

DISCUSSION PAPER

Fair Shares in Loss and Damage Finance

Brot
für die Welt



OXFAM
Deutschland



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List of abbreviations

BASIC	Group comprising Brazil, South Africa, India, and China
CBDR-RC	Common but differentiated responsibilities and respective capabilities
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of the Parties
GDP	Gross domestic product
GHG	Greenhouse gas
FLD	Fund for Responding to Loss & Damage
IPCC	Intergovernmental Panel on Climate Change
L&D	Loss and damage
LDC	Least developed country
LULUCF	Land use, land use change, and forestry
NCQG	New Collective Quantified Goal on Climate Finance
NELD	Non-economic loss and damage
ODA	Official development assistance
OECD	Organisation for Economic Co-operation and Development
PPP	Purchasing power parity
RCI	Responsibility and Capability Index
SDG	Sustainable Development Goal
SIDS	Small Island Developing States
SNLD	Santiago Network for loss and damage
UNFCCC	United Nations Framework Convention on Climate Change
V20	Vulnerable Twenty
WIM	Warsaw International Mechanism

Executive summary

Background of the discussion paper

For decades, vulnerable countries have advocated for solid agreements to advance the provision of financial support specifically aimed at addressing and responding to the needs associated with loss and damage (L&D) from extreme weather events and slow-onset processes. The decision to establish the new multilateral Fund for Responding to Loss and Damage (FLD) at the 27th Conference of the Parties (COP 27) was a historic milestone after decades of blocking by many developed countries (Siegele 2023). However, the fund's mere existence will not automatically lead to adequate provision of L&D finance, which still has no solid foundation within the international climate finance architecture under the Paris Agreement and the UN Framework Convention on Climate Change (UNFCCC). The goal to mobilise USD 100 billion per year in climate finance set by developed countries also does not cover addressing of L&D. Established principles of climate justice do, however, offer guidance on the need to provide L&D finance and who should provide it. The polluter pays principle and the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC), a foundational principle of both the Paris Agreement and UNFCCC, suggest that wealthy countries with historically high emissions should take the lead in responding to the climate crisis in a general sense and, specifically, providing climate finance and other support to developing countries affected by climate impacts. Given full operationalisation of the FLD and the upcoming adoption of a new global climate finance goal (NCQG), the question of fair shares in providing L&D finance arises.

Objective of this discussion paper

Calculating fair shares, including for mitigation and adaptation finance,¹ has a long tradition in the climate justice movement, yet a comprehensive² calculation of fair shares in providing L&D finance remains missing. This paper aims to contribute to filling this gap. As we explicitly do not take firm positions on several aspects brought up in this paper, we nonetheless offer it as a discussion paper to advance the debate. It does so by describing possible ways to arrive at fair shares in providing L&D finance, while seeking to inform and catalyse advocacy around these important processes and, ultimately, strengthen climate justice. The central question of this discussion paper is: **What would constitute a fair share for a country in providing finance to address L&D compared with other countries?**

L&D finance needs

There is no internationally agreed to amount that should be provided for adequately addressing L&D and that could be used as a basis for calculating fair shares in providing L&D finance. The L&D finance needs used for this discussion paper are: USD 275 billion/year for 2025 and USD 435 billion/year for 2030, based on Markandya/González-Eguino (2018).³

¹ See, for instance, Beynon 2023; Bos et al. 2021; Civil Society Equity Review 2015, 2016, 2018, 2022, 2023; Climate Action Tracker 2024; Colebrand et al. 2022; Gabbatiss/Evans 2022.

² The Civil Society Equity Review (2019) calculated tentative fair shares of L&D finance for a limited number of countries.

³ The calculations in this discussion paper obviously could be updated with improved figures once available. L&D finance should be new and additional, both to climate finance for adaptation and mitigation and to existing commitments to official development assistance (ODA) and humanitarian finance. It should be needs-based, adequate, and principally provided as grants and non-debt-creating financial instruments.

L&D finance contributor cases

Before calculating fair shares, we look at three possible cases for contributor bases. Note that we express no preference on any of these but offer all three to compare them to one another and study their implications:

- **Case 1: Annex II** – Limits the contributor base to countries listed in Annex II of the UNFCCC.
- **Case 2: Annex II plus countries ‘in range’** – Expands to countries with per capita responsibility and capability in the range of Annex II countries, using a dedicated methodology to assess if a country meets this criterion.
- **Case 3: All ‘developed’ countries** – Expands further to all countries that could be categorised as ‘developed’ countries. As there is no formal definition of what considers ‘developed’ we use a list of criteria to establish if or if not a country would be in this group (for the purpose of forming our Case 3).

All three cases start from the obligation for developed countries under Paris Agreement Article 9.1 to provide climate finance. This obligation only covers finance for mitigation and adaptation, but the omission of L&D finance was mainly due to developed countries’ political blocking during the Agreement’s finalisation. If developed countries are obligated to provide finance for mitigation and adaptation in developing countries, the reasoning underpinning this obligation could be equivalently applied to L&D finance.

For Case 3, we further consider it reasonable to interpret that Article 9.1 creates an obligation for *all* developed countries, not just Annex II countries. With no formal definition of ‘developed’ country (from a contemporary perspective), Case 3 considers a country developed if it meets at least one of several criteria: (1) Listed in UNFCCC Annex II (i.e. included in Case 1); (2) Per capita capability and responsibility in the Annex II range (i.e. included in Case 2); (3) An Inequality-adjusted Human Development Index [IHDI] of at least 0.8 (‘very high’); (4) Listed in UNFCCC Annex I; or (5) Categorised itself as a developed country for UN statistical purposes.

For comparison and to test the responsibility and capability approach this discussion paper uses to calculate fair shares in providing L&D finance, we also calculate the theoretical shares for a fourth case (which we do not consider a fair or defensible approach to L&D finance provision):

- **Case 4: All countries** – Here, we study the effects of including all countries that are parties to the UNFCCC in the contributor base, purely differentiating by responsibility and capability.

We do not consider this fourth case as a viable option for future L&D finance, as it would undercut the provisions and principles of the Paris Agreement and UNFCCC (e.g. the provisions of Article 9 and the extensions to L&D finance as argued above) and, thus, be inequitable and inadequate. Case 4 is offered solely for showing the resulting shares in an extreme boundary case that provides useful insights about the outside bounds of countries’ possible shares even under extreme assumptions that no country is advocating for in the climate negotiations.

Fair share calculation methodology

We then calculate L&D finance shares for each of the cases based on a composite indicator that combines, for each country, measures of ability (to provide resources), responsibility (for causing climate change), and development need.⁴

1. **Capability:** Overall economic output is used as a proxy for the ability to pay L&D finance. Income inequality within countries is considered, and the incomes of the poorest and wealthiest people are treated differently when measuring capability.
2. **Responsibility:** Cumulative territorial greenhouse gas (GHG) emissions since 1950 are used as a proxy for historical responsibility for causing climate change. Emissions of the poorest ('survival emissions') and wealthiest ('luxury emissions') are treated differently when measuring responsibility.
3. **Development need:** This is reflected by differently treating the incomes and emissions of individuals at different levels of prosperity, including by fully disregarding incomes below a certain level from calculating a country's capability, as it is appropriate to prioritise the use of those incomes toward securing a decent standard of living for all. Therefore, the excluded incomes are not considered available toward paying for climate action, including L&D finance.

While this discussion paper focuses on calculating an L&D fair share, its methodology could, in principle, also be applied to calculating fair shares for mitigation and adaptation finance. Indeed, it has been used for such purposes (e.g. in FoE US et al. 2021, Rac-France 2022, Holz 2024).

Findings

The following findings emerge from the fair share calculations:

Finding 1: Annex II countries remain responsible for providing the overwhelming majority of L&D finance (at least 88%). This also applies to Cases 2 and 3 that expand the L&D finance contributor base, emphasising these countries' continued responsibility to lead in finance provision. Even in Case 3 (All 'developed' countries to contribute), eight of the 10 countries with the highest fair shares in providing L&D finance are Annex II: United States (45.6%), Japan (9.3%), Germany (5.8%), Canada (3.8%), United Kingdom (3.8%), France (3.6%), Australia (3.0%), and Italy (2.8%). Note that even in the extreme and deeply inequitable case of expanding the contributor base to all countries as potential contributors (Case 4), Annex II countries would still have to provide 72% of the total L&D finance.

Finding 2: In all analysed cases, the United States has the highest L&D finance fair share. The fair share of the United States, the country with, by far, the largest combined responsibility and capability is, by far, the highest. Even in Case 3 (All developed countries) the United States' fair share is nearly half of the total (45.6% in 2025).

Finding 3: Under Case 3 (All 'developed' countries), countries not included in Annex II with non-negligible fair shares would be Russia (2.4%), Saudi Arabia (1.8%), South Korea (1.7%), Türkiye (1.4%), United Arab Emirates (1.1%), Qatar (0.7%), Singapore (0.5%), Poland (0.5%), Israel (0.5%), and Kuwait (0.4%). China, often implied in calls for an expanded contributor base, is not included in this list, as it does not meet the criteria that define a developed country per Case 3 in this

⁴ This composite indicator is the core of the Climate Equity Reference Framework that is used in this analysis (Holz et al. 2018). The Climate Equity Reference Framework itself is a further development of the earlier Greenhouse Development Rights framework (Baer et al. 2008, 2009) and is used extensively by civil society organisations and social movements around the world (e.g. CAN-Rac Canada 2019; CER 2021; Civil Society Equity Review 2015, 2016, 2017, 2018, 2019, 2021, 2022, 2023a; FoE US et al., 2021; Holz 2021, 2023, 2024; Johnston/Tong 2020; Kartha et al. 2018; Rac-France 2022; USCAN 2019) as well as some governments (UCT 2021; Nigeria 2021).

discussion paper. China appears only in our ‘extreme’ Case 4, expanding the contributor base to all countries, and would then have the third highest L&D finance fair share for 2025 (7.4%) after the United States and Japan and would have the second largest share after the United States by 2030 (8.5%).

Finding 4: In Case 3 (All ‘developed’ countries), the countries with the highest per capita fair share are: 1. Monaco (USD 1,089 per capita in 2025), 2. Lichtenstein (USD 710), 3. Qatar (USD 662), 4. Luxembourg (USD 616), 5. Norway (USD 419), 6. Ireland (USD 416), 7. United States (USD 361), 8. Switzerland (USD 337), 9. United Arab Emirates (USD 312), 10. Australia (USD 306). It is informative to compare the per capita figures, as opposed to national totals; for example, Türkiye’s total share (USD 3.8 billion) is slightly larger than Switzerland’s (USD 3.0 billion), which may seem unfair at first glance given their substantially different capabilities. However, comparing the per capita figures demonstrates that, when weighted by population, Switzerland’s fair share is in fact 8 times that of Türkiye (USD 337 versus USD 43 per capita on average in 2025).

Finding 5: Contributing fair shares in L&D finance from 2025 onward is important but only one of the many steps in realising climate justice. Another aspect involves dealing with the historical climate debt. Providing L&D finance for present and future L&D does not reduce the historical climate debt (i.e. for causing past L&D). An additional process is needed for dealing with this historical debt – both in calculating and providing financing to remedy it. The FLD can play a crucial role here.

Policy relevance

This discussion paper’s findings are highly relevant to the international debate around climate finance. Three key points stand out:

1. **Climate finance discussions:** The findings clearly show that delays in outcomes on L&D finance (and climate finance in general) caused by contributor base discussions are largely of a purely political nature and indefensible from a climate justice perspective.
2. **The FLD and related funding arrangements:** Information on the fair share of L&D finance will be relevant for the long-term funding structure and the fundraising strategy for the FLD, and its scope, which the Fund’s board is set to develop in 2024. This discussion paper’s findings can be used to hold countries accountable regarding their future L&D finance contributions and to inform on their performance compared with that of other countries.
3. **The New Collective Quantified Goal on Climate Finance (NCQG):** The NCQG, which will build on the USD 100 billion climate finance goal, is set to be decided at COP 29 in Baku. Thus far, there is no specific agreement for ensuring the provision of adequate finance to address L&D and the USD 100 billion climate finance goal does not cover addressing L&D. Including L&D alongside adaptation and mitigation under the NCQG, ideally as a subgoal or a predefined minimum floor, would help in building a solid foundation to facilitate L&D finance provision and, more specifically, a successful and effective FLD. This discussion paper’s results are also relevant for key questions around defining the NCQG, including those on the contributor base, and climate finance at large.

1 Introduction

1.1 Background

We are living in the ‘era of loss and damage’ (Huq 2023). Unprecedented climate change impacts are visible worldwide and are already a lived reality for people on all continents and in all regions. Science is ‘unequivocal.’ The results of the Sixth Assessment Discussion paper of the Intergovernmental Panel on Climate Change (IPCC 2022) clearly show how ‘human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people (...).’

Across sectors and regions, the most vulnerable systems and people, including marginalised groups, people, and populations, are disproportionately affected. Climate change’s hardest impacts are on those who have contributed the least to its causes and have the fewest resources to respond. For them, climate change perpetuates structural inequalities in gender, age, disability, race, migration status, income and wealth, and other areas. This threatens lives and livelihoods, food security, human security, culture, and sustainable economic development. Costs associated with L&D in developing countries are estimated to reach USD 128–937 billion per year by 2025 (Tavoni et al. 2024). Despite the known urgency, global mitigation and adaptation efforts are advancing far more slowly than what is needed (UNEP 2022). Emissions are increasing rather than decreasing (UNEP 2023a). These factors suggest escalating climate change impacts in the future. Developed countries have yet to contribute their fair share of globally needed climate action, including through providing financial assistance commensurate with their historical emissions and responsibility, and their respective capabilities to act (Colebrander et al. 2022).

For decades, vulnerable countries have advocated for solid agreements to advance the provision of financial support specifically for addressing and responding to L&D-related needs, from extreme weather events and slow-onset processes. The decision at COP 27 to establish the FLD as a new multilateral fund was a historic milestone after decades of blocking, mainly by many developed countries (Siegele 2023). The establishment lays the foundation for, in addressing and responding to L&D, supporting countries and people particularly affected by climate impacts. However, the fund’s mere existence does not automatically lead to adequate provision of L&D finance, which still lacks a solid foundation within the international climate finance architecture under the Paris Agreement and UNFCCC. The goal to mobilise USD 100 billion a year in climate finance that developed countries pledged in 2009 also does not cover addressing L&D.

Established climate justice principles do, however, offer guidance on the need to provide L&D finance and who should provide it. The polluter pays principle indicates that those responsible for pollution (in this case emissions) should pay to cover the costs of harm it causes. The CBDR-RC principle, foundational in both the Paris Agreement and UNFCCC, recognises that countries with high responsibility for emissions and high economic and financial capabilities should lead the response to the climate crisis (UNFCCC 1992). This response includes providing climate finance and other support to developing countries. From a human rights perspective, human rights law requires not only urgent action to prevent climate change-related violations of human rights but also that climate change-induced harm is remedied; the actors responsible for the harm (primarily states and businesses) should be accountable for remedying them (OHCHR 2024).

The question of fair shares in providing L&F finance arises in the context of both full operationalisation of the FLD and the expected adoption of an NCQG. Calculating fair shares – including for mitigation and adaptation finance⁵ – has a long tradition in the climate justice movement. However, there is still no comprehensive⁶ calculation on fair shares in providing L&D finance. This discussion paper helps to fill this gap. It does so by providing possible options to consider such fair shares, seeking to inform and catalyse advocacy around these pivotal processes and ultimately strengthening climate justice.

1.2 Objectives

This discussion paper addresses a key question: **What would constitute a fair share for a country in providing finance to address L&D compared with other countries?**⁷ Doing so requires discussing fundamental questions, some of which are subject to current political discourse in multilateral fora, including the UNFCCC. The questions include: What counts as L&D finance? How much L&D finance should be provided (e.g. under an L&D finance subgoal of the NCQG)? Which countries should provide L&D finance? To approach these questions' complexity and establish a basis for calculating the L&D fair share, we discuss the questions in chapter 2. We summarise the current state of research and the political discourse on these issues and use that background to make evidence-based decisions on the criteria and indicators for the fair share calculation (described in chapter 3).

L&D is a pivotal climate justice issue, and one aspect therein is that countries provide their fair shares in financial support to address L&D. This discussion paper contributes to this aspect in current debates and decision-making processes around L&D and climate finance and seeks to inform and catalyse advocacy around these processes. While we explicitly do not take firm positions on several aspects brought up in this paper, we nonetheless offer it as a discussion paper to advance the debate. Based on the fair share calculation's results, we derive a set of key findings and reflect on their policy relevance (chapter 6).

This discussion paper does not compare countries' past or current contributions and commitments to L&D finance with their fair shares. Although such analysis would have value, it would be difficult because official climate finance reporting does not include L&D finance. That analysis, therefore, is beyond the scope of this discussion paper but is a necessary next step that should be facilitated by transparent discussion papering of L&D finance separate to adaptation, development, or humanitarian finance.

This discussion paper calculates possible future fair shares based on future estimated needs (starting in 2025) and countries' historical responsibilities and current and future capabilities. The discussion paper does not include an assessment of past L&D caused by past emissions that constitutes part of countries' climate debt. Notably, paying L&D fair shares from 2025 onward is significant, but it is only one part of realising climate justice. The other part involves dealing with the historical climate debt. Future payments of L&D finance to address future losses and damages should not be considered contributing to 'debt forgiveness' for the historical climate debt. A separate and additional process is needed to calculate and deal with such debt.

⁵ See, for instance, Beynon 2023; Bos et al. 2021; Civil Society Equity Review 2015, 2016, 2018, 2022, 2023; Climate Action Tracker 2024; Colebrander et al. 2022; Gabbatiss/Evans 2022.

⁶ The Civil Society Equity Review (2019) calculated tentative fair shares of L&D finance for a limited number of countries.

⁷ While this discussion paper focuses on calculating an L&D fair share, its methodology could also be applied to calculating fair shares for mitigation and adaptation finance and has, indeed, been used for such purposes (e.g. in FoE US et al., 2021, Rac-France 2022, Holz 2024).

2 Creating the basis for an L&D fair share calculation: Fundamental concepts and issues

This chapter explains and defines concepts and terms relevant for calculating fair shares in providing L&D finance.

- Section 2.1 answer key questions relating to the L&D concept, including: What is L&D? Who is most impacted by L&D? Who is responsible for L&D and how is that measured?
- Then, 2.2 clarifies key questions relating to L&D finance, including: What counts as L&D finance? and How much L&D finance do developing countries need? We also look at the history of L&D finance under the UNFCCC.
- Then, 2.3 describes key climate justice principles relevant for calculating L&D finance fair shares.
- Finally, 2.4 reflects on the contributor base for L&D finance.

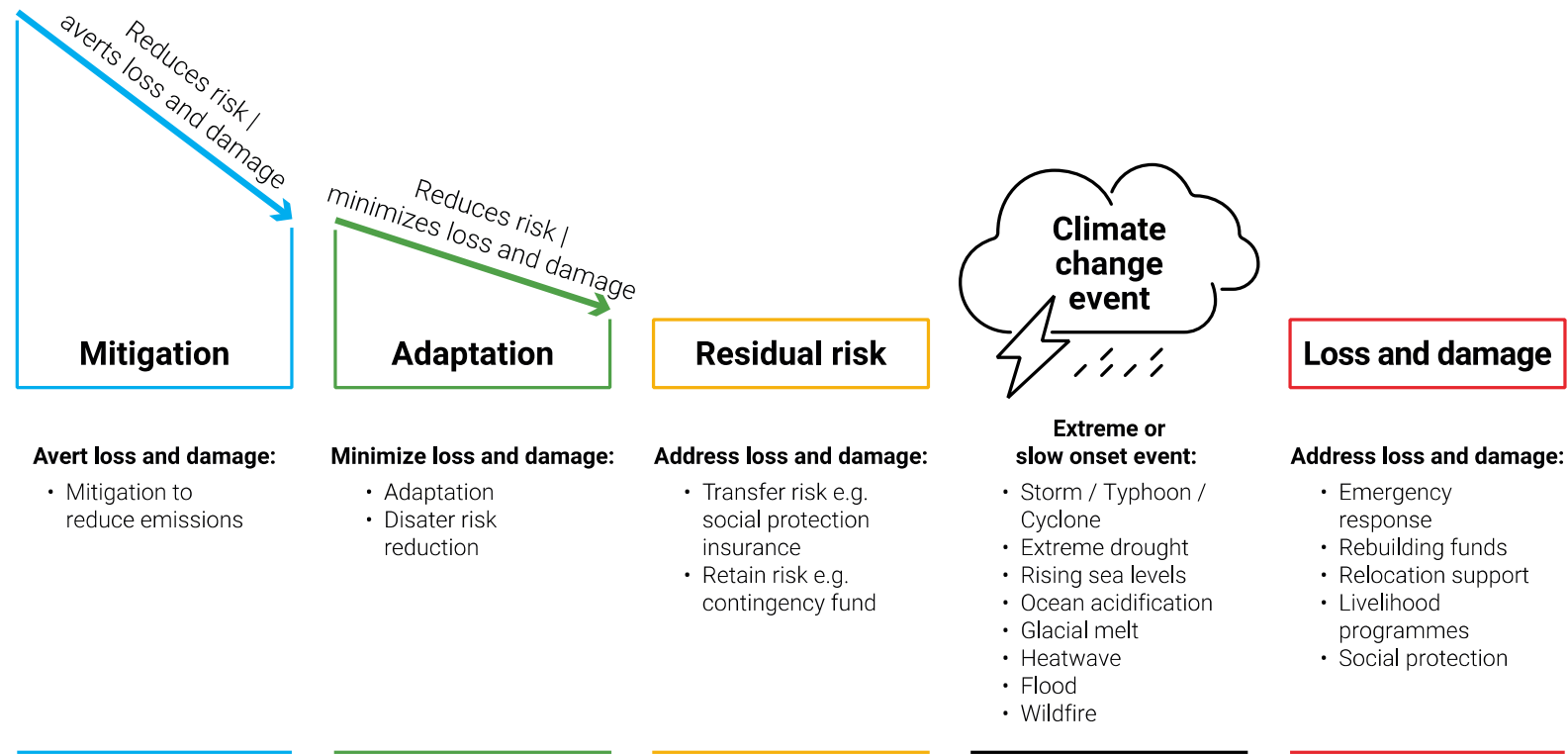
2.1 Loss and damage

2.1.1 What is L&D?

This discussion paper understands loss and damage/losses and damages as ‘adverse impacts of human-induced climate change on human societies and the natural environment that cannot or have not been avoided by mitigation or adaptation, or that will not be avoided in the future’ (Schaefer et al. 2021 based on Mace/Verheyen 2016: 198). Verheyen (2012) indicates there are three types of L&D: avoided, unavoided, and unavoidable. This designation reflects that a lack of mitigation and adaptation efforts leads to unavoided L&D due to physical, technical, financial, or political constraints and limits, especially for vulnerable countries. Certain L&D cannot be averted via mitigation or adaptation measures. This includes L&D due to slow-onset processes that have already begun and cannot be (fully) reversed, such as sea level rise (Schinko et al. 2016). The extent of L&D faced also depends on individual and collective vulnerabilities, determined by exposure, sensitivity, and coping capacity (IPCC 2022). L&D can be caused by extreme weather events (e.g. typhoons, floods) and slow-onset processes (e.g. glacial melting, sea level rise), as well as events triggered by a combination of those (e.g. glacial melting leading to glacial lake outburst floods, or sea level rise combined with increased storm intensity).

A main distinction can be made between economic and non-economic L&D. Climate change hazards cause L&D of items (resources, goods, and services) commonly traded in markets, such as property and infrastructure. Affected people, however, also experience loss of untradeable material and non-material items (Serdeczny 2018), such as cultural identity, human health, and lives. Non-economic L&D can take material (e.g. lives, biodiversity, territory) and non-material (e.g. identity, physical and mental health) forms (Morrissey/Oliver-Smith 2013).

Figure 1: Loss and damage risk cascade



Source: UNEP 2023b, adapted from Richards 2022.

2.1.2 Who is most impacted by L&D?

Climate change impacts are visible worldwide and L&D is already a daily lived reality in all regions and countries. Meanwhile, those with the fewest resources and the least historical and current contributions to the climate crisis bear the greatest burden of paying for L&D. The latest IPCC discussion paper (2022) highlights that, ‘across sectors and regions the most vulnerable people and systems are observed to be disproportionately affected.’ This is also partially because L&D perpetuates collective and individual vulnerabilities (van der Geest/Schindler 2017). These parts of the population are more vulnerable to hazards’ damaging effects (because, for instance, their livelihoods depend on fewer assets and their consumption is closer to subsistence levels) but have lower coping capacity (because, for instance, they cannot rely on savings to buffer the impacts and may need longer to rebuild and recover). These most impacted groups include Indigenous Peoples, women, children, older people, people with disabilities, migrants and refugees, farmers, and people living in poverty, especially in rural areas and coastal communities in low-income and lower-middle-income countries. L&D also particularly impacts these groups and communities because of entrenched structural inequalities, discrimination, and marginalisation. Marginalised communities, including climate refugees and disabled individuals with limited access to essential services and entrenched structural inequalities, encounter further challenges in navigating climate change impacts, thereby amplifying their vulnerability (RCCC 2023, Jattansingh 2023, Boyd et al. 2021).

On a national level, recent research clearly shows that countries in the lowest income quintile, mainly in Africa and Asia, that have ‘caused close to zero effects on other countries are suffering the greatest disadvantages from the emissions of larger economies’ (Callahan/Mankin 2022b). These impacts threaten life and livelihoods, food security, human security, and sustainable economic development (ibid.). Moreover, research shows that climate risks have worsened access to international capital and increased interest rates, resulting in higher indebtedness and lower investment (Buhr/Volz 2018) for low-income and lower-middle-income countries. These countries grapple with the dual challenge of heightened vulnerability to climate change impacts and limited capacity to minimise, avert, and address adverse impacts (IPCC 2022; Warner/ van der Geest 2013). Vulnerability hotspots, being exposed to a range of climate-related hazards, emerge across West, Central, and East Africa; South Asia; Central and South America; Small Island Developing States (SIDS); and the Arctic. Often, they are further compounded by complex socio-economic contexts influenced by historical and ongoing patterns, such as governance, inequality, modern forms of colonialism, and constrained access to resources (RCCC 2023).

The Global Climate Risk Index indicates that the countries that the quantified impacts of extreme weather events in 2019 most severely affected were predominantly low-income or lower-middle-income countries, with a significant portion designated as least developed countries (LDCs) (Eckstein/Künzel/Schäfer 2021). Climate change’s trajectory is clear: escalating L&D, particularly under scenarios surpassing 1.5°C of global warming. The World Meteorological Organization has warned that even temporarily breaching the 1.5°C threshold between 2022 and 2026 will have ominous repercussions for ecosystems, coastal settlements, and vulnerable regions worldwide (IPCC 2022).

The consequences will be dire once these climate thresholds are breached. Ecosystems will collapse, coastal communities will be forced to cope with rising sea levels, and water-stressed regions will face chronic scarcity. Despite concerted adaptation efforts, persistent adaptation gaps and entrenched socio-economic vulnerabilities will leave swathes of communities ill-prepared to confront the mounting challenges of a changing climate (IPCC 2022). From the frigid poles to the equatorial belt, natural systems are pushed to their limits, and the risks for vulnerable populations will only

increase. Coastal cities, small-island states, and communities dependent on coral reefs face a particularly precarious future, characterised by heightened vulnerability to the perils of climate change (IPCC 2022).

2.1.3 Who is responsible for L&D and how is that measured?

L&D that has not, will not, or cannot be avoided is, foremost, a result of inadequate climate change mitigation and adaptation action. Responsibility is rooted in GHG emissions, with their impact on global mean temperature changes, a changing climate, and resulting intensification of slow- and rapid-onset processes and events. Thus, ambitious mitigation measures are a critical prerequisite for reducing, minimising, and avoiding L&D. Current global mitigation action is highly inadequate. Rather than decreasing, global GHG emissions rose by 1.2% from 2021 to 2022, according to the latest emissions gap discussion paper (UNEP 2023a) and global average temperature increases are already exceeding 1.1°C (above pre-industrial levels) (UNEP 2023b). Countries thereby vary widely in their contributions. Also, significant variations exist when looking at income levels. At the global level, the 10% of the population with the highest income accounted for 48% of emissions in 2022 (two-thirds living in developed countries), whereas the bottom 50% of the world population (with the lowest income) accounted for 12% of emissions (UNEP 2023a). Attribution science provides certainty that this climate crisis exacerbation is resulting in intensified and more frequent extreme weather events (see Otto 2023) and slow-onset processes. Adaptation measures can minimise or further avoid the resulting impacts on people, environment, and economy. L&D materialises if measures are insufficient or (physical or financial) adaptation limits are reached. The lack of available financial support for lower-income countries is a key reason adaptation measures remain insufficient. The United Nations Environment Programme estimates the gap between finance provided and needed is USD 194–366 billion per year, with needs being 10–18 times higher than public adaptation finance flows (UNEP 2023). At the same time, the IPCC notes that residual climate risks (not to be avoided even with ambitious adaptation measures) will still apply, even with successful implementation of the Paris Agreement (IPCC 2021).

Meanwhile, there are attempts to attribute climate damages (such as economic losses) to countries' responsibilities for emissions. Callahan and Mankin (2022a) use a carbon-climate model to estimate the contribution of a country's emissions to calculate these temperature changes' economic effects at the country level. The study uses historical data and climate models to quantify each country's responsibility for historical temperature-driven income changes in every other country. This undertaking clearly illustrates high-emitting countries' responsibility for economic losses in low-income, tropical countries. The losses are attributable to the largest emitters, even when considering uncertainties (Callahan/Mankin 2022a).⁸ This is embedded in a situation where, as described above, many countries are not on track to meet their emission reduction goals.

⁸ The study mentions that the 'United States, China, Russia, Brazil, and India have collectively caused USD 6 trillion in income losses from warming since 1990, comparable to 11% of annual global GDP; many other countries are responsible for billions in losses' (ibid.).

Carbon Majors' responsibility

Of global CO₂ emissions, 72% can be traced back to the 122 biggest oil-, gas-, coal-, and cement-producing entities, labelled the 'Carbon Majors'.⁹ These include investor-owned companies (e.g. Chevron, ExxonMobil, BP, Shell, RWE), state-owned entities (e.g. QatarEnergy, Saudi Aramco), and nation states (e.g. China with its state coal and cement production, the former Soviet Union or the Russian Federation).

The Carbon Majors have massively profited from extracting and selling fossil fuels that cause climate change. They have done so without paying for the damage from climate change that their products cause. In 1985–2018, the top 25 oil and gas Carbon Majors are estimated to have caused USD 20 trillion in damages while earning USD 30 trillion over the same period (Schleussner et al. 2023). Another study found 21 coal, oil, and gas companies are responsible for USD 209 billion/year in compensation for the consequences of extreme weather and other climate change impacts predicted to occur around globally in 2025–2050 (Grasso/Heede 2023). Recently, many of these entities have enjoyed very high profits because of the fossil fuel price hikes caused by the Russian war against Ukraine. For 2022, the financial gains of seven Carbon Majors almost doubled the estimated damages their emissions caused that year: USD 497 billion vs USD 260 billion (Schleussner et al. 2023).

Even if they are not UNFCCC parties, the Carbon Majors have a moral and legal responsibility (see chapter 2.3 for the relevant normative principles) to pay for the L&D caused by emissions traced back to them. This is underscored by several court cases where specific companies, such as German energy company RWE, have been challenged for the damages they caused (see UNEP 2023c). The United Nations Secretary General and leaders of vulnerable countries have called for the use of windfall taxes to redistribute huge profits from Carbon Majors for L&D finance. There are precedents for a levy for those actors, including the International Oil Pollution Compensation Funds, 1992 Liability Convention, and 1992 Fund Convention. In the calculations of this paper, it is not possible to separately account for Carbon Majors' emissions – these are included in nation states' emissions. The Carbon Majors therefore have a high responsibility to contribute to their respective countries' L&D fair shares.

2.2 L&D finance

2.2.1 Brief history of L&D finance under the UNFCCC

After decades of debate on integrating L&D into global climate policy, L&D now is a distinct pillar of climate policy, alongside mitigation and adaptation. The inclusion of Article 8 in the Paris Agreement (Richards et al. 2023) and the establishment of the FLD, the Warsaw International Mechanism for Loss and Damage (WIM) and its Santiago Network for averting, minimising, and addressing L&D (SNLD) have contributed to L&D gaining this status.

L&D has been marked by a high degree of polarisation, driven by the need to address increasingly frequent and intense climate impacts' consequences (Roberts/Pelling 2018; Huber/Murray 2023) and decades of developed countries trying to block or avoid substantial progress on the matter. Over 30 years ago, during the 1991 drafting of the UNFCCC, Vanuatu, representing the Alliance of

⁹ See Carbon Majors database: www.carbonmajors.org.

Small Island States, proposed establishing an insurance mechanism to provide financial compensation to vulnerable countries impacted by sea-level rise. This proposal was rejected, and the L&D issue was not clearly addressed in the convention (Siegele 2023). Some progress was achieved in 2013 with the inception of the WIM, designed for knowledge exchange, stakeholder dialogue, and enhancing action support, aiming to fortify efforts to address L&D (Bhandari et al. 2022).

The inclusion of Paris Agreement Article 8 recognising the importance of ‘averting, minimizing and addressing’ L&D (UNFCCC 2016) was a critical step forward. However, the Paris Agreement’s obligation for developed countries to provide climate finance to developing countries only covers mitigation and adaptation and does not extend to addressing L&D, due to developed countries successfully blocking its inclusion during Agreement negotiations. At developed countries’ insistence, the COP decision adopting the Paris Agreement further clarified that Article 8 would not involve or provide a basis for any liability or compensation (UNFCCC 2016).¹⁰ This article, however, does not rule out financial support/finance for L&D in general.

At COP 26 in 2021, developed nations rebuffed calls from developing countries, especially climate-vulnerable nations, for a dedicated financing platform for L&D (Schalatek 2021). Instead, the SNLD was established in 2019, during COP 25 in Madrid, under the WIM to provide technical support to vulnerable countries (Richards et al. 2023) and the three-year Glasgow Dialogue was initiated to explore potential funding structures.

Since CO P27, considerable developments have unfolded for mobilising L&D finance. The FLD’s establishment marked a crucial step forward, aiming to efficiently mobilise and direct finance to assist particularly vulnerable developing countries in addressing climate change impacts. COP 28 then made further progress toward operationalising the FLD with the adoption of the FLD’s governing instrument and countries pledging nearly USD 700 million. The SNLD also became operational (Bhandari et al. 2024).

As COP 29 approaches, continued deliberations on the FLD’s arrangements, the Santiago Network and WIM, and potential inclusion of L&D under the NCQG for climate finance are anticipated. This environment emphasises the persistent commitment (at least from developing countries) toward identifying and expanding sources for L&D finance (Johnson/Wenger 2024). However, political will is needed to put L&D finance on a solid foundation for ensuring that adequate support is provided to impacted countries, and this will particularly involve further acknowledgment of developed countries’ historical responsibility in causing the climate crisis and associated negative impacts leading to L&D.

2.2.2 What counts as L&D finance?

L&D is determined by the level of preventive action, both through reducing emissions and by adaptation and disaster risk reduction measures to reduce vulnerabilities and build resilience. Consequently, effective strategies for mitigation, adaptation, and disaster risk reduction are an essential element for averting and minimising avoidable L&D. However, despite these efforts, some impacts are inevitable and require financial support for recovery and resilience-building and, thus, to address L&D through adverse impacts from human-induced climate change (Bhandari et al. 2024, Schäfer et al. 2021).

¹⁰ Notably, several countries issued, alongside their ratification of the Paris Agreement, a note that their understanding is that, in reverse, Article 8 would not limit or restrict other potential avenues, such as under international law, for addressing such liability or compensation issues in the future.

This discussion paper understands L&D finance as **climate finance dedicated to addressing L&D, ex-ante and ex-post, from extreme weather events and slow-onset processes in developing countries**. This understanding reflects the current UNFCCC understanding as defined in the FLD. Decisions 2/CP.27 and 2/CMA.4, established ‘a fund for responding to loss and damage whose mandate includes a focus on addressing loss and damage to assist developing countries that are particularly vulnerable to the adverse effects of climate change in addressing economic and non-economic loss and damage (NELD) associated with the adverse effects of climate change,’ and new (funding) arrangements that ‘complement and include sources, funds, processes and initiatives under and outside the Convention and the Paris Agreement’ (UNFCCC 2023).

L&D finance should be balanced and comprehensive – it should include funding for L&D due to both extreme weather events and slow onset processes, and for economic and non-economic damages (Richards/Schalatek 2023, Boyd et al. 2021). Funding to comprehensively address L&D should include the following categories and measures:

Table 1: Measures to address loss and damage

Financial protection	<ul style="list-style-type: none"> - Setting up, scaling up, premium support, or capacity building for climate risk insurance schemes - Integrating climate change risks and impacts into and/or scaling up social protection schemes - Setting up, scaling up, or capacity building for contingency funds
Emergency response	<ul style="list-style-type: none"> - Humanitarian and other relief immediately following an emergency to provide temporary and transitional assistance
Recovery and rehabilitation	<ul style="list-style-type: none"> - Rebuilding of economic, physical, social, cultural, and environmental assets, systems, and activities (including e.g. infrastructure, ecosystems and landscapes and livelihoods, and essential services) aligning with the principles of sustainable development and ‘build back better’ to avoid or reduce future climate risk - Rehabilitation for non-economic L&D (e.g. medical and psychological care and social services or rehabilitation of cultural losses)
Migration and alternative livelihoods	<ul style="list-style-type: none"> - Support measures for (planned) relocation or resettlement - Support for establishing alternative and/or diversified livelihoods – to build new skills, opportunities, and resources to diversify or establish alternative livelihoods - Support measures for climate-induced displaced persons
Addressing non-economic loss and damage (NELD)	<ul style="list-style-type: none"> - Active remembrance (e.g. through museum exhibitions and school curricula) - Recognition and repair of L&D (including through restitution, compensation, and measures of satisfaction such as official apologies) - Social and cultural identity and cultural heritage protection - Counselling and other mental health support - Conservation and restoration of ecosystems and biodiversity

Source: Based on (and adapted from) Schäfer/Jorks 2021, Richards/Schalatek 2023, Shawoo/Maltais 2021.

Current climate and development finance, which heavily relies on loans and other debt-creating instruments, is not only woefully inadequate compared with the L&D’s rising costs, but also exacerbates affected regions’ fiscal vulnerability. Over the past 10 years, 40 highly vulnerable countries’

additional interest payments on government debt amounted to USD 40 billion, undermining their ability to repay debts and increasing the costs to invest in recovery efforts and climate-resilient infrastructure (Jattansingh 2023). Moreover, the costs of addressing L&D themselves are increasing developing countries' debt burdens while exposure to climate impacts increases borrowing costs (Donovan 2018). This situation reduces long-term fiscal stability and capacity to invest in climate-resilient public services, and threatens progress in fighting poverty and achieving the Sustainable Development Goals (SDGs) (Achampong 2023). Therefore, equitable and effective remedies for L&D require providing L&D finance in the form of grants and non-debt-creating financial solutions.

L&D finance must (based on Schalatek/Bird 2022, CAN/DCJ/WGC 2023):

- Recognise and aim to comprehensively address L&D
- Be new, additional, needs-based, adequate, and predictable, surpassing existing commitments to official development assistance (ODA) and other types of climate finance
- Be predictable and the provision of finance must be just, gender-responsive, intersectional, and accessible for the most impacted and vulnerable communities and countries
- Be obligatory and compensatory, with funding provided as grants and non-debt-creating instruments
- Be equitably governed and provided, including by prioritising direct access for all developing countries and affected communities therein
- Ensure affected communities' meaningful and effective participation
- Respect, uphold, and promote human rights

2.2.3 L&D finance needs

There is still no specific agreement for ensuring the provision of adequate finance to address L&D. There is no internationally agreed to quantification of amounts to be provided for adequately addressing L&D that can be used as a basis for calculating fair shares for providing L&D finance.

Therefore, to calculate an L&D fair share, we use L&D finance needs estimates available in the literature. It may be possible to differentiate between the costs/needs and the proportion of the needs that should be covered through the provision of financial support. Even without a specific percentage of global climate finance attributed to addressing L&D, affected countries are already paying to deal with L&D within their respective borders. They will continue to do so if international support is inadequate. We have witnessed the difference in the context of the USD 100 billion goal – a number chosen based on perceived political feasibility and with little relation to the real needs and, therefore, completely inadequate. The setting of an NCQG on climate finance, currently being negotiated, is to consider developing countries' needs and priorities (UNFCCC 2016). Therefore, using needs estimates as a basis for quantification of financial assistance to address L&D is a legitimate measure.

There are no officially accepted estimates of L&D finance needs, and the existing estimates vary widely. Estimating climate L&D finance needs presents challenges:

- L&D heavily depends on emissions reductions and adaptation. Needs estimates, therefore, depend on assumptions about the scale and of adaptation and mitigation measures and development investments.

- Integrated assessment models used for estimating needs cannot adequately capture the nature and scale of climate change-related risks and, thus, the models likely underestimate the costs from L&D in developing countries and specific regions.
- The current L&D needs assessments are mostly based on top-down approaches (including the integrated assessment models). They provide an order of magnitude estimate for the resources needed to meet L&D estimates. However, a bottom-up sector-by-sector analysis of existing and projected L&D would provide a more detailed understanding of financing needs. Data availability and quality for this varies greatly among countries.
 - Costs associated with non-economic L&D, such as loss of human health, biodiversity, and cultural heritage, could be ‘sizable’ (Markandya/ González-Eguino 2018) but are less understood, much harder to quantify and, therefore, largely omitted in current needs estimates.
- Multiple factors are behind L&D, as hazards, intensified by climate change, interact with national- and local-level exposure and vulnerability (IPCC 2022).

IPCC, AR5 estimates of global annual economic losses for additional temperature increases of ~2.5°C are incomplete but within 0.2–2.0% of GDP (IPCC 2014). The latest estimates, however, show macroeconomic damages from climate change are six times what was previously thought. A 1°C increase in global temperature leads to a 12% decrease in global GDP (Bilal/Känzig 2024). In Vulnerable 20 countries’ economies, L&D is estimated to have cost 20% in lost GDP over the last two decades (V20 2022). The following estimates of finance needs for L&D exist beyond this very general assessment:

- **Markandya/González-Eguino (2018)** estimate (for non-Annex I countries), total residual damages of USD 116–435 billion in 2020, rising to USD 290–580 billion in 2030, USD 551–1,016 billion in 2040, and USD 1,132–1,741 billion in 2050. This only includes economic L&D.
- **Richards et al. (2023)** recalculated the estimation originally made by Markandya and González-Eguino in 2005 USD value to 2023 USD value as follows: 2020: USD 179–671 billion; 2030: USD 447–894 billion; and 2040: USD 850–1,567 billion. The study recommended that discussions of L&D finance should use USD 400 billion per year as a floor and acknowledged that actual financing needs will likely need revising upward over time.
- **The Independent High-Level Expert Group on Climate Finance** (Songwe et al. 2022) estimated investment/spending requirements for ‘coping with loss and damage’ (coping with immediate impacts and for subsequent reconstruction) to be USD 200–400 billion per year by 2030. The discussion paper, however, provided no information on the method used to prepare this estimate.
- **Howard/Sylvan (2021)** conducted an expert survey of 738 economists publishing climate-related research in the highest-ranking economics journals. The median forecast of their survey respondents anticipated global net economic damages of USD 1.7 trillion in 2025, increasing to USD 29.8 trillion in 2075 if the current warming trend continues and 3°C warming above pre-industrial levels is reached by that year. These figures are for global damages, though substantial amounts can reasonably be expected specifically in developing countries.
- **Baarsh/Schaeffer/Awal (2022)** estimate past economic losses attributable to anthropogenic climate change for the Climate Vulnerable Forum. They concluded that USD 525 billion had been lost because of climate change in the last two decades and economic losses

cut GDP growth by one full percentage point each year on average in the most vulnerable countries.

- **Tavoni et al. (2024)** estimated the total L&D funding needs for 2025 to be USD 395 (128–937) billion, based on a climate-economy model that calculated global economic impacts of climate change to have a median cost of USD 515 billion.

There are different L&D finance needs estimates and none are perfect because of the challenges in estimating the needs described above. In calculating a fair share, the amount of needs is an interchangeable variable. This discussion paper uses the estimates by Markandya/González-Eguino (2018), based on a proper economic impact assessment. The calculations could be updated with improved figures if required. As those estimates are presented as ranges of total residual damages, we use the value at the centre of those ranges per Table 2 below.¹¹ These numbers are also in line with recommendations by civil society, including the Loss and Damage Collaboration (Richards et al. 2023), Climate Action Network International (CANI 2024), and others (e.g. Martínez et al. 2024), which all conclude USD 400 billion per year as a floor for L&D finance.

Table 2: Loss and damage finance needs used for the fair share calculation

Year	Low estimate	High estimate	Centre of range
2025	116	435	275
2030	290	580	435

Note: Figures are given in billion USD per year, showing the low and high ends of the estimate by Markandya/González-Eguino (2018). We use the value at the centre of each range for 2025 and 2030 for our fair share calculation.

2.3 Climate justice principles relevant for calculating an L&D fair share

Climate justice can be understood as ‘paying attention to how climate change impacts people differently, unevenly, and disproportionately, as well as redressing the resultant injustices in fair and equitable ways’ (Sultana 2022). Climate justice is based on the inequities embedded in the causes and consequences of climate change: Climate change impacts are disproportionately felt in low-income and low-emitting developing countries, while high-income and high-emitting developed countries have disproportionately contributed to climate change (Callahan/Mankin 2022a). Climate justice involves the need for equity in procedures and responses related to climate change (Uri et al. 2024). This also includes climate finance as support for all actions to address climate change.

Based on this understanding, the calculation of an L&D finance fair share is rooted in the concept of transitional justice and based on elements of restorative and distributive justice.

Transitional justice

Transitional justice offers a set of tools and concepts for dealing with injustices at the interface of historical responsibility and imperatives for a new collective future. It aims to ‘enable purposeful transitions from a period of injustice to a more peaceful regime’ (Brankovic et al. 2021, p. 1). In the context

¹¹ Markandya/Gonzalez-Eguino used 2005 USD values for their calculation. Using updated USD values for the calculations would lead to substantially higher results. Richards et al. (2023) recalculated the estimate originally made in 2005 USD value to a 2023 USD value as follows: 2020, USD 179–671 billion; 2030, USD 447–894 billion. Additionally, according to the latest estimates, macroeconomic damages from climate change may be six times what was previously thought: A 1°C increase in global temperature leads to a 12% decline in global GDP (Bilal/Känzig 2024).

of climate change, transitional justice's goal is to 'recognize and at least partially remedy injustices while also building a sense of unity and solidarity' (Klinsky/Brankovic 2018, p. 3). The important components relevant for climate change context are: (1) Providing immediate support to those most impacted, such as through the L&D fund; (2) Avoiding recurrence or intensification of climate impacts and minimising additional harms to those already impacted through long-term support for low-carbon development targeted at those most marginalised; and (3) Cultural efforts, including non-legally binding apologies, sensitive wording and phrases used in formal texts, recognition that acknowledgment is, over the long term, less harmful than excessive caution driven by fears of legal liability, and commitments to education and awareness domestically (ibid.).

Based on these principles, the Global North owes Global South countries a substantial climate debt (Brankovic et al. 2021). This discussion paper calculates a future fair share (starting in 2025) based on the historical responsibility (through past emissions) and countries' current and future capability. It does not include an assessment of countries' past climate debt (i.e. previously causes damages). This means that providing L&D finance fair shares from 2025 onward is only one part in realising climate justice. The other part involves dealing with the historical climate debt. Future payments of L&D finance should not lead to forgiveness of the historical debt. An additional process is needed to calculate and deal with such debt.

Compensatory justice

Compensatory justice focuses on holding emitters accountable for their contributions to climate change and regulating how polluters must indemnify countries and people that their historic and current emissions affect. This approach is based, first, on the polluter pays principle, which is anchored as Principle 16 of the Rio Declaration (1992) and, second, on the no-harm rule indicating that states are duty-bound to prevent, reduce, and control the risk of environmental harm to other states. When harm is caused, there is an obligation to cease wrongful conduct and make full reparation for any injuries caused. The no-harm rule is a widely recognised principle of customary international law and is also anchored in Principle 2 of the Rio Declaration 1992. This principle is also echoed by the obligation under human rights for those responsible for human rights harms to provide effective remedies. However, if the political solution to support poor and vulnerable countries in dealing with unavoidable and unavoids L&D is only based on compensatory justice principles, then those facing L&D would only be supported in dealing with part of the harm faced. As this is ethically problematic, the political solution would need to include elements of distributive justice.

Distributive justice

In the case of an emergency (as materialising L&D is), 'someone is under duty to assist irrespective of whether that agent has caused the threat ("remedial responsibility")' (Wallimann-Helmer et al. 2018). States, because of their extraterritorial state obligations, are obliged to support one another and cooperate for realising human rights for all people (see Article 2.1 of the International Covenant on Economic, Social and Cultural Rights). Accordingly, developed and other wealthier country parties should take the lead in combating climate change and supporting lower income countries in addressing the adverse effects – at least if their government is unable to guarantee minimum essential levels of economic, social, and cultural rights to all. Moreover, the CBDR-RC principle anchored in UNFCCC Article 3.1 supports the same concept in saying that, 'the parties should protect the climate system for the benefit of present and future generations of humankind, based on equity and in accordance with their common but differentiated responsibilities and respective capabilities.' CBDR-RC recognises that high-emission countries should take the lead in assisting and supporting countries strongly affected by climate risks. They should do so through financial protection measures against L&D. This should,

however, be within their differing capabilities, and national and regional priorities, objectives, and circumstances (UNFCCC 1992) affecting their contributions to fulfilling the outlined responsibilities.

2.4 Reflections on the L&D finance contributor base

Several factors are relevant to the question of a contributor base that also includes obligations for L&D financing. The following summarises these factors under a legal and a principles-based perspective.

Legal perspective

From this perspective, the Paris Agreement and UNFCCC are the foundation for a contributor base.

Under the UNFCCC, developed countries that were members of the Organisation for Economic Co-operation and Development (OECD) in 1992, European Economic Community (now the European Union), and countries with economies in transition (Russia, Baltic states, and several Central and Eastern European states) were listed in Annex I and are, therefore, required to agree to economy-wide emissions reduction targets. All other countries are usually referred to as non-Annex-I countries. This dichotomous interpretation (Annex I and non-Annex I) of the CBDR-RC principle enabled international agreement on the Convention and its Kyoto Protocol (Pauw et al. 2019). Annex I countries that were also OECD members in 1992 were listed in Annex II, except for Türkiye.¹² These countries have accepted a legal obligation to provide climate finance for mitigation and adaptation as support for developing countries.

The Paris Agreement does not refer to the Annexes. Rather, it differentiates between developed and developing countries. Developed countries have specific obligations regarding mitigation activities, communication, and transparency, and regarding climate finance. Article 9.1 states that, ‘developed countries shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention,’ while Article 9.2 adds that, ‘Other Parties are encouraged to provide or continue to provide such support voluntarily.’

The Paris Agreement does not give a definition (or an Annex) on what makes a country developed or developing. Regarding developed countries’ financial obligation, the ‘in continuation of existing obligations’ in Article 9.1 could be interpreted as meaning that only UNFCCC Annex II countries have that obligation. However, the article can also be interpreted as creating an obligation for *all* developed countries, not Annex II. By this interpretation, the ‘in continuation’ addition would merely clarify that Annex II countries would fulfil this obligation in continuation with their existing obligations under the UNFCCC, while other developed countries also face the obligation as such but need not continue any existing obligations (as they have none).¹³

In the ongoing debate about climate finance’s future, developed countries usually argue that the strict distinction through the UNFCCC’s Annexes does not reflect global changes since 1992, such as countries’ evolved contributions to global emissions (concerning both current and historically accumulated emissions) and economic growth patterns. Arguably, the Paris Agreement distinguishes between developed and developing countries and not between Annexes. This theoretically allows for dynamism, as countries could acquire ‘developed country’ status (e.g. through nationally determined self-categorisation) and could then be considered covered under the relevant provisions in the Paris Agreement

¹² UNFCCC Parties and Observers. Available at: <https://unfccc.int/parties-observers>.

¹³ This interpretation is supported by analysis of Legal Response International. Available at: <https://legalresponse.org/legaladvice/interpretation-of-article-9-1-paris-agreement>.

applicable to such countries. This thinking is also reflected in the Paris Agreement adding the term ‘in the light of national circumstances’ to the CBDR-RC concept: As countries’ circumstances evolve, their common but differentiated responsibilities and respective capabilities change.

Several countries have joined the OECD, the grouping that was the original justification for identifying Annex II countries. Other countries, while not having joined,¹⁴ have seen considerable increases in economic and financial capabilities, per capita incomes, and/or emissions, with some now even categorising themselves as ‘developed.’¹⁵ Several countries that are not part of a traditional contributor base, not part of Annex II, or would not be categorised as covered under Paris Agreement Article 9.1 have become notable providers of international concessional finance (Colenbrander et al. 2022), despite having no formal obligation to provide climate finance or discussion paper on provision. Lately, some countries have also pledged finance to the FLD and other L&D funding arrangements (e.g. United Arab Emirates¹⁶ to the FLD and Saudi Arabia and China to the Pacific Resilience Facility¹⁷).

Regarding provision of L&D finance, developed countries usually reject a perspective that starts from existing climate finance obligations. Article 9.1 obligates developed countries to provide financial resources to assist developing countries only regarding mitigation and adaptation. Inclusion of L&D finance in Article 9 was blocked mainly by developed countries, foremost the United States. However, it can be argued that, were it not for this blockade, L&D finance could have been treated similarly to climate finance for adaptation and mitigation, because providing L&D finance, on the provision side, does not conceptually differ from climate finance for other purposes.¹⁸ Thus, if one accepts the logic underpinning the financial obligation as such, it could reasonably be seen as applying for provision of L&D finance as well, not least the weight L&D given through establishing a standalone Paris Agreement article covering it.

Principles-based perspective

The Paris Agreement provides a substantially weaker link between the financial obligations and responsibility for emissions than the UNFCCC, which notes in its preamble that, ‘the largest share of historical and current global emissions of GHG has originated in developed countries’¹⁹ and continued with establishing the CBDR-RC principle, before determining that, ‘the developed country Parties and other developed Parties included in Annex II shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change.’ In any event, CBDR-RC is also enshrined in Paris Agreement Article 2, stipulating that, ‘this Agreement will be implemented to reflect

¹⁴ As OECD membership is an issue of self-differentiation and requires the respective countries to apply as members (which can have advantages and disadvantages), it alone is not an objective measure for distinguishing between developed and developing countries.

¹⁵ For over half a century, international organisations have categorised countries as developing or developed and disseminated data grouped by these classifications. Unlike the classification of goods, economic activities, financial flows, or consumption purposes, classifying countries by development status is not based on a universal, objective definition (Hoffmeister 2020). Only some base their development status schemes on specific criteria and, among these, criteria differ. Development status is expected to be objectively related to development levels, despite differing concepts of development. Otherwise, the widespread use of country data aggregated by development status classes would be hard to justify. However, and notably, a country’s classification as developed or developing can also be based on a sovereign decision (see M49 Standard: <https://unstats.un.org/unsd/methodology/m49>).

¹⁶ Pledges to the Loss and Damage Fund. See: <https://unfccc.int/process-and-meetings/bodies/funds-and-financial-entities/loss-and-damage-fund-joint-interim-secretariat/pledges-to-the-loss-and-damage-fund>.

¹⁷ Pacific Islands Forum. Pledges to the Pacific Resilience Facility. See: <https://forumsec.org/publications/release-piflm52-global-pledges-begin-leaders-endorse-new-pacific-resilience-facility>.

¹⁸ Developed countries’ regular pointing to the legal limitations of Article 9.1 in relation to L&D finance is likely rooted in the continued political blockade rather than in genuine legality concerns.

¹⁹ The UNFCCC preamble no longer fully reflects the reality, as roughly two-thirds of current emissions originate in developing countries. However emissions in developed countries, as a group, remain larger than those of developing countries on a per capita basis, and developed countries’ share of cumulative historical emissions remains the largest.

equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.’

Interpreting these principles with recognition that countries’ responsibilities and capabilities are undergoing constant change, countries that now have accumulated responsibility and reached capability comparable with Annex II countries (or developed countries) could be expected to contribute comparably for climate finance, commensurate with their levels of responsibility and capability. Per the above, this would logically also include providing L&D finance.

Notably, a contributor base for climate finance *only* defined based on such a dynamic interpretation of CBDR-RC does not respect the existing financial obligations under the Paris Agreement and UNFCCC. However, the interpretation allows for a comparison of countries from a climate justice standpoint beyond the formalities of articles and paragraphs. It also establishes an understanding of fair shares for providing L&D finance (or climate finance at large) for individual countries. As shown later, this perspective also clearly shows that Annex II countries must still take the lead. They still bear primary responsibility for the climate crisis, despite some emerging economies’ considerably elevated emissions levels, because of their historical emissions to date.

The means of operationalising an understanding of responsibility and capability is, of course, a key issue. In all considerations on responsibility and capability in this discussion paper, countries’ development is factored in via an operationalisation of capability and responsibility that treats incomes of the poorest and wealthiest differently when assessing a country’s capability and treats emissions of the poorest (‘survival emissions’) and wealthiest (‘luxury emissions’) differently when assessing responsibility. See chapter 3 for details on how this discussion paper conceptualises and measures capability and responsibility.

2.5 Options for an L&D finance contributor base

Based on the above considerations, we examine three scenarios for defining a contributor base for L&D finance. We are aware of the political sensitivities around this issue and note that some scenarios could be seen as a maximalist interpretation of criteria used (e.g. in Case 3 on the notion of what constitutes a ‘developed’ country). We offer these cases without expressing a preference on any of them but we consider them useful to examine different scenarios for the purpose of illustration, comparison, and reference for upcoming discussions, including through showing the impacts of such an expansion of the L&D finance contributor base.

- **Case 1: Annex II** – This case assumes that only countries in UNFCCC Annex II would contribute to L&D finance. Based on their existing obligations to provide climate finance for adaptation and mitigation, we assume they would also bear primary responsibility for providing L&D finance per the above arguments.
- **Case 2: Annex II plus countries ‘in range’** – This case includes all Annex II countries but extends the list of contributors to countries that are parties to the UNFCCC,²⁰ whose per capita responsibility and capability are in the same range as Annex II countries.²¹ A country is considered in this range if its per capita capability is equal to or higher than that of the Annex

²⁰ Except the Holy See.

²¹ We use per capita values here instead of national totals because the comparison of countries with substantially different population sizes is most appropriately done on a per capita basis.

II country with the lowest per capita capability and per capita responsibility is equal to or higher than that of the Annex II country with the lowest per capita responsibility. See chapter 3 (Methodology) for details how we conceptualise and measure capability and responsibility.²²

- **Case 3: All ‘developed’ countries** – This case is based on the interpretation that Paris Agreement Article 9.1 results in an obligation for all developed countries to provide climate finance (extended to the provision of L&D finance, as argued above) and not just for those in UNFCCC Annex II. Thus, this scenario attempts to create a list of countries that could be categorised as developed (solely with respect to the provisions in Article 9.1). As there is no formal definition of what makes a country developed (from a contemporary standpoint), for this Case 3, a country is treated as a developed if it meets at least one of the following criteria:²³
 - Listed in Annex II of the UNFCCC (i.e. included in Case 1)
 - Per capita capability and per capita responsibility in Annex II range (i.e. included in Case 2)
 - IHDI of at least 0.8 (‘very high’)
 - Listed in UNFCCC Annex I
 - Categorises itself as a developed country for UN statistical purposes²⁴

We also calculate the theoretical shares for a fourth case (emphatically not a fair or defensible approach) for comparison and to test the responsibility and capability approach used in this discussion paper to calculate fair shares in providing L&D finance.

- **Case 4: All countries** – This case studies the effects of including all countries, developing or developed, that are parties to the UNFCCC in a hypothetical contributor base, purely differentiating by responsibility and capability and not by any country categorisation. We do not consider this case to be a viable option for future L&D finance, as it would undercut the provisions and principles of the Paris Agreement and UNFCCC (e.g. the provisions of Article 9 and the extensions to L&D finance as argued above) and, thus, is inequitable and inadequate. This case is solely to show the resulting shares in an extreme edge case providing useful insights on the outside bounds of countries’ possible shares even under extreme assumptions. The approach of this case – to expect all countries to contribute to providing L&D finance – is not consistent with key climate justice principles, including polluter pays and do no harm. As shown later, in this case, the size of countries’ theoretical contributions would vary widely. For countries with the lowest capability and responsibility, it would be negligible – given the vast differences in responsibilities and capabilities – and would be much smaller than the L&D finance these countries would be entitled to receive.

Figure 2 gives an overview of countries included in the three main cases for the calculations of results and which criteria they met to justify inclusion in each case.

²² We owe the idea that countries should perhaps be considered contributors to climate finance when their per capita responsibility and capability are comparable to Annex II countries to Colenbrander et al. (2022). However, our implementation differs in that we use inequality-aware conceptualisations of responsibility and capability (see chapter 3 for details) and consider countries for inclusion only if they are in the Annex II range for both metrics, whereas Colenbrander et al. (2022) suggests that one might be sufficient.

²³ See Appendix 2 for a discussion of the criteria and additional criteria considered but not used for defining ‘all developed countries’ here.

²⁴ The UN Statistical Division maintains a list of ‘developed’ and ‘developing’ countries, based on historical classification as developed and on countries’ own declarations to the UN Statistical Division that they wish to be considered a developed country, ‘on the understanding that being part of either developed or developing region is through sovereign decision of a state.’ See: <https://unstats.un.org/unsd/methodology/m49#devdandDeveloping>.

Figure 2: Loss and damage finance contributor base in the three main cases and criteria used

	Annex II	Per Capita Capacity & Per Capita Responsibility in Annex II range	Very high IHDI	Annex I	M49 Self-Declaration
Case 3: All 'developed' countries	Case 1: Annex II				
	Australia, Canada, Denmark, Iceland, Ireland, Luxembourg, Netherlands, Norway, United States, Japan, Sweden, Switzerland, Belgium, Germany, New Zealand, Austria, Finland, France, United Kingdom, Italy, Greece				
	Spain, Portugal				
	Liechtenstein, Monaco				
	San Marino				
	Singapore, United Arab Emirates				
	Andorra, Israel, South Korea				
	Qatar, Brunei, Kuwait, Bahamas, Bahrain, Saudi Arabia				
	Slovenia				
	Hungary, Latvia, Slovakia, Croatia, Czech Republic, Estonia				
	Cyprus, Malta				
	Lithuania, Poland, Belarus, Bulgaria, Romania, Ukraine, Russia				
	Türkiye				
	Montenegro, Serbia				
	Case 2: Annex II plus countries 'in range'				

Source: Authors' own, based on calculations carried out using the Climate Equity Reference Calculator (Kemp-Benedict et al. 2024, Holz et al. 2019).

3 Methodology: How to calculate L&D finance fair shares

L&D finance shares are calculated for the cases described above based on a composite indicator that combines, for each country, measures of capability (to provide resources), responsibility (for causing climate change), and development need.²⁵

1. **Capability:** Overall economic output is used as a proxy for the ability to pay L&D finance. Income inequality within the countries is considered and the incomes of the poorest and wealthiest people, and those that are neither, are treated differently when measuring capability.
2. **Responsibility:** Cumulative territorial greenhouse gas (GHG) emissions since 1950 are used as a proxy for historical responsibility for causing climate change. Emissions of the poorest ('survival emissions') and wealthiest ('luxury emissions'), and those that are neither, are treated differently when measuring responsibility.
3. **Development need:** This is reflected by differently treating the incomes and emissions of individuals at different prosperity levels, including by disregarding incomes below a certain level from calculating a country's capability, as it is appropriate to prioritise the use of those incomes toward securing a decent standard of living for all. Therefore, the excluded incomes are not considered as available for paying for climate action, including L&D finance.

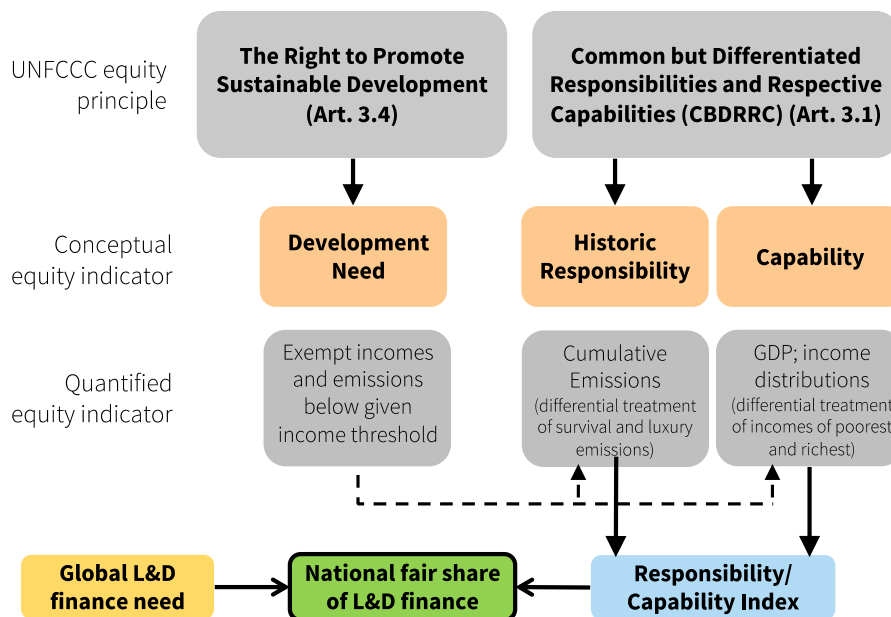
This composite indicator, called the Responsibility and Capability Index (RCI), is calculated for each country.^{26, 27} We calculate fair shares of L&D finance in proportion to each country's RCI as a fraction of the sum of the RCIs of all countries in each of the three main 'contributor base' cases described above. For comparison, we also provide such results for the fourth case (all countries to contribute). While this discussion paper focuses on calculating L&D fair shares, its methodology could also be applied to calculating fair shares for mitigation and adaptation finance. Appendices 5 and 6 provide details about the data sources used in the fair shares calculations (appendix 5) and the mathematical formulas behind the Climate Equity Reference Calculator (appendix 6).

²⁵ The composite indicator is based on national totals rather than per capita values because this part of the analysis uses this to calculate the total national fair shares of entire countries. In the earlier analysis of countries' capability and responsibility to assess whether they should be included in Cases 2 or 3 (see section 2.4 above), we used per capita values instead because that analysis' objective was comparing countries with vastly different populations, which is only meaningful on a per capita basis.

²⁶ The RCI composite indicator is the core of the Climate Equity Reference Framework used in this analysis (Holz et al. 2018). The Climate Equity Reference Framework itself is a further development of the earlier Greenhouse Development Rights framework (Baer et al. 2008, 2009) and is used extensively by civil society organisations and social movements worldwide (e.g. CAN-Rac Canada 2019; CER 2021; Civil Society Equity Review 2015, 2016, 2017, 2018, 2019, 2021, 2022, 2023a; FoE US et al., 2021; Holz 2021, 2023, 2024; Holz et al. 2022; Johnston/Tong 2020; Kartha et al. 2018; Rac-France 2022; USCAN 2019) as well as some governments (UCT 2021; Nigeria 2021).

²⁷ Calculations were performed with the Climate Equity Reference Calculator (Kemp-Benedict et al. 2024, Holz et al. 2019) using a custom variant of version 7.4 of the Climate Equity Reference Calculator database created for this analysis, where the actual national emissions replaced the default no-effort baseline emissions projections up to 2022. For reproduction purposes, this custom database is available from the authors on request. A live version of the calculator is available at <https://calculator.climateequityreference.org>; the open-source code can be accessed at <http://github.com/climateequityreferenceproject/cerc-web>.

Figure 3: The Climate Equity Reference Framework as used in this discussion paper



Source: Adapted from Holz et al. 2022.

Several additional indicators for capability and responsibility have been discussed in the context of this methodology. Appendix 2 gives a list of these and an explanation of why they were found not applicable for this discussion paper.

3.1 Capability and development need

We conceptualise the ability to pay for L&D finance, or capability, as the total income of a country available once the basic needs of its population to ensure a decent standard of living for all have been met. The first instance uses countries’ GDP²⁸ as a proxy for capability to pay for L&D and the second instance makes deductions from that value to account for countries’ development need, as described below.

Development need

To take development needs properly into account when considering a country’s capability (or ability to pay), we treat incomes earned by individuals at different income levels differently from each other. In the first instance, we completely exclude all incomes earned by the poorest, regardless of whether they live in a wealthy or less wealthy country, from the calculation of equity. Per the Climate Equity Reference Framework, this exclusion threshold is called the ‘development threshold,’ and is set, for this discussion paper’s central case, at USD 7,500 (2005, PPP)²⁹ per person per year. It is set to protect a decent standard of living largely free of poverty’s adverse impacts but is by no means a

²⁸ Conceptually, gross national income (GNI) would be the more appropriate principal measure to use here for ability to pay, as it includes income earned by a country’s residents from sources outside the country but does not include income earned in the country by non-residents. Instead, however, we use GDP here as a proxy for GNI. This is mainly because publicly available datasets for GNI have major data gaps and, therefore, are unsuitable for an analysis like this, which includes all countries. Importantly, GNI and GDP are extremely closely correlated, so that GDP is a suitable proxy for GNI, despite the former’s relative weakness as a measure of ability to pay.

²⁹ The unit of measurement for the development threshold is 2005 USD, with purchasing power parity (PPP) adjustment, written as USD (2005, PPP). Purchasing power adjustment is important for the development threshold because the same USD amount has vastly different purchasing power in different countries and, therefore, a different amount of income (before PPP adjustment) is needed to provide the same standard of living. PPP adjustment, therefore, makes incomes comparable across countries.

standard of living that more affluent populations enjoy (see Appendix 1 for more details on the justifications for this level and methodological details on how the development threshold is implemented).

It also is appropriate to treat incomes just above the development threshold differently than incomes of much wealthier individuals. Therefore, we use a second, higher threshold, of USD 50,000 per person per year (in 2010 USD, without PPP adjustment). Only incomes above this higher threshold are fully counted as contributing to a country's capability to respond to the climate crisis (as any additional income above the threshold would correspond to purely discretionary consumption), while the degree to which incomes between the lower and upper thresholds are counted as capability gradually increases from 0% to 100% between the thresholds. This condition reflects the notion that incomes just above the development threshold mostly still represent non-discretionary spending supporting extremely modest standards of living, but this changes as incomes increase further above the lower threshold. Sensitivity cases (see Appendix 3) include different choices for the level at which both thresholds are set.

All countries have at least some people receiving incomes above the higher threshold and some below the basic development threshold. The Global North countries have proportionately more people above both thresholds, with considerable individual variations.

3.2 Responsibility

This discussion paper conceptualises responsibility as a country's responsibility for causing climate change (and, thus, for causing L&D). This is measured as the country's cumulative total territorial GHG emissions. Recognising the meaningful difference between the minimal 'survival emissions' associated with the consumption of the poorest and the 'luxury emissions' of the more affluent and the rich (Shue 1993), emissions associated with the consumption below the development threshold (as defined in 'Capability and development need' above) are exempted from being counted toward the country's responsibility. In this regard, the degree that emissions are associated with consumption between the development and higher thresholds gradually increases. Emissions associated with consumption above the higher threshold are counted fully.

Emissions accounting approach

The analysis uses cumulative territorial emissions because the UNFCCC uses this method of emissions attribution. The main alternative is consumption-based emissions accounting, whereby countries are also held responsible for the emissions embodied in their imports, but not those in their exports (as they become the responsibility of the importer/consumer). Consumption-based emissions are relevant, as countries might have reduced their territorial emissions but maintain a high demand for high-carbon goods and services imported from overseas and, thus, can be considered responsible for the emissions associated with these goods' and services' production. Consumption-based emissions accounting places full responsibility on users of products and services rendered with fossil energy, tending to reduce the total for major exporters, such as China. Critics of consumption-based accounting note that it does not fully resolve the question of responsibility for emissions, given that both sides of a trade relationship are likely to gain financially (Evans 2021). Appendix 3 (Tables A-3 and A-4) provides a sensitivity analysis for Cases 3 and 4 with consumption-based instead of territorial emissions accounting.

Scope of emissions

The analysis includes GHG emissions from all sources except land-use, land-use change, and forestry (LULUCF). Reasons for excluding LULUCF emissions are: (1) The available data for national land use emissions are partial, inconsistent, and contain inaccuracies. High-quality country-specific data would be needed for this analysis but is not available for all countries; (2) Even with accurate data and accounting, a strict fungibility between fossil carbon and land-based carbon is deeply problematic in that it falsely equates the scope for unstable, limited, and multi-purpose stock of carbon on the land to substitute for the permanent and secure stock of fossil carbon deep underground; and (3) Assigning the responsibility for historical LULUCF emissions should consider colonial history. The current country should not necessarily be assigned the responsibility of these emissions, but rather it should be the country that controlled the land at the time of the emissions; e.g. European empires should be held accountable for emissions occurring during their time of direct colonial control. There are currently no accurate calculations for this, though early calculations indicate that the European colonisers are responsible for most of the historical LULUCF emissions from Asia and Africa (Evans/Viisainen 2023). This last reason is especially relevant for historical emissions before the end of direct European colonisation in the mid-20th century and, thus, does not arise here to the same degree as if a longer time horizon were used.

Time horizon for historical emissions

The cut-off year for counting historical emissions used in the central case of this analysis is 1950. Appendix 3 (Table A-2) shows sensitivity analyses for 1850 and 1990.

Reasons for choosing 1950 as the cut-off year are:

- L&D is caused by the total GHG accumulation since the beginning of large-scale emissions causing the current levels of climate change and, thus, causing climate change-induced L&D. The ‘Great Acceleration’ (Steffen et al. 2015) of industrial development that marked a substantial increase in GHG emissions started after the end of the World War II, around 1950.³⁰ Economic development rose during that time and the infrastructure put in place (much of it is still in place) continues to benefit present generations in certain countries. Thus, based on the ‘benefactor’s responsibility’ principle, it is appropriate to count emissions from that point onward.
- In the wake of World War II, and in the context of the end of direct European colonisation in most former colonies, nation-state boundaries from about 1950 largely reflect the present-day situation. Thus, emissions after that point are more clearly the present-day countries’ responsibility, though, for the prior period of direct colonial rule, a legitimate case could be made that it is more appropriate to assign this responsibility to the colonisers rather than the colonies (see, for example, Evans/Viisainen 2023).

Other analyses of fair shares or equitable effort sharing have used different cut-off years, including 1990 (e.g. Colebrander et al. 2022, Pettinotti et al. 2023), 1979 (e.g. Beynon 2023), and 1850 (e.g. Civil Society Equity Review 2015). The respective authors argue that those years represent times when sufficient scientific consensus on climate change was available that could be used to politically justify domestic action (the first IPCC discussion paper was published in 1990) and when there was a clear uptick in the frequency with which world leaders at the UN General Assembly meetings referred

³⁰ Of all GHG emissions (including LULUCF) emitted in 1850–2022, 77% is attributable to the post-1950 period (own calculations using Gütschow et al. 2024).

to climate-related issues (1979), or the full extent of reliably calculable responsibility (1850 is a typical time horizon for emissions datasets).

However, as L&D is caused by the total accumulation of carbon dioxide, and to various degrees, other GHGs in the atmosphere, it is appropriate to include cumulative historical GHG emissions over a longer time horizon. Doing so would, arguably, be a more faithful application of the polluter pays principle. The 1950 start date this discussion paper uses for counting historical emissions represents a compromise between a full accounting of historical responsibility that an even earlier start date would provide and the meaningful advantages of 1950 over earlier dates, as detailed above.

Figure 4: Key normative choices used in this discussion paper

	CENTRAL CASE	SENSITIVITY CASES
CAPABILITY		
Lower-income threshold (‘development’ threshold below which per capita income does not count toward national capability)	USD 7,500 per person per year (PPP-adjusted 2005 USD)	USD 17,380; USD 29,000 ³¹ per person per year (PPP-adjusted 2005 USD)
Higher-income threshold (threshold above which income fully counts toward national capability)	USD 50,000 per person per year (unadjusted 2010 USD)	No higher threshold used
RESPONSIBILITY		
Historical responsibility cut-off year	1950	1850; 1990
Emissions accounting approach	Territorial emissions accounting, all greenhouse gases, excluding LU-LUCF	Consumption-based emissions accounting (other choices constant)
Relative weighting of capability and responsibility	Equal/average (50% : 50%)	No sensitivity case

³¹ These thresholds represent different views on the appropriate level of the development threshold civil society groups previously used: USD 17,380 reflects the French poverty line and was used in fair share calculations by Réseau action climat France (Holz et al. 2022); USD 29,000 reflects the income threshold between the bottom 90% and top 10% of global income distribution, used in the US Climate Action Network’s fair share calculations (USCAN 2020).

4 Results: L&D finance fair shares

Section 2.4 defines three cases of groups of countries among which L&D finance could be fairly shared (according to different criteria, including a plausible, illustrative, though not universally shared, interpretation of what constitutes a ‘developed country’). Section 3 outlines a methodology for calculating a composite indicator of responsibility, capability, and development need. This RCI is intended to reflect CBDR-RC as the UNFCCC’s core equity principle. Based on these steps, this discussion paper now presents and discusses the results of the indicator’s calculations and the resultant L&D finance fair shares.

This chapter, in section 4.1, will first explore some of the key metrics that are used in these calculations and show how they change over time, thus enabling the dynamic differentiation used here. Subsequently, in section 4.2, the results of the fair share calculations for L&D finance contributions in 2025 and 2030 are presented for the three main contributor base cases. Section 4.3 contrasts these central results with the theoretical shares of the fourth comparison case to illuminate the possible values’ outer bounds.

4.1 Background: Key effort-sharing metrics and dynamic differentiation

Table 3 shows key effort-sharing metrics for 2020 – reflecting responsibility, capability, and development need – for a selection of countries and groups of countries. This demonstrates the relationship between these key metrics and the composite RCI used here to calculate countries’ L&D finance fair shares.³²

Developed countries, such as the United States and European Union countries, represent relatively small shares of the global population (column 2, 17.2% is the total for all developed countries) but have a much larger share of the global combined responsibility and capability (79%, column 9 ‘RCI’). Their disproportionately large share of the overall world economy (62%, column 4) is part of the reason, though their disproportionately large share of responsibility for historical emissions (column 8) is another factor.

Recall that indicators of capability and responsibility used here are ‘progressive’ (see the discussion of the ‘development threshold’ and the higher threshold and their application to indicators of capability and responsibility in chapter 3). The word ‘progressive’ is used here with the economic, not political, meaning. In this sense, for example, income tax systems are said to be progressive if lower incomes are subject to lower average tax rates than higher incomes (i.e. the tax rate ‘progresses’ with the income). Here, the impact of progressive measurement of capability and responsibility can be clearly observed when comparing countries’ and groups’ shares of the global economy (column 2) and global capability (column 7) or their PPP-adjusted GDP per capita (column 5) with the per capita capability (column 6). For example, while the United States GDP represents 22% of the global economy, the country’s global capability is much greater, at 35%. In contrast, India’s share of the global economy is 3.3%, while its share of global capability is only 0.4%. This disparity largely owes to the exemption of incomes of the poorest (with incomes below the development threshold) and different countries having different population ratios below this threshold, the impact on their capability indicator, relative to their GDP share, differs accordingly. Column 10 shows the percentage of the population for each country and group that received incomes above the threshold. In the

³² All results reported in this section were obtained using the Climate Equity Reference Calculator (Kemp-Benedict et al. 2024, Holz et al. 2019)

United States and European Union, 95% or more of the population receives an income above the threshold, though only 14.5% does so in India.

Table 3: Key effort-sharing metrics of selected countries/regions in 2020

	2020									
	1	2	3	4	5	6	7	8	9	10
	population (million)	population (% of global)	GDP (USD Billion)	GDP (% of global)	Income Per Capita (PPP)	Capability per Capita	Capability (% of global)	Responsibility (% of global)	RCI (% of global)	Population above development threshold (%)
United States	340	4.3%	17,795	22.0%	47,425	29,054	35.0%	43.1%	39.0%	95.7%
European Union	449	5.7%	15,569	19.3%	29,924	13,093	20.9%	15.3%	18.1%	94.8%
China	1,425	18.3%	12,067	14.9%	12,550	1,259	6.4%	4.7%	5.5%	50.4%
India	1,396	17.9%	2,707	3.3%	4,332	90	0.4%	0.4%	0.4%	14.5%
OPEC Middle East & North Africa	230	2.9%	2,117	2.6%	12,898	2,780	2.3%	4.7%	3.5%	42.1%
Rest of Africa	1,307	16.7%	2,290	2.8%	3,009	111	0.5%	1.5%	1.0%	8.9%
Latin America	649	8.3%	5,426	6.7%	10,096	2,052	4.7%	6.9%	5.8%	33.4%
Other Developed Countries	559	7.2%	16,462	20.4%	25,293	12,657	25.1%	19.5%	22.3%	77.0%
Other Developing Countries	1,453	18.6%	6,395	7.9%	6,713	897	4.6%	4.1%	4.4%	21.1%

Note: Responsibility is based on cumulative GHG emissions (excluding LULUCF) in 1950–2020, while all other metrics are for 2020. RCI is the Responsibility and Capability Index – the average between capability and responsibility – and measures the country's/region's share of combined global capability and responsibility. For simplicity, and for this table only, 'other developed' and 'other developing' countries are defined according to their membership and non-membership in UNFCCC Annex I, respectively, though the main fair share results in this paper use a different definition of 'developed' and 'developing.'

Recall that indicators of capability and responsibility used here are 'progressive' (see the discussion of the 'development threshold' and the higher threshold and their application to indicators of capability and responsibility in chapter 3). The word 'progressive' is used here with the economic, not political, meaning. In this sense, for example, income tax systems are said to be progressive if lower incomes are subject to lower average tax rates than higher incomes (i.e. the tax rate 'progresses' with the income). Here, the impact of progressive measurement of capability and responsibility can be clearly observed when comparing countries' and groups' shares of the global economy (column 2) and global capability (column 7) or their PPP-adjusted GDP per capita (column 5) with the per capita capability (column 6). For example, while the United States GDP represents 22% of the global economy, the country's global capability is much greater, at 35%. In contrast, India's share of the global economy is 3.3%, while its share of global capability is only 0.4%. This disparity largely owes to the exemption of incomes of the poorest (with incomes below the development threshold) and different countries having different population ratios below this threshold, the impact on their capability indicator, relative to their GDP share, differs accordingly. Column 10 shows the percentage of the population for each country and group that received incomes above the threshold. In the United States and European Union, 95% or more of the population receives an income above the threshold, though only 14.5% does so in India.

However, this approach to conceptualising and calculating capability (and, analogously, responsibility) also means that even countries with average per capita incomes below the threshold, and substantial ratios of their population below it, are considered to have some capability. For example, in India, 85.5% of the population receives incomes below the threshold (column 10) and the average

per capita income (column 5) of USD 4,332 is well below the development threshold. Yet the remaining 14.5% of the population (about 200 million people) have incomes above, with many far above, the development threshold and these incomes are counted toward India's capability.

Table 3 also clearly shows how the various key effort-sharing metrics are distributed very differently from each other. This is perhaps most striking when comparing population shares (column 2) and shares of capability (column 7) and responsibility (column 8), respectively, wherein wealthier countries tend to have much smaller population shares than shares of global capability and responsibility, with the reverse true for less wealthy countries. The comparison of shares of responsibility and capability is equally informative and reveals the differing degrees of carbon intensity of countries' economies. For example, while the share of global responsibility is larger than that of global capability for the United States and the oil extracting countries of the Middle East and North Africa, the reverse is true for, for example, the European Union, China, and India. This finding is partially influenced by the choice of the 1950 cut-off year for historical emissions, which disregards the earlier emissions that had a substantially different global distribution than post-1950 emissions. (Appendix 3 shows results of a sensitivity analysis with different cut-off dates.)

Dynamism is an additional aspect of the effort-sharing methodology used in this analysis. As countries change, their populations become more affluent and their continuing emissions add to their cumulative responsibility, as do their shares of global responsibility and capability and, consequently, their RCI. Table 4 shows a subset of the metrics from Table 3 above and, in addition to the 2020 data, calculations based on projections for 2025, 2030, and 2035. Over time, the shares of the United States, European Union countries, and other developed countries of both global capability and responsibility will decline (with the latter declining faster). This is, to the largest degree, a direct result of their shrinking share of the global population. (In fact, in many cases, population share shrinks faster than capability share, resulting in these countries capturing an increasing portion of capability in per capita terms). Relatedly, it is also a direct result of the increased capability and responsibility of India, China, and the other groups of countries listed, again where increased populations drive a large proportion of that increase. This shift's pace is perhaps most pronounced in China, whose share of the combined global responsibility and capability would, based on these projections, increase by 76%: from 5.5% in 2020 to 9.7% in 2035.³³

Thus, these results demonstrate that effort sharing with dynamic differentiation and dynamic calculations of effort-sharing results suggests the need for periodical reassessment of these results and countries' resulting shares. This need for periodic reassessment is due to the general principle of the RCI-based effort-sharing framework, whereby each country should contribute to a globally shared climate effort in proportion to its (evolving) share of global responsibility and capability or its RCI. In this understanding of effort sharing each country has, in principle, a fair share, even though for some countries it may be small, even negligibly, and the share changes over time as the country's circumstances change.

³³ However, a separate analysis (not reported here) on the dynamic differentiation based on the criteria for the 'Annex II plus countries in range' case found that Guyana is the only additional country expected to meet the criteria before 2035 (i.e. the criteria that countries are included in 'Annex II plus countries in range' if their per capita responsibility and capability fall within the range of current Annex II countries).

Table 4: Dynamic differentiation: Shifts to Responsibility and Capability Index over time

	2020			2025			2030			2035		
	Capability (% of global)	Responsibility (% of global)	RCI (% of global)	Capability (% of global)	Responsibility (% of global)	RCI (% of global)	Capability (% of global)	Responsibility (% of global)	RCI (% of global)	Capability (% of global)	Responsibility (% of global)	RCI (% of global)
United States	35.0%	43.1%	39.0%	33.8%	41.1%	37.6%	32.8%	38.8%	36.8%	30.4%	35.4%	35.7%
European Union	20.9%	15.3%	18.1%	20.5%	14.6%	17.6%	19.8%	13.7%	17.2%	19.1%	12.4%	16.8%
China	6.4%	4.7%	5.5%	8.4%	6.9%	7.4%	10.0%	9.6%	8.5%	12.3%	13.1%	9.7%
India	0.4%	0.4%	0.4%	0.8%	0.5%	0.6%	1.2%	0.8%	0.8%	1.5%	1.3%	1.0%
OPEC Middle East & North Africa	2.3%	4.7%	3.5%	2.3%	4.8%	3.6%	2.5%	5.1%	3.7%	2.8%	5.5%	3.8%
Rest of Africa	0.5%	1.5%	1.0%	0.5%	1.5%	1.0%	0.5%	1.5%	1.0%	0.6%	1.7%	1.1%
Latin America	4.7%	6.9%	5.8%	5.3%	6.9%	6.1%	5.4%	7.1%	6.2%	5.8%	7.6%	6.3%
Other Developed Countries	25.1%	19.5%	22.3%	23.8%	19.1%	21.5%	22.5%	18.4%	21.0%	21.4%	17.2%	20.5%
Other Developing Countries	4.6%	4.1%	4.4%	4.7%	4.5%	4.6%	5.2%	5.0%	4.8%	6.0%	5.6%	5.1%

4.2 L&D finance fair shares for 2025 and 2030

Importantly, and as explained in chapter 2, it is not consistent with legal and ethical principles to expect all countries to contribute to the provision of L&D finance. For this reason, this section presents fair share results only for the countries included in Cases 1–3, i.e. the scenarios ‘Annex II’, ‘Annex II plus countries in range’, and ‘All ‘developed’ countries’, as detailed in section 2.4. Thus, fairly sharing total L&D finance contributions among those countries is determined by each of those countries’ combined capability and responsibility as part of all countries’ total combined capability and responsibility in each case. For example, for any developed country (Case 3), we would calculate that country’s RCI and divide it by the sum of the RCIs of all developed countries. This fraction is then multiplied by the total L&D finance amount that needs to be provided to obtain the country’s L&D finance fair share. Given the RCI’s dynamic nature, as just described, this calculation is performed separately for 2025 and 2030. The resulting percentages are then multiplied by the L&D finance totals for each year.

For comparison, in section 4.3, the same calculations are then also performed for a hypothetical case where *all countries* are assigned shares. As mentioned, we do not consider this a scenario, but it can nevertheless provide useful insights about the extreme outside bounds of possible shares of countries even under extreme, and inequitable, assumptions.

Table 5 shows the impact of the contributor base’s ever-expanding definition. Using Case 1 (Annex II) as the reference case, the table shows the results of adding countries with per capita capability and responsibility in the same range as Annex II countries (Case 2, Annex II plus countries ‘in range’ of) to the contributor base and further expanding it to include all developed countries per Case 3 (all ‘developed’ countries). It then shows, for comparison, the shares resulting from the extreme Case 4 (All countries) scenario, with results for LDCs and SIDS further differentiated, given the special provisions regarding these countries in the Paris Agreement.

Table 5: Comparison of loss and damage finance provision by case

	2 0 2 5							
	Annex II		Annex II plus countries 'in range'		All 'developed' countries		All Countries	
	%	\$ bn	%	\$ bn	%	\$ bn	%	\$ bn
Annex II countries	100%	275	93%	255	88%	242	72%	199
Countries 'in Annex II range'	n/a	n/a	7%	20	7%	19	6%	16
All other 'developed' countries	n/a	n/a	n/a	n/a	5%	14	4%	12
All other countries	n/a	n/a	n/a	n/a	n/a	n/a	18%	48
(... of which LDCs/SIDS)	n/a	n/a	n/a	n/a	n/a	n/a	0.37%	1.0

	2 0 3 0							
	Annex II		Annex II plus countries 'in range'		All 'developed' countries		All Countries	
	%	\$ bn	%	\$ bn	%	\$ bn	%	\$ bn
Annex II countries	100%	435	92%	401	87%	379	71%	307
Countries 'in Annex II range'	n/a	n/a	8%	34	7%	32	6%	26
All other 'developed' countries	n/a	n/a	n/a	n/a	6%	24	4%	19
All other countries	n/a	n/a	n/a	n/a	n/a	n/a	19%	83
(... of which LDCs/SIDS)	n/a	n/a	n/a	n/a	n/a	n/a	0.40%	1.8

Note: '%' – percentage share of the combined capability and responsibility within each column; '\$ bn' fair share (Cases 1-3) or theoretical share Case 4) of L&D finance, based on '% 'All Countries' is highlighted to show that it is not considered a 'fair share' approach.

The table shows that adding countries with responsibility and capability in the Annex II range (Case 2) would reduce Annex II countries' shares of L&D finance by 7%. Instead of having to provide all (100%) of the L&D finance in Case 1, Annex II would now only have to pay 93% (for 2025) because the added countries (relative to only Annex II) have a 7% joint share of the total, in line with their combined responsibility and capability. When further adding the other countries that could be considered 'developed countries' per the additional criteria discussed for Case 3, the Annex II share falls by a further 5%. This change demonstrates that even with the expansive definition of 'developed' used in Case 3, current Annex II countries would still have to provide the overwhelming majority of L&D finance, as they have the overwhelming majority of this group's responsibility and capability.

Even in the extreme case of adding all other countries, Annex II countries would still have to provide 72% of the total and the other developed countries (i.e. the sum of rows 2 and 3) would provide 10% (for 2025), while countries not considered developed under any of our criteria would theoretically contribute 18%, given their 18% combined share of global capability and responsibility. Perhaps not unexpected, the countries in this latter category that are also LDCs and SIDS would only theoretically contribute 0.37% of the global total, despite having 72 parties in it. This is because the total combined share of the global combined responsibility and capability of this last group is only 0.37% (see Table 8 for the theoretical shares of individual countries with the largest total responsibility and capability among this group, including China, Brazil, Mexico, South Africa, etc.).

All of the above findings point to the fact that the quantitative focus of providing L&D finance (or any climate finance provision based on equity principles) will remain on the same countries that have thus far been at the centre of climate finance provision – namely, the Annex II countries responsible for jointly providing or mobilising the USD 100 billion annually (OECD 2023). This is because they will remain responsible for the great majority of L&D climate finance in all cases shown here, in which the circle of contributors is expanded via potentially defensible definitions of what constitutes a country equivalent to Annex II or a developed country. Moreover, even in the extreme and deeply inequitable scenario where all, even the least responsible and least financially capable, countries would contribute, the Annex II countries' share of global provision of L&D finance would change very little.

Table 6: Fair shares of loss and damage finance in 2025 and 2030 for Case 1 (Annex II)

	Share of Loss and Damage Finance					
	2025			2030		
	(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)
United States	142.9	412	52.0%	226.8	638	52.1%
Japan	29.1	239	10.6%	45.4	383	10.4%
Germany	18.3	219	6.6%	28.7	346	6.6%
Canada	12.0	304	4.4%	19.0	464	4.4%
United Kingdom	12.0	175	4.3%	18.9	272	4.3%
France	11.2	164	4.1%	17.7	257	4.1%
Australia	9.4	349	3.4%	15.1	534	3.5%
Italy	8.8	151	3.2%	13.7	238	3.2%
Spain	5.1	107	1.8%	8.2	174	1.9%
Netherlands	4.8	266	1.8%	7.6	417	1.8%
Switzerland	3.4	383	1.2%	5.3	578	1.2%
Norway	2.6	477	1.0%	4.1	716	0.9%
Belgium	2.5	210	0.9%	3.9	327	0.9%
Ireland	2.4	473	0.9%	3.9	736	0.9%
Sweden	2.4	223	0.9%	3.8	348	0.9%
Denmark	2.0	324	0.7%	3.1	494	0.7%
Austria	1.9	207	0.7%	2.9	322	0.7%
Finland	1.1	201	0.4%	1.8	321	0.4%
New Zealand	1.0	187	0.4%	1.6	293	0.4%
Greece	1.0	95	0.4%	1.6	156	0.4%
Portugal	0.7	66	0.2%	1.1	111	0.3%
Luxembourg	0.5	702	0.2%	0.7	1,058	0.2%
Iceland	0.1	239	0.03%	0.1	379	0.03%
TOTAL	275.0	284	100.0%	435.0	445	100.0%

Note: '\$ bn' – billion USD, '\$ per cap' – average USD per capita.

Table 6 shows the results for the L&D finance fair shares for 2025 and 2030 for Case 1 (Annex II). It shows the amount (in USD) of L&D finance each country should provide in accordance with its fair share, the per capita equivalent of this amount (to facilitate more relevant between-country comparisons) and the percentage of the L&D finance total – the share of the country's RCI of the sum of all Annex II countries' RCIs.

Perhaps unsurprisingly, the fair share of the United States, as the country with, by far, the largest combined responsibility and capability is, by far, the largest. Given that the United States' responsibility and capability is over half the total of all Annex II countries, its fair share of L&D finance provision in this case is also just over half, at USD 143 billion in 2025 and USD 227 billion in 2030.

Table 7 shows the L&D finance fair shares when Case 2 (Annex II plus countries 'in range') is considered, where the calculations' basis is expanded to include countries whose per capita capability and responsibility are in the same range as current Annex II countries. As Table 5 above shows, even with these additional countries, Annex II's share of the fair share provision of L&D remains at 93% of its previous scale. As such, the United States share unsurprisingly close to 50% (though now slightly below) and, likewise, the other Annex II countries' shares do not change substantially. Saudi Arabia has the largest fair share in this case of a non-Annex II country, with a combined responsibility and capability of 1.9% of all Case 2 countries and, therefore, responsible for just over USD 5 billion of L&D finance provision in 2025, with South Korea having very similar results (1.8% share). Saudi Arabia and South Korea are also the only of the newly added countries that would be among the 10 largest contributors. All other new additions have much smaller fair shares (for 2025, United Arab Emirates: USD 3.2 billion; Qatar: USD 1.9 billion; Singapore: USD 1.5 billion; Israel: USD 1.4 billion; Kuwait: USD 1.2 billion; etc.).

Table 7: Fair shares of loss and damage finance in 2025 and 2030 for Case 2 (Annex II plus countries 'in range')

	Share of Loss and Damage Finance					
	2025			2030		
	(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)
United States	132.4	381	48.1%	209.3	588	48.1%
Japan	27.0	221	9.8%	41.9	353	9.6%
Germany	16.9	203	6.1%	26.4	319	6.1%
Canada	11.1	281	4.0%	17.6	428	4.0%
United Kingdom	11.1	162	4.0%	17.4	251	4.0%
France	10.3	152	3.8%	16.3	237	3.7%
Australia	8.7	323	3.2%	13.9	493	3.2%
Italy	8.2	140	3.0%	12.7	220	2.9%
Saudi Arabia	5.2	138	1.9%	8.7	215	2.0%
South Korea	5.1	98	1.8%	8.4	164	1.9%
Spain	4.7	99	1.7%	7.5	160	1.7%
Netherlands	4.5	247	1.6%	7.0	384	1.6%
United Arab Emirates	3.2	330	1.2%	5.4	537	1.2%
Switzerland	3.2	355	1.1%	4.9	534	1.1%
Norway	2.5	442	0.9%	3.8	661	0.9%
Belgium	2.3	195	0.8%	3.6	302	0.8%
Ireland	2.2	439	0.8%	3.6	679	0.8%
Sweden	2.2	207	0.8%	3.5	321	0.8%
Qatar	1.9	699	0.7%	3.2	1,135	0.7%
Denmark	1.8	300	0.7%	2.8	456	0.7%
Austria	1.7	191	0.6%	2.7	297	0.6%
Singapore	1.5	239	0.5%	2.3	374	0.5%
Israel	1.4	150	0.5%	2.4	232	0.5%
Kuwait	1.2	273	0.4%	1.9	421	0.4%
Finland	1.0	187	0.4%	1.6	296	0.4%
New Zealand	0.9	173	0.3%	1.5	270	0.3%
Greece	0.9	88	0.3%	1.4	144	0.3%
Other Countries*	1.9	120	0.7%	3.1	194	0.7%
TOTAL	275.0	251	100.0%	435.0	392	100.0%

Note: 'Other countries' are those with <0.25% of the total in 2025, specifically: Portugal, Luxembourg, Bahrain, Slovenia, Brunei Darussalam, Iceland, Bahamas, Monaco, Liechtenstein, Andorra, and San Marino; '\$ bn' – billion USD, '\$ per cap' – average USD per capita.

Table 8 shows the results for Case 3, where L&D finance fair shares are calculated for all countries that fulfil at least one of the criteria detailed above that could justify their consideration as a developed country. For the top 10 contributors, Russia and Saudi Arabia are the non-Annex II countries in this group, though all other top 10 countries remain in the current Annex II. Because, in Case 3, the collective share of Annex II decreases to 88% relative to Case 1 (see Table 5), the United States' fair share decreases to further below 50% in this scenario, with 45.6% of L&D finance still being its fair share.

Countries not in the Annex II group with fair shares >0.1% of the global total include Russia (2.4%), Saudi Arabia (1.8%), South Korea (1.7%), Türkiye (1.4%), United Arab Emirates (1.1%), Qatar (0.7%), Singapore, Poland, Israel (0.5% each), and Kuwait (0.4%).

Table 8: Fair shares of loss and damage finance in 2025 and 2030 for Case 3 (All ‘developed’ countries)

	Share of Loss and Damage Finance					
	2025			2030		
	(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)
United States	125.5	361	45.6%	197.8	556	45.5%
Japan	25.6	210	9.3%	39.6	334	9.1%
Germany	16.0	193	5.8%	25.0	302	5.7%
Canada	10.5	267	3.8%	16.6	405	3.8%
United Kingdom	10.5	153	3.8%	16.5	237	3.8%
France	9.8	144	3.6%	15.4	224	3.5%
Australia	8.3	306	3.0%	13.1	466	3.0%
Italy	7.8	132	2.8%	12.0	208	2.7%
Russia	6.5	45	2.4%	10.6	75	2.4%
Saudi Arabia	5.0	131	1.8%	8.2	204	1.9%
South Korea	4.8	93	1.7%	8.0	155	1.8%
Spain	4.4	94	1.6%	7.1	152	1.6%
Netherlands	4.2	234	1.5%	6.7	363	1.5%
Türkiye	3.8	43	1.4%	6.4	72	1.5%
United Arab Emirates	3.0	312	1.1%	5.1	507	1.2%
Switzerland	3.0	337	1.1%	4.6	504	1.1%
Norway	2.3	419	0.8%	3.6	624	0.8%
Belgium	2.2	185	0.8%	3.4	285	0.8%
Ireland	2.1	416	0.8%	3.4	641	0.8%
Sweden	2.1	196	0.8%	3.3	303	0.8%
Qatar	1.8	662	0.7%	3.1	1,073	0.7%
Denmark	1.7	284	0.6%	2.7	431	0.6%
Austria	1.6	181	0.6%	2.5	281	0.6%
Singapore	1.4	226	0.5%	2.2	354	0.5%
Poland	1.4	35	0.5%	2.4	63	0.6%
Israel	1.3	142	0.5%	2.2	219	0.5%
Kuwait	1.1	258	0.4%	1.8	398	0.4%
Finland	1.0	177	0.4%	1.6	280	0.4%
New Zealand	0.9	164	0.3%	1.4	255	0.3%
Greece	0.9	83	0.3%	1.4	136	0.3%
Czechia	0.7	66	0.3%	1.1	108	0.3%
Portugal	0.6	58	0.2%	1.0	97	0.2%
Romania	0.4	21	0.1%	0.7	38	0.2%
Luxembourg	0.4	616	0.1%	0.6	923	0.1%
Other Countries*	2.4	22	0.9%	4.0	38	0.9%
TOTAL	275.0	184	100.0%	435.0	289	100.0%

Note: ‘Other Countries’ are those with a <0.1% share of the total in 2025: Hungary, Slovakia, Bahrain, Slovenia, Ukraine, Brunei Darussalam, Lithuania, Croatia, Iceland, Estonia, Bulgaria, Serbia, Cyprus, Latvia, Bahamas, Belarus, Monaco, Malta, Liechtenstein, Bosnia and Herzegovina, Andorra, North Macedonia, San Marino, Albania, Montenegro, and Moldova; ‘\$ bn’ – billion USD, ‘\$ per cap’ – average USD per capita.

A comparison of per capita figures is also informative. While, for example, Türkiye’s share (USD 3.8 billion) is very close to Switzerland’s (USD 3 billion) – which may seem unfair at first glance given their substantially different capabilities – a per capita figure comparison demonstrates that, when weighted by population, Switzerland’s fair share is 8 times that of Türkiye (USD 337 versus USD 43 on average in 2025).³⁴

³⁴ Both of the most ‘extreme’ (highest and lowest) cases of per capita fair shares in Case 3 are countries that are part of the figure in the ‘Other Countries’ row in the table and, therefore, not readily visible in Table 8: Moldova’s per capita L&D finance fair share is USD 1 in 2025, whereas Monaco’s is almost USD 1,100 (also see the complete results table 8-Full in Appendix 4). This point highlights that, despite a country plausibly being developed per the criteria used, circumstances still widely differ within this group.

Tables 6, 7, and 8 also show 2030 results, where total and per capita fair shares substantially increase, which is because of our earlier finding (chapter 2) that the global total for L&D finance should increase from USD 275 billion in 2025 to USD 435 billion in 2030. In addition to the sharp total figure increase, there are minor changes in the 2030 figures relative to 2025. This results from the dynamic nature of the effort-sharing approach used here. However, the changes in the RCI shares shown in these tables (in the ‘%’ columns) are much less pronounced than those seen in Table 4. This is because of the much greater homogeneity among Annex II (Table 6), Annex II plus countries ‘in range’ (Table 7), and all ‘developed’ countries (Table 8), respectively, in terms of capability and responsibility compared with all countries (Table 4) and, therefore, the *relative shares* (‘%’ column) of individual countries in all three cases (Annex II, Annex II plus countries ‘in range,’ or ‘developed’ countries) vis-à-vis other countries in the same group do not change substantially.

4.3 Theoretical shares of L&D finance for all countries

As discussed, in addition to calculating L&D finance fair shares for the three main cases, we also calculate the theoretical shares of L&D finance for a hypothetical case where all countries are included in the calculations. As emphasised above, this approach is not considered consistent with relevant legal and ethical principles and we, therefore, emphatically do not consider the resulting figures to represent ‘fair shares.’ These results can, nevertheless, provide useful insights on the outside bounds of plausible shares of countries even under extreme, and inequitable, assumptions.

Notably, they offer insights into the remaining scale of L&D contributions that developed countries would have to provide even if they successfully expanded the circle of contributing countries in this extreme manner (though, importantly, no delegation currently argues in UNFCCC negotiations for an expansion to include all countries). Besides examining results for individual countries not included in the three main cases above and the impact that adding all countries would have on the shares of any of the Case 1, 2, or 3 countries (Table 9), it is also informative to directly compare the results for the Annex II, all developed countries, and all countries cases for individual countries (Table 10).

Table 9 shows the results of the theoretical shares in the case where *all* countries are included in the calculations. The table only shows countries with a theoretical share of >0.5%. The first notable result is that only a few countries that were not already included in Cases 1–3 have shares above this threshold. Specifically, only China, Brazil, Mexico, India, South Africa, and Iran have theoretical shares large enough (>0.5%) for their individual results to be shown in the table. The shares of all other newly added countries are combined in the ‘Other Countries’ row of the table (however, Table 9-Full in Appendix 4 discussion papers the individual results for all 196 countries in this analysis). Of these five countries, China’s theoretical share is, unsurprisingly, the largest, at 7.4% in 2025 (and 8.5% in 2030). In other words, if the contributor base for L&D finance is expanded to all countries (instead of, for example, using criteria, such as those introduced above, to define which countries could be considered developed), then China’s L&D finance share would be 7.4% (or 8.5%) of the total needed. As one of the world’s two most populous countries, in absolute terms, China’s unsurprisingly is, by far, the largest figure of any of the newly added countries. In fact, it is about 40% of the total amount added by expanding the analysis to all countries together (7.4% of 18%). However, per capita, its theoretical share is in a similar range as that of South Africa, Brazil, and Iran (all in the USD 10-30 range), India’s is substantially smaller at only about USD 1 per person.

Table 9: Theoretical shares of loss and damage finance in 2025 and 2030 for all countries

	Share of Loss and Damage Finance					
	2025			2030		
	(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)
United States	103.5	298	37.6%	160.1	450	36.8%
Japan	21.1	173	7.7%	32.0	270	7.4%
China	20.4	14	7.4%	36.9	26	8.5%
Germany	13.2	159	4.8%	20.2	244	4.6%
Canada	8.7	220	3.2%	13.4	328	3.1%
United Kingdom	8.7	126	3.1%	13.3	192	3.1%
France	8.1	119	2.9%	12.5	181	2.9%
Australia	6.8	253	2.5%	10.6	377	2.4%
Brazil	6.4	29	2.3%	10.2	45	2.3%
Italy	6.4	109	2.3%	9.7	168	2.2%
Russia	5.3	37	1.9%	8.6	61	2.0%
Mexico	4.8	37	1.8%	7.7	57	1.8%
Saudi Arabia	4.1	108	1.5%	6.7	165	1.5%
South Korea	4.0	77	1.4%	6.4	126	1.5%
Spain	3.7	77	1.3%	5.8	123	1.3%
Netherlands	3.5	193	1.3%	5.4	294	1.2%
Türkiye	3.1	36	1.1%	5.2	58	1.2%
United Arab Emirates	2.5	258	0.9%	4.1	410	0.9%
Switzerland	2.5	278	0.9%	3.7	408	0.9%
Norway	1.9	345	0.7%	2.9	505	0.7%
Belgium	1.8	152	0.7%	2.7	231	0.6%
Ireland	1.8	343	0.6%	2.7	519	0.6%
Sweden	1.7	162	0.6%	2.7	245	0.6%
India	1.7	1	0.6%	3.4	2	0.8%
South Africa	1.7	27	0.6%	2.6	40	0.6%
Qatar	1.5	546	0.5%	2.5	869	0.6%
Denmark	1.4	235	0.5%	2.2	349	0.5%
Iran	1.4	16	0.5%	2.3	25	0.5%
Austria	1.3	150	0.5%	2.1	227	0.5%
Other Countries*	22.1	6	8.0%	36.3	10	8.3%
TOTAL	275.0	34	100.0%	435.0	51	100.0%

Note: 'Other countries' are those with a <0.5% share of the total in 2025; '\$ bn' – billion USD, '\$ per cap' – average USD per capita.

The shares of the countries already included In Case 3 (All developed countries) change because of this inclusion of additional countries (because the same total is now distributed among many more countries). However, for most but the largest contributors, this effect is not so substantial. For example, while the United States' 2025 share is reduced from 45.6% (Table 8) to 37.6% (Table 9) other countries show far less, such as Japan's reduction from 9.3% to 7.7% or Germany's from 5.8% to 4.8%.

Table 10: Comparison of loss and damage finance – ‘Annex II’ and ‘All developed countries’ cases and hypothetical ‘All countries’ case

	2 0 2 5									2 0 3 0								
	(\$ bn)			(\$ per cap)			(%)			(\$ bn)			(\$ per cap)			(%)		
	Annex II	All ‘developed’ Countries	All Countries	Annex II	All ‘developed’ Countries	All Countries	Annex II	All ‘developed’ Countries	All Countries	Annex II	All ‘developed’ Countries	All Countries	Annex II	All ‘developed’ Countries	All Countries	Annex II	All ‘developed’ Countries	All Countries
United States	142.9	125.5	103.5	412	361	298	52.0%	45.6%	37.6%	226.8	197.8	160.1	638	556	450	52.1%	45.5%	36.8%
China	-	-	20.4	-	-	14	-	-	7.4%	-	-	36.9	-	-	26	-	-	8.5%
Japan	29.1	25.6	21.1	239	210	173	10.6%	9.3%	7.7%	45.4	39.6	32.0	383	334	270	10.4%	9.1%	7.4%
Germany	18.3	16.0	13.2	219	193	159	6.6%	5.8%	4.8%	28.7	25.0	20.2	346	302	244	6.6%	5.7%	4.6%
United Kingdom	12.0	10.5	8.7	175	153	126	4.3%	3.8%	3.1%	18.9	16.5	13.3	272	237	192	4.3%	3.8%	3.1%
Canada	12.0	10.5	8.7	304	267	220	4.4%	3.8%	3.2%	19.0	16.6	13.4	464	405	328	4.4%	3.8%	3.1%
France	11.2	9.8	8.1	164	144	119	4.1%	3.6%	2.9%	17.7	15.4	12.5	257	224	181	4.1%	3.5%	2.9%
Australia	9.4	8.3	6.8	349	306	253	3.4%	3.0%	2.5%	15.1	13.1	10.6	534	466	377	3.5%	3.0%	2.4%
Italy	8.8	7.8	6.4	151	132	109	3.2%	2.8%	2.3%	13.7	12.0	9.7	238	208	168	3.2%	2.7%	2.2%
Russia	-	6.5	5.3	-	45	37	-	2.4%	1.9%	-	10.6	8.6	-	75	61	-	2.4%	2.0%
Brazil	-	-	6.4	-	-	29	-	-	2.3%	-	-	10.2	-	-	45	-	-	2.3%
South Korea	-	4.8	4.0	-	93	77	-	1.7%	1.4%	-	8.0	6.4	-	155	126	-	1.8%	1.5%
Netherlands	4.8	4.2	3.5	266	234	193	1.8%	1.5%	1.3%	7.6	6.7	5.4	417	363	294	1.8%	1.5%	1.2%
Spain	5.1	4.4	3.7	107	94	77	1.8%	1.6%	1.3%	8.2	7.1	5.8	174	152	123	1.9%	1.6%	1.3%
Switzerland	3.4	3.0	2.5	383	337	278	1.2%	1.1%	0.9%	5.3	4.6	3.7	578	504	408	1.2%	1.1%	0.9%
Saudi Arabia	-	5.0	4.1	-	131	108	-	1.8%	1.5%	-	8.2	6.7	-	204	165	-	1.9%	1.5%
Türkiye	-	3.8	3.1	-	43	36	-	1.4%	1.1%	-	6.4	5.2	-	72	58	-	1.5%	1.2%
Mexico	-	-	4.8	-	-	37	-	-	1.8%	-	-	7.7	-	-	57	-	-	1.8%
United Arab Emirates	-	3.0	2.5	-	312	258	-	1.1%	0.9%	-	5.1	4.1	-	507	410	-	1.2%	0.9%
Norway	2.6	2.3	1.9	477	419	345	1.0%	0.8%	0.7%	4.1	3.6	2.9	716	624	505	0.9%	0.8%	0.7%

Note: Excerpts of data from Tables 6, 8 and 9 showing the 20 countries with the highest USD amount in 2025 in either case. ‘\$ bn’ – billion USD; ‘\$ per cap’ – average USD per capita; ‘%’ – percentage share of group.

5 Conclusions and key findings

This discussion paper addresses the key question: **What share of finance to address L&D should countries provide?** To answer this, the discussion paper also addresses fundamental questions surrounding L&D finance, including ‘How much L&D finance should be provided?’ and ‘Which countries should provide L&D finance (the L&D contributor base)?’

With its results, the discussion paper aims to contribute to the current debates and decision-making processes concerning L&D and climate finance and to inform and catalyse advocacy around these important processes.

The following findings emerge from the fair share calculations:

Finding 1: Annex II countries remain responsible for providing the overwhelming majority of L&D finance (at least 88 %). This also applies to Cases 2 and 3 that expand the L&D finance contributor base, emphasising these countries’ continued responsibility to lead in finance provision. Even in Case 3 (All ‘developed’ countries to contribute), eight of the 10 countries with the highest fair shares in providing L&D finance are Annex II countries: United States (45.6%), Japan (9.3%), Germany (5.8%), Canada (3.8%), United Kingdom (3.8%), France (3.6%), Australia (3.0%), and Italy (2.8%). Note that even in the extreme and deeply inequitable case of expanding the contributor base to all countries as potential contributors (Case 4), Annex II countries would still have to provide 72% of the total L&D finance.

Finding 2: In all analysed cases, the United States has the highest L&D finance fair share. The fair share of the United States, the country with, by far, the largest combined responsibility and capability is, by far, the highest. Even in Case 3 (All ‘developed’ countries) the United States’ fair share is nearly half of the total (45.6% in 2025).

Finding 3: Under Case 3 (All ‘developed’ countries), countries not included in Annex II with non-negligible fair shares are Russia (2.4%), Saudi Arabia (1.8%), South Korea (1.7%), Türkiye (1.4%), United Arab Emirates (1.1%), Qatar (0.7%), Singapore (0.5%), Poland (0.5%), Israel (0.5%), and Kuwait (0.4%). China, often implied in calls for an expanded contributor base, is not included in this list, as it does not meet the criteria that define a developed country per Case 3 in this discussion paper. China appears only in our ‘extreme’ Case 4, expanding the contributor base to all countries, and would then have the third highest L&D finance fair share for 2025 (7.4%) after the United States and Japan and would have the second largest share after the United States by 2030 (8.5%).

Finding 4: The countries with the highest per capita fair share are (in Case 3): 1. Monaco (USD 1,089), 2. Lichtenstein (USD 710), 3. Qatar (USD 662), 4. Luxembourg (USD 616), 5. Norway (USD 419), 6. Ireland (USD 416), 7. United States (USD 361), 8. Switzerland (USD 337), 9. United Arab Emirates (USD 312), 10. Australia (USD 306) (all data in USD per capita in 2025). This finding indicates very high per capita capability and/or emissions, as well as gross domestic product (GDP), in these countries. For the real fair share, it is informative to compare the per capita figures, as opposed to national totals; for example, Türkiye’s total share (USD 3.8 billion) is slightly larger than Switzerland’s (USD 3.0 billion), which may seem unfair at first glance given their substantially different capabilities. However, comparing the per capita figures demonstrates that, when weighted by population, Switzerland’s fair share is in fact 8 times that of Türkiye (USD 337 and USD 43 per capita on average in 2025, respectively).

Finding 5: Contributing fair shares in L&D finance from 2025 onward is important but only one of the many steps in realising climate justice. Another aspect involves dealing with the historical climate debt. Providing L&D finance for present and future L&D does not reduce the historical climate debt (i.e. for causing past L&D). An additional process is needed for dealing with this historical debt – both in calculating and providing financing to remedy it. The FLD can play a crucial role here.

Policy relevance

This discussion paper’s findings are highly relevant to the international debate around climate finance. Three key points stand out:

1. **Climate finance discussions:** The findings clearly show that delays in outcomes on L&D finance (and climate finance in general) caused by contributor base discussions are largely of a purely political nature and indefensible from a climate justice perspective.
2. **The FLD and related funding arrangements:** Information on the fair share of L&D finance will be relevant for the long-term funding structure and the fundraising strategy for the FLD, and its scope, which the Fund’s board is set to develop in 2024. This discussion paper’s findings can be used to hold countries accountable regarding their future L&D finance contributions and to inform on their performance compared with that of other countries.
3. **The New Collective Quantified Goal on Climate Finance (NCQG):** The NCQG, which will build on the USD 100 billion climate finance goal, is set to be decided at COP 29 in Baku. Thus far, there is no specific agreement for ensuring the provision of adequate finance to address L&D, and the USD 100 billion climate finance goal does not cover addressing L&D. Including L&D alongside adaptation and mitigation under the NCQG, ideally as a subgoal or a predefined minimum floor, would help in building a solid foundation to facilitate L&D finance provision and, more specifically, a successful and effective FLD. Our results could also help the debate on key questions around defining the NCQG, including those on the contributor base, and climate finance at large.

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Appendix 1: Definition of development threshold

The development threshold defines an income threshold below which an individual's income, irrespective of their country, is taken to be exempt from the calculation of national fair shares. Income below the development threshold is not taken to contribute to national capability, nor are emissions corresponding to consumption below this threshold taken to contribute to national responsibility. The development threshold used for this discussion paper is **USD 7,500 (2005, PPP) per person per year**. The level where to best set a development threshold is debatable. The logical choice would be to use the international poverty line. The World Bank set the **International Poverty Line**, a global absolute minimum, at USD 2.15 per day. This is more an extreme poverty line and empirical analysis shows that the income levels where people begin to overcome the typical manifestations of poverty (low educational attainment, high relative food expenditures, malnutrition, high infant mortality) is much higher (Holz et al. 2018). An empirical analysis by Pritchett (2003, 2006) showed that if the poverty line were defined as the level of income at which people typically achieve acceptable levels of the Millennium Development Goal indicators (such as universal primary school completion), it would be set at about [\$16] a day (Pritchett 2006, p. 13), which 'is justifiable, more consistent with international fairness, and is a better foundation for [...] poverty reduction' (Pritchett 2003, p. 3). Another study argued that a development threshold needs to be set at least moderately higher than this global poverty line to 'reflect a level of welfare that is beyond basic needs but well short of today's levels of 'affluent' consumption' (Baer et al. 2008, p. 16). People below this threshold are taken as having development as their proper priority. This discussion paper takes a figure 25% above this global poverty line to derive a development threshold of USD 20 per person per day (USD 7,500 per person per year). This income also reflects the level at which the Global South 'middle class' begins to emerge.

Appendix 2: Additional indicators for responsibility and capability discussed for this discussion paper

The following additional indicators for responsibility and capability were discussed during preparation of this discussion paper (during the preparation team's discussions and an expert workshop).

- **Making foreign/external investments** could be interpreted as an indication of a certain level of wealth and, therefore, capability to pay, but the assumption is difficult to generalise and would 'punish' countries already spending a higher amount on climate finance, which would be counterproductive in this case.
- **OECD membership** it is not an objective measure, as it is based on self-differentiation and requires a country's application.
- **Levels of contribution to ODA** are not included, as this would reflect the actual provision of ODA, which might not represent an appropriate contribution.
- **Countries' affectedness by climate impacts** related to their ability to pay is not included in the calculation because of the assumption it would bias the analysis toward richer countries, which tend to have higher economic losses (e.g. more expensive infrastructure) and reduce their burden when participating in financing.
- Also, **wealth distribution, indebtedness, and access to private capital** on the capital market were discussed as indicators for capability but were discarded because they are not generalisable and suitable proxies for capability.

Appendix 3: Sensitivity analyses

Table A-1: Comparing progressivity settings (Case 3: All ‘developed’ countries)

	1950 ‘High’ (CSER)	1950 ‘Medium’ (CSER)	1950 ‘High’ (Rac-F)	1950 ‘Medium’ (Rac-F)	1950 ‘Top 10% only’
United States	45.6%	39.3%	48.6%	44.4%	49.5%
Japan	9.3%	8.3%	9.3%	8.3%	8.2%
Germany	5.8%	6.5%	5.3%	6.0%	5.1%
Canada	3.8%	3.5%	3.8%	3.6%	3.4%
United Kingdom	3.8%	4.7%	3.3%	4.2%	3.4%
France	3.6%	4.0%	3.1%	3.5%	2.6%
Australia	3.0%	2.7%	2.9%	2.6%	2.5%
Italy	2.8%	3.0%	2.6%	2.8%	2.4%
Russia	2.4%	5.5%	1.8%	3.4%	2.5%
Saudi Arabia	1.8%	1.6%	2.0%	1.9%	2.3%
South Korea	1.7%	2.3%	1.7%	2.3%	2.3%
Spain	1.6%	2.0%	1.4%	1.8%	1.4%
Netherlands	1.5%	1.5%	1.5%	1.5%	1.4%
Türkiye	1.4%	1.8%	1.3%	1.7%	1.7%
United Arab Emirates	1.1%	0.8%	1.3%	1.0%	1.3%
Switzerland	1.1%	0.8%	1.1%	0.9%	0.8%
Norway	0.8%	0.6%	0.9%	0.7%	0.7%
Belgium	0.8%	0.9%	0.7%	0.8%	0.6%
Ireland	0.8%	0.6%	0.8%	0.7%	0.8%
Sweden	0.8%	0.8%	0.7%	0.7%	0.5%
Qatar	0.7%	0.4%	0.8%	0.6%	0.8%
Denmark	0.6%	0.6%	0.6%	0.5%	0.4%
Austria	0.6%	0.6%	0.6%	0.6%	0.5%
Singapore	0.5%	0.4%	0.6%	0.5%	0.6%
Poland	0.5%	1.2%	0.4%	0.8%	0.6%
Israel	0.5%	0.5%	0.5%	0.5%	0.5%
Kuwait	0.4%	0.3%	0.5%	0.4%	0.5%
Finland	0.4%	0.4%	0.3%	0.3%	0.2%
New Zealand	0.3%	0.3%	0.3%	0.3%	0.2%
Greece	0.3%	0.4%	0.3%	0.3%	0.3%
Czechia	0.3%	0.6%	0.2%	0.4%	0.2%
Portugal	0.2%	0.3%	0.2%	0.3%	0.2%
Romania	0.1%	0.4%	0.1%	0.2%	0.2%
Luxembourg	0.1%	0.1%	0.2%	0.1%	0.1%
Hungary	0.1%	0.3%	0.1%	0.2%	0.1%
Bahrain	0.1%	0.1%	0.1%	0.1%	0.1%
Slovakia	0.1%	0.2%	0.0%	0.1%	0.1%
Lithuania	0.1%	0.1%	0.1%	0.1%	0.1%
Ukraine	0.1%	0.5%	0.0%	0.1%	0.1%
Slovenia	0.1%	0.1%	0.0%	0.1%	0.1%

Note: Top 40 developed countries (Case 3). Different progressivity choices: ‘High’ (CSER) is the central case as described in chapter 3 (highlighted in green); ‘Medium’ (CSER) is the same case without the higher threshold; ‘High’ (Rac-F) is the same case as the central case except for using the French poverty line as a development threshold, as defined by Réseau Action Climat France (Rac-F; see Holz et al. 2022); ‘Medium’ (Rac-F) is the same case (French poverty line) without the higher threshold; ‘Top 10% only’ uses the income level at the top 10% mark of the global income distribution as the development threshold and does not use the higher threshold.

Table A-2: Comparing historical emissions cut-off year (Case 3: All 'developed' countries)

	1850 'High' (CSER)	1950 'High' (CSER)	1990 'High' (CSER)	1850 'Medium' (CSER)	1950 'Medium' (CSER)	1990 'Medium' (CSER)
United States	46.4%	45.6%	44.4%	40.3%	39.3%	38.2%
Japan	9.1%	9.3%	9.8%	8.0%	8.3%	8.9%
Germany	5.7%	5.8%	5.6%	6.4%	6.5%	6.1%
United Kingdom	3.9%	3.8%	3.7%	5.1%	4.7%	4.3%
Canada	3.8%	3.8%	3.9%	3.5%	3.5%	3.7%
France	3.6%	3.6%	3.4%	4.0%	4.0%	3.8%
Australia	3.0%	3.0%	3.1%	2.6%	2.7%	2.8%
Italy	2.8%	2.8%	2.9%	2.9%	3.0%	3.1%
Russia	2.3%	2.4%	2.5%	5.1%	5.5%	5.0%
Saudi Arabia	1.8%	1.8%	1.9%	1.6%	1.6%	1.9%
South Korea	1.7%	1.7%	2.0%	2.2%	2.3%	2.8%
Spain	1.6%	1.6%	1.7%	2.0%	2.0%	2.2%
Netherlands	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Türkiye	1.3%	1.4%	1.5%	1.8%	1.8%	2.0%
Switzerland	1.1%	1.1%	1.0%	0.8%	0.8%	0.8%
United Arab Emirates	1.1%	1.1%	1.2%	0.8%	0.8%	1.0%
Norway	0.8%	0.8%	0.8%	0.6%	0.6%	0.6%
Belgium	0.8%	0.8%	0.8%	0.9%	0.9%	0.9%
Ireland	0.8%	0.8%	0.8%	0.6%	0.6%	0.7%
Sweden	0.8%	0.8%	0.7%	0.8%	0.8%	0.7%
Qatar	0.6%	0.7%	0.8%	0.4%	0.4%	0.5%
Denmark	0.6%	0.6%	0.6%	0.6%	0.6%	0.5%
Austria	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Singapore	0.5%	0.5%	0.5%	0.4%	0.4%	0.5%
Poland	0.5%	0.5%	0.6%	1.1%	1.2%	1.3%
Israel	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Kuwait	0.4%	0.4%	0.4%	0.3%	0.3%	0.3%
Finland	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
New Zealand	0.3%	0.3%	0.3%	0.3%	0.3%	0.4%
Greece	0.3%	0.3%	0.3%	0.4%	0.4%	0.5%
Czechia	0.2%	0.3%	0.3%	0.6%	0.6%	0.5%
Portugal	0.2%	0.2%	0.2%	0.3%	0.3%	0.4%
Luxembourg	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Romania	0.1%	0.1%	0.2%	0.4%	0.4%	0.4%
Hungary	0.1%	0.1%	0.1%	0.2%	0.3%	0.3%
Bahrain	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Slovakia	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%
Lithuania	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Ukraine	0.1%	0.1%	0.0%	0.4%	0.5%	0.3%
Slovenia	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%

Note: Top 40 developed countries (Case 3). Different historical responsibility cut-off year choices. Compares 1850, 1950, and 1990 cut-offs with the 'High' and 'Medium' progressivity settings for exemptions and different treatment of the emissions (and incomes) of the poorest and wealthiest. The discussion paper's central case is highlighted in green.

Table A-3: Comparing emissions accounting – territorial vs. consumption-based accounting (CBA) (Case 3: All ‘developed’ countries)

	1950 ‘High’ (CSER)	1950 ‘High’ (CSER) (CBA)	1990 ‘High’ (CSER)	1990 ‘High’ (CSER) (CBA)	1950 ‘Medium’ (CSER)	1950 ‘Medium’ (CSER) (CBA)
United States	45.6%	45.1%	44.4%	43.8%	39.3%	39.0%
Japan	9.3%	9.4%	9.8%	9.9%	8.3%	8.4%
Germany	5.8%	5.9%	5.6%	5.7%	6.5%	6.6%
Canada	3.8%	3.7%	3.9%	3.7%	3.5%	3.4%
United Kingdom	3.8%	3.9%	3.7%	3.8%	4.7%	4.8%
France	3.6%	3.6%	3.4%	3.5%	4.0%	4.1%
Australia	3.0%	2.8%	3.1%	2.9%	2.7%	2.5%
Italy	2.8%	2.9%	2.9%	3.0%	3.0%	3.1%
Russia	2.4%	2.1%	2.5%	2.2%	5.5%	5.1%
Saudi Arabia	1.8%	1.7%	1.9%	1.7%	1.6%	1.5%
South Korea	1.7%	1.9%	2.0%	2.1%	2.3%	2.5%
Spain	1.6%	1.6%	1.7%	1.7%	2.0%	2.0%
Netherlands	1.5%	1.6%	1.5%	1.6%	1.5%	1.6%
Türkiye	1.4%	1.3%	1.5%	1.5%	1.8%	1.8%
United Arab Emirates	1.1%	1.0%	1.2%	1.1%	0.8%	0.8%
Switzerland	1.1%	1.2%	1.0%	1.2%	0.8%	0.9%
Norway	0.8%	0.9%	0.8%	0.9%	0.6%	0.7%
Belgium	0.8%	0.9%	0.8%	1.0%	0.9%	1.0%
Ireland	0.8%	0.8%	0.8%	0.9%	0.6%	0.6%
Sweden	0.8%	0.8%	0.7%	0.8%	0.8%	0.8%
Qatar	0.7%	0.6%	0.8%	0.7%	0.4%	0.4%
Denmark	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Austria	0.6%	0.6%	0.6%	0.7%	0.6%	0.6%
Singapore	0.5%	0.9%	0.5%	1.0%	0.4%	0.7%
Poland	0.5%	0.5%	0.6%	0.5%	1.2%	1.1%
Israel	0.5%	0.4%	0.5%	0.4%	0.5%	0.4%
Kuwait	0.4%	0.4%	0.4%	0.3%	0.3%	0.3%
Finland	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
New Zealand	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Greece	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%
Czechia	0.3%	0.2%	0.3%	0.2%	0.6%	0.6%
Portugal	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%
Romania	0.1%	0.1%	0.2%	0.2%	0.4%	0.4%
Luxembourg	0.1%	0.2%	0.1%	0.2%	0.1%	0.1%
Hungary	0.1%	0.1%	0.1%	0.1%	0.3%	0.3%
Bahrain	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Slovakia	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%
Lithuania	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Ukraine	0.1%	0.1%	0.0%	0.0%	0.5%	0.4%
Slovenia	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%

Note: Top 40 developed countries (Case 3). Compares results for territorial emissions accounting (data columns 1, 3, 5) with consumption-based accounting (columns 2, 4, 6) for the central case (‘1950 High’), a variant with a later (1990) historical emissions cut-off (‘1990 High’), and a variant without the upper threshold (‘1950 Medium’). The discussion paper’s central case is highlighted in green.

Table A-4: Comparing emissions accounting – territorial vs. consumption-based accounting (CBA) (Case 4: All countries)

	1950 'High' (CSER)	1950 'High' (CSER) (CBA)	1990 'High' (CSER)	1990 'High' (CSER) (CBA)	1950 'Medium' (CSER)	1950 'Medium' (CSER) (CBA)
United States	37.6%	37.7%	35.9%	36.1%	28.6%	29.0%
Japan	7.7%	7.9%	7.9%	8.2%	6.1%	6.2%
China	7.4%	6.7%	8.6%	7.5%	12.5%	11.4%
Germany	4.8%	4.9%	4.5%	4.7%	4.7%	4.9%
Canada	3.2%	3.1%	3.2%	3.1%	2.6%	2.5%
United Kingdom	3.1%	3.3%	3.0%	3.1%	3.4%	3.6%
France	2.9%	3.0%	2.7%	2.9%	2.9%	3.0%
Australia	2.5%	2.4%	2.5%	2.4%	1.9%	1.9%
Brazil	2.3%	2.3%	2.4%	2.3%	2.2%	2.2%
Italy	2.3%	2.4%	2.3%	2.4%	2.2%	2.3%
Russia	1.9%	1.8%	2.0%	1.8%	4.0%	3.8%
Mexico	1.8%	1.8%	1.9%	1.9%	1.6%	1.6%
Saudi Arabia	1.5%	1.4%	1.5%	1.4%	1.2%	1.1%
South Korea	1.4%	1.6%	1.6%	1.8%	1.7%	1.8%
Spain	1.3%	1.4%	1.4%	1.4%	1.5%	1.5%
Netherlands	1.3%	1.4%	1.2%	1.3%	1.1%	1.2%
Türkiye	1.1%	1.1%	1.2%	1.2%	1.3%	1.3%
United Arab Emirates	0.9%	0.9%	1.0%	0.9%	0.6%	0.6%
Switzerland	0.9%	1.0%	0.8%	1.0%	0.6%	0.7%
Norway	0.7%	0.8%	0.7%	0.8%	0.5%	0.5%
Belgium	0.7%	0.8%	0.6%	0.8%	0.7%	0.7%
Ireland	0.6%	0.7%	0.7%	0.7%	0.5%	0.5%
Sweden	0.6%	0.7%	0.6%	0.7%	0.6%	0.6%
India	0.6%	0.6%	0.7%	0.7%	1.8%	1.8%
South Africa	0.6%	0.5%	0.5%	0.4%	0.8%	0.6%
Qatar	0.5%	0.5%	0.6%	0.6%	0.3%	0.3%
Denmark	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%
Iran	0.5%	0.5%	0.6%	0.5%	1.0%	1.0%
Austria	0.5%	0.5%	0.5%	0.6%	0.4%	0.5%
Argentina	0.4%	0.4%	0.4%	0.4%	0.6%	0.6%
Singapore	0.4%	0.7%	0.4%	0.8%	0.3%	0.5%
Poland	0.4%	0.4%	0.5%	0.4%	0.9%	0.8%
Israel	0.4%	0.4%	0.4%	0.4%	0.3%	0.3%
Malaysia	0.3%	0.3%	0.4%	0.4%	0.5%	0.5%
Venezuela	0.3%	0.3%	0.3%	0.2%	0.3%	0.3%
Kuwait	0.3%	0.3%	0.3%	0.3%	0.2%	0.2%
Colombia	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%
Chile	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Finland	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Thailand	0.3%	0.2%	0.3%	0.3%	0.4%	0.4%

Note: Top 40 of all countries (Case 4). Compares results for territorial emissions accounting (data columns 1, 3, 5) with consumption-based accounting (columns 2, 4, 6) for the central case ('1950 High'), a variant with a later (1990) historical emissions cut-off ('1990 High'), and a variant without the upper threshold ('1950 Medium'). The discussion paper's central case is highlighted in green.

Appendix 4: Full results sets

Table 8-Full: Fair shares of loss and damage finance in 2025 and 2030 for all 'developed' countries (case 3)

	Share of Loss and Damage Finance							Share of Loss and Damage Finance					
	2025			2030				2025			2030		
	(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)		(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)
United States	125.5	361	45.6%	197.8	556	45.5%							
Japan	25.6	210	9.3%	39.6	334	9.1%	... continued from left ...						
Germany	16.0	193	5.8%	25.0	302	5.7%	Czechia	0.7	66	0.3%	1.1	108	0.3%
Canada	10.5	267	3.8%	16.6	405	3.8%	Portugal	0.6	58	0.2%	1.0	97	0.2%
United Kingdom	10.5	153	3.8%	16.5	237	3.8%	Romania	0.4	21	0.1%	0.7	38	0.2%
France	9.8	144	3.6%	15.4	224	3.5%	Luxembourg	0.4	616	0.1%	0.6	923	0.1%
Australia	8.3	306	3.0%	13.1	466	3.0%	Hungary	0.3	30	0.1%	0.5	53	0.1%
Italy	7.8	132	2.8%	12.0	208	2.7%	Bahrain	0.3	186	0.1%	0.5	292	0.11%
Russia	6.5	45	2.4%	10.6	75	2.4%	Slovakia	0.2	33	0.07%	0.3	57	0.07%
Saudi Arabia	5.0	131	1.8%	8.2	204	1.9%	Lithuania	0.2	68	0.07%	0.3	116	0.07%
South Korea	4.8	93	1.7%	8.0	155	1.8%	Ukraine	0.2	4	0.06%	0.3	7	0.06%
Spain	4.4	94	1.6%	7.1	152	1.6%	Slovenia	0.2	71	0.05%	0.3	119	0.06%
Netherlands	4.2	234	1.5%	6.7	363	1.5%	Croatia	0.1	35	0.05%	0.2	61	0.05%
Türkiye	3.8	43	1.4%	6.4	72	1.5%	Brunei Darussalam	0.1	299	0.05%	0.2	467	0.05%
United Arab Emirates	3.0	312	1.1%	5.1	507	1.2%	Bulgaria	0.13	20	0.05%	0.2	36	0.05%
Switzerland	3.0	337	1.1%	4.6	504	1.1%	Serbia	0.09	13	0.03%	0.2	24	0.04%
Norway	2.3	419	0.8%	3.6	624	0.8%	Estonia	0.09	70	0.03%	0.1	116	0.03%
Belgium	2.2	185	0.8%	3.4	285	0.8%	Iceland	0.08	210	0.03%	0.1	330	0.03%
Ireland	2.1	416	0.8%	3.4	641	0.8%	Bahamas	0.07	159	0.02%	0.1	241	0.02%
Sweden	2.1	196	0.8%	3.3	303	0.8%	Cyprus	0.06	49	0.02%	0.1	81	0.02%
Qatar	1.8	662	0.7%	3.1	1,073	0.7%	Belarus	0.06	6	0.02%	0.10	11	0.02%
Denmark	1.7	284	0.6%	2.7	431	0.6%	Latvia	0.06	33	0.02%	0.10	60	0.02%
Austria	1.6	181	0.6%	2.5	281	0.6%	Malta	0.04	79	0.02%	0.07	134	0.017%
Singapore	1.4	226	0.5%	2.2	354	0.5%	Monaco	0.04	1,089	0.01%	0.06	1,676	0.014%
Poland	1.4	35	0.5%	2.4	63	0.6%	Bosnia and Herzegovina	0.03	10	0.01%	0.06	18	0.013%
Israel	1.3	142	0.5%	2.2	219	0.5%	Liechtenstein	0.03	710	0.01%	0.04	1,062	0.010%
Kuwait	1.1	258	0.4%	1.8	398	0.4%	Andorra	0.01	171	0.005%	0.02	263	0.005%
Finland	1.0	177	0.4%	1.6	280	0.4%	Albania	0.01	4	0.004%	0.02	7	0.004%
New Zealand	0.9	164	0.3%	1.4	255	0.3%	North Macedonia	0.01	5	0.004%	0.02	8	0.004%
Greece	0.9	83	0.3%	1.4	136	0.3%	Montenegro	0.008	12	0.003%	0.013	21	0.003%
... continued to right ...							San Marino	0.008	227	0.003%	0.012	352	0.003%
							Moldova	0.004	1	0.001%	0.007	2	0.002%

Notes: See notes for Table 8 in main text.

Table 9-Full: Theoretical shares of loss and damage finance in 2025 and 2030 for all countries (case 4)

	Share of Loss and Damage Finance							Share of Loss and Damage Finance						
	2025			2030				2025			2030			
	(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)		(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)	
United States	103.5	298	37.6%	160.1	450	36.8%	... continued from left ...							
Japan	21.1	173	7.7%	32.0	270	7.4%	Singapore	1.1	187	0.4%	1.8	286	0.4%	
China	20.4	14	7.4%	36.9	26	8.5%	Poland	1.1	29	0.4%	2.0	51	0.5%	
Germany	13.2	159	4.8%	20.2	244	4.6%	Israel	1.1	117	0.4%	1.8	178	0.4%	
Canada	8.7	220	3.2%	13.4	328	3.1%	Malaysia	1.0	27	0.3%	1.7	45	0.4%	
United Kingdom	8.7	126	3.1%	13.3	192	3.1%	Venezuela	1.0	32	0.3%	1.4	44	0.3%	
France	8.1	119	2.9%	12.5	181	2.9%	Kuwait	0.9	213	0.3%	1.5	322	0.3%	
Australia	6.8	253	2.5%	10.6	377	2.4%	Colombia	0.9	17	0.3%	1.5	27	0.3%	
Brazil	6.4	29	2.3%	10.2	45	2.3%	Chile	0.8	42	0.3%	1.3	66	0.3%	
Italy	6.4	109	2.3%	9.7	168	2.2%	Finland	0.8	146	0.3%	1.3	227	0.3%	
Russia	5.3	37	1.9%	8.6	61	2.0%	Thailand	0.7	10	0.3%	1.2	17	0.3%	
Mexico	4.8	37	1.8%	7.7	57	1.8%	New Zealand	0.7	135	0.3%	1.1	207	0.3%	
Saudi Arabia	4.1	108	1.5%	6.7	165	1.5%	Greece	0.7	69	0.3%	1.1	110	0.3%	
South Korea	4.0	77	1.4%	6.4	126	1.5%	Indonesia	0.7	2	0.3%	1.3	5	0.3%	
Spain	3.7	77	1.3%	5.8	123	1.3%	Kazakhstan	0.6	29	0.2%	1.0	46	0.2%	
Netherlands	3.5	193	1.3%	5.4	294	1.2%	Czechia	0.6	54	0.2%	0.9	88	0.2%	
Türkiye	3.1	36	1.1%	5.2	58	1.2%	Portugal	0.5	48	0.2%	0.8	78	0.2%	
United Arab Emirates	2.5	258	0.9%	4.1	410	0.9%	Oman	0.4	91	0.16%	0.7	141	0.2%	
Switzerland	2.5	278	0.9%	3.7	408	0.9%	Libya	0.4	58	0.15%	0.6	85	0.1%	
Norway	1.9	345	0.7%	2.9	505	0.7%	Peru	0.4	11	0.14%	0.6	16	0.1%	
Belgium	1.8	152	0.7%	2.7	231	0.6%	Romania	0.3	18	0.12%	0.6	31	0.14%	
Ireland	1.8	343	0.6%	2.7	519	0.6%	Luxembourg	0.3	508	0.12%	0.5	747	0.12%	
Sweden	1.7	162	0.6%	2.7	245	0.6%	Iraq	0.3	7	0.11%	0.5	10	0.12%	
India	1.7	1	0.6%	3.4	2	0.8%	Hungary	0.2	24	0.09%	0.4	43	0.09%	
South Africa	1.7	27	0.6%	2.6	40	0.6%	Bahrain	0.2	153	0.08%	0.4	236	0.09%	
Qatar	1.5	546	0.5%	2.5	869	0.6%	Philippines	0.2	2	0.07%	0.4	3	0.09%	
Denmark	1.4	235	0.5%	2.2	349	0.5%	Trinidad and Tobago	0.2	115	0.06%	0.3	184	0.07%	
Iran	1.4	16	0.5%	2.3	25	0.5%	Egypt	0.2	1	0.06%	0.3	2	0.07%	
Austria	1.3	150	0.5%	2.1	227	0.5%	Angola	0.2	4	0.06%	0.3	6	0.06%	
Argentina	1.1	25	0.4%	1.9	39	0.4%	Uruguay	0.2	45	0.06%	0.2	73	0.06%	
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Notes: See notes for Table 9 in main text.

	Share of Loss and Damage Finance					
	2025			2030		
	(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)
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Dominican Republic	0.2	13	0.06%	0.3	22	0.06%
Nigeria	0.2	1	0.06%	0.3	1	0.06%
Slovakia	0.2	27	0.06%	0.3	46	0.06%
Algeria	0.15	3	0.06%	0.2	5	0.06%
Lithuania	0.15	56	0.05%	0.2	94	0.06%
Turkmenistan	0.14	22	0.05%	0.2	34	0.06%
Ukraine	0.14	4	0.05%	0.2	6	0.05%
Slovenia	0.12	58	0.05%	0.2	96	0.05%
Costa Rica	0.12	23	0.04%	0.2	37	0.05%
Cuba	0.12	10	0.04%	0.2	18	0.05%
Croatia	0.11	29	0.04%	0.2	49	0.04%
Brunei Darussalam	0.11	247	0.04%	0.2	378	0.04%
Ecuador	0.11	6	0.04%	0.2	9	0.04%
Panama	0.11	24	0.04%	0.2	38	0.04%
Bulgaria	0.11	16	0.04%	0.2	29	0.04%
Paraguay	0.09	13	0.03%	0.15	21	0.04%
Uzbekistan	0.08	2	0.03%	0.15	4	0.03%
Vietnam	0.08	1	0.03%	0.17	2	0.04%
Serbia	0.08	11	0.03%	0.13	20	0.03%
Estonia	0.08	58	0.03%	0.12	94	0.03%
Azerbaijan	0.07	7	0.03%	0.12	12	0.03%
Morocco	0.07	2	0.03%	0.12	3	0.03%
Iceland	0.07	173	0.02%	0.10	267	0.02%
Botswana	0.06	23	0.02%	0.10	35	0.02%
Guyana	0.06	72	0.02%	0.15	183	0.04%
Bahamas	0.05	131	0.02%	0.08	195	0.02%
Guatemala	0.05	3	0.02%	0.09	4	0.02%
Cyprus	0.05	41	0.02%	0.09	65	0.02%
Syria	0.05	2	0.02%	0.08	3	0.02%
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	Share of Loss and Damage Finance					
	2025			2030		
	(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)
<i>... continued from left ...</i>						
Belarus	0.05	5	0.02%	0.08	9	0.02%
Latvia	0.05	28	0.02%	0.08	49	0.02%
Jordan	0.05	4	0.02%	0.08	6	0.02%
Bolivia	0.05	4	0.02%	0.08	6	0.02%
Lebanon	0.04	8	0.01%	0.06	13	0.01%
Equatorial Guinea	0.04	22	0.01%	0.06	30	0.014%
Gabon	0.04	15	0.01%	0.06	22	0.014%
Jamaica	0.04	13	0.01%	0.06	21	0.014%
Tunisia	0.04	3	0.01%	0.06	4	0.013%
Malta	0.03	65	0.01%	0.06	108	0.014%
Pakistan	0.03	0	0.01%	0.06	0	0.014%
Namibia	0.03	12	0.01%	0.05	18	0.012%
Monaco	0.03	898	0.01%	0.05	1,357	0.011%
Korea, Dem. Rep.	0.03	1	0.01%	0.05	2	0.012%
Barbados	0.03	108	0.01%	0.05	169	0.011%
Georgia	0.03	8	0.01%	0.05	14	0.012%
Bosnia and Herzegovina	0.03	8	0.010%	0.05	15	0.010%
Kenya	0.03	0	0.009%	0.04	1	0.010%
Zimbabwe	0.03	1	0.009%	0.04	2	0.009%
Zambia	0.02	1	0.009%	0.04	2	0.009%
Cameroon	0.02	1	0.009%	0.04	1	0.009%
Liechtenstein	0.023	585	0.009%	0.04	860	0.008%
Sri Lanka	0.023	1	0.008%	0.03	1	0.007%
El Salvador	0.023	4	0.008%	0.04	6	0.008%
Congo, Republic of the	0.022	3	0.008%	0.04	5	0.008%
Mongolia	0.021	6	0.008%	0.04	11	0.009%
Cote d'Ivoire	0.021	1	0.008%	0.04	1	0.009%
Mauritius	0.019	15	0.007%	0.03	25	0.008%
Myanmar	0.018	0	0.007%	0.03	1	0.007%
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Notes: See notes for Table 9 in main text.

	Share of Loss and Damage Finance							Share of Loss and Damage Finance					
	2025			2030				2025			2030		
	(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)		(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)
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Honduras	0.016	2	0.006%	0.03	2	0.006%	Ethiopia	0.004	0	0.001%	0.008	0	0.0018%
Armenia	0.016	6	0.006%	0.029	11	0.007%	Burkina Faso	0.0036	0	0.001%	0.006	0	0.0015%
Sudan	0.015	0	0.006%	0.026	0	0.006%	Madagascar	0.0033	0	0.001%	0.005	0	0.0012%
Bangladesh	0.014	0	0.005%	0.032	0	0.007%	Moldova	0.0033	1	0.001%	0.006	2	0.0014%
Ghana	0.012	0	0.004%	0.023	1	0.005%	Seychelles	0.0031	29	0.001%	0.005	47	0.0012%
Cambodia	0.012	1	0.004%	0.024	1	0.005%	Saint Lucia	0.0031	17	0.001%	0.005	27	0.0011%
Yemen	0.012	0	0.004%	0.019	0	0.004%	Benin	0.0028	0	0.001%	0.005	0	0.0012%
Afghanistan	0.012	0	0.004%	0.017	0	0.004%	Belize	0.0028	7	0.001%	0.005	10	0.0011%
Nicaragua	0.012	2	0.004%	0.019	2	0.004%	Saint Kitts and Nevis	0.0023	49	0.0009%	0.004	80	0.0009%
Andorra	0.011	141	0.004%	0.017	213	0.004%	Chad	0.0020	0	0.0007%	0.003	0	0.0007%
Suriname	0.011	18	0.004%	0.018	28	0.004%	Tajikistan	0.0019	0	0.0007%	0.0032	0	0.0007%
Tanzania	0.011	0	0.004%	0.021	0	0.005%	Rwanda	0.0018	0	0.0007%	0.0037	0	0.0008%
Senegal	0.011	1	0.004%	0.019	1	0.004%	Mali	0.0018	0	0.0007%	0.0031	0	0.0007%
Eswatini	0.010	8	0.004%	0.017	13	0.004%	Bhutan	0.0017	2	0.0006%	0.0031	4	0.0007%
Uganda	0.010	0	0.004%	0.019	0	0.004%	Mauritania	0.0016	0	0.0006%	0.0026	0	0.0006%
Congo, Democratic Republic (DRC)	0.009	0	0.003%	0.014	0	0.003%	Palau	0.0015	84	0.0006%	0.0025	138	0.0006%
Albania	0.008	3	0.003%	0.015	5	0.003%	Grenada	0.0014	11	0.0005%	0.0024	18	0.0005%
North Macedonia	0.008	4	0.003%	0.014	7	0.0032%	Cook Islands	0.0013	74	0.0005%	0.0022	128	0.0005%
Maldives	0.008	15	0.003%	0.014	28	0.0033%	Guinea	0.0013	0	0.0005%	0.0021	0	0.0005%
Papua New Guinea	0.008	1	0.003%	0.013	1	0.0030%	Fiji	0.0013	1	0.0005%	0.0021	2	0.0005%
South Sudan	0.007	1	0.003%	0.011	1	0.0024%	Kyrgyzstan	0.0012	0	0.0004%	0.0021	0	0.00047%
Haiti	0.007	1	0.002%	0.011	1	0.0024%	Togo	0.0012	0	0.0004%	0.0023	0	0.00052%
Montenegro	0.006	10	0.002%	0.011	17	0.0025%	Saint Vincent and the Grenadines	0.0012	11	0.0004%	0.0020	19	0.00045%
Mozambique	0.006	0	0.002%	0.012	0	0.0028%	Dominica	0.0010	14	0.0004%	0.0017	23	0.00039%
San Marino	0.006	187	0.002%	0.010	285	0.0022%	Cabo Verde	0.0010	2	0.0004%	0.0019	3	0.00043%
Laos	0.006	1	0.002%	0.010	1	0.0024%	Niger	0.0009	0	0.0003%	0.0016	0	0.00036%
Antigua and Barbuda	0.005	49	0.002%	0.008	78	0.0017%	Djibouti	0.0009	1	0.0003%	0.0015	1	0.00036%
Central African Republic (CAR)	0.004	1	0.002%	0.007	1	0.0016%	Comoros	0.0007	1	0.0002%	0.0011	1	0.00025%
Palestine	0.004	1	0.001%	0.005	1	0.0010%	Sierra Leone	0.0006	0	0.0002%	0.0010	0	0.00023%
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Notes: See notes for Table 9 in main text.

	Share of Loss and Damage Finance					
	2025			2030		
	(\$ bn)	(\$ per cap)	(%)	(\$ bn)	(\$ per cap)	(%)
<i>... continued from previous page ...</i>						
Gambia	0.0006	0	0.0002%	0.0009	0	0.00022%
Liberia	0.00054	0	0.0002%	0.0008	0	0.00019%
Lesotho	0.00054	0	0.0002%	0.0008	0	0.00019%
Nepal	0.00051	0	0.0002%	0.0008	0	0.00020%
Malawi	0.00048	0	0.0002%	0.0008	0	0.00019%
Guinea-Bissau	0.00034	0	0.0001%	0.0005	0	0.00012%
Micronesia, Federated States	0.00020	2	0.00007%	0.00031	2	0.00007%
Somalia	0.00020	0	0.00007%	0.00031	0	0.00007%
Timor-Leste	0.00018	0	0.00007%	0.00031	0	0.00007%
Samoa	0.00018	1	0.00006%	0.00029	1	0.00007%
Eritrea	0.00013	0	0.00005%	0.00019	0	0.00004%
Vanuatu	0.00012	0	0.00004%	0.00019	0	0.000043%
Tonga	0.00011	1	0.00004%	0.00017	2	0.000040%
Solomon Islands	0.00009	0	0.00003%	0.00014	0	0.000032%
Nauru	0.00009	7	0.00003%	0.00014	10	0.000031%
Marshall Islands	0.00005	1	0.00002%	0.00009	2	0.000020%
Niue	0.000032	17	0.00001%	0.00006	31	0.000014%
Tuvalu	0.000022	2	0.000008%	0.00004	3	0.000008%
Burundi	0.000010	0	0.000004%	0.00002	0	0.000004%
Kiribati	0.000007	0	0.000002%	0.00001	0	0.000003%
Sao Tome and Principe	0.000002	0	0.000001%	0.00000	0	0.000001%

Notes: See notes for Table 9 in main text.

Appendix 5: Data sources for the Climate Equity Reference Calculator

Appendix 5 available for download at: www.doi.org/10.5281/zenodo.2595510

Appendix 6: Calculations for the Climate Equity Reference Calculator

Appendix 6 available for download at: www.doi.org/10.5281/zenodo.1748847

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