Publication Series

ADDRESSING LOSS AND DAMAGE
FROM SLOW-ONSET PROCESSES

Financing Instruments and Sources to Address Loss and Damage from Slow-onset Processes

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IMPRINT

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List of abbreviations

AF	Adaption Fund
AOSIS	Alliance of Small Island States
CDRF	Climate risk financing
CDT	Climate Damages Tax
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COP	Conference of the Parties
ECAL	Environment and Climate Adaptation Levy
EUSF	European Solidarity Fund
ExCom	Executive Committee of the Warsaw International Mechanism
FbF	Forecast based finance
GCF	Green Climate Fund
GEF	Global Environment Facility
HNS	Hazardous and Noxious Substances
IPCC	Intergovernmental Panel on Climate Change
ITAP	Independent Technical Advisory Panel
LDCF	Least Developed Countries Fund
SCCF	Special Climate Change Fund
UNFCCC	curret United Nations Framework Convention on Climate Change
WIM	Warsaw International Mechanism for Loss and Damage

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ABOUT THE PAPER SERIES ‘ADDRESSING LOSS AND DAMAGE FROM SLOW-ONSET PROCESSES’

What is the background of the series?

The effects of climate change can be divided into two categories according to the temporal scale over which they occur and the speed at which their impacts manifest. There are rapid-onset events, such as cyclones and heatwaves, typically referred to as ‘extreme weather events’ in the climate context. Then there are slow-onset processes, such as sea level rise, acidification, and desertification, which unfold slowly and gradually over years, decades, or centuries. Both of these substantially impact people’s lives, cause loss and damage, obstruct the enjoyment of human rights, and impel human mobility. Priority should therefore be placed on preventing or minimising this potential loss and damage. This can be approached through effective mitigation, adaptation, and risk reduction measures.

Preventing or minimising all loss and damage is, however, no longer possible, as climate change is already leading to unavoidable losses, and it will increasingly do so. Taking this into account, it seems essential to address the unavoidable residual loss and damage, especially for countries particularly vulnerable to climate change impacts. In contrast with extreme weather events, loss and damage caused by slow-onset processes is still neglected in the climate change context, both at the national and international levels. Several gaps and challenges in coping with and managing these processes and their outcomes can explain this. These include lack of common understanding of terminology related to slow-onset processes, and lack of data and knowledge on these losses and damages (particularly at the local level). They also include lack of clarity about the question of how countries are currently coping with this loss, and lack of clarity regarding adequate measures for dealing with the loss and damage. The United Nations’ Intergovernmental Panel on Climate Change (IPCC) Special Report on the Ocean and Cryosphere in a Changing Climate thus states that, ‘[m]ore work is needed to explore the range of activities available to respond to loss and damage resulting from slow onset processes in the scope of the SROCC report (...)”’ (IPCC 2019a, 630).

What is the objective of the paper series?

This series responds to the above-described challenges. The first paper introduced slow-onset processes and resulting loss and damage. The second analysed the status quo, challenges, and gaps in addressing the loss and damage at the national and international levels. This third paper analyses financing instruments and sources necessary for addressing the loss and damages from slow-onset processes.

Through these analyses, we seek to foster awareness of the urgency for action in this area, and to provide input for processes at the national and international levels. This is with the aim of finding tangible and feasible solutions. The series is prepared in the context of the Multi-Actor Partnership on Climate and Disaster Risk Financing project.[1] It includes a case study from the partner country Senegal and contains insights from the other partner countries of Malawi, Madagascar, Laos, the Philippines, and Sri Lanka.

1 The Multi-Actor Partnership on Climate and Disaster Risk Financing and Preparedness in the Context of the InsuResilience Global Partnership project is carried out by a consortium of civil society organisations. Its main focus is capacity development and establishment/expansion of multi-actor dialogue platforms at the national and global levels to promote development and implementation of gender-equitable, poverty-oriented, and human rights-based approaches to climate risk financing. The project is carried out in Malawi, Madagascar, Laos, Philippines, Sri Lanka, Senegal, and the Caribbean by implementing partners from the project countries. The overall coordination is led by CARE Germany with Germanwatch and the Munich Climate Insurance Initiative (MCII). The project is supported by Engagement Global with funding from the German Ministry for Economic Cooperation and Development. For more information and a detailed project summary see: https://careclimatechange.org/multi-actor-partnership-climate-and-disaster-risk-finance-in-the-context-of-the-insuresilience-global-partnership-igp/.

KEY FINDINGS

The following key findings emerged from the analyses and discussions in this paper.

A Financing instruments to address loss and damage from slow-onset processes

1 Social protection schemes can contribute to addressing (the risk of) loss and damage due to slow-onset processes, particularly with a focus on reaching populations' most vulnerable parts. A growing body of research recognises that social assistance instruments can reinforce the most vulnerable group's capacity to respond to climate-induced shocks. Promising suggestions include the broadening of government-run social safety nets to include slow-onset processes such as sea level rise or social protection schemes used to support transformative livelihood strategies and ecosystem restoration initiatives.

2 Insurance products theoretically could play a role in addressing some slow-onset processes but would be extremely difficult to implement. Existing and effective insurance schemes primarily provide quick and efficient first-response relief via short-term financial liquidity for specific events and are therefore difficult to apply to slow-onset processes. However, different authors have developed theoretical approaches on how to use insurance as a risk financing tool for slow onsets. These ideas can be compared with capital-forming life or pension insurance, which are characterised by the fact that, additional to highly uncertain benefits, they provide for secure or almost secure benefits. The approaches suggested would require a public–private partnership approaches wherein, in line with climate justice principles, Global North countries contribute substantively to build up capital required over a long period. Also products that help to restore ecosystem services damaged as a consequence of slow-onset processes seem theoretically feasible but highly difficult to implement, as they require substantial amounts of data.

3 Instruments with no or only a limited applicability for addressing loss and damage from slow-onset processes are catastrophe bonds, often only available to institutional investors and with an even higher fixed cost than insurance products. Additionally, forecast-based financing is not a suitable tool in the context of slow-onset processes.

4 Instruments that can deal with unavoidable loss and damage from slow-onset processes are national loss and damage funds and mechanisms, like the one Bangladesh is currently working to establish. These include long-term accrual of funds to pay inevitable losses, and they are a form of

saving. These funds could be based on examples of trust funds, already applied by countries to pool, save, grow, and disseminate financial resources over time and address future needs. Additionally, dedicated loss and damage funds such as Fiji's Climate Relocation and Displaced Peoples Trust Fund for Communities and Infrastructure could be a blueprint for providing finance for unavoidable loss and damage, such as that from sea level rise. Considering the 'polluter pays' climate justice principle, as well as the perspective of growing costs of slow-onset processes in the future, these mechanisms require adequate donor support, both for capitalisation and for sustaining them. A particular challenge for these solutions is posed by the fact that at a certain stage, slow-onset processes in a combination with other stresses may exceed vulnerable social and ecological systems' abilities to cope, which leads to the risk of a system collapse.

5 **There are several interesting funds from other areas and from which we can learn** regarding the establishment of loss and damage funds (both for slow-onset processes and extreme weather events) and the operationalisation of key climate justice principles. Particularly, the European Solidarity Fund presents an example of a functional regional loss distribution mechanism to alleviate non-insurable damage. This could be a model for financing loss and damage resulting from climate change-related slow-onset processes. For integrating the polluter pays principle into a fund structure, the International Oil Pollution Compensation and the Hazardous and Noxious Substances Fund, as well as the so-called Superfund, provide interesting examples at the international and national levels. All funds provide for liability of people/organisations responsible for environmental damage, thereby establishing systems for compensation to be paid in the event of an accident, and including compulsory insurance solutions.

B The potential of the existing UNFCCC financial architecture to finance loss and damage measures

Our evaluation of the theoretic funding scope and the current funding portfolio of the Adaptation Fund (AF), Green Climate Fund (GCF), Least Developed Countries Fund (LDCF), and Special Climate Change Fund (SCCF) shows that:

1 The **best-covered measure**, both through the theoretic funding scope and current project portfolio, is setting up, scaling up, or capacity building for climate risk insurance schemes. All the analysed funds can potentially finance this measure. It is even explicitly covered in the theoretic funding scope of the LDCF, while the GCF identified climate insurance and reinsurance as an area where its targeted investment would have the most impact. This is also a measure with one of the highest numbers of projects (18) already financed under the funds. In this context, the funds provide funding for product design, piloting, introduction, promotion, and upgrading of, as well as awareness raising and training on, climate risk insurance schemes, primarily agricultural and flood index-based risk insurance. This high degree of coverage owes to climate risk insurance projects and components being well aligned with the funds' objectives of addressing adverse impacts and risks posed by climate change, increasing adaptive capacity and building climate resilience, and is used as a measure to leverage private sector capital.

2 The **largest gap** exists in coverage of measures to address non-economic loss and damage. Funding of related measures is not possible or highly unlikely under the current UNFCCC financial architecture. Accordingly, we could identify no related project components or outputs in the current funding

portfolio. Funding is particularly restricted through: (a) the funds' criteria for assessing project proposals determining that the outcomes and outputs must be measurable, monitorable, and verifiable, and (for the GCF) contribute to a 'paradigm shift,' and (b) the funds' general objectives of increasing adaptive capacity. Although the points leave room for interpretation, they are difficult to meet for measures addressing non-economic loss and damage. No official document of the UNFCCC funds, however, explicitly excludes coverage of non-economic climate risks. Therefore, while assumed unlikely, the AF in particular holds certain potential to also finance projects that address non-economic loss and damage. The AF's new Innovation Facility includes the promising area of 'societal identity and cultural heritage protection.' Also the GCF's investment criteria 'sustainable development potential' and 'needs of the recipient' could open up a space for financing non-economic loss and damage, as they include social co-benefits such as cultural preservation and social inclusion.

3 For **migration**, there is a visibly large difference between support measures for planned relocation and those to support displaced persons. The funding scopes of the AF, GCF, and LDCF potentially cover resettlement activities. The AF and GCF already provide funding for projects with a respective component. For example, a AF project in Rwanda supports a resettlement process (including materials procurement for housing construction) for the most vulnerable households living in high-risk zones, and a GCF project in Senegal, in which people in flood-prone areas are resettled when adaptation limits are reached. Support measures for displaced persons seem potentially fundable by the AF, GCF, and LDCF, but there is a large gap in providing actual funding, as we found no projects containing a respective component or output.

4 Measures that have an **adaptive capacity and resilience building element** have a high chance of being funded. This owes to the funds' objectives with an adaptation focus (AF, SCCF, and LDCF) or adaptation window (GCF). This particularly includes 'restoration of ecosystems' and 'building up alternative livelihoods.' We identified several projects with components or outputs for all funds (with the GCF providing the most funding) for these measures. These measures address climate change-related loss and damage to ecosystems or livelihoods, often from slow-onset processes (e.g. restoration of mangroves damaged by sea level rise, or where salinised lands or vegetation particularly impacted by climate change are restored to strengthen communities' climate resilience, in most cases to implement ecosystem-based adaptation systems).

5 Most **projects identified didn't have an exclusive focus on the analysed loss and damage measures**. The category of climate risk insurance was an exception. All other types of measures were included as components, but more often as a smaller activity for the output category.

6 The **current financing mechanisms and modalities of the UNFCCC funds are not suitable for funding all loss and damage activities analysed**. Particularly measures to address loss and damage due to extreme weather events immediately after they occurred and slow-onset processes at an early stage of occurrence – which would need rapid and large-scale financing - are not possible to fund through the existing UNFCCC financial architecture. This particularly owes to the financing mechanisms (with the exception of the GCF, all analysed funds are grants-only mechanisms) and the type of funding accessible through the funds, which is primarily distributed through multi-year projects with a long application and pre-project phase.

7 The loss and damage measures that the UNFCCC already funds all contain a **strong element of addressing the residual risk of loss and damage ex-ante** through resettlement and climate risk insurance. **Ex-post measures** to address actual materialised loss and damage (e.g. rebuilding of infrastructure and livelihoods, support for displaced persons, and all measures to address non-economic loss and damage), however, **have less potential to receive funding** (particularly due to key finding 6).

Mid-term to long-term rehabilitation (e.g. restoration of ecosystems) can theoretically be financed by all analysed funds. Rapid response measures to address loss and damage due to extreme weather events are usually not fundable through the existing UNFCCC financial architecture. While the GCF currently still provides financing for a project in Tuvalu, in which GCF resources will be used to rebuild key economic and social assets following natural disasters, this type of activity (related to disaster response and relief) is now explicitly excluded by its Board. Additionally, the LDCF excludes 'rapid, large-scale financing that certain extreme events causing loss or damage incur' (GEF 2018).

8 **Measured against the theoretic funding scope and the current project portfolio, the greatest potential for funding the analysed loss and damage measures is with the AF**, which potentially covers 10 of 12 measures and already funds 17 projects with loss and damage components or outputs. The AF's focus is on providing support for setting up, scaling up, or capacity building for climate risk insurance schemes. It also, however, provides support for resettlement of people and building up alternative livelihoods, always with a focus on the AF mandate on increasing adaptive capacity. **Additionally, the GCF has good potential for providing funding for loss and damage measures**, and already funds 15 projects with loss and damage components or output, with a focus on climate risk insurance, restoration of ecosystems, and building up alternative livelihoods. The 'climate rationale' complicates financing loss and damage measures under the GCF, as many developing countries lack access to necessary data to prove that an event resulting in loss and damage resulted from climate change and not just climate variability. Additionally, the LDCF has potential to particularly finance climate risk insurance (with potential to provide smart premium support), restoration of ecosystems, and support for relocation and displaced persons, though the LDCF faces capitalisation challenges. **Measured against the available resources to finance loss and damage measures, the greatest potential for funding the analysed loss and damage measures lies with the GCF.** Compared to the AF and LDCF, the GCF has much higher resources and is therefore most likely able to act on its potential to finance loss and damage measures - which is particularly relevant in view of the high level of funding required to address loss and damage. As of October 2021, total contributions to the GCF amount to $15 billion while contributions to AF and LDCF only amount to $1,1 billion and $ 1,6 billion respectively.

9 Measures **do not have to be explicitly covered by the theoretic funding scope to be funded**. This indicates the climate funds' mandates and other relevant documents are formulated extremely broadly and, thus, leave ample room for interpretation for the boards and advisory panels regarding concrete funding decisions. It shows that funding for measures may be possible even if loss and damage is not explicitly covered in the funding scope.

C Criteria and principles for instruments and sources

Important criteria for testing financing instruments' adequacy to address loss and damage from slow-onset processes are application of comprehensive risk management as well as a risk layering approach, appropriate delivery mechanisms to reach to most vulnerable, and a human rights-based approach. Important criteria for assessing financing sources include the polluter pays principle and the principle of common but differentiated responsibilities and respective capabilities, solidarity, and intergenerational equity, as well as appropriateness, additionality, equitable access, and predictability.

INTRO DUCTION

Slow-onset processes lead to risks to, and impacts on, ecosystems, people, human activities, and the built environment (IPCC 2019a). Like rapid-onset events, slow-onset processes and resulting losses and damages particularly affect vulnerable people in Global South countries, worsen existing poverty, and exacerbate inequalities (IPCC 2014a, Warner/van der Geest 2013, Zorn 2018). In contrast with extreme weather events, addressing this loss and damage from slow-onset processes is still neglected in the climate change context, both at the national and international levels. A major gap in addressing it exists particularly regarding adequate financing instruments and sources. The gap is well known at the international level. Different fora have acknowledged the major gap in addressing slow-onset processes, as current approaches are more suited to rapid onset events and there is need for further work and analysis to expedite suitable solutions (UNFCCC 2012b and 2016, ExCom 2016). Even the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate states: '[m]ore work is needed to explore the range of activities available to respond to loss and damage [loss and damage] resulting from slow onset processes in the scope of the SROCC report

(...)' (IPCC 2019a, 630). Yet despite awareness of the problem, progress on analysing, developing, and testing adequate approaches has been lacking, both for political and technical reasons.

The pressure to act is high. Researchers conclude that over the long term, more people will be affected by slow-onset processes than by rapid-onset events. The example of sea level rise effectively illustrates the problem's global dimension. The latest IPCC Report (2021) estimates it is 'virtually certain that global mean sea level will continue to rise over the 21st century.' Even if warming is limited to 1.5°C, sea levels will rise about 2–3 m, and 2–6 m if limited to 2°C, over the next 2,000 years (ibid.). Sea level rise already does, and increasingly will, lead to substantive economic and non-economic loss and damage. This threatens millions of people living in low-lying coastal areas, causing massive economic loss from coastal flooding. For low-lying developing countries and Small Island Developing States (SIDS), its effects will be particularly severe, and in some cases existential. Adequate instruments for dealing with the resulting economic and non-economic loss and damage, as well as appropriate financing, are therefore urgently needed.

This paper seeks to help close the gap in financially addressing loss and damage from slow-onset processes by (a) discussing options for financing instruments and mechanisms to address loss and damage, (b) discussing options for financing sources, and (c) presenting criteria needing consideration for both financing instruments and sources. The paper starts with a description of the needs from vulnerable developing countries in addressing loss and damage from slow-onsets, and the lack of respective adequate financing instruments and financing. It then applies a comprehensive literature review in discussing financing instruments and sources to address loss and damage. First, the paper presents and discusses options for financing instruments, as well as related criteria for applicability and adequacy. The instruments include those already implemented and tested, as well as those still in the theoretical conceptual phase. It then gives an in-depth analysis of the potential of the existing UNFCCC financial architecture to finance loss and damage measures as well as a list of criteria for financing sources. Based on the analyses, recommendations for the national level (with a focus on Senegal) and international level (with a focus on the UNFCCC) are formulated regarding how to find tangible and feasible solutions to address loss and damage from slow-onset processes.

UNDERSTANDING THE PROBLEM

LACK OF ADEQUATE FINANCIAL INSTRUMENTS AND FINANCING TO ADDRESS LOSS AND DAMAGE FROM SLOW-ONSET PROCESSES

Vulnerable developing countries' needs to address loss and damage from slow-onset processes

Slow-onset processes lead to risks to, and impacts on, ecosystems, people, human activities, and the built environment (IPCC 2019a). Like rapid-onset events, slow-onset processes and resulting losses and damages[2] particularly affect vulnerable people in Global South countries, worsen existing poverty, and exacerbate inequalities (IPCC 2014a, Warner/van der Geest 2013, Zorn 2018). Our analysis in part one of this paper series revealed that slow-onset processes can and do already lead to a huge variety of economic and non-economic losses and damages. Potential and already materialised loss and damage include the following.

2 Loss and damage are "adverse impacts of human-induced climate change that cannot be [or have not been] avoided by mitigation or adaptation, or that will not be avoided in the future by adaptation due to insufficient resources" (adjusted definition based on Mace/Verheyen 2016, 198).

Table 1: Potential loss and damage from slow-onset processes

Economic loss and damage	Non-economic loss and damage
■ Damage and loss of infrastructure and property ■ Loss for fisheries and aquaculture ■ Losses in livestock production ■ Economic loss of agriculture production ■ Reduction and loss of crop productivity ■ Loss of areas for tourism and recreation	■ Damage or loss of ecosystems and their services ■ Decrease and loss of biodiversity ■ Decrease or loss of freshwater availability ■ Increased morbidity/mortality, potential loss of life ■ Loss of (cultural) heritage ■ Loss of identity ■ Loss of health ■ Loss of local and indigenous knowledge ■ Loss of land and habitat for people and animals ■ Loss of territory

Source: Source: Schäfer et al. 2021a

Loss and damage resulting from slow-onset processes (and from rapid -onset events) can be differentiated into avoided, unavoided, and unavoidable (Mace and Verheyen 2016). All must be managed. According to the Paris Agreement's differentiation, measures to manage (risk of) loss and damage include those to avert, minimise, and address it (UNFCCC 2015).

Averting and minimising avoidable loss and damage: Losses and damages are determined by the level of preventive action, both through reducing greenhouse gas emissions and by adaptation and disaster risk reduction measures to reduce vulnerabilities and build resilience (IPCC 2014a). Consequently, essential elements to avert and minimise avoidable loss and damage are effective and ambitious mitigation, adaptation, and disaster risk reduction action.

Addressing unavoided and unavoidable loss and damage: It is no longer possible, however, to prevent or minimise all loss and damage. Historical greenhouse gas emissions and investments locked into fossil fuel industries have already committed the world to a certain level of climate impacts (IPCC 2021). Moreover, not all climate change impacts can be successfully adapted to (IPCC 2014a, Warner/van der Geest 2013). The IPCC defines an adaptation limit as reached when "adaptation efforts are unable to provide an acceptable level of security from risks to the existing objectives and values and prevent the loss of the key attributes, components, or services of ecosystems" (Klein et al. 2014).[3] This is now also accepted by the Conference of the Parties (COP) – decision 2.CP/19 acknowledges that "loss and damage associated with the adverse effects of climate change includes, and in some cases

3 The IPCC (2014) differentiates between hard adaptation limits (those that will not change, such as thresholds in physical systems or exceeding the physiological capacity of individual organisms or communities to adapt to changes), and soft adaptation limits (which could change over time, such as economics, technology, infrastructure, laws and regulations, and broader social and cultural considerations).

involves more than, that which can be reduced by adaptation" (UNFCCC 2019). When adaptation limits are reached or adaptation is generally not possible, climate change will lead to unavoided and unavoidable loss and damage induced by extreme weather events, as well as slow-onset changes, and will increasingly do so. The other essential element of loss and damage measures therefore includes strategies to address the unavoided or unavoidable. Without proper instruments and mechanisms, and access to formal sources of finance to address these, the most vulnerable households often resort to various (erosive) coping strategies in the case of a disaster. These might, applied independently, impede sustainable development and trap people in cycles of poverty (Schäfer et al. 2018).

Table 2 provides an overview of potential loss and damage measures activities countries need to address unavoided and unavoidable climate change impacts. It is based on scientific literature on such measures, as well as views by developing country parties on the type and nature of actions to address loss and damage for which the UNFCCC may need to collect financing (UNFCCC 2018).

Table 2: Measures and actions needed to address loss and damage due to slow-onset processes

Measures and actions needed to address loss and damage due to slow-onset processes	
Setting up financial protection measurese	Including but not limited to: ■ Setting up, scaling up, or capacity building for insurance schemes ■ Integrating climate change risks and impacts into or setting up, scaling up, or capacity building for social protection schemes ■ Setting up, scaling up, or capacity building for contingency funds
Recovery and rehabilitation	Including but not limited to: ■ Reconstruction and reparation of destroyed infrastructure to restore the supply of and access to basic health, education, and water and sanitation services (including health, education, transport, communication, environment, water supply and sanitation, and public buildings) – with priority on building back better ■ Rebuilding/restoring of livelihoods (assist affected people in recovering their pre-disaster levels of household income, including recovery of production in the agriculture, industry, commerce, and other sectors [e.g. reconstruction of plantations, provision of seeds and other inputs, and restoration of equipment and gear]) ■ Restoration of ecosystems and landscapes (rehabilitation of damaged unique ecosystems, such as mangrove areas) ■ Reconstruction of housing ■ Restoration of cultural assets ■ Capacity building in the context of recovery and rehabilitation **Applicable, for example, for areas not permanently submerged but affected from more frequent high sea level events**

Measures and actions needed to address loss and damage due to slow-onset processes	
Displacement, migration, and alternative livelihoods	Including but not limited to: ■ Support measures for planned relocation/resettlement (e.g. if areas can be foreseen as no longer inhabitable or manageable, and safe alternative localities are available), including, for example: a. Monetary costs of relocating infrastructure and people b. Psychological support c. Social support for vulnerable groups d. Language and educational support e. Ensuring housing, property, and land f. Ensuring access to jobs, schools, medical services, and sustainable living g. Establishing legal protection for displaced persons h. Support for preserving culture and language ■ Support measures for climate-induced displaced persons and people affected by forced migration (e.g. those displaced by a slow-onset process, detailed measures similar to the point above) ■ Building up alternative livelihood provisions/developing alternative livelihoods, such as from fishing to agriculture systems ■ Measures to address the root causes of vulnerability, such as through social protection that addresses multi-dimensional inequalities by enhancing capacities, and reduces dependencies and vulnerabilities ■ Capacity building in the context of displacement, migration and alternative livelihoods
Addressing non-economic loss and damage	Including but not limited to: ■ Recognition of loss (accompanied/unaccompanied by financial payments) ■ Active remembrance (e.g. through museum exhibitions, school curricula) ■ Counselling (e.g. for people experiencing trauma related to loss and damage) ■ Capacity building to address non-economic loss and damage

Source: Authors. Measures taken from AGN 2018, AOSIS 2018, ExCom 2019, IPCC 2019, LDCs 2018, Ministry of Economy Republic of Fiji 2018, Schinko et al. 2018 UNFCCC 2018, Vanuatu 2018, Wallimann-Helmer et al. 2018 and post-disaster needs assessments (including Government of Malawi 2019, Government of Vanuatu 2016, Government of the Union of Myanmar 2015)

Lack of adequate financing instruments and financing to manage loss and damage from slow-onset processes

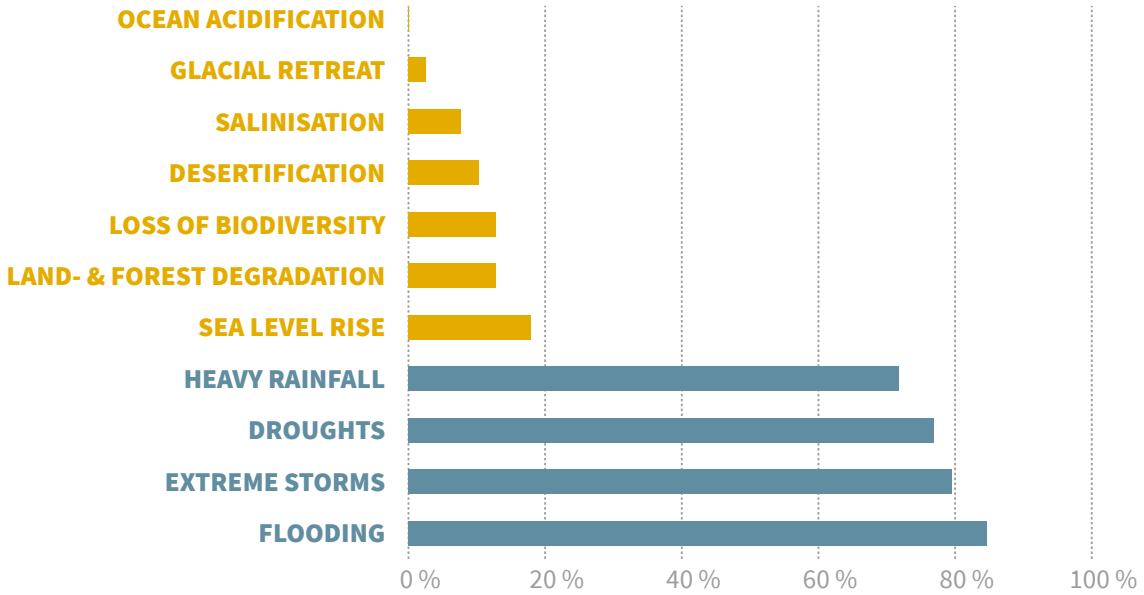
There are several gaps in adequately addressing loss and damage from slow-onset processes (see Paper 2 for a detailed analysis of gaps). One notable gap, as several researchers highlight, and the UNFCC officially acknowledges, is the lack of adequate financing instruments and financing to manage (the risk) of loss and damage (Schaefer et al. 2021b, Durand et al. 2016, UNFCCC 2016, ExCom 2016, UNFCCC 2012a). To adequately address (the risk of) loss and damage due to slow-onset processes we need both:

- **Financing instruments** and mechanisms that ensure adequate financial capacity of governments, households, and businesses to address the (financial) consequences of risks that materialise, to cope with potential impacts and thus implement the measures listed in table two above.
- **Financing sources** that provide funding to set up and implement financing instruments or finance measures that support countries in addressing climate risks and impacts. The financing can come from national or international sources.

Lack of financing instruments and financing at the national level

At the **country level**, there are often neither financial tools and instruments nor sufficient financing sources available to address slow-onset processes countries are facing. A recent survey by Künzel/Schäfer (2021) on financial mechanisms and instruments to address climate impacts in Climate Vulnerable Forum countries revealed that, compared with extreme weather events, slow-onset processes are covered by a highly limited number of countries.

Figure 1: Coverage of slow-onset processes by Climate Vulnerable Forum countries



Source: Künzel/Schäfer (2021)

Although national budgets or bilateral and international financial resources cover some effects, the funding is largely insufficient. In the case of Senegal it only allows quite limited-scale activities (Schäfer et al. 2021b). A general problem is that "the annual budget cycle often cannot accommodate needs related to events that evolve over many years" (UNFCCC 2012a). This severely affects households because, due to the current lack of financial protection strategies, households shoulder a large part of the funding for the fight against climate hazard impacts such as coastal erosion, salinisation of land and water resources, loss of biodiversity, desertification, and the drop in yields due to rising temperatures (Schaefer et al. 2021b for the case of Senegal). A recent study found that for Bangladesh in 2015, measured by spending on disaster preparedness and response, "climate and disaster spending by rural households (…) forms the largest share of climate and disaster expenditure in the country" (Eskander/Steele 2021). Female-headed rural households are particularly impacted, as they spend three times more as a share of income compared with male-headed ones (ibid.). Current estimates indicate financial damage of at least $290–580 billion by 2030 for developing countries, from both, extreme weather events and slow-onset processes (Markandya/González-Eguino 2018). Many researchers and organisations have, however, identified a lack of adequate financial support for vulnerable countries and vulnerable communities therein to deal with loss and damage (Loss and Damage Collaboration 2021, Hirsch 2020, Schäfer/Künzel 2019).

The conceptual gap regarding adequate financing instruments to address slow-onset processes

The country-level gap is due to a **general conceptual gap regarding adequate financial tools and instruments to address loss and damage**. This gap is well known at the international level. Already in 2016, the Forum of the Standing Committee on Finance, on financing instruments addressing the risks of loss and damage, concluded that "a major gap exists in addressing slow-onset events, because current approaches are more suited to extreme weather events and other rapid-onset events" (UNFCCC 2016). A key challenge the Forum highlighted in this regard, and echoed in literature, is that "existing financial instruments have limitations in addressing slow-onset events" (ibid.). Consequently, the Committee "encourages Parties, research institutions and the private sector, inter alia, the insurance industry, to advance discussions and expedite work on suitable solutions and approaches that address slow-onset events" (ibid.) as part of its recommendations. The same problem also appears in the Warsaw International Mechanism Executive Committee's (ExCom) compilation of best practices, challenges, and lessons learnt from existing financing instruments, for addressing loss and damage risk. While a variety of financial tools to address rapid-onset events could be listed, "information was also rather limited regarding those financial instruments and tools that could be effective for the context of slow onset events, and that of non-economic losses" (ExCom 2016). The ExCom concludes that, "further analysis may be useful for a better understanding of what kind of "novel" instruments could fill such gap" (ExCom 2016). Our analysis in part 2 of this paper series shows, however, that the ExCom thus far has scarcely implemented any activities to fill this gap.

While the UNFCCC identified this gap in 2012 (2012b), noting that "most lessons need to be learned, new approaches to be tested and experiences need to be shared", no significant progress has been made since then, owing to political and technical reasons. Progress on developing adequate approaches, and then testing them, has been lacking.

This paper seeks to help close the gap in financially addressing loss and damage from slow-onset processes by:

- Discussing options for financing instruments and mechanisms to address loss and damage
- Analysing options for financing sources for these instruments and mechanisms
- Presenting criteria needing consideration for both financing instruments and sources

FINANCING INSTRUMENTS

Criteria for assessing the applicability and adequacy of financing instruments

Applicability of potential financing instruments for slow-onset processes

Slow-onset processes and their impacts manifest gradually and over long timespans. Dealing with these impacts therefore becomes a continuous activity for parts of societies, such as those living along slowly inundated coastlines. Financing instruments and mechanisms should respond to several distinct characteristics of slow-onset processes.[4] Amongst other factors, they need to allow:

- For long-term planning (over years to decades) to deal with gradual and creeping processes slowly unfolding over years, decades, or centuries and without a clearly identifiable start or end point.

4 The analysis in the first paper in this series revealed several distinct characteristics of slow-onset processes; see Schäfer et al. 2021.

- Managing, per se, foreseeable phenomena with uncertainty about concrete impacts, as they depend on emissions scenarios as well as anthropogenic parameters and external stressors.
- Addressing of gradual impacts that manifest over a longer period due to creeping environmental transformation and degradation (compared with extreme weather events that often rapidly cause major damage).
- Addressing of impacts potentially spread over larger geographical areas up to the global level.

Adequacy of financing instruments to address loss and damage from slow-onset processes

The need for a comprehensive risk management approach

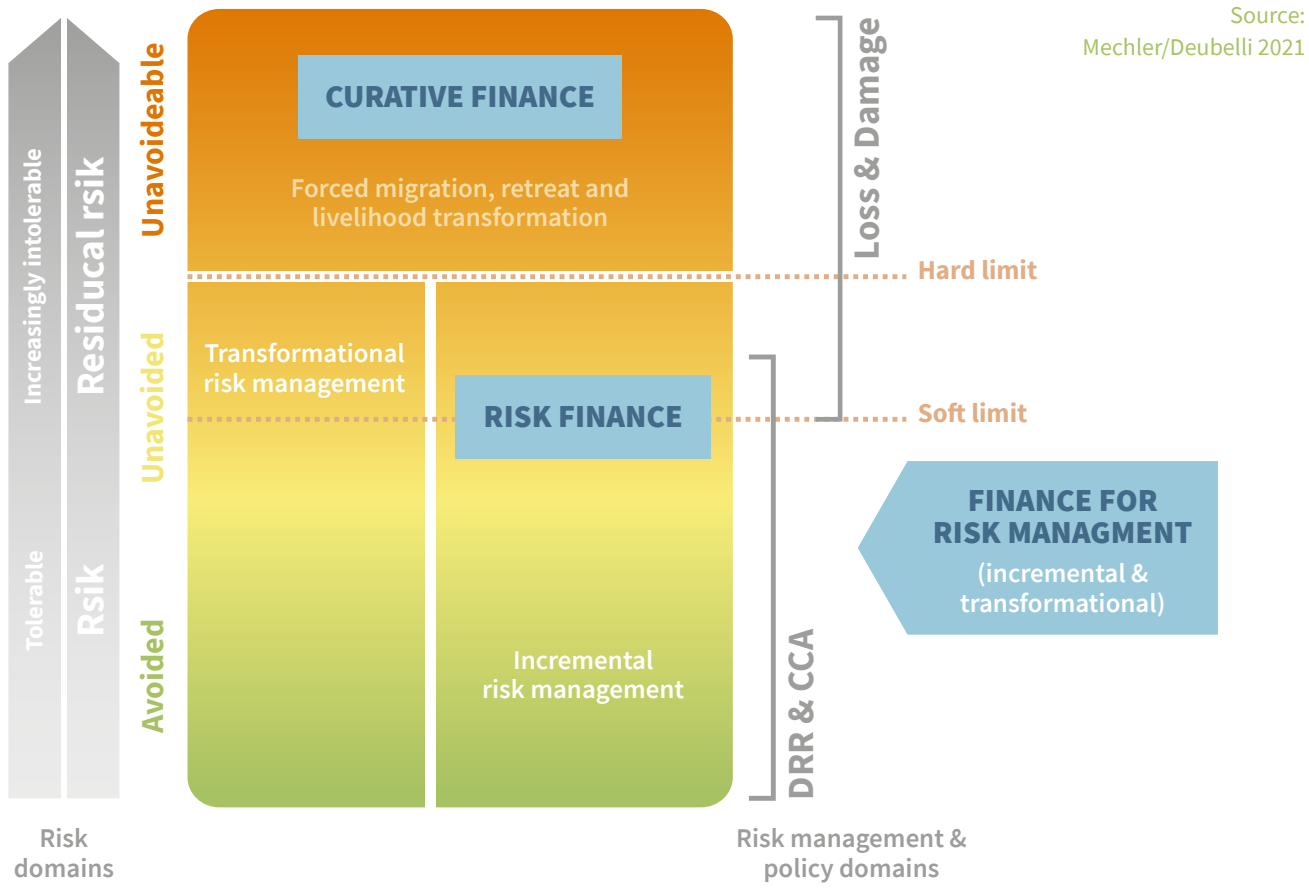
Addressing residual risks and impacts of slow-onset processes through financing instruments and tools should be only one step in a systematic process for managing related risks and impacts. This process should involve a range of activities aimed at improving the understanding of risks, to prevent, reduce, and transfer risk, as well as measures to continually improve disaster preparedness, response, and recovery. This is as opposed to a singular focus on one action or type of action (IPCC 2012). Existing climate risk management approaches, however, do not yet effectively cover risks and impacts from slow-onset processes. Initial steps are being made in addressing this conceptual gap (e.g. GIZ 2019) and that need to be further developed and tested on the ground.

The risk layering approach is a key concept used as part of the climate risk management approach.[5] Only recently, Mechler and Deubelli (2021) suggested how comprehensive and combined risk layering with associated finance options and sources could look for both extreme weather events and slow-onset processes. It is based on three (residual) risk layers considering potential loss and damage. The risks are classified as tolerable or increasingly intolerable.[6] By this approach, incremental risk management, including risk reduction and climate change adaptation, is used for tolerable risk and avoidable loss and damage. Unavoided and therefore residual risks are managed with risk financing mechanisms that transfer or retain residual risk (e.g. through insurance, catastrophe bonds, social protection schemes, or national contingency funds). Residual unavoidable and intolerable risks need curative finance including compensation (e.g. national, regional, and global loss distribution and compensation mechanisms such as solidarity funds for forced migration or livelihood transformation). Figure two shows the risk-layering approach.

5 Risk layering helps to (a) identify the different risk layers by frequency and severity of risk and (b) assign instruments to each layer (Poundrik 2011). Risk layering approaches usually suggest different risk management options for low-, medium-, and high-frequency and severity, but also allow tailoring to different risk-bearing capacities of governments and communities (Linnerooth-Bayer/Hochrainer-Stigler 2015).

6 Roberts and Pelling (2016) highlight that all countries must decide on their risk and loss tolerance and select the balance of risk management approaches appropriate for their social, economic, and political context.

Figure 2: A risk layering approach for loss and damage from extreme weather events and slow-onset processes



Reaching the most vulnerable and respecting and promoting human rights

Climate risk financing (CRF) measures and activities that governments or other actors carry out can affect enjoyment of human rights. Consideration of the human rights impacts of climate risk management instruments and activities is therefore essential to ensure that key actors respect and promote existing human rights obligations and principles; thus, promoting full enjoyment of human rights. Applying a human rights-based approach can ensure this. By such an approach, CRF instruments and activities should be developed, implemented, and evaluated in a way that 'protects and promotes the enjoyment of human rights to prevent harm to communities and ecosystems, and promotes sustainable development in the context of climate risk management' (Schäfer et al. 2020). Schäfer et al. (2020) developed a human rights-based approach for CRF activities and instruments. It suggests that for all CRF activities and instruments the human rights-based approach principles of non-discrimination and equality, participation and empowerment, transparency, accountability, and do no harm should guide development, implementation, and evaluation (ibid.).

To reach to most vulnerable with CRF it is also important to have appropriate delivery mechanisms in place. This is because even if financing instruments work and funds are available, they need to be transferred to the affected communities when required. Social safety nets are schemes that regularly transfer cash or other benefits to many households and can therefore be used if existing for delivery benefits (Calcutt et al. 2021). Otherwise, effective delivery mechanisms need to be designed for the instruments to ensure that funding reaches those most in need.

Options for financing instruments to address the (risk of) loss and damage from slow-onset processes

Based on a comprehensive literature review, we identified different options for the financial management of loss and damage due to slow-onset processes. These options are described and discussed below. The instruments presented include those already implemented and tested, as well as those still in the theoretical conceptual phase. In accordance with the categorisation introduced by Mechler and Deubelli (2021) in their comprehensive loss and damage finance taxonomy, we differentiate between risk management finance (finance sources for supporting incremental and transformational risk assessments, risk reduction, and risk financing measures), risk finance (risk financing mechanisms that transfer or retain residual risks) and curative finance (finance for dealing with unavoidable risks to ecosystems and livelihoods). We use this clustering approach for our discussion, focusing on risk finance and curative finance. The tools described below will not, by themselves, provide solutions to address loss and damage from slow-onset processes. In a comprehensive risk management approach, they must be complemented by a range of tools to fully address loss and damage. The **key findings of the analysis** are summarized on page 6.

Risk financing instruments for dealing with avoidable loss and damage

Risk pools and climate risk insurance

The literature generally states that insurance is not suitable or generally feasible as a financial risk management tool for countries to deal with slow-onset risks (Warner et al. 2013, Surminski et al. 2016, Balogun 2014, Robinson et al. 2021). It is argued that slow-onset risks violate the criteria of insurability, particularly the unpredictability of a certain event (i.e. losses occur suddenly and are not foreseeable), its infrequency, and the ability to spread risk over time and regions, between individuals/entities (Warner et al. 2013). There is, however, ongoing discussion on insurance's potential to contribute to responses directed at slow-onset impacts. Different authors have developed and discussed theoretical approaches on how to use insurance as one element of risk management for slow-onset processes. Three types of suggestions can be differentiated:

1. Insurance products or risk pools to insure against the effects of specific slow-onset processes, particularly sea level rise (e.g. Silver and Dlugolecki 2009, AOSIS 1991, Wenka et al. 2016). These ideas can be compared with capital-forming life or pension insurance, which are characterised by the fact that, in addition to highly uncertain benefits, they also provide for secure or almost secure benefits. These benefits must be saved for, and the insurer must accrue the necessary capital over a long period. Only uncertain benefits can be financed in accordance with the insurance principle (GDV 2021). The suggested approaches would require public–private partnership approaches wherein, in accordance with climate justice principles, Global North countries contribute substantively to building up required capital over a long period.
2. Insurance products that help to protect or restore ecosystem services. Lessons from existing products can be found this area, such as coral reef and beach insurance in Mexico (The Nature Conservancy 2021). While researchers note it would be feasible to theoretically insure mangroves against slow-onset processes, the process is described as highly difficult, requiring substantial amounts of data.
3. Insurance products that could cushion risks arising from the need to build up alternative livelihoods, similar to the concept of drought adaptation insurance (e.g. World Bank 2009). Further research would be needed on this suggestion's feasibility in the context of slow-onset processes.

We must note that while insurance products could play a role in addressing some slow-onset processes, they generally do not have the structure or resources to manage all loss and damage resulting from slow-onset processes. Existing and effective insurance schemes primarily provide quick and efficient first-response

relief via short-term financial liquidity, and they should be complemented by long-term relief strategies (Broberg 2019).

(Parametric) all-risk insurance has been suggested as a useful concept applicable to slow-onset processes (Silver and Dlugolecki 2009, UNFCCC 2008). This insurance operates whenever a loss occurs, not defining what the exact circumstances of a loss-causing situation might be. There are few prescribed exceptions to avoid circumstances "where compensation is not paid because the causation is in doubt, or where a completely novel cause of loss occurs." According to the UNFCCC (2008), "all-risks parametric insurance may be able to deal with slow-onset hazards and minimize basis risk due to climate change." Normally, payouts of all-risk insurance are based on claims adjustment processes wherein the policyholder must prove the loss. Silver and Dlugolecki (2009) consider a combination of the parametric insurance approach's administrative simplicity with the all-risk contract's comprehensive coverage. They suggest finding a parameter that captures the progress of climate change in the geographical area concerned; such as annual temperature as an indicator of climate change. For islands, it could be sea level. The trigger would be the annual change in the climate change parameter (Silver/Dlugolecki 2009). Premiums for this all-risk insurance would, however, be higher than for specified risk policies, and would also include substantial deductibles so as to avoid minor claims (ibid.). This type of insurance, however, could potentially accumulate funds to plan and finance alternative economic and geographical configurations for untenable economies over the long term (UNFCCC 2008).

Another concept suggested is **insurance pools against specific slow-onset processes**, particularly sea level rise. These also resemble capital-forming life insurance, with a high-fund character, and they are based on climate justice principles. This would therefore need public–private partnership approaches wherein Global North countries accrue necessary capital over a long period. Suggestions include the Alliance of Small Island States (AOSIS) international insurance pool against sea level rise. Based on climate justice principles, the basic concept is to distribute the financial burden of loss and damage suffered by the most vulnerable SIDS resulting from sea level rise "in an equitable manner amongst industrialized developed countries by means of an insurance pool" (AOSIS 1991). The insurance pool, which would be under the COP's control and management, would be funded by contributions levied on developed countries, calculated in accordance with the formula of the 1963 Brussels Supplementary Convention on Third Party Liability in the Field of Nuclear Energy. For pay-outs, an agreed upon level above base levels regarding the rate of global mean and the absolute level of global sea level rise, as well as the relative mean sea level rise for the insured country, would be considered. Based on the AOSIS idea, Wenka et al. (2016) suggested a regional index insurance mechanism related to the slow-onset risk of sea level rise. Their regional risk pool, in a type of 'life insurance to public infrastructure,' aims to address sea level rise for Pacific SIDS. The mechanism would cover public assets and infrastructure (e.g. public utilities such as power plants, major transport infrastructure, or essential emergency facilities such as hospitals) in member countries, which would need to prepare and implement an 'asset/infrastructure protection plan' as an eligibility criterion. The authors suggest the mechanism be based on a parametric trigger with two components: (1) relative mean sea level rise at a particular location exceeding a predetermined threshold level and (2) global mean sea level rise exceeding a predetermined threshold. The mechanism would not cover the actual loss or damage the insured country suffers. As the mechanism would require substantive resources, the authors suggest concrete contributions from developed countries in the context of the UNFCCC – financial contributions (e.g. capitalisation, premium subsidies, and regular financial assistance for administrative and operational activities) and non-financial contributions (e.g. sharing technical expertise, contributing to development of an information base underpinning the mechanism, and capacity building).

Another potentially helpful idea in the context of slow-onset processes is to use **insurance to help protect or restore ecosystem services**. While it may not be possible to generally insure against sea-level rise or ocean acidification, it might be possible to insure core ecosystems impacted by the changes (e.g. coral reefs and mangroves) against impacts. **The coral reef and beach insurance** by the Nature Conservancy and the National Parks Commission is an innovative use of insurance to protect and restore a 160-kilometer stretch of reefs on Mexico's Yucatan peninsula against damage due to severe storm events. The insurance is managed by a coastal zone management trust, designed to collect and manage funds for reef maintenance and repair. The state government established the trust with participation of the tourism industry, the Nature Conservancy, and other civil society members, as well as the international insurance industry. The parametric policy pays out when wind speeds exceed 100 knots, allowing swift damage assessment and repairs (The Nature Conservancy 2021). Key in this type of nature insurance is finding an entity with an insurable interest and available funds (Kousky/Light 2019). The insurance was created against the backdrop of coastal communities being protected against storms by natural systems such as coral reefs. This gives the tourism industry a particularly large incentive to participate in the policy. Additionally, sea-level rise, ocean acidification, or temperature rise can potentially damage ecosystems so they lose their benefit to communities and need restoration. This could impel thinking about options to also insure these ecosystems against slow-onset processes. Regarding mangrove forests, Beck et al. (2020) discussed the idea of focussing on the benefits of these forests to neighbouring communities, including their carbon storage function. As mangroves store carbon not only in their biomass but also in the soil, they act as long-term carbon sinks. The authors note that it would be possible to develop a **mangrove insurance product** related to carbon storage, like in Australia where the Insurance Facilitators launched one of the first insurance products to cover sequestered carbon from the forest in collaboration with major accredited carbon offset projects (ibid.). Beck et al. (2020) noted that mangroves could theoretically also be insured against temperature changes, a slow-onset process. However, compared with the above-described storm insurance for coral reefs, it is much more difficult to assess the fragility of mangroves to these stressors, leading to a highly time-intensive pursuit in constructing the necessary curves and data. They conclude that 'while feasible, it's much more likely that any cost-effective mangrove insurance product would focus on the impact to mangroves from storm events. Funding from any storm-related insurance product would then have to be utilized efficiently to resolve any other compounding factors that threaten mangroves.' Kousky/Light (2019) noted a general challenge to insuring ecosystems, because even if there is an entity with an insurable interest, it must be willing and able to pay the necessary insurance premiums. For most ecosystems the benefits are public goods, so this might provide disincentives to those with an insurable interest to pay – being unwilling to shoulder the costs alone. Moreover, these types of insurance policies must be cost-effective. Kousky/Light (2019) conclude that 'instead of purchasing insurance from a third party, entities could choose to **self-insure by setting aside their own funds to use post-disaster, or they could use debt to finance any needed restoration**. It may not always be financially optimal to purchase insurance for restoration; financial analyses would need to be undertaken on a case-by-case basis. (…) insurance can play an important role in ecosystem management but that this role is narrow.'

While an all-risk insurance could fund alternative economic options for full communities/societies, slow-onset processes will also result, with the need to change livelihoods for a specific group of people, such as from fishing to agriculture. An **insurance product to cover against risk resulting from new forms of business** is a potential way to support people in finding new livelihoods, like the suggestion of a 'drought adaptation insurance' (World Bank 2006). This product is premised on protecting farmers against new risk sources resulting from a change in their farming practices towards more drought-resilient and less water-intensive practices. The product

is coupled with a credit that provides initial capital to help farmers shift to long-term viable businesses. Further research would be needed on this suggestion's feasibility in the context of slow-onset processes.

Bonds

Catastrophe bonds are another form of insurance-linked securities wherein bond issuers transfer risks to investors to acquire funds should a catastrophe strike (III 2021). These bonds have high interest rates and are often used by investors to diversify their portfolio because, for example, extreme weather events occur randomly. Thus far, catastrophe bonds are only used to cover sudden-onset catastrophes. There are ideas, however, on how to also apply the catastrophe bond concept to slow-onset processes. One innovative idea is a sea level rise bond, which would provide a pay-out when the event's mean sea level exceeds a predetermined threshold (CIGI 2016). The index measure would be based on a series of official tide gauges. This bond is only in the conceptual stage, and further research would be needed to analyse its feasibility. Even if, however, innovative products are developed, there must be consideration with this type of solution that bonds generally come with stricter terms and conditions and have a higher fixed cost than traditional insurance, irrespective of how much is insured (III 2021). They are also often only available to institutional investors (ibid.). This makes catastrophe bonds an unsuitable tool for dealing with the risks concerning slow-onset processes in developing countries.

Social protection schemes

Social protection schemes are a potential option for addressing (the risk of) loss and damage due to slow-onset processes, particularly with a focus on reaching populations' most vulnerable parts (Bowen et al. 2020, Aleksandrova 2019, Ulrichs et al. 2019). Recently, Farbin/Huq (2021) argued that for the special case of Bangladesh, where government-run social safety nets can be broadened to "include slow onset processes such as sea level rise to soften the blow of loss and thus build resilience to climate change and help communities to cope when losses and damages cannot be avoided." Additionally, Mechler and Deubelli (2021) mentioned social protection schemes that work via social safety nets as an opportunity for addressing residual risks for slower-onset risks. The following box details this option.

BOX: SOCIAL PROTECTION MECHANISMS TO ADDRESS LOSS AND DAMAGE ASSOCIATED WITH SLOW-ONSET PROCESSES IN COASTAL REGIONS

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Social protection systems contain a mix of policies, mechanisms, and interventions targeted at lowering poverty, social inequality, and vulnerability throughout the life cycle (ILO 2017). Social assistance is the most widely used form of social protection in developing countries with limited capacities to establish comprehensive national social security structures. These programmes offer poor and socially vulnerable groups access to non-contributory social protection schemes. The main instruments are public work programmes, which provide regular payments to vulnerable unemployed people through employment guarantee schemes; 'cash for work' or 'food for work' programmes; and conditional and unconditional cash or in-kind transfers, such as school meal programmes. Integrated programmes (productive safety nets) blend social assistance instruments with

livelihood promotion activities, such as skills development, entrepreneurship support, and improved access to finance. Research suggests social assistance's potential to build adaptive capacity through social inclusion, and to reduce vulnerability by addressing multi-dimensional poverty with benefits across multiple development spheres, such as food security, health, education, and human mobility (Aleksandrova 2019b). Vitally, social protection schemes are often used to aid environmental conservation and restoration initiatives, which are a critical action area to address slow-onset climate processes. A growing body of study thus recognises that social assistance instruments can reinforce the most vulnerable group's capacity to respond to climate-induced shocks and adapt to climate change (Agrawal et al. 2019; Aleksandrova, 2019a+b; Kuriakose et al. 2013; Norton et al. 2020; Tenzing 2020; Ulrichs et al. 2019).

In coastal areas, well-designed social protection measures, integrated into comprehensive coastal risk management policy frameworks, can contribute to reducing the risks of poverty and marginalisation resulting from slow-onset processes' impacts. Social protection instruments can support transformative livelihood strategies designed to reduce communities' dependence on fisheries and to protect vulnerable coastal ecosystems. This, in turn, can help curtail loss of marine biodiversity. Social transfers and skills development programmes can be developed for people affected by planned relocation or environmental policies in the fisheries sector. As an example, a project financed by the GCF ([7]) builds on a national social housing programme in Vietnam to aid poor people's access to climate-resilient housing in coastal areas. In Senegal, fishers' cooperatives and associations support fisherfolk through social service programmes such as free training to obtain new skills, social insurance schemes, employment guarantee programmes (e.g. for mangrove restoration and coastal protection), and conditional cash transfers for promotion of sustainable fishing practices and post-harvest operations (FAO 2017). South Africa's Working for the Coast Programme, which is aligned with the objectives of key national legislative frameworks such as the Integrated Coastal Management Act, provides direct employment in public sector projects aimed at conservation and restoration of coastal ecosystems. A study conducted in the Philippines found that, under certain conditions, environmental cash for work programmes, which support fisherfolk through income during closed fishing seasons, as well as mangrove reforestation activities, offer opportunities to extend social protection coverage, with benefits for improved fishery management and mangrove reforestation (Altenburg et al. 2017).

Despite these efforts, innovative social protection approaches are needed to help current and future generations counter irreversible losses due to global warming, such as loss of land, social cohesion, and ecosystem services. Moreover, there are numerous challenges related to using the potential of social protection to contribute to effective management of climate risks of a slow-onset nature. Success factors are improved programme design, increased understanding of potential negative social and environmental outcomes, climate-aware and cross-sectoral planning with a long-term outlook, sustainable sources of finance, and enhanced institutional capacity and coordination (Agrawal et al. 2019; Aleksandrova/Catella 2021; Aleksandrova 2019b; Béné et al. 2018; Kuriakose et al. 2013; Norton et al. 2020; Tenzing 2020; Ulrichs et al. 2019).

7 Improving the resilience of vulnerable coastal communities to climate change-related impacts in Viet Nam.

Forecast-based financing

All the above-described tools only pay out when a climate change impact has already materialised. As this is often too late to keep people from using erosive coping strategies, humanitarian actors have developed forecast-based finance (FbF) as a means of anticipatory humanitarian action. Based on scientific forecasts and risk analysis, FbF releases pre-approved funds for pre-defined early actions. Funds are automatically allocated when a forecast threshold is reached. This is to reduce the potential impacts of events and to meet immediate needs (German Red Cross 2017). In Bangladesh, for example, the FbF approach tries to address tropical cyclones with distribution of health and hygiene kits to ensure access to safe drinking water and reducing the risk of waterborne diseases. Unconditional cash transfers have also been used in pilot communities to allow people to evacuate their families and belongings to safe areas without selling all their assets to fund it. FbF mechanisms thus far have been developed for rapid-onset events (e.g. cyclones, floods, and cold waves) and geophysical events (e.g. volcanic ash). Regarding general application of FbF for slow-onset processes such as desertification or sea-level rise, representatives from the humanitarian field are sceptical, not seeing this substantial difference this approach can make (IFHV 2021). For these types of processes, they see governments and development banks as stepping in (ibid.). Although FbF as such might not be applicable for slow-onset processes, the approach can be interesting – pay-outs as soon as a trigger is hit to allow for a quick response before a slow-onset process' actual impact hits.

Curative financing instruments to deal with unavoided and unavoidable loss and damage

While the above-described instruments attempt to address the risk of potentially avoidable loss and damage, curative finance to deal with unavoided loss and damage will be needed. This response element as part of a comprehensive approach will be the most challenging towards designing in the context of slow-onset processes. This is because it needs to include instruments for addressing consequences of permanent or irreversible loss and damage. A particular challenge is posed by the fact that for slow-onset processes, coping with impacts can become a continuous activity for parts of societies, such as those living along slowly inundated coastlines. At a certain stage, a combination of stresses may exceed vulnerable social and ecological systems' abilities to cope, which leads to the risk of a system collapse (IPCC 2012). Mechler and Deubelli (2021) mention the need for a loss distribution and compensation mechanism to provide curative finance to deal with unavoided and unavoidable loss and damage. Countries would need this type of finance to, in other words, rebuild infrastructure and livelihoods, finance resettlement and displacement, and build up alternative livelihoods. Subsequently, we particularly look at fund-based approaches that could accumulate the necessary funding to address loss and damage from slow-onset processes. The instruments presented include both theoretical and implemented funds dedicated to addressing loss and damage, impact investment funds, and trust funds for relocation. As examples of existing and theoretical funds for curative loss and damage finance are limited, we present examples of funds from other areas from which we may learn, particularly regarding implementing the 'polluter pays' principle.

The potential implementation of these instruments is closely linked to questions of climate justice and operationalisation of the polluter pays principle, which is part of a highly contentious debate in the international climate policy sphere. Based on COP decision 1/CP.21, the Paris Agreement and its Article 8 on loss and damage do not 'involve or provide a basis for any liability or compensation' (§51). The COP decision, however, "cannot exclude the application of the general rules on liability and compensation be-tween states" (Sharma et al. 2016); thus, the formulation does not apply to other international duties, international law, and national legal systems.

Fund-based approaches

Loss and damage funds: As slow-onset processes are not accounted for in the current national climate change policies, national level NGOs have long been suggesting a **national loss and damage mechanism** for Bangladesh (Huq et al. 2016; Haque et al. 2018; Farbin 2021). The idea here is to establish a mechanism to comprehensively manage loss and damage. ([8]) The mechanism would also include a trust fund, which could be based on the Bangladesh Climate Change Trust Fund, financed by the domestic budget. Currently, 34 % (about $135,000,000) of the fund is held in a reserve in a fixed deposit account. This could create the financial base to set up a loss and damage fund with domestic resources (Haque et al. 2018). Other countries have considered establishing loss and damage mechanisms developed in accordance with the Warsaw International Mechanism, in their nationally determined contributions. Sri Lanka is one example (Ministry of Mahaweli Development and Environment 2016). These funds could be based on examples of trust funds, already applied by countries to pool, save, grow, and spread out financial resources over time, and address future needs. According to Siegele (2012) these mechanisms could serve as a model to also deal with the impacts of slow-onset processes. Sovereign wealth funds and national trust funds are mentioned as examples. Several countries (e.g. Virgin Islands, Tonga, Bangladesh, and Indonesia) have already set up climate change trust funds. These trusts facilitate access to international funds and raise local funds dedicated to climate change mitigation, adaptation, and climate risk management activities. The funds' capitalisation requires a certain level of donor support. Contributions to the funds thus far have come from the countries themselves, as well as from development banks (e.g. Virgin Islands 2015, Government of Tonga 2017). These types of funds could also be used to address loss and damage from slow-onset processes.

Impact investment funds: To address loss and damage due to desertification and other processes, and to achieve the Sustainable Development Goals target of a land degradation-neutral world, the United Nations Convention to Combat Desertification set up the **Land Degradation Neutrality Fund** in 2017. This is an impact investment fund with a mix of private and public contributions, and with the public money 'buffering' the risk of private investments to support achieving land degradation neutrality through sustainable land management and land restoration projects (implemented by the private sector) (UNCCD 2021). While the initial design was undertaken with support from forerunner governments and The Rockefeller Foundation, the private sector investment management firm Mirova manages the Fund. The Fund invests in financially viable private projects to restore degraded land that will generate competitive returns for investors, yet it will also generate revenue from sustainable use of natural resources. The Fund is based on a public–private partnership wherein investments by development banks such as the European Investment Bank buffer the risk of loss for investors from the financial sector in a sector (land use and agriculture) shown to have extremely high financial risks for investors (Kill 2019). While development banks and United Nations organisations see the Fund as a promising and innovative investment model in the fight against the loss of fertile land and soil, civil society organisations highlight risks in the model concerning the private sector, particularly for smallholder farming – if investors' interests are prioritised over farmers' interests (Kill 2019).

(Trust) funds for relocation: Like other examples, funding instruments to deal with relocation are often designed for the post-disaster context in response to rapid-onset disasters. Boston et al. (2020) reported that 'most require a clear declaration of disaster for funding to become available and do not sufficiently consider the issue of planned relocation in the context

8 Including a wide range of activities from risk assessment and understanding to financial instruments to pay compensation and specific approaches to address loss and damage associated with slow-onset processes.

of slow-onset events.' With the **Fiji Climate Relocation and Displaced Peoples Trust Fund for Communities and Infrastructure**, Fiji set up the world's first fund to specifically respond to the challenge of relocation due to sea-level rise. The Government of Fiji provides seed funding through a percentage of the revenue from an Environment and Climate Adaptation Levy (ECAL) basis (Fijian Government 2019a). ECAL is a consortium of taxes on designated services, items, and income (The Fijian Government 2019b).[9] Based on current projections, the annual allocation from ECAL will be approximately $5,000,000 a year. The Fijian Government hopes to raise bilateral and multilateral donor funding. The Fund is dedicated to financing the relocation of low-lying vulnerable coastal communities. This also includes rebuilding communities and the sense of community, and ensuring access to jobs, schools, medical services, and sustainable living, all based on Fiji's Planned Relocation Guidelines (TFijian Government 2019a).

Funds from other areas as lessons from which we can learn: Several noteworthy funds from other areas offer potential lessons for financing loss and damage from slow-onset processes. These include examples from dealing with rapid-onset events, health crises, or environmental harm. The **European Solidarity Fund** (EUSF), established after severe floods in 2002, is an ex-post financing instrument for emergency operations in the event of a major disaster or major public health emergency. The Fund pools risk among European countries, paying out in the form of grants to supplement public spending by the beneficiary state, and is intended to finance essential emergency and recovery measures to alleviate damage that, in principle, is non-insurable (EU Parliament 2020). The Fund's eligibility criterion is the damage due to the disaster beyond a threshold and specific for each country.[10] Thus far, the Fund has been used to cover major disasters, including floods, forest fires, earthquakes, storms, and drought. Through the EUSF, which is not covered by the normal EU budget, up to €500,000,000, plus the unspent allocation from the previous year, can be made available each year to supplement public expenditure on emergency operations by the Member States concerned (ibid.). Assistance is intended for financing; in other words, immediate restoration of infrastructure and facilities, the provision of temporary accommodation, protection of cultural heritage, cleaning up of disaster-stricken areas, and rapid medical assistance. After receiving a grant, countries must present an implementation report including details on expenditures, preventative measures taken, and experience gained. Hochrainer-Stigler et al. (2017) described the Fund as 'a model for financing loss and damage from climate change in vulnerable countries worldwide.' Such a solidarity fund could be organised both at the regional and global levels to address effects of slow-onset processes.

In reflecting the **polluter pays principle** in instruments, much can be learnt from fund-based approaches for dealing with environmental harm and that are based on the no-harm rule, both at the international and national levels. At the international level, the **Oil Pollution Compensation Fund** under the auspices of the International Maritime Organization provides financial compensation for oil pollution damage occurring in member states and resulting from persistent and ongoing oil spills of from tankers. The fund is financed by contributions paid by entities that receive certain types of oil via maritime transport (IOPC 2021). Contributions are based on the amount of oil received in the relevant calendar year. The owners of tankers

9 ECAL comprises: 10 % tax on importation of luxury vehicles; miscellaneous – inclusive of a 10 % charge on super yacht charters and docking fees; 10 % income tax on individual earnings exceeding FJ $270,000; 20 cent levy on plastic bags; and 10 % ECAL on prescribed services offered by businesses with a turnover of FJ $1.5 million.

10 A natural disaster is regarded as 'major' if it results in direct damage (in the Member State or country applying for accession) exceeding €3 billion (2011 prices) or > 0.6 % of the gross national income of the beneficiary state. A 'regional natural disaster' is defined as any natural disaster in a NUTS 2 region (3.1.6) that results in direct damage > 1.5 % of that region's gross domestic product (GDP). For outermost regions, within the meaning of Article 349 of the TFEU, this latter threshold is set at 1 % of the region's GDP.

carrying >2,000 tonnes of oil are obliged to take out liability insurance. Built on the example of the oil pollution fund, the **Hazardous and Noxious Substances Fund** aims to ensure adequate, prompt, and effective compensation for damage to people and property, costs of clean-up and reinstatement measures, and economic losses resulting from maritime transport of hazardous and noxious substances (HNS Convention 2018). As with the original oil pollution compensation regime, the Hazardous and Noxious Substances (HNS) Convention establishes a two-tiered system for compensation to be paid in the event of maritime accidents; in this case, involving hazardous and noxious substances, such as chemicals. Tier one is covered by compulsory insurance taken out by shipowners, who would be able to limit their liability. In cases where the insurance does not cover an incident, or is insufficient to satisfy the claim, a second tier of compensation is paid from a fund made up of contributions from the HNS receivers. Contributions are calculated in accordance with the amount of HNS received in each member state in the preceding calendar year. The HNS Fund pays compensation when the total admissible claims exceed the shipowner's liability; i.e., it pays 'top up' compensation when the shipowner, or their insurer, cannot fully compensate for the loss or damage resulting from an incident. The maximum amount the HNS Fund must pay in any single incident is 250 million Special Drawing Rights, including the sum the shipowner or their insurer pays. There are also national-level fund approaches to deal with environmental harm that industries cause. To deal with contaminated sites due to hazardous waste being dumped, left out in the open, or otherwise improperly managed, the United States established the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980, informally called the **Superfund**. CERCLA provides for liability of people responsible for releases of hazardous waste at the sites, compels them to clean up sites, and establishes a trust fund to provide for clean-up, seeking to recover the costs from the responsible parties through settlements or legal means (EPA 2021). CERCLA created a tax on the chemical and petroleum industries which went to the trust fund. In 1995, however, the tax on industries was not renewed and costs were shifted to taxpayers.

FINANCING SOURCES

The chapter “Financing instruments” (page 18 et seq.) discussed different financing instruments to address (the risk of) loss and damage from slow-onset processes. The chapter “Understanding the problem” (page 12 et seq.) already noted that to adequately address (the risk of) loss and damage, both financing instruments and the financing sources to implement them are needed. This chapter therefore analyses financing sources that provide funding to set up and implement measures that support countries in addressing climate risks and impacts. While this financing generally can come from national or international sources, we focus on the international level. After a brief explanation of key principles for financing measures (page 18), the chapter focuses on possibilities for financing measures to deal with slow-onset loss and damage through the UNFCCC financial architecture (page 32). Box 2 (page 46) describes complementary financing options from innovative sources.

Criteria for assessing financing sources

The following criteria should be used to assess financial sources to address loss and damage from slow-onset processes.

Climate and intergenerational equity: Polluter pays and common but differentiated responsibilities and respective capacities

The slow-onset processes discussed in this paper are phenomena caused or intensified by anthropogenic climate change (see, e.g., James et al. 2019). As countries in the past and present have contributed unevenly to climate change, and countries most vulnerable to the impacts of climate change have contributed substantially less, the **polluter pays principle** (anchored in the Rio Declaration 1992) should be applied to assess financing sources for dealing with loss and damage. Under the UNFCCC, the **principle of common but differentiated responsibilities and respective capacities** recognises that high-emission countries should take the lead in assisting and supporting countries strongly affected by climate risks via financial protection measures against loss and damage (from slow-onset processes). This should, however, be within their differing capabilities, and national and regional priorities, objectives, and circumstances (UNFCCC 1992) affecting their contributions to fulfilment of the outlined responsibilities.

The polluter pays principle applies to cases in which attribution to human made climate change can be shown, and responsibility should increasingly shift to those that contributed to the anthropogenic climate change; i.e. the emitters. In many circumstances, however, the impacts have been exacerbated, or even primarily caused, by human-induced non-climatic drivers such as land subsidence (e.g. groundwater extraction), pollution, habitat degradation, reefs, sand mining (IPCC 2019), and socio-economic conditions. Solidarity with the countries most vulnerable to climate change is therefore another essential principle regarding financing sources to address loss and damage (from slow-onset processes). **Solidarity** is proclaimed to be "a fundamental value, by virtue of which global challenges must be managed in a way that distributes costs and burdens fairly, in accordance with basic principles of equity and social justice, and ensures that those who suffer or benefit the least receive help from those who benefit the most" (GA resolution 57/213). The solidarity principle includes the concept of voluntary payments, made from humanitarian considerations, rather than responsibilities stemming from liabilities (Mechler 2019).

Appropriateness, additionality, equitable access, and predictability

Largely in line with a human rights-based approach are the principles of appropriateness, predictability, and additionality of finance for loss and damage proposed by Richards and Schalatek (2017). The principle of **appropriateness** adds to the do-no-harm principle in the sense that financing measures for loss and damage from slow-onset process should not place an additional burden on the recipients. Another aspect of appropriateness is financing that should adequately respond to the scale of the existing challenge in addressing loss and damage, based on needs assessments in recipient countries. Moreover, finance to deal with loss and damage in general, and particularly from slow-onset processes, should be **additional** to official development assistance and additional to climate finance for adaptation and mitigation. It therefore should be provided on top of existing climate finance commitments (Richards/Schalatek 2017). The Paris Agreement recognised loss and damage as separate from adaptation and mitigation (UNFCCC 2015); therefore, financial measures should also be provided in a distinctive manner. This is not to say co-benefits should not be harnessed. Finance should also be **equitably accessible**, particularly for the most affected (ibid.). Slow-onset processes' risks unfold in a cascading manner, given their gradual nature. This means both timely and continuous provision of financial measures is important to be able to address the loss and

damages of gradually progressing climate impacts. A certain degree of **predictability** for recipients is needed to secure the sustainability of approaches and allow for planning security (ibid.).

The potential of the existing UNFCCC financial architecture to finance loss and damage measures

Methodology

This paper's analysis focused on four funds that are part of the UNFCCC financial architecture: the AF, GCF, LDCF, and SCCF. We undertook a comprehensive document review of the theoretic funding scope and the current project portfolio for each of the funds.

a) The evaluation of the **theoretic funding scope** considered relevant decisions and agreements under the UNFCCC, governing documents, strategic documents of and related to the funds, and other guiding documents produced by the funds' boards or secretariats. Additionally, we reviewed relevant literature on the funds' theoretic funding scope and current project portfolio, including journal articles, grey literature, and documents produced by UNFCCC bodies or committees. As the wording in set out documents generally remains broad, the evaluation of potential coverage often remains subject to interpretation by the funds' secretariats and (for the GCF) the Independent Technical Advisory Panel (ITAP). Evaluating the theoretic funding scope in this study therefore also partly depends on our interpretation.

b) The **current funding portfolio** for loss and damage measures was determined by reviewing a fund's current project portfolio. The research was conducted in two steps. First, a keyword[11] search comprising project titles and descriptions, including project components on the funds' websites, based on the categorisation of loss and damage measures outlined in table 3, helped identify potentially relevant projects. The analysis was undertaken between May and October 2021. The number of projects screened for keywords on funds' websites is 167 (AF), 190 (GCF), 305 (LDCF), 87 (SCCF). In a second step, the full project document of the projects identified in the first step were reviewed to ensure that the project indeed focussed primarily on addressing climate change-related loss and damage (and not purely finance rehabilitation measures due to other social or environmental factors, such as restoration of ecosystems due to overgrazing).

We considered four categories of loss and damage measures in need of financing for the analysis, based on identification of needs in chapter "Understanding the problem" (page 12 et seq.) and instruments to address loss and damage from slow-onset processes in chapter "Financing instruments" (page 18 et seq.): (1) financial protection measures; (2) recovery and rehabilitation measures, (3) measures relating to migration and developing alternative livelihoods, and (4) measures relating to addressing non-economic loss and damage. Each category comprised three measures that address (the risk of) loss and damage (see Table 3). In total, we considered 12 loss and damage measures for the analysis (the most relevant measures were chosen from the comprehensive overview of measures to address loss and damage in table 2). The measures were analysed in terms of addressing loss and damage from both slow-onset processes and extreme weather events. This was because the nature of the analysis made it difficult to distinguish between rapid- and slow-onset events and processes in some places (e.g. displacement). The analysis therefore allows conclusions to be drawn for general financing possibilities of loss and damage measures through the UNFCCC financial architecture, yet has a focus on slow-onset processes.

11 See Annex I for complete list of keywords included in the search.

Table 3: Analysed measures to address loss and damage

Analysed measures to address loss and damage
A. Financial protection[12] ■ Setting up, scaling up, 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**
B. Recovery[13] **and rehabilitation**[14] (e.g. applicable for areas that are not permanently submerged but affected by more frequent high sea level events), including, for example: ■ Rebuilding of **infrastructure** ■ Restoration of **ecosystems and landscapes** ■ Rebuilding/Restoring of **livelihoods**
C. Migration and alternative livelihoods ■ Support measures for (planned) **relocation** or **resettlement** ■ Building up **alternative livelihood** provisions ■ Support measures for climate-induced **displaced** persons and people affected by **forced migration**
D. Addressing non-economic loss and damage ■ Active **remembrance** ■ Societal **identity** and **cultural heritage** protection ■ **Counselling**

Source: Authors

12 Financial protection is understood as 'the use of financial tools to retain, transfer and share risk to address to manage the financial impact of extreme events' (OECD 2017).

13 Recovery is understood as 'the restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and "build back better," to avoid or reduce future disaster risk' (UNDRR 2021b).

14 Rehabilitation is understood as 'the restoration of basic services and facilities for the functioning of a community or a society affected by a disaster' (UNDRR 2021c).

The findings were put into three categories. For the theoretic funding scope, we differentiated between explicitly covered, potentially covered, and coverage not possible/unlikely. For the current project portfolio, we differentiated between funding available, only limited funding available, and not funded. Tables 4 and 5 give definitions for each category.

Table 4: Analysis categories for theoretic funding scope

Category	Definition
Explicitly covered by outlined funding scope	Explicit mention of funding for loss and damage measures (keywords) in mandate and/or strategy documents
Potentially covered by outlined funding scope	Implicit reference to loss and damage measures through funding in mandate and/or strategy documents
Coverage by fund not possible/unlikely	Funding for loss and damage measures explicitly excluded in mandate and/or strategy documents and/or coverage unlikely because of restricting eligibility criteria or other prerequisites for funding that restrict funding of loss and damage measures

Source: Authors

Table 5: Analysis categories for current project portfolio

Category	Definition
Funding available	Multiple concrete projects with explicit components or outputs classified as loss and damage measures were/are being funded (5 or more projects)
Only limited funding available	Only a limited number of projects with explicit components or outputs classified as loss and damage measures were/are being funded (4 or less projects)
Not funded (yet)	No projects/activities with components or outputs classified as loss and damage measures were funded (yet)

Source: Authors

The analysis' objective was to identify if measures to address loss and damage could be funded by the existing UNFCCC financial architecture.[15] For the analysis, we only considered projects including explicit components or outputs classified as loss and damage measures (see list of keywords in Annex I). Projects including smaller scale loss and damage-relevant sub-activities were not considered. These sub-activities are not critical for project approval and do not allow for assessment of whether adequate financing of loss and damage measures by the funds is possible.

The analysis only considered approved projects. An analysis of funding proposal with loss and damage components denied by the fund's boards would provide interesting insights on loss and damage projects submitted but denied, as well as respective criteria for this decision. This is a potential next step for analysis.

We selected 12 relevant loss and damage measures, while several other measures were not examined (e.g. rapid response measures needed after extreme weather events). The study therefore does not claim to encompass all possible loss and damage measures. However, the selected measures cover four categories and a broad field of loss and damage measures, providing a basis for generalizing the results.

One challenge encountered in the analysis was distinguishing whether financial measures were specifically attributable towards loss and damage or adaptation actions. In most cases, the two go together, with the objective of building climate resilience.

Findings

The **key findings of the analysis** are summarized on page 6. Table 6 provides an overview of (potential) financing for loss and damage measures under the UNFCCC financial architecture (with a focus on loss and damage from slow-onset processes).

15 In the Paris Agreement, Parties recognise the importance of averting, minimising, and addressing loss and damage associated with the adverse effects of climate change (…)"(Article 8 of Decision 1/CP.21). The analysis focused on the potential of the UNFCCC financial architecture to finance measures to address loss and damage. We note, however, that the UNFCCC funds contribute to averting and minimizing loss and damage in the context of their financing of mitigation, adaptation and disaster risk reduction measures.

Table 6: (Potential) financing for loss and damage measures under the UNFCCC financial architecture

Funds	Loss and damage measure/ funding scope and portfolio	A. Financial protection Recovery and rehabilitation Migration and alternative livelihoods: Setting up, scaling up, or capacity building for climate risk insurance schemes	A. Financial protection Recovery and rehabilitation Migration and alternative livelihoods: Integrating climate change risks and impacts into and/or scaling up social protection schemes	A. Financial protection Recovery and rehabilitation Migration and alternative livelihoods: Setting up, scaling up, or capacity building for contingency funds	B. Recovery and rehabilitation: Rebuilding of infrastructure	B. Recovery and rehabilitation: Restoration of ecosystems and landscapes	B. Recovery and rehabilitation: Rebuilding/restoring of livelihoods	C. Migration and alterative livelihoods: Support measure for (planned) relocation or resettlement	C. Migration and alterative livelihoods: Building up alternative livelihood provisions	C. Migration and alterative livelihoods: Support measure for climate-induced displaced persons and people affected by forced migration	D. Addressing non-economic loss and damage: Active remembrance	D. Addressing non-economic loss and damage: Societal Identity and cultural heritage protection	D. Addressing non-economic loss and damage: Counselling	Total projects to loss and damage in current funding portfolio
AF	Theoretic funding scope													
	Current funding portfolio	9				3		2	2					17
GCF	Theoretic funding scope													
	Current funding portfolio	3			1	5		1	5					15
LDCF	Theoretic funding scope													
	Current funding portfolio	3				3			1					7
SCCF	Theoretic funding scope													
	Current funding portfolio	3				1								4

Theoretic funding scope

- Explicitly covered by outlined funding scope
- Potentially covered by outlined funding scope
- Coverage by fund not possible/ unlikely

Current funding portfolio

- Funding available
- Only limited funding available
- Not funded (yet)

Source: Authors.
See Annex II for a complete list of projects included

The Adaptation Fund's potential in funding loss and damage measures

Theoretic funding scope

Decision 5/CP.7 sets out a list of activities that "shall be supported through […] the Adaptation Fund […]." This list includes implementation of adaptation activities "inter alia, in the areas of water resources management, land management, agriculture, health, infrastructure development, fragile ecosystems, including mountainous ecosystems, and integrated coastal zone management" (UNFCCC 2001). Further named are enhancement of "institutional capacity, for preventive measures, planning, preparedness and management of disasters relating to climate change, including contingency planning, in particular, for droughts and floods in areas prone to extreme weather events," as well as for "rapid response to extreme weather events." The AF Operational Policies and Guidelines (AFB 2017a) state that "the Adaptation Fund established under decision 10/CP.7 shall finance concrete adaptation projects and programmes" (ibid., paragraph 9), which are defined as a "set of activities aimed at addressing the adverse impacts of and risks posed by climate change," that produce "visible and tangible results on the ground by reducing vulnerability and increasing the adaptive capacity of human and natural systems to respond to the impacts of climate change, including climate variability" (ibid., paragraph 10).[16] The language of 'address(ing) the adverse effects of climate change' implicitly leaves room for coverage of most of the loss and damage addressed in this analysis.

On financial protection measures: Although not explicitly mentioned in the AF policy and strategic documents, climate risk insurance solutions can well be supported through the AF. This is because they meet the criteria for an adaptation project as defined in the Operational Policies and Guidelines, and this is also reflected in the Adaptation Fund Project Review Criteria (AFB 2017) – " An activity aimed at addressing the adverse impacts of and risks posed by climate change and build climate change resilience". This could be interpreted similarly for social protection measures.

On recovery and rehabilitation: The AF's Strategic Results Framework, with which any project must align, opens potential for funding rehabilitation and response measures, if these measures contribute to building climate change resilience. Output 2.1 encompasses the 'strengthened capacity of national and sub-national centres and networks to respond rapidly to extreme weather events' and Output 5 encompasses 'ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress' (AFB 2019).

On migration and alternative livelihoods: Although not explicitly mentioned in the AF's policy and strategic documents, measures that support planned relocation/resettlement or the building up alternative livelihoods fall under the AF's objectives of funding activities that produce results by 'reducing vulnerability and increasing adaptive capacity' (AFB 2017b). As indicated in Principle 3 of the Adaptation Fund's Guidance Document for Implementing Entities on Compliance with the Adaptation Fund Environmental and Social Policy, particularly vulnerable social groups, amongst others, include displaced persons, and refugees (AF 2016).

On non-economic loss and damage: The AF's Operational Policies and Guidelines specify, that "the outcome(s) and output(s) must be measurable, monitorable, and verifiable" (ibid., paragraph 10). For non-economic loss and damage, it is harder to fulfil the named criteria and define how these actions 'increase

16 Financing for the AF comes mainly from a 2 % levy on the sale of emission credits from the Clean Development Mechanism of the Kyoto Protocol. The AF also receives contributions from governments, the private sector, and individuals. Due to the low carbon price, the AF is increasingly depended on voluntary grant contributions by developed countries. In its resource mobilization strategy, the AF sets our $120 million per year as the resource mobilization target for 2020 – 2021 (AF 2021e). As of October 2021, total contributions to the AF amount to $1,102 billion. So far, the AF has committed $ 925 million to 167 projects.

the adaptive capacity.' We therefore assume there is extremely low likelihood of the theoretic funding scope of the AF covering non-economic loss and damage. A UNFCCC (2019) technical paper came to a similar conclusion that "non-economic losses, such as loss of biodiversity, loss of sense of place when people must move, loss of territory and loss of societal and cultural identities may potentially fall outside the scope of its mandate" (UNFCCC 2019a, 22). No official document of the AF, however, explicitly excludes coverage of non-economic climate risks. Thus, while it is assumed unlikely, the AF has certain potential to also finance projects that address non-economic loss and damage.

A special case is the areas of 'societal identity and cultural heritage protection,' which could potentially be funded through the AF Innovation Facility (see AF 2021c). The programme was established in April 2021; therefore, only an extremely small number of activities have been funded through this channel. Coverage of activities in the fields of cultural heritage protection, which could potentially also include activities for dealing with non-economic loss and damage, under the Facility's grants programme seems promising. With regard to the necessary funding for loss and damage measures, however, it should be noted that the scope of grants under the Innovation Facility is limited. Projects funded will be supported through grants of up to $5 million each, under an initial total of $30 million in available funding for the first round of proposals.

Current funding portfolio[17]

The AF's current funding portfolio indicates it has multiple concrete projects or programmes with explicit loss and damage-related components in the areas of 'setting up, scaling up or capacity building for insurance schemes' (9). In this context, the AF provides funding for product design, piloting, introducing, promoting, and upgrading of, as well as awareness raising and training on, insurance schemes – primarily agricultural and flood index-based risk insurance. The portfolio also includes measures to 'build up alternative livelihood provisions' (2), such as development of new climate-proofed income generating activities for women and youth, or promotion of alternative livelihood practices. Our analysis also found two projects or programmes with explicit loss and damage components that are support measures for (planned) relocation or resettlement, such as in Rwanda, where a project supports a resettlement process for the most vulnerable households living in high-risk zones.[18] The project both manages the relocation process and procures materials for house construction. Interesting to mention in this context is also a project implemented in Jordan and Lebanon with the objective to 'better respond to climate change impacts and vulnerabilities' by 'demonstrating what concrete adaptation measures respond to the needs of both displaced persons and host communities' (Adaptation Fund 2021d) focusing on climate change-related water challenges. Although the project is not counted for our analysis, as those displaced were in the context of the Syrian crisis, the approach could be replicated for those displaced because of climate change. The AF also funds projects (3) with components aiming to restore ecosystems damaged as a result of climate change effects, such as restoration of mangroves damaged by sea level rise, and salinisation leading to loss of beaches and productive land along Cambodia's coastline.[19]

As expected, the category of non-economic loss and damage generally remains highly uncovered by the AF's funding activities. Further gaps can be seen for the areas of including climate risks and impacts into social protection schemes, setting up and scaling up contingency funding, rebuilding/restoring livelihoods, and

17 For a complete list of identified projects (mentioned in brackets below) see Annex II 'List of identified projects including loss and damage measures'.

18 https://www.adaptation-fund.org/project/reducing-vulnerability-to-climate-change-in-north-west-rwanda-through-community-based-adaptation/.

19 https://www.adaptation-fund.org/project/climate-change-adaptation-through-protective-small-scale-infrastructure-interventions-in-coastal-settlements-of-cambodia-2/.

provision of support measures for climate-induced displaced persons and people affected by forced migration.

The Green Climate Fund's potential in funding loss and damage measures

Theoretic funding scope

The GCF's Governing Instrument (UNFCCC 2011b) set out that the Fund is to 'support developing countries in pursuing project-based and programmatic approaches in accordance with climate change strategies and plans, such as low-emission development strategies or plans, nationally appropriate mitigation actions (NAMAs), national adaptation plans of action (NAPAs), national adaptation plans (NAPs) and other related activities' (ibid., 10). Decision 3/CP.17 entrusts the GCF's board with the responsibility of even-handedly allocating the GCF's resources between adaptation and mitigation activities (UNFCCC 2011a).[20] In addition to adaptation and mitigation, the Governing Instrument indicates the GCF will finance activities in the areas of technology development and transfer, capacity-building, and preparation of national reports by developing countries. It is also stated that, while the Fund has two initial funding windows for adaptation and mitigation, as well as cross-cutting projects and programmes, it is the responsibility of the GCF Board to consider the need for additional funding windows and conduct adjustments (ibid., 11).

The Governing Instrument also notes the GCF 'will be accountable to and function under the guidance of the Conference of the Parties,' and receive guidance from the COP. Considering loss and damage only in 2019, the COP gave such guidance in decision 12/CP.25.[21] The COP invited "the Board of the Green Climate Fund to continue providing financial resources for activities relevant to averting, minimizing, and addressing loss and damage in developing country Parties, to the extent consistent with the existing investment, results framework and funding windows and structures of the Green Climate Fund" (UNFCCC 2019b). Additionally, the GCF Board was advised to "take into account the strategic workstreams of the five-year rolling workplan of the ExCom of the WIM " (ibid). The strategic workstreams include: slow-onset processes, non-economic losses, comprehensive risk-management approaches, migration, displacement, and human mobility, as well as action and support. The formulation 'take into account' does not specify to what extent and how loss and damage activities should be funded. The GCF Board, therefore, still has the task of interpreting and executing the COP's decisions and guidance. The COP formulation "to the extent consistent with the existing investment, results framework and funding windows and structures" however creates a clear limitation for loss and damage funding, as this requires compatibility with the investment framework, requirements for co-financing and the climate rationale. Potential funding for loss and damage measures is therefore placed within the existing GCF framework without adjustments or allowances for the specifity of loss and damage (e.g., the rapid provision of funding following an extreme weather event which is not possible under the current project funding framework).

In its Updated Strategic Plan for the Green Climate Fund: 2020-2023, the GCF Board restated its guidance in line with the Paris Agreement objectives, including to increase 'the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development' (GCF 2020a: 3). This includes continuously providing and facilitating access to finance and 'activities relevant to averting, minimizing and addressing loss and damage associated with the adverse effects of climate change

20 The GCF's Governing Instrument enables the Fund to accept contributions from developed countries party to the UN Framework Convention on Climate Change (UNFCCC) as well as public, non-public, and alternative sources. The initial resource mobilisation process for the GCF raised $10.3 billion (of which$ 8.3 billion are confirmed so far). The first replenishment conference raised $9.9 billion (of which $9.5 billion are confirmed) (GCF 2021a). As of October 2021, total contributions to the GCF amount to $15,048 billion. The GCF has committed $8,653 billion to 190 projects so far.

21 Although creation of a new funding window for loss and damage would lie within the GCF Board's mandate, the decision text's wording does not explicitly call for creation of an additional funding window. Rather, it implicitly states that all funding activities related to loss and damage should happen within the existing funding windows.

in developing countries' (ibid.). Moreover, activities can be funded through a 'flexible range of financing instruments,' including the possibility of applying instruments such as insurance schemes (ibid., 8).

Taken together, neither the GCF Governing Instrument nor the GCF's central strategic documents, such as the Integrated Results Management Framework or its investment criteria, makes direct reference to addressing loss and damage (from slow-onset processes). The GCFs theoretic funding scope, however, includes the proclaimed aim of continuously providing and facilitating access to finance projects and programmes relevant to addressing loss and damage associated with the adverse effects of climate change, based on the COP's guidance - as long as they are compatible with GCF procedures and operational policies. This extremely broad potential funding scope leaves many opportunities for the GCF to implicitly finance loss and damage (see FS-UNEP Collaborating Centre 2021). The broad scope and unclarity, however, of how to interpret it may also hinder explicit loss and damage financing under the GCF.

Another point complicating the financing of loss and damage under the GCF is that proposals tend to have a higher chance of receiving approval when they include a strong 'climate rationale' (a concept still not fully defined), including an explanation of how the proposed activities are climate-related (GCF 2019). This rationale requires applicants to prove that any event resulting in loss and damage is the result of climate change and not just of climate variability. For many developing countries that lack access to necessary data owing to capacity and resource constraints, it is extremely difficult to present the scientific evidence the GCF suggests (Climate Analytics 2020).[22] The GCF Board Meeting in July 2021 was interrupted by a dispute on the extent to which the climate rationale, for which no Board decision has been taken yet, can be used to justify the non-advancement of projects under the technical consideration of the ITAP[23] and the difficulty of demonstrating the climate rationale particularly in the context of adaptation measures. A call for more robust guidance on the climate rationale from the GCF Board to be provided to the ITAP was raised by Board members from developing countries (Farand 2021).

On financial protection: Insurance solutions, which also enhance communities' adaptive capacity, are well covered in the GCF's theoretic financing scope. In a document the GCF secretariat prepared, identifying results areas where targeted GCF investment would have the most impact, climate insurance and reinsurance is identified, particularly for removing barriers towards attracting private insurance capital (GCF 2018a). Because of its focus on 'transformational' and paradigm shift' approaches, and its climate rationale, the coverage of more 'traditional development activities,' such as social protection schemes, or risk retention approaches such as contingency funds, is highly unlikely, as also identified by a UNFCCC process in 2019 (UNFCCC 2019a).

On recovery and rehabilitation: Although not an official part of the GCF policy, a recent mapping (GCF 2018b) shows elements related to project or programme eligibility and selection criteria that have been included in previous Board decisions, conditions the Board imposed on funding proposals, and the Governing Instrument. This also includes that 'GCF proceeds shall not be used for financing activities related to disaster response and relief' (ibid., 8) as one condition that implies a general policy and indicates the type of activity the Board may wish to exclude from financing. The definition of what would fall under 'disaster response and relief' is not specified in the document, and under the UNFCCC, the term is not officially defined. Usually, the term is used to describe activities

22 We note that the GCF has already undertaken some activities to assist countries with improving their access to climate data.
23 According to decision B.17/19 (i), only funding proposals for which approval has been recommended by both the ITAP and GCF Secretariat are submitted to the Board for its consideration (GCF 2017).

needed immediately after an event.[24] Recovery and rehabilitation, the category we used for our analysis, are mid- to longer-term activities to restore or improve livelihoods and health, as well as economic, physical, social, cultural, and environmental assets, systems, and activities, of a disaster-affected community or society (UNDRR 2021a,b,c). We therefore assume the GCF exclusion mainly concerns immediate or emergency response after extreme weather events and does not necessarily lead to the exclusion of all activities listed under 'recovery and rehabilitation'. More clarification from the GCF Board would be needed on this question. Interestingly, the current GCF funding portfolio (see below) includes the Tuvalu Coastal Adaptation Project, wherein "GCF resources will be used to rebuild key economic and social assets in the aftermath of natural disasters" (GCF 2016).

On migration and alternative livelihoods: The GCF's extremely broad potential funding scope leaves opportunities for financing projects with migration components. The GCF, however, does not make explicit reference to human mobility in the context of climate change in its overall objective that, according to the Task Force on Human Displacement, "might hinder the possibility to finance action on a large scale" (Task Force on Displacement 2019).

On non-economic loss and damage: The COP decision from Madrid advises the GCF Board to consider the strategic workstreams of the WIM ExCom five-year rolling workplan, which includes non-economic losses. Regarding whether activities to address non-economic loss and damage are included in the GCF's theoretic funding scope it is, however, important to consider the Fund's initial criteria for assessing project proposals as part of its initial investment framework. The criteria list includes 'paradigm shift potential' as a guiding principle for investment decisions, stating the "GCF will finance projects and programmes that demonstrate the maximum potential for a paradigm shift towards low-carbon and climate-resilient sustainable development" (GCF 2020b). Although this leaves room for interpretation, these criteria seem to restrict the possibility of funding activities included in the category of addressing non-economic loss and damage. This is because the relation between these activities and building resilience evidently is not straightforward. On the other hand, GCF investment criteria beyond the initial investment framework could open up a space for financing non-economic loss and damage. This includes the 'sustainable development potential': In addition to the impacts of the project, GCF proposals must identify at least one positive sustainable development co-benefit. The list of co-benefit indicators also includes social co-benefits, including improvements in health and safety, access to education, cultural preservation and social inclusion (GCF 2019b). The GCF investment criteria also includes the 'needs of the recipient' where the project proposal should describe the county's financial, economic, social and institutional needs and how the proposed intervention will address the identified needs (ibid.).

Current funding portfolio[25]

Of the categories in question, the GCFs funding portfolio as of August 2021 covers an extremely limited number of projects/programmes with an explicit loss and damage component. These focus on supporting insurance schemes (3), including development, design, testing, and implementation of weather index micro-insurance in Senegal and Zimbabwe, and a recently approved project in the seven countries of the Great Green Wall with a primary focus on climate risk insurance. The project removes obstacles to developing access to climate risk transfer products (e.g. data and capacity building), yet develops micro-insurance schemes and

24 The UNDRR defines disaster response as, 'actions taken directly before, during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected' (UNDRR 2021a). An official definition is not available, but it is usually used to cover actions focussing on the 'immediate response and early recovery' (Drolet 2015).

25 For a complete list of identified projects (mentioned in brackets below) see Annex II: List of identified projects including loss and damage measures.

provides support to countries in accessing African Risk Capacity as a regional risk pool.[26] As described above, the current funding portfolio also includes a project in Tuvalu with an activity for rebuilding (coastal) infrastructure , wherein 'GCF resources will be used to rebuild key economic and social assets in the aftermath of natural disasters.'[27] Other GCF-financed projects including loss and damage-related activities mainly covering ecosystem restoration (5), wherein salinised lands or vegetation in communal grazing land particularly impacted by climate change are restored to strengthen communities' climate resilience, in most cases to implement ecosystem-based adaptation systems. The current portfolio also includes one project with an explicit support measure for (planned) relocation or resettlement. This is in a project addressing flood risk in Senegal, including a sub-component to resettle people in flood-prone areas when adaptation limits are reached. These are people who cannot be protected by the drainage infrastructure to be set up in the project.[28] An analysis by the ExCom's task force on migration, moreover, sees 'encouraging signs as some integration of human mobility elements can be observed at the project level in 21 current GCF projects.' These elements are not bigger project components but rather are smaller activities and were therefore not included in this analysis. Five projects with components on alternative livelihoods could be identified, aiming at developing and introducing alternative livelihoods to strengthen resilience in target communities.

No project with a component or output on integrating climate risks and impacts into social protection schemes could be identified. In this context it is interesting to note that in 2017 the World Bank seeked feedback from the GCF Secretariat about whether a proposal on "Adaptive Social Protection in Africa: Resilience Against Climate-Related Shocks" matches the Fund's objectives and mandate. The project aims at propelling the climate change adaptation of social protection systems in Madagascar, Senegal, and Tanzania starting with their social safety net programs and to provide the poorest households with income support so that they can better cope with climate-related shocks and avoid harmful coping strategies. No further information on the status quo of the process could be found. However, researcher conclude that investments by the climate funds (GCF but also AF) to integrate climate change considerations into social protection schemes, policies and mechanisms are generally lacking (Alekandrova 2021).

Considering the COP 25 guidance to the GCF to 'continue providing financial resources for activities relevant to averting, minimizing, and addressing loss and damage to the extent consistent with the existing investment, results framework and funding windows and structures,' we could identify an extremely limited amount of loss and damage-related projects in the analysis. The overall gap in funding loss and damage measures through the GCF could be seen simply as inadequate recognition of the guidance provided to the GCF by the COP in 2019. Consideration should be given, however, to the fact most projects in the current GCF portfolio were approved or entered the pipeline before the COP 25 decision. As projects also need considerable time to pass through the pipeline and finally be approved, another analysis will be needed in a few years to conclusively assess implementation of the mandate. This distribution of financial measures, however, or lack thereof, could equally result from several other causes. An essential question is whether the lack of coverage of loss and damage projects by the GCF is either due to a lack of funding proposals being put forward or a lack of funding proposals with loss and damage components being accepted. For the latter, the subsequent question would be whether this results from obstacles for funding proposals including loss and damage components in the process or from poor drafting quality.

26 https://www.greenclimate.fund/document/africa-integrated-climate-risk-management-programme-building-resilience-smallholder-farmers.
27 https://www.greenclimate.fund/project/fp015.
28 https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp021-afd-senegal.pdf.

The Least Developed Countries Fund's potential in funding loss and damage measures

Theoretic funding scope

Decision 5/CP.7 officially established the LDCF with the main purpose of supporting the work programme for the Least Developed Countries, including support for preparing and implementing national adaptation programmes of action (UNFCCC 2001).[29] Decision 7/CP.7 added that the commitments in UNFCCC Article 4 should be achieved inter alia by providing funding to developing country Parties, by financial channels including the LDCF. Article 4, paragraph 1 of the Convention includes the commitment to "cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, water resources and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods" (UNFCCC 2001). The LDCF is under the direction of the Global Environment Facility (GEF). The GEF Programme strategy, which includes a strategy for the LDCF, acknowledges extreme weather, biodiversity loss and ecosystem collapse, major natural disasters and human made environmental disasters, and failure to mitigate and adapt to climate change as major global risks (see GEF 2018a). Based on this, the LDCF's potential funding scope is likely including both extreme weather events and slow-onset processes. Aside from this, several UNFCCC decisions such as inter alia decision 6/CP.9 and decision 3/CP.11 reference enhancing adaptive capacity to address the adverse effects of climate change and funding for activities to adapt to the adverse effects. Decision 27/CP.7 presents a more detailed list of activity areas, including integrated disaster risk management and community-based adaptation, including ecosystem restoration and livelihood opportunities.

In summary, the theoretic funding scope seems to have potential to cover loss and damage (from slow-onset processes), with a focus on specific areas such as ecosystem restoration, livelihood options, resettlement, displacement, and certain financial protection measures, specifically including insurance schemes. Addressing non-economic losses seems to largely fall outside of the LDCF's scope (UNFCCC 2019a). Our analysis showed that the areas of rebuilding infrastructure, rebuilding/restoring livelihoods, social protection schemes, and contingency finance are likely not fundable through the LDCF.

On financial protection: In the LDCF's results-based management framework, the 'Type and No. of insurance schemes introduced to reduce climate induced damages' is listed as one indicator under the Fund's objective of 'Reducing Vulnerability' (GEF 2010). In the LDCF programming strategy and operational policy, three strategic objectives are listed, including objective 1 on reducing vulnerability and increasing resilience through innovation and technology transfer for climate change adaptation. Under this objective, the LDCF should play a 'catalytic role in (…) piloting financial tools, risk transfer mechanisms, including risk insurance, climate risk pooling and other risk sharing solutions' (GEF 2018, 17). Additionally, during the Suva expert dialogue in 2017, the LDCF was identified as having the potential to support risk transfer solutions through 'smart premium support' (UNFCCC 2019a).

On response and rehabilitation: UNFCCC Article 4, which will be achieved via LDCF funding, includes preparation of 'rehabilitation of areas, particularly in Africa, affected by (…) desertification, as well as floods' (UNFCCC 2001). Additionally, the Fund's website indicates that 'restoring mangrove forest to help

29 The LDCF supports developing countries through smaller scale projects and has a country ceiling for funding of $20 million. As of October 2021, total contributions to the LDCF amount to $1,666 billion. So far the LDCF has committed $1.130 million to projects, with cash transfers to projects of $809 million.

protect exposed coastal areas' is part of the focus, with a clear objective of driving nature-based adaptation solutions. The Fund's strategy document, however, also states that because the LDCF is a 'grants-only mechanism (…) it does not offer the rapid, large-scale financing that certain extreme events causing loss or damage incur' (GEF 2018), making provision of finance for rebuilding of infrastructure or livelihoods after an event extremely unlikely.

On migration and alternative livelihoods: The LDCF's programming strategy and operational policy notes that Fund support may be provided for the following categories to address fragility and security concerns related to climate adaptation: (a) land-based measures to address poverty, conflict, and displacement; and (b) policies and strategies for climate-sensitive resettlement that address displacement and forced migration (GEF 2018). What land-based measures include, however, is not specified.

Current funding portfolio[30]

The LDCF, to date, has a limited number of funding activities with an explicit component relating to addressing loss and damages. The identified activities relate to restoration of losses and damages to ecosystems and biodiversity (2) and areas of setting up and scaling up insurance schemes (3), e.g. securing resilience of smallholder farmers' livelihoods through weather index-based insurance in Burkina Faso[31] or designing and introducing index-based weather insurance including an insurance literacy programme and recommendations for a legal and regulatory framework for risk transfer in Sudan.[32] Moreover, we could identify three projects with sub-components on ecosystem rehabilitation, such as capacity building in Lesotho, wherein technical staff are trained on restoring and managing ecosystems in a climate-smart manner[33]. and one project with components on building alternative livelihoods.

No projects were found concerning the categories of setting and scaling up other types of financial protection measures other than insurance schemes, support measures for (planned) relocation and resettlement, support measures for climate-induced displaced persons and people effected by forced displacement or for measures to address non-economic loss and damage.

The Special Climate Change Fund's potential in funding loss and damage measures

Theoretic funding scope

Decision 5/CP.7 mandated implementation of Article 4, paragraphs 8 and 9 of the Convention via the SCCF, under the GEF. The SCCF's objectives are to support adaptation and technology transfer projects and there are according funding windows for these two areas.[34] The SCCF's special focus is, as indicated in decision 6/CP.9, on support for enhancing the 'endogenous capacities and technologies of developing country Parties' (UNFCCC Article 4, paragraph 5). Paragraph 8 of the decision and paragraph 2 of **decision 5/CP.9** specified the scope of activities eligible for SCCF support, such as inter alia in the areas of water resources management, land management, agriculture, health, infrastructure development, fragile ecosystems, including mountainous ecosystems, integrated coastal zone management, and climatic disaster risk management (with a focus on support of national centres and information networks for rapid response). This expands the SCCF's potential funding range to loss and damage from extreme weather events and slow-onset processes. Through one of its funding windows

30 For a complete list of identified projects (mentioned in brackets below) see annex II 'List of identified projects including loss and damage measures'.
31 https://www.thegef.org/project/promoting-index-based-weather-insurance-small-holder-farmers-burkina-faso.
32 https://www.thegef.org/project/climate-risk-finance-sustainable-and-climate-resilient-rainfed-farming-and-pastoral-systems.
33 https://www.thegef.org/project/reducing-vulnerability-climate-change-foothills-lowlands-and-lower-senqu-river-basin.
34 Similar to the LDCF, the SCCF supports developing countries through smaller scale projects and has a country ceiling for funding of $20 million. As of October 2021, total contributions to the SCCF amount to $354 million. So far, the SCCF has committed $309 million to projects, making cash transfers of $273 million.

related to its first objective, the SCCF specifically aims to foster innovation and technology transfer (see GEF 2018, 25), which could likely cover innovative financing measures to address loss and damage from slow-onset processes (see also UNFCCC 2019a).

On financial protection: Like the LDCF, the 'Type and No. of insurance schemes introduced to reduce climate induced damages' is listed as one indicator under the Fund's objective of 'Reducing Vulnerability' (GEF 2010). Moreover, the SCCF's programming strategy and operational policy notes the SCCF is 'poised to build on its track record of supporting comprehensive risk assessment and management approaches, risk insurance facilities, climate risk pooling and other insurance solutions, in coordination with the G7 InsuResilience initiative to increase the availability of risk transfer and insurance solutions for poor and vulnerable people' (GEF 2018).

On migration and alternative livelihood provisions: The SCCF, based on a 2018 Board decision, may begin to finance more innovative financial instruments, such as concessional loans and equity. The UNFCCC (2019) indicates these new instruments could allow the SCCF to, for example, offer loans for activities supporting human mobility. It should be noted, however, that loans or other non-grant finance as support for human mobility is very problematic from a social and climate justice perspective. Depending on who is granted the loan, these loans result in debts for those displaced - which can affect their livelihoods and access to education and health-care.

Current funding portfolio[35]

Also the SCCF, to date, has a limited number of funding activities with an explicit component relating to addressing loss and damages. For the SCCF's current funding portfolio, we identified three projects with components or a focus on setting and scaling up insurance schemes, such as scaling up risk transfer mechanisms for climate-vulnerable agriculture-based communities in the Philippines[36], or funds for technical and regulatory work needed to develop catastrophe and weather risk insurance markets in Albania, North Macedonia, and Serbia.[37] We identified one project with a component for restoring ecosystems: Smart Adaptation of Forest Landscapes in Lebanon, wherein both climate change and human intervention and exploitation accelerate the pace of forest degradation. With participatory reforestation, the project aims at increasing the adaptive capacity of fragile forest ecosystems.[38]

Non-economic losses were again neglected. Our analysis also found no activities with specific components related to social protection schemes, contingency finance, or other financial protection measures, nor did it find activities addressing migration, displacement, and rebuilding/restoring of destroyed livelihoods.

35 For a complete list of identified projects (mentioned in brackets below) see annex II 'List of identified projects including loss and damage measures.'
36 https://www.thegef.org/project/scaling-risk-transfer-mechanisms-climate-vulnerable-agriculture-based-communities-mindanao.
37 https://www.thegef.org/project/southeastern-europe-and-caucasus-catastrophe-risk-insurance-facility-seec-crif.
38 https://www.thegef.org/project/smart-adaptation-forest-landscapes-mountain-areas-salma.

BOX 2: INNOVATIVE SOURCES FOR FINANCING ADDRESSING LOSS AND DAMAGE – THE CLIMATE DAMAGES TAX

Author: David Hillman, Stamp Out Poverty

The Climate Damages Tax (CDT) proposal attempts to have the fossil fuel industry pay for the damage its activities have caused and to contribute to creating the green economy we require going forward. Fossil fuels are the world's largest source of climate pollution, responsible for 91 % of global industrial greenhouse gases in 2015, and about 70 % of all anthropogenic emissions. One hundred fossil fuel companies and other entities are responsible for over half of all emissions since the start of the Industrial Revolution. Hugely accelerated extraction of fossil fuels has doubled their contribution to climate change since 1988. During this time, some of the largest fossil fuel companies have run campaigns to spread disinformation and misunderstanding about climate science so as to confuse and deceive, as they lobby politicians not to act, thus sustaining and boosting their profits. In 2017, just six of the largest oil companies made combined profits of approximately $133 billion. Consistent with the polluter pays principle, the contention of the Climate Damages Tax is that it is only just for the fossil fuel industry to pay its fair share of costs resulting from extreme weather events and slow-onset processes in developing countries, and that such redistribution from the sector's profits is long overdue.

The proposal. The CDT proposal is to set up a funding facility for loss and damage so countries and communities faced with this type of devastation have recourse to quick and substantial financial assistance, funded (at least in large part) by the fossil fuel industry through a tax on the coal, oil, and gas they extract. The CDT is a charge on the extraction of each tonne of coal, barrel of oil, or cubic litre of gas, calculated at a consistent rate globally based on how much climate pollution (CO_2e) is embedded within the fossil fuel. Working with existing systems of payment, fossil fuel companies, which already pay royalties (or similar) to the states in which they operate, will pay an extra amount on the volume they extract to the solidarity facility for loss and damage. This will be managed, we propose, by the already existing GCF. International law and precedents embodying the polluter pays principle, such as those that apply to oil and nuclear pollution, serve as working examples of similar facilities. It is recommended that the CDT is introduced in 2022 at a low initial rate of $5 per tonne of CO_2e, increasing by $5 per tonne each year until 2030, to $50 per tonne. This is with the expectation it is increased at the rate of $10 per tonne annually after that, to reach $250 per tonne by 2050. If implemented as we recommend, the CDT would raise roughly $210 billion in its first year. Increasing the tax rate will incentivise phasing out of fossil fuels by mid-century and help keep CDT revenue for loss and damage at around $300 billion per year over this period. It is extremely important to recognise fairness, or equity, in how the CDT is applied, as richer countries have the capacity to pay more. Their historical emissions have caused the climate change to date; they therefore also have the responsibility to contribute more. To incorporate equity into the CDT, we propose that 50 % of the revenue generated from fossil fuels extracted in high-income countries be contributed to the loss and damage solidarity facility, whereas low-income countries would retain all revenue generated from fossil fuels extracted in their countries, with a sliding scale between the two.

Funding for loss and damage and just transition and phasing out fossil fuels. Part of the CDT revenue should be allocated to loss and damage, to pay for the devastating storms, droughts, and sea level rise vulnerable communities are facing. A proportion is remitted back to the country where the oil, coal, or gas was extracted, to provide funds to support a just transition from fossil fuels to renewable energy, helping low-income communities and workers shift to carbon-free jobs, energy, and transport. In this way, countries that undergo fossil fuel extraction will derive revenue from the CDT. Additionally, fossil fuels must be phased out by mid-century: the IPCC 1.5°C report from October 2018 shows this is essential to avoid catastrophic climate change. The CDT will assist by putting a price on carbon and incentivising a shift to renewables. This must be embedded within an overall plan to phase out fossil fuels, which will require a host of measures. Accordingly, the CDT should complement, and not replace, other regulations and carbon prices.

More information on the Climate Damages Tax can be found in The Climate Damages Tax: A guide to what it is and how it works, at: www.stampoutpoverty.org/the-climate-damages-tax-a-guide-to-what-it-is-and-how-it-works/

RECOMMENDATIONS

With discussing potential financing instruments and sources, the hope is that this paper contributes to finding tangible and feasible solutions to address loss and damage from slow-onset processes. This paper and its insights are just a first step in achieving this objective. We offer the following recommendations for next steps.

Research and concept development

1 Recommendation: More research and concept development are needed on slow-onset processes to better understand related finance needs and instruments that address the scale of the problem. Additional research is particularly needed to:

- Increase understanding of loss and damage caused by slow-onset processes at the national and local levels, while suitable approaches for different impacts and the amount of resources are needed to implement these approaches.

- Increase the understanding of suitable instruments that can adequately address the loss and damage caused by slow-onset processes under different emissions scenarios, including the long-term sustainability of instruments considering increasing climate change impacts that are potentially spread out over large geographical areas.
- Better understand how options could appear for dealing with unavoidable loss and damage caused by slow-onset processes, such as a global solidarity mechanism to cover these processes' increasing costs.

Further develop and test a risk management approach that covers both extreme weather and slow-onset processes, and how to adequately include risk financing and rehabilitation and recovery measures in these.

Actions needed at the international level

2 Recommendation: Detailed guidance on how the funds of the UNFCCC financial architecture can provide funding to address loss and damage should be developed by the funds' boards. Mandates and strategic documents providing the basis for funding decisions of the UNFCCC funds are formulated extremely broadly and thus leave considerable room for interpretation for the boards and advisory panels concerning concrete funding decisions. Our analysis showed that funding for measures might be possible even if loss and damage is not explicitly covered in the funding scope. To improve remaining lack of clarity regarding funding for loss and damage measures, all analysed funds (incl. GCF, AF, SCCF and LDCF) should develop detailed guidance for applicants on success criteria for loss and damage projects. In particular, the GCF Board should develop more detailed guidance on how to interpret strategic documents on means of providing financial resources for measures relevant for addressing loss and damage in developing countries. **COP 26 should therefore mandate the boards of the UNFCCC funds to develop detailed guidance on how their respective fund can currently provide funding to address loss and damage.**

3 Recommendation: The UNFCCC financial architecture's funding scope and financing mechanisms needs to be expanded to provide funding for key loss and damage measures that currently cannot be, or are extremely unlikely to be, funded by the UNFCCC financial architecture. These measures include activities in the field of recovery and rehabilitation, and those to address non-economic loss and damage. Although it is often argued that mechanisms outside the UNFCCC regime (particularly humanitarian assistance) cover response, recovery and rehabilitation in particular, this funding is far from sufficient, particularly regarding the growing number and intensity of extreme weather events and other increasing climate impacts. Moreover, a key tasks for the UNFCCC is to manage climate change and its impacts in accordance with the CBDR principles, which has special relevance with view to addressing loss and damage that most affects vulnerable communities that have contributed the least to climate change's drivers. The UNFCCC financial architecture must therefore create ways to finance these measures and make sure that the most vulnerable communities, in particular, can access these financial resources. One option to implement this is by extending the mandate and objectives of an existing UNFCCC fund and adjusting its financing mechanisms so that adequate loss and damage finance can be provided also beyond a project logic. Suggestions for this option include, for example, a loss and damage funding window for the GCF. Another option to create ways to finance loss and damage measures is by establishing a new loss and damage finance facility or fund. **COP 26 should assess these options and decide on the expansion of the UNFCCC financial architecture's funding scope and financing mechanisms in order to allow for the channelling of adequate loss and damage financing to vulnerable developing countries.**

4 Recommendation: New and additional funding to address loss and damage needs to be provided by the international community and a specific share of a new finance goal from 2025 onwards should be dedicated to loss and damage, based on the CBDR principle and solidarity. The analysis revealed that AF, GCF and LDCF have potential for providing funding for loss and damage measures. We have to note, however, that the current resources of these funds are earmarked for mitigation and adaptation activities. Loss and damage measures can have adaptation co-benefits but are distinct from adaptation and mitigation measures and therefore need dedicated and additional funding. Drawing finance for loss and damage measures from these existing resources risks 'cannibalising' these if no additional resources are provided (Loss and Damage Collaboration 2021). Current estimates indicate financial damage of at least $290–580 billion by 2030 for developing countries (Markandya/González-Eguino 2018). This does not include non-economic losses such as loss of biodiversity and cultural sites. One key step on the way to providing this funding is to **adequately include loss and damage in the post-2025 finance goal at COP 26**, recognising that loss and damage finance must be new and additional to increased and balanced funding allocations for adaptation and mitigation finance and guided by the needs of developing countries. Grants and other non-debt-generating instruments should be prioritized, so as not to exacerbate the debt situation of climate vulnerable nations and communities. Loss and damage finance must be given the same importance as mitigation and adaptation finance, while keeping the accounting separate. Accordingly, loss and damage finance should be included in the UNFCCC's climate finance reporting, particularly the SCF's biennial 'Assessment and Overview of Climate Finance Flows'. To better understand countries' finance needs, **COP 26 should decide on the commission of an annual stocktake of national financial needs to address loss and damage and loss and damage funding available in a loss and damage finance gap**. Similar to Adaptation and Emissions Gap reports, this report should outline experienced loss and damage in a year and analyse the availability of loss and damage finance against the needs of developing countries to address current and projected climate impacts.

Actions needed at the national level

5 Recommendation: More knowledge and scientific evidence should be accumulated to inform better prioritisation of loss and damage from slow-onset processes in national strategies. There is particular need regarding climate change and sustainable development. The necessary efforts can underpin:

- Research focused on the effects of loss and damage from slow-onset events, especially on populations, infrastructure, and ecosystems
- Identification, mapping, and modelling of climate and disaster risks
- Capacity building of populations to better understand loss and damage from slow-onset processes
- Consultations with various stakeholders, including civil society, farmers' organisations, and government representatives, so loss and damage from slow-onset processes is considered a key topic on climate change discussion agendas at the national level
- Advocating for integration of loss and damage in the Nationally Determined Contribution (NDC), strategies, and processes at the national level
- Engagement of civil society actors, farmers, women, and youth organisations in climate and disaster risk finance and insurance initiatives to enhance debates on loss and damage

6 Recommendation: National financial measures should allocate more funds to slow-onset processes, given the increased frequency of related climate change impacts that exacerbate communities' vulnerability. To this can be added in the following activities:

- Strengthening communication, information, and training on climate risks and instruments

to address loss and damage from slow-onset processes

- Enhancing knowledge of causes and assessing the cost of loss and damage from slow-onset processes
- Studying to assess the financial needs of households dealing with the risks of and impacts due to slow-onset processes
- Advocating for finance to address loss and damage (from slow-onset processes)
- Enhancing social protection systems with calibration of insurance offers to meet beneficiaries' needs
- Learning from good practices of climate finance mechanisms and insurance systems, especially through, for example, funds mobilised for drought with African Risk Capacity

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ANNEX I

Keywords used for analysis of the theoretic funding scope and the current project portfolio of UNFCCC funds

General	Loss and damage, dealing/managing/addressing/coping with climate impacts (from extreme weather events and slow-onset processes/events)
A. Financial protection	Climate risk financing, risk retention, risk transfer, (climate risk) insurance, Integrating climate change risks and impacts into and/or scaling up social protection schemes (also: social safety nets, social assistance schemes, public works and employment guarantee programmes), contingency funds (also: calamity, reserve, disaster funds)
B. Recovery and rehabilitation	Recovery, rehabilitation, disaster response, disaster relief, rebuilding/reconstruction/reparation (of infrastructure that have been destroyed by extreme weather events or slow-onset processes), building back (better), rebuilding/restoring of livelihoods, restoration/rehabilitation (of ecosystems and landscapes)
C. Migration and alternative livelihoods	Human mobility, migration, displacement, planned relocation, resettlement, building up alternative livelihood provisions
D. Addressing non-economic loss and damage	Non-economic loss and damage, loss of ecosystems/biodiversity/freshwater availability/identity/heritage/territory/health/knowledge/land and habitat active remembrance, societal identity and cultural heritage protection, counselling

ANNEX II

List of identified projects including loss and damage measures

		AF
A. Financial protection measures	Setting up, scaling up, or capacity building for climate risk insurance schemes	■ https://www.adaptation-fund.org/project/rural-integrated-climate-adaptation-and-resilience-building-project-ricar-2/ ■ https://www.adaptation-fund.org/project/enhancing-the-adaptive-capacity-and-increasing-resilience-of-small-scale-agriculture-producers-of-the-northeast-of-argentina/ ■ https://www.adaptation-fund.org/project/reducing-the-vulnerability-by-focusing-on-critical-sectors-agriculture-water-resources-and-coastlines-in-order-to-reduce-the-negative-impacts-of-climate-change-and-improve-the-resilience-of-these/ ■ https://www.adaptation-fund.org/project/building-adaptive-capacities-of-small-inland-fishers-for-climate-resilience-and-livelihood-security-madhya-pradesh-2/ ■ https://www.adaptation-fund.org/project/adapting-to-climate-change-through-integrated-risk-management-strategies-and-enhanced-market-opportunities-for-resilient-food-security-and-livelihoods/ ■ https://www.adaptation-fund.org/project/developing-climate-resilient-flood-and-flash-flood-management-practices-to-protect-vulnerable-communities-of-georgia/ ■ https://www.adaptation-fund.org/project/enhancing-climate-resilience-of-rural-communities-living-in-protected-areas-of-cambodia/ ■ https://www.adaptation-fund.org/project/climate-smart-agriculture-enhancing-adaptive-capacity-of-the-rural-communities-in-lebanon-agrical/ ■ https://www.adaptation-fund.org/project/ecosystem-based-adaptation-approach-to-maintaining-water-security-in-critical-water-catchments-in-mongolia/
B. Recovery and rehabilitation	Restoration of ecosys-tems and landscapes	■ https://www.adaptation-fund.org/project/ecosystem-based-adaptation-to-climate-change-in-seychelles/ ■ https://www.adaptation-fund.org/project/increasing-climate-resilience-restoration-degraded-landscapes-atlantic-region-central-america-belize-guatemala-honduras/ ■ https://www.adaptation-fund.org/project/climate-change-adaptation-through-protective-small-scale-infrastructure-interventions-in-coastal-settlements-of-cambodia-2/

C. Migration & alternative livelihoods	Support measures for planned relocation or resettlement	■ https://www.adaptation-fund.org/project/reducing-vulnerability-to-climate-change-in-north-west-rwanda-through-community-based-adaptation/ ■ https://www.adaptation-fund.org/project/enhancing-resilience-of-samoas-coastal-communities-to-climate-change/
	Building up alternative livelihood provisions	■ https://www.adaptation-fund.org/project/economic-social-and-solidarity-insertion-for-resilience-in-the-governorate-of-kairouan-iess-adapt-2/ ■ https://www.adaptation-fund.org/project/enhancing-the-resilience-of-the-agricultural-sector-and-coastal-areas-to-protect-livelihoods-and-improve-food-security/
GCF		
A. Financial protection measures	Setting up, scaling up, or capacity building for climate risk insurance schemes	■ https://www.greenclimate.fund/project/fp049 ■ https://www.greenclimate.fund/project/sap007 ■ https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp162.pdf
B. Recovery and rehabilitation	Rebuilding of infrastructure	■ 1. https://www.greenclimate.fund/project/fp015
	Restoration of ecosystems and landscapes	■ https://www.greenclimate.fund/project/fp158 ■ https://www.greenclimate.fund/project/fp003 ■ https://www.greenclimate.fund/project/fp084 ■ https://www.greenclimate.fund/project/fp011 ■ https://www.greenclimate.fund/project/fp167
C. Migration and alternative livelihoods	Building up alternative livelihood	■ https://www.greenclimate.fund/project/sap002 - ■ https://www.greenclimate.fund/project/fp072 - ■ https://www.greenclimate.fund/project/fp067 ■ https://www.greenclimate.fund/project/fp160 ■ https://www.greenclimate.fund/project/fp034
	Support measure for (planned) relocation or resettlement	■ https://www.greenclimate.fund/document/senegal-integrated-urban-flood-management-project

LDCF		
A. Financial protection measures	**Setting up, scaling up, or capacity building for climate risk insurance schemes**	■ https://www.thegef.org/project/promoting-index-based-weather-insurance-small-holder-farmers-burkina-faso ■ https://www.thegef.org/project/climate-risk-finance-sustainable-and-climate-resilient-rainfed-farming-and-pastoral-systems ■ https://www.thegef.org/project/community-based-climate-risks-management-chad
C. Migration and alternative livelihoods	**Restoration of ecosystems and landscapes**	■ https://www.thegef.org/project/reducing-vulnerability-climate-change-foothills-lowlands-and-lower-senqu-river-basin ■ https://www.thegef.org/project/building-climate-resilience-through-rehabilitated-watersheds-forests-and-adaptive
	Building up alternative livelihood provisions	■ https://publicpartnershipdata.azureedge.net/gef/PMISGEFDocuments/Climate%20Change/Rwanda%20-%20(5495)%20-%20Increasing%20the%20Capacity%20of%20Vulnerable%20Rwandan%20Comm/2015_11_09_5495_GEF_Rwanda_PRODOC_4.pdf
SCCF		
A. Financial protection measures	**Setting up, scaling up, or capacity building for climate risk insurance schemes**	■ https://www.thegef.org/project/southeastern-europe-and-caucasus-catastrophe-risk-insurance-facility-seec-crif ■ https://www.thegef.org/project/southeast-europe-and-central-asia-catastrophe-risk-insurance-facility ■ https://www.thegef.org/project/scaling-risk-transfer-mechanisms-climate-vulnerable-agriculture-based-communities-mindanao
B. Recovery and rehabilitation	**Restoration of ecosystems and landscapes**	■ https://www.thegef.org/project/smart-adaptation-forest-landscapes-mountain-areas-salma