Links to loss and damage: Nearly half of NAPs explicitly reference loss and damage, mainly in relation to climate risks, vulnerabilities, and adaptation priorities (Qi et al., 2023).

Alignment with CRM: The UNFCCC's Updated Technical Guidelines for NAPs align closely with CRM components, particularly:

- *Risk assessment*: Assessing climate hazards, exposure, vulnerability, and risk using medium- and long-term scenarios (UNFCCC, 2025).
- *Planning*: Identifying and prioritising risk reduction, risk transfer, and resilience-building measures.

Key gaps: Many NAPs do not adequately address irreversible impacts beyond adaptation limits, non-economic losses, permanent climate-related mobility, or response and recovery from extreme events (Qi et al., 2023).

Way forward:

Strengthening links between NAPs and CRM can help address these gaps by explicitly integrating loss and damage considerations and aligning adaptation, risk reduction, and risk transfer measures.

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Overall, risk reduction depends on integrated, multi-level governance, and cross-sectoral coordination, combining scientific evidence with participatory approaches. As a foundational component of CRM, it helps safeguard development gains, reduce reliance on emergency responses, and support long-term, climate-resilient development.

2.3 Risk Transfer

Risk transfer manages the financial risks that remain after risk reduction measures are implemented. Mechanisms such as insurance, catastrophe bonds, contingency funds, and regional risk pools provide governments, businesses, and households with financial protection against incurred loss and damage (European Bank, 2024; UNDP, 2025; MCII, 2018; Schäfer et al., 2016). By spreading risk across actors, time, and geographies, risk transfer can reduce catastrophic economic impacts and support faster recovery. However, many instruments face challenges related to affordability, basis risk, low uptake among low-income and marginalised groups, and limited suitability for slow-onset events, underscoring the need for context-specific and pro-poor design. Within CRM, financial risk transfer contributes to resilience by providing predictable and timely resources when loss and damage occur. For vulnerable populations and climate-exposed economies, these tools can help protect livelihoods, maintain public services, and reduce reliance on ad hoc emergency assistance. Risk transfer is most effective when embedded within broader strategies that prioritise risk reduction, social protection, and inclusive development, and when distributional impacts and protection gaps are explicitly addressed.

Advancing risk transfer requires coordinated action across governance levels, including enabling regulatory frameworks, public–private partnerships, and international initiatives such as the G7 InsuResilience and regional risk pools including ACRIFA, CCRIF-SPC, the Pacific Insurance and Climate Adaptation Programme, and the Pacific Catastrophe Risk Insurance Company (Global Shield Secretariat, 2024; ACRIFA, 2023; CCRIF-SPC, 2024; UNCDF, 2020; PCRIC, 2021). Integration with broader adaptation and development strategies is essential to ensure affordability, accessibility, and equity.

Risk transfer also has clear limits. Non-economic loss and damage, such as cultural heritage loss or biodiversity decline, is largely outside the scope of these mechanisms. As risks intensify, insurance may also become prohibitively expensive or unavailable, highlighting the need to treat risk transfer as one component of a broader CRM framework (Jarzabkowski et al., 2019; Collier and Elliott, 2021). Recent analyses therefore emphasise that pro-poor risk transfer requires strong public oversight, transparent criteria, sustained subsidies, and alignment with rights-based and justice-oriented approaches to loss and damage (MCII, 2018; Schäfer et al., 2016).

2.4 Risk Retention

Risk retention is an established component of CRM and refers to explicit or implicit arrangements that help a risk holder (e.g. governments, businesses, or households) to absorb the impacts of a climate-related hazard (UNFCCC, 2019; SCF, 2016). Financial risk retention instruments used by governments include, for instance, national budget contingencies, reserve funds, and contingent loans, including access to contingent credit facilities offered by Multilateral Development Banks (ODI, UNDRR, 2023; UNFCCC, 2024). An example of these budgetary arrangements is FONDEN, the national contingency fund for disasters in Mexico, which finances recovery in the aftermath of floods, tropical cyclones, and earthquakes through previously set-aside funds (UNFCCC, 2019). Fiji provides an example in the context of L&D from Slow Onset Events (SOEs) through the "Climate Relocation of Communities Trust Fund," created by the Government in 2019 to resource vulnerable communities adversely impacted by climate change and needing to be relocated (ODI, UNDRR, 2023). The Fiji Government contributes to this fund through

the payment of 3% of the revenue raised through VAT on prescribed services, plastic levy, superyacht levy, and income tax (Fiji, 2023).

Well-planned risk retention can be a component of a broader strategy to manage loss and damage. However, when costs arise unexpectedly, they can create heavy financial pressures on the public sector (UNFCCC, 2012). Moreover, if resources set aside for recovery, reconstruction and rehabilitation do not include sufficient incentives to Build Back Better (BBB), the risk is to perpetuate existing vulnerabilities and miss opportunities to enhance long-term resilience (Birkmann et al., 2023).

Risk retention also encompasses activities, like social protection, which target specific populations and aim at increasing their adaptive capacity, prevent and reduce risks, and enhance livelihoods. Social protection consists of public interventions to assist individuals, households, and communities in better managing risk, and to provide financial support to the critically poor. Social protection systems build on three key types of interventions: i) social assistance as non-contributory programmes aimed at supporting particularly vulnerable groups through cash or in-kind transfers; ii) abour market programmes and policies and iii) social insurance interventions as contributory programmes aimed at protecting individuals and households against shocks (Jorgensen and Siegel, 2019). The WIM ExCom Technical Guide on Sea Level Rise (UNFCCC, 2024) exemplifies several formal social protection systems in the context of sea level rise, including training for sustainable fishing and in-kind transfers (e.g. fishing nets) for fish farmers and fishers, and social health protection programmes for sea level rise-related risks (e.g. psychological support, public awareness).

2.5

Transformational Approaches

Transformational approaches involve fundamental changes to systems in response to climate impacts, either through new activities or scaling existing measures to higher intensity or new contexts (IPCC, 2022; Pelling, 2011; O'Brien, 2012). Whether an action is transformational or incremental depends on baseline conditions and socio-economic context—for example, introducing health services in underserved rural areas can be transformational but incremental where services already exist (Biesbroek et al., 2025).

Transformation also encompasses changes in decision-making, values, capacities, and priorities across scales, from households to governments (Few et al., 2017; Pelling & Garschagen, 2019). This includes redesigning settlements and governance for equity, sustainability, and resilience, particularly addressing structural inequalities in informal settlements (UNFCCC, 2025; Howard et al., 2025). Documented examples of transformational actions are currently limited. The second volume of the Compendium on Comprehensive Risk Management by the WIM ExCom compiles some case studies across the world which demonstrate transformative efforts, including re-skilling when jobs are no longer viable, fundamentally changing urban planning and communication strategies, embracing innovative urban planning and water storage, and relocating communities at risk (UNFCCC, 2025).

2.6

Managing Impacts

Assessing incurred loss and damage

Retrospective assessment of loss and damage (L&D) is complex due to its diverse, context-specific impacts on individuals, society, and the environment, unfolding across different temporal and spatial scales (Boyd et al., 2021; FAO, 2023). Some non-economic losses (NELs) occur over generations, such as the loss of traditional livelihoods, while others, like psychological distress, manifest within weeks or months. Climate hazards also trigger cascading effects on ecosystem services, infrastructure, livelihoods, food security, and education, which are often poorly captured in conventional assessments. Attribution of impacts to climate change remains a key challenge.

Few tools exist for retrospective L&D assessments, mostly at community or city levels, covering extreme and slow-onset events and combining quantitative and qualitative methods (surveys, interviews, FGDs),

with emphasis on participatory approaches. Emerging, locally-led assessments, e.g., in Nepal (Parajuli et al., 2023), highlight the need for integrative strategies across scales. Table A1 in Annex A summarises these tools, their purpose, methods, hazards addressed, scale, strengths, and limitations. These approaches provide a foundation for more comprehensive L&D assessments.

Economic losses and damage

Tools traditionally used to assess the impact of disasters - especially in monetary terms - are increasingly considered and applied within the loss and damage context. Assessing the cost of disasters requires, as a first step, the recording of physical damage, which is then translated into monetary value by applying unit prices - e.g. "as built" or "improved" replacement cost, inflation-adjusted original values, depreciated values etc. - (ECLAC, 2003). Losses are estimated by comparing the economy's actual post-disaster output with a modelled scenario of what would have been produced had the disaster not occurred and can be valued at either producer or consumer prices (ECLAC, 2003; 2014). It is worth stressing, however, that while data and methods are available for assessing the economic impacts of extreme events, quantifying the impacts of slow-onset events remains much more difficult - including the lack of clear start and end points (UNDRR, 2024). Moreover, these methods have been developed in the context of disasters and do not address the climate change attribution question.

In loss and damage discussions, the Post-Disaster Needs Assessment (PDNA) methodology has attracted increasing attention as an internationally accepted tool through which governments can determine the physical damage, economic losses, and costs of meeting recovery needs after a large disaster. The PDNA builds on the quantitative analysis of the Damage and Loss Assessment (DaLA) methodology, developed by the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC) (ECLAC, 2014; GFDRR, 2014). National authorities receive technical and financial support from partners such as the World Bank, the European Commission, and UN agencies. The PDNA assesses all sectors of the national economy as grouped into productive (agriculture, commerce, industry, tourism), social (housing, education, health, culture) and infrastructure (water and sanitation, community infrastructure, electricity, transport and telecommunication) sectors. It further includes gender, governance, environment, disaster risk reduction, employment, livelihoods, and social protection as cross-cutting areas. The PDNA uses standard templates and a standard methodology for carrying out the assessment. While the tool mainly focuses on economic losses in the context of extreme events, discussions are underway within UN agencies on how to expand it to address ecosystem losses, health impacts, and intangible heritage impacts, and to investigate its suitability to assess loss and damage from slow onset events (UNDP, 2023). Challenges for employing the PDNA for SOEs relate to the lack of clear start and end date times, which makes it hard to identify the pre-event period (baseline) and effect of the hazard(s), as well as assess the associated socioeconomic and environmental (ongoing) impacts, among other things (UNDRR, 2023).

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Box 2

Using Satellite Night-Light Data to Estimate Disasters' Economic Impacts

Night-time light data, captured by satellites, has become a common tool for estimating the economic losses caused by disasters (Jia et al., 2023). A study by the Inter-American Development Bank (Zagarra et al., 2021) employed an innovative approach to measure the macro-economic effects of four recent hurricanes in The Bahamas: Joaquin (2015), Matthew (2016), Irma (2017), and Dorian (2019). Historical night light intensity between 2015 and 2019 was used to develop monthly GDP time series by island prior to and after the four hurricanes. The study then compared the spatial variation of satellite night lights as an indicator of the country's economic activity before and after each event. The study allowed to track short-term changes in economic activity across the islands to assess economic recovery times to achieve pre-hurricane GDP levels (from four to eight months on average for the hurricanes studied) and to identify tourism, transport infrastructure, and housing among the most affected sectors. This approach is particularly useful in contexts where primary data on economic losses is unavailable.


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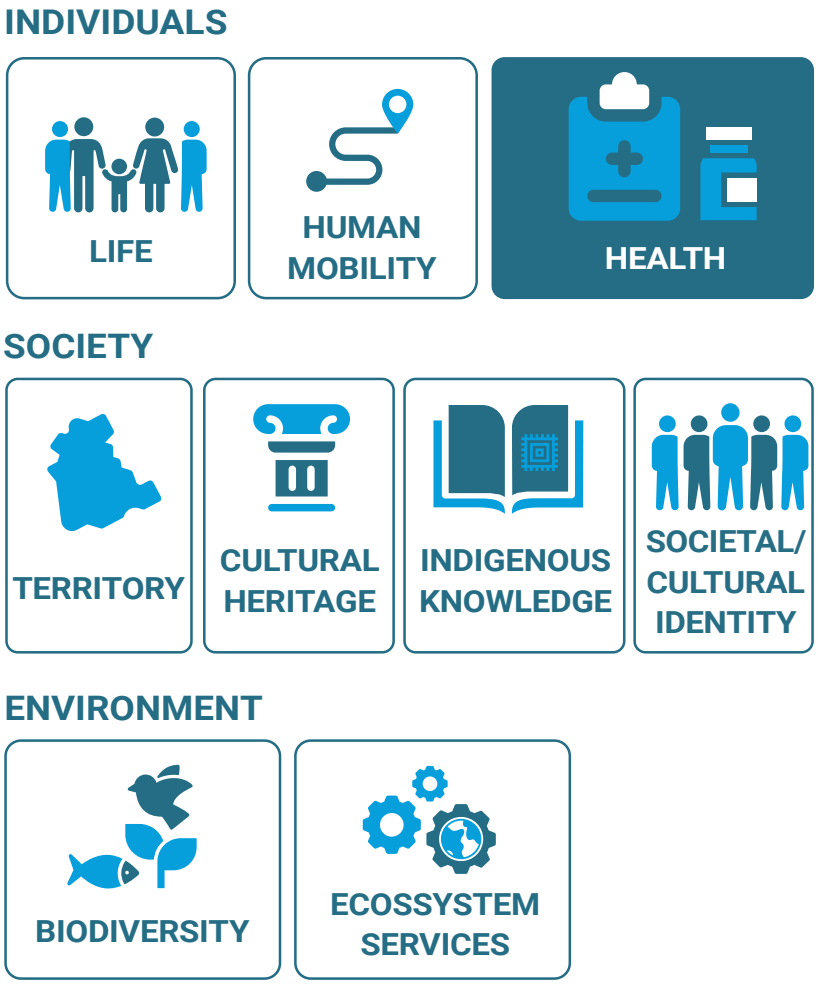
Non-economic loss and damage

Intangible or non-market effects of disasters are often excluded from cost assessments due to their subjective and variable valuation (Magee et al., 2016). Welfare economics offers methods to value such losses, including revealed preference (observing behaviour, e.g., money spent visiting cultural sites) and stated preference (survey-based) approaches (UNFCCC, 2013). Revealed preference methods can estimate ex post disaster costs, environmental goods, and health impacts, such as using the cost-of-illness approach (Markantonis et al., 2012) or valuing coral reef ecosystem losses (IIED, 2024), though they can be time- and resource-intensive (UNFCCC, 2013; see Chapter 4). Ethical concerns arise when valuing life or applying these methods in low-income communities (LSE, 2015).

Some non-economic losses and damages (NELDs) can be quantified without monetary valuation. For example, the disability-adjusted life year (DALY) estimates healthy years lost due to illness, disability, or premature death, capturing impacts on education, work capacity, productivity, and wellbeing (UNDRR, 2025). Human mobility, such as displacement due to climate events, can also be measured using surveys, drones, satellite imagery, or mobile phone data (UNFCCC, 2013; IDMC, 2021; Lu et al., 2016). Cultural heritage impacts can be mapped (e.g., via PDNA), though economic valuation is difficult due to uniqueness and incommensurability.

Some NELDs, like mental health, sense of place, cultural practices, and traditional livelihoods, cannot be meaningfully monetised. Qualitative methods such as interviews, focus groups, and participatory approaches help capture context-specific impacts, while surveys can quantify perceived losses, as shown in studies on social cohesion in Ghana and Niger (Jarawura & Lindegaard, 2024). Centring local values ensures people's experiences are recognised and informs more accurate, context-relevant L&D assessments (van Schie et al., 2023).

Figure 2: Non-economic loss and damage categories



Loss and damage databases

International disaster databases compile statistics from national governments and other sources, using standardised indicators like fatalities or economic loss for comparability (OECD, 2018). Notable databases include EM-DAT, DesInventar, and insurance databases such as Natcat-Service (MunichRe) and Sigma (SwissRe). UNDRR, UNDP, and WMO are developing the Disaster Tracking System (DTS) to replace DesInventar, offering a more comprehensive, interoperable platform with localised, disaggregated loss and damage data (CRED, 2024; UNDRR, UNDP & WMO, 2024; Munich Re, 2024; Swiss Re, 2023) (see Chapter 5). See Annex (Table A2).

Existing databases may not fully capture actual economic and non-economic losses or explicitly link impacts to climate change. To address this, Scown et al. (2022) compiled a harmonised country-level dataset covering climate-related loss and damage, exposure, vulnerability, adaptation readiness, climate attribution, finance, and governance, standardising indicators where relevant[2,3].

2 The database is available here: https://doi.org/10.23644/uu.14769675

3 Importantly, no dataset will ever fully capture all dimensions of loss and damage; data will remain incomplete, uncertain, and uneven across countries. Rather than treating data gaps as a barrier to action, countries are encouraged to work with the best available evidence, using reasonable estimates, proxies and expert judgment, and to transparently document assumptions and limitations so that loss and damage assessments can improve over time

Attributing loss and damage to climate change

Loss and damage results from the interplay between climate hazards and the exposure and vulnerability of human systems, ecosystems, and their biodiversity (IPCC SPM). Attribution science compares the climate conditions that we are experiencing today with what they would be without human influence (Otto, 2023). Early studies in the 1990s focused on trend attribution, looking at the extent greenhouse gas emissions affected global temperatures, sea level rise, and precipitation shifts (UCS, 2025). Since then, the field has greatly evolved and made it possible to answer other critical questions like "Did climate change make a specific weather event worse?" or "How much damage from an event was caused by climate change?" (UCS, 2025).

Extreme event attribution aims at answering the first question. It is a distinct sub-field that emerged in 2004 when scientists managed to quantify how human-induced climate change had increased the likelihood of a specific extreme event, i.e. the 2003 heatwaves (Stott, Stone, & Allen, 2004). Since then, studies have been able to quantify the contribution of climate change to other extremes, like hurricanes, droughts, and wildfires. In this field, the World Weather Attribution (WWA[4]) initiative was established in 2015 to provide rapid assessments to understand the role of climate change in the aftermath of extreme weather events. For instance, WWA scientists studied the 2022 Pakistan flood and found that climate change increased extreme monsoon rainfall in 2022 (Otto et al., 2023).

Impact attribution is the newest sub-field of attribution, science quantifies the direct social and economic consequences of climate change. Studies typically focus on human impacts (e.g., mortality, morbidity, displacement) or economic impacts (e.g., direct and indirect damage, insured losses), with few addressing both (Noy et al., 2024). It informs adaptation planning by identifying areas with high or increasing climate-related damage (Noy et al., 2024).

Complexity increases uncertainties, for example, when including human outcomes in flood attribution alongside rainfall modelling, runoff conversion, or protective infrastructure (Scussolini et al., 2024). These studies require long, high-quality datasets, often lacking in vulnerable countries, highlighting a need to expand research capacity to close the Global North–South evidence gap (Otto, 2023). For data-scarce settings, proposed approaches include an "inclusive approach," treating all weather events as climate-related, and a "qualitative approach" using IPCC insights to assess human influence on events (Serdeczny et al., 2024).

Recovery, response and rehabilitation

Response, recovery, and rehabilitation are actions taken before, during, and after a disaster (UNDRR, 2017):

- **Response:** Immediate actions to save lives, reduce health impacts, ensure safety, and meet basic needs.
- **Recovery:** Restoring or improving livelihoods, health, economic, social, cultural, and environmental assets, aligned with sustainable development and BBB principles.
- **Rehabilitation:** Restoring basic services and facilities for community functioning.

Recovery and rehabilitation enhance resilience by addressing long-term vulnerabilities and improving coping capacity (World Bank, 2022). In Vanuatu, post-Cyclone Pam recovery leveraged traditional building techniques such as the wind-resistant nakamal (Vanuatu, 2025). The PDNA highlighted how Indigenous architecture minimised loss of life. To preserve this knowledge, the Vanuatu National Cultural Centre documented techniques, promoted legal protection, and integrated them into schools and policy frameworks. Today, these designs are applied in cyclone-safe housing by engineers, universities, and NGOs, demonstrating locally-led resilience that combines traditional knowledge with modern solutions adaptable to local hazards, materials, and needs.

4 https://www.worldweatherattribution.org/

Box 3

Anticipatory Action (AA) to Bridge Preparedness with Response

AA refers to measures taken before a forecasted hazard strikes, with the aim of minimising its effects on people's lives, livelihoods, and humanitarian needs. It includes a set of pre-agreed and pre-financed measures that are ready to be executed when forecasts reach an established triggering threshold (UNDRR and OCHA, 2024). For instance, in the agricultural sector, these actions are designed to safeguard farmers, herders, and fishers' key assets, and can range from providing drip irrigation systems and drought-resistant seeds, to offering financial support to fishermen for safeguarding their vessels and equipment before a storm, to supplying pastoralists with feed and vaccines to ensure livestock survival and well-being before droughts (FAO, 2021).

2.7

Challenges and Ways Forward to Strengthen CRM

CRM is complex due to the interconnected and compounding nature of climate risks (Qi et al., 2023; RCCC et al., 2023). Effective CRM requires integrated approaches, addressing both adaptation and loss and damage, while managing risks across sectors and regions (Qi et al., 2023; Mechler et al., 2021; RCCC et al., 2023).

Governance challenges include fragmented institutions, unclear mandates, and limited coordination across sectors and scales. CRM has traditionally focused on extreme events and ex-ante measures, but slow-onset events and ex-post responses are increasingly recognised as critical (MCII et al., 2025). Strong governance frameworks are needed, using participatory methods, impact chains, quantitative risk indexes, and scenario-based modelling (Mechler et al., 2021).

Knowledge and data gaps constrain CRM. Limited temporal and spatial data, underuse of the term "loss and damage" (RCCC et al., 2023), and difficulty measuring non-economic impacts - especially ecological losses - hinder planning and finance integration (IPBES, 2019; IPCC, 2022; New et al., 2022). Strengthening inventories, aligning disaster and climate data, and leveraging national, subnational, and global sources (e.g., EM-DAT, DesInventar) are essential (UNDRR & WMO, 2023; New et al., 2022) (see Chapter 5, Sections 5.1 and 5.2).

Finance remains a key barrier. National systems often lack dedicated funding streams, limiting CRM implementation. Adequate and predictable finance is critical, particularly for vulnerable developing countries (RCCC et al., 2023; New et al., 2022) (see also Chapter 4).

Implementation challenges include limited uptake of global frameworks at national and subnational levels (UNDRR, 2024; New et al., 2022) and unclear guidance on transformative action (MCII et al., 2025). Effective CRM emphasises both forward- and backward-looking approaches should integrate response, recovery, and rehabilitation not just humanitarian action to reduce future vulnerability. Documenting and sharing good practices will enhance CRM use (Mechler et al., 2021; UNDRR, 2024).

Addressing governance, knowledge, finance, and implementation challenges is essential for CRM to function as a comprehensive approach to L&D. Policymakers must invest in the systems, capacities, and resources needed to support its development and implementation.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3. Integrating Loss and Damage into National Policy Processes: Identifying Gaps and Providing Guidance

National policy processes and political institutions will be a critical force in allowing human societies to effectively navigate climate change loss and damage. Decisions about how to respond to loss and damage are inherently domestic political choices that must address the country-specific climate risks and impacts that a country faces, while considering institutional capacities and balancing diverse stakeholder needs.

Public authorities' existing work on sustainable development, disaster risk management (DRM), environmental management, civil protection, and humanitarian response provides a foundation for integrating loss and damage into national policy processes.

The intensifying scale of climate impacts suggests that countries which are able to identify adaptation limits[5] both *within* and *through* their governance systems will be better placed to respond to loss and damage. Identifying adaptation limits *within* governance systems refers to the ability to identify underdeveloped governance structures and institutions, and the ways in which these may constitute soft limits to adaptation (Juhola and Malmström, 2025). The ability to recognise adaptation limits and identify, assess, and respond to loss and damage *through* governance systems refers to the design of governance systems that inform policy stakeholders when adaptation limits are being breached and provide awareness of the range of policy options for responding to loss and damage[6].

3.1 Institutional and Governance Gaps

Countries with underdeveloped governance systems and/or weak political institutions are more likely to see soft limits to adaptation within these systems. This section assesses key governance-related soft limits.

5 see Chapter 2 for a detailed explanation on adaptation limits.
6 see Chapter 4 for the financial options available.

3.1.1. Importance of Governance

Climate governance refers to the institutions, mechanisms, processes, and norms through which societies manage climate change (Dubash et al., 2022) and provide a mandate for action, enabling coordination across sectors and scales, facilitating inclusive participation, securing and allocating resources, and ensuring accountability for long-term planning (UNEP, 2023).

Regulatory, legislative and policy measures on adaptation are important as they signal the direction of travel by setting goals and targets, mainstreaming adaptation into sector policies, encouraging whole-of-economy approaches, and enhancing regulatory certainty. They also create new institutions which can serve as focal points for societal engagement and attract international finance.

Political institutions should enable adaptation governance by coordinating and cooperating across sectors, scales, and policy stakeholders. Sub-national institutions play a complementary role to national institutions, as municipalities and regional governments often have jurisdiction over adaptation relevant sectors, such as land-use and public health, and because adaptation requires context-sensitive solutions at local level.

3.1.2. Cross-Country Assessment of Institutional Arrangements for Loss & Damage Governance

Effective L&D governance hinges on robust institutional arrangements: laws, data systems, and partnerships linking government, experts, and communities. Yet research shows uneven progress: most vulnerable countries lack fully dedicated L&D frameworks, making transparency and action a persistent challenge (UNEPCCC Forthcoming). A desktop review of developing countries showed that, overall, only three countries out of 118 LDCs and SIDS, - Bangladesh, Nepal, and South Africa - had national frameworks dedicated specifically to L&D, highlighting the nascent state of this governance domain[7]. Further detail is provided in Annex B (Table B1), which presents a comparative overview of institutional arrangements across the reviewed LDCs and SIDS and highlights emerging practices.

Key comparative insights:

- **Mandates & coordination:** Less than half of countries (46%) have established a designated national focal point or inter-ministerial coordinating body for L&D. The majority instead integrate L&D into broader disaster risk or climate adaptation policy.
- **Legal frameworks:** About 35% of reviewed documents directly address L&D through explicit law or policy, but most function through indirect or cross-referenced measures. Only a handful - notably Bangladesh, Nepal, South Africa - have adopted dedicated L&D frameworks.
- **Expertise & data systems:** One-third identify or regularly engage expert teams for L&D tracking. Fewer than one-third (30%) have formalised agreements on data flows, collection, or quality management. Centralised climate data repositories, where present, are regarded as best practice but remain the exception rather than the norm.
- **Stakeholder inclusion:** While multi-stakeholder committees or participatory processes are encouraged, only about 42% of countries document sustained or formal stakeholder engagement in their arrangements. This means local community input and non-governmental perspectives are often underutilised.

7 This desktop research was conducted using targeted keyword searches of government strategies, action plans, climate adaptation/loss and damage frameworks, and recent grey literature. An iterative review process prioritised documents published from 2013 to 2025, with selection criteria based on relevance, specificity, and inclusion of institutional features tied to L&D. Qualitative content analysis distilled arrangements along core categories (legal mandates, data management, stakeholder engagement, etc.), drawing on both literature and feedback from international workshops. Regional Coverage: Africa: 29.66% (= 35 out of 118); Asia-Pacific: 26.27%, Europe and Central Asia: 27.12%, Latin America and the Caribbean: 12.71%, North America: 1.69% and West Asia: 2.54% (UNEPCCC forthcoming).

To strengthen national L&D architectures, focus on four key actions: clarify mandates, formalise coordination, establish robust data flows, and actively involve affected communities meaningfully. Many countries are still at the early stages, so addressing fragmentation, closing funding gaps, and ensuring broad stakeholder participation will be important for building resilient and future-ready L&D governance.

3.1.3. Identifying Governance Gaps

Underdeveloped, underperforming or dysfunctional governance systems are often described as a "soft limit" to adaptation, yet multiple potential soft limits exist within governance systems (Juhola and Malmström, 2025, 1). When governance systems lack the capacity, coordination, or legitimacy to respond effectively, even viable solutions may fail, resulting in loss and damage. Therefore, addressing and avoiding loss and damage requires sustained investment in governance systems that can: identify and monitor climate risks in real time, coordinate responses across sectors and levels of government, and ensure justice and protection for vulnerability in the face of escalating climate threats.

Below are key soft limits that lie within governance systems (these are often overlapping and mutually reinforcing) and should be strengthened where they have gaps:

Financial Constraints (see Chapter 4, Sections 4.2–4.4):

- **Resource constraints:** Limited institutional capacity and/or insufficient resources for developing and/or implementing adaptation measures (Thomas and Theokritoff, 2024; Moser et al., 2019), and/or overreliance on funds-based and/or donor-driven projects (Garschagen and Doshi, 2022).

- **Rigid institutional structures:** fixed budgetary systems and opaque processes can make it difficult to determine financial responsibility (Noy, 2020), and/or to find/access resources in a timely manner, for local stakeholders (Kidane et al., 2022, 134; Moser et al., 2019).

- **Access to resources**: Limited access to international or regional insurance schemes (Madaki et al., 2023) or other financial tools for climate-related disaster recovery (Thomas and Theokritoff, 2024; Berkhout et al., 2024).

Institutional Issues:

- **Policy prioritisation**: Political behaviour and lack of commitment can hinder action, especially when measures are contested, deprioritised, or constrained by outdated laws or unclear tenure rights (Berkhout et al., 2024, Runhaar et al., 2018).

- **Policy silos**: Lack of coordination between different government agencies (Bailey et al., 2024; Vanhala and Calliari, 2025).

- **Overlapping mandates**: Overlapping or conflicting mandates among institutions can lead to policy incoherence, implementation paralysis, or fragmentation across levels of governance (Thomas and Theokritoff, 2024, 5). For example, when international agencies, local governments and non-governmental organisations operate without cross-institutional coordination, adaptation responsibilities/initiatives may be duplicated or neglected (Olusanya et al., 2025; Petzold et al., 2023).

- **Limiting modes of governance**: Different governing approaches can create distinct soft limits (Juhola and Malmström, 2025, 2). Such limits can be triggered by 1) regulatory governance and legal limitations around adaptation actions; by 2) market-reliant governance and financial disincentives around adaptation actions or by 3) network-reliant governance and issues around access to and management of adaptation actor networks (see also Ahmed et al., 2019; Lucas and Booth, 2020; Barnett et al., 2015; Birchall and Kehler, 2023).

- **Lack of data, evidence, and information for robust policy design and implementation**: Lack of reliable, disaggregated, and locally relevant data weakens climate risk assessment or the design of effective interventions, especially for slow-onset events like sea-level rise or for marginalised populations (Petzold et al., 2023).

- **Capacity constraints**: insufficient technical capacity or professional expertise to design and implement policy (Berkhout et al., 2024, 8). In SIDS, for instance, weak coastal zone governance may result in unregulated development in hazard-prone areas, amplifying storm-related losses (Berkhout et al., 2024, 8; Thomas and Theokritoff, 2024, 2).

- **Less focus and/or reach on policy implementation**: adaptation plans may exist on paper but lack clear timelines, institutional champions, buy-in, or have sufficient enforcement mechanisms (Kidane et al., 2022).

- **Technological limitations**: Limited access to or capacity for deploying new technologies for policy design and implementation (Leal Filho et al., 2021; Thomas and Theokritoff, 2024).

- **Limited multi-actor collaboration**: Limited multi-actor collaboration, knowledge transfer and division of responsibilities, for example between individuals/households, civil society, governments and the private sector, inhibit more transformational approaches to adaptation governance (Petzold et al., 2023; Thomas et al., 2021, 12; Calliari et al., 2019; Roberts and Pelling, 2020).

Accountability Factors:

- **Democratic constraints**: Lack of transparency and democratic legitimacy in policy design and implementation (Juhola and Malmström, 2025, 3; Puig et al., 2025).

- **Inadequate consultation**: Weak coordination and/or consultation with stakeholders can result in implementation barriers (Runhaar et al., 2018, 1209).

- **Corruption**: Misallocation of adaptation resources undermines effectiveness (Theokritoff et al., 2023; Andrijevic et al., 2020).

Social and Cultural Factors:

- **Conflicting values and practices**: Social values and organisational norms and practices may hinder adaptation (Jones and Boyd, 2011; Lee et al., 2022; Puig et al., 2025, Kuruppu and Willie, 2015).

- **Knowledge gaps**: Low awareness of climate change risks and adaptation options can block action (Nalau et al., 2016; Chandra et al., 2023).

- **Power imbalances**: Unequal distribution of resources and authority shapes vulnerability (Zahnow et al., 2025).

Recognising when these soft limits arise is crucial for establishing robust monitoring systems that track policy design flaws, implementation failures, accountability breakdowns, and exclusion patterns. Indicators could include persistent delays, absent early warning systems despite known risks, or repeated exposure of the same communities to avoidable harm.

Collectively, these soft limits reduce adaptive capacity by preventing timely and equitable decision-making, and by excluding local knowledge and long-term planning, causing loss and damage that could be prevented, such as livelihood collapse, cultural dislocation, or ecosystem degradation (Box 4 illustrates examples of ecological loss and damage, including declines in pollinators and mangrove dieback, demonstrating the relevance of integrating ecological considerations into national L&D strategies). Identifying and addressing governance-related soft limits is therefore essential to prevent avoidable loss and damage, particularly in highly vulnerable contexts.

These limits are particularly severe in countries where governance systems are fragmented, under-resourced, or exclusionary. In such contexts, even well-funded adaptation projects may fail to achieve meaningful outcomes. For example, if climate plans lack legal enforceability, adaptation can stall or result in maladaptation, leaving vulnerable social, economic and ecosystems at risk. A list of selected examples of governance challenges is provided in the Annex B (Box B2).

3.1.4. Addressing Governance Gaps through Policy and Institutional Strengthening

To overcome governance-related soft limits to adaptation, countries can take practical steps to clarify mandates, improve coordination, and build long-term capacity:

- **Strengthen the legal and regulatory frameworks:** Establish clear laws and institutions for loss and damage assessment and response, including mechanisms for compensation, recovery, and protection of vulnerable populations. *Example:* Antigua and Barbuda has developed a comprehensive disaster risk framework since the early 2000s and, since 2019, has enacted legislation explicitly addressing loss and damage through its Environmental Protection and Management Act. (Antigua and Barbuda 2019, 2021).

- **Create national coordinating bodies:** Designate a central authority to coordinate loss and damage efforts across ministries, subnational governments, and non-state actors, supporting integrated planning and coherent policy responses. *Example:* Vanuatu's National Working Group on Loss and Damage serves as the country's coordinating body, linking domestic policy development with international negotiations (Vanuatu, 2025).

- **Enhance knowledge management:** Develop standardised, transparent data systems to track climate impacts, including slow-onset events, and strengthen subnational capacity to translate national policies into local action. *Example:* Vanuatu has developed a dedicated national Loss and Damage policy and implementation framework that systematises data on economic and noneconomic losses from both rapid- and slow-onset events and links this information to NDC 3.0 targets and subnational programming (Vanuatu, 2025).

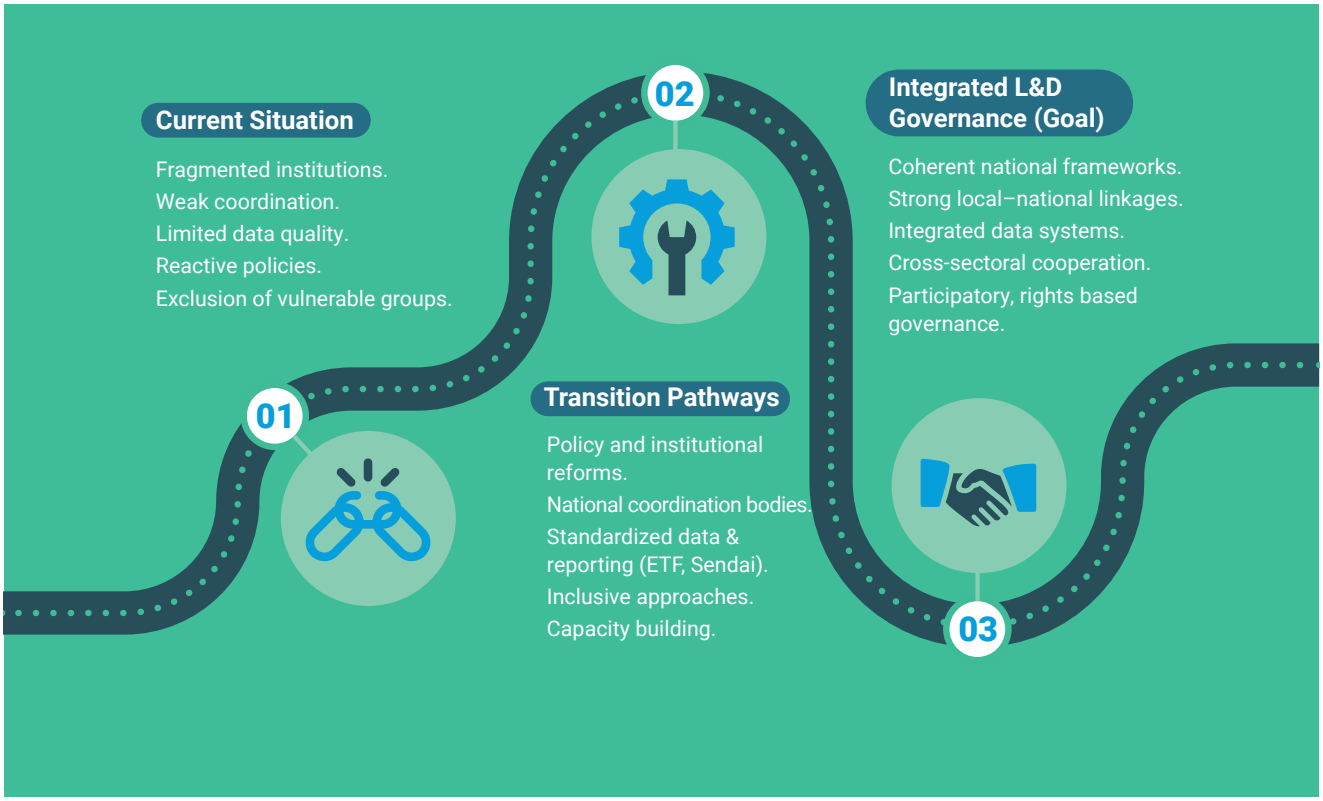
Implementing these strategies can help reduce maladaptation, strengthen resilience, and ensure that responses to loss and damage are timely, equitable, and effective.

3.1.5 The Potential of DRR Governance for Loss and Damage

Many countries already have DRM authorities, early warning centres, and emergency operations systems. These provide a foundation for loss and damage governance. These institutions typically possess well-defined mandates covering preparedness, response, and recovery, and have cultivated coordination mechanisms across sectors and levels of government through repeated disaster experiences. However, their efforts often focus on rapid-onset events and immediate response. To enhance national capacity for managing loss and damage, DRM mandates and coordination frameworks can be strengthened by expanding mandates to cover slow-onset hazards, displacement, human rights, and social protection; linking DRM frameworks to ministries of finance, planning, and environmental agencies to integrate climate policy with long-term development planning and incorporating non-economic losses and livelihood impacts into monitoring, planning, and recovery strategies (UNDRR, 2015; 2025).

Strengthening DRM governance in these ways can ensure that countries can respond more effectively to both immediate and gradual climate risks by bridging the gap between emergency management and long-term adaptation planning.

Figure 3: Addressing Governance Gaps through Policy and Institutional Strengthening



3.2

Integration with National and International Policies

Building a practical knowledge base and context-specific approaches to address loss and damage is key to managing climate risks, impacts, and loss and damage. Strong data and evidence help inform national and sub-national decisions and can feed into broader planning and reporting frameworks. The following guidance highlights activities that countries can explore to link governance, policy, and practice.

Building the knowledge base: Develop practical, context-specific data systems to track loss and damage, particularly for slow onset events where there is less evidence and the challenge of shifting baselines (Thomas and Benjamin, 2020; N'Guetta et al., 2025; Vanhala and Calliari, 2025). Use multidimensional vulnerability and risk assessments to capture the range of factors that L&D management should address (Bharadwaj et al., 2022). Repurpose adaptation data to identify and incorporate loss and damage to underpin policy development and learning. Data-gathering for adaptation efforts can be enhanced to include improved abilities to identify adaptation limits and can be re-purposed to gather data relevant for designing and evaluating loss and damage measures.

Developing a comprehensive legal and regulatory framework: Create or update legislative and regulatory frameworks to clarify responsibilities for L&D assessment, management, and recovery. Integrate climate risks and impacts into national development goals, plans, and national strategic development goals. These measures can help to ensure that comprehensive responses to loss and damage are on the policy agenda, that policy measures are effective, legitimate, and properly implemented. Ensure policies are inclusive and transparent so they are implementable and recognised as legitimate by affected communities. For example, Antigua and Barbuda's Environmental Protection and Management Act explicitly addresses L&D, supporting structured preparedness and recovery.

Enhancing institutions: Clarify institutional mandates to explicitly address loss and damage, reduce overlaps, and strengthen coordination. Invest in institutional capacity through training, resources, technology, and knowledge sharing, while encouraging policy and institutional innovation. Many countries are expanding existing mandates or establishing new institutions focused on loss and damage and resilience-building. *For example,* Chile established an Interinstitutional Working Group on Gender and Climate Change in 2019 to strengthen coordination across ministries, while Tuvalu has integrated loss and damage as a cross-cutting issue linking adaptation, sovereignty, displacement, and infrastructure to support multi-scalar governance (Calliari, 2025).

Developing new and enhancing existing national funds: Establish or adapt national funds to provide timely and flexible support for L&D. Some countries are creating new national loss and damage-focused funds and others are reconsidering and repurposing existing national funds to respond to loss and damage more effectively (Calliari and Ryder, 2023) (see also Chapter 4, Section 4.2).

Ensuring inclusivity: Include marginalised and vulnerable groups, such as women, children and people with disabilities (Bharadwaj et al., 2022; Puig et al., 2025) in policy planning, ensuring their needs shape interventions. Apply human rights and gender-responsive approaches to decision-making. Loss and damage can undermine progress on the Sustainable Development Goals; analysis of the implications of loss and damage for specific objectives can enhance efforts on inclusivity (for example, SDG 5 gender equality and SDG 3 good health and wellbeing) (Adger et al., 2022; Boda et al., 2021). For example, Tuvalu integrates L&D across adaptation policies, national sovereignty, displacement and infrastructure planning.

Text Box B3 in Annex B highlights some examples of the types of measures that countries have reported in their NDCs.

3.2.1. Standardised Reporting Frameworks to Support Policy Integration

This section explores how consistent and harmonised reporting mechanisms, such as common metrics and guidelines, can enhance the alignment of loss and damage data with broader policy processes.

Standardised and harmonised reporting frameworks are fundamental to effectively integrating loss and damage into national and international policy processes, promoting transparency, efficiency, and comparability among countries. Historically, fragmented methodologies and a lack of common indicators have undermined the credibility and utility of L&D reporting, making it difficult to draw meaningful comparisons or coordinate global responses.

Emerging and existing opportunities for improved loss and damage reporting are reshaping the way countries assess, track, and integrate climate impacts into national and international frameworks. Key tools and their relevance include:

- **Enhanced Transparency Framework (ETF):** The ETF under the Paris Agreement offers a structured process for countries to report on climate actions, including L&D, within their biennial transparency reports (BTRs). It provides clear sections for reporting adaptation, L&D, and support received, allowing countries to present loss and damage data systematically alongside mitigation and adaptation efforts. By adopting globally harmonised templates, the ETF ensures consistency and comparability in reporting, while accommodating flexibility for resource-constrained countries. It provides guidance for reporting both economic and non-economic losses, including impacts such as loss of biodiversity, displacement, health, and cultural heritage impacts. Countries can leverage the ETF to enhance visibility of L&D, track support needs, and advocate for international assistance. Integration with ETF is essential for meeting Paris Agreement obligations and accessing emerging funding opportunities tied to transparency and accountability (see Chapter 5, Sections 5.1 and 5.2 and Chapter 4.5).

- **Sendai Framework Indicators**: The Sendai Framework for Disaster Risk Reduction promotes the use of standardised indicators to assess and report disaster losses, many of which overlap directly with L&D metrics (e.g. infrastructure damage, fatalities, injuries, disrupted livelihoods, and impacts on schools and hospitals). Aligning national L&D reporting with Sendai indicators streamlines data collection, reduces duplication of efforts, and fosters interoperability between disaster risk and climate frameworks. Sendai targets and indicators also serve as benchmarks for monitoring progress, providing a mechanism to track reductions in risk, economic loss, and population displacement. Countries are encouraged to design their L&D monitoring tools to be compatible with Sendai reporting, allowing for seamless integration of disaster and climate losses at both national and international levels. Aligning L&D reporting with Sendai benchmarks streamlines data collection, prevents duplication, and enables interoperability between disaster and climate frameworks for national and global progress tracking.

- **PDNA:** PDNAs standardise post-disaster data collection across sectors and are increasingly being updated to better capture slow-onset and non-economic losses (UNDP, 2023). Integrating PDNA findings strengthens evidence-based recovery planning, supports cross-sectoral approaches, and ensures L&D reporting compatibility with ETF and Sendai frameworks.

- **DTS:** Launching in 2025, this open-source platform provides event-specific, georeferenced, and disaggregated loss and damage data. DTS builds on PDNA and DesInventar methodologies, offering a long-term solution for systematic data integration (UNDRR, 2025). It increases data inclusivity and granularity, enabling community-led monitoring, improved policy targeting, and better access to support, connected to transparent international reporting.

The annex provides a list of best practice examples that demonstrate how nations excel in loss and damage reporting by integrating comprehensive data management, participatory approaches, flexible financing mechanisms, and robust partnerships.

3.2.2. Cross-Sectoral Approaches

Addressing L&D requires integration across key sectors, including health, agriculture, water, housing, and infrastructure. These sectors are often on the frontlines of climate impacts, from crop losses and health emergencies to damaged transport and energy systems. Cross-sectoral[8] coordination ensures more coherent policies, efficient resource use, and the design of interventions that offer multiple benefits, such as nature-based solutions that support both resilience and livelihoods. Aligning L&D planning with national development goals and sectoral strategies is essential for long-term effectiveness.

A cross-sectoral approach is key for effective L&D reporting, as climate impacts are multifaceted and intersect across sectors, including health, agriculture, water, housing, and infrastructure. These sectors experience direct and indirect losses from crop failures and disease outbreaks to damaged transportation networks and disrupted energy systems, requiring integrated strategies that reflect the complexity of climate change impacts.

Loss and damage reporting frameworks that operate in silos often miss critical synergies, leading to policy gaps and inefficient resource allocation. For example, flood events may simultaneously degrade agricultural productivity, contaminate water supplies, and damage health infrastructure, yet sector-specific reporting could underestimate the full scale of the disaster (CDC, 2024). By fostering cross-sectoral coordination, governments can design interventions, such as nature-based solutions and climate-resilient infrastructure, that deliver co-benefits for multiple sectors, enhancing both resilience and livelihoods.

8 See also Chapter 5

Key measures can include:

- **Alignment with national and sectoral development goals**: Integrating L&D reporting into national development plans and sectoral strategies enables better prioritisation and long-term effectiveness (UNDP, 2012). Sectoral coordination ensure that interventions address interconnected risks, reduce duplication, and maximise returns on investment. Linking disaster risk reduction in housing to water management and public health planning supports community-level resilience and rapid recovery. Nature-based solutions (Box 4) support ecosystem resilience and also agricultural productivity, water security, and public health (World Bank, 2022).

- **Joint risk assessments and data sharing:** Inter-ministerial or multi-agency task forces can harmonise data collection and develop shared methodologies that capture both economic and non-economic losses. Digital tools such as GIS, remote sensing, and early-warning systems allow for multi-hazard scenario analysis, mapping risks and vulnerabilities across sectors.

- **Integrated and harmonised reporting frameworks:** Reporting templates should reflect interlinked sectoral losses, including non-economic dimensions, such as displacement, cultural heritage, and ecosystem damage. Aligning reporting with national instruments (NAPs, NDCs) and global frameworks (SDGs), facilitates policy coherence and decision-making.

- **Policy coherence and multi-sectoral coordination:** Cross-sector planning workshops and multi-stakeholder committees help align objectives, identify co-benefits, and support joint budget planning.

3.2.3. Inclusive Approaches

Loss and damage affect communities differently, often hitting vulnerable groups hardest, including women, children, the elderly, Indigenous Peoples, and people with disabilities. Inclusive approaches ensure these groups are not only protected but actively engaged in shaping responses. Applying gender-responsive and socially inclusive strategies, while recognising overlapping vulnerabilities, is key to equitable and effective L&D planning. Incorporating local knowledge and promoting community participation helps ensure no one is left behind.

Strengthening communication strategies, channels, and networks is a key to overcoming adaptation constraints inclusively (Galappaththi et al., 2025). Targeted communication for highly vulnerable groups can also address several governance soft limits (Annex B, Box B2), including lack of understanding, limited accountability, conflicting norms, and power relations.

Human rights approaches: Deploying a human rights lens supports understanding and addresses loss and damage (Doelle and Seck, 2019; McNamara et al., 2023; Nordlander, 2023; Thomas and Benjamin, 2022; Toussaint and Blanco, 2020). A rights-based approach can elevate loss and damage on the political agenda, provide a framework for decision-making, and highlight procedural dimensions, including enforceable rights, access to information, and participation. Locally developed solutions for restoring human rights can include investing in education, recording, and safeguarding Indigenous knowledge, promoting cultural continuity, restoring the socio-ecological system and "building back better" (McNamara et al., 2023).

Annex B (Box B3) provides a list of best practice examples that demonstrate how nations excel in loss and damage reporting by integrating comprehensive data management, participatory approaches, flexible financing mechanisms, and robust partnerships.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Finance for Loss and Damage:
Access and Availability of (including innovative finance options)

4.

4.1
Understanding needs and estimating costs

Global estimates

Over the past few years, scholars have attempted to quantify the impacts of climate change related l&d with varying degrees of success. While costs are escalating, estimates differ widely depending on methodologies, how l&d is defined, what is included in the calculation, data limitations and the difficulty of predicting future events or attributing past events to climate change (Bhattacharya et al., 2025). The table below summarises costs collected from selected sources:

Table 3: Global Loss and Damage Cost Estimates: Selected global estimates of loss and damage costs highlight the scale and variability of projected financial needs due to differing definitions, data limitations, and attribution methodologies.

Estimated Cost or Impact	Key Notes	Source / Study
USD 150–300 billion annually by 2030 for immediate impacts and reconstruction; latest update ≈ USD 0.25 trillion per year by 2030	Responsible for over 50 % of debt increase in many climate-vulnerable countries and signals rising investment needs for L&D	Independent High-Level Expert Group on Climate Finance (Songwe et al., 2022; Bhattacharya et al., 2024)
Losses ≈ 20 % of GDP between 2000–2019 (USD 525 billion total / USD 143 billion per year); ≈ 60,951 deaths linked to climate change across 187 events	Illustrates long-term economic and human toll of extreme weather in vulnerable economies	Vulnerable 20 Group (V20, 2022; Newman & Noy, 2023)
USD 109 billion in economic losses from major climate events in 2022 (excluding non-economic losses)	Reflects escalating short-term financial impacts in emerging markets and developing countries (EMDCs)	Richards et al., 2023

Table 3: Global Loss and Damage Cost Estimates: Selected global estimates of loss and damage costs highlight the scale and variability of projected financial needs due to differing definitions, data limitations, and attribution methodologies. (cont.)

Estimated Cost or Impact	Key Notes	Source / Study
3,800 deaths (of 10,113) attributable to anthropogenic climate change and USD 1.7 billion annual losses (0.8 % of SIDS GDP)	Demonstrates regional vulnerability and attribution to anthropogenic climate change	Panwar et al., 2023
USD 395 billion (2025 estimate based on historical responsibility principles)	Used by developing countries in FRLD board meeting as benchmark figure	Tavoni et al., 2024
$USD 10 trillion annual global economic impact due to biodiversity loss including healthcare costs from increased disease transmission and agricultural losses from pollinator declines	Estimates by the WHO, highlighting that biodiversity loss has profound impacts on human health and ecosystem services that humans rely on for water and food security	World Health Organisation, 2025
$235 to $577 billion loss annually in global crop output due to pollinator decline	Highlights the economic effects of ecosystems services loss on various sectors	Kumar et al., 2024
GDP loss of $USD 2.7 trillion annually by 2030 due to ecosystem collapse in various sectors (wild pollination, marine fisheries and native forests)	Illustrates potential macroeconomic losses from ecosystem collapse (e.g. wild pollination, marine fisheries, native forests) with direct relevance for future loss and damage	Johnson et al., 2021

Accounting for context-dependency

These global estimates highlight the scale of financial needs, but they are less for guiding concrete national action to address L&D impacts in affected communities. They also raise challenges of attribution.

L&D needs and impacts are unique to each country. To enable meaningful L&D action, countries must identify concrete loss and damage, set priorities and estimate associated costs. As discussed in Chapter 2, these elements can be integrated into national strategies and plans. A country-driven and context-specific approach provides a basis for developing tailored, impactful and investible projects (see Chapter 6, box 11). This level of specificity is especially important when addressing and financing NELDs. Countries could clearly define and articulate NELDs to formulate context-responsive solutions that can be financed. In addition to national policy instruments, countries should capture NELDs in PDNAs for data collection and evidence-building, where possible. Chapters 4.2.1, 4.2.2 and 4.2.3 on financial options for loss and damage reflect this approach. There is no one size fits all, and no single financial solution can meet all L&D financing needs.

4.2

Diversifying Financing Instruments

Bilateral and public sources of finance remain vital to loss and damage financing (Battacharya et al., 2025) However, declining levels of international public finance for both climate and development (OECD, 2025; OXFAM/CARE, 2025) combined with rising levels of debt and debt servicing costs in emerging markets and developing economies (Battacharya et al., 2025; IMF, 2025; OXFAM/CARE, 2025) are reducing fiscal space and compromising the reliability and predictability of

these flows. Climate finance specifically directed to loss and damage remains extremely limited; OXFAM estimates it accounted for at most only 1 percent of total bilateral climate finance in 2022, largely in the form of loans (OXFAM, 2025). As the discourse on loss and damage financing matures, a range of funding sources, arrangements, and instruments have been identified as potentially relevant (Mechler et al., 2021; UNFCCC, 2023; Panwar et al., 2023; UNCTAD, 2023; Battacharya et al., 2025; L&DC, 2025; Shawoo et al., 2025) With the exception of the recently established FRLD, most of these options are not explicitly designed for l&d (UNFCCC, 2023). Considering the full range of financing options helps countries match different financing tools to different l&d needs and time horizons. (UNFCCC Synthesis Report, 2023). Different approaches drawing on disaster risk finance and applicable lessons from DRM approaches (Mechler et al., 2021; Panwar et al., 2023) offer useful lessons for blending instruments and accessing multiple funding channels. Alternatively, financing can be assessed through a principles-based framework, grounded in equity and justice, and using criteria such as fairness, dependability, feasibility, suitability, and transparency (Roberts et al., 2017; Robinson, S-ann et al., 2021; Lai et al., 2022; UNCTAD, 2023; Uri et al., 2024; L&DC, 2025; Shawoo et al., 2025). Funding source arrangements comprise six main categories: disaster risk finance e.g. contingent budget lines, CAT DDO, parametric sovereign insurance, CAT bonds, insurance linked securities.

1. Multilateral funds and funding arrangements– e.g. FRLD, GCF, AF, LDCF, SCCF, Global Shield Against Climate Risks and CERF

2. Humanitarian and anticipatory financing e.g. forecast-based financing (FbF), AA windows (CERF), humanitarian impact bonds, multi-year humanitarian funding

3. Debt and macro-fiscal instruments e.g. climate resilient debt clauses, state-contingent debt instruments, debt swaps

4. Social protection and local level finance e.g. adaptive social protection, linking FbF to social protection, microinsurance

5. Innovative revenue sources e.g. solidarity levies, financial transactions tax, ODA expansion

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Figure 4: Global and National L&D Finance Flow Landscape

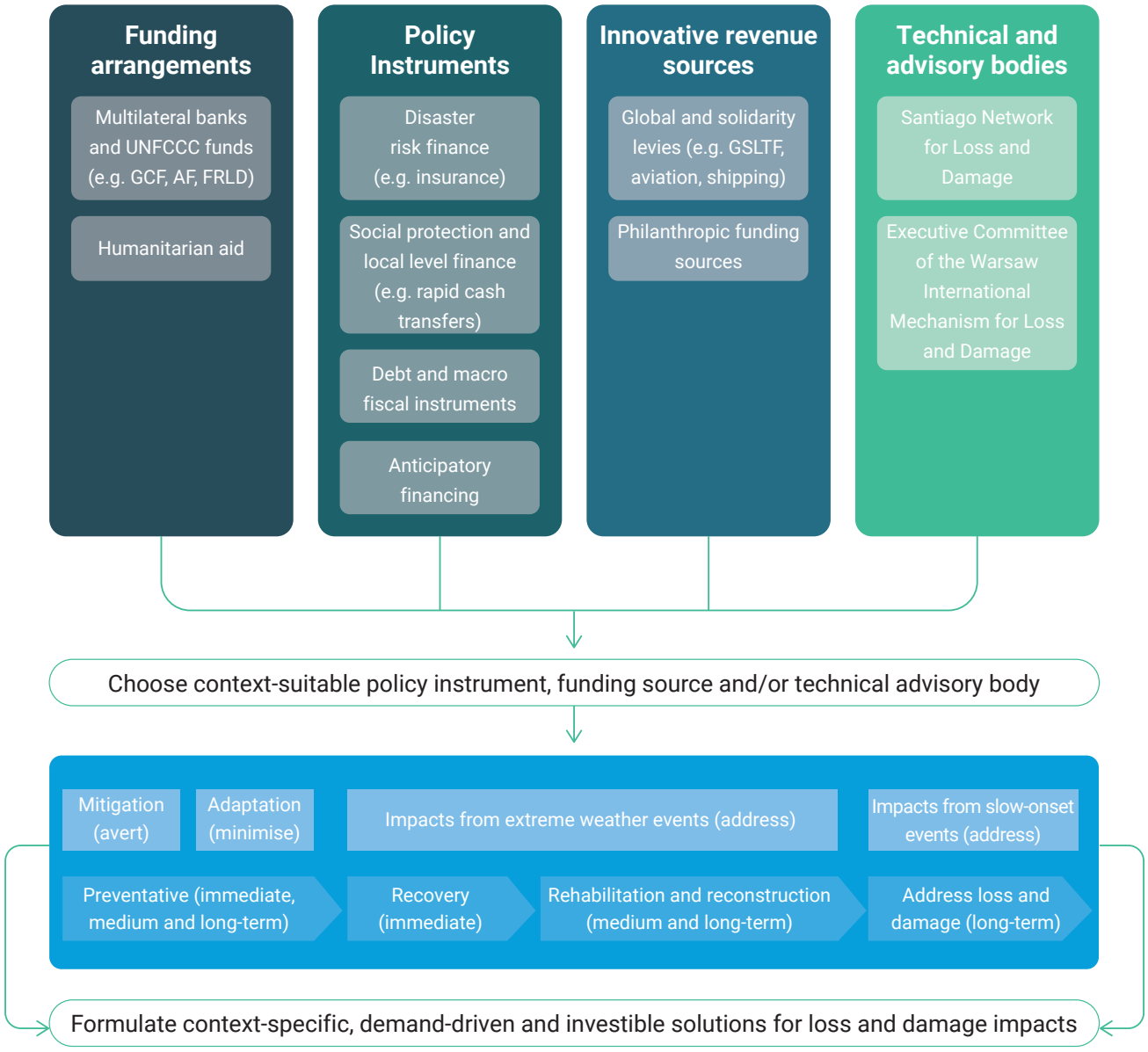

Figure 4 shows a hypothetical schematic of finance flows relevant to responding to loss and damage, adapted from Pill and Hammersley, 2024 Source.

These options can be used for l&d – individually, in combination, or through layered approaches – depending on country context and needs in order. Recent experience drawn from Jamaica demonstrates how different instruments can be stacked to cover losses from frequent small events to rare, severe shocks. In Jamaica, the World Bank–supported catastrophe bond discussed below, sits in the top layer, providing rapid liquidity for extreme hurricanes, while sovereign reserves, contingent credit and regional insurance help manage more frequent but less catastrophic losses and fiscal volatility. However, severe events that do not trigger payouts still leave households and small businesses exposed, underscoring the role of social protection and domestic public finance in the lower layers. Belize's debt-for-nature "blue bond" plays a neighbouring role by restructuring debt and freeing fiscal space for climate-related loss and damage.

4.2.1. Existing Mechanisms

Disaster risk finance

Parametric insurance pays out based on the probability of a loss-causing event rather than actual losses incurred. Countries have created regional risk pools where they form a collective of policyholders to cover extreme weather events and natural disasters such as tsunamis, earthquakes, and volcanic eruptions. Three major regional pools currently operate: the African Risk Capacity Group, the Caribbean Catastrophe Risk Insurance Facility (CCRIF SPC), and the Pacific Catastrophe Risk Insurance Company (PCRIC).

Payouts trigger when events exceed pre-defined thresholds (wind speed, rainfall, extreme heat days). Funds can be accessed within 7-10 days, significantly faster than indemnity insurance. These rapid payouts can address immediate post-disaster needs such as emergency shelter or drinking water.

However, parametric insurance has significant limitations. It is not affordable for all countries and is widely recognised as far from a "silver bullet" for l&d. Payouts are estimated to cover only about 2 per cent of actual damage caused, limiting their usefulness to immediate emergency needs rather than recovery and reconstruction (Nordlander et al., 2019). Designing parametric insurance also requires detailed, context-specific analysis of the natural hazard risks a country seeks to insure against. Important considerations include the intensity and frequency of historical events, possible future scenarios accounting for climate change, expected impacts, relevant response measures, and estimated costs. A further complication is basis risk - the policy may not trigger even when an event is highly destructive. Increasingly unpredictable and unprecedented extreme weather make it difficult to anticipate the extent of impacts. The twin cyclones, Judy and Kevin, which hit Vanuatu within 48 hours in March 2023 (SOURCE), illustrate this evolving threat of unprecedented events.

Parametric insurance is not suitable for loss and damage caused by slow-onset events, as the sudden trigger is absent. Potential alternatives could be modelled on life insurance or insurance for an invaluable piece of art; however, these remain conceptual.

Catastrophe bonds

Catastrophe bonds (also known as "cat bonds") are capital market instruments that transfer disaster risk from a sponsor to private investors (Hofer et al., 2021; Barrieu et al., 2024; World Bank, 2025) Like parametric insurance, cat bonds trigger pay outs based on the pre-defined physical parameters of an event. In World Bank-issued cat bonds, coverage can include hurricanes, drought, earthquakes, tsunami, and pandemics. The structure involves a risk transfer agreement between a client and the World Bank (WB), under which a client pays a premium in exchange for a payout if a qualifying event occurs. The WB issues the bond and transfers the risk to investors, who receive a coupon reflecting both a risk margin (funded by the client's risk premium payments) and a funding margin (paid by the WB). If a triggering event occurs, the bond principal is reduced by the payout amount. Any remaining principal is returned to investors at maturity (World Bank, 2025).

The experience with CAT bonds for financing loss and damage is varied in terms of design and equity (World Bank, 2025; Bretton Woods Project, 2024). Jamaica was severely impacted by Category Four Hurricane Beryl, which caused extensive damage to property and infrastructure (Planning Institute of Jamaica, 2024). However, this event did not trigger a payout because an air pressure threshold was not met despite the scale of impacts. While CAT bond payout post-Melissa highlights how ex ante finance can ease immediate fiscal pressure and support early recovery, it has also reinforced calls for more flexible, locally tailored triggers, greater

national ownership of modelling, and stronger links to domestic recovery and social protection systems (World Bank, 2025;Barrieu et al., 2024; Ahmed, 2024).

4.2.2 Multilateral Funds, Regional Funds and Other Funding Sources and Arrangements

Multilateral funds are an important source of finance for developing countries. Up until the decision to establish the FRLD, no UNFCCC climate fund had a window or mandate to provide financial assistance for L&D. However, those funds proved to be capable of addressing l&d impacts to various degrees in projects without explicit L&D framing. Three major multilateral funding sources and their potential to finance L&D are provided below but this list is not exhaustive.

Multilateral funds

FRLD: Established at COP27, the FRLD assists particularly vulnerable developing countries in responding to economic and non-economic loss and damage from extreme weather events and slow-onset events. The FRLD is the only multilateral fund that has a particular and explicit focus on "addressing" L&D from climate change impacts. At its seventh meeting in 2025, the Board operationalised the start-up phase with the Barbados Implementation Modalities (DECISION B.7/D.3) and in November 2025, launched its first call for funding requests (FRLD, 2025a; FRLD, 2025b). The FRLD is the only multilateral fund that has a particular and explicit focus on "addressing" L&D from climate change impacts. For submissions, countries should have designated national authorities in place, implement domestic governance systems, connect relevant institutions, identify preliminary areas needing support with available data, identify accredited institutions to receive and manage funds, and explore joint proposals for transboundary challenges.

Green Climate Fund (GCF): The GCF is the largest dedicated climate fund, supporting developing countries to achieve their NDCs and respond to climate change through both mitigation and adaptation projects. However, accessing GCF resources has proven challenging, due to lengthy accreditation procedures, complex proposal development processes, and demanding fiduciary standards, as well as unrealistic data requirements (Pill and Hammersley, 2023; Independent Evaluation Unit, 2024). These barriers, particularly accreditation, affect smaller nations with limited capacity disproportionately, preventing or significantly delaying direct access. While GCF lacks a L&D window, the Executive Committee of the Warsaw International Mechanism for L&D has compiled case studies of GCF-funded projects, relevant to the WIM's L&D workstreams (UNFCCC, 2024).

Adaptation Fund: The Adaptation Fund funds concrete adaptation projects and programmes in developing countries that are parties to the Kyoto Protocol and are particularly vulnerable to the adverse effects of climate change. This fund is suitable for project applications that demonstrate significant overlap between adaptation and L&D, such as resilience-building measures or AA components to prepare responses to future L&D. The Adaptation Fund's focus on concrete, on-the-ground interventions that reduce vulnerability of communities, protect critical infrastructure, or enhance early warning systems align closely with efforts to avert and minimise l&d.

Global Environment Facility (GEF): The GEF is a financing mechanism that provides grants for projects addressing biodiversity loss, climate change or land degradation. While the GEF does not officially cover loss and damage, its objectives align well with the environmental and ecological dimensions of climate-induced l&d, particularly NELs, making it a potential avenue for addressing l&d through strategic project design, even without explicit L&D framing.

Humanitarian Aid and ODA

Official Development Assistance (ODA) and humanitarian finance are not dedicated L&D streams, nor should they be treated as such (Uri et al., 2024) This distinction is critical for maintaining the integrity of climate finance commitments and ensuring that vulnerable countries receive genuinely additional resources to address climate-induced l&d. However, overlaps do exist as, in reality, finance for L&D comes from ODA and humanitarian budgets, pressuring countries into choosing between addressing climate change impacts and achieving other development objectives such as poverty alleviation, education, or healthcare. DanChurchAid's monitoring of their project

portfolio found that L&D responses have been funded from both humanitarian assistance, particularly for extreme weather events and development assistance, especially for slow onset events and long-term recovery efforts (DanChurchAid, 2024). They found that sometimes a carefully planned "nexus approach" where both the humanitarian need, and the reconstruction and resettlement, including addressing NELD, can have very positive outcomes.

Loss and damage finance should come from dedicated, additional sources rather than existing ODA and humanitarian budgets. In UNCTAD's review of innovative sources, it proposed that developed countries should not only meet the current ODA target of 0.7 percent of GNI but that they should further increase it by an additional 0.3 percent, which could be ringfenced for loss and damage(UNCTAD, 2023).

Pacific Resilience Facility

The Pacific Resilience Facility (PRF) is a Pacific-led, owned and managed, community-centred climate and disaster resilience fund (PIF, 2025a). It aims to support small-scale community projects - addressing "the last mile" - that are underserved by large global climate funds and multilateral development banks. Significantly, it includes a dedicated loss and damage window under its Climate and Disaster Resilient Grant facility. It operates under a self-sufficiency model after initial capitalisation[9] and received finance is reinvested into capital markets to generate a continuous funding stream, making its operation independent from ongoing external contributions. While the PRF operates in the Pacific region, this innovative model could serve as a blueprint for other regions or alliances of like-minded countries seeking sustainable climate finance mechanisms.

Global Shield Initiative

The **Global Shield Initiative**, launched at COP27 with the Vulnerable 20 Group together with the Group of 7, provides pre-arranged finance instruments including social protection, livestock and crop insurance, and risk-sharing networks. While modest compared to estimated needs, it plays a role in the loss and damage financing landscape.

Santiago Network

The Santiago Network for Loss and Damage (SNLD) was established at COP25 in 2019 to catalyse technical assistance for developing countries. The network connects vulnerable countries experiencing l&d with providers of technical assistance, for CRA, early warning systems, disaster preparedness, recovery planning, and addressing both economic and non-economic losses. The network operates through a demand-driven approach, responding to requests ("call for proposals") from developing countries and communities, and channelling appropriate technical support from a diverse roster of organisations, including UN agencies, research institutions, civil society organisations, and technical experts. By focusing on providing targeted expertise, the Santiago Network complements financial mechanisms like the FRLD.

4.2.3 Policy Instruments

Given the scale of loss and damage costs, public finance alone will never suffice. The following section outlines policy and institutional arrangements that can address loss and damage financing across different country contexts. These options, some established, some still conceptual, can be supported by developed country partners or implemented through national systems. Countries should assess their own financial and institutional circumstances to identify suitable solutions. Examples are provided where available.

9 The PRF is pursuing capitalisation through two tranches: an initial target of USD 500 million by the end of 2026, with ambitions to scale up to USD 1.5 billion thereafter. The first call for pilot project proposals is planned for the 55th Pacific Islands Forum Leaders Meeting in Palau in 2026 (PIF, 2025b). As of late 2025, approximately USD 167 million has been pledged, leaving USD 333 million still to be mobilised. Resource mobilisation efforts will continue through 2026, including at the action agenda of COP31, as part of the Australia-Türkiye shared presidency.

Table 4: Possible Policy Instruments

Policy instrument	Explanation
Earmarked budget support for loss and damage	Budget support is financial assistance given to the government of a recipient country, which is then managed through their national systems (e.g. Department of Treasury or Finance). Budget support is flexible, not tied to a particular project, and often contingent on broader policy agendas such as public financial management reforms, anti-corruption measures or strengthening institutional capacity. For L&D, funding partners could provide earmarked funds usable only for loss and damage initiatives, improving tracking, transparency, direct access, and context-sensitivity, while increasing usage of national systems over external entities (see Chapter 5).
Debt pauses or cancellation	Extreme weather events such as cyclones, floods, and even drought, cause humanitarian disasters that developing countries have to deal with, while at the same time, continuing to repay loans to their creditors (e.g. the WB or financially contributing countries). The WB currently offers pauses on debt repayments through the Climate Resilient Debt Clause (World Bank, 2024b) on new and existing loans and the Debt Services Suspension Initiative (DSSI), allowing eligible Covid-struck countries to pause their debt repayments. Countries should consider incorporating clauses on debt suspension and even partial debt cancellation into new and existing loans.
Debt for climate or nature swaps	Debt-for-climate or debt-for-nature swaps reduce or restructure debt in exchange for national climate action or conservation (Battacharya et al., 2025; Shawoo et al., 2025). Belize's USD 364 million debt conversion with The Nature Conservancy (2023) provided ocean conservation finance, while reducing debt by 12% of GDP. Though no explicit loss and damage case studies exist yet, debt swaps could address non-economic losses from biodiversity loss or fund cultural heritage preservation.
Social protection systems	Social protection systems providing financial aid for food, education, health, disability, and unemployment remain underutilised for climate change despite resilience-building potential. Effective responses require transforming current systems through climate factors for vulnerable regions or dedicated climate arms within government systems. Fiji's Anticipatory Action Framework demonstrates effective integration, providing cash assistance through existing social protection infrastructure ahead of anticipated cyclones, reducing dependence on external humanitarian aid. Similarly, Tuvalu's Resilience Development Policy Operation, with Catastrophe-Deferred Drawdown Option, offers rapid post-disaster financing whilst strengthening financial management, infrastructure, and social protection - building fiscal buffers for cyclone recovery.

Microinsurance

Microinsurance is a risk management tool specifically designed for low-income households, functioning as both social protection and a market-based approach. It provides coverage against specific perils through affordable premium payments, reducing vulnerability and providing direct support to vulnerable populations (Churchill, 2006; Merry et al., 2025).

Despite increasing uptake, a significant protection gap remains (ILO, 2012).

While traditionally focused on life and health products, climate-related microinsurance is emerging for agriculture and property products (ILO, 2006; Merry et al., 2025). Delivery involves diverse actors ranging from specialised mutuals and cooperatives, microfinance

institutions, NGOs, community-based schemes, and commercial insurers, often supported by reinsurers and public or donor-backed facilities to ensure solvency against covariate climate risks (ILO, 2006).

The CCRIF SPS recently launched the Livelihood Protection Policy (LPP), a parametric weather index-based microinsurance, providing tropical cyclones and rainfall coverage, with cash payouts within 14 days of a policy triggering (CCRIF, 2025). It targets fisherfolk, farmers, vendors, labourers, tourism workers, and small business owners. This is the first product of LPP's recently launched Microinsurance Facility. The LPP targets fisherfolk, farmers, vendors, labourers, tourism workers, and small business owners, amongst others[10].

However, operational challenges persist. Sparse data, basis risks, and affordability remain significant barriers. Climate change compounds these challenges - accelerating environmental changes mean historical data becomes less reliable, requiring ongoing reassessment of product design, including covered risks, time periods, and premium structures. As climate impacts intensify, ensuring microinsurance remains viable and affordable for those who need it most and requires the continuous adaptation of products and support mechanisms (ILO, 2012).

4.2.4 Mobilising Finance for L&D

Levies

Taxes and levies remain an underused and often contested mechanism in multilaterally and globally negotiated agreements (Wemaëre et al., 2023). Wemaëre cites the two International Oil Pollution Compensation Funds (IOPC Funds) as a precedent for the feasibility of a possible levy on the extraction of fossil fuels. However, the experience in designing global level taxes or levies, especially in the context of climate change has been mixed, not least because they require consensus which could moderate design and ambition. The latest example is a global levy on bunker fuels through the International Maritime Organisation, first and only achieved with major concessions for large polluters and subsequently boycotted by the US, resulting in a deferral of an agreement to the following year (IMO, 2025; Euronews, 2025; Economist Intelligence Unit, 2025).

A recent push by the Global Solidarity Levies Task Force, led by France, Barbados and Kenya aims to encourage countries, developed and developing alike, to adopt voluntary levies on high polluting industries such as aviation, shipping, or crypto services (GSLTF, 2025). Aviation is an attractive sector as the implementation is practical and transparent, with minimal administrative burden, as the solidarity contribution becomes part of the ticket price. The design of the aviation levy could take into account revenue potential, equity, and emissions impacts (Wemaëre et al., 2023; CE Delft, 2025; Zheng et al., 2025) For developing countries, proceeds from an aviation levy can be applied to finance climate and development challenges. One option is to direct these funds, either received from the pool of finance of participating countries or domestically generated, towards initiatives that address the impacts from l&d (Wemaëre et al., 2023).

Philanthropy

Philanthropy is an increasingly recognised and called-upon sector to finance climate change initiatives and is well suited to address market failures in underserved communities experiencing significant and urgent need (Battacharya et al., 2025). Current philanthropic spending on climate change mitigation only makes up 2% of global giving (Esmaeili et al., 2025) and while it has grown steadily over the years, only an estimated 600 million was dedicated to adaptation (Climateworks, 2024). It can be assumed that dedicated loss and damage funding will be significantly less and funding for loss and damage also needs to be grant-based as there is no financial return to be made; neither should countries go further into debt. Philanthropy is by no means suggested as filling the finance gap for L&D but is suggested as a complementary source (Battacharya et al., 2025). Philanthropic capital can be described as

10 The LPP can also be purchased by a community group, an NGO or a cooperative for its members (CCRIF, 2026). Following Hurricane Melissa, the CCRIF SPC launched the LPP in Jamaica, which is planned to be expanded to Belize, Grenada and Saint Lucia in 2026. It is being sold through Guardian General Insurance Jamaica Limited.

having six key characteristics, making it distinct from other, particularly multilateral and bilateral funding sources. It is nimble (moves capital quickly to where most needed), risk-tolerant (de-risks and leverages new capital), flexible (adapts to different funding needs), patient (waits for better, more impactful outcomes), equitable (focuses on the marginalised and vulnerable), and systemic (takes systems-level approaches to solutions), (World Economic Forum, 2023).

Box 4

The Bezos Earth Fund invests a total of US$ 100 million to Accelerate Pacific-Led Ocean Protection as part of "Unlocking Blue Pacific Prosperity (UBPC)", which aims to "unlock new, catalytic and accessible investment for the sustainable management and conservation of the Blue Pacific Continent and for robust food systems, to ensure the livelihoods and well-being of all Pacific peoples" (Bezos Earth Fund, 2025). Strategies such as UBPC provide an easy way for philanthropies to give, as the landscape of climate action is complex and vast. Philanthropy can also support innovation and AA in addressing non-economic losses, such as putting measures in for the conservation of sacred sites, for example, inclusion of traditional and historical knowledge in national curricula or finance for celebratory ceremonies (Pill and Hammersley, 2024).

Philanthropic funds have been a major catalyst in unlocking future finance in grant-seed funding, provided by the Leonardo DiCaprio Foundation to the Government of Fiji at COP23 in 2017 for the **Fiji Rural Electrification Fund (FREF)** (Deo, 2017). The FREF uses a revolving fund structure under which affordable monthly tariff payments for rural communities, combined with grant financing, are placed into a trust fund and used to electrify additional rural communities throughout Fiji.

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4.3

Improving the Quality of Finance, Financing Locally and at Scale

Locally led and needs-based approaches are essential for effective L&D finance (Klinsky et al., 2023). Chapter 6 outlines in detail the importance of project design that is led, developed, and owned by the communities the initiatives are implemented in. In addition to the vast literature and guidance provided in Chapter 6, the World Resources Institute and IIED have developed eight principles for locally led adaptation (Coger et al., 2022) (Annex C, Table C1), emphasising the engagement of affected communities and quality finance with lasting results. Three of these principles specifically refer to the characteristics of finance which need to be predictable, long-term and easily/directly accessible and include capacity strengthening during project delivery, eliminating the need for additional financial resources in the future[11].

Annex C (Table C2) provides a list of case studies across the globe that are examples of locally led, spent, and administered funds for L&D initiatives. Locally led approaches should go hand in hand with the usage of national systems and in-country organisations (see Chapter 6, Sections 6.1 and 6.3). Currently, most climate finance flows through intermediaries like the WB rather than developing country systems. This arrangement often reflects lack of trust in developing countries' capacity to manage funds appropriately, despite evidence to the contrary. National systems in many developing countries can manage and administer funds effectively without oversight from intermediaries, and prioritising these systems ensures finance reaches communities on the ground at the lowest possible level (Hammersley and Pill, 2023), through, for example, existing trust funds or in-country NGOs. Countries should identify appropriate national systems for disbursement and propose innovative, context-appropriate mechanisms for handling revenues, which promotes effectiveness and alignment with national priorities, development plans (see Chapter 3, Section 3.1), and locally identified needs rather than externally driven agendas[12]. Where adequate structures do not exist, FRLD can support development of the necessary financial enabling environment.

However, L&D does not form part of the activities to be funded under the climate finance goal agreed at COP29 (UNFCCC, 2024b). Yet Paragraph 14 acknowledges the need for public and grant-based resources, particularly for adaptation and responding to loss and damage, and paragraph 19 recognises the significant gaps in responding to loss and damage and the need for urgent action and support for averting, minimising, and addressing it. However, L&D is absent from Paragraph 5, the paragraph that defines what the NCQG will support. Paragraph 5 explicitly mentions solely NDCs, NAPs, and adaptation communications. This means the decision acknowledges that L&D exists and requires finance but does not explicitly commit the USD 300 billion goal or the USD 1.3 trillion respectively, to supporting it in the way it does for adaptation and mitigation. Countries can interpret the text as allowing NCQG finance to support loss and damage activities, but there is no clear mandate or dedicated allocation. It therefore makes sense for countries to integrate L&D activities into initiatives and projects that are eligible for funding under the UNFCCC decisions.

11 A full list of adapted LLA principles and those relevant to finance can be found in the Annex).

12 Existing in-country examples that could serve as entities to manage funds could be, for example, the Climate Community Relocation Trust Fund, embedded in its corresponding as well as the Climate Change Act, 2022 the Climate Relocation of Communities Trust Fund Act in 2019, and through the passage of the Climate Change Act in 2021 (Government of Fiji, 2023) or the Indonesian Nusantara Direct Funding Programme, an NGO supporting Indigenous communities, farmers, fishermen, women, and youth in Indonesia (Nusantara Funds, 2025). Other suitable channels and entities are those accredited with any of the multilateral funds.

4.4

Overcoming Access Barriers

Improving access to climate finance through direct access modalities is critical for particularly vulnerable developing countries. Direct access reduces transaction costs and enhances national ownership. International accredited entities charge management fees, often 5-10% depending on project size, meaning less money reaches actual climate action. The NCQG further recognises the importance of a structural reform of the multilateral financial architecture and urges enhanced transparency on efforts to reduce constraints and barriers, calling for inclusion and extension of benefits to vulnerable communities (UNFCCC, 2024).

Multilateral climate funds are working towards improved access including through simplified approval procedures, expanding direct access modalities, and increased complementarity and coherence with a view to responding to calls for the harmonisation of procedures. Multilateral funds are working towards simplified approval procedures and expanded direct access, but despite progress, developing countries still face major challenges. Questions persist about whether funds reach those most in need and whether finance reaches communities on the ground.

These issues have also been raised in the decision [1/ CMA.6] on the NCQG, (UNFCCC, 2024).

4.5

Tracking and Transparency of Financial Flows

The Standing Committee on Finance has documented ongoing methodological challenges with tracking climate finance flows (SCF2014-2024). Currently, loss and damage-relevant finance flows are not systematically and specifically tagged, neither by UNFCCC reporting methods nor other funders, and are instead reported on and lumped into the reporting of other categories, such as adaptation or disaster recovery (SCF, 2024; UNFCCC, 2023).

The Executive Committee of the Warsaw International Mechanism (ExCom) finalised an annotated outline of guidelines for enhancing the collection of data and information[13]. The CGE Training Material on Reporting Information Related to Climate Change Impacts and Adaptation also includes a chapter on loss and damage, providing examples of emerging good practices, models, methodologies, and initiatives (UNFCCC, 2023[14]).

The OECD tracks funding, distinguishing between mitigation and adaptation, through the Rio Markers and also makes a distinction between a principal (score 1) and significant (score 2) climate change component of a given project. L&D is not included in the Rio Markers, making tracking challenging. DanChurchAid (2024) developed their loss and damage marker to complement the OECD Rio Markers on climate adaptation and mitigation. They have used this marker since 2019 to monitor the share of finance channelled to interventions addressing L&D. Like the Rio Markers, DanChurchAid uses, amongst other criteria, a scoring system where 1 has a significant element of L&D and 2 where the primary focus of a project is on L&D. This methodology could serve as a potential way for countries to track L&D funds. The ETF also provides further guidance on loss and damage tracking and could be used and integrated into national reporting to the UNFCCC, as described in Chapter 3.2.1.

13 [1/CMA.5 para 133, FCCC/PA/CMA/2023/16/Add.1]
14 EXCOM/2025/23/2, FCCC/SB/2024/2/Add.1]


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5. Loss and Damage Monitoring, Evaluation, Reporting and Learning

Monitoring, evaluation, reporting, and learning are all distinct but complementary processes that work together to assess and communicate progress in responding to loss and damage over time. Monitoring involves the ongoing assessment of interventions and progress made in achieving established milestones and targets. Evaluation examines whether set objectives are achieved and assesses performance across criteria such as effectiveness, efficiency, and cost-effectiveness. Reporting refers to activities and efforts to communicate with relevant stakeholders about processes and outcomes. Learning focuses on using gathered data and evidence to adapt management practices, improve programmes, and apply insights for better future outcomes. These four processes are synergistic and are combined to create a more comprehensive framework for understanding intervention effectiveness and informing future decision-making.

In the context of loss and damage, monitoring, evaluation, reporting, and learning (MERL) systems are essential for understanding the full scope of climate impacts and for informing effective responses. Accurate and systematic data collection enables countries to better understand the climate risks and impacts that they face, to evaluate the effectiveness of interventions, identify emerging trends, and to ensure accountability.

The relevance of loss and damage to MERL systems is growing for several reasons (AF-TERG and UNEPCCC Forthcoming). First, accurate data, evidence, and knowledge of climate risks and impacts will be critically important in allowing countries to incorporate these considerations into their economy-wide and sector-specific planning and implementation processes. Second, as national actors are beginning to design measures to respond to loss and damage and as funders are beginning to invest in them, these stakeholders will want to understand the outcomes of these projects to derive useful lessons, shape policy, and inform public and private investment in loss and damage responses.

In this context, the development of robust loss and damage MERL systems can help in:

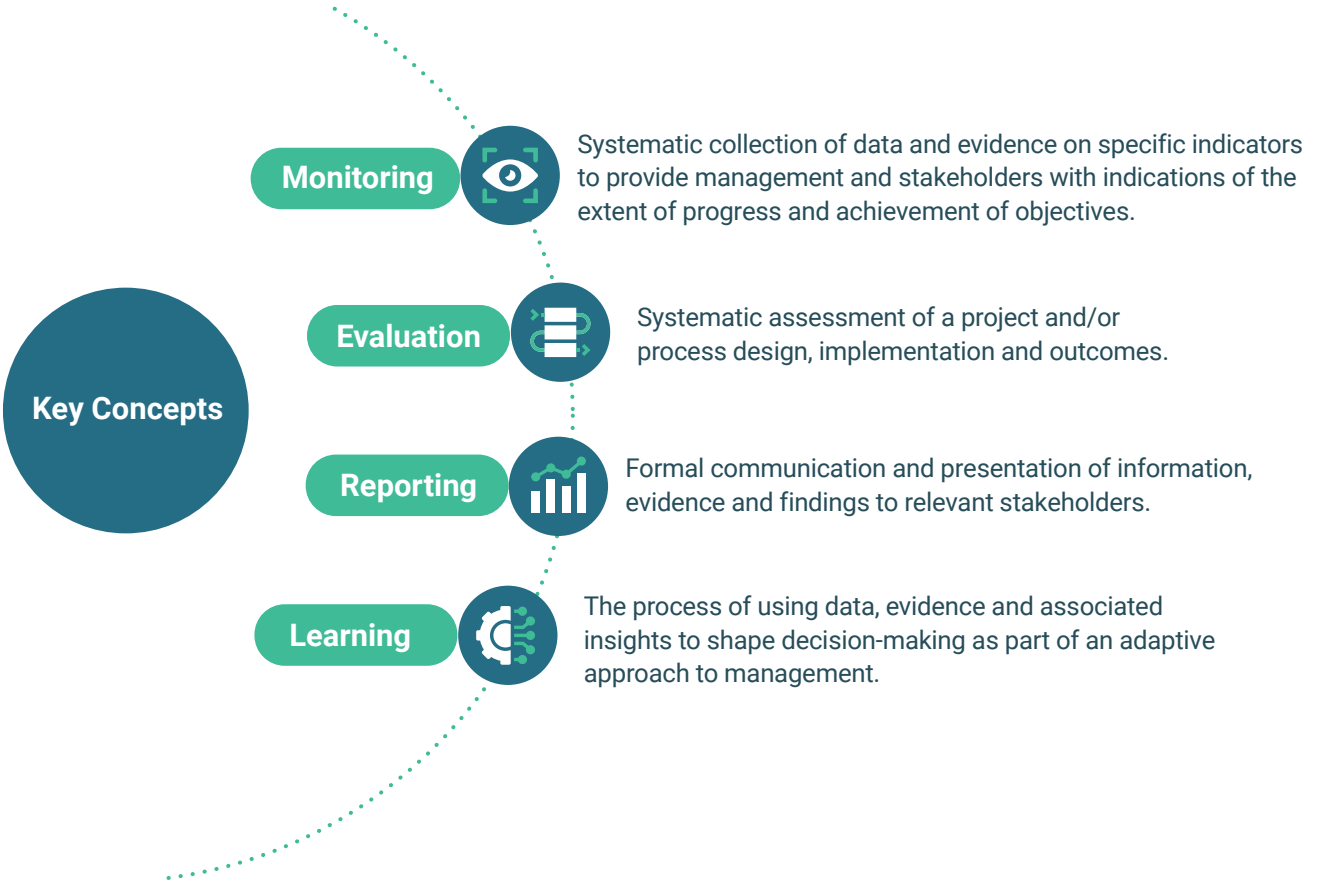
- Tracking progress on the implementation of strategies and actions addressing loss and damage, from individual projects to sector-wide and national initiatives (short- and medium-term).
- Supporting adaptive management to respond to emerging challenges and evolving risks, enabling dynamic adjustments during implementation (short-term).

- Promoting transparency around fund allocation and use at local, sectoral, and national levels, providing assurance to taxpayers and international donors (short- and medium-term).

- Facilitating learning to inform future policy, enhance system design, and deepen understanding of loss and damage and its drivers (long-term).

The role a MERL system can play may shift over time as systems mature and can move from simply tracking outputs to a learning system. Stakeholders will need to start with a system that is practical and feasible, and develop it over time to meet emerging needs and build on expanded capacity. This chapter outlines key considerations and best practices for moving towards the development of robust national loss and damage MERL systems, including practical steps for designing loss and damage MERL systems (Figure 5), including in alignment with global frameworks and building on innovative and inclusive approaches.

Figure 5: Loss and Damage: Monitoring, Evaluation, Reporting, and Learning



5.1

Understanding and Developing MERL Systems for Loss and Damage

A critical distinction lies between a) systems for *assessing* loss and damage and b) a system for monitoring and evaluating measures to *respond* to loss and damage. The former is concerned with developing a better understanding of climate change impacts and risks. The second focuses on assessing progress and outcomes of measures to respond to loss and damage.

Existing disaster loss databases and DRR monitoring systems, including national inventories and regional platforms, provide valuable data on fatalities, asset damage, and direct economic losses. However, they often underreport localised events, overlook slow-onset processes, and exclude non-economic impacts such as cultural loss, mental health, and social cohesion. Enhancing their relevance for loss and damage requires expanding indicators to capture slow-onset and non-economic effects, strengthening local data collection and feedback mechanisms, improving integration across DRR, climate, social protection, and statistical systems, and investing in sustained institutional capacity to ensure data inform planning and finance decisions beyond immediate disaster response (Mechler, 2019).

With respect to *assessing* loss and damage, Chapter 2 reviews several methods used to assess occurred impacts and projected risks and useful databases (e.g. EMDAT, Desinventar). This section complements that discussion by focusing on loss and damage as manifesting when limits to adaptation are reached or exceeded. This happens, for example, when adaptation measures are not enough to ensure the viability of a crop in one region against changing rainfall patterns, or when protecting a settlement from persistent flooding becomes too costly or is technically not feasible. There are limited ways to assess when these thresholds are being reached and therefore when responses to loss and damage will be needed. Some of these contexts will be areas where adaptation projects are ongoing; consequently, some evidence of the declining progress on outcomes may be discernible in the data in future. In some cases, existing development or adaptation projects may be performing well, but as climate impacts increase, they are no longer sufficient. This could also happen in loss and damage interventions, where the measures put in place to address loss and damage are not sufficient due to escalating risks, even if the intervention is performing well. Practitioners may also find it useful to track not just direct, immediate impacts but also cascading or indirect losses from climate events, such as increased school dropout rates, changes in community networks, or psycho-social effects following disasters and relocations.

Table 5: Indicative Data and Trends on Adaptation Limits

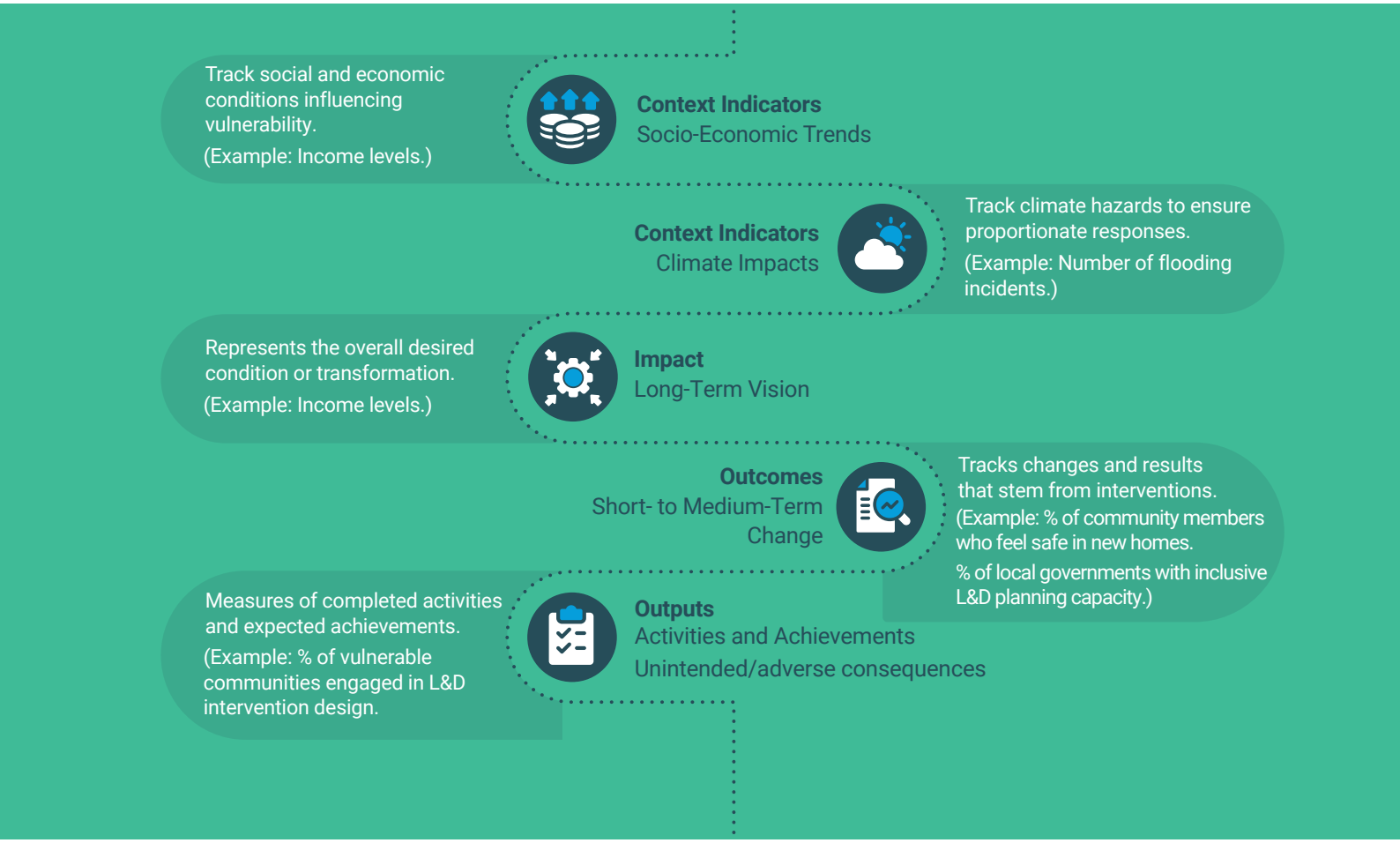
Indication of limits to adaptation being reached	Scale of data	Additional data to consider	Implications for responding to loss and damage
Community feedback or change in behaviour (e.g. new seasonal human migration pattern)	Local	• How do local communities understand the changes? • How do changes resonate with local knowledge of ecosystems? • How does this relate to available climate data? • Are there other explanations for the change?	• How can community insight be incorporated into the response? • How can community insights be communicated at other scales?
Metrics in an adaptation or development project or national data set not showing progress or reaching a plateau	Project or national	• Is the project or local area otherwise performing well? • Is there data on local climate impacts that suggest things are worse than planned for? • How do local communities understand the changes?	• How can the response to loss and damage build on the existing data? • Is this a hard or soft limit? • Can more adaptation be useful before responding to loss and damage?
Climate scenarios and data on hazards indicate tipping point	Specific regions, national or global	• How do local communities understand the changes? • What is the expected timeframe of the change? • How certain is the prediction or scenario?	• Is any adaptation to the climate impacts possible? • Will the climate impacts continue to escalate? • How can this be addressed in order to minimise loss?

With respect to *responding* to loss and damage, MERL measures will require stakeholders to map the progress of the intended activities to be undertaken (outputs), the immediate changes they hope to see (outcomes), and the longer-term vision for what it means to have successfully addressed loss and damage (impact). Theories of change are useful tools to map out how any planned intervention might lead to these changes and what other factors will contribute (Brooks and Fisher, 2014). Metrics can then be selected and used to measure progress in these areas (outputs, outcomes, and impact) as well as to verify the intended pathways for change identified in the Theory of Change. These will need to be linked to longer-term sectoral plans or national development objectives. In order to incorporate a longer-term vision into a practical MERL framework, dedicated mechanisms for reflecting on findings and adjusting indicators (learning) need to be explicitly planned and budgeted, enabling an iterative and non-linear MERL process.

Box 5

eL&D refers to the unavoidable impacts of climate change on ecosystems, species, and biodiversity, with knock-on effects for human societies (Walters et al., 2025). These impacts can undermine critical ecosystem services, such as pollination, water purification, and coastal protection, affecting livelihoods, food security, and well-being. For instance, declines in pollinators can reduce crop yields and the loss of mangrove wetlands increases flood risks for coastal communities (IPCC, 2022). eL&D also affects social and cultural systems: habitat degradation can erode community identity, traditional knowledge, and recreational or spiritual values. Addressing eL&D requires governance and finance mechanisms that support both ecosystems and human resilience, through measures such as restoration projects, nature-based solutions, and equitable climate finance (Walters et al., 2025).

Figure 6: Hierarchy of Metrics in Loss and Damage MERL Systems



Recent research on loss and damage offers important lessons for loss and damage metrics, addressing both assessment of loss and potential outcomes from any responses to that loss (AF-TERG and UNEPCCC, Forthcoming). These include:

- Approaches for assessment, outcome, and impact measurement must be sensitive to the complexity and multi-dimensional nature of loss and damage.
- Standardised metrics exist for some areas of loss and damage and not others. An emerging evaluation system needs to address these varying levels of maturity and evidence to avoid under investment in areas without robust protocols.
- The overlapping and cascading nature of loss and damage needs to be accommodated in L&D metrics, particularly those focusing on outcomes and impact.
- Where appropriate monitoring and evaluation could involve a longer timeframe, re-visiting after several months or even years to understand cascading impacts, as well as the sustainability of outcomes.
- It will be important to consider modes for evaluating both the results of efforts to respond to loss and damage and the inclusivity of processes for developing and implementing those responses.
- Developing assessment principles rather than fixed indicators may be useful in striking a balance between local and general.
- The use of a variety of qualitative and first-voice narratives would allow people to articulate for themselves how climate-driven harms manifest in their lives.

Table 6[15] outlines the steps towards the development of MERL systems for responses to loss and damage.

Table 6 (summary): Key steps for developing Loss and Damage MERL systems

Step	Core focus
Define	Clarify purpose, key questions, and end users of the L&D MERL system
Frame	Develop a theory of change and establish baselines for economic and non-economic losses
Manage	Define institutional roles, coordination, and learning cycles
Describe	Select balanced indicators and data collection approaches
Analyse	Assess medium- to long-term outcomes and contributions to addressing L&D
Synthesise	Consolidate findings for learning and policy improvement
Report & use	Ensure transparent reporting and feed results into planning and future L&D responses

The full version of Table 6, including detailed actions and rationales, is provided in Annex D (Table D1).

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15 The full version is provided in the Annex, and a summarised version is included below.

Box 5

Loss and Damage in Panama's Monitoring and Evaluation System

Panama's updated NDC (2020) led to a Monitoring and Evaluation (M&E) system with 21 adaptation indicators, including 16 on L&D (8 management, 4 economic, 4 non-economic). Key indicators track:

- Families receiving humanitarian aid after extreme events
- Losses to tourism, crops, and vital infrastructure
- Coastal erosion, mangrove cover, and coral bleaching
- Municipal climate risk reduction strategies
- The system includes a module for streamlined data collection and emphasises validation of indicators through annual reflection meetings with national and subnational stakeholders.

Takeaway: Panama's experience demonstrates how dynamic M&E systems can **track diverse L&D impacts**, remain responsive over time, and improve coordination across institutions

5.2

Aligning with Global Reporting Frameworks

Robust national loss and damage MERL systems also create the foundation for meaningful engagement in international reporting processes. There are several opportunities for aligning with and contributing to global frameworks like the Sendai Framework, the Paris Agreement's ETF, and the SDGs. This can enhance transparency and policy relevance, while also supporting access to international support. Harmonised reporting enables countries to generate comparable data, demonstrate the effectiveness of their interventions, and facilitate learning with international partners (Climate Action Transparency Initiative, 2023). Increased transparency also improves opportunities for climate finance and donor engagement, while linking national information to global targets supports credibility and integration into broader policy and planning (Serdeczny et al., 2024).

Several measures can be taken to pursue alignment, including:

1. **Indicator alignment:** It may be useful to review and select indicators that are compatible with Sendai and SDG reporting – such as the "number of disaster-affected people," "direct economic losses," and "population displaced." Mapping national indicators to global codes and definitions could support multi-purpose reporting and reduce duplication of effort.

2. **Data system development:** Countries might consider upgrading data systems for interoperability, allowing direct uploads to the Sendai Monitor and ETF templates (ICAT 2023; UNFCCC, n.d.). Digital and automated solutions, such as centralised repositories, may help streamline reporting and allow ongoing updates from diverse actors.

3. **Coordination and institutional arrangements:** Cross-ministerial coordination can assist in data quality and consistency. Joint protocols, including disaster management and statistical agencies, may prevent gaps and overlaps (ICAT, 2023; Serdeczny et al., 2024). Periodic review workshops offer a means to keep procedures current with global frameworks and national priorities (EC, 2005).

4. **Capacity strengthening and stakeholder engagement**: Engaging local governments, technical experts, and community organisations may improve inclusiveness of loss and damage monitoring. For instance, Caribbean countries have involved local actors in finance needs reporting for international channels (Serdeczny et al., 2024).

5. **Linking to finance and decision-making:** Countries might document loss and damage asset and activity costs in BTRs, NAPs, and dedicated loss and damage submissions to evidence support requests. Consistent methodologies, aligned with global standards, can strengthen evidence for both domestic and donor decision-makers (ICAT, 2023; UNFCCC, n.d.; Serdeczny et al., 2024).

Table 7: Different forms of indicators for potential alignment

Potential L&D MERL Indicator	Sendai Framework Indicator	SDG Indicator
Number of people directly affected by disasters	Target B1: Number of people directly affected by disasters, per 100,000 population	1.5.1, "Number of deaths, missing persons and people directly affected by disasters"
Economic loss from disasters	Target C1: Direct economic loss attributed to disasters in relation to global gross domestic product	11.5.2 "Direct economic loss from disasters"
L&D/DRR strategies adopted by national/local governments	Target E2: Percentage of local governments that adopt and implement local disaster risk reduction strategies in line with national strategies	1.5.4 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies

Box 6

Innovative Approaches for Enhanced L&D Data Quality and Management

Improving loss and damage (L&D) data requires systematic identification of evidence gaps and the use of **innovative, technology-driven approaches**.

Open source and open data:

Platforms like the **Global Resilience Index (GRI) Risk Viewer** and the **DTS** provide publicly accessible monitoring of hazards and losses (UNDRR, UNDP, WMO).

APIs enable interoperability between datasets, enhancing usability and analysis (Roick, Haklay & Ellul, 2016).

Machine Learning and AI:

AI and machine learning can improve **prevention, assessment, and attribution** of L&D, automate data extraction, and increase accuracy (Larosa & Wickberg, 2024; Hicks et al., 2019).

Tools such as **AR/VR** and social media analytics support **community training, preparedness, and rapid assessment** (Erokhin & Komendantova, 2024; Jung, 2022).

Inclusive and transparent development ensures technology benefits **vulnerable communities**.

Takeaway: Leveraging open data, AI, and digital tools enhances the accuracy, accessibility, and applicability of L&D data, supporting more informed decision-making and community engagement.

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There are already examples of how countries and regions are integrating loss and damage into their monitoring and reporting systems in ways that align with international frameworks. In South Africa, the loss and damage framework incorporates hazard and impact classifications based on Sendai indicators, with standardised data verification procedures and central databases used for domestic and international reporting (ICAT, 2019, 2023). Caribbean states have begun to systematically tag loss and damage (including finance needs) in existing climate reports, such as National Communications and BTRs, supporting emerging global calls for improved loss and damage evidence (Serdeczny et al., 2024). At regional level, the EU Disaster Loss and Damage Working Group developed guidelines and held regular consultations to harmonise national damage databases and reporting with Sendai requirements, demonstrating a collaborative pathway for alignment (EC, 2005).

5.3

Gender-Responsive, Socially Inclusive, and Participatory Loss and Damage MERL systems

Embedding gender equality and social inclusion (GESI) principles into MERL systems allow for identifying and addressing differences in participation and access to the benefits of L&D responses that are shaped by gender and social inequality (Beauchamp et al., 2024). It also enables countries to systematically track progress on GESI within national L&D processes and to capture potential unintended consequences. By strengthening the evidence base, GESI-responsive MERL supports more inclusive learning on both loss and damage processes and their outcomes.

GESI-responsive MERL systems should incorporate participatory monitoring practices that empower women and marginalised groups. Quantitative indicators like 'percentage increase in women's leadership roles' and qualitative narratives capturing changes in social dynamics can enhance understanding of project impacts. Using innovative methods can enhance inclusion and voice but some of these approaches need to be approached with special care and consideration for the capacity constraints of vulnerable countries and communities, given that technological advances often originate and are used in high- and middle-income countries (AF-TERG and UNEPCCC Forthcoming; Larosa and Wickberg 2024).

Participatory and inclusive MERL also involves deploying innovative methods for data generation that can enhance voice, accessibility, and legitimacy. Community-based approaches to environmental and climate risk data collection and management include, for example, citizen science, gamification and community-led data collection and monitoring systems and crowdsourcing methods, such as mobile phone reporting, social media data sifting and analysis, public monitoring apps and online platforms (Balzter et al. 2023, pp. 4-7; Erokhin and Komendantova 2024; Danielsen et al. 2022; Wolff 2021; see also Toyoda and Tanwattana 2023; Hicks et al. 2019). In DRM, citizen science and community monitoring have been successfully applied in flood, health and hazard monitoring, feeding into public dissemination of information and warnings in communities (Danielsen et al. 2022, p. 649).

To strengthen their relevance for L&D, participatory MERL approaches can be complemented by clearer involvement of local governments and other sub-national institutions, which play a key role in integrating community-generated evidence into planning, decision-making, and reporting processes. This linkage also facilitates the alignment of locally produced information with national and donor reporting requirements on L&D, potentially improving consistency and completeness of evidence across scales.

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6. Fostering Multi-Stakeholder Partnerships and Innovative Approaches to Stakeholder Engagement in L&D

Traditional resilience measures are increasingly insufficient, and even ambitious mitigation cannot prevent all residual and irreversible climate impacts. For many vulnerable countries, these impacts are already visible in coastal erosion, droughts, displacement, and loss of cultural heritage (IPCC, 2022). This raises a central governance challenge: how to address unavoidable climate impacts in just, inclusive, and sustainable ways.

Meeting this challenge requires more than technical solutions. Inclusive and well-structured deliberative forums that engage a broad range of stakeholders in evaluating evidence and designing responses are vital for ensuring that loss and damage (L&D) initiatives are fair, credible, and effective (Stevenson & Dryzek, 2014). Stakeholder engagement is critical because climate impacts and vulnerabilities are highly context specific. Groups such as women, Indigenous peoples, low-income communities, persons with disabilities, youth, older persons, and marginalised groups hold vital knowledge about local risks and response options (IPCC, 2022; UNFCCC LCIPP, 2021). Without their participation, L&D policies risk misalignment and may reinforce existing inequalities. Inclusive engagement also builds trust, legitimacy, and accountability, supporting more durable outcomes.

Many developing countries face constraints in institutional mandates, time, and financial and technical resources, even where local expertise exists. Capacity strengthening across governments, civil society, academia, and the private sector is therefore essential. This should go beyond training to include co-created knowledge, community-driven approaches, and the integration of Indigenous and traditional knowledge (UNFCCC LCIPP, 2021). Practical tools — such as gender-sensitive assessments, social vulnerability mapping, and participatory scenario development — can help ensure that L&D responses are locally appropriate and socially inclusive (UN Women, 2021; UNDRR, 2022; FAO, 2023).

Stakeholder engagement and capacity strengthening are mutually reinforcing. Engagement helps identify local priorities and capacity gaps, while targeted capacity strengthening enables communities and institutions to participate meaningfully in decision-making and guide policy and financing choices.

This chapter provides practical guidance for governments, NGOs, and practitioners on how deliberative, inclusive approaches can move L&D governance from fragmented, reactive responses towards coherent, people-centred systems.

6.1

Fostering Multi-Stakeholder Partnerships and Innovative Approaches to Stakeholder Engagement in L&D

Effective L&D responses depend on multi-stakeholder partnerships that bring together governments, civil society, academia, the private sector, and affected communities (NAP Global Network, 2023; UNFCCC, 2019). Many countries have applied such approaches in national adaptation planning—such as whole-of-government and whole-of-society processes in Senegal, Sudan, and Fiji, demonstrating their value for ownership and implementation (Government of Sudan, 2016; Government of Fiji, 2017; UNDP, 2021).

Responding to loss and damage requires coordinated and sustained engagement, particularly with marginalised groups who face the highest risks but have the least access to recovery resources. Participatory planning, consultations in local languages, and the integration of Indigenous and traditional knowledge help ensure that L&D interventions reflect local realities. Emerging mechanisms, including Local Loss and Damage Hubs and participatory non-economic loss and damage documentation, support co-governance, accountability, and preparedness for accessing L&D finance.

To be effective and durable, these multi-stakeholder processes should be institutionally anchored within national L&D coordination mechanisms, ensuring that participatory inputs directly inform policy and financing decisions.

Box 7

Lessons Learned:
AI for Stakeholder Consultations on Loss and Damage

Case example: Sulawesi, Indonesia (2018)

Following the Sulawesi earthquake and tsunami, AI and satellite imagery were used to rapidly estimate damage and reconstruction costs, creating a shared evidence base that shifted consultations from debating data to discussing priorities and response options.

Key lessons

AI-generated damage maps can provide timely and credible evidence, reduce mistrust, and support inclusive dialogue among governments, donors, and communities. However, AI tools cannot capture non-economic losses and require local interpretation to remain contextually relevant.

Practical Takeaway

AI is most effective as a **complementary tool** in stakeholder consultations, supporting transparent decision-making while participatory processes ensure local knowledge and non-economic losses are fully recognised.

6.2

Building Institutional and Technical Capacity for L&D

Effective loss and damage (L&D) action depends on strong institutional arrangements and adequate technical capacity working together. Clear mandates, national coordination mechanisms, and institutional anchoring are needed to sustain data systems, assessment teams, and expertise beyond individual projects. Without this foundation, technical skills and data often dissipate, leading to fragmented and inconsistent responses. At the same time, institutions cannot deliver credible assessments or access finance without sufficient technical capacity.

For countries, particularly SIDS and LDCs, capacity strengthening is not an add-on but a core requirement for translating L&D commitments into action, enabling timely assessment, response, and access to finance (UNDP, 2024; Sircar et al., 2024).

Strengthening institutional capacity in practice

Governments can strengthen institutional capacity by:

- **Embedding L&D in national planning:** Integrating L&D into climate and development policies helps ensure it informs investments and budgeting, rather than being treated as a stand-alone issue (UNDP, 2024).
- **Improving coordination:** Clear roles across ministries, disaster agencies, and local governments reduce duplication and speed up response and recovery (UNDRR, 2024).
- **Strengthening accountability:** Transparent monitoring, reporting, and review processes—using gender- and equity-sensitive indicators—help track impacts and finance flows and support continuous improvement (UNDP, 2024).

Capacity gaps are often greatest at sub-national and community levels, where local governments, Indigenous institutions, women's groups, and youth networks lead initial assessments and recovery but have limited resources. Targeted support at these levels is therefore essential.

Building technical capacity where it matters

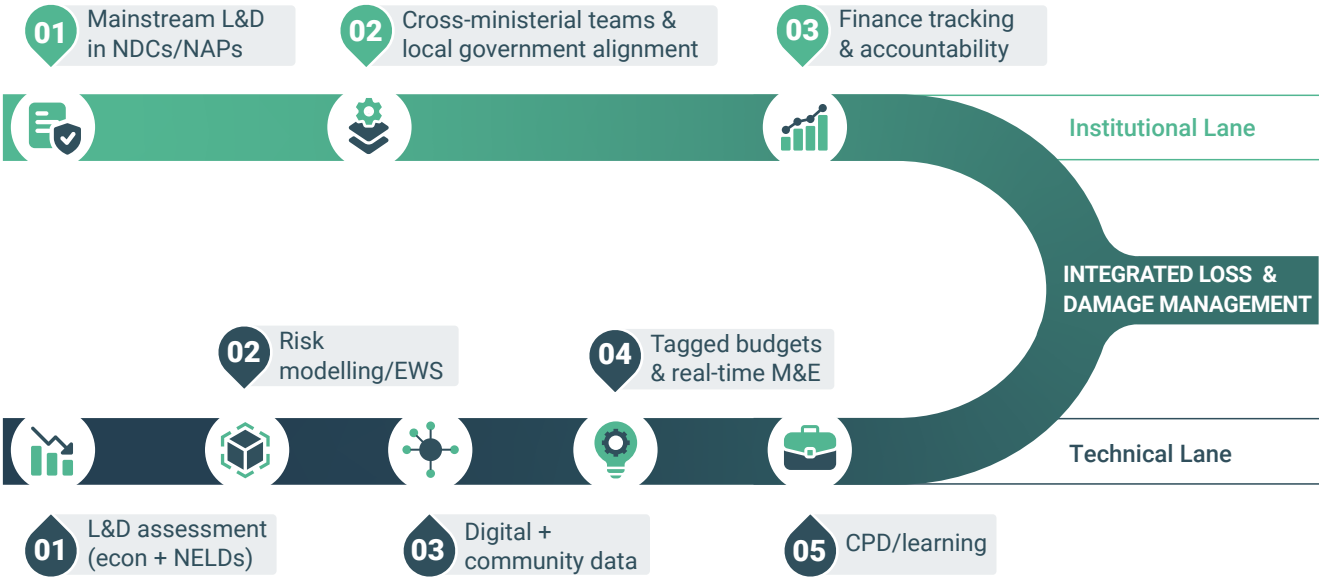
In practice, technical capacity strengthening should focus on:

- **Comprehensive L&D assessments:** Build skills to assess both economic and non-economic losses using standardised but locally adapted methods for rapid- and slow-onset events, combining sectoral checklists with participatory approaches (UNDP, 2024).
- **Risk modelling and scenario analysis:** Use climate projections, geospatial tools, and early warning systems to anticipate impacts and prioritise investments (GCA, 2025).
- **Integrated data collection:** Combine digital tools (e.g. mobile reporting, remote sensing) with community-based data to improve accuracy, trust, and cross-sector coordination (SEforALL, 2025).
- **Monitoring and reporting for finance:** Track L&D-related projects and expenditures using tagged budgets and transparent reporting that directly supports applications to the Loss and Damage Fund and other financing windows (UNDP, 2024).
- **Continuous learning:** Invest in ongoing training, peer learning, and post-event reviews to keep national and local teams aligned with evolving guidance and best practice (UNDRR, 2024).

Knowledge sharing and collaboration

Regional networks, South–South cooperation, and knowledge platforms play a critical role in sustaining capacity by enabling countries to **share tools, lessons, and solutions**. These mechanisms help connect local evidence to global policy and financing processes, though sustained investment is needed to scale and maintain them (NAP Global Network, 2023).

Figure 7: Integrated Loss and Damage Management



Box 8

Case Study:
South–South Cooperation

South–South cooperation has been crucial for SIDS addressing loss and damage (L&D). By collaborating across regions, SIDS have advanced **shared methodologies, institutional frameworks, and access to finance**, enhancing credibility and collective influence.

Key examples:

Co-developed assessment tools: Standardised approaches for economic and non-economic losses, including slow-onset events, support national planning and L&D Fund access.

Capacity building: Regional training, knowledge exchanges, and joint symposia strengthen technical expertise for L&D assessment and reporting (UNDP, 2024; GCA, 2025).

Policy advocacy: Coordinated platforms and regional studies enable SIDS to influence global L&D frameworks and secure targeted finance (Climate Analytics, 2024; SEforALL, 2025).

South–South cooperation demonstrates the value of solidarity in linking local impacts to international support and guiding operationalisation of the L&D Fund.

Strengthening capacity reduces uncertainty and improves L&D outcomes. By equipping stakeholders with tools, financial support, and institutional resources, countries can produce more accurate assessments, anticipate risks, and design context-specific, forward-looking interventions. Capacity building should be continuous and well-resourced, underpinning credible, inclusive, and effective L&D responses (NAP Global Network, 2023).

Centring marginalised voices is essential. Effective inclusion goes beyond participation: it requires redistributing influence through safe-space dialogues, community-led agenda setting, representation quotas, and removal of structural barriers such as language, mobility, or social hierarchies. Embedding these practices ensures L&D processes promote procedural justice, collective agency, and governance grounded in lived realities, giving that most affected real influence over decisions shaping their futures.

6.3

Locally Led Approaches to L&D

Locally led approaches ensure that frontline communities **drive L&D strategies**, contributing Indigenous knowledge, traditional practices, and lived experience. Local actors participate meaningfully in setting priorities, accessing resources, and identifying context-specific needs, rather than acting only as implementers (Scottish Government, 2021; Loss and Damage Collaboration, 2023).

Why locally led approaches matter:

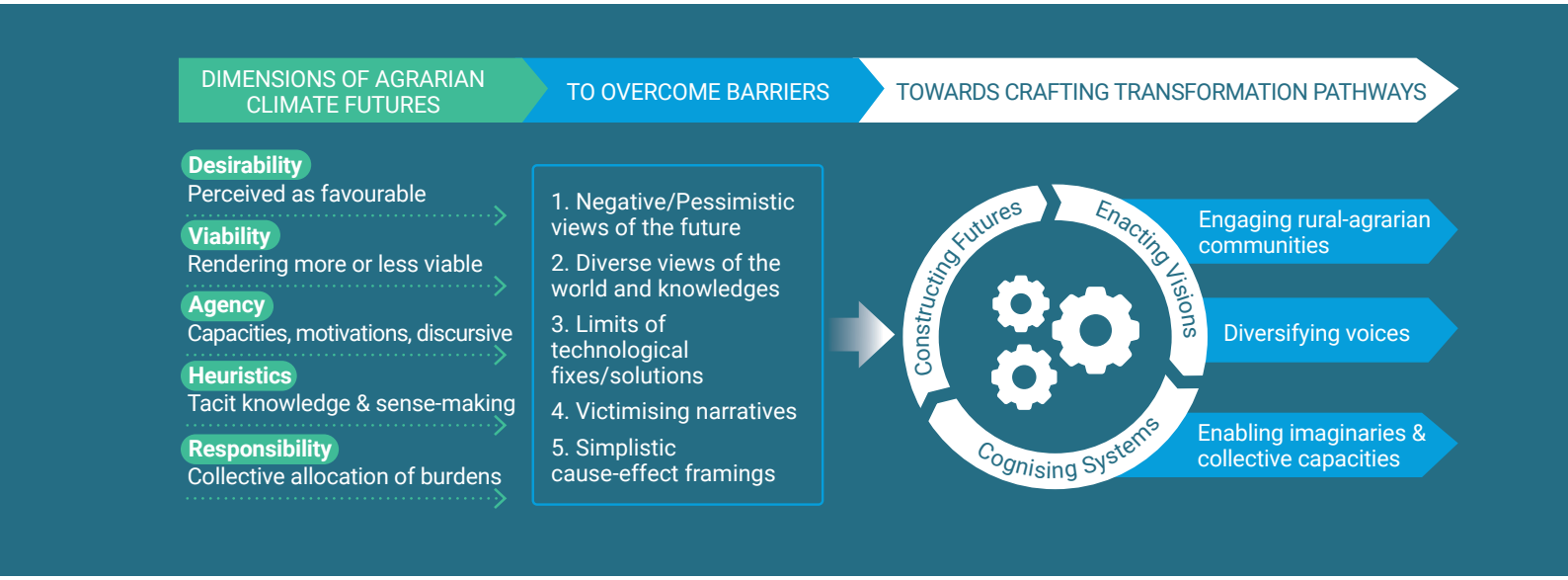
- Communities hold critical ecological, cultural, and social knowledge.
- They identify risks and thresholds missed by top-down assessments.
- They surface non-economic losses such as identity, spiritual well-being, and social cohesion (McNamara et al., 2024).

Governance challenges:

- Centralised decision-making often limits local influence over assessment, resource allocation, and policy.
- Local actors frequently lack budgets, institutional power, or authority to implement context-specific solutions.
- Donor-driven, short-term programming can undermine long-term ownership (Loss and Damage Collaboration, 2025).

These challenges are illustrated in practice through lessons from a multi-stakeholder loss and damage workshop in Ratanakiri Province, Cambodia, which highlights how power asymmetries, problem framing, and externally driven solutions can constrain meaningful participation. Further detail is provided in Annex E (Box E1).

Figure 8: An approach for pluralising and politicising agrarian climate futures, moving from loss towards transformation



Source: Adapted from Persson et al. (2026)

Key components of locally led approaches:

1. Indigenous Knowledge and Traditional Practices (TEK)

- Encode long-term environmental observations, early warnings, land-use rules, and recovery rituals (Berkes, 2012; McNamara et al., 2024).
- Integration requires safeguards: Free, Prior, and Informed Consent (FPIC), protection of cultural/intellectual property, benefit-sharing, and preventing tokenistic engagement.
- Practical impact: expands what is counted in assessments, recognises cultural thresholds, and informs intervention design (Bohensky & Maru, 2011; Hiwasaki et al., 2014).

2. Traditional Adaptation Practices

- Include communal safety nets, stewardship systems, and collective labour arrangements.
- Support social cohesion, protect marginalised groups, and reduce cultural erosion (Nyong et al., 2007).
- Can be blended with modern tools — early-warning systems, GIS, participatory mapping — to create hybrid solutions for resilience and L&D readiness (Hermans et al., 2022; Paudel et al., 2025; Chaudhary et al., 2022).
- Youth participation strengthens intergenerational knowledge transfer and digital documentation (Lanouette et al., 2025; Bishop et al., 2025; Datta et al., 2024).

3. Participatory Decision-Making in National Frameworks

- Iterative engagement across risk identification, planning, implementation, and monitoring ensures legitimacy and alignment with community priorities (Pill, 2022).
- Methods: community mapping, oral histories, participatory workshops, photovoice, citizen science (ActionAid, 2020; Mohr et al., 2023; Geekiyanage et al., 2021; Huber et al., 2023; Wolff et al., 2021).
- Examples:
  - India: participatory mapping revealed family network disruptions, informing mental health programmes (CJRF, 2025; PreventionWeb, 2024).

- Bangladesh: Barisal L&D Hub integrates local data into district and national planning (STRENGTH Team, 2024).

4. Moving Beyond Top-Down Approaches

- Centralised approaches often miss cultural, psychosocial, and relational harms and can produce maladaptation (IIED, 2023; Eriksen et al., 2021).
- Effective governance requires **two-way accountability**: reporting back to communities, validating findings, and showing how insights influence decisions (Parajuli et al., 2023).
- Combining quantitative, participatory, and Indigenous knowledge improves L&D accuracy and legitimacy.

5. Trust-Building and Long-Term Partnerships

- Mutual trust between communities and institutions is essential for sustained, effective L&D governance (Lansing et al., 2023; Brittain, 2025).
- Trust grows through long-term engagement, predictable financing, co-management of data, and shared decision-making (Ortega-Rodríguez et al., 2020; Rabbani et al., 2022).
- Inclusive governance enhances legitimacy, accountability, and resilience while reducing inequities.

In summary, locally led approaches combine TEK, traditional practices, participatory decision-making, and long-term partnerships to ensure L&D strategies are culturally relevant, equitable, and durable, empowering communities to shape priorities, interventions, and recovery pathways.

Box 9

Community-Based Loss and Damage Assessment Toolkit

Overview of the Community based loss and damage assessment toolkit and its approach to stakeholder engagement

Case study: Pacific Islands

The Community-Based L&D Assessment Toolkit enables Pacific Island communities to lead their own assessments using participatory methods, placing ownership and decision-making with local actors.

Key features:

- Participatory tools: Hazard mapping, seasonal calendars, questionnaires, L&D matrices, and root-cause analysis capture both economic and non-economic losses.
- Community ownership: Local priorities guide design, implementation, and validation.
- Knowledge integration: Combines scientific data with Indigenous knowledge and lived experience.
- Feedback loops: Results are shared with communities to build trust and plan next steps.
- Policy linkages: Outputs inform sub-national and national planning, bridging grassroots realities with higher-level decision-making.

Takeaway

The toolkit demonstrates how locally led assessments can surface critical insights, empower vulnerable populations, and strengthen trust, making national L&D strategies more inclusive and responsive.

6.4

Synthesis and Conclusion: Towards an Inclusive and Future-Oriented Engagement Framework for L&D

Effective loss and damage (L&D) governance requires inclusive, justice-centred, and proactive approaches. Continuous stakeholder engagement and capacity strengthening are essential foundations for credible, durable, and equitable L&D strategies (UNDP, 2024; Climate Analytics, 2024). Without these, interventions risk being fragmented, technocratic, or disconnected from lived realities.

Key principles for inclusive L&D governance:

- **Institutionalise engagement:** Embed the voices of women, Indigenous Peoples, youth, migrants, and grassroots organisations across assessment, planning, implementation, and monitoring (IIED, 2022).
- **Strengthen capacity:** Invest in cross-sector coordination, monitoring systems, professional development, South–South knowledge exchange, and mainstreaming L&D into national planning (UNDRR, 2024).
- **Ensure long-term financing:** Multi-year, flexible funding and direct support to local actors sustain staffing, monitoring, partnerships, and participatory processes.
- **Blend data and lived experience:** Combine rigorous, context-specific assessments with participatory methods, digital tools, and Indigenous knowledge to inform national reporting, global finance, and policy decisions (DIIS, 2022; Puig et al., 2019).
- **Prioritise attribution and slow-onset risks:** Strengthen methodologies to link climate change to specific losses, particularly for slow-onset hazards, improving transparency and finance targeting.

Future priorities:

- Develop robust, standardised methodologies for data-scarce contexts (SIDS, LDCs).
- Address political economy barriers, including centralisation, institutional silos, donor conditionalities, and elite capture.
- Embed participatory assessments into national L&D systems to ensure community knowledge informs policy and funding decisions.
- Foster long-term, multi-stakeholder platforms and inclusive partnerships that empower marginalised and frontline actors.

Therefore, when inclusive engagement, sustained capacity, stable financing, and local leadership are combined, countries can create L&D systems that are equitable, effective, and resilient, translating policy commitments into tangible outcomes for climate-vulnerable communities.

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Conclusion and Recommendations

This guide provides a comprehensive framework for strengthening national and local systems and capacities to address loss and damage in the face of escalating climate risks. Drawing on evidence from research, international policy processes, and country-level experiences, it demonstrates that effective responses to L&D require integrated strategies, strong institutions, accessible and predictable finance, inclusive monitoring systems, and sustained capacity strengthening efforts. The practical guidance is aimed at developing countries, to support their efforts in assessing and managing loss and damage, and providing insight into how to integrate loss and damage into national policies and plans.

The guidelines highlight that loss and damage is not an isolated outcome but a manifestation of adaptation limits, structural vulnerabilities, and limited integration of climate risk into national and local development planning. While mitigation and adaptation remain vital, there are residual impacts that need to be addressed. National governments are recommended to prioritise loss and damage as a core dimension of climate, disaster risk reduction, and sustainable development policies and plans. Below are the practical steps from each required step in loss and damage management:

Integrated and Context-Aware Risk Management

At the foundation of L&D strategies, CRM plays an important role (see Chapter 2, Sections 2.1–2.7 for the CRM framework and components). Evidence highlights that successful approaches must begin with robust, inclusive CRAs that combine scientific data with community-led knowledge to identify vulnerabilities across geographic, social, and economic dimensions. These assessments are not only technical exercises but also social processes that strengthen ownership and empower communities.

Risk reduction strategies should focus on addressing root drivers of vulnerability, such as poverty, weak infrastructure, and inequality, while risk transfer and retention mechanisms, including insurance, contingency funds, and social safety nets, must be designed to reach those most affected. Where incremental adaptation is insufficient, transformational measures, such as livelihood diversification, planned relocation, and ecosystem-based restoration, should be considered. These actions should be guided by continuous MEL systems that are flexible, context-specific, and aligned with national priorities.

Strengthening Institutional and Policy Frameworks

Institutional capacity and policy coherence are essential for operationalising L&D. Findings show that fragmented mandates, limited coordination, and inconsistent data management may undermine national efforts. Effective governance requires assigning clear institutional responsibilities, fostering cross-sectoral collaboration, and harmonising data systems for decision-making. Strategies should be tailored to national contexts. While this guide provides flexible tools and typologies, each country will need to generate its own evidence base to define priorities and communicate needs, including both economic and non-economic loss and damage to domestic and international stakeholders.

Scaling Up Finance and Resource Access

Finance is one of the main challenges countries face in managing and responding to loss and damage, especially where repeated climate shocks and limited fiscal space already stretch capacities (UNDP, 2024). Many developing countries are doing a great deal despite these constraints, so guidance should help build on existing systems rather than add new burdens.

Countries can, where useful, strengthen ways to record and track loss and damage needs and related spending, using formats that link to national budgets and to applications for international support (UNDP, 2024). Building on existing coordination mechanisms can help to bring together L&D information across sectors, without changing mandates, and to engage more coherently with international funds and partners (GCF, 2023).

Options to diversify finance, such as international climate funds, regional mechanisms and, in some cases, risk-pooling schemes or private-sector engagement, can be explored, in line with national priorities, equity concerns and clear assessment of benefits and risks (GCF, 2023). Rapid-response and longer-term resilience finance are both helpful and their impact ultimately depends on resources and on systems that can channel funds rapidly to those most in need (UNFCCC, 2023). This underlines the importance of international cooperation, to enable support for countries that are already coping with severe and recurrent climate impacts (UNDP, 2024).

Adaptive, Inclusive, and Learning-Oriented Systems

MERL systems should go beyond compliance reporting to function as living, adaptive frameworks that support decision-making. Embedding equity and inclusion is essential and therefore collecting disaggregated data, integrating gender-sensitive indicators, and actively engaging vulnerable communities in MERL ensures that strategies remain grounded in lived realities. Countries should also foster a culture of continuous learning, drawing on emerging science, international best practices, and local innovation.

Building Capacity and Stakeholder Partnerships

Capacity gaps, both technical and institutional, remain a critical challenge. Training programmes for government officials, local authorities, and civil society organisations are essential to build sustained expertise. Establishing national knowledge platforms and regional centres of excellence can facilitate peer-to-peer learning. Locally led initiatives can be resourced and supported to ensure that solutions reflect community priorities. Partnerships across government levels, civil society, academia, the private sector, and international agencies play a critical role in mobilising resources and sustaining action.

L&D is a global challenge requiring both domestic and international responses. National actions will be enabled by active participation in global fora, such as the UNFCCC, regional networks, and the Santiago Network. Multi-country cooperation on risk pooling, shared data systems, and joint capacity development can significantly advance collective responses to loss and damage. Engaging with international initiatives also enables countries to access financial and technical resources, while contributing to global accountability and shared ambition.

The evidence synthesised in this guide underscores that managing L&D requires decisive action, to continue to build hard-won development gains, overcome inequality, and support communities' capacity to adapt. By adopting the recommendations outlined here, countries can move towards workable strategies that protect ecosystems and lives, and sustain economic and social development in the face of future climate risks and impacts.

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Annexes

Annex A: Supplementary Material for Chapter 2

Table A1: Overview of tools developed for loss and damage retrospective assessments

Tool	Description	Method(s)	Hazard type	LnD type	Scale	Strengths	Limitations
Handbook for Community-Led Assessment of Climate-Induced Loss and Damage (Anderson, Hossain, & Singh, 2019)	Provides a participatory 7-step process for communities to assess and document loss and damage, understand emerging risks, and advocate for support: i) mapping risks and resources; ii) participatory drawing of seasonal, agricultural and livelihood calendars; iii) identifying vulnerable households; iv) understanding the impacts of disasters and climate change; v) complementing community assessment with external expertise; vi) calculating and reporting loss and damage, to develop a database/ baseline of impacts for the community; viii) advocacy and lobbying. Builds a local evidence base for both qualitative and quantitative assessments.	HH surveys; FGD; participatory methods (e.g. community mapping, seasonal calendars)	EE, SOE	Mainly EL&D	Community	Captures local perspectives and context-specific impacts; can address NELs; builds ownership	Time-consuming; requires facilitation

Table A1: Overview of tools developed for loss and damage retrospective assessments (cont.)

Tool	Description	Method(s)	Hazard type	LnD type	Scale	Strengths	Limitations
Handbook for assessing loss and damage in vulnerable communities (Van der Geest & Schindler, 2017)	Offers a methodological toolkit for researchers and practitioners to assess L&D and adaptation limits in vulnerable communities. Structured around seven domains including climatic stressors, livelihood vulnerability, preventive measures, residual losses, adaptation strategies, coping mechanisms, and costs/unintended effects. Employs mixed methods to capture both quantitative data and lived stories of L&D.	Desk review; HH surveys; participatory rural appraisal (e.g. through FGD); participatory evaluation of CCA and DRR initiatives; expert interviews; open-ended interviews (loss and damage stories)	EE, SOE	ELnD, NELs	Community, but can be scaled up to region and state levels		Time and resource intensive (both human and financial)
Community-Based Loss and Damage Assessment Toolkit for the Tourism and Agricultural Sectors (Lese et al., 2015)	Designed to support communities and practitioners in initial L&D assessments in agriculture and tourism. Focuses on vulnerability, exposure, impacts, and adaptive capacity, while also examining why coping and adaptation strategies succeed or fail. Helps uncover root causes of L&D, including maladaptive practices and poor planning, through reflection and participatory tools.	HH surveys; FGD; participatory methods (e.g. community mapping, seasonal calendars).	EE, SOE	Mainly EL&D	Community	Captures local perspectives and context-specific impacts; can address NELs; builds ownership	Time-consuming; requires facilitation

Table A1: Overview of tools developed for loss and damage retrospective assessments (cont.)

Tool	Description	Method(s)	Hazard type	LnD type	Scale	Strengths	Limitations
Comprehensive Climate Impact Quantification (C-CIQ): an approach to co-developing policy and programmatic responses for climate risk management (IIED, 2024)	Provides a 5-step toolkit for participatory, community driven assessment of L&D. It follows a multidimensional (economic and non-economic) approach in identifying L&D caused by a variety of climate hazards. The tool also supports the co-definition of solutions towards improved resilience in a community and stakeholder setting.	Inclusive participatory community assessment and co-development approach; index-based mixed-methods approach (economic valuation, multi-criteria decision-making analysis, composite risk index and qualitative analysis)	EE & SOE	EL&D and NEL (multidi-mensional)	Community	Captures EL&D and NEL; clear process with steps; draws on a variety of methodological approaches	Requires local engagement; combines many meth-odological approaches that require broad knowledge
ICAT Assessing climate change-driven losses and damages (Puig, 2023)	Presents a practical and structured guide for assessing EL&D and NEL caused by climate change via two distinct approaches. It explains how to conduct retrospective assessments of past impacts and prospective assessments of future risks, with the aim of supporting better planning, decision-making, and resource allocation under climate change.	Different assessment approach for EL&D and NEL. Mixed methods: household surveys, case studies, participatory and quantitative tools	EE, SOE	EL&D, NELs	Community, City–na-tional	A framework providing a standardised, stepwise approach; integrates qualitative and quantitative assessment for EL&D/NELs	Requires both local engagement and data work

Table A1: Overview of tools developed for loss and damage retrospective assessments (cont.)

Tool	Description	Method(s)	Hazard type	LnD type	Scale	Strengths	Limitations
Baseline Assessment of Retrospective Loss and Damage: Assess past climate-related hazards and their impacts on urban systems, health, social systems, and economies over the last 50 years in two selected cities (UNEPCCC, forthcoming)	Undertakes a comprehensive evaluation of past climate-related hazards and their impacts on urban systems, health, social systems, and economies over the last 50 years in Ahmedabad and Surat, India. Builds on and adapts the ICAT Loss and Damage Guide to address the complexities and data needs of rapidly urbanising cities.	HH surveys, FGDs, secondary multisectoral data, GIS-based mapping	EE, SOE	EL&D, NELs	City	Systematic, participatory, and multi-sectoral; integrates economic and non-economic losses; pilots adaptation of ICAT guide for urban contexts	Resource-intensive; currently limited to pilot cities; methodology still under refinement

Table A2: Loss and Damage Database

Database / initiative	Type / owner	What it provides
EMDAT	Public database managed by the Centre for Research on the Epidemiology of Disasters (CRED)	Global disaster database with standardised information on disaster events, people affected and reported economic losses. preventionweb
DesInventar	Public database (UNDRR legacy system)	Historical, nationally reported records of hazardous events and impacts, often at subnational level; being phased out and migrated into DTS. mhewc
NatCatSERVICE	Proprietary database, Munich Re	Insurancebased global dataset on natural catastrophe events, with detailed loss information used for risk modelling and pricing. gfdrr
Sigma	Proprietary database, Swiss Re	Annual natural and manmade catastrophe statistics, including insured and total losses by peril and region. gfdrr
DTS	Under development by UNDRR, UNDP & WMO	Successor to DesInventar, designed as an interoperable platform combining hazardous event data with disaggregated loss and damage information on a local scale. mhewc

Annex B: Supplementary Material for Chapter 3

Table B1: Comparative Table: L&D Institutional Arrangements in Practice

Governance Feature	% Coverage Among Countries	Common Gaps or Issues	Example
National Focal Point or Coordinator	46%	Many mandates unclear/incomplete; ad hoc roles are common	Bangladesh, South Africa
Explicit L&D Laws/ Policies	35% (direct reference)	L&D often fragmented, lacks distinct legal status	South Africa (ICAT project), Nepal
Technical Expertise (in documents)	33%	Most countries do not specify expert teams for L&D	Vanuatu, Fiji, Guyana, Liberia
Data Agreements & Data Quality	~30%	Siloed, inconsistent, or absent data flows & standards	Bangladesh, Cambodia
Centralised Data Repositories	52%	Quality assurance often lacking; integration needed	Vanuatu, Cambodia
Stakeholder Engagement	42%	58% lack active consultation with key partners	Fiji, Vanuatu, Cape Verde
Data Quality Management Tools	7%	Standardised protocols rare or non-existent	Mauritius, Fiji

Box B2

Examples of Governance Challenges

Mozambique: Overlapping institutional mandates and weak coordination between national and local authorities have constrained disaster risk reduction and climate adaptation efforts, despite repeated exposure to cyclones. The aftermath of Cyclone Idai in 2019 revealed not just physical vulnerability but also administrative fragmentation that delayed early warning, evacuation, and relief.

Fiji: While national-level adaptation plans are relatively advanced, limited local capacity and unclear land tenure laws have slowed the relocation of climate-threatened communities, even when there is broad consensus on the need for managed retreat.

Bangladesh: Established adaptation planning is undermined by persistent data gaps on groundwater depletion and salinity intrusion in low-income coastal areas. Political sensitivity around acknowledging internal displacement further delays effective policy action.

Caribbean, SIDS (e.g. Jamaica): Progress in mainstreaming adaptation into development planning is hampered by donor-driven projects that lack long-term institutional anchoring, leading to fragmentation once funding ends.

Box B3

Responses to Loss and Damage in the NDCs

Some NDCs have included measures to address governance systems as part of their responses to loss and damage.

Developing the knowledge base: Initiatives aimed at data gathering, analysis, and assessment of L&D at the national level were discussed in a number of NDCs. For example, Sri Lanka documents plans for knowledge generation, including, conducting a gap analysis to assess the current status and understanding of L&D, strengthening the existing weather and climate forecasting system, and improving data management systems to record loss and damage by sector (Sri Lanka, 2021). Vanuatu commits to conducting assessments on potential and actual loss and damage across the country, linked with ongoing vulnerability assessment processes, and quantifying losses (e.g. food security, culture, ecosystem services and integrity) particularly though the Post Disaster Needs Assessment approach (Vanuatu, 2021).

New and evolving institutions: This includes initiatives to expand the mandate of existing institutions or to establish new ones to deal with loss and damage (Calliari and Ryder, 2023). For instance, Venezuela reported in 2021 that the General Directorate on Climate Change Adaptation and Mitigation was expanded to include a new "Directorate on loss and damage due to Climate Change" (quoted in Calliari and Ryder, 2023). Nepal announced its intention in 2020 to devise "a national strategy and action plan on Loss and Damage (L&D) associated with climate change impacts" by 2025 (quoted in Calliari and Ryder, 2023).

New and existing national funds: Some NDCs reflect on the role of existing national funds in responding to L&D as well as the creation of dedicated funds (Calliari and Ryder, 2023). The Dominican Republic's NDC observes that the "institutionalization of the National Prevention, Mitigation and Response Fund" could "strengthen financing systems for loss and damage" (Dominican Republic, 2020). Other NDCs instead elaborate on opportunities for setting up new ad hoc funds, such as "contingency funds for climate impacts with a flexible and rapid dispersal system" (Saint Lucia, 2021) or "a dedicated fund within the national CCFF [Climate Change Financing Framework]" (State of Palestine, 2021).

National risk transfer mechanisms: Antigua and Barbuda's NDC sets the conditional target of giving farmers, fishers, and residential and business owners access to "comprehensive and tailored national programs that allow them to affordably manage and transfer risks resulting from increasing climate variability" (Antigua and Barbuda, 2021). Honduras' NDC instead proposes to establish a "gender responsive agricultural insurance mechanism for loss and damage" targeting women and young people (Honduras, 2021). Haiti's NDC mentions risk transfer (Haiti, 2021). Vanuatu's NDC commits to developing a loss and damage implementation framework, including risk sharing, insurance and compensation approaches at replacement value by 2030 (Vanuatu, 2021).

Source: Calliari and Ryder (2023) and authors' own research.

Box B3

Case Studies on Successful and Advance L&D Reporting

Bangladesh

Bangladesh stands out for its commitment to building institutional structures that address its acute climate vulnerability, especially to cyclones and floods. A key element of its strategy is the development of a unified climate change database, designed to collect standardised data on losses to infrastructure, agriculture, and livelihoods. This database supports both rapid emergency response and long-term planning, allowing policymakers to identify gaps and direct resources effectively. Bangladesh excels at integrating international reporting requirements, making it possible to connect local experiences with global climate finance and policy frameworks. Strong partnerships with regional networks and international organisations enhance technical capacity, while efforts to build local government expertise and support participatory risk mapping promote more inclusive, evidence-based decision-making. The country's approach also prioritises co-production of knowledge between communities and government, ensuring that reporting reflects both grassroots needs and national objectives (Farbin and Huq, 2021; van Schie et al., 2025).

Saint Lucia

Saint Lucia demonstrates leadership by integrating loss and damage into its NAP, establishing dedicated policy instruments, such as contingency funds and micro-insurance schemes to address the financial impacts of disasters. Following major weather events, the country's flexible financing system enables a rapid response to affected communities, minimising long-term disruption. Regional collaborations, particularly through Caribbean insurance pools and climate resilience networks, allow Saint Lucia to access shared expertise and address capacity constraints resulting from limited human and technical resources. Importantly, Saint Lucia places a premium on transparency and local relevance through community partnerships and civil society engagement. This ensures reporting and response policies remain accessible and effective, closing implementation gaps between national ambitions and local impact (Saint Lucia, 2018).

Kenya and Kiribati

Kenya anchors its loss and damage reporting in a national adaptation theory-of-change, using focused indicators for both economic and non-economic losses. Data is collected systematically through disaster assessments and ongoing monitoring, while local officials verify impacts and contribute to national reporting processes. Kenya's productive use of regional and global networks supports technical expertise and financial support (Karani et al., 2014; Kenya, 2016; Qi et al., 2023; IIED, 2014).

Kiribati, facing persistent threats from sea-level rise, has developed a data system tailored to slow-onset events, prioritising real-time documentation of impacts on housing, livelihoods, and cultural heritage (Australia and Kiribati, 2023). This supports the country to use detailed evidence for adaptation planning, attract climate finance, and respond to incremental changes that unfold over decades. Kiribati's framework exemplifies flexibility, adapting reporting approaches to fit its specific geographic and socioeconomic realities (Kiribati, 2013).

Box B3 (CONT.)

Case Studies on Successful and Advance L&D Reporting

Vanuatu

Vanuatu has emerged as a leader in advancing loss and damage as a policy and governance issue at both national and international levels (Government of Vanuatu, 2022; UNDP, 2023). Within national policy and planning processes, loss and damage considerations are taken into account in climate strategies and planning processes, with a focus on linking impact assessments to dimensions of responsibility, support needs, and long-term development pathways (Government of Vanuatu, 2022). Internationally, Vanuatu's initiative to seek an advisory opinion from the International Court of Justice on states' climate obligations has helped connect its national experience with wider debates on equity and accountability, offering a reference point for other countries developing their own loss and damage approaches (UN General Assembly, 2023; SPREP, 2023).

Annex C: Supplementary Material for Chapter 4

Table C1: Summary of LLA principles to ensure long-lasting and transformative L&D initiatives, adapted from WRI (2021)

LLA principle	Description
Principle 1*	Devolving decision-making to the lowest appropriate level: Giving local institutions and communities more direct access to finance and decision-making power
Principle 2	Integrating gender-based, economic, and political inequalities that are root causes of vulnerability into the core of adaptation action and encouraging vulnerable and marginalised individuals to meaningfully participate in and lead adaptation decisions
Principle 3*	Providing patient and predictable funding that can be accessed more easily: Supporting long-term development of local governance processes, capacity, and institutions through simpler access modalities and longer-term and more-predictable funding horizons to ensure that communities can effectively implement adaptation action
Principle 4*	Investing in local capabilities to leave an institutional legacy: Improving the capabilities of local institutions to ensure they can understand climate risks and uncertainties, generate solutions, and facilitate and manage adaptation initiatives over the long term without being dependent on project-based donor funding.
Principle 5	Building a robust understanding of climate risk and uncertainty: Informing adaptation decisions through a combination of local, traditional, Indigenous, generational, and scientific knowledge
Principle 6	Flexible programming and learning: Enabling adaptive management to address inherent uncertainty
Principle 7	Ensuring transparency and accountability: Making processes of financing, designing, and delivering programmes more transparent and accountable downwards to local stakeholders
Principle 8	Collaborative action and investment: Collaboration across sectors, initiatives, and levels ensuring that different initiatives and different sources of funding support each other, and that their activities avoid duplication, thereby enhancing efficiencies and good practice
*Directly related to finance	

Table C2: Financing locally and reaching the most affected

Region	Case Study	Description	Link
Pacific Islands	Fiji: Climate Relocation Community Trust Fund	The Fiji Government established the Climate Relocation of Communities Trust Fund, enshrined in the Climate Change Act, to support planned relocation projects. The Fund is partly supported by proceeds from Fiji's Environment and Climate Adaptation Levy (ECAL).	
	Vanuatu: Blockchain-powered Cash Transfer Programme	Vanuatu piloted an innovative financial equity transfer system with local private sector and civil society actors to distribute finance directly to households and individuals. The "tap and pay" card system empowers recipients to choose recovery goods/ services from trusted local vendors.	Vanuatu Case Study
	Fiji: Anticipatory Action Framework	The World Food Programme (WFP) and the Fijian Government implemented structures to provide cash assistance ahead of cyclones, enabling AA for disaster response.	Fiji Case Study
Caribbean	CCRIF SPC	CCRIF SPC is the world's first multi-country risk pool based on parametric insurance, covering tropical cyclones, earthquakes, excess rainfall, fisheries, electric utilities, and water utilities.	CCRIF website
	Jamaica/WB Catastrophe Bond	Jamaica is the first Caribbean and first SIDS to sponsor a catastrophe bond in partnership with the WB, enhancing financial protection for disaster events.	Jamaica Case Study
	Belize Debt for Marine Conservation, Contingency Fund and Parametric Insurance	Belize's debt swap for marine conservation supported debt sustainability and fiscal space, with investments in a contingency fund and parametric insurance to mobilise resources for loss and damage.	Belize case study. See appendix
Southeast Asia	Nusantara Fund	The Nusantara Fund is a direct funding mechanism supporting Indigenous Peoples, farmers, fisherfolk, women, and youth for tenure rights, land and resource management projects, and environmental stewardship at community level.	
Other regions	Ireland: Mourning of the irrecoverable loss of a glacier	People of Ireland mourned the "death" of the glacier, Okjökull, with a grieving ceremony, symbolising cultural responses to climate-induced loss.	

Annex D: Supplementary Material for Chapter 5

Table D1: Steps towards the development of responses to loss and damage MERL systems

Design Step	Action for L&D MERL System Design	Rationale and L&D Specific Focus
1. Define	Establish the **purpose, key evaluation questions, and target users** (e.g. local and/or national authorities and/or development partners).	MERL should focus on tracking the **sustainability, equity, and long-term outcomes** of L&D responses, not just expenditure or activities (see Chapter 2 on CRM approaches). Prioritise the needs of the primary end users in designing the system.
2. Frame	Develop a **Theory of Change (ToC)** and establish **L&D baselines** for all types of loss (economic and non-economic).	The ToC maps the intervention's pathway to impact and the expected contribution of the intervention to the outcomes. Will require **widespread consultation** on what success looks like to different actors when responding to L&D. Baselines combine quantitative (e.g., historical disaster data) with qualitative data (e.g. first voice and community-based narratives). The latter are crucial for establishing the pre-impact state of loss and damage NELDs. See Chapter 2 for assessment methods and data sources. May require consideration of Impact Attribution (see Chapter 2) to **map the potential interactions** between primarily climate-driven losses and other losses and stresses in the ToC.
3. Manage	Define i**nstitutional roles, coordination mechanisms, and learning cycles**.	Requires **coordination across stakeholders** and the involvement of local actors at the scale at which the L&D MERL system operates (see Chapter 3, Section 3.1 and 3.2). For national L&D MERL, this may involve multiple ministries, national agencies and sub-national authorities, together with civil society and communities. For sub-national or project MERL, coordination may centre on local governments, community organisations and implementing partners, without ministerial involvement. Establish regular **MERL reflection cycles** (e.g., annual reviews) for data interpretation and indicator revision, as exemplified by Panama (Box 6). Specify relationships to other relevant MERL processes, such as those addressing adaptation, disaster response, and preserving national culture and heritage.
4. Describe	Develop **balanced indicators** and set up d**ata collection protocols**.	Use a mixed portfolio: **standardised metrics** (for alignment with Sendai/SDGs) and specific **NELD indicators** (e.g., social cohesion, cultural loss). Employ **participatory monitoring** (citizen science) to generate evidence, especially in **data-poor contexts**, using administrative data as **proxies** where needed. Include ex-post assessments where feasible.

Table D1: Steps towards the development of responses to loss and damage MERL systems (cont.)

Design Step	Action for L&D MERL System Design	Rationale and L&D Specific Focus
5. Analyse	Analyse collected data and secondary information to assess the contribution of the intervention in responding to loss and damage. Consider the outcomes over the medium-long term.	Analysing outcome data needs to take into account the changing climate and socio-economic context through contextual data. Losses may not be well addressed through an intervention if the climate or wider socio-economic context has worsened, but this does not mean the intervention was not effective. Outcomes also need to be considered in relation to the future climate impacts rather than only compared to historical assessments, e.g. wellbeing measures may initially be reduced after a planned relocation but staying in place under worsening conditions could lead to worse outcomes over time. Results should be interpreted with attention to the interactions between primarily climate-driven and primarily non-climate driven losses, acknowledging the uncertainty and interconnected nature of these issues.
6. Synthesize	Consolidate findings to inform **broader learning and policy**.	Findings should be used to update indicators, identify emerging risks, and assess long-term impacts, including **intergenerational** (i.e. long-term displacement, cultural decay). Findings should also inform understanding of thresholds around adaptation limits and when best to transition from adaptation to L&D responses.
7. Report and support use	Ensure **transparency, alignment, and feedback** to planning processes.	Data can build on or be harmonised with international reporting efforts (e.g. ETF, Sendai, development partners) and existing national reporting and planning cycles for better integration Data should feed into future L&D interventions as part of rapid learning and sharing between similar contexts.

Annex E: Supplementary Material for Chapter 6

Box E1

Lessons Learned from a Multi-stakeholder L&D Workshop in Ratanakiri, Cambodia – A Framework for Stakeholder Engagement

Ratanakiri province is one of Cambodia's most vulnerable rural landscapes, where smallholder farmers, Indigenous groups, and ethnic minorities face climate and socio-economic pressures. A subnational workshop with 26 participants — government, civil society, and community leaders — sought to bridge national climate policy and local agrarian realities through participatory scenario exercises and dialogue.

The workshop revealed major barriers to meaningful engagement:

- **Negative framings** of loss and damage reinforced hopelessness.
- **Externally imposed technical solutions** overlooked the socio-environmental roots of vulnerability.
- **Knowledge gaps** between scientific and local framings created disconnects.
- **Structural constraints** like land loss, debt, and power asymmetries limited agency.
- **Responsibility** was often shifted to farmers, obscuring systemic drivers.

A Framework for Productive Engagement in Futures-Oriented Climate Change Research

The study proposes a five-dimensional framework—desirability, viability, agency, heuristics, and responsibility—as a lens for understanding rural-agrarian futures in climate research.

Desirability reflects the futures communities aspire to, shaped by agrarian histories and intergenerational goals, such as secure livelihoods, education, healthcare, and cultural continuity, offering alternatives to loss-driven futures.

Viability concerns the limits and trade-offs of adaptation, noting that technical notions of what is "feasible" often differ from local, practice-based understandings. Futures depend on who defines viability.

Agency highlights the political and psychosocial capacities of rural people to anticipate and enact change. Farmers' adaptive capacities, rooted in agrarian transformations, call for collective strategies.

Heuristics bridges climate science with experiential knowledge. Farmers often link climatic shifts to causes like forest loss or pesticide use, making integration of diverse knowledge systems essential.

Box E1 (cont.)

Lessons Learned from a Multi-stakeholder L&D Workshop in Ratanakiri, Cambodia – A Framework for Stakeholder Engagement

Responsibility stresses how governance shapes vulnerability and capacity. It calls for moving beyond individual burdens to systemic accountability, recognising the roles of multiple actors and institutions.

Together, these dimensions foster inclusive, transdisciplinary engagement by: (1) building agrarian futures, (2) outlining strategies to achieve them, and (3) situating them within governance contexts. This iterative process connects knowledge, builds ownership, and supports sustainable transformations.

Lessons Learned

The Ratanakiri workshop highlights that participatory approaches can generate unique insights for addressing loss and damage. Effective engagement must be iterative, reflexive, and equity-focused, redistributing responsibility across governance levels, decentralising climate finance, and embedding justice in climate responses (see Chapter 4 and 6).

Reference: Persson, J., Dorkenoo, K., Nong, M., Nhong, S., & Nguyen, V. H. T. (in press). From loss to transformation? Towards pluralistic and politicised agrarian climate futures. Asia Pacific Viewpoint.

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