UN environment programme

Ready? Not.

Climate impacts will not wait.
Adaptation finance must rise.



Adaptation Gap Report 2026

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Glossary

The entries in this glossary are primarily taken or modified from definitions provided by reports published by the Intergovernmental Panel on Climate Change (IPCC) or previous editions of the Adaptation Gap Report.

Adaptation: The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects (IPCC 2022).[1]

Adaptation costs: Costs of planning, preparing for, facilitating and implementing adaptation measures, including transaction costs (IPCC 2007).[2]

Adaptation gap: The difference between actually implemented adaptation and a societally set goal, determined largely by preferences related to tolerated climate change impacts and reflecting resource limitations and competing priorities (UNEP 2014).[3]

Adaptation limits: The point at which an actor's objectives (or system needs) cannot be secured from intolerable risks through adaptive actions (IPCC 2022).[1]

- **Hard adaptation limit:** No adaptive actions are possible to avoid intolerable risks.
- **Soft adaptation limit:** Options are currently not available to avoid intolerable risks through adaptive action.

Adaptive capacity: The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences (IPCC 2022).[1]

Exposure: The presence of people; livelihoods; species or ecosystems; environmental functions, services and resources; infrastructure; or economic, social or cultural assets, in places and settings that could be adversely affected (IPCC 2022).[1]

Hazard: The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources (IPCC 2022).[1]

Impacts: The consequences of realized risks on natural and human systems, where risks result from the interactions of climate-related hazards (including extreme weather and climate events), exposure and vulnerability. Impacts generally refer to effects on lives; livelihoods; health and well-being; ecosystems and species; economic, social and cultural assets; services (including ecosystem services); and infrastructure. Impacts may be referred to as consequences or outcomes, and can be adverse or beneficial (IPCC 2022).[1]

Institutions: Rules, norms and conventions that guide, constrain or enable human behaviours and practices.

Loss and damage: Under the UNFCCC, no formal definition of loss and damage has been established. In this report, the term refers to the adverse effects of climate change, both those that persist even after mitigation and adaptation measures have been implemented and the associated economic and non-economic losses (based on UNFCCC 2013, paras. 6[c] and 32).[5]

Maladaptation: Actions that may lead to increased risk of adverse climate-related outcomes, including via increased vulnerability to climate change, diminished welfare, or increased greenhouse gas emissions, now or in the future. Maladaptation is usually an unintended consequence (IPCC 2022).[1]

Mitigation (of climate change): A human intervention to reduce the sources or enhance the sinks of greenhouse gases (IPCC 2022).[1]

Non-economic losses (NELs): Climate-related harms not typically reflected in market prices, including impacts on life, health, mobility, territory, cultural heritage, Indigenous and local knowledge, biodiversity and ecosystem services (adapted from UNFCCC 2013, paras. 4, 8 and 45–48).[5]

Residual risk: The risk related to climate change impacts that remains following adaptation and mitigation efforts. Adaptation actions can redistribute risk and impacts, with increased risk and impacts in some areas or populations, and decreased risk and impacts in others (IPCC 2022).[1]

Resilience: The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation (IPCC 2022).[1]

Risk: The potential for consequences where something of value is at stake and where the outcome is uncertain, recognizing the diversity of values. In the context of climate change impacts, risks result from dynamic interactions between climate-related hazards with the exposure and vulnerability of the affected human or ecological system to the hazards (IPCC 2014; IPCC 2022).[4,1]

Vulnerability: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm, and the lack of capacity to cope and adapt (IPCC 2022).[1]

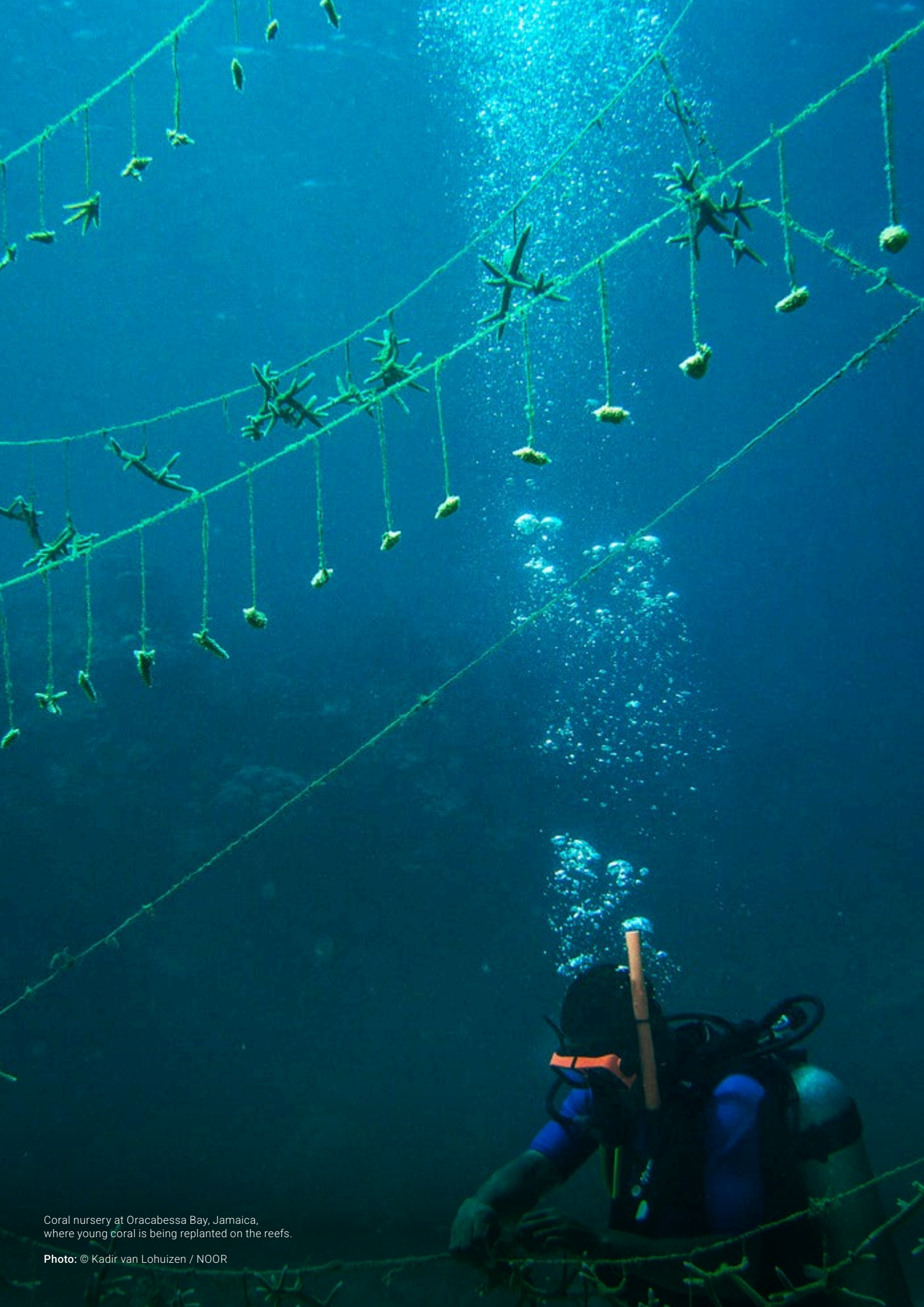
1 See: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Annex-II.pdf.

2 See: https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-app-1.pdf.

3 See: https://wedocs.unep.org/bitstream/handle/20.500.11822/9331/-Adaptation_gap_report_a_prel.pdf?sequence=2&isAllowed=y.

4 See: https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-AnnexII_FINAL.pdf.

5 See: https://unfccc.int/documents/7954.



Coral nursery at Oracabessa Bay, Jamaica, where young coral is being replanted on the reefs.

Photo: © Kadir van Lohuizen / NOOR

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Volunteers and veterinarians bandage a coati's paws after wildfires in the Brazilian Pantanal.

Photo: © Maria Magdalena Arrellaga / Climate Visuals Countdown

Foreword



Global warming is now set to exceed 1.5°C. Even if the world unites to minimize peak temperatures and bring them back down – which it must do – we face more frequent and more intense climate impacts that fall disproportionately on vulnerable populations. This makes effective and well-financed climate adaptation essential to reduce risks, strengthen resilience, save lives and protect infrastructure and development.

The United Nations Environment Programme *Adaptation Gap Report 2026: Ready? Not.* shows that much work is needed to put adaptation in place at the appropriate levels. Yes, international public adaptation finance flows from developed to developing countries grew by US$1 billion between 2023 and 2024, reaching US$28.2–31.7 billion. But the pace of growth is slowing, and their actual finance needs are around US$305 billion per year by 2035 – excluding private sector needs, which could almost double the figure.

This growth also remains below the pace required to double flows in line with the Glasgow Climate Pact to approximately US$40 billion/year by 2025 – although initial reports indicate that multilateral development banks increased their financing significantly in 2025. This could help reach the Pact if declining official development assistance does not affect bilateral adaptation finance. Looking longer term, even meeting the very welcome COP30 Global Mutirão call to at least triple adaptation finance by 2035 is not enough. When adjusting for inflation, the tripling would deliver just 20–29 per cent of developing countries' finance needs. On the other hand, tripling adaptation flows to least-developed countries and small island developing States could meet 49–84 per cent of their needs.

As a result of insufficient mitigation and adaptation action, climate-related losses and damages are substantial, while responses remain insufficient. The initial funding round envelope of the Fund for responding to Loss and Damage was US$342 million, but developing countries submitted requests totalling around eight times that value. There are also difficulties around identifying what counts as losses and damages and complex procedures that make support difficult to access.

There are some promising trends. Developing countries are increasing financial flows to each other. Private sector financing is growing – although investment is largely for the private sector's own needs and not a substitute for public adaptation. Governments are taking steps to strengthen the institutional factors that translate adaptation priorities into implemented measures. The bottom line, however, is that the world is not ready to adapt to current climatic conditions, never mind what overshoot of 1.5°C will bring.

At climate COP31 in Türkiye and beyond, nations must focus on intensifying their efforts to achieve the Global Mutirão decision of tripling adaptation finance by 2035 – while understanding that they will need to go even higher to m*eet all* financing needs. It is time to get ready. Because investing in adaptation now means more lives saved, more losses and damages avoided and more economies protected in the years to come.

Inger Andersen
Executive Director
United Nations Environment Programme

Executive summary

Climate impacts are accelerating, but adaptation action is not keeping pace.

This year's heatwaves, droughts, wildfires and floods illustrate the growing human and economic costs associated with climate change. These impacts fall disproportionately on vulnerable populations, such as those of least developed countries (LDCs) and small island developing States (SIDS), where adaptive capacity and access to resources are often most constrained.

Global warming is now set to exceed 1.5°C above pre-industrial levels. Even if emissions are cut and temperatures brought back down by the end of the century, as the United Nations Environment Programme (UNEP)'s *Limiting Overshoot – Navigating exceedance of 1.5°C and pathways towards return* and the 2026 Emissions Gap Report show they can and must be, climate risks and impacts will rise. Effective adaptation will be crucial to reduce risks, strengthen resilience and support more inclusive development – and is supported by the high economic returns that adaptation can deliver. However, adaptation cannot eliminate all loss and damage, particularly as natural and human systems approach or exceed adaptation limits.

Against this backdrop, the Adaptation Gap Report 2026 assesses three critical dimensions of the global adaptation challenge:

- The scale of adaptation finance needs and the adaptation finance gap
- The institutional conditions required to accelerate implementation
- Loss and damage, based on a new assessment framework

The report finds that adaptation finance continues to fall far short of needs, implementation remains constrained by institutional barriers, and loss and damage are mounting as climate impacts intensify. Action on all these fronts is essential to build resilience in a rapidly changing climate.

Adaptation finance: Needs, flows and outlook

Needs

Developing countries' adaptation finance needs are estimated at around US$305 billion annually, but rise when private sector needs are included.

Based on an assessment of the latest nationally determined contributions (NDCs) and national adaptation plans (NAPs), adaptation finance needs for all 155 developing countries are estimated at US$255–328 billion per year[1] over the next decade.

Model-based estimates produce similar results, with a central estimate of needs at US$320 billion annually. There is a wide range around these modelled estimates, influenced by factors such as adaptation objectives and risk coverage. The central value of these two lines of evidence suggests needs of around US$305 billion annually by 2035.

These estimates, however, largely exclude private sector needs, which could almost double overall finance needs for developing countries, reflecting the more public nature of adaptation priorities in countries' NDCs and NAPs. The distinction between public and private adaptation investment needs is therefore important for understanding financing gaps and potential flows.

LDCs and SIDS have higher adaptation finance needs relative to the size of their economies.

The annual adaptation finance needs of LDCs and SIDS over the coming decade are estimated at US$50 billion, based on NDCs and NAPs, and at US$40 billion from the modelling analysis. This is equivalent to 3–4 per cent of their gross domestic product (GDP), twice the relative adaptation finance needs of upper-middle-income developing countries.

1 Unless mentioned otherwise, all figures are adjusted to 2024 prices.

Flows

International public adaptation finance flows from developed to developing countries are flattening, putting the Glasgow Climate Pact in doubt, but South-South support is increasing.

International public adaptation finance flows from developed to developing countries reached US$28.2–31.7 billion in 2024, the latest year for which data are available. While this represents an increase of US$1 billion from 2023, annual growth remains well below the pace required to meet the Glasgow Climate Pact goal of hitting approximately US$40 billion by 2025 (double 2019 levels). The Pact could still be met, as initial reports indicate that the multilateral development banks (MDBs) increased their financing significantly in 2025, but it is unclear if declining official development assistance will affect bilateral adaptation finance.

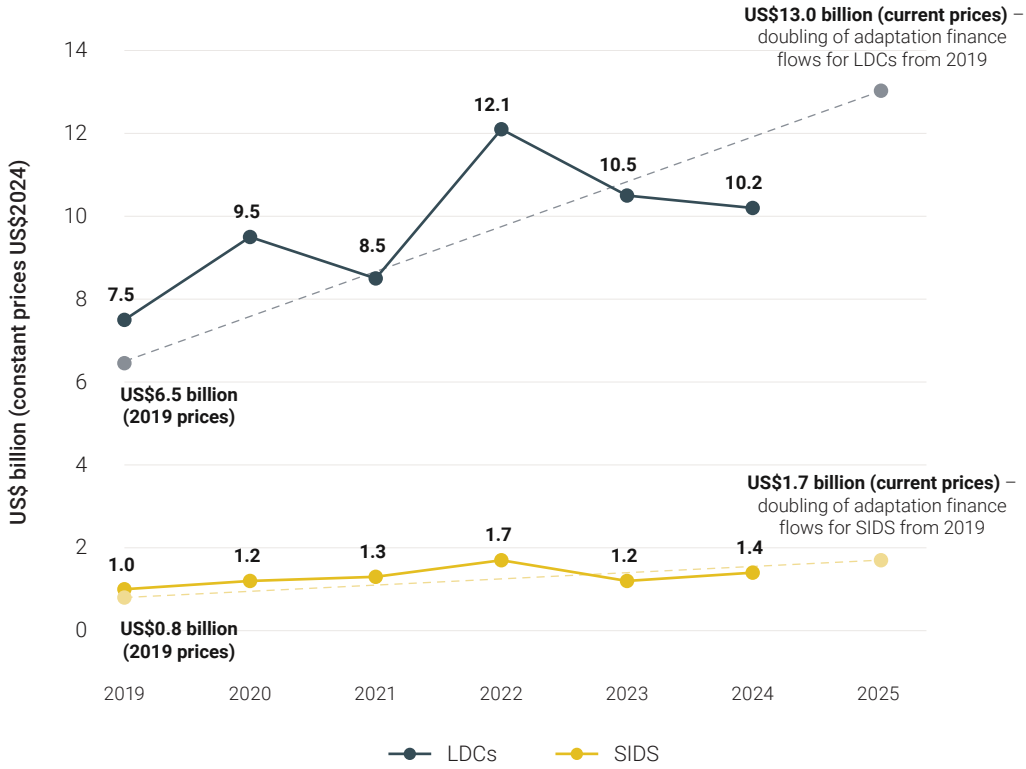
Support from developing-to-developing countries is also increasing. Contributions, channelled primarily through shares in MDBs, but also through direct bilateral and multilateral South-South cooperation, rose from US$3.8 billion in 2019 to US$9.6 billion in 2024 – almost a third of the flows from developed countries – though these flows do not count towards current developed country finance goals.

Adaptation finance support to LDCs and SIDS is highly concessional, but not increasing sufficiently.

International public adaptation finance from developed countries to LDCs and SIDS rose in real terms between 2019 and 2024 (figure ES.1). Flows in 2024 are, however, below their 2022 peak, when they should be increasing.

LDCs and SIDS do receive a greater share of overall finance flows to all developing countries relative to their needs. A large proportion of this finance is highly concessional. In 2024, almost 90 and 80 per cent of finance directed to LDCs and SIDS respectively took the form of grants or highly concessional loans. This concessionality is vital and must be maintained, as many vulnerable countries face severe fiscal constraints and debt pressures that limit their ability to finance adaptation domestically.

Figure ES.1 Annual international public adaptation finance flows from developed countries towards LDCs and SIDS for the period 2019–2024 (in constant 2024 prices). The figure also shows the levels in 2025 (in current prices) that would be equivalent to a doubling from 2019



The picture across all developing countries is different: in 2024, loans accounted for 55 per cent of the total, whereas 44 per cent were delivered in the form of grants. However, non-concessional loans are increasing, and now represent approximately half of all lending. These are provided mainly by MDBs, primarily supporting middle-income countries.

Private sector adaptation finance is increasing from a low level, but much of this is likely to address the private sector's own needs, or will be paid for by developing country actors.

While there is poor data availability, the most robust data relate to private flows mobilized from international public adaptation finance. These flows – generated through the use of public finance to create enabling conditions and de-risking mechanisms for private finance – doubled from US$1.5 billion in 2019 to US$3 billion in 2024.

While some of these flows appear to have a strong climate rationale, adaptation intent is highly variable. Noting that these flows are included in the new collective quantified goal on climate finance (NCQG) – and given the strong focus on scaling up blended adaptation finance – improved tracking would strengthen attribution and transparency.

A further US$3 billion of private sector flows is reported globally (excluding western Europe and the United States of America). Although this is almost certainly a small fraction of actual flows, due to the difficulties in tracking, they can be expected to increase for two reasons:

First, to adapt the private sector's own assets, operations and supply chains. These investments build resilience, and can reduce pressures on public finances as climate risks accelerate

Second, as a response to new markets for adaptation goods and services for the public sector, households and firms. However, these goods and services will be paid for by those receiving them in developing countries themselves

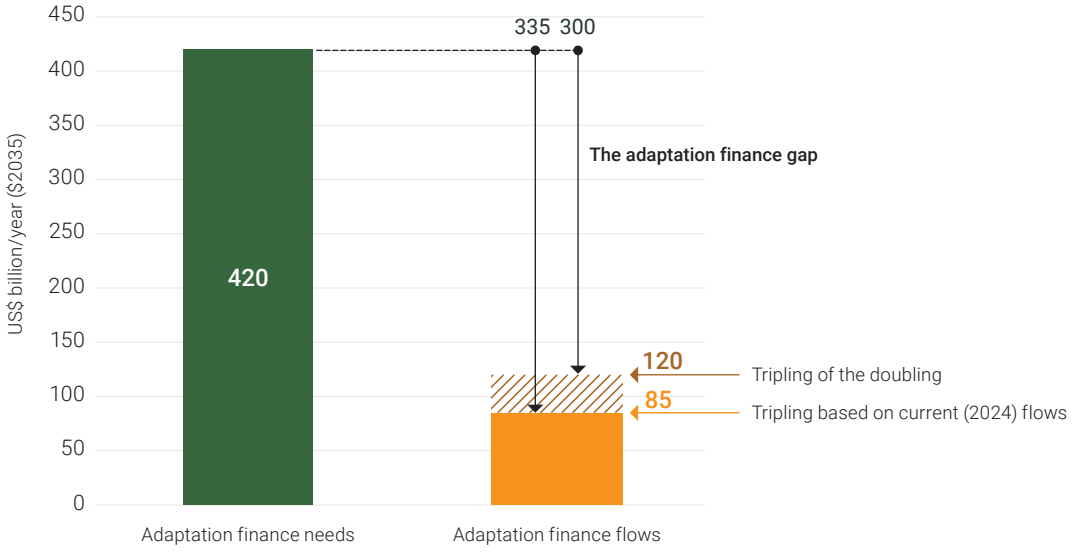
Despite its large potential, private sector adaptation finance may only reduce the funding gap of more public-oriented adaptation needs for developing countries by 15–20 per cent, and often does not substitute for the public sector finance and adaptation needs prioritized in NDCs and NAPs.

Outlook

The COP30 call for efforts to triple adaptation finance by 2035 is welcome, but not as ambitious as it seems.

The call to triple adaptation finance by 2035 would contribute to reducing the adaptation finance gap, but by how much depends on how the decision is interpreted.

Figure ES.2 Adaptation finance needs (including with potential inflation) and flows, and the potential adaptation finance gap for developing countries in 2035 for different tripling scenarios



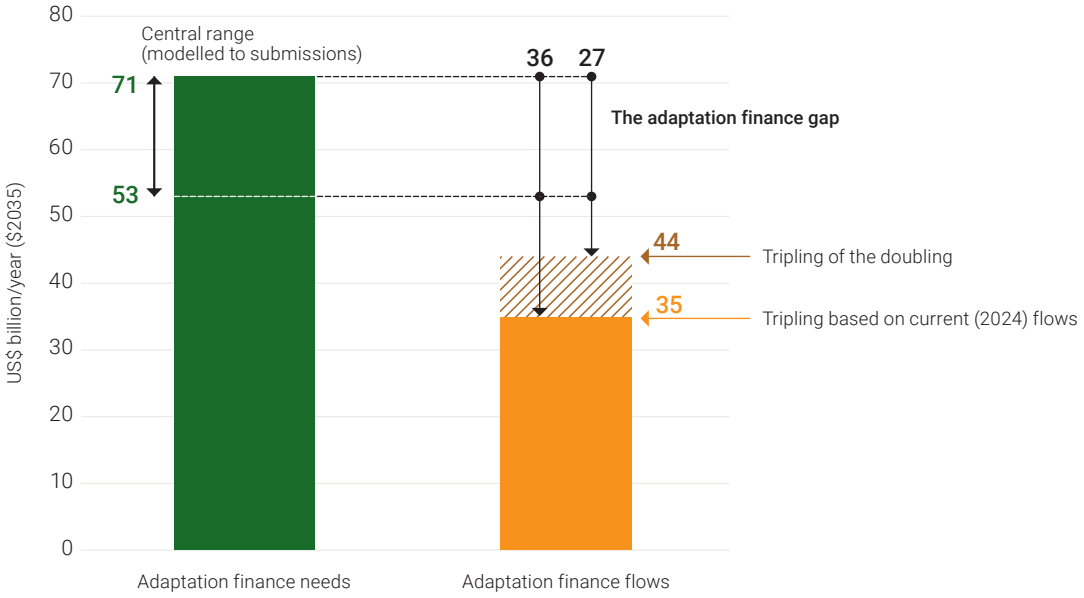
Depending on whether tripling is based on current flows or on the Glasgow Climate Pact, international adaptation finance would increase to US$85–120 billion per year by 2035 (figure ES.2). However, to compare to the Adaptation Gap Report (AGR) estimates of adaptation finance needs, potential future inflation needs to be included: this would raise annual adaptation finance needs in 2035 from US$305 billion (2024 prices) to US$420 billion. The tripling is therefore estimated to meet just 20–29 per cent of finance needs in 2035.

These figures do not include the potential contribution of domestic public finance. This can be a potentially important source of additional finance for adaptation, but data availability is very limited, and it remains difficult to estimate these flows.

Tripling adaptation finance flows to LDCs and SIDS could meet 49–84 per cent of estimated finance needs in 2035.

While there are no individual finance goals for LDCs and SIDS, tripling adaptation finance flows would have a substantial effect on reducing the finance gap. Adjusting for inflation, annual adaptation finance needs would be US$53–71 billion in 2035 (figure ES.3), whereas annual adaptation finance flows to LDCs and SIDS would rise to between US$35 and US$44 billion for the two tripling scenarios, meeting an estimated 49–84 per cent of needs.

Figure ES.3 Adaptation finance needs (including potential inflation) and flows, and the potential adaptation finance gap for LDCs and SIDS in 2035 for different tripling scenarios

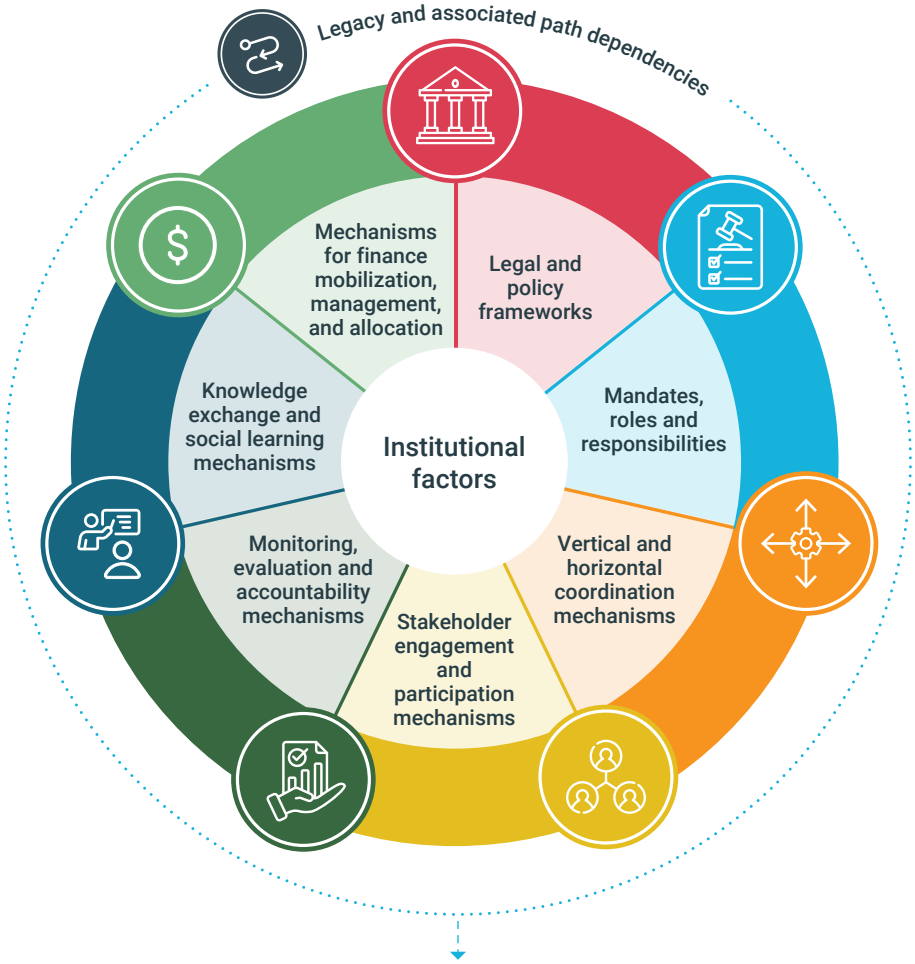


The institutional conditions required to accelerate implementation

While adaptation finance is essential for translating adaptation priorities into action, it is not sufficient on its own.

The AGR has consistently examined the broader conditions needed for effective implementation. This includes implementation of art. 2.1(c) of the Paris Agreement, the reform of the financial architecture and the relevance of remittances (AGR 2023); the contribution of and gaps in capacity-building and technology transfer and cooperation (AGR 2024); and the relevance of mainstreaming adaptation across sectors to achieve climate resilient development outcomes (AGR 2025). This year's report reviews the literature and selected country experiences to assess how institutional factors shape enabling conditions for the implementation of adaptation. Key institutional factors that can enable or constrain adaptation can be organized into eight broad groups (figure ES.4).

Figure ES.4 Taxonomy of institutional factors that influence the implementation of adaptation



Legacy and path dependencies
Extent to which past decisions, established rules and governance practices condition future adaptation choices.

Legal and policy frameworks
Laws, policies and regulations promoting adaptation and their coherence with broader legal and policy frameworks.

Mandates, roles and responsibilities
Mandates to engage in the implementation of adaptation priorities, and clearly defined roles and responsibilities.

Vertical and horizontal coordination mechanisms
Institutional arrangements supporting coordination across levels of government and sectors.

Stakeholder engagement and participation mechanisms
Institutional arrangements enabling stakeholders to influence the design and implementation of adaptation.

Monitoring, evaluation and accountability mechanisms
Systems and mechanisms to track progress, foster accountability and ensure transparency.

Knowledge exchange and social learning mechanisms
Institutional arrangements that facilitate knowledge sharing and foster learning.

Mechanisms for finance mobilization, management and allocation
Institutional arrangements supporting the mobilization of adaptation finance and its efficient management and allocation.

Governments have implemented a range of interventions to strengthen the institutional environment for adaptation.
These include:

- Adopting climate change framework laws to establish legal mandates for public and private actors to engage in adaptation
- Developing institutional infrastructure to facilitate coordination, stakeholder engagement and knowledge exchange between relevant actors
- Putting in place dedicated institutional arrangements to strengthen how climate finance is mobilized, managed and disbursed

- Establishing independent bodies/offices to provide oversight, track progress, evaluate performance and hold responsible entities accountable for adaptation policy implementation

Country experiences show that the institutional environment for adaptation rarely emerges from a blank slate. Countries have often built on existing institutional architecture that allow them to leverage ready-to-use delivery pathways, and therefore significantly accelerate the transition from planning to implementation.

Strengthening the institutional environment is part of implementation, not just a prerequisite for it. As adaptation becomes increasingly integrated into government systems, institutional arrangements must be developed and refined alongside the implementation of adaptation measures.

Feeding back implementation experience into policy processes can inform and strengthen future planning. While policies can provide the initial impetus and secure the government buy-in necessary to prioritize, finance and scale adaptation measures, practical implementation experience can feed back into higher-level policy processes – informing and strengthening future planning.

Loss and damage

Climate-related losses and damages are substantial, but assessment, response and finance gaps persist.

Stronger adaptation action can reduce climate risks but cannot eliminate all climate-related loss and damage. Loss and damage arise where risk-reduction measures are absent or insufficient, where residual risks remain despite action, and where soft or hard adaptation limits are reached. This year's AGR uses a multidimensional assessment framework (figure ES.5) to establish a preliminary baseline of loss and damage, and examine evidence, response, finance and access gaps. Five key findings emerge.

First, recorded disaster impacts show substantial and unequal burdens, but provide an incomplete picture. Between 2020 and 2025, low- and middle-income countries accounted for 99 per cent of the 765 million people recorded as affected by floods and landslides. However, only 27 per cent of nearly 240,000 recorded extreme-heat deaths were reported in lower-income countries, reflecting systematic underreporting and observation capacity, but potentially also differences in heat preparedness. Additional evidence is required to wholly attribute these recorded impacts to anthropogenic climate change.

Second, recognition of loss and damage is more widespread than the arrangements needed for systematic assessment. Across 118 countries, 89 per cent mention or discuss loss and damage in their NDCs or NAPs; however, only 54 per cent have a loss and damage information system, and 38 per cent have a relevant legal framework. This limits the ability to document impacts consistently, identify support needs and integrate evidence into planning and finance decisions.

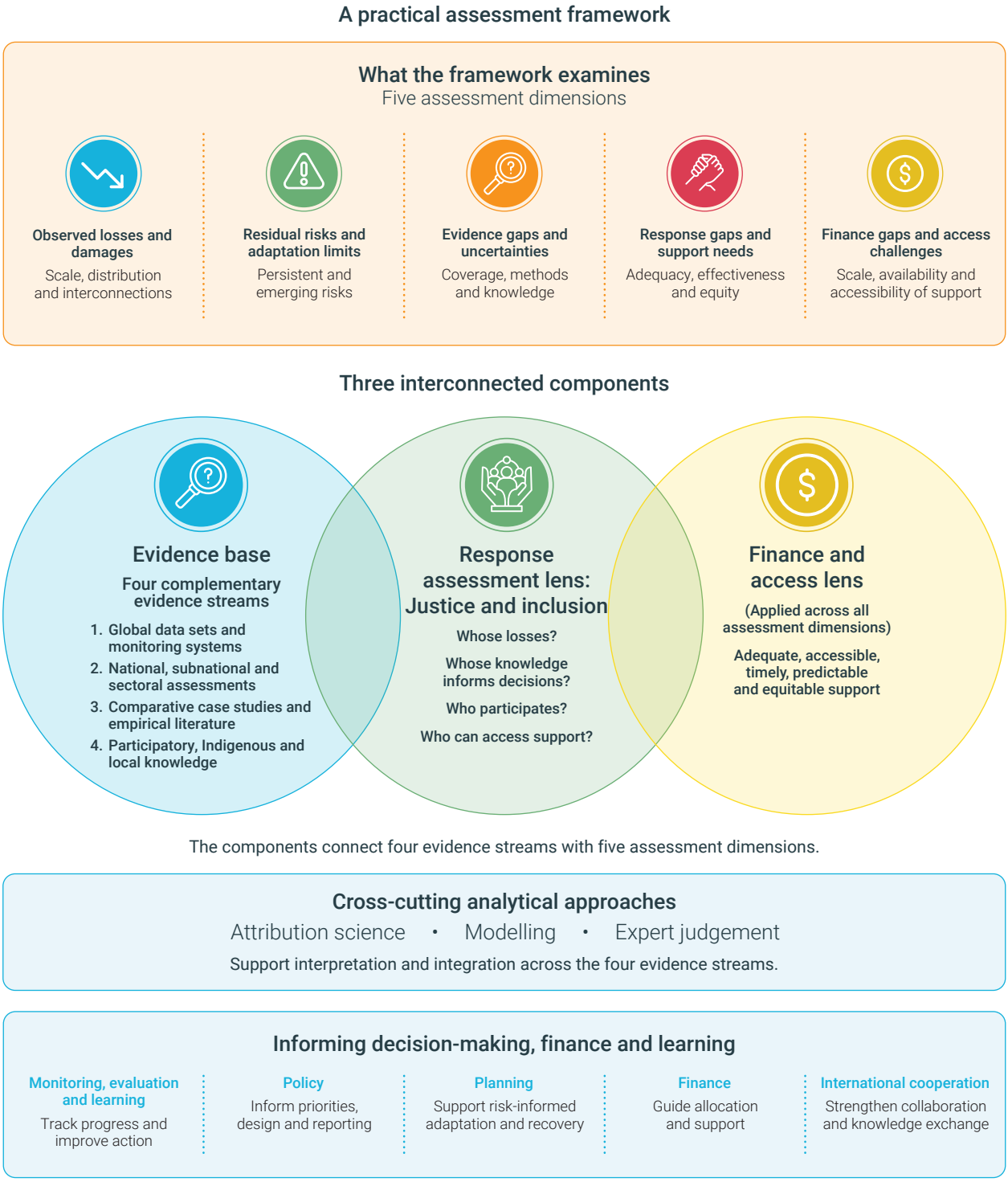
Third, non-economic loss and damage are substantial but remain insufficiently visible in conventional assessments. Indirect, slow-onset, non-economic, ecological and relational loss are often place-based, difficult to put a price on and unevenly documented across regions and social groups. While the literature documents climate impacts on mental health, identity, cultural heritage, ecosystem services, and biodiversity, among others, they are less visible in assessments of loss and damage.

Fourth, loss and damage interact and cascade across systems. Economic and non-economic loss and damage often occur together, while impacts can propagate through livelihoods, ecosystems, health, debt, infrastructure, social relations, culture, and identity. Assessment and response should therefore consider interacting risks and consequences, rather than treating impacts as isolated sectoral outcomes or direct reflections of hazard magnitude alone.

Fifth, finance falls short of identified needs, while complex procedures and limited capacity make support difficult to access. In its first funding round, 119 developing countries submitted requests totalling US$2.8 billion to the Fund for responding to Loss and Damage, outstripping the initial funding envelope of US$342 million. Substantial needs thus remain unmet, although the overall finance gap cannot yet be measured reliably.

Together, these findings point to the need for stronger assessment capacity, adequate and predictable financial and technical support, simpler access procedures, and meaningful participation by affected communities in shaping responses. They also suggest that access to support and outcomes remain uneven, and the available evidence does not yet support a systematic estimate of the global response gap. Responses should be assessed against whether they meet affected people's needs, enable meaningful participation, and reduce rather than reinforce vulnerability.

Figure ES.5 A framework combining evidence, justice and inclusion, and finance and access to assess loss and damage and guide responses



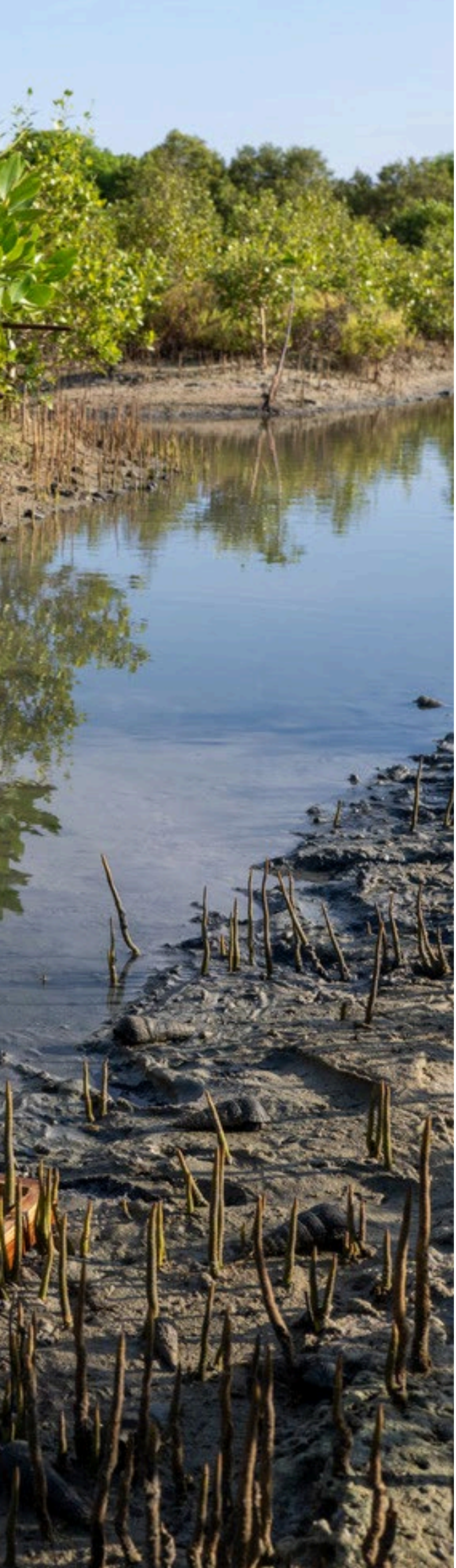


Nature-based Solutions in Bangkok.

Photo: © Luke Duggleby / CLARE Programme / Climate Visuals

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Chapter 1

Introduction

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Growing mangroves in Sri Lanka.

Photo: © Todd Brown / UNEP

1.1 Introduction

The year 2026 has provided stark reminders that climate change affects us all and requires urgent action. To name but two, western Europe experienced its hottest June on record, with extreme heat, wildfires and thousands of excess deaths, while catastrophic flooding in Nepal washed away entire villages, claiming the lives of more than 1,400 people, with thousands still missing (Chandrasekhar and Gabbatiss 2026; Dwyer and Nam 2026). At the same time, possibly the strongest El Niño event in recorded history is mounting, with expected extraordinary damages in the months to come (Hausfather 2026; United States of America, National Oceanic and Atmospheric Administration 2026). Climate risks and impacts will continue to amplify as global temperatures rise amid current emissions trajectories, moving well beyond pathways consistent with achieving the temperature goal of the Paris Agreement (United Nations Environment Programme [UNEP] 2026a).

UNEP's recently published *Limiting Overshoot* report asserts that global action has been insufficient to avoid warming reaching 1.5°C above preindustrial levels in the next few years (UNEP 2026b). Limiting the magnitude and duration of overshoot through rapid and ambitious mitigation, while managing its consequences through accelerated adaptation, is therefore increasingly urgent, as there are no benign outcomes above this level. The International Court of Justice (ICJ)'s 2025 Advisory Opinion on climate change considers the 1.5°C threshold to be "the parties' agreed primary temperature goal" for limiting the global average temperature increase under the Paris Agreement. The ICJ further observes that "the adaptation obligations under the Paris Agreement complement the mitigation obligations", and identifies an obligation to prevent significant harm to the climate system and other parts of the environment (ICJ 2025).

Across regions, climate-related hazards are changing in different ways, including in their frequency, intensity, duration and spatial extent, placing growing pressures on water and food systems, human health, ecosystems and infrastructure (UNEP 2024b; World Meteorological Organization 2026). These effects are increasingly affecting human development worldwide, with particularly severe consequences in least developed countries (LDCs) and small island developing States (SIDS). Impacts are also unevenly distributed within countries and communities, as differences in gender, income, age and other dimensions of social and economic inequality shape exposure, vulnerability and the capacity to adapt (Pörtner *et al.* 2023). While adaptation efforts are expanding, they are not keeping pace with the accelerating impacts, contributing to increasing losses and damages (UNEP 2023). As a result, the global adaptation gap continues to widen, with growing consequences for vulnerable countries and communities (UNEP 2025).

At the same time, well-designed adaptation can respond to current and expected climate change while supporting more resilient and inclusive development. Framed in this way, adaptation is both an essential investment in managing climate risk and an opportunity to support development pathways better suited to a changing climate.

Yet important bottlenecks remain. Institutional, capacity and technology constraints frequently impede the translation of adaptation plans into action (UNEP 2024a). Adaptation finance needs in developing countries substantially exceed available international support, while access and distribution remain uneven, particularly for LDCs and SIDS (United Nations Framework Convention on Climate Change [UNFCCC] 2024; UNEP 2025). Even with accelerated adaptation, not all climate risks can be avoided as natural and human systems increasingly encounter soft and hard limits to adaptation, resulting in growing economic and non-economic loss and damage (Dow, Berkhout and Preston 2013; O'Neill *et al.* 2022). Together, these challenges underscore the need to strengthen implementation, scale up and improve access to finance, and address residual risks in a coherent and equitable manner.

The thirtieth session of the Conference of the Parties to the UNFCCC (COP30) call for efforts to at least triple adaptation finance by 2035 (UNFCCC 2025a) marks an important political signal, but realizing this ambition will require increased provision and mobilization of finance, improved access, and stronger capacity to deploy resources effectively. As COP31 in Antalya approaches, ongoing work on the global goal on adaptation, adaptation finance, and loss and damage underscores the need for coherence across these interconnected agendas. Closing the adaptation gap will therefore depend not only on stronger commitments, but on effective implementation and the integration of adaptation and loss and damage into planning, investment and development decisions.

To address these issues, the Adaptation Gap Report (AGR) 2026 comprises three thematic chapters:

- **Chapter 2**, on finance, builds on the approach of previous AGR editions by assessing the adaptation finance gap and options for narrowing it. The chapter updates the estimates of adaptation finance needs, drawing on the latest round of submitted national adaptation plans (NAPs) and nationally determined contributions (NDCs). It then assesses finance flows and progress against international public finance targets. The 2026 chapter also broadens the analysis to consider domestic public finance and private finance flows, as well as the implications of tripling adaptation finance by 2035. Finally, it examines adaptation benefits and the extent to which finance supports gender equality and social inclusion objectives and locally led adaptation.

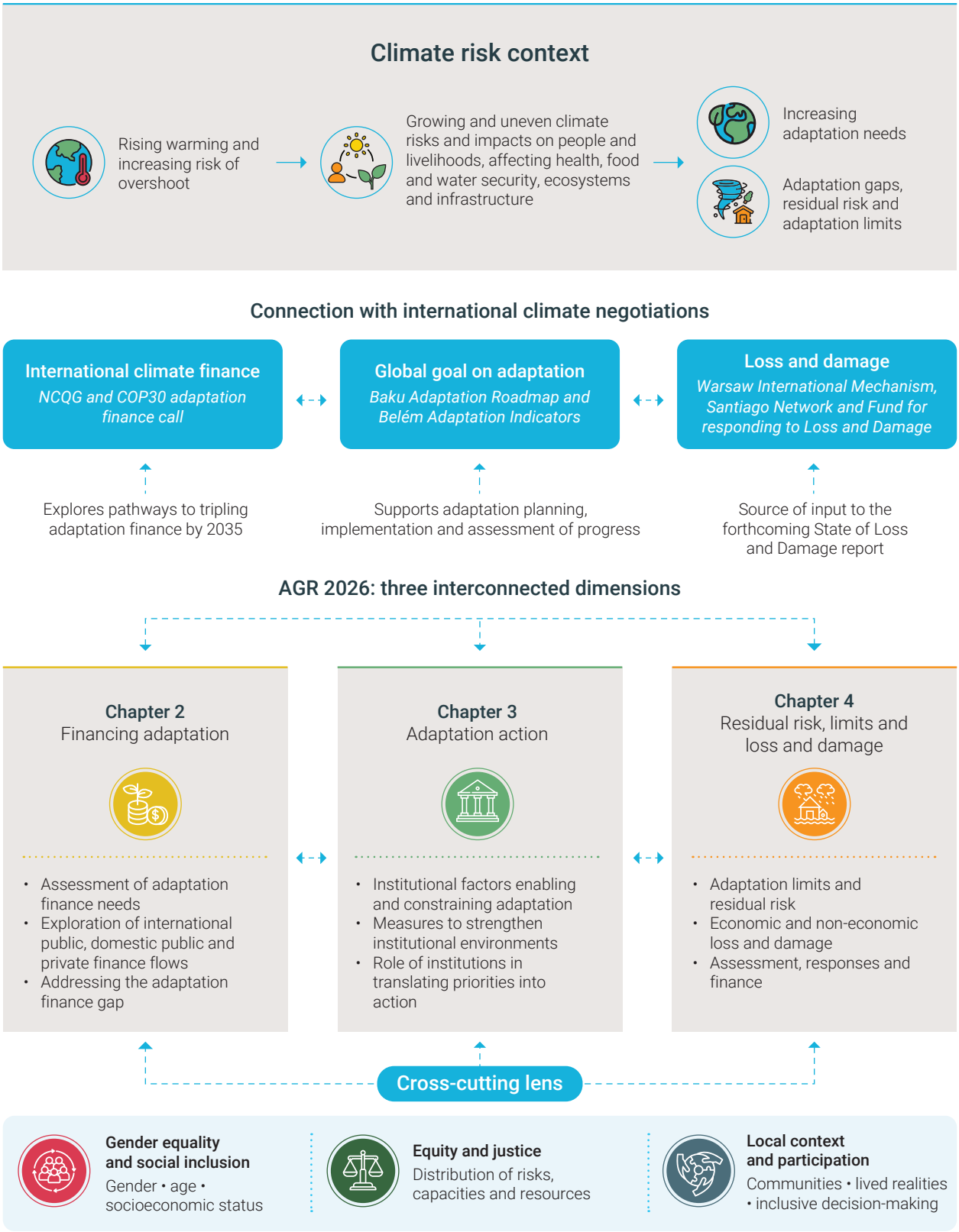
- **Chapter 3** explores how institutional factors shape countries' abilities to translate their national adaptation objectives into concrete implementation. To do this, the chapter reviews available literature to present a comprehensive conceptual taxonomy that organizes institutional factors across governance structures that enable and inhibit the implementation of adaptation, and takes stock of the different measures Governments are deploying to strengthen their institutional enabling environments for adaptation. Following this, it presents a series of illustrative country examples to demonstrate how diverse institutional assets, delivery pathways and leadership structures interact dynamically across different contexts to advance implementation.
- Reflecting the need to account for residual risks and losses and damages as part of the adaptation gap, **chapter 4** uses multiple lines of evidence as complementary building blocks to establish a preliminary 2026 baseline of losses and damages and associated gaps. Building on AGR 2023, it brings together evidence on adaptation limits, residual risk, and observed losses and damages, and provides insights into evidence, response and finance gaps, including challenges in accessing support. By showing what can currently be documented, where evidence is strongest and where important gaps remain, the chapter provides a foundation for future AGR assessments to track how these dimensions evolve over time, and can provide inputs to the forthcoming regular report on loss and damage under the Warsaw International Mechanism (UNFCCC 2025b). Figure 1.1 illustrates how the three chapters address the interconnected institutional, financial and risk-related dimensions of the adaptation gap.



Firefighting at Fingal, Tasmania, in 2020.

Photo: © Conservation commons/unsplash

Figure 1.1 AGR 2026 conceptual framework: from climate risk to adaptation action and loss and damage





The aftermath of a tornado.

Photo: © Greg Johnson / Unsplash

2





Chapter 2

Progress on adaptation finance

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Fisherman in the Gambia.

Photo: © Duncan Moore / UNEP

Key messages

- **An updated assessment of adaptation finance needs for developing countries indicates a plausible central estimate of US$305 billion/year (2024 prices)**. These estimates are based on the average of two lines of evidence:

  i. An updated assessment of the latest submitted nationally determined contributions (NDCs) and national adaptation plans (NAPs) estimates adaptation finance needs of US$255–328 billion/year over the next decade (2024 prices). Of this, least developed countries (LDCs) and small island developing States (SIDS) account for US$50 billion/year. The submissions show that low-income countries have the highest relative needs, at around 4 per cent of their gross domestic product (GDP).

  ii. Modelling of adaptation costs indicates similar short-term needs, with a central estimate of US$320 billion/year (2024 prices). The analysis shows that these estimates are strongly influenced by several factors, especially the objectives set for adaptation.

  Both estimates focus on the adaptation activities identified in NDCs and NAPs, and they exclude most private sector needs. Initial modelling shows that these private needs could be very significant, with the potential to almost double overall finance needs for developing countries.

- **Increases in international public adaptation finance flows have been levelling off, but support from developing-to-developing countries is increasing.** Flows from developed to developing countries were tracked at US$28.2–31.7 billion in 2024, only a modest increase from 2023. The Glasgow Climate Pact of doubling 2019 adaptation finance flows by 2025 will be met only if flows increase very considerably in 2025. At the same time, support from developing-to-developing countries has increased from US$3.9 billion in 2019 to US$9.6 billion in 2024.

  Relative to their GDP, a higher proportion of this international public adaptation finance is flowing to low-income countries, LDCs and SIDS, which are among the most vulnerable to climate change. However, despite wide year-to-year variability, annual flows to LDCs have declined since 2022, which is a concern.

- **At the 30th session of the Conference of the Parties (COP30), Parties called for efforts to triple adaptation finance by 2035; while welcome, the tripling is less ambitious than it first appears.** Depending on the interpretation of this decision, it could increase international adaptation finance to US$85–120 billion/year by 2035. The tripling does not account for future inflation, and developing countries may contribute to this goal through their shares in multilateral development banks (MDBs).

  Based on Adaptation Gap Report (AGR) analysis, tripling flows would meet only 20–29 per cent of developing countries' estimated annual finance needs of US$420 billion/year in 2035 (after adjusting finance needs of US$305 billion for possible future inflation).

  More positively, the relative finance gap is lower for LDCs and SIDS. Tripling flows to these countries could meet 49–84 per cent of their estimated finance needs in 2035. Flows to these vulnerable countries are currently predominantly concessional, and this would need to continue.

- **Domestic public finance can be a potentially important additional source of adaptation finance, but data availability is very limited, and flows remain difficult to estimate.** Of the 47 countries that have presented disaggregated adaptation finance needs by conditionality in their NDCs and NAPs, an average of 18 per cent of needs was marked as unconditional. If these are indicatively assumed to reflect domestic flows (noting the caveats introduced in this chapter), and this share is applied to the needs of all developing countries, it would equate to US$50 billion/year (or US$69 billion/year with inflation by 2035).

  Adding these unconditional flows to international public flows, assuming the tripling is achieved, would be equivalent to US$154–189 billion/year in 2035. This would still mean that more than half of adaptation finance needs (US$420 billion/year) would still be unmet.

- **Private flows could help fill some of this adaptation finance gap, though current tracked flows are low, and many of these flows will either not contribute to NDC and NAP priorities or will be paid for by developing country actors**. The AGR has investigated two types of private flows:

  i. Private adaptation finance flows mobilized by international public finance are currently estimated at US$3 billion/year, and these flows have doubled since 2019.

  ii. Additional tracked private adaptation finance flows are estimated at a further US$3 billion, though this significantly underestimates actual levels.

  Private flows are very likely to increase and will play a critical role in adaptation. However, most will support private sector needs or reflect new adaptation goods and services paid for by the developing countries themselves (governments, citizens and firms). As such, they will not fund, and are not a substitute for, the public adaptation actions prioritized in NDCs and NAPs.

- **As greater emphasis is placed on mobilized private and cross-cutting finance, improved transparency and consistency in how these flows are tracked is needed.** The attribution of these flows to adaptation will also be important for assessing progress towards adaptation finance goals.

  The AGR 2026 has undertaken an analysis of private flows mobilized by international public finance. The data are confidential, but some funds and facilities that receive this finance publish documentation. Although it covers only a subset, a review of these flows finds that a low proportion target climate change as a principal objective; most deliver adaptation as a secondary benefit, and many appear to have low adaptation relevance.

  The AGR 2026 has also analysed cross-cutting international public flows, which support both mitigation and adaptation simultaneously. These have increased significantly from US$6.9 billion in 2019 to US$11.8 billion in 2024. However, the analysis finds that only 15 per cent of these flows target adaptation as a principal objective, with most targeting it as a significant objective.

- **An updated analysis indicates progress since the last AGR in incorporating gender equality and social inclusion (GESI) considerations into NDC and NAP costings**. However, this remains uneven across countries.

- **Scaling up adaptation finance is essential to reduce avoidable residual risks and future loss and damage; however, it is stressed that adaptation cannot eliminate all residual risk, and that finance for addressing realized losses and damages is also essential.** Loss and damage finance is discussed in chapter 4.

2.1 Introduction

Finance is a key enabling factor for adaptation (O'Neill *et al.* 2022) and is central to meeting the goals of the Paris Agreement. The AGR assesses progress on finance for developing countries,[1] defined here as all non-Annex I countries,[2] with an analysis of the following:

- **Adaptation finance needs:** These reflect the volume of finance (in US$) that countries need to address climate change impacts. They are estimated (see section 2.2) using two lines of evidence:
  - i. An analysis of adaptation finance needs from developing countries' NAPs and NDCs, extrapolating these to all countries
  - ii. A modelled estimate of the additional costs of adaptation for all developing countries, based on global sectoral models with national-level resolution
- **Adaptation finance flows:** These reflect the flows of finance (in US$) to adaptation in developing countries. The AGR assesses these flows (see section 2.3) for:
  - i. International public adaptation finance flows; particularly relevant for progress towards the climate finance goals, including:
    - The Glasgow Climate Pact, in which developed country Parties were urged to at least double their collective provision of climate finance for adaptation to developing country Parties from 2019 levels by 2025 (UNFCCC 2022a)
    - The new collective quantified goal (NCQG) on climate finance (UNFCCC 2024a), to mobilize at least US$300 billion/year by 2035 for developing country Parties for climate action, with developed country Parties taking the lead
    - The Global Mutirão decision at COP30, where Parties to the Paris Agreement called for efforts to triple adaptation finance by 2035 (UNFCCC 2025a)
  - ii. Private sector finance flows (section 2.3.6)
  - iii. Domestic public finance for adaptation (section 2.3.7)

The difference between adaptation finance needs and adaptation finance flows, the finance gap, provides evidence on progress and adequacy (section 2.4). The assessment of needs and flows also takes GESI inclusion into account and whether these reach the local level (section 2.5).

The figures in this chapter are first reported in constant US$ 2024 prices. However, the NCQG and the tripling decisions are for the year 2035, and these future goals are set relative to current prices. Therefore, to ensure equivalency for direct comparison in 2035, finance needs are also reported with potential inflation included.

It is stressed that adaptation finance is essential to meet adaptation needs and reduce risks and future loss and damage, but that adaptation cannot eliminate all residual risk. These residual risk issues and finance for addressing loss and damage are included in chapter 4.

2.1.1 Framing the AGR finance landscape

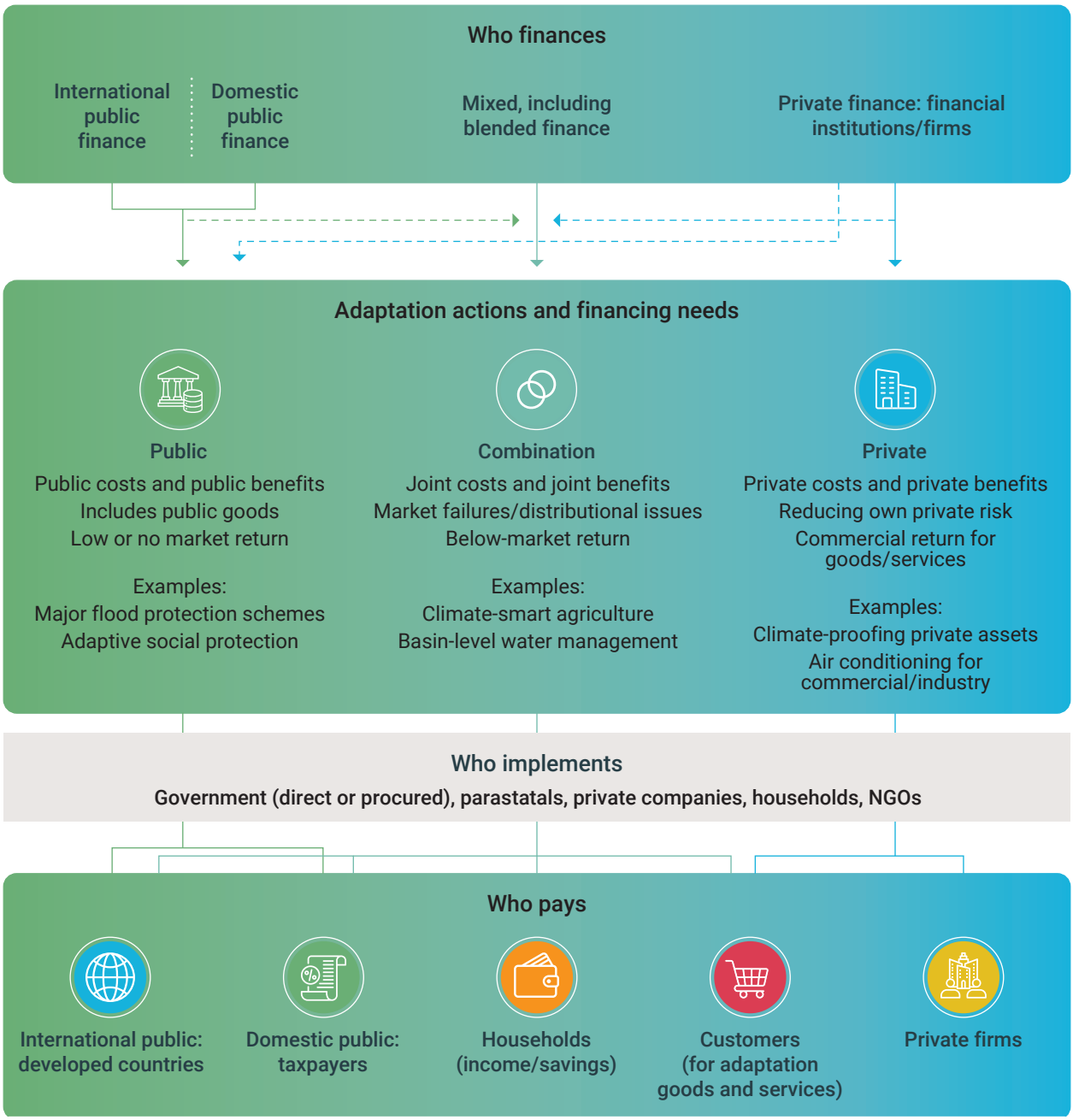
The finance chapter of previous AGRs has focused on international public adaptation finance flows. The AGR 2026 has widened this analysis to cover domestic public and private flows. This leads to a broader finance landscape, which is shown in figure 2.1, noting that this is a simplification.[3]

1 This chapter was co-financed by two projects. The ECONOGENESIS project is funded by UK Aid from the UK Government and by the International Development Research Centre (IDRC), Canada, as part of the Climate Adaptation and Resilience (CLARE) research programme. The views expressed herein do not necessarily represent those of the UK Government, IDRC or IDRC's Board of Governors. The Assessing Climate Change Risk in Europe (ACCREU) project is funded by the European Union through Horizon Europe under grant agreement No. 101081358. The views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union.

2 See the non-Annex I countries under the UNFCCC: https://unfccc.int/process/parties-non-party-stakeholders/parties-convention-and-observer-states.

3 There will often be a wider mix of private and public sources, actors, and instruments acting together. There are also many more types of private sector actors with different roles, as well as philanthropic and non-governmental organizations.

Figure 2.1 The landscape of adaptation finance used in the AGR 2026



In the centre of figure 2.1 are **adaptation actions and finance needs**. The figure uses the typology of the AGR 2025 for the characteristics of adaptation (United Nations Environment Programme [UNEP] 2025). On the left are adaptation actions that involve public costs and public benefits. Examples include major flood protection schemes, adaptive social protection or health for the most vulnerable. These generate low or no revenues, often including public goods, and therefore do not offer commercial returns, so they are typically provided by the public sector. On the right are adaptation actions that have only private costs and private benefits. Examples include private firms implementing adaptation to address risks to their own assets, operations or their employees. This also includes existing or future markets for adaptation goods and services that can offer commercial returns – for example, air conditioning in factories and offices. These activities are delivered entirely by the private sector, usually without government funding, although governments can implement enablers to support such actions (e.g. disclosure requirements or standards). Between these two extremes are interventions that involve a mix of public and private costs and benefits, and thus both public and private actors. These may include cases where government usually intervenes to address market failures, deliver more positive societal outcomes or address distributional concerns, as well as areas where returns are below market rates, or markets are partially developed, and government action is justified. An example is climate-smart

agriculture, which often has positive non-market benefits but also involves barriers and constraints (UNEP 2025). Notably, the costed needs estimates in NAPs and NDCs tend to be focused on the left and middle of figure 2.1; they exclude the private actions (right) and their costs.

At the top of figure 2.1 are the **adaptation financial flows**. The figure shows international public and domestic public sources (left), which are the main sources of finance for public actions. It also shows private sector sources, especially financial institutions (right),[4] which are the main source of finance for private adaptation. Between these is an area with the potential for blended finance, where public finance is used to de-risk or unlock private finance. In practice, there are many more interacting flows, such as public borrowing from private capital markets and public procurement of private goods and services. This finance will be delivered through various financial instruments (e.g. grants, lending, guarantees, equity).

Finance will flow through various implementation entities and arrangements, by many different pathways. For example, governments may implement public adaptation directly or procure private sector services to do so. However, as highlighted in previous AGRs (UNEP 2024; UNEP 2025), it is critical to separate the *financing* of adaptation (where the money comes from) from the *funding* of adaptation (who ultimately pays),[5] regardless of who implements it. This distinction is especially important for lower-income developing countries on grounds of equity, as shown at the bottom of figure 2.1. For example, even if finance flows from private capital markets to a country or a household takes a commercial loan to finance a household-level resilience measure, the developing country government and its households ultimately fund, and thus pay for, this adaptation.

2.2 Adaptation finance needs

The first step in the AGR analysis is to identify potential adaptation financing needs (adaptation costs).[6] In practice, estimating these is challenging, and there is no single definitive estimate. Further, costs will change as an iterative response to dynamically changing risks over time. The analysis here uses two alternative methods to assess adaptation finance needs. These should be considered as complementary lines of evidence.

2.2.1 Submitted adaptation finance needs

NDCs and NAPs submitted to the UNFCCC provide a critical, bottom-up perspective on adaptation finance needs, presenting self-assessed estimates of the costs of implementing nationally defined adaptation priorities. Although these estimates are heterogeneous in scope and methodology, they draw on domestic climate risk assessments, development plans and sector-level costing exercises, and capture additional elements that top-down modelled approaches may miss (UNFCCC Adaptation Committee 2022). Further details of the method is provided in annex 2.A.

These submissions were accessed from the UNFCCC's NDC Registry (UNFCCC, 2026a), and NAP Central (UNFCCC 2026b). As at 31 July 2026, 115 developing countries had submitted costed adaptation finance needs in NDCs or NAPs (see annex 2.A), an increase from the 97 countries reported in the AGR 2025. They represent 74 per cent of all 155 non-Annex I countries, several of which have updated their earlier estimates. For comparison, 83 per cent of all LDCs and SIDS reported their adaptation finance needs. These submissions focus primarily on adaptation actions at the left and centre of figure 2.1 and therefore have a strong public focus.

The total adaptation finance needs of the 115 reporting countries add up to US$2.0–2.1 trillion (constant 2024 prices), equivalent to US$200–210 billion/year. These reports have various implementation time frames, with most converging on 2020–2035. When expressed as a share of national income, these needs follow a broadly consistent gradient across income groups. On average, needs are equivalent to 3.7 per cent of GDP per year for low-income countries (median), 2.8 per cent for lower-middle-income countries, 2 per cent for upper-middle-income countries, and 0.3 per cent for high-income non-Annex I countries: a 12-fold difference across the range. Relative to the size of their GDP, lower-income economies thus have higher adaptation needs, whereas absolute US$ values will be lower for smaller economies. LDCs and SIDS report disproportionately high adaptation financing needs relative to their economic size due to their high vulnerability, with needs equivalent to 3.6 per cent of GDP (median) on average for the 63 LDCs and SIDS in the data set. See annex 2.A for details.

4 This is a simplification and there are many more types of private sector actors (commercial financial institutions, asset managers, venture capital, private equity, pension funds and insurers) with different roles.

5 While 'financing' and 'funding' are often used interchangeably, they are different concepts (UNEP 2025). Financing relates to the source of finance and the financing model for adaptation (i.e. how the upfront costs of investment are met, and the financial instruments involved). This focuses on the role of the public and private actors in providing money to implement adaptation, through relevant financial instruments with associated terms (including financing costs). This is different from the funding of adaptation, which refers to how to pay for adaptation over the lifetime of the investment and how these costs (including the financing costs and the cost of capital) will be paid for. This relates to the cost recovery mechanism and requires consideration of whether the funding is from the public budget, from user charges, and so on.

6 In this chapter, the terms 'adaptation finance needs' and 'adaptation costs' are used interchangeably. These terms are applied to both evidence lines (submissions and modelling). However, while both terms and approaches reflect the costs of adaptation, they involve different methods and definitions, and consider different adaptation activities and additionality, including for financing. See the AGR 2023 (UNEP 2023) for further details.

Conditionality of finance needs

Only 47 of the 115 reporting countries specify whether their adaptation finance needs are conditional or unconditional, but this breakdown still provides useful information. The exact definitions for these terms vary in the documents, though conditional needs are generally understood as costs expected to be met through international support, and unconditional needs are costs expected to be met through domestic resources. However, the two components do not map cleanly onto international and domestic finance. What countries report in an NDC or NAP, and what is presented here, is a conditionality classification rather than a financing source.

Across the 47 sample countries, approximately 18 per cent of annual adaptation finance needs are marked as unconditional and the remaining 82 per cent as conditional. Among LDCs and SIDS, 29 out of 63 reporting countries provide a conditionality breakdown, and they report that 23 per cent of needs in LDCs and SIDS are unconditional. This is higher than the average of all countries and shows these vulnerable countries are allocating, on average, a larger share of needs as unconditional. It is stressed that allocating unconditional shares does not necessarily mean that actions will be financed domestically, as this will depend on fiscal space, debt sustainability and competing budget priorities that NDC and NAPs documents do not report. At the same time, unconditional shares may have been set in anticipation of expected international flows. See annex 2.A for details.

Sectoral breakdown of reported needs

A total of 71 countries provide sector-level adaptation finance needs. Sectoral coverage of needs becomes progressively broader with each successive NDC submission. The share of countries reporting needs for more than one sector rises from 57 per cent in first NDCs to 60 per cent in second NDCs and 80 per cent in third NDCs, while the median number of sectors covered rises from two to seven.

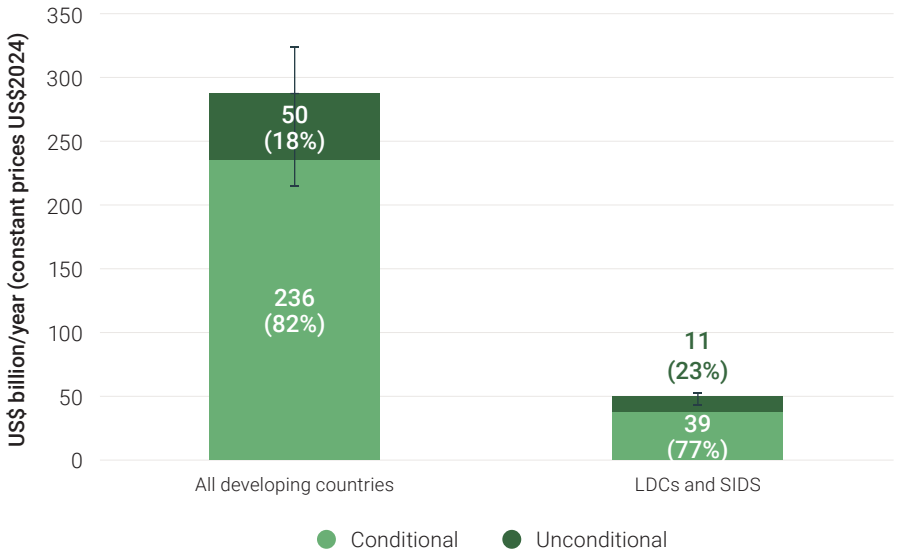
Among the 71 countries providing cost estimates for at least four sectors, adaptation finance needs are concentrated in cross-cutting programmes (24 per cent) and agriculture and food security (23 per cent), the latter reflecting the importance of rural livelihoods and food systems in developing countries' adaptation priorities. Infrastructure and buildings, and water supply account for 17 per cent each. Other priority sectors are health and sanitation (5 per cent) and forestry and ecosystems (4 per cent). The remaining 10 per cent is distributed across six other sectors (energy, disaster, transportation, coastal zone, tourism and culture, and industry). See annex 2.A for details.

Adaptation finance needs for all developing countries

To estimate adaptation finance needs for all 155 developing countries, a projection model was developed and applied to extrapolate from the 115 reporting countries (see annex 2.A). The extrapolation yields annual adaptation finance needs for all developing countries in the range of US$255–328 billion per year (constant 2024 prices) with a central estimate of US$286 billion/year (figure 2.2). The updated methodology differs from that of the AGR 2025, which was a fully model-based extrapolation, applying regression-derived projections to all 155 countries regardless of whether they had submitted estimates. The updated approach retains each reporting country's own submitted finance needs directly and applies regression projections only to the 40 non-reporting countries. This substantially reduces the influence of model assumptions on the headline figure. The considerably narrower uncertainty range (US$255–328 billion, compared with US$144–1,032 billion in the AGR 2025) is a direct consequence of this shift: uncertainty in the approach is confined to the projected non-reporting countries rather than the full country set. It does not, however, capture the substantial uncertainty and heterogeneity within the submitted estimates. Adaptation finance needs for LDCs and SIDS combined are US$49–51 billion/year.

Subject to these caveats, it is possible to allocate these total numbers according to the average submitted conditional and unconditional shares reported. This would imply that approximately US$50 billion/year (18 per cent) of the $286 billion could be unconditional, while US$236 billion/year could be conditional (figure 2.2). For LDCs and SIDS, the equivalent numbers are US$11 billion/year (23 per cent) unconditional and US$39 billion/year conditional.

Figure 2.2 Adaptation finance needs of all 155 developing countries



Note: The conditional and unconditional components reflect the conditionality classification used in NDCs and NAPs rather than the financing source. Error bars show the uncertainty range. These values do not account for future inflation.

2.2.2 Modelled adaptation finance needs

Complementing the country-led assessment in section 2.2.1, the AGR uses a set of peer-reviewed sectoral models to estimate the incremental costs of adapting to climate change in developing countries (see annex 2.B). A major modelling update was included in the AGR 2025 (UNEP 2025). This led to a central estimate of adaptation costs for the 2030s of US$320 billion/year (constant 2024 prices) for all developing countries, for representative concentration pathway 4.5 (RCP 4.5) (which implies a mean temperature increase of 2°C to 3°C (with a central estimate of roughly 2.4 °C) above pre-industrial levels by the year 2100. This is in line with the global warming projections of the scenarios covered in the Emissions Gap Report (UNEP 2026)). LDCs and SIDS account for US$38 billion/year of this. These modelled estimates also primarily focus on the public adaptation priorities on the left and centre of figure 2.1.

What influences the costs of adaptation?

The AGR 2023 explored the reasons why the estimates of adaptation costs differ (UNEP 2023). To provide more insights on these issues, the AGR 2026 has analysed the factors affecting cost estimates quantitatively, to draw out relevant policy insights. More details are provided in annex 2.B, but the main insights are summarized here.

In the coming decade, adaptation finance needs are unavoidable, but mitigation remains critical for limiting longer-term adaptation costs. The level of future climate change will determine the amount of adaptation needed (UNEP, 2023). Higher warming requires more adaptation and involves higher costs, though the rate of change also matters, with faster warming leading to higher adaptation costs for the same levels of warming. However, future climate change is uncertain (Intergovernmental Panel on Climate Change 2022). In the short term (up to 2035), the results of the AGR modelling analysis (see annex 2.B) show that most emission scenarios have a relatively low influence on adaptation costs[7, 8]. This is explained by the minimal difference between forcing levels in the near term. A much stronger influence was found with the climate model chosen and, by implication, the local level of climate change. Very large differences in climate risk and adaptation costs were found in the modelling results between different climate model projections even in the short term, reflecting hotter, cooler, wetter or drier projections. This influence is greatest for sectors where precipitation drives risk; for example, the climate model chosen altered short-term river flood adaptation costs by a factor of four. The influence of the warming scenario does, however, become much more important over time. The warming scenario, and progress towards the Paris Agreement goals, drives significant differences in adaptation costs towards mid-century and

7 This applies primarily to the main RCPs (2.6, 4.5, 6.0 and 7.0) and SSP-RCP (SSP1-2.6, SSP2-4.5, SSP3-7.0). Note that runs using RCP8.5 / SSP-8.5.do lead to higher adaptation costs even in 2035.

8 Meeting the Paris Agreement goal of 'holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C' would have more influence. A scenario that led to limiting the temperature increase to 1.5°C without overshoots or SSP1-1.9 would also have more influence in reducing short-term adaptation costs.

beyond. Ambitious mitigation that meets the goals of the Paris Agreement is therefore critical for limiting future adaptation costs, as well as reducing peak warming, compound risks, and exceedance of adaptation limits.

The impact assessment method and model strongly influence adaptation costs. Interestingly, while scenario and climate models have been the main focus of uncertainty in the literature, the analysis finds that the choice of impact model (or function) also has a large influence on adaptation costs. This can be seen in the AGR results that compared different coastal flood models (Lincke *et al.* 2019; Haas *et al.* 2024) and agricultural models (Sulser *et al.* 2021; Palazzo *et al.* 2024). In these modelling examples (see annex 2.B), the choice of model altered the magnitude of global adaptation costs by a factor of two (and for individual countries, it can even change the sign of the effect for agriculture).

The countries included significantly affect aggregate adaptation costs. The AGR 2025 adaptation costs include all non-Annex I countries. Selecting a different set of countries will change these costs. As an example, the Independent High-Level Expert Group on Climate Finance (Bhattacharya *et al.* 2025) drew on the AGR cost data, but excluded high-income non-Annex I countries and the People's Republic of China. This lowered the aggregate modelled estimate from US$320 billion to US$240 billion/year in 2035.[9]

Adaptation objectives alter costs significantly, but involve equity considerations. One of the most important factors influencing adaptation costs is the normative choice of the objective (the goal) for adaptation. This involves a trade-off between adaptation costs, benefits and the residual impact after adaptation, which is closely related to the concept of loss and damage discussed in chapter 4 (UNEP 2023). Because individual adaptation actions are often only moderately effective in reducing risks (Rexer and Sharma 2024), this leads to rising marginal costs and diminishing marginal returns with more ambition. The modelling analysis in AGR found large differences in adaptation costs between three different objectives, notably between the economically optimal level of adaptation, maintaining an acceptable level of risk protection (e.g. a 1-in-100-year return period under climate change) or limiting residual damage to current levels. For coastal and river floods, the choice of objective changed modelled costs by a factor of four: costs were lowest for the economically optimal level and highest for limiting residual damage. The objectives chosen also influence who benefits. For example, the economically optimal level will involve higher residual risks in areas where adaptation does not pass a cost-benefit test, while maintaining universal protection standards will provide similar protection for all people, everywhere. The choice of objective therefore involves political and ethical decisions, and will vary with actor perspectives, societal risk preferences and willingness to either pay for adaptation or accept the impacts. The issue of objective setting requires greater consideration by countries, especially as they involve issues of climate justice.

Sectoral and risk coverage matters. Adaptation costs will also clearly vary with the coverage of sectors and risks that are included: a more comprehensive coverage will mean higher costs. The current AGR estimates implicitly underestimate total adaptation finance needs, as they only cover a limited number of sectors and risks (see annex 2.B). They also do not capture adaptation to cascading or compounding risks, or the limits of adaptation (see chapter 4).

Countries should be putting more emphasis on private sector adaptation costs, especially for climate-proofing private assets and addressing heat. The modelled central AGR estimates of US$320 billion/year are primarily associated with public and mixed activities (shown on the left and in the centre of figure 2.1) and do not include most of the private sector's own adaptation needs (shown on the right of figure 2.1). The AGR has undertaken an initial indicative analysis of these private needs. This draws on the costs of climate-proofing and retrofitting private sector assets, using the approach of Aligishiev, Bellon and Massetti 2022. It also includes the additional adaptation costs of addressing the impacts of heat on the labour force, such as increased cooling for indoor work, and shifting labour activities, protective measures or mechanization to address outdoor work[10], drawing on recent new modelling analysis of adaptation for these impacts (Palazzo *et al.* 2024; Watkiss *et al.* 2025). This analysis finds that these private sector adaptation needs could add approximately US$260 billion/year to the more public adaptation finance needs already identified for developing countries in the 2030s, though there is a large range around these figures. This would almost double overall adaptation finance needs for developing countries. Other recent studies have identified these private flows to be of a similar level, especially for addressing heat through cooling (Krishnan *et al.* 2025). These additional adaptation costs will be borne by the private sector, and they will involve additional financing needs (top right of figure 2.1). A key insight is that more attention is needed on these costs, with greater inclusion in NDCs and NAPs.

Baselines and boundaries strongly influence estimates. Adaptation costs vary with the starting conditions (e.g. whether costs are relative to the 1990s, 2000s or later). They also vary with the boundaries and definitions of adaptation.

9 The study also included private sector adaptation costs (private infrastructure, supply chains and addressing heat through cooling, totaling US$165 billion/year), which, when added to the more public costs, totaled US$400 billion/year in 2023.

10 Note that while the focus of these impacts has been on the effects on the private sector, they will also affect public sector workers, and therefore there will need to be public sector actions to address these risks.

For example, higher adaptation costs are needed if existing adaptation deficits are included. These are defined as actions that are needed to tackle existing natural climate variability and extremes, rather than the additional risks due to climate change. Similarly, adaptation may include or exclude development options (and their costs) – i.e. measures that reduce vulnerability or build resilience, such as general agricultural development or education. The AGR modelled cost estimates explicitly assess incremental and targeted adaptation, but it is noted that many NDCs and NAPs often include these. These can strongly influence the adaptation costs estimated.

Costs differ between modelled and real-world application. Adaptation costs are typically higher if real-world implementation is considered, due to opportunity and transaction costs, as well as design, management, implementation and monitoring costs (UNEP 2018). This leads to higher costs when compared to studies that consider technical costs only. Modelled costs are effectively ex ante estimates, and there is increasing evidence that adaptation effectiveness is lower in practice (ex post) (see Rexer and Sharman 2024). This implies higher adaptation costs to achieve the same level of risk reduction.

The costs of capital significantly increase financing needs. The costs in the AGR modelling and the country-submitted adaptation finance needs (in NDCs and NAPs) do not take account of the costs of capital – i.e. the cost of financing adaptation. Recent analysis identifies that the cost of capital for adaptation is a critical but often invisible factor, and that this strongly shapes overall costs – especially for capital-intensive infrastructure projects (Metayer, Postic and Ross-Oliver 2026). Debt and equity costs can more than double total project costs. This is not an issue when adaptation finance flows are grants, but it is a crucial issue when finance flows are non-concessional (see section 2.3).

The analysis provided in this subsection highlights that there is a considerable range around the modelled cost estimates and adaptation finance needs. This is not only scientific, but involves political framing perspectives.

2.3 Adaptation finance flows

The AGR 2026 has updated the analysis of international public climate finance flows for adaptation from developed to developing countries, covering the latest available period (2019–2024). Voluntary contributions from developing countries are also assessed, but separately. The AGR bases its analysis on the Organisation for Economic Co-operation and Development (OECD) Climate-Related Development Finance (CRDF) Recipient Perspective database (OECD undated a), given its consistency and the high level of transactional detail. The AGR uses coefficients to estimate climate-specific flows from the bilateral flows available in the database, and to calculate attributable multilateral outflows to developed countries. Commitment rather than disbursement data is used, as the former is more complete,[11] and constant prices are used rather than current prices to remove the effect of inflation over time. In addition to international public finance adaptation flows, AGR has considered 'cross-cutting' finance, as well as private sector flows mobilized by the public sector. Further details are provided in annex 2.C.

2.3.1 International public climate finance

The OECD regularly assesses international public climate finance as part of its role in tracking progress towards the US$100 billion climate finance goal, assessing contributions from developed countries to support climate action in developing nations (OECD 2026a). However, the estimates in this analysis differ slightly from the AGR, due to differences in the underlying data sources and reporting methodologies. A key distinction lies in the data sources used for bilateral finance, which are treated differently with respect to the years covered (calendar or fiscal), the point of measurement (commitments or disbursements) and how cross-cutting climate-specific finance is calculated (table 2.1).[12] While the overall climate finance totals in both reports are close in magnitude, there are notable divergences in bilateral cross-cutting estimates, which affect adaptation-only and mitigation-only calculations.

11 While disbursement data would provide a more accurate picture of the resources received by countries, these data continue to be reported inconsistently to OECD CRDF, particularly by multilateral institutions.

12 The treatment of Rio markers for cross-cutting climate-related finance affects the totals for adaptation and mitigation only. The most common practice by Parties is to allocate 100 per cent as adaptation-specific if a cross-cutting transaction has a 'principal' Rio marker for adaptation, and a 'significant' one for mitigation. However, there are several variations or a lack of disclosure of the coefficients used for these activities.

Table 2.1 Differences between OECD US$100 billion report and AGR calculation for adaptation finance

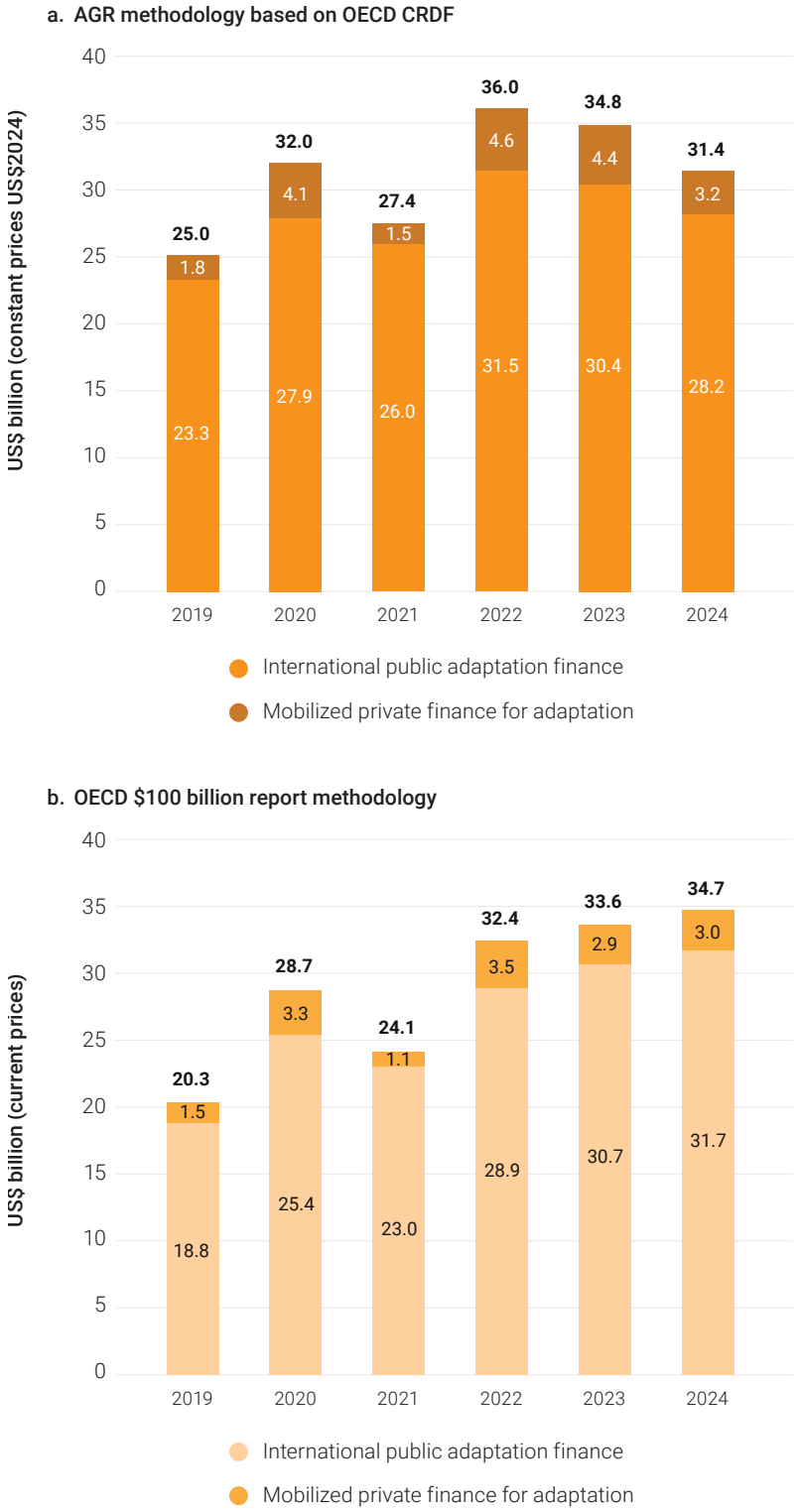
2024 estimates	AGR	OECD $100b	Discussion of the differences
Bilateral finance	11.0	14.5	Different data sources are used. The AGR uses the OECD CRDF (OECD undated a) publicly available database for financial flow commitments (reported on calendar years) and applies coefficients to make the data climate-specific. The OECD US$100 billion report (OECD 2026a) uses confidential preliminary biennial transparency report (BTR) data on climate finance,[13] which is already climate-specific. BTRs can include flow and non-flow financial instruments, correspond to fiscal or calendar years and be presented in commitments or disbursements, depending on the reporting party.
Multilateral finance	17.2	17.2	The same data source is used. Both documents use data from OECD CRDF, and apply coefficients to identify the share attributable to developed countries.
Mobilized private	3.2	3.0	AGR uses the numbers reported in the OECD public dashboard for mobilized private finance for development (OECD undated b), in constant prices. The OECD US$100 billion report (OECD 2026a) uses OECD-mobilized data and has access to transactional details for both bilateral (disclosed) and multilateral transactions (not disclosed publicly) and applies coefficients to identify the share attributable to developed countries.
Total (in US$ billion)	**31.4**	**34.7**	

The AGR estimates that international public adaptation finance flows in 2024 were US$31.4 billion in constant 2024 prices, including mobilized private finance, but excluding official export credits (see figure 2.3),[14] compared with US$34.7 billion published by the OECD (OECD 2026a). Finance flows for adaptation have been larger than in 2019 every year, although AGR estimates show a slight decline (in constant prices) since 2022.

13 Once BTRs are officially submitted to UNFCCC, the information is public. However, as the deadline for the BTR2 is 31 December 2026 for 2023 and 2024 data, preliminary calculations are shared confidentially with OECD.

14 OECD (2026a) reports climate finance flows in 2024 at US$136.7 billion. The differences are explained in annex 2.B. Official export credits for climate were estimated at US$4.6 billion, all targeting mitigation.

Figure 2.3 International public adaptation finance commitment flows from developed towards developing countries per year for the period 2019–2024



Note: Panel (a) shows the AGR calculations of international public adaptation finance flows (attributed to developed countries) and mobilized private finance for adaptation (without attribution to developed countries). Panel (b) shows OECD US$100 billion report numbers for international public adaptation finance flows and mobilized private finance for adaptation (attributed to developed countries). Values in panel (a) are expressed in constant 2024 prices, while values in panel (b) are expressed in current prices for each year. All values are attributed to developed countries, with the exception of the values for mobilized private finance in panel (a), as publicly available data is insufficient to determine the attribution of mobilized private finance for adaptation. This means that values provided for this data set refer to the total mobilized by bilateral and multilateral finance providers, without discounting for the share of developing countries within multilateral institutions. See table 2.1 for more details on the differences between AGR and OECD US$100 billion report adaptation finance estimates.

2.3.2 Progress in delivering the Glasgow Climate Pact on adaptation finance

The AGR estimates international public adaptation flows, from bilateral and multilateral sources, at US$28.2 billion in 2024, with an additional US$3.2 billion in mobilized private flows. As discussed, this is lower than the combined $31.7 billion (public) and US$3.0 billion (mobilized private) reported by OECD in its US$100 billion report (OECD 2026a). On average, bilateral and multilateral entities allocated approximately US$29 billion (2024 constant prices) annually to adaptation between 2020 and 2024. Sustaining this level of adaptation finance is notable considering the strong dependence of adaptation finance on official development assistance flows, which declined 4.5 per cent in net flows in 2024 (OECD 2026b).

However, maintaining current adaptation finance levels will not be sufficient to meet the Glasgow Climate Pact to double adaptation finance relative to 2019 levels by 2025. It is broadly acknowledged that that this goal is equivalent to approximately US$40 billion by 2025[15],, though the value depends on the exact 2019 baseline used and on which flows are included[16], which in turn affects the scale of the increase required in 2025 varies.

The OECD US$100 billion report (OECD 2026a) cites that 2019 international public adaptation finance flows from developed to developing countries (in 2019 prices) were US$18.8 billion, rising to US$20.3 billion if mobilized private finance was included (see figure 2.3 panel b). A doubling of these 2019 values would therefore require an increase of US$5.9 billion (in 2025 prices) from 2024 to 2025.

Using the OECD CRDF database (OECD undated a) and the AGR methodology, 2019 baseline numbers are estimated to be higher at US$20.3 billion, rising to US$21.8 billion if private mobilized finance is included (in 2019 prices). A doubling of these values would require an increase of over US$12.2 billion (in 2025 prices), representing a much greater increase due to a higher 2019 baseline and also lower 2024 flows.

Whichever baseline and source is used, a very significant increase in finance flows – considerably above recent annual trends – will have to have occurred in 2025 to meet the goal.

The MDBs recently estimated a joint US$10.3 billion increase in 2025 compared to 2024 for adaptation in low- and middle-income countries (African Development Bank, Asian Development Bank, Asian Infrastructure Investment Bank, Council of Europe Development Bank, European Bank for Reconstruction and Development, European Investment Bank *et al.* 2026).[17] This increase will strongly support progress towards the doubling target. Therefore, achieving the doubling will depend on the bilateral adaptation finance flows in 2025, which may have been negatively affected by the estimated decline of 23 per cent in net official development assistance flows, unless adaptation finance was prioritized.

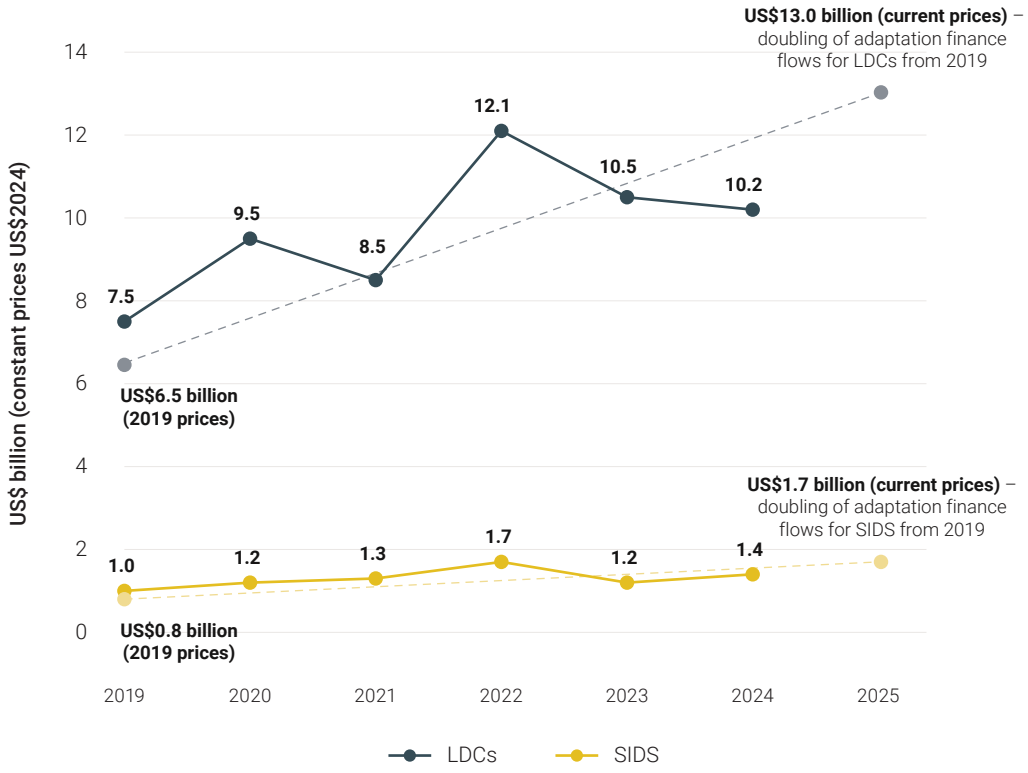
While there is *not* a separate doubling goal for LDCs and SIDS, it is useful to consider the levels of finance flows to these highly vulnerable countries. Based on OECD CRDF, the AGR estimates that a doubling for these countries would equate to US$1.7 billion (SIDS) and US$13 billion (LDCs) in 2025, relative to the baseline 2019 levels in current prices. This is shown in figure 2.4. Finance levels to these country groups fluctuate from year to year but have fallen since 2022, which is also confirmed by Climate Policy Initiative (Abraham *et al.* 2026). An additional US$2.8 billion would be required for LDCs and US$0.3 billion for SIDS compared to 2024 to deliver a doubling.

15 In the 2022 *Climate Finance Delivery Plan Progress Report*, and in a joint letter published in 2023, developed countries confirmed their understanding that doubling adaptation finance implies an increase by contributors from approximately US$20 billion in 2019 to US$40 billion by 2025 (Canada, Environment and Climate Change 2022). The UNFCCC 2023 *Report on the Doubling of Adaptation Finance* reviews various sources and methods, and identifies that three of the five sources point to a 2019 baseline of US$19.4 billion on average across all included channels (US$18.8 billion from the OECD report on the US$100 billion goal, excluding mobilized private finance, but US$20.3 billion if it is included; and US$19.2 billion from the AGR). This indicates a doubling to US$38.8 billion by 2025 (UNFCCC 2023). The report does not specify whether mobilized private finance should count.

16 The Glasgow Climate Pact does not take inflation into account and thus the doubling is assessed relative to 2019 flows in 2019 prices. This does make a large difference to the 2025 levels. A doubling of 2019 flows that accounted for inflation over the period would equate to approximately US$47 billion by 2025 (at 2024 constant prices) rather than approximately US$40 billion as above.

17 The US$10.3 billion figure covers both financing flows and non-flow financial instruments, such as guarantees. Of this increase, about 42 per cent can be attributable to developing countries.

Figure 2.4 International public climate finance flows from developed countries towards LDCs and SIDS per year for the period 2019–2024, in current and constant 2024 prices



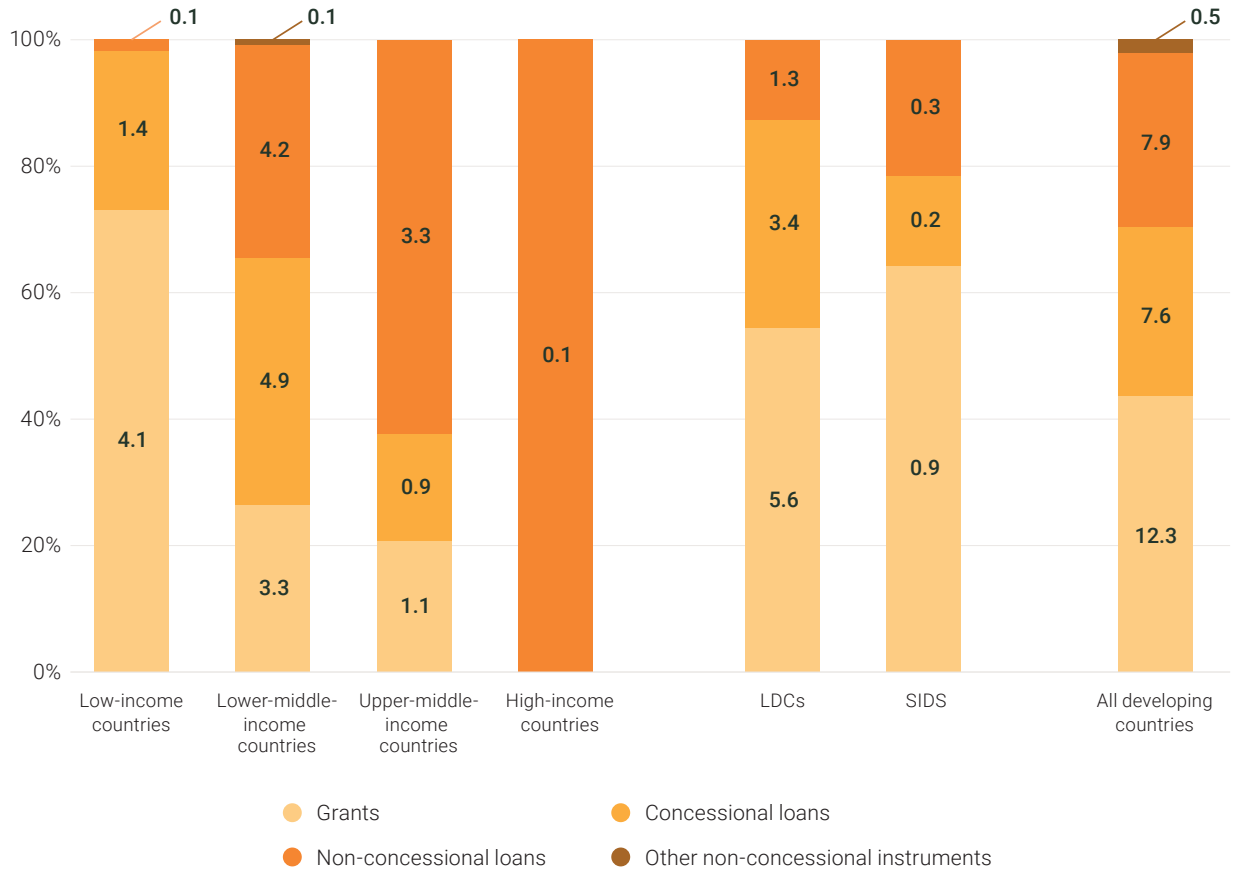
Note: The doubling of adaptation finance by 2025 in the Glasgow Climate Pact is assessed relative to 2019 flows in 2019 prices. The figure shows the 2019 values for LDCs and SIDS, along with a doubling of these by 2025. Some LDCs are also SIDS, and these estimates do not include regional allocations. Small errors can appear due to rounding.

2.3.3 Financial instruments

Analysis of the data in the CRDF (OECD undated a) shows that loans remained the primary financial instrument in 2024, accounting for 55 per cent (US$15.4 billion) of the AGR international public adaptation estimates, compared with 44 per cent (US$12.3 billion) for grants. Concessional and non-concessional loans were broadly balanced, with non-concessional loans accounting for 51 per cent. The latter, provided mainly by MDBs, primarily supported middle-income countries. By contrast, concessional instruments, including grants and concessionary loans, accounted for 88 per cent of finance allocated to LDCs and 78 per cent of finance directed to SIDS. Concessional finance for adaptation is particularly important for developing countries where high financing costs constrain investment.[18] Its predominant use in LDCs and SIDS suggests that international providers are responding to these financing constraints. At the same time, the continued use of non-concessional finance, particularly outside LDCs and SIDS, indicates that financial instruments are not perfect substitutes and serve different financing needs. Non-concessional loans generally support investments with sufficient financial returns, while concessional finance supports social sector activities and public goods (International Monetary Fund 2014). However, it is important to consider that when adaptation is financed through non-concessional debt, high borrowing costs can increase the fiscal burden of adaptation investments and create challenges for debt sustainability in developing countries (de Soyres, Obeng and Tan 2026).

18 There are no existing overall estimates of the cost of capital for adaptation, but studies of renewable energy projects in Africa suggest that this cost can be up to three times higher in developing than in developed economies, albeit with substantial variations (Metayer, Postic and Ross-Oliver 2026).

Figure 2.5 International public adaptation-only finance by financial instrument and country group (in US$ billion, constant 2024 prices)



Note: World Bank income classifications are used in this figure. The United Nations list of LDCs for 2024 and the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States is used for LDCs and SIDS, respectively. Note that some LDCs are also SIDS. Financial flows include only those identifiable to specific individual countries in the respective lists. "All developing countries" includes all Annex I and non-Annex I Parties receiving financial flows. See annex 2.B for the full list of countries included in each category.

2.3.4 Developing countries' contribution to international public adaptation finance

The analysis in section 2.3.3 only includes contributions from developed countries, but there are also flows from developing-to-developing countries. An analysis of the data in the CRDF (OECD undated a) for these flows finds that in 2024, contributions from developing countries to developing countries reached US$9.7 billion – more than double the 2019 levels – primarily through their share in MDBs, but also through direct bilateral finance provided by non-Annex I Parties and their support for climate funds. When considering both developed and developing country contributions, the latter provide 25 per cent of the adaptation-only finance flows, shown in table 2.2. The finding indicates a significant contribution despite a lack of formal obligation under the UNFCCC historic international finance goals (UNFCCC 2009; UNFCCC 2022a). This suggests an increasingly diversified financing architecture for adaptation, aligned with NCQG encouragement to expand and diversify the contributor base (UNFCCC 2024a). However, this trend also raises questions about the evolving distribution of adaptation finance responsibilities. While some developing countries take on larger roles as adaptation finance providers, it is important to consider how these contributions interact with the UNFCCC principle of common but differentiated responsibilities that has historically placed primary financing obligations on developed countries (United Nations 1992).

Table 2.2 **International public adaptation-only finance, considering developed and developing countries' contributions (in US$ billion, constant 2024 prices)**

	Attributed to developed countries		Attributed to developing countries		Developed and developing countries' adaptation-only finance flows	
Year	2019	2024	2019	2024	2019	2024
Provider	n/a	n/a	n/a	n/a	n/a	n/a
Bilateral Annex I	0.01	0.01	n/a	n/a	0.01	0.01
Bilateral Annex II	9.99	11.02	n/a	n/a	9.99	11.02
Bilateral non-Annex I (south–south)	n/a	n/a	0.16	1.46	0.16	1.46
MDBs	11.96	14.08	3.47	7.69	15.43	21.77
Multilateral climate funds	1.31	3.11	0.18	0.50	1.49	3.61
Total US$ billion (2024 constant prices)	**23.28**	**28.23**	**3.81**	**9.65**	**27.09**	**37.88**

Source: Authors, based on the CRDF (OECD undated a)

2.3.5 Cross-cutting finance

In addition to international public finance flows for adaptation, OECD tracks international cross-cutting flows that support both adaptation and mitigation objectives simultaneously (see section 2.C). Given the increasing scale of cross-cutting flows since 2019 (see annex 2.3),[19] and calls for integrated approaches for adaptation and mitigation, the AGR 2026 has examined these flows to consider their contribution and relevance for adaptation.

Based on the OECD CRDF (OECD undated a), during 2024, US$11.8 billion of flows from developed to developing countries was tagged as cross-cutting climate finance, equivalent to about 42 per cent of adaptation finance during the same year. For bilateral flows, cross-cutting finance comprises flows assigned the same score for both the adaptation and mitigation Rio markers (i.e. 2:2 and 1:1). However, only about 15 per cent (US$1.8 billion) targeted adaptation as a 'principal' objective. The bulk of this finance targets adaptation marked as 'significant' (73 per cent, US$8.6 billion). The remaining 11 per cent (US$1.3 billion) is provided by MDBs, who do not tag their projects following the principal and significant markers, but instead use climate components.

The AGR has reviewed the data on these cross-cutting flows, examining the overall portfolio and assessing some of the larger reported projects. This includes the five largest cross-cutting projects by financial amount in 2024. All five projects were tagged as significantly contributing to adaptation. However, based on their project titles and descriptions, the relevance to adaptation is not immediately evident for most of these projects. This is consistent with previous findings that a substantial proportion of reported activities lacked a well-defined or specific climate rationale, suggesting potential overreporting (Weikmans *et al.* 2017; UNEP 2021; Toetzke, Stünzi and Egli 2022; Vincent, Butera and Savvidou 2023).

The analysis has also assessed the top-five cross-cutting projects tagged as principally targeting adaptation by financial amount in 2024. Unlike dedicated adaptation finance that has a higher proportion of loans than grants (see section 2.3.3), cross-cutting finance principally targeting adaptation has a higher share of grants (86 per cent) than loans (13 per cent), with the remaining 1 per cent on common equity.

2.3.6 Private sector flows including mobilized private

There is an increasing focus on the potential for private sector finance. The AGR 2025 explored this issue in detail (UNEP 2025) and the AGR 2026 has further investigated the two key sources of private sector finance.

Mobilized private finance

The most robust data relate to private flows mobilized by international public finance, which are tracked and reported by OECD (section 2.3.1). Positively, these flows have doubled from US$1.5 billion in 2019 to US$3 billion in 2024 (OECD 2026a), though there is variability between years due to the

19 AGR estimates cross-cutting climate-significant flows from OECD CRDF. This involves specific allocation rules. This includes approximately 100 per cent of finance of those bilateral transactions with two principal Rio markers, and about 40 per cent of finance of transactions with two significant Rio markers, as well as accounting for the attributable share to developed countries from the multilateral transactions.

influence of large projects. They are generated by using public finance strategically to increase private investment, for example through de-risking mechanisms and support to create the enabling conditions for private finance. OECD reports (OECD, 2026a) that this support includes direct investment in companies, guarantees and syndicated loans, and that flows are primarily provided by MDBs and primarily directed to middle-income countries.

The AGR 2026 set out to investigate these mobilized flows. This is challenging because OECD does not publish details on sources, instruments, country recipients, leverage ratios or adaptation activities, as the data are confidential. However, some funds and facilities that receive international public finance for mobilization do publish annual performance reports and portfolio disclosures (see annex 2.D). These data are limited and not representative of all mobilized flows, but they provide some insights. The AGR identified 13 vehicles, holding approximately US$3.7 billion in closed or anchored capital and involving 111 individual investments, loans, guarantees and country programmes. The vehicles do not publish data on individual investments, but do provide fund- or facility-level information.

These funds and facilities report on adaptation differently: some only report generically at an aggregate level; one has a certified process for selecting investments; and most sit between these two extremes. This raises questions about comparability with OECD Development Assistance Committee and MDB adaptation finance tracking guidance. Based on AGR analysis, if one assumes all these investments are adaptation flows, the total portfolio value is US$3.2 billion, but if a more stringent tracking approach is used, the flows might be only one-twentieth of this value, or under US$150 million.

Of the 111 entries: 15 have a strong climate rationale, with investments in index insurance, flood and cyclone forecasting, solar irrigation and water supply in water-scarce settings; 75 deliver resilience as a secondary benefit; 21 appear to have no direct adaptation focus, and indeed a number of these seem to be principally mitigation, though this might be due to undisclosed aspects (see annex 2.D). This is similar to the findings of cross-cutting analysis (section 2.3.5) and raises some questions around the attribution and adaptation relevance of this mobilized private finance, noting that these flows are included in the NCQG. Given the strong focus on scaling up blended adaptation finance, it would be beneficial to improve approaches for tracking, attribution and transparency.

Analysis of the activities mobilized also indicates that the majority of these flows are supporting the private sector's own adaptation actions and more commercial opportunities (i.e. on the right of figure 2.1), as would be expected. This is not in itself a problem: it is critical for companies to address their own risks and respond to new adaptation markets. However, these are not a substitute for public-orientated actions and public adaptation finance: a large-scale shift of international public adaptation finance towards blended finance would not be a substitute for more public adaptation, and would have consequences for the most vulnerable.

Other private finance

Complementing these private mobilized flows are additional private sector flows. These flows could make an important contribution to meeting adaptation finance needs. It is, however, difficult to define and track these flows. The Climate Policy Initiative has advanced the tracking of such private adaptation finance flows (Connolly *et al.* 2024). This reports that in 2024 these were approximately US$3 billion globally (excluding Western Europe and the United States of America) (Abraham *et al.* 2026), though they stress that this is almost certainly a small fraction of what is flowing. This analysis also reports that most of these tracked private flows are in water and wastewater, and a large proportion are associated with desalination, though it is not clear how much of these flows have a strong climate rationale. Filatova *et al.* (2025) also examined adaptation expenditures from businesses in five coastal regions, including in Jakarta and Shanghai, and identified significant private flows, particularly in agriculture.

There are a number of reasons why these private flows will increase. First, the private sector in developing countries will invest in its own adaptation needs to protect assets, operations and supply chains, if it makes sense for them to do so. These investments can be encouraged or mandated by government (e.g. through incentives, disclosures, regulation, standards, market instruments, etc.). The scale-up of such private adaptation is critical, as it builds the resilience of developing countries, and can reduce additional pressures on the public finances. However, as mentioned, these private actions are primarily on the right of figure 2.1 and thus most will not substitute for the more public actions on the left, which are the focus of NDCs and NAPs. For example, the climate-proofing of private assets against flooding is not a substitute for major public flood infrastructure. However, more positively, in some sectors, notably agriculture, private investment can complement and even support public activities (UNEP 2025).

Second, the private sector will also invest where there are new markets for adaptation goods and services. These can include the role of the private financial sector in financing public adaptation (e.g. directly financing government debt) as well as private adaptation. This also includes the role of the private sector in delivering adaptation goods and services to the public sector (through public procurement, for example) – though note in this case that adaptation is still funded by government. It also includes new adaptation goods and services for households and firms. This might involve new demand for climate resilient seeds, air conditioning for private factories, etc. There are some indicative estimates of household adaptation flows, with detailed studies in specific countries that indicate high levels already (e.g. Eskander *et al.* 2022). Some of these adaptation goods and services could be financially net positive for

households, such as where they lead to cost savings or increase incomes (e.g. cost savings from water efficiency, or more resilient seeds that reduce future risks and also improve current yields). However, some will be defensive investments by households to cope with rising climate risks (e.g. additional costs to raise the height of houses to adapt to increasing floods), and these involve additional costs for households (compared to the counterfactual without climate change). The latter is a particular concern, as these costs are funded by developing country households, and can involve important gender and distributional inequalities, as women and the poorest typically spend a higher share of their income on such actions.

2.3.7 Domestic adaptation finance flows

The level of domestic public finance is not well-understood, but scattered evidence demonstrates that it is a potentially substantial and often vitally important source of finance for adaptation (UNFCCC undated b). For example, Climate Policy Initiative estimates that green bonds contributed US$6.6 billion to adaptation in 2024, and that development finance institution flows were US$11.4 billion, 87 per cent of which was from the China Development Bank (Abraham *et al.* 2026).

Domestic budgets could be a large source of funds for adaptation in developing countries (Allan *et al. 2019)*, especially middle-income countries. For example, public adaptation finance in Brazil totalled US$993 million from 2016 to 2020, of which 81 per cent came from domestic sources (Briant and Igari 2026).

As highlighted in section 2.2.1, it is generally understood that unconditional needs are met through domestic resources. Yet, the countries that express conditionality for their adaptation finance needs only aim to finance 18 per cent unconditionally (noting earlier caveats). While this assumes that this goal is deliverable in practice, a study on the Green Climate Fund indicates that many developing countries struggle to co-finance international adaptation projects, even after project approval (Independent Evaluation Unit 2023).

Domestic public finance offers a number of comparative advantages that makes it particularly well-suited for financing adaptation:

- Mainstreaming of adaptation in development activities, such as through climate-proofing routine investments, including in infrastructure (Allan *et al.* 2019), with governments also tending to be strongly involved in sectors that are particularly relevant for adaptation, such as agriculture, infrastructure and social services (OECD 2024)
- Addressing domestic adaptation priorities (World Bank 2021)
- Offering relatively high predictability and suitability for financing long-term and recurring adaptation investments (Allan *et al.* 2019)
- Stimulating private sector investments in adaptation (Cortés Arbués *et al.* 2025)

Over longer time periods, tracking domestic adaptation-related expenditure can help identify whether countries are shifting public financial flows towards climate-resilient development pathways, thereby implementing article 2.1(c) of the Paris Agreement (Zamarioli *et al.* 2021).

There has been continued development in the uptake and application of country-level approaches, assessments and reporting on climate finance (Ockenden *et al.* 2026). However, quantitative evidence continues to remain scarce, and aggregation of data to the global level is impossible. This section therefore *discusses* – rather than *assesses* – three complementary, partial and potentially overlapping sources of data.

Domestic budget expenditures. The most common method of assessing domestic expenditure on adaptation is climate change budget tagging and tracking. Tracking is the process of using a predefined tag to quantify and monitor climate-relevant activities and expenditure (Choi *et al.* 2023). Such domestic expenditure can be substantial. A review in 2022 identified 14 countries that had undertaken expenditure studies (UNFCCC Adaptation Committee 2022). Comparing the levels to domestic public budgets and GDP, it found a wide range – from very low levels to over 3 per cent of GDP. A United Nations Development Programme (UNDP) study estimated that African countries on average might spend around 0.95 per cent of their government budget on adaptation in 2019 (UNDP and Kenya, Ministry of Environment and Forestry 2019). The 2026 Biennial Assessment analysed eight countries that are applying tagging and tracking of financing adaptation (UNFCCC undated b). This indicates that the LDCs of Benin, Senegal and Togo are budgeting US$678 million, US$26.4 million and US$108.1 million for adaptation, respectively. When comparing these with the inflation-adjusted finance needs for adaptation as indicated in the NDCs, US$26.4 million would represent less than 5 per cent of the annual needs of Senegal, whereas US$678 million is more than Benin's total annual needs of US$491.5 million. While these numbers are insightful, they also point at weaknesses of tagging and tracking. First, these numbers indicate budgets related to adaptation (e.g. on water and agriculture): it is not necessarily explicitly spent on adaptation or to address the needs identified in NDCs. Second, tagging methodologies vary and therefore provide different outcomes. Key design considerations for national tagging and tracking include defining what counts as climate-relevant, deciding the coverage of the system, and choosing how to estimate relevance or weights (UNFCCC undated b). Finally, the inconsistency in methods hinders meaningful international country comparisons and aggregation of information (UNFCCC 2026c).

National climate funds. Approximately 100 countries have created national climate funds (Bhandary and Pitts 2024) in order to collect, combine/blend, coordinate and account for climate finance (Yasmin 2018; Bhandary 2022). Such funds are long-standing macro-finance tools, with which developing countries can take greater responsibility, commitment and ownership in addressing climate change (Sheriffdeen *et al.* 2023). While a few funds are created to finance adaptation, a larger number have mandates to finance activities in priority sectors for adaptation, such as forestry, conservation or agriculture (Bhandary and Pitts 2024).

Domestic finance through national climate funds can be significant, but their institutional set-ups vary, meaning transparency is low and finance flows are incomparable. For example, Bangladesh has supported its Climate Change Trust Fund with at least US$400 million from the revenue budget between 2010 and 2017/2018. In this period, 512 projects by 18 different ministries were approved, and at least 45 per cent of the funding (over US$180 million) financed adaptation (Yasmin 2018). This significant amount is, however, modest when compared to the estimated annual needs of US$12–14 billion for adaptation, as indicated in the country's third NDC. In contrast, the Indonesia Climate Change Trust Fund has been successful in mobilizing bilateral finance from, for example, the United Kingdom, the United States of America and Denmark. However, it has mobilized limited domestic or private finance, likely due to unrevised legal and operational handicaps (Sheriffdeen *et al.* 2023).

Sovereign green bonds (SGBs) enable governments to raise capital for sustainable development objectives. Their rapid adoption among developing countries since the first issuance in 2016 reflects a growing interest in debt-based instruments that can align fiscal strategies with national climate goals. So far, however, evidence of using SGBs to stimulate domestic expenditure on adaptation is scarce. A recent study on four emerging economies demonstrates that Indonesia and Egypt used around 50 per cent of their SGB proceeds for adaptation to rectify a market imbalance that prioritizes mitigation over adaptation (Owusu-Mante, Chi and Gopalakrishnan 2025). However, Chile (96 per cent) and Nigeria (> 77 per cent) direct most of their SGB proceeds towards mitigation (ibid). While SGB are an interesting instrument to study domestic climate expenditure, they are skewed towards mitigation, predominantly used in developed countries and non-concessional in nature.

This information demonstrates that there are opportunities, from multiple strategies, for countries to make domestic expenditure on adaptation more transparent or to stimulate it.

What is not clear yet is the extent to which domestic expenditure on adaptation also increases financing for adaptation. Some studies indicate that climate budget tagging could lead to larger inflows of international climate finance (Pindiriri and Kwaramba 2024), while others highlight that it focuses explicitly on mainstreaming adaptation into the government budget and does not necessarily mobilize new finance (Allan *et al.* 2019). In addition, as Yasmin (2018) shows, dedicated climate funds are also used to implement routine development activities under a label of climate risk reduction. This points to the importance of critically assessing whether such adaptation-related financial flows do indeed increase resilience.

Finally, ethical considerations should also be kept in mind when analysing the extent to which domestic expenditure *can* or *should* help close countries' adaptation finance gaps. This is especially the case in relation to particularly vulnerable countries that have contributed little to global historical greenhouse gas emissions, such as LDCs and SIDS (Grasso 2010)

2.3.8 The Belém outcome on tripling adaptation finance

As part of the Global Mutirão decision at COP30, Parties to the Paris Agreement called for efforts to at least triple adaptation finance by 2035. This has been highlighted as a major outcome regarding climate finance. The goal reflects developing countries' continuous push for increasing adaptation finance, including an earlier call led by LDCs for "a tripling of grant-based adaptation finance by 2030 to at least $120 billion" (Gabbatiss 2025, pp. 60-61). The AGR 2025 indicated that even this call would not lead to closing the adaptation finance gap (UNEP 2025). The outcome in Belém is less ambitious than this, with four factors causing uncertainty around the amount of additional adaptation finance that the decision on tripling will ultimately provide.

First, the tripling is an unspecific decision. It 'calls for efforts' – language that is much weaker than earlier UNFCCC decisions on finance goals, such as the commitment to a goal of mobilizing jointly US$100 billion/year by 2020 in the Copenhagen Accord (UNFCCC 2009) or the decision made in the Paris Agreement that Parties shall set a NCQG (UNFCCC 2015).

Second, it is not clear what should be tripled. The decision is taken in the context of paragraph 16 of the NCQG on pursuing efforts to at least triple annual outflows from the financial mechanism from 2022 levels by 2030, as well as the Glasgow Climate Pact's urge to developed countries to at least double their collective provision of adaptation finance from 2019 levels by 2025. In contrast to the decision in Glasgow, the call for efforts agreed in Belém does not include a baseline. While the interpretation of the decision should be advanced in the negotiations, the AGR considers two possible options:

1. **Triple the double scenario:** Doubling 2019 flows by 2025, and tripling these by 2035 is the "most logical interpretation" (Larsen *et al.* 2025). Assuming that the goal of 'doubling' is reached (see section 2.3),

this would result in approximately US$120 billion of adaptation finance per year in 2035.[20] It also matters what pathway is used to triple the flows. By way of illustration, an exponential growth pathway would require an annual growth rate of 11.6 per cent to triple flows from US$40 billion in 2025 to US$120 billion by 2035. This rate is slightly lower than the rate of 12.2 per cent/year required for doubling adaptation finance between 2019 and 2025. Linear growth would require adaptation finance to increase by US$8 billion every year. A linear growth pathway would result in a cumulative total of US$880 billion in international adaptation finance in the period 2025–2035 – significantly more than the US$809 billion under the exponential growth pathway.

2. **Tripling current flows**: This is irrespective of whether the Glasgow Climate Pact to double adaptation finance is achieved. The 2025 flows (the year in which the COP in Belém took place) will only be available in 2027, and therefore we use 2024 flows as an illustration. Tripling US$28.2 billion of adaptation finance attributed to developed countries would result in US$84.7 billion in 2035. Tripling all adaptation finance (thus including the US$9.6 billion attributed to developing countries; see table 2.2) would result in US$113.6 billion.

Under the assumptions that both the tripling goal and the NCQG goal of providing and mobilizing US$300 billion are met in 2035, adaptation finance would amount to 28.2 per cent to 40 per cent of total climate finance, as compared to the average of 28.9 per cent in the period 2019–2024 (see figure 2.3). Whether or not the share of adaptation finance will increase thus depends on what the baseline is for tripling.

Third, in contrast to the decision of the Glasgow Climate Pact that urges *developed countries* to at least double adaptation finance, the tripling goal is set in the context of the NCQG that was agreed at COP29 in Baku. Notwithstanding the logic of aligning the tripling goal with the NCQG – including its target year 2035 – this causes additional uncertainty about the amount of new and additional adaptation finance provided and mobilized by developed countries. The NCQG does not mention the concept of 'new and additional' finance (Pauw 2025), and climate finance channelled by MDBs will contribute to the US$300 billion target in its entirety, thus including the share attributable to developing countries (David 2025). This is especially important because of the likely future contribution of MDBs to these flows, following the joint MDB pledge to increase adaptation finance to US$49 billion/year by 2030.[21]

Adaptation finance flows that can be attributed to developing countries based on their shares in MDBs are significant (US$7.7 billion in 2024), and developing countries contribute US$9.6 billion (or 25.5 per cent) in international adaptation finance in total (see section 2.3). Counting the share of developing countries towards the tripling goal would have significant implications. When assuming that the share of developing countries was to remain stable at 25.5 per cent, developed countries would have to provide the following by 2035:[22]

- US$89.4 billion under the 'tripling of the doubling' scenario (mobilization and provision)
- US$84.7 billion under a 'tripling 2024' scenario where the overall adaptation finance flow of US$37.8 billion is the starting point and where the 25.5 per cent share continues
- US$63.1 billion under the 'tripling 2024' scenario where the US$28.2 attributed to developed countries in 2024 (see table 2.2) is the starting point and where the 25.5 per cent share of developing countries is introduced

These differences indicate the importance of advancing the understanding of the tripling decision at United Nations climate negotiations.

Fourth, the decision to triple adaptation financing does not specify whether it will be corrected for inflation. Previous goals did not correct for inflation, which significantly limits real increases. In line with the analysis across this chapter, a 3 per cent fixed annual level of inflation is applied. This would imply that tripling adaptation finance by 2035 would equate to approximately US$60.6 billion to US$ 81.3 billion for the tripling 2024 scenarios and to US$88.5 billion for tripling of the doubling scenario in constant 2025 prices (see table 2.3).

20 The Glasgow Climate Pact only refers to the provision of adaptation finance, and not mobilized private financing. However, the latter is included in these scenarios too, because it is the developed countries' understanding that doubling is from US$20 billion in 2019 to US$40 billion in 2025 (Canada, Environment and Climate Change Canada 2022).

21 See: https://www.aiib.org/en/news-events/news/2024/pdf/Final-Joint-MDB-Statement-for-COP29-FOR-PUBLICATION.pdf.

22 Note that mobilized private finance is only included in the 'tripling of the doubling' scenario, because of data limitations concerning mobilized private finance through finance attributed to developing countries.

Table 2.3 **Scenarios for tripling**

Scenario	Amount to be tripled (US$ billion)	Amount in 2035 (US$ billion)	Amount in 2035, in 2025 constant prices (US$ billion)
Tripling 2024 scenario	31.7 (2024)	84.7–113.6	60.6–81.3
Tripling of the doubling scenario	40 (2025)	120	88.5

When taking into account both the third and fourth points above, the amount of adaptation finance provided and mobilized by developed countries could be as low as US$45.1 billion for the tripling 2024 scenario and US$65.9 billion for the tripling of the doubling scenario (after adjusting for inflation). These numbers are only indicative, given the assumptions on the shares provided by developing countries and uncertainty concerning the real inflation rates, but they temper expectations regarding the extent to which adaptation finance provided and mobilized by developed countries will close the adaptation finance gap.

2.4 The adaptation finance gap

2.4.1 Assessing adaptation needs and flows

The information from the preceeding sections is brought together in this section to explore the potential adaptation finance gap.

Adaptation finance needs

Based on the average of the two lines of evidence (section 2.2), NDC/NAP submissions and the modelling analysis, the AGR2026 estimates a plausible central value for adaptation finance needs of US$305 billion/year by 2035 for developing countries (constant 2024 prices), though there is a large range around these values. These needs are primarily for the more public-focused and mixed-adaptation interventions and exclude additional private sector costs (refer back to figure 2.1).

In order to compare these needs to the call for tripling for the year 2035, these estimates have to be adjusted for inflation. Future inflation levels are extremely hard to predict, so the AGR has used a 3 per cent fixed annual level of inflation. This is close to the 10-year historical average inflation rate and previous near-term projections (e.g. World Bank 2025) but lower than current (2026) levels. This would increase these adaptation finance needs to approximately US$420 billion/year by 2035.

International public adaptation finance flows

The OECD US$100 billion analysis (section 2.3) reports flows at $31.7 billion in 2024 (constant 2024 prices), which is equivalent to 10.4 per cent of the finance needs of $305 billion. If additional private mobilized finance is included, this rises to $34.7 billion and 11.4 per cent. If the Glasgow Climate Pact is achieved, these flows will increase to approximately US$40 billion in 2025.

If the tripling is achieved, this will increase these flows to between US$85–120 billion/year by 2035 (section 2.3.8). However, to compare to the AGR needs on a like-for-like basis, the tripling has to be compared to the AGR 2035 estimate with inflation (US$420 billion/year). Therefore, even if the tripling is achieved, it would only meet 20–29 per cent of estimated adaptation finance needs for developing countries.

It is also stressed that the tripling, if delivered, will only be fully delivered in 2035. This means that there will be a shortfall in the flows before this time, which will mean a large cumulative shortfall over the period 2026–2034.

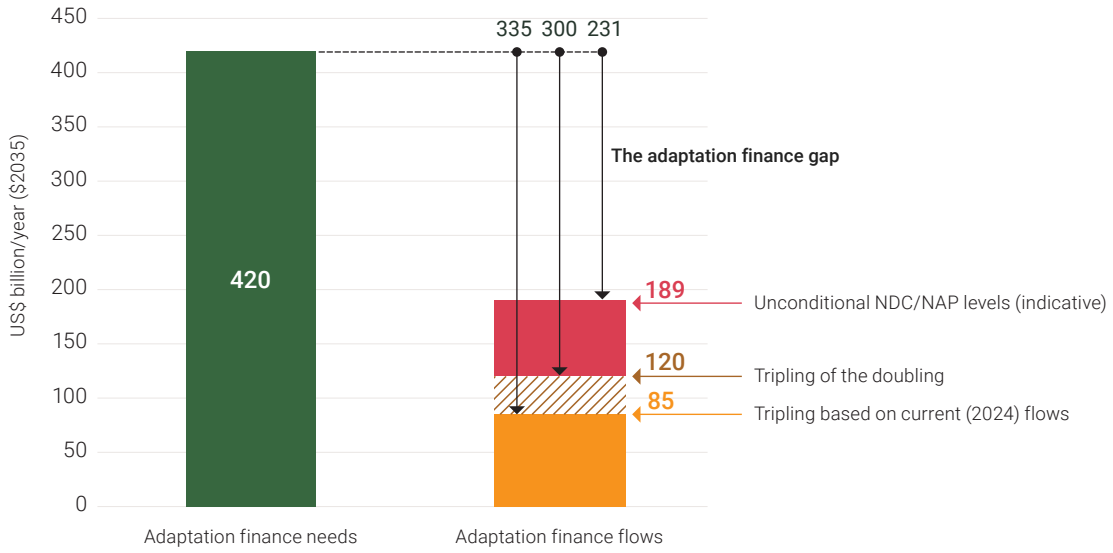
Domestic public adaptation flows

As highlighted in section 2.2, while only some countries report on conditionality, submissions indicate the unconditional share at 18 per cent. While there are no formal agreements on these terms, these are generally understood as costs expected to be met through domestic resources. As highlighted above, these unconditional shares do not necessarily mean that these actions will be financed domestically, as this will depend on fiscal space, debt sustainability and competing budget priorities. Nonetheless, these unconditional submissions provide some indication of plausible domestic finance flows. Noting the significant caveats, the AGR has used these to tentatively explore potential domestic adaptation finance flows, assuming similar levels for all developing country needs. However, it should be cautioned that this is indicative only – a more comprehensive analysis of domestic finance flows will be included in the AGR 2027.

Noting the indicative nature of the analysis, these unconditional adaptation flows would equate to US$50 billion/year (constant 2024 prices) and US$69 billion/year with inflation by 2035 for all developing countries.

If these unconditional (domestic public) flows are added to international public flows, as shown in figure 2.7, and assuming the tripling is achieved, this would be equivalent to a total of US$154–189 billion/year in 2035. This would mean that even if these flows were delivered, it would cover only 37–45 per cent of needs of $420 billion/year, and thus more than half of adaptation finance needs would still remain unmet. This still leaves a very large adaptation finance gap (US$231–266 billion).

Figure 2.7 Adaptation finance needs (with inflation in 2035) versus adaptation finance flows (2035) with tripling and potential unconditional flows, and the adaptation finance gap for developing countries in 2035

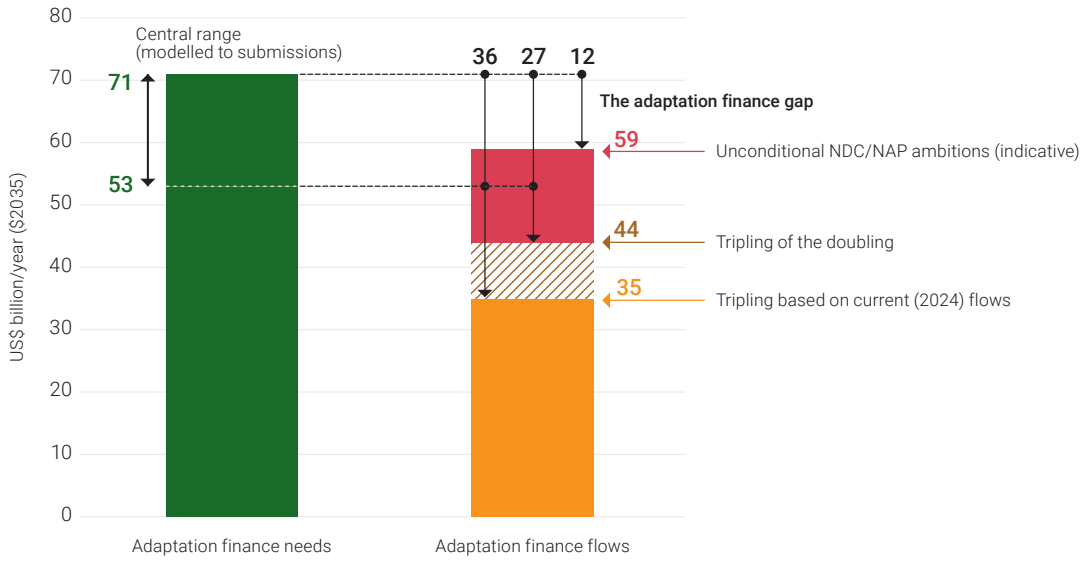


It is also useful to look at what this gap looks like for LDCs and SIDS. Adaptation finance needs for these countries are estimated at US$38–51 billion/year (reflecting the range of submissions and the modelling analysis), which would be equivalent to US$53–71 billion/year with inflation in 2035 (see figure 2.8).

This can be compared to adaptation finance flows. While there are not specific finance goals for these countries, a doubling would equate to US$1.7 billion (SIDS) and US$13 billion (LDCs) (noting there is overlap, as a few SIDS are LDCs), and a subsequent tripling to US$5.1 billion (SIDS) and US$39 billion (LDCs). A tripling of current flows would be lower at US$4.2 billion (SIDS) and US$30.6 billion (LDCs).

This indicates a much more positive story, because if international public adaptation finance goals are delivered, and these increase proportionately to LDCs and SIDS, the adaptation finance gap for these countries would be much lower, and a tripling could meet 49–84 per cent of estimated finance needs. A further proportion of the remaining gap could be filled by unconditional commitments. As shown in section 2.2, these amount to US$11 billion, which with inflation would be equivalent to US$15 billion in 2035.

Figure 2.8 Adaptation finance needs (with inflation in 2035) versus adaptation finance flows (2035), with tripling and potential unconditional flows, and the adaptation finance gap for LDCs and SIDS only in 2035



However, it is not just the volume of finance but also the type of finance (and instruments) that will be critical for these countries. Currently, the flows to these vulnerable countries are predominantly concessional (see section 2.3). Given their limited fiscal space, this would also need to be the case going forward. However, the NCQG and recent finance flow trends put a greater focus on private finance, including mobilized finance, which will be very different in nature (see section 2.3.6). It is also highlighted that recent years have actually seen a reduction in flows to LDCs, and if these trends continued in the future, or flows did not rise in line with the tripling, then clearly the gap for these countries would grow.

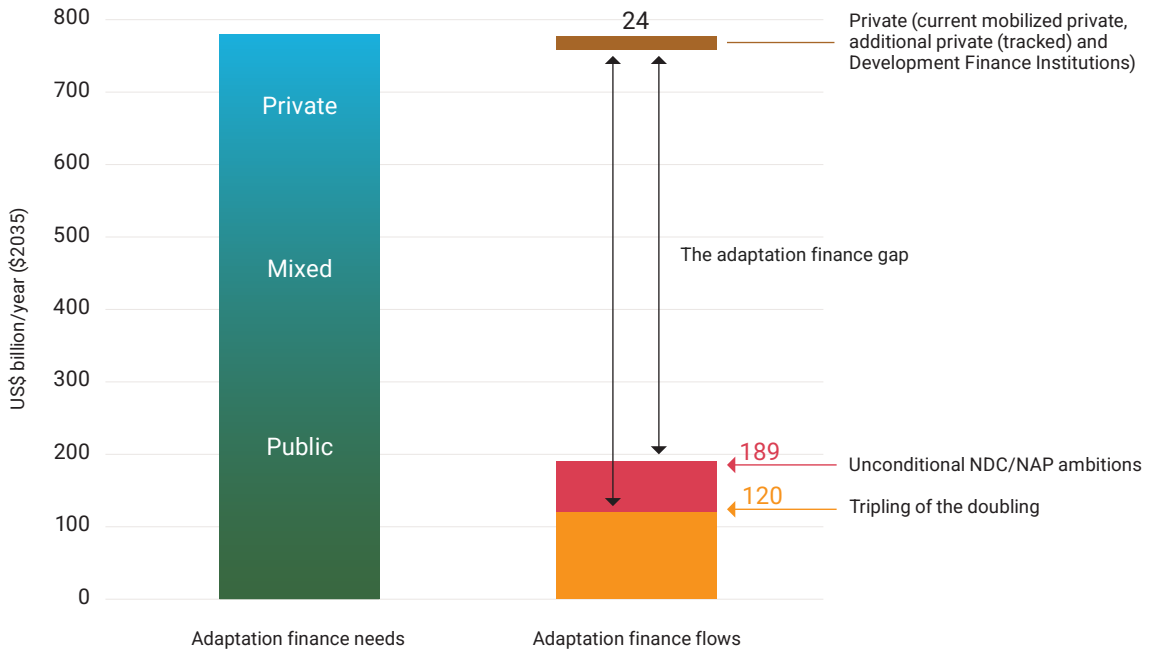
Private finance flows

Private finance mobilized from public finance is currently estimated at $3 billion/year (section 2.3.1). The additional tracked private finance flows are estimated at a further US$3 billion (section 2.3.6), though this is considered to be a significant underestimate. There are also tracked development finance institution flows of US$11.4 billion (section 2.8). These overall tracked private flows are modest, as shown in figure 2.9, though they would be expected to increase significantly by 2035.

However, while this scale-up is critical, and will address broader economic risks to developing countries, many of these flows will not contribute to public adaptation priorities, as was shown in the detailed analysis in AGR2025 (Watkiss and England 2025; UNEP 2025). This estimated private sector adaptation might only reduce the funding gap for more public-oriented adaptation needs by 15–20 per cent in developing countries. Instead, these flows will primarily contribute to meeting the private sector's own adaptation finance needs, and delivering adaptation goods and services to households and firms. As highlighted in section 2.2, the private sector adaptation needs in developing countries are estimated very indicatively at US$260 billion/year (2024 prices), which is equivalent to US$360 billion/year in 2035 with inflation. These needs can be added to the more public adaptation finance needs of US$420 billion/year, as shown on the left of figure 2.9.

This means that private adaptation flows will need to scale up massively to deliver private sector needs (a tenfold increase) and highlights the need for more consideration of how to deliver more impactful private sector investment. However, as noted, these private flows should not be seen as a direct substitute for public interventions and the associated public finance to implement them.

Figure 2.9 Adaptation finance needs and flows (with inflation), and the potential adaptation finance gap for developing countries in 2035, including private finance needs and flows (with inflation)



Note: The figure shows the estimated adaptation needs (left) with inflation by 2035, including needs that are more public (green) at the bottom and more private (blue) at the top. The figure also shows finance flows on the right, including future international public goals and potential unconditional flows (bottom) and current tracked private flows (top) (including inflation).

Finally, it is stressed that the scaling up of all adaptation finance is essential to reduce avoidable residual risks. Therefore, insufficient, delayed or inaccessible adaptation finance will increase the likelihood of avoidable loss and damage. However, even effective adaptation cannot prevent all climate impacts. Finance for addressing loss and damage is needed alongside adaptation finance and this is discussed in chapter 4.

2.4.2 Scaling up finance and the economic benefits of meeting finance needs

Given the size of the gaps identified, a key question is how to scale up adaptation finance. This issue was the subject of the COP30 *Report on the Baku to Belém Roadmap To 1.3T* (UNFCCC 2025b).

Delivering such a scale-up, towards meeting the adaptation finance needs in this report, would lead to high economic (societal) benefits, from reducing climate impacts.[23] In practice, estimating these economic benefits of adaptation is challenging (Fankhauser 2017; UNEP 2023), and the results are extremely site and context specific. Nonetheless, there is evidence emerging on the economic returns of adaptation (Markanday *et al.* 2019; Watkiss, Cimato and Hunt 2021; World Bank 2024; Brandon *et al.* 2025; Krishnan *et al.* 2025; Watkiss *et al* 2025; Rising *et al.* 2026;). This research finds that, in general, many adaptation actions (though importantly not all) have net positive economic returns, with economic benefit-to-cost ratios above 1. Further work on these benefits will be a focus of AGR 2027.

However, these *economic* returns are not the same as the *financial* returns that would accrue to private actors and the return on investment. An initial review finds that the financial returns of many adaptation investments are lower than the economic returns, often significantly so (Watkiss *et al* 2025). In many cases there are no or low financial returns due to a lack of cash flow and revenue streams. This reflects the nature of many traditional adaptation investments, which are either public goods, have strong distributional benefits, involve non-market sectors or have non-market benefits (reflecting the adaptation activities in the left and centre of figure 2.1).

At the same time, there will be adaptation actions that do have positive financial returns, notably those actions in the right of figure 2.1 (and if barriers are addressed, including through blended finance, those actions in the centre of the figure). These might include adaptation solutions such as climate-resilient seeds and high-efficiency irrigation systems, or cooling technologies and climate-resilient building materials. As highlighted in the AGR 2025 (UNEP, 2025), however, these will be concentrated in certain sectors and geographies (see also section 2.3.6). Nor will the private sector prioritize the poorest or most vulnerable. Most of these private actions are therefore not direct substitutes for public adaptation.

Finally, and positively, there is emerging evidence of macroeconomic and fiscal benefits of adaptation, including its positive benefits for the public finances (see Bachner, Bednar-Friedl and Knittel 2019; Lehner *et al.* 2026). These studies find that public adaptation investment can have net benefits for the public finances, because even though it requires public expenditures (additional costs and spending), it reduces additional expenditure associated with disasters as well as the negative impacts of climate change on revenues.

2.5 Gender equality, social inclusion and local-level adaptation

To avoid reinforcing existing inequalities, adaptation finance needs to be equitable, inclusive and responsive to differentiated vulnerabilities on the basis of intersecting factors including, inter alia, gender, age, indigeneity and disability.

2.5.1 Gender equality and social inclusion

To investigate this, the AGR 2026 analysed costed adaptation actions in submitted NDCs and NAPs from non-Annex I countries to investigate GESI aspects (see annex 2.5). This uses a GESI spectrum to determine the extent of GESI integration (distinguished into GE and SI) based on four categories: -blind, -, specific, integrative and responsive.[24] The results are shown in figure 2.10. The full country analysis is presented in annex 2.E.

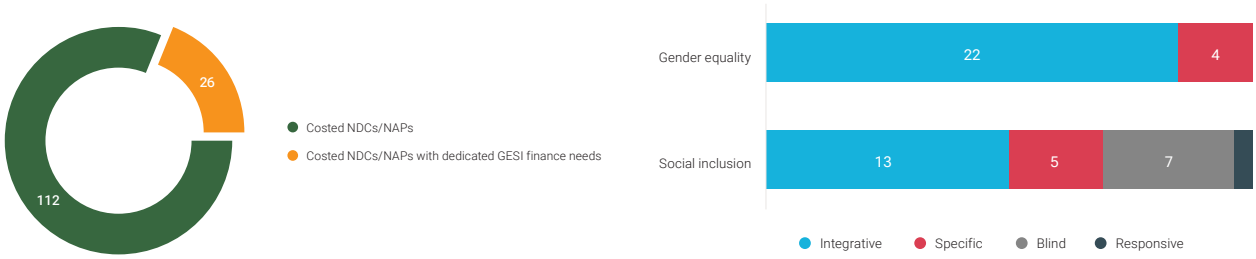
The analysis finds that 21 per cent (26 of the 112) of the costed NDCs and NAPs include dedicated (separate) allocations for GESI interventions. The proportion of total adaptation finance needs attributed to GESI activities ranged from 0.02 per cent (Bhutan NAP) to 20.1 per cent (Mauritania NDC 3.0), with an average of 3.8 per cent. As in previous editions of the AGR, GESI consideration in NDCs and NAPs continues to be dominated by gender. Social inclusion is addressed less frequently than gender, but the coverage has increased in NDCs and NAPs compared to the 2023 analysis (UNEP 2023), with consideration for disability, age (elderly, children and youth), Indigeneity, sexual orientation and migration status. A number of documents include substantive GESI commitments without attaching cost figures and therefore were not captured in this analysis. While these trends are positive, it cannot be determined from document analysis alone whether the

23 The term 'economic' in this chapter aligns to the economics literature and the concepts of welfare economics. This is concerned with social or public value and not just market efficiency: it includes all relevant costs and benefits that affect well-being, and thus includes environmental, cultural, health, social and justice effects. This is different to chapter 4, which, in line with the loss and damage literature, uses the terms 'economic' and 'non-economic' to differentiate market and non-market.

24 GESI-blind interventions fail to recognize current inequalities and risk reinforcing existing disparities. GESI-specific interventions target marginalized groups to address their specific needs. GESI-integrative interventions ensure that programming provides opportunities for inclusion based on gender and social identity. GESI-responsive interventions make more explicit attempts to address the root causes or structural barriers of differentiation, thereby offering potential to address gender and social inequality.

increase in GESI language in recent submissions reflects genuine shifts in approach or more superficial engagement with GESI terminology. Additionally, some NDCs and NAPs may have mainstreamed GESI considerations so comprehensively across sectoral priorities that no separate budget line appears, and these are similarly excluded. A further consideration is that a small number of countries that included costed GESI activities in previous submissions do not do so in their most recent NDC or NAP.

Figure 2.10 GESI adaptation finance needs in costed NDCs and NAPs



Note: Among the NDCs and NAPs reviewed, none came out to be GE-blind nor GE-responsive. Some NDCs and NAPs included GESI-specific activities targeting marginalized groups and evidence for effort to include marginalized groups in other activities (GESI-integrative). In these cases, the documents were classified as integrative.

2.5.2 Adaptation finance to the local level

There is growing recognition that adaptation should be driven from the local level, which requires that adaptation finance reaches local actors. The LDC Group on Climate Change aims to channel 70 per cent of climate finance to the local level by 2030 and is driving the momentum behind a shift towards more locally led adaptation (Least Developed Countries Groups 2019).

The AGR 2023 indicated that approximately 17 per cent (US$16.5 billion) of total commitments between 2017 and 2021 were dedicated to projects with a specific focus on local communities (UNEP 2023). However, a much smaller portion of this will have been explicitly locally led.

This is confirmed in a recent analysis of 2016–2023 international public finance flows in the OECD Development Assistance database, which finds that this level has grown, and that climate finance including some reference to local implementation has risen to around 29 per cent (Treichel *et al.* 2025). However, this is not the same as being locally led. The same analysis found that only 0.17 per cent of this climate finance explicitly refers to locally led or community-led action, and even in the most recent year of the data set, this figure remains below half a percentage point (Treichel *et al.* 2025).

Further, 40 per cent of all locally led climate finance by value included no gender focus, despite principle 2 of the locally led adaptation framework explicitly requiring attention to structural inequalities faced by vulnerable groups. Only 0.7 per cent of all reported climate finance made mention of the keyword 'Indigenous' (Treichel *et al.* 2025). As with GESI, despite the increase in use of locally led terminology, it is difficult to determine whether this reflects genuine changes in practice or merely changes in language.

Therefore, despite growing political momentum for locally led adaptation, with over 100 governments and institutions having endorsed the locally led adaptation principles since 2021, the gap between commitments and finance flows is high.

3





Chapter 3

From adaptation priorities to implementation: How institutions shape the journey

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Women at a market in the Gambia.

Photo: © Duncan Moore / UNEP

Key messages

- **Supportive institutional environments are a prerequisite for accelerating implementation.** While finance is critical to closing the gap between setting adaptation priorities and their implementation (see chapter 2), finance alone is insufficient. Progress also depends on a range of institutional factors that create the conditions for implementation.

- **This chapter identifies eight key institutional factors that shape implementation.** These are: (i) legal and policy frameworks; (ii) mandates, roles and responsibilities; (iii) mechanisms for vertical and horizontal coordination; (iv) stakeholder engagement and participation; (v) monitoring, evaluation and accountability; (vi) knowledge exchange and social learning; (vii) mobilization, management and allocation of finance, and (viii) legacies and associated path dependencies. These factors do not operate in isolation, but interact in ways that can reinforce or weaken their individual effects.

- **The institutional environment for implementing adaptation can be strengthened through deliberate measures that address these factors.** Measures such as adopting climate change framework laws, creating dedicated policy learning platforms and establishing independent bodies/offices to support adaptation action can be utilized to strengthen institutional factors. The effectiveness of such measures, however, depends on key operational considerations – such as good design tailored to the given context and sustained financing and high-level support – and support from other elements of the institutional environment.

- **The institutional environment for adaptation implementation rarely emerges from a blank slate.** Countries often build on existing institutional assets – including legal and policy frameworks, government financial systems, long-standing initiatives and established mechanisms for coordination, and stakeholder engagement and knowledge exchange – to provide strong starting points and delivery pathways for implementation. Identifying and leveraging these assets is an important part of moving from planning to implementation.

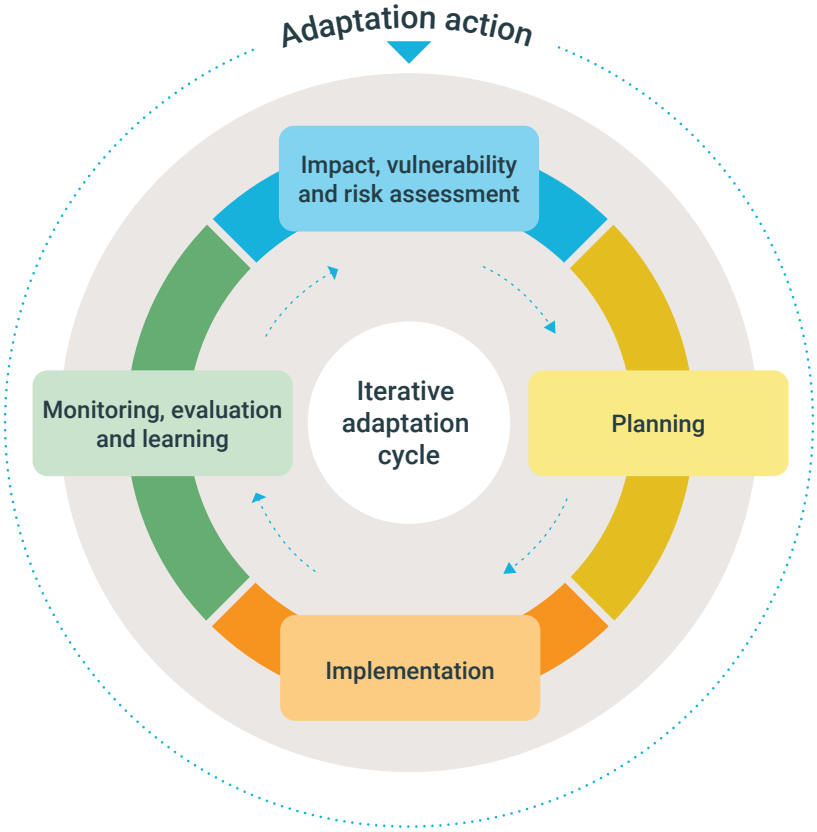
- **Strengthening the institutional environment is part of implementation, not just a prerequisite for it.** As adaptation becomes increasingly integrated into government systems, institutional arrangements must be developed and refined alongside the implementation of adaptation measures.

- **The relationship between adaptation policies and implementation is not always strictly sequential.** Because climate legislation and adaptation plans and strategies are relatively new in many countries, many adaptation measures currently under implementation emerged prior to these instruments. Over time, however, these instruments provide the necessary anchors to sustain, finance and scale action, while (conversely) experience from the implementation of adaptation measures is continuously informing and improving future planning.

3.1 Introduction and context

The global adaptation landscape is changing: more countries have plans and policies in place, more resources (albeit still insufficient) have been made available for adaptation, and attention is increasingly turning to implementation. Understanding progress across this landscape requires a broad view of adaptation action, understood here as the processes and measures that advance adaptation – from assessing risks and setting priorities to implementing measures and monitoring, evaluating and learning (MEL), as reflected in the iterative adaptation cycle of the United Nations Framework Convention on Climate Change (UNFCCC) (figure 3.1). Adaptation action therefore encompasses all dimensions of the iterative adaptation cycle, rather than implementation alone.

Figure 3.1 The iterative adaptation cycle



Since 2020, the Adaptation Gap Report has tracked progress in developing national adaptation plans (NAPs), strategies and policies. Last year's report found that nearly nine out of ten countries had at least one such instrument in place (United Nations Environment Programme [UNEP] 2025). These instruments typically set out adaptation frameworks and strategies and often serve as the primary vehicles through which countries articulate their adaptation priorities, although priorities may also be reflected in other national policy instruments, including nationally determined contributions (NDCs). Over the same period, adaptation project funding through the funds that serve the UNFCCC and the Paris Agreement has also increased, both overall and per project (UNEP 2025), while adaptation finance commitments from multilateral development banks have steadily grown. This has expanded the potential resources available for the implementation of adaptation measures (African Development Bank *et al.* 2026).

The policy architecture for adaptation action is similarly evolving. Through its thematic and dimensional targets, the United Arab Emirates Framework for Global Climate Resilience provides greater substance to the global goal on adaptation, articulating what countries seek to achieve through adaptation in key sectors and systems, as well as across the adaptation policy cycle. The latter are notable because they recognize advances in the adaptation process – not just the outcomes it produces – as an important measure of progress. Providing more structure to characterizing and assessing adaptation action are the subsequent adoption of the 59 Belém Adaptation Indicators to help countries measure and report on progress against the targets, and the launch of the two-year Belém–Addis Vision on Adaptation to operationalize the indicators through early testing and further guidance (Lamhauge and Duluk 2026). Together, these developments are strengthening the framework and evidence base for assessing adaptation progress and – combined with information emerging from NAP processes and Parties' second biennial transparency reports – they should enable a more comprehensive picture of adaptation action in the second global stocktake (Jeudy-Hugo and Charles 2026).

Beyond the UNFCCC process, the legal foundations of adaptation have also been strengthened. The 2025 International Court of Justice Advisory Opinion on the *Obligation of States in Respect of Climate Change* affirmed that both treaty law and customary international law impose binding obligations on states in relation to adaptation planning and implementation, with compliance assessed against a standard of due diligence (International Court of Justice 2025; Qi 2026). The subsequent adoption of a resolution to operationalize the Advisory Opinion by the United Nations General Assembly in May 2026 further

reinforced the recognition of climate action – including adaptation – as a matter of international legal obligation rather than a voluntary policy choice.

Despite these advances, a significant gap persists between adaptation priorities articulated in NAPs, strategies and policies and their implementation in practice (Darjee *et al.* 2021; Alie *et al.* 2024; UNEP 2024; World Bank 2024b; Kisambira, Songcai and Bomuhangi 2025; Manuelli, Deshayes and Chelleri 2026; Roest *et al.* 2026). This represents a gap in the adaptation process itself, making it critical to understand what enables or constrains progress towards implementation. While the availability of finance is essential, particularly for low- and middle-income countries (Intergovernmental Panel on Climate Change [IPCC] 2022a, p. 2448), finance alone is insufficient. Translating adaptation priorities into sustained implementation also depends on a broader set of enabling conditions, including political, legal, organizational, sociocultural, capacity, technological and other contextual factors (Thomas *et al.* 2021; IPCC 2022b; UNFCCC 2024). Within this, the Intergovernmental Panel on Climate Change (IPCC) identifies governance and institutional conditions as important enablers of adaptation, while also finding that institutional constraints can significantly impede implementation (IPCC 2022a).

This chapter explores the institutional factors within government systems that enable or inhibit the translation of adaptation priorities into implementation, contributing to a broader understanding of how the enabling environment for adaptation can be strengthened. For the purposes of this chapter, "implementation" refers to the delivery or roll-out of an adaptation measure, extending beyond the point at which a measure has been approved or financing has been secured. The entry point for the analysis is the delivery of priorities articulated in national policy documents or processes, while recognizing – but not separately examining – the important roles of subnational governments and non-state actors in their implementation. The analysis does not focus on the effectiveness of the resulting adaptation measures or outcomes.

Section 3.2 introduces key concepts related to the chapter, provides a taxonomy for understanding institutional factors and identifies measures that governments are taking to strengthen them for adaptation within their jurisdictions. Section 3.3 presents a series of illustrative country examples that trace the implementation of adaptation measures to better understand the institutional factors that enabled them, including the role of adaptation plans, strategies and policies within this broader enabling environment.

Methodology

Information for this chapter was gathered through two complementary processes. First, a systematic review of peer-reviewed journal articles published since 2020 and a structured search of grey literature using the Overton Index database were conducted to identify and synthesize the main institutional factors that enable or constrain the implementation of adaptation priorities and to identify measures available to governments to strengthen institutional environments (presented in sections 3.2.1 and 3.2.2). Under both approaches, reviews were supplemented by additional articles identified through snowballing and expert recommendation. Second, illustrative country examples were developed through document reviews and semi-structured interviews with actors involved in implementing selected adaptation measures. The institutional factors identified through the literature review provided a basis for analysing and interpreting these examples. A more detailed description of the methodology is available in annex 3.A.

3.2 Understanding and strengthening institutional factors for adaptation

3.2.1 Understanding institutional factors that influence adaptation

Institutions can be understood as the formal and informal rules, norms, procedures and conventions that shape human behaviours and practices (IPCC 2022a, p. 2913). Accordingly, in this chapter, the term "institution" refers to these rules and arrangements rather than to organizations and government entities (box 3.1). Formal institutions comprise laws, policies, regulations and other legal and policy instruments, together with the procedures, governance arrangements and decision-making processes established through them. Informal institutions include traditions, cultural practices and social norms, together with the practices and patterns of interaction that emerge from them.

Specific features of institutions and how they operate – referred to here as institutional factors – can enable or constrain the implementation of adaptation priorities.[1] Institutional factors can shape incentives/disincentives for actors to engage in adaptation; determine how decision-making powers, responsibilities and resources are distributed among actors; regulate how adaptation processes are conducted and the range of solutions that can be applied; and influence how actors perceive problems, can evaluate adaptation options and learn from experience (Oberlack 2017).

1 The term 'factor' is used rather than 'enabler' or 'barrier' to recognize that the influence of an institutional feature is not inherently binary but depends on its characteristics and context.

Box 3.1 What counts as an institutional factor?

In this chapter, "institutional factors" refer to the features of the institutional environment that enable or constrain adaptation implementation. They are distinct from factors related to the characteristics, capacities or agency of the actors involved in adaptation. This distinction draws on North's (1991) framing of institutions as the "rules of the game" and actors as the "players", a framing that is widely reflected in adaptation literature.

Factors such as access to information and financial, human and technological resources are not institutional factors. Nor is the presence of catalysing factors such as adaptation champions, policy entrepreneurs or social and political movements. However, these actors and resources interact with institutional factors, which can facilitate or constrain their contributions to the implementation of adaptation.

The distinction is not always clear-cut, particularly where institutional environments shape actors' access to or use of resources and capacities. For example, while availability of financial resources is not treated as an institutional factor, the rules and procedures governing how adaptation finance is allocated or accessed are. Similarly, the presence of stakeholders in a policy process is distinct from the institutional arrangements that enable or constrain their participation and influence.

Institutional factors can serve as barriers or enablers to adaptation. Barriers are conditions or obstacles that impede progress towards adaptation but may be surmountable through appropriate actions or interventions (Moser and Ekstrom 2010; Biesbroek *et al.* 2013). Meanwhile, enablers of adaptation are often understood as conditions that accelerate the adaptation process and are often framed as having an inverse correlation with barriers (IPCC 2022b, p. 2546; Brullo *et al.* 2024).

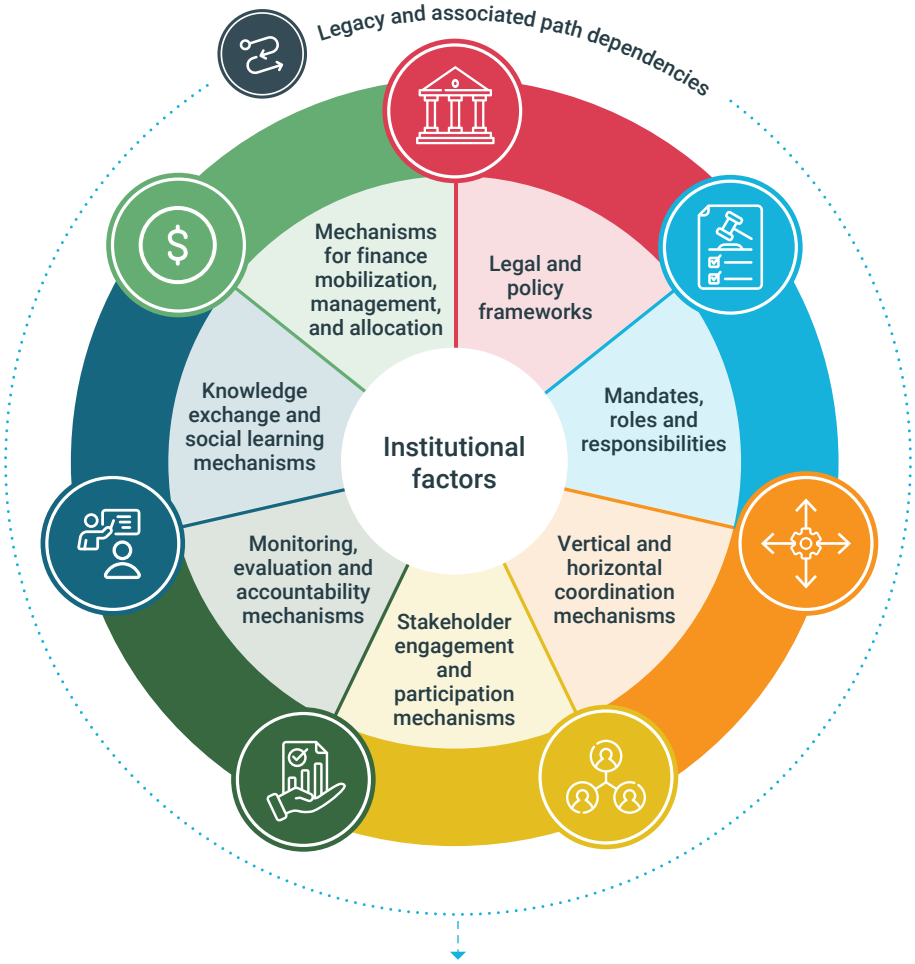
Literature exploring barriers and enablers to adaptation highlights that they are interdependent and highly context-specific, with their influence varying across spatial, temporal and sectoral settings. Consequently, the intensity of these barriers and enablers is dynamic, changing over time in response to shifts in the wider context. Whether, or the extent to which, actors perceive factors to be barriers or enablers is determined by their values, roles and interests – meaning perspectives on specific factors often differ, and actors may even hold opposing views on whether a factor acts as a barrier or enabler (O'Brien 2009; Burch 2010; Oberlack 2017; Eisenack *et al.* 2014). Figure 3.2 organizes institutional factors that influence adaptation into eight broad groups, adapting the framework proposed by Oberlack (2017).



Sakaivo Ecovillage in Madagascar.

Photo: © Florian Fussstetter / UNEP

Figure 3.2 Taxonomy of institutional factors that influence the implementation of adaptation



Legacy and path dependencies
Extent to which past decisions, established rules and governance practices condition future adaptation choices.

Legal and policy frameworks
Laws, policies and regulations promoting adaptation and their coherence with broader legal and policy frameworks.

Mandates, roles and responsibilities
Mandates to engage in the implementation of adaptation priorities, and clearly defined roles and responsibilities.

Vertical and horizontal coordination mechanisms
Institutional arrangements supporting coordination across levels of government and sectors.

Stakeholder engagement and participation mechanisms
Institutional arrangements enabling stakeholders to influence the design and implementation of adaptation.

Monitoring, evaluation and accountability mechanisms
Systems and mechanisms to track progress, foster accountability and ensure transparency.

Knowledge exchange and social learning mechanisms
Institutional arrangements that facilitate knowledge sharing and foster learning.

Mechanisms for finance mobilization, management and allocation
Institutional arrangements supporting the mobilization of adaptation finance and its efficient management and allocation.

Legal and policy frameworks refer to the presence of laws, policies and regulations promoting adaptation and their coherence with broader legal and policy frameworks.

The absence or limited integration of adaptation within legislative, policy and regulatory instruments can result in insufficient prioritization and institutionalization of adaptation. Incoherence between these instruments and sectoral or wider development and economic frameworks can create conflicting objectives that may inhibit the implementation of adaptation and result in policies that actively enhance vulnerability to climate risks and offset the benefits achieved through adaptation efforts (Oberlack 2017; IPCC 2022b, p.2581; World Bank 2024b).

Mandates, roles and responsibilities refer to the extent to which expectations for organizations to prioritize adaptation in their decision-making and operations are

clearly established, and roles and responsibilities for implementing adaptation policies and priorities are clearly defined, assigned and understood.

The absence of a clear mandate, or the presence of conflicting mandates, can lead government actors to perceive that they lack the authority or responsibility to engage in adaptation, or will not be held accountable for failing to prioritize it (Hong *et al.* 2024; Lundahl 2024; Sandberg, Bonnett and Birchall 2025). Similarly, roles and responsibilities that are defined or allocated inadequately can lead to inaction by, or disputes between, the actors that are notionally responsible for implementing adaptation. Inaction can occur when actors fail to take ownership of adaptation actions because they either lack clarity about the scope of their responsibilities, assume that other actors will take the lead or are unequipped to execute them (Phuong *et al.* 2018; Vindegg *et al.* 2022; Ranjan, Biswas and Neppl 2023; Cavane *et al.* 2026). Disputes, meanwhile, can be triggered by disagreements over authority and resource allocation stemming from unclear or misallocated roles, which can increase transaction costs and hinder implementation (Mumtaz 2023; Coalition of Finance Ministers for Climate Action [CFMCA] 2023; Asibey *et al.* 2024).

Vertical and horizontal coordination mechanisms refer to the extent to which institutional arrangements and mechanisms support coordination of adaptation policy across levels of government and sectors.

Adaptation's cross-scalar nature means that vertical and horizontal coordination are essential prerequisites for the implementation of adaptation policies and priorities. Weak vertical integration can result in national policies being inadequately aligned with local priorities, needs and capacities, while poor horizontal integration can contribute to fragmentation, duplication, missed opportunities and policy conflicts, which can delay or hinder the implementation of adaptation objectives (Lawrence *et al.* 2015; Gogoi, Bahadur and Rumbaitis del Rio 2017; Phuong *et al.* 2018; Dinshaw *et al.* 2019; Cid *et al.* 2020; Birchall, MacDonald and Slater 2021; Brawley-Chesworth, Clarke and Marks 2022; UNFCCC 2024; Ozioko and Madukwe 2025; Bernabé and Park 2026; Chan *et al.* 2026; Moyo, Paramasivam and Mashingaidze 2026).

Stakeholder engagement and participation mechanisms refer to the extent to which institutional arrangements and decision-making processes provide stakeholders – including civil society organizations, private sector, academia, communities, and vulnerable and marginalized social groups including women, youth, elderly, people with disabilities and Indigenous Peoples – with opportunities to influence the design and implementation of adaptation processes.

Active forms of engagement that allow stakeholders to share decision-making authority and co-produce outcomes can strengthen adaptation interventions by bringing relevant needs, priorities and knowledge into decision-making, while fostering buy-in and ownership among the actors who are intended to sustain these interventions following the implementation phase (Mogelgaard *et al.* 2018; Tye, Waslander and Waslander 2020; Darjee *et al.* 2021; Mukhlis and Perdana 2022; Rahman 2023; Haque, Khan and Choudhury 2024; UNEP 2024; Mukhlis and Yulianto 2025; Bruley *et al.* 2026; Mensah, Jacobs and Cunningham 2026; Robinson *et al.* 2026). Conversely, the absence of meaningful engagement leaves adaptation processes vulnerable to elite influence, entrenched interests and power imbalances that can compromise the legitimacy of these processes and disenfranchise stakeholders (Rahman 2023; Mensah, Jacobs and Cunningham 2026).

Monitoring, evaluation and accountability mechanisms refer to the extent to which mechanisms are established and sufficiently robust to track policy implementation, assess progress, hold actors accountable for fulfilling their responsibilities, and make relevant information transparent and accessible.

Robust monitoring and evaluation of adaptation policies provides important evidence on implementation progress while supporting learning and the adjustment of adaptation interventions over time (UNFCCC 2010; IPCC 2022b, p. 2605; Kisambira, Songcai and Bomuhangi 2025; Bernabé and Park 2026). Meanwhile, meaningful accountability can deter the misuse of power, nepotism, favouritism and corruption, and discourage politically motivated spending on highly visible but ineffective actions and maladaptive investments that reinforce vulnerabilities – all of which can undermine implementation and reduce perceptions of fairness, equity and ownership (Gogoi, Bahadur and Rumbaitis del Rio 2017; Oberlack 2017; Kundu, Morgan and Smart 2024).

Knowledge exchange and social learning mechanisms refer to the extent to which institutional arrangements and processes facilitate information and knowledge sharing, as well as learning from experience among relevant actors.

By facilitating the exchange of knowledge, lessons learned, and good practices and innovations developed, such processes expand the adaptation solution space by equipping actors with a broader range of options and the practical knowledge to apply them, thereby accelerating implementation and enhancing potential effectiveness of adaptation efforts (Ariza-Montobbio and Cuvi 2020; Angeles, Ngo and Greig 2021; Ranjan, Biswas and Neppl 2023; Haque, Khan and Choudhury 2024; Owusu, Adu-Boahen and Dadson 2024; Nocentini 2025). Meanwhile, unequal access to information can perpetuate or exacerbate existing power imbalances and weaken incentives for anticipatory adaptation by affected stakeholders (Oberlack 2017).

Mechanisms for finance mobilization, management and allocation refer to the extent to which institutional arrangements and procedures support the mobilization of adaptation finance and its efficient management and allocation.

While the availability of finance is widely recognized as critical for facilitating the implementation of adaptation priorities, mechanisms that allow governments to access, coordinate, disburse, track and evaluate adaptation finance are of equal importance (Kiremu *et al.* 2022; Sheriffdeen *et al.* 2023; Adom *et al.* 2024; Pauline, Sumari and Friis Hansen 2025; Pillay *et al.* 2025; Rogers, Mabhuye and Pauline 2026). Without climate finance tracking mechanisms, climate can be overshadowed by other financing priorities with reduced visibility and traceability (Pauline, Sumari and Friis Hansen 2025). Without coordinating actors to oversee funding allocation to different adaptation projects, there can be duplication and inefficiencies.

Legacy and associated path dependencies refer to the extent to which institutional factors interact with each other and with broader factors in the enabling environment for adaptation to condition future adaptation choices, either enabling or constraining implementation. Specific configurations of these institutional factors in certain contexts can trigger feedback loops and self-reinforcing dynamics, leading to outcomes – both positive and negative for adaptation – that become locked in over time (Siebenhüner *et al.* 2021; Brawley-Chesworth, Clarke and Marks 2022; Birchall, Kehler and Weissenberger 2025; Puig *et al.* 2025; Jager *et al.* 2026). Positive lock-ins can be created through the implementation of interventions that strengthen the institutional environment for adaptation (see section 3.2.2) (Jager *et al.* 2026).

These categories of institutional factors are inherently interlinked. For example, formally expressed mandates are typically inherent in legal, regulatory and policy instruments (Abeysinghe, Dambacher and Byrnes 2017). Likewise, the presence of laws, policies and regulations, formally expressed mandates, roles and responsibilities, and mechanisms for facilitating coordination and stakeholder engagement and participation in of itself creates the basis for accountability, even where these instruments or mechanisms do not include provisions or features that formally establish processes for providing accountability.

3.2.2 Strengthening institutional factors for implementation of adaptation

While section 3.2.1 categorizes the institutional factors that enable or constrain adaptation, governments can actively shape them through deliberate measures. This section reviews key practical interventions that governments are taking to strengthen institutional environments. Table 3.1 summarizes the measures identified alongside the primary and additional institutional factors they strengthen.

Table 3.1 Measures for strengthening the institutional enabling conditions for adaptation

Measure	Institutional factors strengthened	
	Primary	Additional
Climate change framework laws		
Adaptation plans, strategies and policies		
Adaptation priorities mainstreamed into wider legal and policy frameworks		
Dedicated coordination arrangements		
Adaptation anchored in influential government institutions		
Dedicated stakeholder engagement arrangements		
Dedicated policy learning platforms		
MEL systems for adaptation		
Independent bodies/offices to support adaptation action		
Dedicated arrangements for mobilizing, managing and disbursing climate finance		

Measures for strengthening the legal and policy framework for adaptation

To strengthen the legal and policy framework for adaptation, governments at different levels have been putting in place climate change framework laws; preparing dedicated adaptation plans, strategies and policies; and mainstreaming adaptation objectives into non-climate legislation, policies and regulations.

While these instruments can support adaptation independently,[2] they are recognized as being mutually reinforcing components of an effective adaptation governance system (Sridhar *et al.* 2022; Chan *et al.* 2026). Within this system:

- A climate change framework law provides the overarching legal foundation that mandates public and (if specified) private actors to engage in adaptation.
- National, sectoral and subnational adaptation plans, strategies and policies articulate more granular adaptation objectives and outline actionable approaches for achieving them.
- Mainstreaming adaptation considerations into relevant laws, policies, regulations and planning processes across sectors and levels of government helps to avoid policy inconsistencies and reduces the risk of maladaptive investments that inadvertently increase exposure and vulnerability to climate hazards.

Operating at different scales of governance, these three instruments facilitate adaptation through fundamentally similar mechanisms. Across their respective scopes, all three drive action by establishing clear mandates for adaptation, explicitly allocating roles and responsibilities among public bodies and – in some cases – private actors, and providing a basis for legal and administrative accountability (Chan *et al.* 2026). Furthermore, while mainstreaming focuses on embedding these priorities into existing operations, framework laws and dedicated adaptation plans can specifically facilitate action by establishing the formal institutional arrangements needed to support implementation – including mechanisms for vertical and horizontal coordination, stakeholder engagement and participation, resource management (spanning finance, information, expertise and knowledge), MEL and accountability (Averchenkova *et al.* 2024; Chan *et al.* 2026).

At present, the use of dedicated adaptation plans, strategies and policies by governments is relatively commonplace, particularly at the national level where the vast majority of countries now have a national adaptation framework in place (UNEP 2025). In contrast, while a significant number of countries have made progress in mainstreaming adaptation into national development plans and strategies, progress at the sector and subnational level appears to be limited (World Bank 2024b; UNEP 2025; Chan *et al.* 2026).

A sizable minority of countries have enacted overarching climate change framework laws. Among those that do, most cover both mitigation and adaptation, though several remain heavily focused on mitigation or omit adaptation provisions entirely (Rumble 2019; Sridhar *et al.* 2022; UNEP 2023; Chan *et al.* 2026). Nevertheless, while countries can – and have – advanced adaptation efforts without formal framework legislation, governments are increasingly leveraging these legal instruments to: (i) clarify the strategic direction of policy; (ii) establish impact, vulnerability, risk assessment, NAP, mainstreaming and MEL legal requirements; and (iii) strengthen accountability for climate action (Fankhauser *et al.* 2018; Rumble 2019; Averchenkova, Fankhauser and Finnegan 2021; Higham *et al.* 2021; UNEP 2023; Averchenkova 2024; World Bank 2024b; Chan *et al.* 2026).

Where successful, framework laws have been documented as helping to accelerate progress across both dedicated adaptation planning and mainstreaming processes, and rendering long-term adaptation efforts less susceptible to policy reversals and deprioritization (Rumble 2019; Chan *et al.* 2026). Furthermore, beyond the direct effects of their provisions, these instruments have been found to facilitate adaptation indirectly by elevating the profile of adaptation as a policy area, enhancing policy certainty regarding long-term adaptation priorities, and strengthening the legal basis for accountability and litigation where adaptation commitments and obligations are not adequately fulfilled (IPCC 2022b, p. 2598-2599; Averchenkova *et al.* 2024; Setzer and Higham 2025; Chan *et al.* 2026).

Measures to facilitate coordination

To improve coordination and information-sharing across actors involved in the implementation of adaptation policies, governments have put in place dedicated coordination mechanisms. Such mechanisms can take several forms, including cross-ministerial committees, multi-stakeholder coordination mechanisms, climate change councils and nodal institutions that serve as central coordinating bodies (UNFCCC 2024). These arrangements convene relevant government and, often, non-government actors. They are recognized for promoting coherent action across sectors and levels of administration (Mogelgaard *et al.* 2018; Dinshaw *et al.* 2019; Fakhri, Dalaa and Belkasmi 2021; Tye and Waslander 2021; Mumtaz 2023; Azhoni, Holman and Jude 2024; NAP Global Network 2026).

Assessments of UNFCCC submissions show that the vast majority of countries have established national coordination

2 For example, many countries have advanced adaptation efforts without climate change framework laws, with adaptation plans, strategies or policies typically providing the primary impetus for action and the strategic direction for implementation.

mechanisms (UNEP 2023; UNFCCC 2024). However, while most of these mechanisms facilitate horizontal cross-sectoral collaboration, fewer support vertical coordination across levels of government (UNEP 2023; Rodríguez, Prías Mahecha and López Arce 2026). The effectiveness of coordination mechanisms can be undermined when participating actors do not adequately prioritize their participation, including where adaptation is perceived as a separate environmental concern rather than integral to achieving their own mandates and objectives. This problem can be addressed by elevating the political standing and institutional authority of the coordination body – for example, by anchoring it in climate change framework laws or assigning responsibility for the coordination of adaptation to an influential government body. At the national level, this could include the Ministry of Finance, the Prime Minister's Office or a central planning ministry. Such bodies can raise the political visibility of adaptation, facilitate resource allocation and strengthen accountability (Davies 2017; Woodruff and Regan 2019). Locating responsibility for adaptation in this way can also help position it as a national development and economic priority rather than a narrow environmental concern, supporting its integration into broader government decision-making (Davies 2017).

Measures to facilitate stakeholder engagement and participation

To ensure stakeholders are engaged in adaptation decision-making and, ultimately, that they strengthen the design and implementation of adaptation measures, governments have established and maintained stakeholder engagement mechanisms. As with coordination mechanisms, these can take a variety of forms including citizen assemblies, public–private partnerships, collaborative governance models and coordination mechanisms that convene government and non-government stakeholders (e.g. multi-stakeholder coordination mechanisms). Given the ongoing and iterative nature of adaptation, such mechanisms provide stakeholders with the opportunity to engage throughout planning and implementation, rather than via one-off consultations. They can also enable stakeholders to contribute to implementation in different roles, making linkages with institutional arrangements governing mandates, responsibilities, and coordination particularly important.

While active forms of engagement are recognized as important for enhancing the inclusiveness, equitability, relevance and sustainability of adaptation interventions (Tye, Waslander and Waslander 2020; Brawley-Chesworth, Clarke and Marks 2022; UNEP 2024; Puig et al. 2025; Manuelli et al. 2026), it can be difficult to facilitate in practice. Competing stakeholder interests, unequal capacities to participate and doubts around whether inputs will influence decisions can limit meaningful engagement. Accordingly, despite the increased application of such forms of engagement, studies find that stakeholder engagement in adaptation processes often remains passive or tokenistic (Khatibi et al. 2021; Kiss et al. 2022; Abas et al. 2023; Bruley et al. 2026). Overcoming these challenges requires carefully designed engagement mechanisms that incorporate flexible processes; audience-tailored information; safe spaces that facilitate mutual learning and the integration of diverse perspectives and knowledge systems; skilled facilitation that bridges science, policy and local knowledge; and incentives that support participation (Bruley *et al.* 2026).

Measures to facilitate knowledge exchange and social learning

Dedicated policy learning platforms promote learning through facilitating the periodic exchange of knowledge, lessons learned, and good practices and innovations developed between different actors (Ariza-Montobbio and Cuvi 2020; Angeles, Ngo and Greig 2021; Ranjan, Biswas and Neppl 2023; Haque, Khan and Choudhury 2024; Owusu, Adu-Boahen and Dadson 2024; Nocentini 2025). These platforms can be stand-alone initiatives (e.g. municipal networks) or embedded in broader mechanisms supporting specific aspects of the adaptation policy process, including stakeholder engagement mechanisms and MEL systems (Dekens *et al.* 2025).

The value of these platforms is enhanced when they convene actors possessing diverse forms of knowledge (e.g. scientific, practitioner, Indigenous and local) supported by learning mechanisms like facilitation, knowledge-brokering, and conflict management (Ariza-Montobbio and Cuvi 2020; Akamani 2023; Zembe *et al.* 2023; Dekens *et al.* 2025; Moyo, Paramasivam and Mashingaidze 2026). Moreover, clear institutional pathways to decision-making and sustained financing are critical to enabling and maintaining platforms' ability to inform adaptation policy processes (Dekens *et al.* 2025).

Measures to support adaptive management, learning, transparency and accountability

Because they support adaptive management, strengthen accountability and promote institutional learning throughout the adaptation process (World Bank 2024b; Montpetit *et al.* 2025), many countries are developing, or have developed, MEL systems to track implementation and assess the outcomes of adaptation policies (Njuguna, Uri and Beauchamp 2024). However, many systems – particularly in developing nations – remain incomplete or restricted to monitoring (Njuguna, Uri and Beauchamp 2024; World Bank 2024b; Rosentreter and Beauchamp 2025; Muradás *et al.* 2026; UNEP Copenhagen Climate Centre 2026).

Some countries are further strengthening their capacity for adaptive management, as well as enhancing oversight and accountability, by establishing independent bodies or offices to support adaptation action. While their precise functions depend on their mandate, such actors can support government-led adaptation by providing independent advice, evaluating government adaptation efforts and holding decision makers accountable for progress made or a lack thereof (Averchenkova, Fankhauser and Finnegan 2021; Brawley-Chesworth, Clarke and Marks 2022; Averchenkova 2024).

Measures to support the mobilization, management and disbursement of adaptation finance

A growing range of dedicated climate finance arrangements are being utilized by governments to mobilise climate finance and strengthen how it is managed, allocated and tracked. National climate funds,[3] country platforms, climate finance units and stronger engagement of Ministries of Finance in climate-related decision-making are being used to coordinate financing from different sources and align financial flows with national adaptation priorities (see CFMCA 2023; Bhandary and Pitts 2024; Pillay *et al.* 2025).

Integrating adaptation into public financial management systems can further connect adaptation priorities with domestic resource allocation and support implementation over time. Measures include legislation that obliges national or subnational governments to allocate a percentage of their budgets to adaptation or provide them with revenue-raising powers (see Chaudary, Summerlin and Ginoya 2020; Organisation for Economic Co-operation and Development 2023). Budget and expenditure tracking systems can make adaptation-related spending more visible and accountable (see Mogelgaard *et al.* 2018; Kiremu *et al.* 2022; UNFCCC Adaptation Committee 2022; CFMCA 2025; Pauline, Sumari and Friis Hansen 2025), while spending targets can influence where resources flow, including by directing adaptation finance towards subnational governments and communities (see Darjee *et al.* 2021; Shrestha *et al.* 2025). Because adaptation measures can entail recurrent as well as capital expenditure, integrating adaptation and climate-related fiscal risks into medium-term expenditure frameworks can help ensure predictable funding for implementation beyond annual budget cycles, including for ongoing operations and maintenance.

Institutional arrangements can also strengthen countries' access to and mobilization of international finance. Establishing and strengthening direct access entities and national designated authorities can facilitate access to multilateral climate funds, while partnerships with international public and private funders can leverage additional resources for implementing adaptation priorities (Pillay *et al.* 2025; Pauline, Sumari and Friis Hansen 2025).

3.3 How institutional factors come together: Illustrative country examples

The implementation of any adaptation measure is shaped by a combination of institutional factors that interact and play out differently across contexts. The following sections offer five illustrative country examples highlighting this in practice. These examples encompass different models of adaptation implementation, each combining institutional strengthening with on-the-ground measures. Rather than offering a checklist or blueprint of institutional factors to enable implementation, they are intended to prompt policymakers to consider which institutional factors – and their interactions – may be more consequential in their particular context.

3.3.1 Kenya: The Financing Locally Led Climate Action programme

Institutional factors highlighted:



The Financing Locally Led Climate Action (FLLoCA) programme in Kenya illustrates how existing legal and policy frameworks, government mandates and coordination arrangements can be leveraged and strengthened to channel climate finance through government systems and support locally led adaptation implementation.

Launched in 2021 with domestic and international financing, including substantial concessional lending, the programme channels climate finance to the county level for locally led resilience investments in agriculture and livestock, water, environment, disaster risk reduction and rural infrastructure (World Bank 2021). By mid-2026, it had initiated over 1,775 climate investments in 45 counties, of which 1,237 had been completed (Lelekoitien, personal communication, August 26 2026).

The country's devolved system of government and constitutionally embedded principles of citizen participation provide an institutional foundation for directing decision-making and resources closer to communities (Kenya 2010). The Climate Change Act No.11 of 2016 establishes mandates and arrangements for climate action (Kenya 2016), while the adaptation priorities and key sectors contained in the NAP and the National Climate Change Action Plan are reflected in the FLLoCA areas of investment (Kenya, Ministry of Environment and Natural Resources 2017; Kenya, Ministry of Environment and Forestry 2018).

FLLoCA illustrates how clearly defined roles and coordination arrangements can help address fragmentation across sectors and levels of government. The National Treasury manages the programme, using its convening power to bring together sector ministries while embedding programme delivery in government financial systems. The Ministry of Environment, Climate Change and Forestry anchors the programme in national climate priorities and helps ensure it addresses climate risks rather than business-as-usual development needs. The Council of Governors shapes the programme around county priorities and implementation realities. More than 15 ministries,

3 More information about national climate funds and budget and expenditure tracking systems can be found in section 2.3.8 of chapter 2.

departments and agencies contribute complementary functions: sectoral ministries provide technical expertise, while government bodies such as the Office of the Auditor–General and the Ethics and Anti-Corruption Commission support oversight and accountability. Formal coordination mechanisms, including the Program Steering Committee and Inter-Agency Technical Advisory Committee, provide structures for linking these actors across sectors and levels of government.

Importantly, FLLoCA illustrates how institutional arrangements for climate finance can support implementation at the subnational level. Rather than treating finance solely as an input, the programme uses access to finance as an incentive for establishing institutional and financial management systems at the county level. Each county receives an institutional support grant to establish a dedicated Climate Change Unit, County Climate Change Act and County Climate Change Fund, to which counties must allocate at least 1.5 per cent of the county development budget. They must also conduct a participatory climate risk assessment and develop a County Climate Action Plan that feeds into the county budgeting process, County Integrated Development Plans, and the National Climate Change Action Plan. The amount of financing each county receives through a separate County Climate Resilience Investment Grant is tied to performance against these institutional requirements. In this way, FLLoCA financing arrangements reinforce several other institutional factors important for implementation: they create dedicated structures for managing adaptation finance; establish more predictable domestic budg*et al*locations; connect adaptation priorities to public financial management and planning processes; and create mechanisms for assessing whether counties have the institutional capacity required to manage larger investment flows.

3.3.2 Kiribati: The South Tarawa Water Supply Project[4]

Institutional factors highlighted:



Kiribati's South Tarawa Water Supply Project (STWSP) illustrates that a strong policy basis can provide the impetus for adaptation action and how effective coordination, stakeholder engagement, accountability and financial governance arrangements can support implementation processes in challenging contexts.

Water supply in South Tarawa, the capital of Kiribati, is constrained by fragile groundwater resources, deteriorating infrastructure, overextraction and pollution, with pressures expected to intensify due to population growth and climate change (Fraser Thomas Partners 2011; Asian Development Bank 2019). Launched in 2020, the STWSP aims to provide safe, reliable water to residents of South Tarawa through the construction of two desalination plants and improved water supply infrastructure. These will be delivered alongside institutional strengthening of the Public Utilities Board, hygiene awareness activities and decentralized sanitation pilots.

The policy impetus for STWSP originated from Kiribati 20-Year Vision (2016–2036) and the Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management (2014–2023), both of which highlighted increasing water insecurity due to climate change as a national priority (Kiribati 2014; Kiribati 2016). The strategy of utilizing desalination to address water insecurity in South Tarawa built on the outputs and experiences of the World Bank–supported Kiribati Adaptation Program (2003–2015). Financial support to develop this idea further was then secured through a policy dialogue between the Government of Kiribati and the Asian Development Bank and resulted in the provision of a Project Design Advance that enabled a full project proposal to be developed across 2017–2019. Finance from the Green Climate Fund (GCF), World Bank and Asian Development Bank for the implementation of the project was secured across 2018–2019.

The project management unit implementing the STWSP sits in the Ministry of Infrastructure and Sustainable Energy while project finance is managed by the Kiribati Fiduciary Support Unit, a dedicated unit within the Ministry of Finance and Economic Development that oversees the management of finance for donor-financed projects. The Public Utilities Board, which will manage the desalination plants and associated water supply infrastructure after project closure, is also heavily involved in project implementation. These actors coordinate through the project steering committee, which also includes the Ministry of Environment, Lands and Agricultural Development and the local authorities of South Tarawa. Accountability is provided by the National Water and Sanitation Coordination Committee, a high-level interministerial body that oversees the implementation of water and sanitation projects and must approve any major changes in scope.

Despite a two-year delay due to a series of unanticipated issues, implementation of STWSP has been relatively smooth, particularly given the challenges common to complex infrastructure projects in Pacific atoll countries, including limited expertise, high staff turnover and complex land tenure systems (World Bank 2024a). Several institutional factors have supported this, notably: the effective coordination facilitated via the project steering committee; collaboration with community groups and

4 An expanded write-up of this illustrative example can be found in Annex 3.B.1.

other stakeholders via the multi-project stakeholder engagement platform hosted by the Public Utilities Board;[5] and dedicated financing arrangements that enable finance to be efficiently disbursed.

The participation of secretaries from the Ministry of Infrastructure and Sustainable Energy and Ministry of Finance and Economic Development in the project steering committee provides the authority needed to quickly address issues that could significantly delay implementation, aided by oversight from an existing influential interministerial committee that reports directly to cabinet to strengthen accountability for addressing implementation issues. Meanwhile, the stakeholder engagement platform has been important for ensuring stakeholder buy-in during implementation and overcoming legal issues associated with the complex land tenure system in Kiribati. By serving several related projects, the platform also reduces the burden of stakeholder engagement and facilitates learning across projects. Finally, specialized financing arrangements have also supported implementation. Specifically, the presence of the Kiribati Fiduciary Services Unit to manage donor-finance within the Ministry of Finance and Economic Development has streamlined fund flows, ensuring timely disbursement to Ministry of Infrastructure and Sustainable Energy and preventing project delays. Furthermore, being dedicated to this task has enabled the Kiribati Fiduciary Services Unit to take on additional supporting functions that also facilitate the disbursement of donor finance, such as assisting project management units to implement procurement and safeguarding processes in line with strict donor standards, and building their capacity to do so, which can be challenging in the context of high staff turnover.

3.3.3 Canada: The Local Leadership for Climate Adaptation programme

Institutional factors highlighted:



The Local Leadership for Climate Adaptation (LLCA) programme in Canada illustrates how long-standing institutional relationships and clearly defined roles can support vertical coordination, with an established intermediary that helps translate national adaptation priorities into locally responsive implementation.

Recognizing the need to "significantly scale up" investments in climate-resilient infrastructure – 60 per cent of which is owned and managed by municipalities (Federation of Canadian Municipalities [FCM] 2025) – the federal government committed CAD 530 million to municipal adaptation in its action plan for implementing the National Adaptation Strategy (Canada, Environment and Climate Change Canada [ECCC] 2024). Launched in 2024, LLCA provides grants for capacity-building, planning, feasibility studies and implementation projects focused on smaller (under CAD 1 million) on-the-ground measures addressing immediate climate risks (FCM undated a; FCM undated b). It also provides grants and loans for the use of innovative financing mechanisms that enable municipalities and homeowners to invest in risk reduction measures. As at 31 March 2026, LLCA had delivered CAD 72.2 million in funding to at least 359 municipal climate adaptation readiness and implementation projects across the country (Canada, ECCC 2026; FCM 2026).

The implementation of LLCA built on more than two decades of institutional experience of the Green Municipal Fund (GMF), an independent endowment managed by the Federation of Canadian Municipalities (FCM) and established with Government of Canada funding in 2000. Rather than creating a new mechanism for delivering financial and technical support to municipalities, the government used established governance structures and management capacities, relationships of trust, as well as FCM's extensive networks and relationships with municipalities across the country. The GMF endowment structure also provides a degree of financial continuity, with a portion of LLCA funding to be revolved and reinvested (FCM 2024), supporting climate resilience investments beyond the life of the programme.

Vertical coordination is supported by the complementary mandates and roles of ECCC and FCM. As the federal lead on adaptation, ECCC provides policy direction, coordination across the federal government, technical guidance and information (including climate information) (Canada, ECCC 2024). FCM, in turn, serves as an interface with municipalities, connecting them with resources and supports and facilitating engagement through its networks, conferences and feedback mechanisms. Together, these roles connect national adaptation priorities and federal decision-making with programme delivery informed by municipal needs and experience.

Horizontal coordination is facilitated through the GMF Advisory Council, which brings together ECCC, Natural Resources Canada, and Housing, Infrastructure and Communities Canada, alongside representatives from municipalities and external experts. By providing a shared forum for advising on the GMF strategy, programme decisions and project approvals – including those for LLCA – the Advisory Council creates opportunities for interdepartmental learning, relationship building and collaboration as the three ministries prepare for its monthly meetings.

5 The stakeholder engagement platform facilitates dialogue with communities and other stakeholders for STWSP and two other major infrastructure projects in South Tawara.

Finally, the LLCA institutional arrangements also enable learning, innovation and adjustment during implementation. Innovation is explicitly encouraged through the LLCA financing work stream, which supports new approaches to financing adaptation. FCM has flexibility to test such new approaches and adjust programme delivery within the bounds set by the federal government. Mid-point and final evaluations of the LLCA – alongside periodic GMF programme and impact evaluations – create pathways for learning, knowledge sharing and adaptive programme design and delivery.

3.3.4 The Grenada Climate-Resilient Water Sector project[6]

Institutional factors highlighted:



The Grenada Climate-Resilient Water Sector (G-CREWS) project illustrates how leveraging existing institutional assets and early stakeholder engagement can strengthen the starting point for implementation, and how the implementation of adaptation measures can directly and indirectly strengthen the institutional environment for adaptation.

With heavy reliance on surface water sources and rainwater catchments, Grenada is highly vulnerable to rising temperatures and increasingly erratic rainfall patterns. Aiming to increase climate resilience in the water sector on a national scale, through the reduction in water demand and increasing reliable water availability, the G-CREWS project was developed (Grenada, Ministry of Climate Resilience, the Environment and Renewable Energy [MCRERE] 2026). With core funding from the GCF, G-CREWS combines improvements in governance, infrastructure, operational efficiency, data gathering and public awareness to strengthen climate resilience (GCF 2018).

The project idea emerged from a Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)–Caribbean Development Bank climate-finance readiness mission and was moved from an investable concept to a funded adaptation initiative through long-standing cooperation between the Government of Grenada and GIZ. Conceptualization of G-CREWS predates Grenada's first NAP.[7] However, once published, the NAP identified a clear need for an intervention in the water sector, and stipulated objectives directly aligned with G-CREWS. As such, it strengthened the policy basis for G-CREWS while it was under funding consideration, providing vital institutional support once approved by the GCF (Grenada, MCRERE 2017). Total grant funding of EUR 35.29 million was secured from the GCF in 2018, alongside EUR 6.767 million in co-financing from Germany and the Government of Grenada (GCF 2018; Grenada, MCRERE 2026). Project implementation started in November 2019.

Management and coordination of project activities was undertaken by a multi-stakeholder project management committee, which included representatives of the National Water and Sewage Authority of Grenada, the ministries of finance, agriculture and climate resilience, the environment and renewable energy, Grenada office of the GIZ, and the Grenada Development Bank. Clear roles and responsibilities were identified for all key implementing organizations involved in the project. The project management committee played a crucial role in facilitating implementation through overall project management, coordinating and overseeing the work of all key partners and supporting the resolution of issues as they came up.

With implementation scheduled to end in December of 2026, the G-CREWS project has recorded significant successes across all major objectives, despite unforeseen challenges presented by external factors (GCF 2025). One of the main institutional factors credited with the success of the G-CREWS project include a pragmatic coordination architecture among key stakeholders, which leveraged existing corporation between partners, avoiding the need to build new networks, but rather strengthen existing well-functioning relationships. Strong stakeholder engagement and participation from the early stages of the project's development represents another. This ensured that, by the onset of implementation, the project was directly relevant to the actors involved and aligned with realities on the ground. This minimized unforeseen challenges and avoided additional delays caused by the need for major design or scope adjustments when transitioning from project proposal to the implementation of activities.

In addition to internal factors, knowledge exchanges between the implementing actors and peers in the Caribbean region informed important adjustments to project activities during implementation. Facilitated through platforms hosted by the Caribbean Development Bank and the Organisation of Eastern Caribbean States, the experiences of neighbouring countries undertaking similar processes guided the decision to develop the Water Resources Management Unit as a separate department of government, with regulatory oversight from the Public Utilities Regulatory Commission, preserving a clear separation between resource regulation and resource provision, the latter of which is delivered by the National Water and Sewage Authority. The new Water Resources Management Unit, bolstered by the passing of the 2025 Water Resources Management and Regulation Act, supports an improved water governance framework for Grenada (Grenada, MCRERE undated).

6 An expanded write-up of this illustrative example can be found in Annex 3.B.2.

7 The preparation of the concept for the G-CREWS project was already under way in 2015–2016, while NAP was published in November 2017.

The creation of the Water Resources Management Unit and the Water Resources Management and Regulation Act under the G-CREWS project have significantly strengthened the institutional environment for adaptation in Grenada's water sector. While beyond the scope of the project to discuss in detail, lessons and experiences from G-CREWS have also enhanced the development of higher-level policy, informing the updated NAP (Grenada, MCRERE 2025) and the development of Grenada's forthcoming NDC 3.0.

3.3.5 Bolivia: The ProResiliente Project - Agroecological and climate-resilient rural development[8]

Institutional factors highlighted:



Bolivia's ProResiliente project illustrates the importance of a policy anchor for project continuity, how implementation lessons can be deliberately fed into wider policy processes, and how existing institutional assets may need strengthening to facilitate implementation.

Smallholder agriculture in Bolivia's Valles region is highly exposed to frequent climate shocks – droughts, heavy rain and frosts – the impacts of which are being exacerbated by climate change and compounded by anthropogenic processes such as soil and hydrological degradation (International Fund for Agricultural Development 2020; GIZ Bolivia 2026).[9] Launched in 2024, the ProResiliente project aims to strengthen the capacity of smallholders to adapt to these challenges through encouraging the adoption of agroecological practices and developing value chains, markets and financing mechanisms required to support the viability of these practices (GIZ 2024; GIZ Bolivia 2026).

The formulation of ProResiliente began in 2022 when negotiations between the governments of Bolivia and Germany resulted in the allocation of EUR 5 million to enhance the climate-resilience of the smallholder agricultural sector in Bolivia. The involvement of the Ministry of Rural Development and Land (MRDyT) in these negotiations ensured that the project concept was aligned with priorities in the country's national and agricultural development plan.[10] With finance secured, GIZ supported MRDyT to develop the project, which drew upon lessons learned in previous internationally supported interventions in the sector.[11] In parallel, coordination between GIZ and the European Union led to the mobilization of an additional EUR 5 million to expand the project's scope.

Following its launch, the successful roll-out of the project has been facilitated by a number of institutional factors – in particular, effective horizontal and vertical coordination, strong stakeholder engagement and participation, and a focus on knowledge exchange and social learning.

Horizontal coordination within the project is facilitated through the Coordination Committee, which is chaired by MRDyT and includes representation from ProResiliente's donors and GIZ. The participation of senior officials from MRDyT and the donors provides the committee with significant decision-making authority and strengthens accountability to the government and donors. This, in combination with operational features – such as frequent technical team meetings and semi-annual reviews of progress – enable the committee to identify and address issues quickly, while also reviewing risks and aligning implementation with sector priorities. Meanwhile, vertical coordination between the coordination committee and local partners was primarily conducted through existing mechanisms that exist between MRDyT and participating municipalities. Where this was absent, or needed strengthening, project-specific coordination infrastructure was put in place by GIZ.

The ability of the ProResiliente project to identify appropriate agroecological practices and develop value chains and markets that can be sustained after the project's close is hugely reliant on the active participation of stakeholders (e.g. smallholders and participants in agricultural value chains and markets). As such, relevant stakeholders were heavily involved in many of the project's activities, including in the testing of new agroecological practices across 28 participatory research plots and the design of interventions to strengthen value chains and markets.

The activities and outputs of the ProResiliente project have also strengthened related national and subnational legal and policy frameworks.

At the local level, the project has worked with participating local governments to design and adjust local regulations to

8 An expanded write-up of this illustrative example can be found in Annex 3.B.3.

9 The Valles region is primarily made up of Andean and inter-Andean territories characterized by a wide range of altitudinal zones and agroecological conditions, ranging from lower-altitude valleys to higher-elevation inter-Andean areas.

10 The Economic and Social Development Plan 2021–2025 of Bolivia (its national development plan) explicitly prioritizes food security and productive diversification, while its Sectoral Plan for Comprehensive Development of the Agricultural Sector 2021–2025 aims to strengthen the resilience of rural development (Bolivia, Ministerio de Planificación del Desarrollo 2021).

11 Experiences from earlier projects showed that stand-alone measures, such as irrigation or technical assistance, were more likely to sustain their results when linked to market access, institutional strengthening and income generation, which informed the integrated value-chain approach of ProResiliente.

support the viability of agroecological practices and their associated value chains and markets.

Meanwhile, at the national level, the outputs of the projects have informed the formulation of the National Agroecology Strategy (NAS) and the agricultural targets under NDC 3.0 (Bolivia, Ministerio de Medio Ambiente y Agua and Autoridad Plurinacional de la Madre Tierra 2025; Bolivia, Ministerio de Producción Sostenible, Medio Ambiente y Agua 2025; Bolivia, MRDyT 2025; GIZ Bolivia 2026). This process was enabled by the role of MRDyT in both ProResiliente and the development of these policy instruments. For NAS, knowledge from ProResiliente was facilitated through including actors participating in ProResiliente within the steering committee and technical working groups leading the development of the strategy, and national and regional consultations.

In turn, the approval of NAS has significantly strengthened the policy rationale for the project. By providing a clear policy basis for the objectives of ProResiliente, NAS has notably reduced the extent to which project activities are reliant on personal agreements to proceed, thereby safeguarding project continuity against frequent staff turnover in public entities and shifts in the priorities government actors caused by, for example, changes in administration.

3.4 Insights across the illustrative examples

The country examples show that institutional factors matter across different projects, programmes and implementation approaches. While they all combine institutional strengthening with concrete measures, they differ in where these efforts are concentrated. Some emphasize strengthening broader systems through which subnational actors can access resources and implement adaptation measures on an ongoing basis; others centre on the delivery of defined adaptation interventions with institutional strengthening aimed at enhancing their longer-term impact and sustainability. Together, these examples surface several insights into how institutional factors shape implementation.

- **Adaptation implementation does not necessarily follow the adoption of climate- or adaptation-specific laws or policies; the relationship can be iterative.** The examples highlighted that implemented measures may precede relevant climate and adaptation policy frameworks or emerge through pilot efforts or earlier projects rather than respond to specific policy directives. Yet such frameworks can still provide important anchors for implementation, giving adaptation measures formal recognition, lending legitimacy to their implementation and potentially making them easier to sustain, finance and scale. Conversely, experience gained through implementation can feed back into subsequent adaptation planning and policy, informing the evolution of NAPs, implementation plans and other frameworks, as what happened in Kenya, Grenada and Bolivia.

- **The authority of those involved in coordination mechanisms determines how effectively these mechanisms can support implementation.** All examples pointed to the existence and role of project or programme coordination bodies, and it was clear that their design was important. The Kenya programme's Steering Committee is co-chaired by the Principal Secretaries for the National Treasury and Ministry of Environment, Climate Change and Forestry, giving it political clout and reinforcing accountability. Similarly, the Kiribati project's Steering Committee, co-chaired by two secretaries, can address implementation issues quickly. These bodies also reinforce strong linkages between project-level coordination and higher-level policy processes, which can strengthen accountability in tracking progress (or lack thereof).

- **Coordination and engagement mechanisms do more than bring people together; they draw on and reinforce other institutional factors to advance implementation.** Coordination bodies and stakeholder engagement platforms can derive authority and influence from clearly established mandates, roles and responsibilities – which may themselves be captured in legal and policy frameworks. These mechanisms can, in turn, support monitoring, evaluation and accountability roles while also providing opportunities for knowledge exchange and learning. The GMF Advisory Council in Canada plays a programme oversight role but is also used as a platform for stakeholder engagement and interdepartmental learning.

- **Ministries of Finance play important but different roles in adaptation implementation.** While often recognized for their political authority and convening power in advancing development – and increasingly adaptation – processes, Ministries of Finance also play important operational roles in implementation. Their relationships with development partners and responsibilities for managing project finance and ensuring compliance with funder requirements, as seen in Kiribati and Grenada, can be important for both accessing adaptation finance and enabling its delivery. However, their role in using public financial management systems to allocate and channel resources can be more consequential. In Kenya, embedding transfers for adaptation within government financial systems illustrates how adaptation can move from being a discrete funding arrangement to being mainstreamed in practice. Ministries of Finance can therefore sit at the intersection of two key institutional factors: (i) mandates, roles and responsibilities; and (ii) the

mechanisms through which finance is mobilized, managed and allocated.

- **Institutional arrangements can support adaptation implementation by enabling different forms of learning, drawing on past experience, experimentation, and knowledge exchange across contexts.** Experiences and lessons from pilot projects or earlier phases of projects provided foundations for designing and implementing adaptation efforts in Bolivia, Grenada, Kenya and Kiribati. Learning can also occur during implementation. In Canada, flexible management arrangements enable experimentation with new approaches to financing adaptation, while regular evaluations provide a basis for adaptive programme design and delivery. In Grenada, G-CREWS exchanged experiences with neighbouring countries that had implemented similar measures, illustrating how knowledge generated through implementation can travel across projects and contexts. The specific mechanisms through which knowledge exchange and social learning occur can range from incidental to deliberately curated, highlighting the value in creating opportunities to capture, share and apply lessons from implementation.

- **Institutional legacies can be important assets for accelerating adaptation implementation.** While new institutional arrangements may sometimes be necessary to implement an adaptation measure, the examples also point to the important role of existing institutional arrangements (such as the National Water and Sanitation Committee in Kiribati), funding mechanisms (such as GMF in Canada) and relationships (such as between the federal government and FCM in Canada, and between governments, multilateral development banks and development partners). Identifying and building on these institutional assets can provide a stronger starting point than creating entirely new arrangements. Existing mechanisms and relationships can bring established capacities, experience, trust and ways of working that shorten the time needed to translate articulated adaptation priorities into implemented measures. In this sense, institutional legacies – and the path dependencies they create – can sometimes facilitate rather than constrain implementation.

- **Implementing adaptation measures can itself strengthen the institutional conditions for further adaptation.** As adaptation is still being understood and integrated into government systems, implementation often involves establishing new institutional arrangements or strengthening existing ones alongside delivering adaptation measures. This is evident in: Kenya, where counties are establishing legal, planning, financial and administrative mechanisms to manage adaptation so they can access climate finance; Bolivia, where results from the ProResiliente project have contributed to NAS and the country's updated NDC; and Grenada, where G-CREWS drove the development of the Water Resources Management and Regulation Act, established Water Resources Management Unit and also informed NDC 3.0. In short, institutional factors not only shape implementation, but they can also emerge from it.

Institutional factors can provide the scaffolding needed for adaptation action, shaping how priorities are translated into implemented measures and how actors, resources and decision-making processes come together to do so. Coordination provides important connective tissue within this scaffolding – across sectors and disciplines, levels of decision-making and different actors – and can support other institutional functions, including knowledge exchange and learning, accountability, engagement, and financial management. But the relative importance and specific configurations of these factors vary by context and can themselves be built or reshaped through implementation. While there is no universal checklist of institutional factors for implementation, policymakers can still take a deliberate and systematic approach to assessing and reinforcing them, using the categories presented in this chapter to diagnose the institutional landscape surrounding different adaptation priorities – identifying what can be built on, what may constrain implementation and what needs to be strengthened.

4





Chapter 4

Climate-related loss and damage – from impacts to response

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Cocoa farmer in the Congo Basin, Cameroon.

Photo: © Will Swanson / UNEP

Key messages

- **Loss and Damage has emerged in the United Nations Framework Convention on Climate Change (UNFCCC) as the third pillar of climate action, alongside mitigation and adaptation, as climate impacts increasingly affect vulnerable developing countries.** Loss and damage, the impacts underlying the Loss and Damage discourse, arise due to insufficient reduction in greenhouse gas emissions. Loss and damage are realized through interactions between climate hazards, exposure and vulnerability.

- **Loss and damage require assessment beyond aggregate monetary estimates.** The assessment framework developed in this chapter combines complementary lines of evidence from global data sets and monitoring systems; national, subnational and sectoral assessments; comparative case study evidence; and participatory, Indigenous and local knowledge. Attribution, modelling and expert judgment provide cross-cutting analytical approaches. Together, these sources can assess observed economic and non-economic loss and damage, residual risks and adaptation limits, evidence gaps and uncertainties, response gaps, and finance gaps and access challenges.

- **Responses to loss and damage are expanding, but substantial response gaps remain.** Countries and communities are using diverse approaches, including risk reduction and preparedness, social protection and recovery, livelihood support, human mobility and planned relocation, risk finance, and measures addressing non-economic loss. However, the existence of a response does not establish its adequacy, effectiveness or equity, and available evidence does not yet support a systematic assessment of the scale of the global response gap.

- **No single estimate captures the full scale of climate-related loss and damage or related finance needs.** Estimates vary due to differences in scope, method and scale; however, available studies point to large loss and financing needs in developing countries, with several estimates reaching hundreds of billions of United States dollars annually. These estimates are not interchangeable measures of a single global finance gap.

- **Finance for addressing loss and damage comes from a wider range of funding sources and instruments, but available flows remain difficult to identify and track.** Relevant support may be provided across mitigation, adaptation, disaster risk reduction and preparedness, or recovery, rehabilitation and reconstruction. Differences in mandates, timing, purpose and classification make it difficult to determine the overall volume of finance available for addressing loss and damage, and the scale of the remaining finance gap.

- **The Fund for responding to Loss and Damage (FRLD) and the Santiago Network are important dedicated Loss and Damage arrangements, but support remains far below the documented needs.** Addressing loss and damage requires accessible, timely and context-responsive financial and technical support, alongside stronger governance, institutions, capacities, information systems, participation and locally led responses.

- **Justice and inclusion are integral to assessing and responding to loss and damage.** Loss, capacities to respond, and access to support are unevenly distributed. Effective responses should recognize diverse forms of loss, enable meaningful participation, respect Indigenous and local knowledge, address gendered and other differentiated impacts, and ensure that support reduces rather than reinforces existing inequalities.

4.1 Introduction: Why loss and damage now, and scope of the chapter

Loss and Damage has emerged as the third pillar of climate action (United Nations Environment Programme [UNEP] 2023), alongside mitigation and adaptation, and has become increasingly prominent in climate policy under the UNFCCC and the Paris Agreement (UNFCCC 2015; UNFCCC 2024c). The evolving institutional architecture includes the Warsaw International Mechanism for Loss and Damage (WIM), its Executive Committee (ExCom), and the Santiago Network, alongside the broader funding arrangements, including the FRLD. Established at the twenty-seventh Conference of the Parties to the UNFCCC (COP 27) and operationalized at COP 28, the FRLD is a dedicated component of funding arrangements that complement and include sources, funds, processes and initiatives under and outside the UNFCCC and the Paris Agreement (UNFCCC 2022a; UNFCCC 2022b; UNFCCC 2024c). These developments reflect growing recognition that climate impacts are already causing severe, unequal and, in some cases, irreversible harms across the globe, particularly in developing countries that are especially vulnerable to the adverse effects of climate change. They also reflect the reality that adaptation is constrained by financial, institutional, technological and social barriers, and that some systems, regions and communities are approaching or exceeding adaptation limits (Pörtner *et al.* 2022; UNEP 2023).

Losses and damages arise through interactions among climate hazards, exposure, vulnerability and development pathways. They may occur where mitigation and adaptation are absent, incomplete, constrained, delayed or ineffective (Pörtner *et al.* 2022; UNEP 2023). The Intergovernmental Panel on Climate Change (IPCC) identifies several relevant analytical entry points for understanding loss and damage, including comprehensive climate risk management, adaptation limits, existential risks, attribution, finance and support (New *et al.* 2022). These entry points inform the chapter's assessment of loss and damage and related response needs.

Climate change is already generating substantial and uneven loss and damage across countries, sectors and population groups, with impacts expected to increase as warming intensifies. Warming to date has generated substantial economic costs, with extreme heat causing particularly severe impacts in hotter regions and developing countries and contributing to wider global economic disparities (Diffenbaugh and Burke 2019; Callahan and Mankin 2022). The consequences extend well beyond monetary loss, affecting lives, health, livelihoods, culture, identity, territory, biodiversity and social cohesion. Many of these non-economic losses (NELs) cannot be adequately captured through monetary valuation (UNFCCC 2013); some, including loss of life, species extinction and the destruction of unique cultural heritage, are permanent or irreversible (Serdeczny *et al.* 2016; Tschakert *et al.* 2019; Pörtner *et al.* 2022; Van Schie *et al.* 2024). This diversity of impacts presents a fundamental assessment challenge: no single data set, method or monetary estimate can capture the full range and distribution of climate-related loss and damage.

Loss and damage arise within a broader continuum of climate risk and response management that includes mitigation, adaptation, disaster risk reduction, preparedness, anticipatory action, climate-responsive social protection, recovery, rehabilitation and reconstruction. They should not be understood only as the result of adaptation failure. Impacts may materialize where risk reduction measures are absent, delayed, inaccessible, underfunded, insufficient or ineffective, or where soft or hard adaptation limits are reached (Pörtner *et al.* 2022; UNEP 2023). Chapter 3 considers finance for reducing prospective climate risks; this chapter focuses on realized loss and damage, residual risks, and associated response, evidence, finance and access gaps.

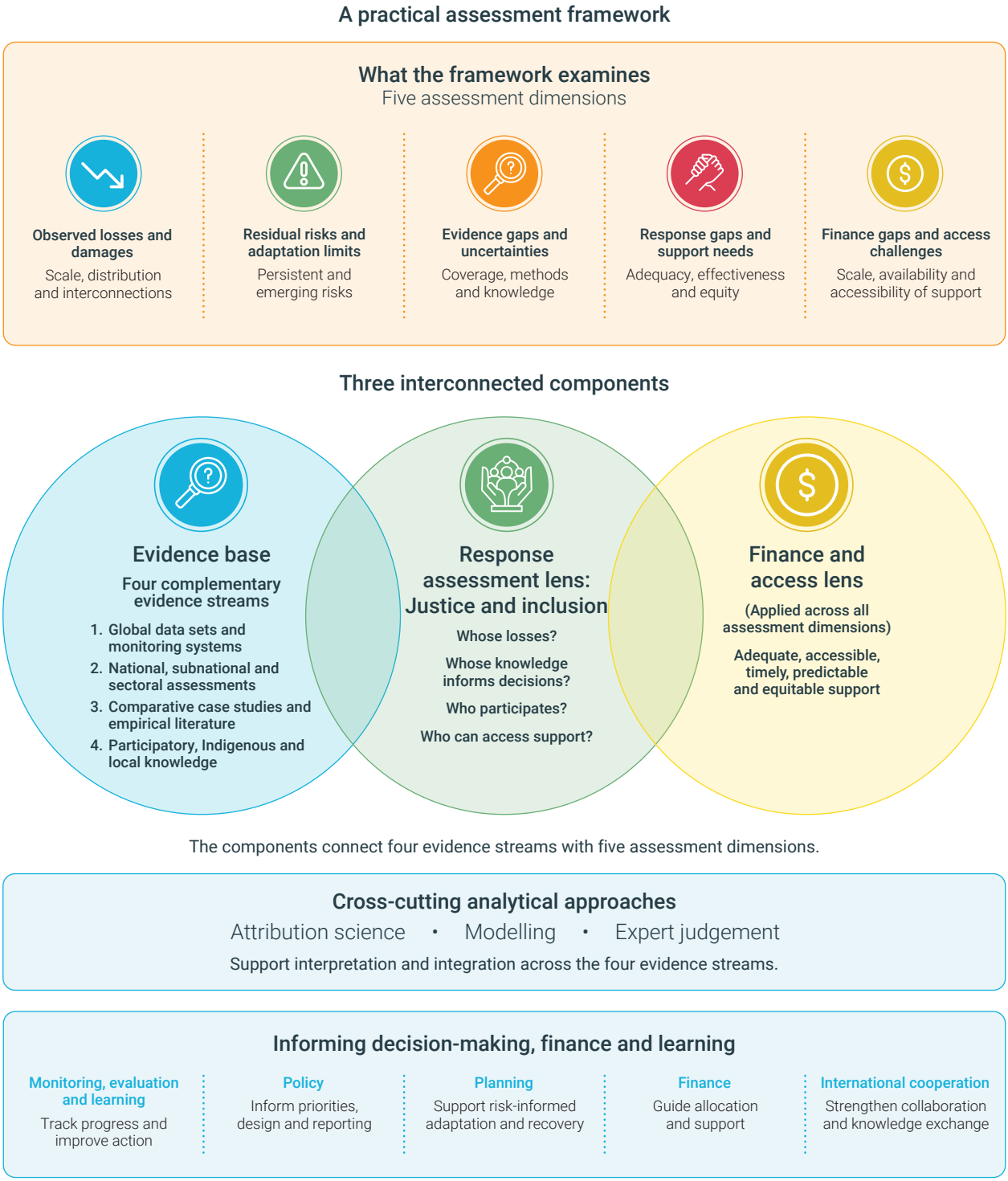
Building on the Adaptation Gap Report (AGR) 2023, this chapter presents a framework for assessing climate-related loss and damage, organized around practical building blocks. These comprise four complementary lines of evidence: global data sets and monitoring systems; national, subnational and sectoral assessments; comparative case study evidence; and participatory, Indigenous and local knowledge. Attribution, modelling and expert judgment support analysis across these lines of evidence, with explicit consideration of the strength, limitations and uncertainties of climate linkages. The framework addresses five complementary assessment dimensions: observed loss and damage; residual risks and adaptation limits; evidence gaps and uncertainties; response gaps; and finance gaps and access challenges. Designed to strengthen and connect existing assessment systems rather than create parallel processes, the framework can inform future AGR cycles, and support national and subnational assessment, planning, monitoring, reporting and learning. The chapter also uses attribution evidence alongside other evidence sources to assess climate-related loss and damage, while making the strength, limitations and uncertainties of climate linkages explicit.

This assessment is also timely in light of the latest review of the WIM, which called for a regular report on loss and damage associated with the adverse effects of climate change (decision 22/CMA.7 [UNFCCC 2025d], endorsed by decision 11/CP.30 [UNFCCC 2025b]). Without prejudging the report's mandate or terms of reference, this chapter and future AGR assessments can provide complementary evidence on loss and damage, residual risks, adaptation limits, and response and finance gaps, while findings from the regular report can inform future AGR assessments.

The chapter is organized as follows (figure 4.1). Section 4.2 clarifies key concepts and the relationship among climate risk, adaptation, residual risk, adaptation limits, and loss and damage. Section 4.3 presents the assessment framework and its building blocks, and applies them to

establish a preliminary 2026 evidence baseline. Section 4.4 examines responses and response gaps through a justice and inclusion lens. Section 4.5 assesses finance gaps and access challenges. Section 4.6 synthesizes the findings, and considers how the framework can support future national, subnational and international assessments.

Figure 4.1 Chapter overview



Note: Figure 4.1 shows three interconnected components: the evidence base, a justice-and-inclusion response lens, and a finance-and-access lens. They connect four complementary evidence streams with five assessment dimensions. The finance-and-access lens applies across all dimensions, while attribution, modelling and expert judgement support analysis to inform decision-making, finance and learning.

4.2 Defining what counts as loss and damage

Establishing clear criteria for identifying and assessing climate-related loss and damage is challenging. This requires clarifying which economic and non-economic impacts are included in an assessment, and how loss and damage relate to risks that adaptation can reduce and those that remain despite adaptation efforts. These conceptual and assessment boundaries shape the evidence collected, the loss recognized, and the response and financing needs identified. This section clarifies these distinctions, recognizing that adaptation and responses to loss and damage are closely connected rather than separated by a rigid divide.

4.2.1 Conceptual boundaries between adaptation and loss and damage

Adaptation and loss and damage are conceptually distinct but practically connected. Adaptation primarily seeks to reduce prospective climate risks and avert or minimize potential harm. Loss and damage, particularly when it comes to the funding modalities, currently gives particular attention to realized impacts and residual risks, including where adaptation and other risk reduction measures are absent, delayed, underfinanced, inaccessible, ineffective or maladaptive, or where soft or hard adaptation limits have been reached (Pörtner *et al.* 2022; UNEP 2023).

This distinction is not a rigid methodological temporal or institutional divide. Measures such as social protection, insurance, recovery support and planned relocation may contribute to both adaptation and addressing loss and damage, depending on their timing, purpose and context. Their effectiveness depends not only on finance, but also on governance and institutional capacity, access to information, technology and social protection, meaningful participation and inclusion, and recognition of Indigenous and local knowledge. These conditions shape both the feasibility of adaptation and the accessibility, adequacy and equity of responses to realized loss and damage. Chapter 3 considers finance for reducing prospective climate risks, while this chapter examines the evidence, response and finance needs associated with realized loss and damage and residual risks.[1]

4.2.2 Risk framing

A risk-based framing helps situate loss and damage within wider climate and disaster risk contexts. Following the IPCC, climate risk emerges from dynamic interactions among climate-related hazards, exposure and vulnerability. Responses can reduce risk, but may also redistribute or defer risk across people, places, sectors and time, or increase risk through maladaptation (Pörtner *et al.* 2022). Hazards such as extreme rainfall, drought, heatwaves or sea-level rise only translate into loss and damage when people, assets, ecosystems and livelihoods are exposed and vulnerable. Vulnerability itself is produced by social, economic, political and historical factors, including poverty, inequality, weak governance, insecure land and housing, discrimination, and limited access to finance, technology and information (Ribot 2011; Eriksen *et al.* 2021). It may also propagate through transboundary supply chains, migration and financial systems. Adaptation, disaster risk reduction, social protection and preparedness can reduce these risks, but are insufficient to eliminate them fully; residual risk remains (New *et al.* 2022). For assessment purposes, this framing directs attention to the interacting drivers of loss and damage: the climate-related hazards or other triggering events; the demographic, geographic, socioeconomic and governance conditions that shape exposure and vulnerability; and the protective factors, including social protection, community institutions, early warning systems, access to finance and preparedness, that influence the severity of impacts, the capacity to respond and recover, and the extent of lasting harm. These drivers can be examined across population groups, places and time to identify differentiated risks, unequal impacts and gaps in protection.

This framing reinforces that loss and damage are not simply the outcome of disasters resulting from hazards. Risk emerges from how hazards intersect with exposure and vulnerability, which is often shaped by entrenched inequalities. Two communities hit by a similar cyclone can experience very different impacts, depending on housing quality, early warning systems, social protection, local institutions, savings and histories of marginalization (Birkmann *et al.* 2022; Tschakert *et al.* 2019). Moreover, these compound, cascading and systemic climate risks can disrupt whole systems, such as food, health, energy or finance, across borders and scales, reinforcing the need for integrated risk management and justice-centred approaches (Simpson *et al.* 2021).

4.2.3 Residual risk, limits to adaptation and maladaptation

Residual risk is the climate-related risk that remains after mitigation and adaptation efforts. It can persist because measures are incomplete, delayed, inaccessible, underfunded or ineffective, because societies accept a certain level of risk, or because climate hazards intensify beyond the conditions for which existing measures were

1 For the purposes of this chapter, finance for prospective measures that reduce future climate risks is treated primarily as adaptation, preparedness or disaster risk-reduction finance. Finance that supports response to realized climate-related impacts and residual risks is treated as finance for addressing losses and damages. Some instruments, including social protection, insurance and relocation, may serve either function depending on their timing and use.

designed (Pörtner *et al.* 2022). As warming increases, residual risk is likely to grow, particularly in systems already under ecological, financial or institutional stress (Mechler and Schinko 2016; UNEP 2023). This is particularly relevant to temperature overshoot, where warming temporarily exceeds a specified level, such as 1.5°C above pre-industrial levels, before declining again: additional impacts during the overshoot period may be irreversible, meaning that subsequent cooling would not necessarily reverse the resulting loss and damage (Pörtner *et al.* 2022).

Adaptation limits help explain why this risk remains and becomes existential. Soft limits arise where further adaptation is possible in principle but constrained by financial, institutional, technological, political or social barriers; hard limits arise where no feasible adaptation can prevent intolerable harm, such as permanent inundation or ecosystem collapse (Mechler *et al.* 2020). Maladaptation can further increase residual risk by increasing vulnerability, transferring risk or undermining long-term adaptive capacity (Barnett and O'Neill 2010; Juhola *et al.* 2024). Kenya's third nationally determined contribution (NDC) illustrates a practical approach by comparing projected loss and damage with and without adaptation measures, thereby identifying potentially avertable impacts and remaining residual risks (Adaptation Consortium and UNEP forthcoming).

Loss and damage: Economic and non-economic (direct, indirect, long-term, systemic)

Economic loss and damage include financial harm to assets, infrastructure, livelihoods, productive systems and public finances. They encompass direct damage and indirect, longer-term or systemic effects, including disruptions to business income, supply chains, employment and development, arising from sudden events and slow-onset processes (Pörtner *et al.* 2022; UNEP 2023).

NELs are harms that cannot be fully represented in monetary terms, and may be irreversible. They include impacts on lives and health, culture, identity, social cohesion, biodiversity, mobility, sense of place, Indigenous and local knowledge, relationships, and cultural or spiritual connections to nature. Their assessment requires qualitative, participatory and place-based approaches, including interviews, narratives and community engagement, alongside relevant health and well-being indicators. These can include climate-related mortality and morbidity, disability-adjusted life years, mental health outcomes, displacement, and educational disruption, but cannot fully capture cultural, relational and place-based losses (Pörtner *et al.* 2022; Willetts and Campbell-Lendrum 2022; Willetts, Campbell-Lendrum and Beagley 2022). See box 4.2 for an example of integrating Indigenous and local knowledge into climate risk assessment and adaptation planning.

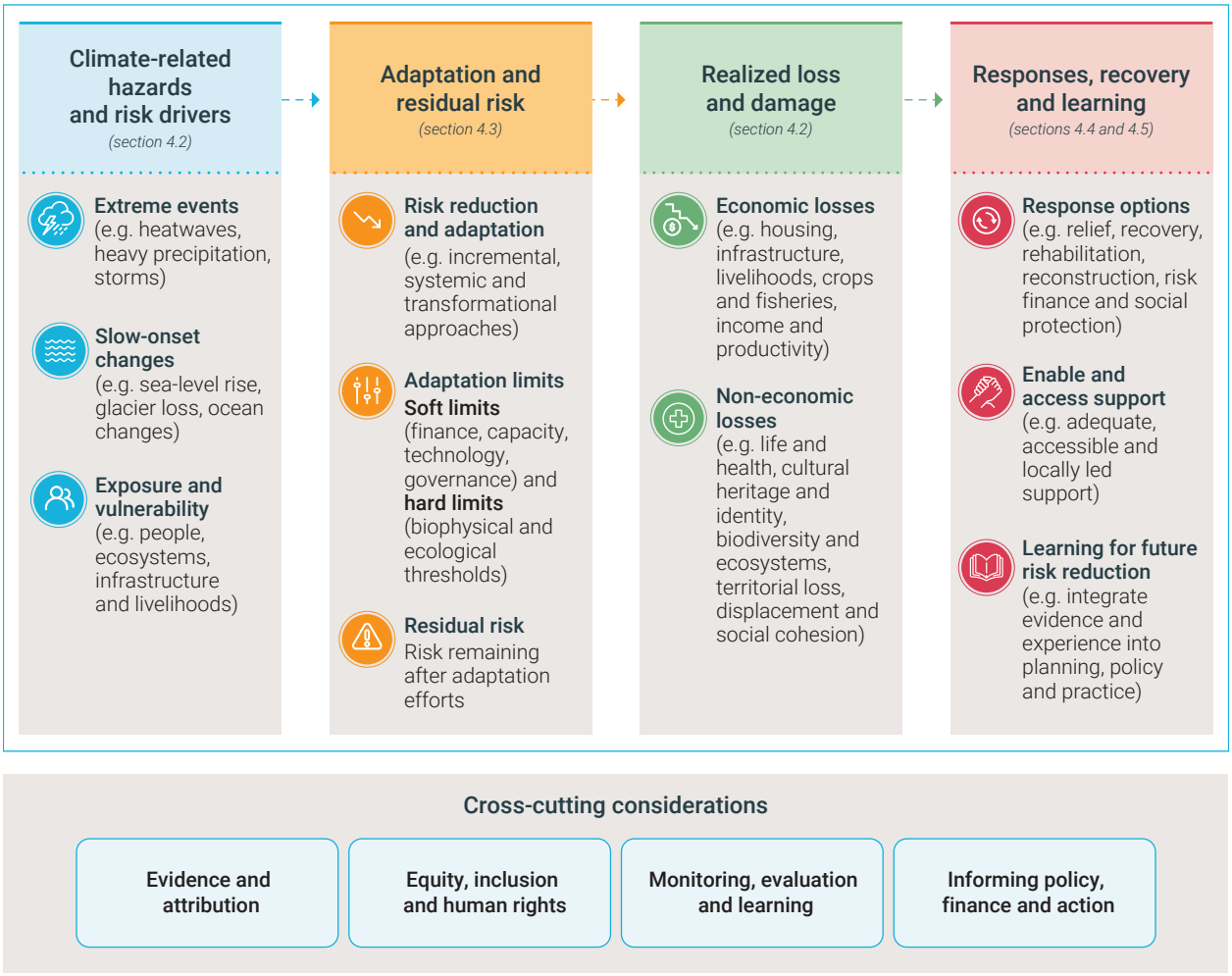
Figure 4.2 summarizes how residual risks may materialize as economic and non-economic loss and damage, including where adaptation is unavailable, insufficient or maladaptive, or where soft and hard adaptation limits are reached. Decisions about what constitutes loss and damage are not value-neutral: they shape whose loss are recognized, measured and financed, and whose experiences remain invisible. The related questions of recognition, distribution and procedural justice are examined in section 4.4.



A collapsed road in Blantyre, Malawi, in the aftermath of Cyclone Freddy in March 2023.

Photo: © UNDP Malawi

Figure 4.2 Pathways from climate risk to loss and damage: the role of adaptation and risk management



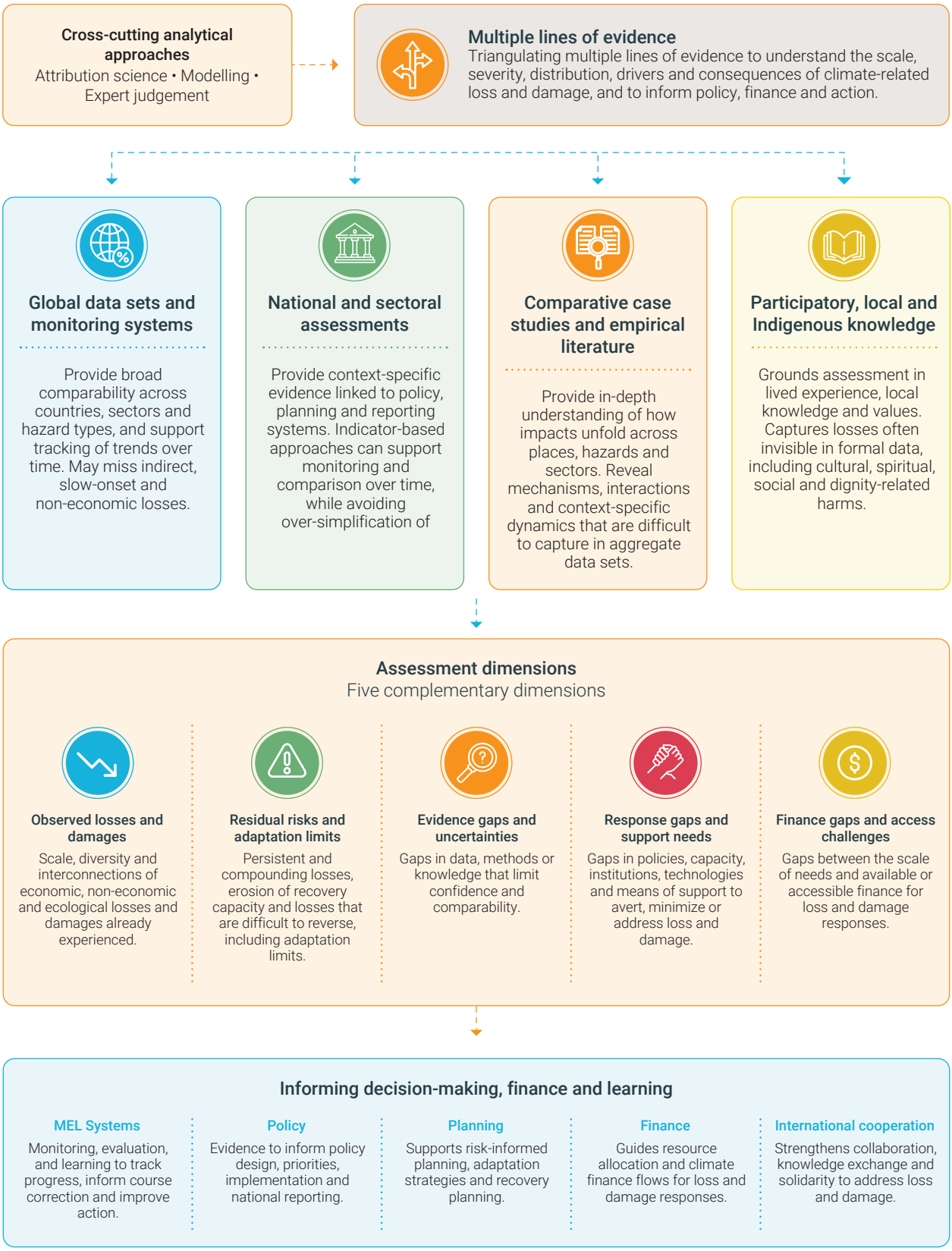
4.3 Assessing loss and damage: A preliminary 2026 baseline

4.3.1 Multiple lines of evidence: An assessment framework built on complementary evidence

No single evidence source captures the full range of climate-related loss and damage. The assessment framework therefore brings together four complementary lines of evidence as practical building blocks (figure 4.3). The 2026 assessment therefore uses multiple lines of evidence as complementary building blocks, combining quantitative, qualitative, participatory and attribution evidence. Four complementary, but not exhaustive, evidence streams are used: global data sets and monitoring systems; national, subnational and sectoral assessments; comparative case studies and empirical literature; and participatory, Indigenous and local knowledge (figure 4.3). Attribution science, modelling and expert judgment provide cross-cutting analytical approaches that can strengthen interpretation and integration across these streams. Annex 4.A describes the evidence sources, coverage, analytical approaches and limitations in greater detail.

The framework organizes assessment across five related dimensions: (i) observed loss and damage; (ii) residual risks and adaptation limits; (iii) evidence gaps and uncertainties; (iv) response gaps; and (v) finance gaps and access challenges. The preliminary 2026 baseline presented in this section considers the first three dimensions. Section 4.4 examines response gaps, including their justice and inclusion dimensions, while section 4.5 examines finance gaps and access challenges. Financial, institutional, technological, political and social conditions, including governance, participation, access to information, and social protection, cut across these dimensions.

Figure 4.3 Complementary lines of evidence as practical building blocks (expanding on figure 4.1)



The framework can help countries organize existing evidence to assess loss and damage, identify response and financing needs, and support monitoring, evaluation, reporting and learning. Its flexible building block approach provides a consistent structure for assessments at national, subnational and international levels.

4.3.2 What does the 2026 preliminary baseline show?

Applying the framework's first three assessment dimensions, the preliminary 2026 baseline shows that evidence of climate-related loss and damage is substantial and expanding, but remains uneven in coverage, representation and the causal relationships it can establish. Global data sets provide evidence of the scale and distribution of recorded impacts, while national and sectoral assessments, empirical studies and participatory evidence reveal a wider range of economic, non-economic and ecological loss and damage. Therefore, the evidence also shows that losses frequently interact and cascade across sectors and dimensions of well-being. Evidence on residual risks and adaptation limits is less systematically developed, while important uncertainties persist in coverage, attribution and the integration of different forms of evidence.

Table 4.1 Headline findings from the preliminary 2026 baseline

Assessment dimension	Key findings from 2026 preliminary baseline	Indicative evidence
i. Observed loss and damage	**Observed loss and damage are substantial, diverse and frequently interconnected.** Global evidence records large-scale human and economic impacts, while national, empirical and participatory evidence reveals a wider spectrum of non-economic, ecological, relational and cascading losses that is less consistently captured in aggregate data sets.	Global disaster and sectoral data sets; national assessments; NEL cases; comparative cases; participatory and Indigenous/local evidence (Boyd *et al.* 2026; UNEP Copenhagen Climate Centre [CCC] 2026b; Moran *et al.* 2026; Mukherjee and Rowan 2026).
ii. Residual risks and adaptation limits	**Evidence of residual risk and adaptation limits is growing but is not yet systematically assessed.** Available studies identify persistent and compounding losses, erosion of recovery capacity, and losses that are difficult to reverse, but rarely distinguish systematically between adaptation deficits, residual risks, and soft or hard adaptation limits.	Empirical cases; participatory evidence on persistence and reversibility; national evidence; economic analysis and modelling (Bauer 2013; van der Geest 2018; Moran *et al.* 2026; Tchuwa *et al.* 2026; Mechler *et al.* forthcoming).
iii. Evidence gaps and uncertainties	**What becomes visible as loss and damage depends partly on how it is observed and assessed.** Important gaps remain in geographic and social coverage, national assessment capacity, observation of slow-onset and non-economic losses, attribution, comparability and integration across evidence streams.	All four evidence streams and cross-cutting attribution evidence (Qi *et al.* 2023; McSweeney and Tandon 2026; Boyd *et al.* 2026; UNEP-CCC 2026a).

i. Observed loss and damage

Available evidence shows substantial and diverse observed loss and damage, although different evidence streams reveal different parts of the overall picture. Global disaster and sectoral data sets provide the broadest comparable evidence of recorded impacts (Centre for Research on the Epidemiology of Disasters undated). Between 2020 and 2025, 2,339 significant climate-related events were recorded, around 70 per cent of them in low- and middle-income countries (LMICs) (Mechler *et al.* forthcoming). Reported impacts include large numbers of people affected, and deaths, as well as substantial economic and insured damages. However, reported impacts also reflect important differences in observation and reporting. Heat-related mortality, for example, is systematically underreported in LMICs, while in the global data sets, recorded monetary damages, particularly insured damages, are concentrated in higher-income countries. These monetary totals should not be interpreted as showing that loss and damage are less severe in LMICs.

National and sectoral evidence broadens this picture. Across 118 countries assessed, 105 (89 per cent) mention or discuss loss and damage, while 64 (54 per cent) have

a Loss and Damage-relevant information system, and 44 (38 per cent) have a relevant legal framework (UNEP-CCC 2026a). Among 123 NDCs, national adaptation plans (NAPs) and health NAPs reviewed, 93 per cent address physical health, 74 per cent health-system impacts and 48 per cent mental health, although non-economic and slow-onset loss remain less consistently documented (Qi *et al.* 2023; UNEP-CCC 2026b).

Empirical evidence reveals a still wider spectrum of experienced loss. A systematic review of 83 empirical cases published between 2012 and 2026 documents NELs involving mental health and well-being, identity and agency, cultural heritage, meaningful places, social relations, Indigenous and local knowledge, ecosystem services, biodiversity, and relational values (Boyd *et al.* 2026). Recent studies further document impacts on well-being (Becchetti, Lubicz and Salustri 2026), cultural heritage (Lei *et al.* 2026), social cohesion (Lindegaard and Jarawura 2026), and Indigenous and relational values (Moran *et al.* 2026), and locally defined economic and non-economic loss and damage (Van Schie *et al.* 2026). Economic and non-economic loss and damage frequently occur together, and can generate interconnected pathways of loss: economic loss and damage can contribute to food insecurity, indebtedness, ill health and declining well-being, while loss of homes, landscapes and ecosystems can affect sense of place, identity and cultural continuity. Across the empirical evidence, loss also frequently interact and cascade. Evidence from Assam shows how observed outcomes are shaped by interactions among hazards, exposure and vulnerability, rather than hazard magnitude alone (Vyas, Barua and Mallikarjuna 2026). In addition, evidence across Pacific island contexts shows changes in biodiversity, ecosystem services and natural resources interact with loss to livelihoods, cultural heritage, identity and well-being (Westoby *et al.* 2022; Moran *et al.* 2026). Earlier studies identified pathways connecting climatic disruption with mental health and well-being (Nand, Bardsley and Suh 2023), and gender-based violence and erosion of well-being (Ayeb-Karlsson, Chandra and McNamara 2023). The 2026 evidence further documents loss to social cohesion (Lindegaard and Jarawura 2026), and cascading economic, health, infrastructure and social consequences (Mukherjee and Rowan 2026).

ii. Residual risks and adaptation limits

Evidence on residual risks and adaptation limits is growing, but remains less systematically assessed than evidence of observed loss and damage. Earlier empirical studies document loss that persist and compound over time, including repeated impacts that can progressively erode capacities to recover (Bauer 2013; van der Geest 2018). The 2026 evidence further shows how participatory approaches can provide additional evidence about the severity, persistence and reversibility of experienced loss, including dimensions that conventional indicators may not capture (Moran *et al.* 2026; Tchuwa *et al.* 2026). Emerging economic analysis also examines observed and projected residual loss, although estimates remain highly sensitive to methodological choices, counterfactual assumptions, attribution methods, geographic coverage and the treatment of NELs (Mechler *et al.* 2021).

However, available evidence does not yet systematically distinguish between loss associated with inadequate, constrained or delayed adaptation; risks remaining after adaptation and risk management measures have been implemented; and situations in which constraints are becoming soft or hard adaptation limits. The preliminary 2026 baseline therefore does not support a global estimate of residual risk or the prevalence of adaptation limits. Rather, it identifies this as an important area for strengthened assessment and future tracking.

iii. Evidence gaps and uncertainties

Important evidence gaps and uncertainties remain across the evidence base in 2026. National recognition of Loss and Damage is advancing faster than systematic assessment capacity: while 89 per cent of the 118 countries assessed mention or discuss Loss and Damage, only 54 per cent have a relevant information system and 38 per cent a relevant legal framework (UNEP-CCC 2026a). Empirical coverage is also geographically and socially uneven. The 83-case review is concentrated particularly in Oceania, South Asia and Africa, with thinner coverage elsewhere. Urban poor and forest communities remain poorly represented, while women and girls and children and youth frequently appear as affected groups, but are less often the primary analytical focus (Boyd *et al.* 2026). This wider evidence gap is also apparent in country-level reviews; a systematic review of 92 studies in India found that NELs remain comparatively underexplored, despite increasing attention (Joshi *et al.* 2025).

A further uncertainty concerns the relationship between observed loss and climate attribution. Evidence of an observed loss, evidence connecting that loss to a climatic hazard or process, and evidence attributing that hazard or process to anthropogenic climate change, are related but distinct evidentiary steps. Event attribution methods can assess how anthropogenic climate change has altered the likelihood or intensity of particular extremes (Seneviratne *et al.* 2021), but this does not in itself establish the full range or distribution of resulting loss and damage. Conversely, empirical evidence may document substantial loss without formally attributing the underlying hazard or process to anthropogenic climate change (Stuart-Smith *et al.* 2021; Boyd *et al.* 2026). Comparison of the empirical evidence on NELs with the event attribution studies compiled by Carbon Brief indicates that the two evidence bases rarely examine the same climate-related events (Boyd *et al.* 2026; McSweeney and Tandon 2026).

4.3.3 Evidence, observability and integration gaps

The 2026 baseline demonstrates that the evidence base for loss and damage is expanding, but remains uneven in what it observes, whose loss it represents and which causal relationships it can establish. Three related challenges emerge.

First, an evidence gap remains. Major dimensions of economic, loss and damage and NELs are still incompletely observed or documented. This includes important geographical and social gaps, as well as limited systematic evidence on residual risks and adaptation limits.

Second, there is an observability gap. Loss that can readily be counted, standardized and expressed through conventional indicators are more visible in global evidence systems than relational, culturally specific, ecological, indirect and slow-onset loss. This does not necessarily mean that the latter are less significant; rather, their visibility depends on the evidence and methods used to identify and assess them.

Third, there is an integration gap. Evidence streams operate at different spatial and temporal scales, use different units and methods, and answer different evidentiary questions. Global data sets, national assessments, empirical studies, participatory evidence and attribution science therefore cannot simply be combined into a single data set or metric. The assessment challenge is not only to generate more evidence, but to bring heterogeneous forms of evidence together while retaining clarity about what each can and cannot establish.

The preliminary 2026 baseline therefore provides a reference point for strengthening assessment over time, rather than a complete global account of loss and damage. Future AGR cycles can build on this baseline to track changes in observed loss and damage, residual risks and adaptation limits, evidence coverage, responses, and finance and access gaps. These evidentiary differences also have implications for whose loss become visible in assessment and decision-making, whose knowledge is recognized, and whose needs are reflected in responses. Section 4.4 therefore examines response gaps through a justice and inclusion lens.

4.4 Responses to loss and damage through a justice and inclusion lens

Building on section 4.3, this section examines the framework's fourth assessment dimension presented in figure 4.1: response gaps and support needs. It considers the range of responses to climate-related loss and damage, where important gaps remain, and how justice and inclusion shape their adequacy, accessibility and outcomes. Particular attention is focused on recognition, participation and equitable access to support, and to whether responses reduce or reinforce existing inequalities.

4.4.1 Justice and inclusion as an assessment lens

Structural inequalities shape exposure, vulnerability, adaptive capacity and access to recovery support. Consequently, similar climate hazards can cause very different loss and damage, while affected people and countries may have unequal access to recognition, finance and recovery support (Pörtner *et al.* 2022; UNEP 2023). A justice lens asks whose loss are documented, whose knowledge informs decisions, and whether responses reach those most affected without reinforcing existing inequalities (Roberts and Pelling 2020; Boyd *et al.* 2021).

International law provides principles relevant to justice in responding to climate-related loss and damage. The International Court of Justice has affirmed that internationally wrongful conduct causing climate-related harm may give rise to obligations for full reparation, including restitution, compensation or satisfaction where the requirements of State responsibility are met. The Court also recognized that environmental damage may be compensable, including where its precise extent is difficult to quantify (International Court of Justice 2025, paras. 450-456). These findings do not, in themselves, characterize existing loss and damage funding arrangements as liability or compensation mechanisms.

Climate justice scholarship considers three interconnected dimensions of justice that shape both the experience of climate-related loss and damage and the design of responses, and which are drawn upon in this chapter. Distributional justice considers how the burdens of climate impacts and the benefits of responses are distributed, including who bears loss, who receives support, and how finance and access are allocated (Pörtner *et al.* 2022; UNEP 2023). Procedural justice concerns whose perspectives, priorities and knowledge shape decisions on risk reduction, preparedness, response and recovery, and whether affected people and communities can participate meaningfully in these processes (Newell *et al.* 2021; Pörtner *et al.* 2022). Recognitional justice asks whether diverse identities, histories and relationships to place, including those of Indigenous Peoples, local communities, migrants and persons with disabilities, are acknowledged, respected and reflected in assessment and implementation processes (Birkmann *et al.* 2022). Intergenerational justice is also an important consideration, recognizing that many climate-related loss and damage may unfold over multiple generations. Recent discussions have also highlighted restorative justice, drawing attention to how experienced harms are acknowledged and addressed, and how affected communities are supported in recovery (Sultana 2021; Düvel and García-Portela 2024; Hourdequin 2025).

4.4.2 Unequal experiences of loss and damage

The justice dimensions described above are reflected in the unequal experiences of climate-related loss and damage across populations. The scale and nature of loss are shaped by differences in exposure, vulnerability, adaptive capacity, and access to resources and institutions (Mukherjee and Rowan 2026). As a result, similar climate hazards can generate markedly different outcomes across households, communities and countries. Understanding these distributional dimensions is important for identifying who is most affected by residual risks, whose losses are most visible within assessment systems, and which groups are able to access support and recovery mechanisms.

Developing countries and communities are often forced to reallocate or divert resources and national budgets originally intended for development and essential public services, such as health-care and well-being, in order to respond to escalating disasters. This can expose them to additional financial and development consequences, including increased debt burdens from external borrowing, external dependency and the erosion of development gains. These pressures have also informed calls for reform of the international financial architecture, including through the Bridgetown Initiative, to expand fiscal space and access to affordable, timely support for climate-vulnerable countries (Bridgetown Initiative 2024). In turn, these pressures reinforce cycles of loss by entrenching repeated exposure and vulnerability to hazards, limiting recovery capacity, exacerbating poverty, and increasing the risk of future loss and damage (Roy *et al.* 2018; Birkmann *et al.* 2022). In addition, systemic inequalities and transboundary risks including disruptions to food systems, supply chains, migration and fiscal stability can amplify and redistribute climate-related loss and damage across regions and countries, with disproportionate impacts on those with limited adaptive capacity.

Gender can influence how loss and damage are experienced, recognized and addressed across different social and economic contexts. Evidence shows that climate-related impacts interact with existing inequalities to affect women and girls in distinct ways, including through impacts on health, access to health-care and other essential services, well-being, mobility, livelihoods, care responsibilities, safety, and access to resources and services (Ayeb-Karlsson *et al.* 2023; UNEP-CCC 2026b). These impacts may be associated with both economic and non-economic forms of loss and damage, and can persist beyond the immediate aftermath of climate-related events. In some contexts, households may also adopt erosive coping strategies, such as withdrawing children from school or resorting to negative livelihood and social coping mechanisms, which can reinforce existing inequalities and contribute to future vulnerability. Women are also key actors in preparedness, response, recovery and community resilience. Recognizing and supporting their leadership, knowledge systems and decision-making roles can contribute to more effective, equitable, and locally relevant responses to climate-related loss and damage (Pörtner *et al.* 2022 in Birkmann *et al.* 2022; Ayeb-Karlsson *et al.* 2023). Age and the stage of life can also shape experiences of climate-related loss and damage. Children, young people and older persons may face disproportionate impacts, including disruptions to education, psychosocial well-being, health, care and social support systems. Climate-related loss and damage experienced during childhood and adolescence can have lasting consequences for children's development, learning, health and future opportunities, while undermining the essential services that support their well-being and resilience. Many of these impacts are non-economic, and may be overlooked in conventional assessments (UNEP-CCC 2026b; United Nations Children's Fund [UNICEF] 2026).

Indigenous Peoples and traditional communities may also experience disproportionate climate-related loss and damage (box 4.1). In some contexts, climate-related loss and damage pose an existential threat, as exposure to climate hazards intersects with historical marginalization, limited access to services, insecure land tenure and underinvestment in public infrastructure (Birkmann *et al.* 2022; Santos de Lima *et al.* 2024; Pinho *et al.* 2025b).

Box 4.1 Cascading and non-economic losses in the Brazilian Amazon

Recent evidence from the Brazilian Amazon highlights compound and cascading climate-related impacts, including droughts, floods, fires and heatwaves, with disproportionate effects in municipalities with high concentrations of Indigenous populations (Pinho *et al.* 2025b). These impacts extend beyond livelihoods and material assets to cultural practices, traditional medicine, territorial relations, food systems, health and collective well-being, generating indirect and compounding losses across interconnected social-ecological systems (Simpson *et al.* 2021).

Climate hazards and slow-onset processes also contribute to significant NELs for Indigenous Peoples. For example, wildfire smoke exposure is estimated to cause approximately 230 premature deaths annually in Indigenous territories across the Amazon Basin (Bonilla *et al.* 2023). Conventional assessments may overlook losses associated with cultural heritage, customary governance, ancestral territories and the intergenerational transmission of knowledge, particularly as climatic changes disrupt ecosystems and culturally significant species (Lenton *et al.* 2025; Pinho *et al.* 2025a).

Looking ahead, large-scale forest dieback and ecosystem-service loss, shaped by interacting climatic and non-climatic pressures, including deforestation and land-use change, could generate substantial economic and non-economic consequences. Estimated socioeconomic costs range from US$957 billion to US$3.6 trillion over three decades, with implications for livelihoods, health, cultural practices and displacement pressures (Lapola *et al.* 2018).

Beyond documenting unequal and NELs, inclusive assessment approaches can help ensure that diverse forms of knowledge, values and community perspectives are recognized in climate risk assessment and planning, as illustrated by the example from Tuvalu (box 4.2).

Box 4.2 Integrating Indigenous and local knowledge: Example of a coastal inundation risk assessment in Tuvalu[2]

Indigenous and local knowledge of NELs has been incorporated into the planning and management of the Green Climate Fund-financed Tuvalu Coastal Adaptation Project. While the project's LiDAR-based risk assessment focused primarily on physical and economic damage, gaps remained in capturing NELs. Community assessments conducted through the UNEP CIS-Pac5 project therefore used participatory approaches to incorporate tangible and intangible losses associated with coastal inundation and sea level rise (Hay *et al.* 2020).

In Nui and Vaitupu, a community risk and impact assessment methodology combined sectoral risk matrices with perspectives from men, women, youth, persons with disabilities and traditional leaders. Working with *kaupule* (local government councils), community-derived scores were overlaid with probabilistic coastal inundation layers to incorporate social and cultural values into the assessment (Panwar Noy and Wilkinson 2025). Engagement through community meetings, focus group discussions and *falekaupule* (traditional assemblies of elders) helped document culturally significant places, fishing grounds and community values. This example illustrates how participatory approaches complement quantitative risk assessments by integrating traditional knowledge, diverse community perspectives and the cultural significance of social assets into adaptation planning.

Differences in recognition and visibility can shape response gaps: losses that are poorly represented in assessment systems may also be less likely to be reflected in planning, recovery mechanisms and access to support..

4.4.3 Responses and response gaps

Responses associated with loss and damage operate across different stages of climate risk and recovery, but their effectiveness depends on how they are designed, implemented and accessed. Responses may be autonomous or planned, and often build on Indigenous knowledge systems, local knowledge, community-led initiatives and local governance arrangements, which shape how climate-related loss and damage are understood, managed and addressed across different contexts. Access to response and recovery mechanisms is often uneven across population groups and places. Assessments

2 This box illustrates the role of Indigenous and local knowledge in assessment, as discussed in section 4.2.

should therefore consider whether these mechanisms are accessible, inclusive and capable of reducing underlying vulnerability (e.g. McNamara *et al.* 2021).

Responses operate across multiple levels, from household- and community-led action to national-level policies, programmes and institutional arrangements. The main response areas illustrated here include risk reduction, preparedness and coping; social protection and recovery support; livelihood support and transitions; human mobility and relocation; risk finance and risk transfer; addressing NELs; and governance and locally led responses. These areas are not mutually exclusive, and may involve actions before, during or following climate-related impacts.

At the local and community levels, responses include household and community preparedness and coping strategies, community-based assistance and social support networks, livelihood diversification, community savings and risk-pooling arrangements, and locally accessible insurance. They may also involve participation in relocation decisions, maintaining social and cultural ties, documenting cultural heritage and traditional knowledge systems, providing psychosocial support, and strengthening community institutions and participatory decision-making.

At the national level, responses include early warning systems, preparedness programmes and risk information systems; social protection, humanitarian assistance, recovery and rehabilitation; reskilling and livelihood transition programmes; planned relocation and assisted migration; and insurance, contingency finance and other risk-financing mechanisms. National actions may also support the recognition and documentation of NELs, cultural heritage protection, ecosystem protection and restoration, and enabling frameworks for locally led responses. Illustrative experiences from Vanuatu, Bangladesh, Mongolia, Pacific small island developing States (SIDS), Fiji and the Brazilian Amazon, together with the Caribbean Catastrophe Risk Insurance Facility as an example of a regional risk-financing mechanism, highlight the range of responses and associated assessment considerations presented in annex 4.C.

4.4.4 Implications for assessment and policy

Evidence of responses to loss and damage is expanding, but available evidence does not yet support a systematic assessment of the scale of the global response gap. The available cases nevertheless identify important dimensions for assessing response gaps, including coverage and access, recognition of economic and non-economic loss and damage, meaningful participation, cultural continuity, locally grounded knowledge, and whether responses reduce or reproduce underlying vulnerability and inequality. Assessments should consider not only the magnitude of impacts, but also whether diverse losses are recognized, affected people can participate in decision-making, and response and recovery mechanisms are equitably accessible. This requires disaggregated evidence across population groups and attention to whether policies, finance, social protection, relocation and locally led responses reduce or reinforce vulnerability. Integrating these considerations into assessment and planning can support more inclusive and equitable recovery outcomes. Across these response types, a further question is whether adequate, timely and accessible finance and technical support are available to enable their implementation. Section 4.5 therefore examines the fifth assessment dimension: finance gaps and access challenges.

4.5 The loss and damage finance gap

Building on the response gaps examined in section 4.4, this section examines the framework's fifth assessment dimension: finance gaps and access challenges. It considers what is known about the scale of financing needs, the finance available to address loss and damage, barriers to accessing support, and challenges in tracking financial flows.

Since challenges exist in identifying and classifying Loss and Damage finance, it is difficult to determine the total finance gap. However, while the magnitude of the Loss and Damage finance gap is unclear, it is evident that existing finance is insufficient, with an urgent and immediate need for new, additional, predictable and adequate financial resources for Loss and Damage (decision 2/CP.27 [UNFCCC 2022b] and decision 2/CMA.4 [UNFCCC 2022a]). This gap widens with increasing climate impacts caused by insufficient greenhouse gas emission reductions and inadequate support for adaptation (decision 1/CMA.6 [UNFCCC 2025a]).

Adaptation finance and finance for addressing loss and damage are related, but not interchangeable. Adaptation finance primarily supports action to reduce prospective climate risks, whereas finance for addressing loss and damage supports responses to realized impacts. In practice, boundaries are not always clear, and some instruments may contribute to both.

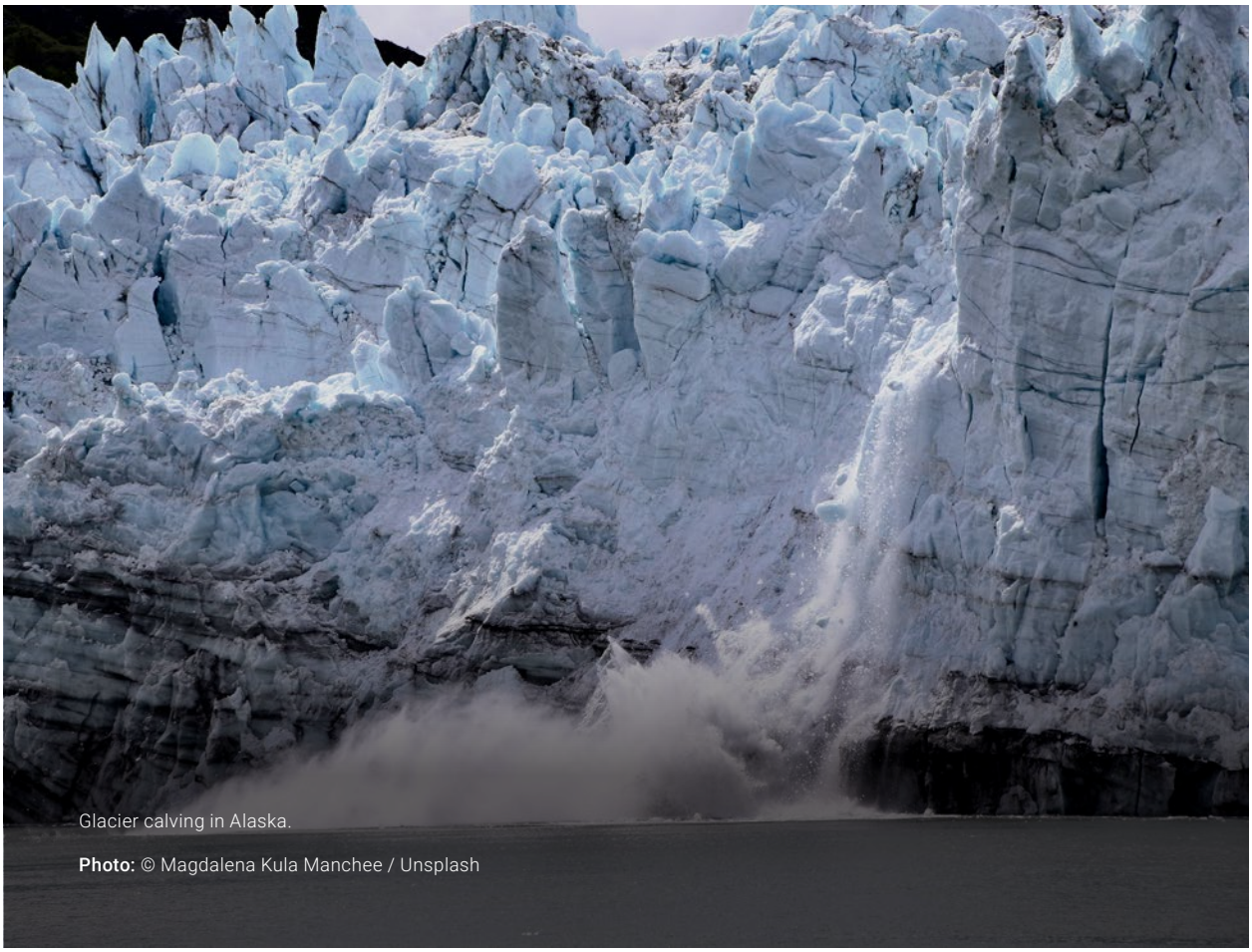
The broader funding arrangements approach recognizes an existing landscape of support relevant to loss and damage, including disaster risk reduction, humanitarian and disaster response, insurance, and other financial support. The Transitional Committee's review identified gaps in finance, access and coherence across this landscape, highlighting the need for greater coordination and complementarity alongside dedicated funding (UNFCCC Transitional Committee 2023).

4.5.1 The scale of financing needs

Accurately assessing and capturing global Loss and Damage finance needs is difficult due to differing definitions, data availability, different geographical and temporal focus, and questions about the attribution of loss and damage to climate change. Existing estimates vary substantially and prevent establishing a single robust global figure (Pörtner

et al. 2022). Estimates are further skewed by the complexity of including NELs, as they conventionally evade monetary evaluation, but potentially require funding for responses to them (for example, the costs associated with cultural preservation).

Under the UNFCCC, the Standing Committee on Finance (SCF)'s Second Needs Determination Report (UNFCCC SCF 2024) presents indicative costed loss and damage needs from nationally reported information, including NDCs. For illustrative purposes, it reports geographical distribution figures such as US$3 billion for Africa, US$5 billion for Latin America and the Caribbean, US$8 billion for least developed countries, and US$5 billion for SIDS over the reporting period. However, Parties have expressed reservations around these figures, including the fact that national reporting does not reflect the entirety of needs, and is limited by significant data challenges and gaps (decision 2/CP.29, paras. 9–10 [UNFCCC 2025c]; decision 1/CMA.6, para. 3 [UNFCCC 2025a]). Table 4.2 presents illustrative estimates of financing needs, observed economic loss and projected economic loss. These estimates address different questions and vary in geographic coverage, time horizon, methods and assumptions. They should not be added together or interpreted as interchangeable measures of a single global Loss and Damage finance gap.



Glacier calving in Alaska.

Photo: © Magdalena Kula Manchee / Unsplash

Table 4.2 Illustrative global loss and damage cost estimates

Source	Geography and period	What is estimated	Estimate
A. Finance needs			
Songwe, Stern and Bhattacharya (2022); Bhattacharya *et al.* (2024)	Emerging markets and developing economies, excluding China; 2030	Scenario-based investment-needs modelling for emerging markets and developing countries (excluding China), estimating additional annual investment and spending required by 2030 to meet Paris Agreement and Sustainable Development Goal targets across categories (clean energy, adaptation and resilience, loss and damage, and natural capital); loss and damage as one component of the overall financing gap.	US$150–300 billion annually by 2030 for immediate impacts and reconstruction; latest update ≈ US$250 billion per year by 2030
Tavoni *et al.* (2024)	Country-level allocation; 2025	Couples integrated economic loss modelling across multiple damage functions with historical responsibility principles (1850, 1990, 2015) to estimate country-level loss and damage funding needs, entitlements and contributions.	US$395 billion in 2025
B. Economic cost **B.1 Observed loss**			
Baarsh, Awal and Schaeffer (2022)	Vulnerable countries; 2000–2019[3]	A macro econometric compares the effect on gross domestic product (GDP) per capita growth in real climate observations against the effect in the counterfactual climate estimates.	Loss ≈ 20% of GDP over 2000–2019 (US$26 billion per year)
Newman and Noy (2023)	All countries for which Emergency Events Database (EM-DAT) data is available for the years 2000–2019	Collates extreme-event attribution studies estimating the fraction of attributable risk for individual events, combines these with socioeconomic cost data for those events, and extrapolates for events or countries lacking attribution studies.	US$143 billion per year in the past two decades
B.2 Projected losses			
Markandya and González-Eguino (2019)	Non-Annex I group 2020–2050	Economic integrated assessment modelling to estimate residual loss.	US$116–435 billion in 2020, US$290–580 billion in 2030, US$551–1,016 billion in 2040, US$1,132–1,741 billion in 2050

Note: Finance needs refer to financial resources required for responses; economic loss and damage refer to observed, realized or projected impacts. Figures are annual unless identified as cumulative. Definitions of "loss" and "damage" follow the source studies.

3 "V20 Member economies" refers to the 55 members of the Vulnerable Twenty Group covered by Baarsch, Awal and Schaeffer (2022), reflecting the group's membership at the time of the report. This is the study's geographic grouping, not a UNEP definition or classification of climate vulnerability.

4.5.2 Scale of finance available

The FRLD and the Santiago Network were dedicated efforts by Parties to establish institutional arrangements under the UNFCCC and Paris Agreement to provide financial and technical support respectively to developing countries that are particularly vulnerable to the adverse effects of climate change. Resources available through these dedicated arrangements are small relative to identified financing needs and demand for support.

In fact, the initial funding envelope for the first funding round covers around 12 per cent of the total demand from its first request for proposals, which closed in June 2026. In total, 119 countries requested US$2.8 billion, compared with an initial funding envelope of US$342 million, excluding US$28 million in oversight fees. Current pledges from countries to the FRLD total US$822.06 million, with US$631 million in contribution agreements (FRLD 2026b). Approvals for the first round of requests are scheduled to commence in December 2026 with each approved request receiving an allocation of US$5–20 million. A system to provide support for developing funding requests and capacity-building is also in development, called the Country Support System (FRLD 2026a). The scale of demand relative to the initial allocation provides early indication of the gap between expressed country demand and resources available through the FRLD. It should not, however, be interpreted as an estimate of the global loss and damage finance gap, since the US$2.8 billion reflects requests submitted through this first funding round rather than total financing needs. At time of writing, the FRLD Board is also considering an additional allocation of rapid emergency finance to the Government of Nepal in response to catastrophic flash floods on 26 August 2026 (box 4.3).

Box 4.3 Flash floods in Nepal

On 26 August 2026, devastating flash floods, triggered when a large mass of ice and rock collapsed from a glacier high in the Himalayas, struck Nepal's Rasuwa, Nuwakot, Dhading, Gorkha and Tanahun Districts along the Nepal-China border. The rock-ice avalanche rapidly transformed into a flood that travelled downstream at average speeds of 188 km/hr, sweeping away homes, roads and bridges and cutting off entire communities. At least 84,270 people, including 32,00 children, have been affected. Local authorities report more than 1,300 killed and over 5,000 still missing in Nepal. Meanwhile, the Chinese Government reports at least 43 people killed and 519 still missing on the Chinese side of the border in the Tibet Autonomous Region.

Nepal has requested that the FRLD Board take a decision to respond "rapidly, directly and effectively" in line with its governing instrument. The Board is in ongoing discussions sharing different views as to what such a response would look like procedurally, and is a test of the FRLD's funding model. Some proposals suggest a provisional set-aside allocation of resources of up to US$20 million, along with an invitation to Nepal to submit a proposal to the Board for consideration and approval as soon as possible.

Research is ongoing to examine the range of factors contributing to the event. Analysis by World Weather Attribution suggests that climate-related factors included unusually warm conditions that supported enhanced snow and ice melt and more precipitation falling as rain rather than snow, with the two preceding months substantially warmer than the climatological average; and warming and permafrost degradation, which can destabilize pre-existing geological weaknesses and likely weakened the rock wall. Glacier thinning and retreat, combined with increased meltwater, may also have interacted to amplify the event. While an accurate calculation of direct attribution requires additional data, unprecedented compounding conditions as a result of rapidly rising temperatures increase the likelihood and severity of such hazards in the Himalayas (World Weather Attribution 2026).

Meanwhile, Parties have been cautious to not describe the Santiago Network as a fund, but rather as a network managing and coordinating demand for and supply of technical assistance, which can be used on a demand-driven basis to access finance. It has received pledges totalling about US$47 million, covering both operational costs and support for technical assistance (Santiago Network 2026b). Requests for technical assistance are approved by the Santiago Network Secretariat on a rolling basis, estimating an annual demand of 20 technical assistance requests for a total of US$4.9 million, averaging US$350,000 per request (Santiago Network 2026a). So far, some requests have been for up to US$700,000 (Santiago Network undated). A simplified community window for smaller requests of up to US$50,000 has also been launched.

The FRLD was established as a dedicated part of, not a replacement for, wider funding arrangements which differ in their objectives, timing, accessibility and capacity to address different types of loss and damage (UNEP and UNEP-CCC 2026). Its coordination role promotes complementarity, and identifies gaps across entities with distinct mandates and forms of support. This includes acting as the platform for facilitating coordination and complementarity under the funding arrangements, by hosting an annual high-level dialogue together with the United Nations Secretary-General.

The dialogue brings together the main entities that form part of the funding arrangements, which cover a wide range of different sources, funds, processes and initiatives under and outside the UNFCCC and the Paris Agreement. This includes representatives of entities such as multilateral climate funds, multilateral development banks, United Nations agencies, and other intergovernmental, regional, international, bilateral and multilateral organizations, civil society, Indigenous Peoples, and the philanthropic sector (Schultheiß *et al.* 2023; annex II of decision 1/CP.28 [UNFCCC 2024b] and decision 5/CMA.5 [UNFCCC 2024c]). Through the high-level dialogue and other approaches established in annex II of decisions 1/CP.28 and 5/CMA.5, the scale of finance available can be more clearly understood and scaled up.

One such area where work is already ongoing to better understand the status of funding arrangements under the UNFCCC is annual reporting by the Green Climate Fund on activities relevant to averting, minimizing and addressing loss and damage (e.g. UNFCCC 2025e). Most of the activities reviewed by the WIM ExCom were pre-emptive ex ante measures, rather than finance addressing realized loss and damage. Some support was, however, directed to medium- and longer-term rehabilitation and reconstruction (WIM ExCom 2024).

This chapter does not undertake a comprehensive assessment of other funding arrangements. However, other examples of funding arrangements can be studied in future AGRs to better understand the scale of finance available for loss and damage. Together, these mechanisms partially cover the loss and damage response continuum, but with significant gaps and imbalances in what is financed, when support is available, and which countries can access it.

4.5.3 Persistent barriers to accessing finance

A financing gap persists for addressing climate-related loss and damage, alongside barriers to accessing available support. This gap extends beyond dedicated UNFCCC arrangements to shortfalls in finance for response, recovery, rehabilitation, reconstruction and measures addressing slow-onset impacts and NELs, more accessible funding processes, and stronger national capacity to develop and implement proposals. Closing it requires increased, better-targeted finance. Access barriers arise from both funding requirements, including lengthy application and accreditation procedures, complex proposal templates, extensive evidence requirements, and demanding monitoring frameworks, and limited institutional capacity, staffing and technical expertise in applicant countries. Some countries lack the data and expertise needed to assess loss, identify appropriate responses, prepare costed proposals and define measurable outcomes. These constraints can be particularly acute in countries facing recurrent climate impacts, leaving needed responses underfunded (UNFCCC 2017; Shakya and Holland 2021; Shawoo *et al.* 2021; Hammersley, Pill and Rajah 2023).

In this context, analysts have suggested direct access can help make support more context-responsive and reduce reliance on international intermediaries. Parties agreed that the FRLD would have various access modalities to address this shortfall, making it easier for Governments to access support. This would also contribute to ensuring that the maximum resources flow to the people on the ground where it is needed most. Many countries have welcomed this opportunity, with the first requests including 26 seeking direct access via direct budget support through national Governments, 16 seeking access in partnership with regional entities, and 24 seeking access in partnership with national entities. Six submissions have also requested direct access via direct budget support in partnership with multilateral development banks.

However, the practical operation of these modalities remains under development. The FRLD Board is in ongoing engagement with the World Bank, the interim host of its secretariat and trustee, on approaches to access that are intended to be more accessible than standard World Bank procedures (FRLD 2026a). It remains to be seen which modalities developing countries will find most accessible as the FRLD's long-term model evolves.

Many observers have stressed that work on a small grants modality should be accelerated, as it would allow easier access and more direct financial support for communities, Indigenous Peoples and vulnerable groups (Cintron-Rodriguez, Schalatek and Vandamme 2024). As mentioned, the Santiago Network has established a community window offering small grants of up to US$50,000.

Debt also creates barriers for accessing Loss and Damage finance. Parties have long been aware of this challenge, deciding at COP 30 that the FRLD would provide financing in the form of grants and highly concessional loans. This would be in addition to considering debt sustainability in deploying a range of financial instruments described in the FRLD governing instrument (COP 28 decision 5/CMA.5, annex I, paras. 57–59 [UNFCCC 2024a]). Access to finance alone does not ensure an effective or equitable response. Outcomes also depend on institutional capacity, accessible procedures, inclusive decision-making, and the ability of affected communities to shape and implement responses.

Loss and damage increase national debt and financing, and often involve diverting funding from critical services like health and education. With already insufficient funding in developing countries for a range of basic needs, this creates challenges for the allocation of scarce resources. There is generally also no financial return on investment with loss and damage interventions, and hence limited to no interest of the private sector to engage, unless through corporate social responsibility-focused initiatives.

4.5.4 Improving finance tracking and assessment

Tracking and assessment of loss and damage finance is challenging for various reasons. First, there is no agreed methodology as to how to tag loss and damage-relevant flows. However, suggestions of a Rio-type marker that captures mitigation and adaptation finance have been made (Pill and Hammersley 2024) and also applied in some contexts (ACT Alliance 2024).

Second, bilateral and multilateral funders do not track expenditures in loss and damage terms or categories. Instead, interventions often overlap with other finance priorities and activities reported under climate adaptation, disaster risk reduction, humanitarian response and broader development objectives. Third, the concept of the mosaic of solutions or funding arrangements to finance Loss and Damage and overlaps, particularly with adaptation, does not lend itself to a distinct capture of financial flows (UNEP 2023; UNFCCC Transitional Committee 2023; UNEP-CCC 2026). For example, Fiji's sovereign green bond financed post-disaster rehabilitation and construction of schools, emergency works and other climate-related investments following Tropical Cyclone Winston, alongside adaptation and "build back better" objectives (Fiji 2023). Such overlaps reflect the complementary roles of existing funding instruments, but can make finance for realized loss and damage difficult to identify and track.

These challenges increase the risk of undercounting or double counting of financial flows, limiting the ability to pinpoint a precise Loss and Damage finance gap.

There is ongoing work under the UNFCCC that will improve tracking and assessment. This includes the outcome of the third WIM review at COP 30, where Parties agreed to develop a regular report on loss and damage led by the Santiago Network, and requested the WIM ExCom to compile existing methodologies for assessing loss and damage, and prepare guidance to assist developing countries with technical assistance and finance requests (decision 22/CMA.7 [UNFCCC 2025d], endorsed by decision 11/CP.30 [UNFCCC 2025]). The WIM ExCom will soon publish guidance for including Loss and Damage in biennial transparency reports. Meanwhile, the UNFCCC SCF will continue to integrate loss and damage in its reports.

In addition to scale, the quality of finance provided is important. Finance should be adequate, predictable, sustainable and primarily grant-based; allocated equitably; and delivered rapidly enough to support response and recovery needs. Mechanisms should minimize access barriers, context-responsive, locally led and country-driven, while providing new and additional support alongside climate, humanitarian and development finance.

4.6 Conclusion

Climate-related loss and damage are already widespread, diverse and interconnected, and will increase as global warming, exposure and vulnerability rise (Pörtner *et al.* 2022). They occur in contexts where risk reduction measures are absent, delayed, inaccessible or ineffective, where residual risks remain despite action, and where mitigation action is inadequate and adaptation limits are reached. The evidence is sufficient to establish that loss and damage are already materializing across countries and communities, but not to provide a complete global account of the scale and distribution.

No single data set or method can capture the full scale and diversity of climate-related loss and damage. The assessment framework developed in this chapter connects complementary evidence building blocks across five assessment dimensions. Rather than requiring parallel systems, it can strengthen existing assessments and, through repeated application, support learning and track changes in loss and damage, residual risks, and response and finance gaps.

Responses to loss and damage are also expanding, but response gaps remain. Countries and communities are using a diverse range of approaches, including risk reduction and preparedness, social protection and recovery, livelihood support, human mobility and planned relocation, risk finance, and measures addressing NELs. However, the existence of a response does not itself establish adequacy, effectiveness or equity, and available evidence does not yet support a systematic assessment of the scale of the global response gap. Future assessment therefore needs to also examine whom responses reach, which losses they address, whether they reduce residual risk and vulnerability, and what trade-offs or new risks they may create.

Financing needs substantially exceed the resources currently available through dedicated Loss and Damage mechanisms, although the precise global finance gap cannot yet be robustly quantified. Existing estimates differ in definitions, methodologies, geographic coverage and time horizons, but consistently point to large financing needs relative to the resources currently available through the FRLD. A wider mosaic of adaptation, disaster risk reduction, humanitarian, social protection, recovery and reconstruction finance may also contribute to addressing loss and damage, but these flows remain difficult to identify and track, and access remains uneven. Assessing the finance gap therefore needs attention to the volume, accessibility, adequacy, predictability and quality of finance.

Finally, loss and damage have important justice implications because losses, capacities to respond and access to support are unevenly distributed. Climate-vulnerable countries, communities and groups often experience severe losses despite having contributed least to climate change, and having the least capacity to recover and often having fewer resources to respond and recover. Effective responses should recognize diverse forms of loss, enable meaningful participation, respect Indigenous and local knowledge, address gendered and other differentiated impacts, and ensure that support reduces rather than reinforces existing inequalities. The framework can support future AGR assessments and provide complementary evidence for the forthcoming regular report on loss and damage under the WIM, without prejudging its mandate or terms of reference.



The main square of Nui Island is still under water over a month after Cyclone Pam created huge waves.

Photo: © Florian Fussstetter / UNEP

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Chapter 3

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Ranvali village in Shrivardhan-Raigad, India, affected by Cyclone Nisarga.

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