# 5 Finance and financial risks in the face of growing losses and damages

This chapter has two aims. First, it explores the implications of current and future losses and damages from climate change on public finances. These affect the ability of governments to pursue sustainable development and poverty reduction priorities under a changing climate. Second, it examines the critical roles of finance in reducing and managing the risks of losses and damages, namely in risk reduction, retention and transfer. The chapter also provides insights on the landscape of development finance directly or indirectly supporting these efforts, recognising the important role of humanitarian finance in supporting relief.

# In Brief

## Losses and damages impact fiscal sustainability: Risk financing instruments need to be employed in a comprehensive manner, while ensuring inclusiveness

Climate-related hazards can have large and complex macroeconomic implications with the precise economic effects depending on the type of hazard and the country context. Impacts are already stretching the financial capacity of many vulnerable countries, especially Small Island Developing States (SIDS) and Least Developed Countries (LDCs). The sustainability of the financial sector, which provides tools for risk financing, is also at risk:

- ***Fiscal sustainability*** is impacted through decreasing government revenues and the need to fund disaster response, diverting spending from other priorities (e.g. investment, education, resilience). In the long term, this may weaken the ability to repay debts. Following a disaster, debt financing is likely to be expensive for affected countries. Some may not be eligible for official development assistance (ODA) given their level of development, exacerbating fiscal challenges.
- The ***financial sector*** directly feels the impact from weather and climate events. Damage to household and business assets, for example, can disrupt production processes and value chains through non-performing loans and reduced value of collateral. This, in turn, increases the costs of services supplied by banking and insurance sectors. These increased costs will likely lead to reduced lending and higher insurance premiums, prolonging the recovery period. Some climate events – from slow-onset events to correlations between some extreme weather events and potential tipping points – are likely to challenge financial risk management approaches. Potential financial stability risks merit further attention and may require co-ordinated international action.

Countries, households, businesses and communities use a diverse set of complementary financial mechanisms to reduce and manage the risks of losses and damages from climate change. The different approaches need to be combined in a comprehensive risk financing strategy by national and subnational governments:

- ***Risk reduction***, such as improving the physical durability of buildings, is the first line of defence against the impacts of climate change. It reduces the risks of losses and damages, and provides a basis for managing residual risks. In addition, it covers social protection schemes, which increase the resilience of otherwise vulnerable and marginalised populations.
- ***Risk retention***, such as disaster management funds, can allocate or redirect budgets to help provide quick access to funds in the face of frequent and low-intensity weather events. Credit from international development banks for unforeseen circumstances is more appropriate for medium-frequency, medium-intensity events. The volume of funds needed to better cope with more intense and less frequent hazards usually exceeds the immediately available funds from government budgets.
- ***Risk transfer***, such as catastrophe bonds or climate risk insurance solutions, provide public actors quick access to resources that can support the recovery from losses and damages. These are well suited for low-probability, high-severity events since large funds are most accessible from capital markets. Such risk transfer mechanisms may benefit from further transfer or sharing through risk pooling or enhanced by other types of risk management, in some cases with the support of development finance.

Many countries have gaps in coverage for climate risks. In high-income countries, over half of economic losses and damages from climate-related extreme events are insured; in other countries barely a tenth are covered by insurance. Such gaps are especially prevalent with non-economic losses and damages, such as cultural losses. At the household level, people with limited access to established finance mechanisms may need to resort to alternatives that build resilience in the short term at the expense of the longer term, for example by taking children out of school to help with recovery of the household. At the international level, the potential role of insurance coverage and affordability is increasingly recognised as part of a comprehensive risk financing strategy. Efforts to scale up insurance must reflect the changing nature of the risks to ensure sustainability of the schemes. The gradual emergence of slow-onset events might in the future strain the traditional model for insurance, making diversification of risks more difficult.

Domestic financing needs might be reduced with financial regulation, policy and transparency. Such elements facilitate an enabling environment that incentivises the reduction and management of risks. Government plays an important role in relation to the disclosure, awareness and understanding of climate risks and risk financing options setting expectations for economic actors and for the financial system. These can strengthen the ability of private actors to manage their own risks, increase resilience and highlight priorities for government intervention. Fiscal rules with escape clauses may also provide a tool to facilitate fiscal sustainability.

International development finance also plays an important role in supporting partner countries. These countries are calling (inter alia) for enhanced and simplified access to finance that reflects national circumstances and is aligned with national priorities. Providers of bilateral and multilateral development finance increasingly realise the importance of explicitly taking the risk of losses and damages into account in their strategic and programming approaches. The methodology of this report provides initial insights, though does not yet capture the full complexity and breadth of development finance for reducing and managing the risk of climate-related losses and damages. International development finance needs to ensure that it targets those most at risk. Mechanisms must reflect the nature of those risks to manage fiscal and debt sustainability. Development co-operation may also have to adjust its approach to support provided to countries no longer eligible to ODA. Such countries may remain highly exposed and vulnerable to climate-related hazards. The humanitarian community is playing an increasingly important role in bridging disaster response and preventive action, and such activities can be better co-ordinated with development co-operation efforts.

## 5.1. Introduction

The adverse impacts of climate-related hazards are stretching the fiscal capacity of many countries affected, as well as impacting people, livelihoods and assets. In 2019, for example, Mozambique was hit by Tropical Cyclones Idai (March) and then Kenneth (April). This pushed government debt to 103% of gross domestic product (GDP) that year. Mozambique was hit again by two major cyclones in January and February 2021; debt was projected to reach 125% of GDP by the end of 2021 (IMF, 2021[1]). Mozambique is not an isolated example. In September 2019, Hurricane Dorian, a Category 5 hurricane, made landfall in the Bahamas causing at least 70 deaths. It also generated losses and damages estimated at USD 3.4 billion, equivalent to around a quarter of the Bahamas' GDP (Zegarra et al., 2020[2]). Dorian was only one of a series of hurricanes to make landfall in the Caribbean in recent years. Parts of Asia are similarly affected by tropical cyclones. These repeatedly occurring disasters affect GDP, often for many years, but they also destroy lives and livelihoods. The attribution of such events to climate change is very difficult for many developing countries because they lack high quality observational data, as highlighted in Chapter 3

and in Hope (2019[3]). However, climate change worsens the adverse impacts of such cyclones: rainfall is more intense and storm surges on coasts higher.

This chapter explores finance in relation to losses and damages from climate change. Section 5.2 surveys the macroeconomic implications of climate change, with a focus on fiscal sustainability. Section 5.3 provides an overview of the roles finance can play with managing losses and damages from climate change, arranged around risk reduction, risk retention and risk transfer. Section 5.4 reports on the current landscape and future trends of the links between development finance and losses and damages from climate change.

## 5.2. Macroeconomic implications of climate change

Risk of climate-related hazards can have large and complex macroeconomic implications. The economic effects, however, differ across different types of hazards. The immediate economic effects of a hazard will be a shock, with losses or damages of assets (e.g. property or crops in the field) and impacts on labour supply. For example, some climate-related hazards, such as more severe floods and storms, can lead to damages to buildings and infrastructure assets. Others, such as heatwaves, are unlikely to cause as much damage to assets. However, they may have other macroeconomic implications, such as declines in productivity in some sectors (Day et al., 2018[4]).

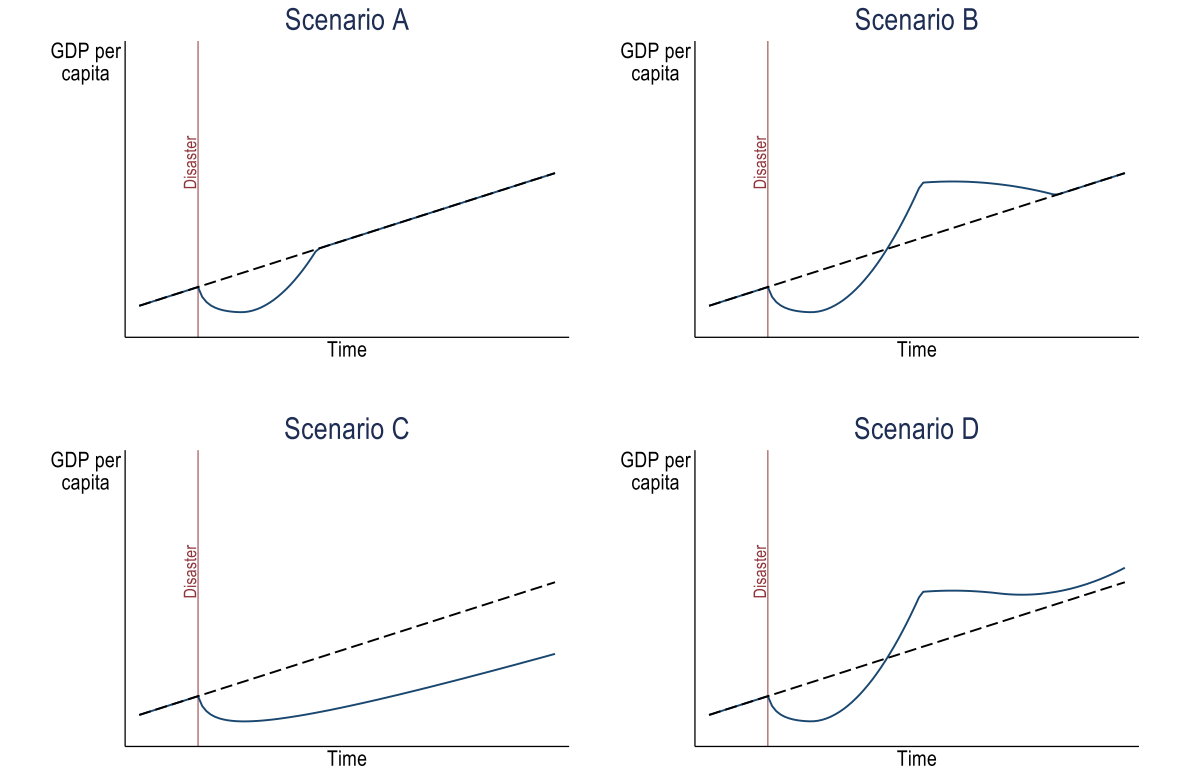
These implications can disrupt economic output in one or more sectors, which might affect trade, foreign earning and exchange rates. For example, climate risks may affect food security both directly and indirectly. A direct impact could be lower yields, while an indirect impact could be reduced water availability and quality, more pests and disease, and fewer pollination services (Mbow et al., 2019[5]). This, in turn, can contribute to increased food prices locally or even globally. The extent of the price increases will depend on the scale of the adverse impact and the importance of the affected crops in global supply chains (see Box 4.1). Similarly, tourism earnings will be vulnerable to climate risks that may destroy iconic natural attractions (e.g. coral reefs), wash away beaches, destroy resorts and local infrastructure, and reduce freshwater supplies (Wolf et al., 2021[6]). Some losses and damages can be quantified in monetary terms. Others, such as non-economic losses, cannot be quantified. Attempts to quantify such losses may make assumptions that are hard to justify or are not widely accepted. Examples include lives lost, the loss of species, cultural and psychological losses, temporary or permanent impairment of people's mobility and lost opportunities for children and future generations (Tschakert et al., 2019[7]) (see Chapter 2).

Institutions and socio-economic characteristics interact with hazards and some events will have smaller effects because countries already deal with that type of hazard. For example, cold regions will be more vulnerable to high temperatures because houses and infrastructure were built with cold weather in mind, and designed to trap heat. Likewise, hot regions may be more vulnerable to extremely cold days, although such extremes are projected to decrease as climate change progresses (Heutel, Miller and Molitor, 2020[8]). The extreme events of 2021 (e.g. the North American heatwave) demonstrate how the intensity of the extremes is already changing at 1.09°C of warming. Novel hazards are emerging, which may be all the more damaging since countries have no or limited experience with such hazards. Some of these shocks to capital, labour and income may persist over years.

Major impacts or disasters demand an immediate response in terms of support to affected individuals and households. However, such an effort may also increase government deficits, increase public debt levels and limit other productive investments. Subsequent recovery and reconstruction activities are likely to have positive direct and indirect economic impacts. Finance may be attracted if interest rates rise after such a shock, reflecting the need for new capital. Where private (domestic or international) finance does not respond, development assistance will likely need to fill the gap. Capacity constraints may also limit the speed and extent of recovery.

For these reasons, economic activity (GDP per capita) may take a range of plausibly different shapes after a disaster (see Box 5.1 for a methodological overview). Expected growth path will depend on the economic effects of the impact that are assumed to dominate. Potential stylised pathways for GDP per capita are shown in Figure 5.1. Scenarios A and B show no long-term impact on growth pathways. Meanwhile, Scenarios C and D lead to a permanent reduction or increase output per capita, respectively. These effects are perhaps due to biting financial constraints (Scenario C) or the replacement of lost capital by improved technologies (Scenario D). These pathways all have long-run growth rates unaffected by the disaster. This may not always be the case; many future climate projections include frequently recurring or more intense climate-related hazards, already witnessed in many countries. A meta-analysis concluded such extreme climate and weather events have a negative impact on economic growth, with the magnitude varying by disaster and country (Klomp and Valckx, 2014[9]).

## Figure 5.1. Stylised pathways for GDP per capita after an extreme weather event




Source: (Chhibber and Laajaj, 2008[10]).

### Box 5.1. Understanding impacts of extreme weather and climate events

The macroeconomic implications of extreme weather and climate events have been estimated through a range of different approaches. Some approaches are more suitable for assessing short-term implications (based on no assumed changes to behaviour and production). Others capture the dynamic implications for the economy over longer periods. Typically, in a more long-term approach, different growth models and regional economic models can link the macroeconomic to micro-level losses and damages, perhaps informed by simulation models.

Catastrophe models using geographic information systems are typically used at a range of scales (local to global). They map and then estimate losses and damages to assets (typically property) and affected populations from a range of different hazards. In so doing, they make different assumptions about the frequency and intensity of a specific type of hazard, such as floods.

Such models can be used to price insurance against such risks or to inform cost-benefit analyses of different adaptation interventions and investments. Mechler (2016[11]) finds that cost-benefit ratios to reducing disaster risks *ex ante* are considerable (though varying across context and intervention). Indeed, benefits outweigh costs by a factor of four on average. Agent-based modelling can be used in conjunction with catastrophe models to approximate behaviours of economic actors. This influences disaster preparedness at a local scale, which may lead to significantly lower damage estimates.

Source: (Botzen, Deschenes and Sanders, 2019[12]).

The impact of disasters also depends on the type of losses and damages sustained. Disasters that result in a larger number of lives lost and lives affected (lethal disasters) have a larger negative impact on output growth than those that primarily destroy property and capital. This is because reconstruction of property, especially when covered by insurance, can contribute to a short-term increase in economic growth (Noy and Vu, 2010[13]). Such positive effects of reconstruction on economic growth, however, are unlikely in general (Botzen, Deschenes and Sanders, 2019[12]). Indeed, the effects of weather and climate events on the economy are overwhelmingly found to be negative, sometimes lasting more than a decade (Deryugina, 2017[14]). The finance sector itself is at risk from climate change, see Box 5.2.

The macroeconomic implications are further mediated by a number of country-specific factors:

- ***Geographic location and size***: Financial impacts of climate change are especially felt in countries that are geographically or economically small (IMF, 2019[15]). The average annual cost of disasters in Small Island Developing States (SIDS), for example, is nearly 2% of GDP, more than four times the amount for larger countries (IMF, 2016[16]). This is in part due to their geographic location that exposes many SIDS to extreme events. These range from annual hurricane and cyclone seasons to slow-onset events, such as sea-level rise (SLR) (see Chapters 3 and 4). However, the scale of impacts is also a factor of their relatively small size, adversely affecting the investment, income and revenue base (IMF, 2016[16]).
- ***Socio-economic development:*** Level of socio-economic development can influence the impact of climate events, including factors such as per capita GDP, social protection, trade openness and literacy rates (Botzen, Deschenes and Sanders, 2019[12]). For example, strong property rights enable the development and penetration of insurance markets, which lead to a quicker recovery from extreme events (Kousky, 2019[17]) (see Section 5.3.3). Less diversification and higher levels of agriculture as a share of economic output can amplify the impact of extreme climate and weather events in developing countries (see next bullet). Given that socio-economic development dampens the impacts, Least Developed Countries (LDCs) are and will be among the most affected by climate change. Socio-economic characteristics are also important within countries as well; impacts of

climate-related events differ by sub-national levels of development and other factors (Noy and Vu, 2010[13]).

- ***Composition of the economy:*** Developing countries tend to be more vulnerable because they depend on a few sectors compared to larger or more economically diverse countries (Narain, Rabanal and Byskov, 2003[18]; Joya and Rougier, 2019[19]). Vulnerability is often exacerbated by the relatively dominant role of agricultural products in LDCs, which represent over 15% of GDP, compared to around 1% in OECD countries (World Bank, 2021[20]). Agriculture is a particularly vulnerable sector to changing climate (IPCC, 2018[21]).
- ***Public debt***: Some developing countries already face high levels of public debt – exacerbated by the COVID-19 crisis. This results in less capacity to cope as it constrains their ability to borrow more, including after extreme climate and weather event disasters (see Section 5.2.1). For example, Africa's total debt-to-GDP ratio reached 70% in 2020, more than ten percentage points higher than in 2019 and the recommended level by the African Monetary Co-operation Programme for developing economies (AfDB, 2021[22]). Such high debt levels leave less fiscal space to invest in long-term resilience or even short-term relief.

Different types of climate-related hazards will raise international attention at different levels, which will affect aid flows and ultimately the extent and speed of recovery (Mejia, 2014[23]; Eisensee and Stromberg, 2007[24]). In particular, Caribbean countries are more likely to receive disaster relief following severe tropical storms than following floods (Mejia, 2014[23]). After St. Vincent and the Grenadines was hit by Hurricane Tomas in October 2010, floods followed a few months later. The estimated damages were similar, but the donor response was three times larger for the hurricane (Mejia, 2014[23]; IMF, 2011[25]). Some SIDS, however, are not eligible for official development assistance (ODA) but still face significant climate risks (see Section 5.4.4). The impacts of slow-onset changes such as temperature increase or SLR might be over time even larger than those of extreme events (Kalkuhl and Wenz, 2020[26]; Haer et al., 2013[27]). Hazards also interact. For example, SLR is likely to make coastal flooding following hurricanes more severe (Knutson et al., 2021[28]).

### *5.2.1. Impacts on fiscal sustainability and domestic remedies*

Macroeconomic impacts, such as those discussed above, will make populations more vulnerable. Consequently, governments will likely need to spend more on social protection, and on rebuilding (Burke, Hsiang and Miguel, 2015[29]; Botzen, Deschenes and Sanders, 2019[12]). For example, spending on unemployment insurance is larger in the years after an extreme event (Deryugina, 2017[14]). After Hurricane Katrina, employment in New Orleans fell from over 600 000 to below 450 000 (BLS, 2021[30]). The tax relief after Katrina further reduced tax revenues (Froetsch and Rector, 2005[31]). On the spending side, the cost of the new levees and floodgates of New Orleans alone are estimated at USD 14 billion (Frank, 2019[32]), a considerable sum compared to USD 80 billion annual GDP of the area (US Bureau of Economic Analysis, 2020[33]). Governments often act as guarantors for bank deposits and need to ensure the financial system is viable (Brei, Mohan and Strobl, 2019[34]; Farhi and Tirole, 2017[35]). Consequently, impacts on the financial sector (e.g. non-performing loans, loss of bank capital reducing their ability to make further loans, see Box 5.2) will also affect government finances.

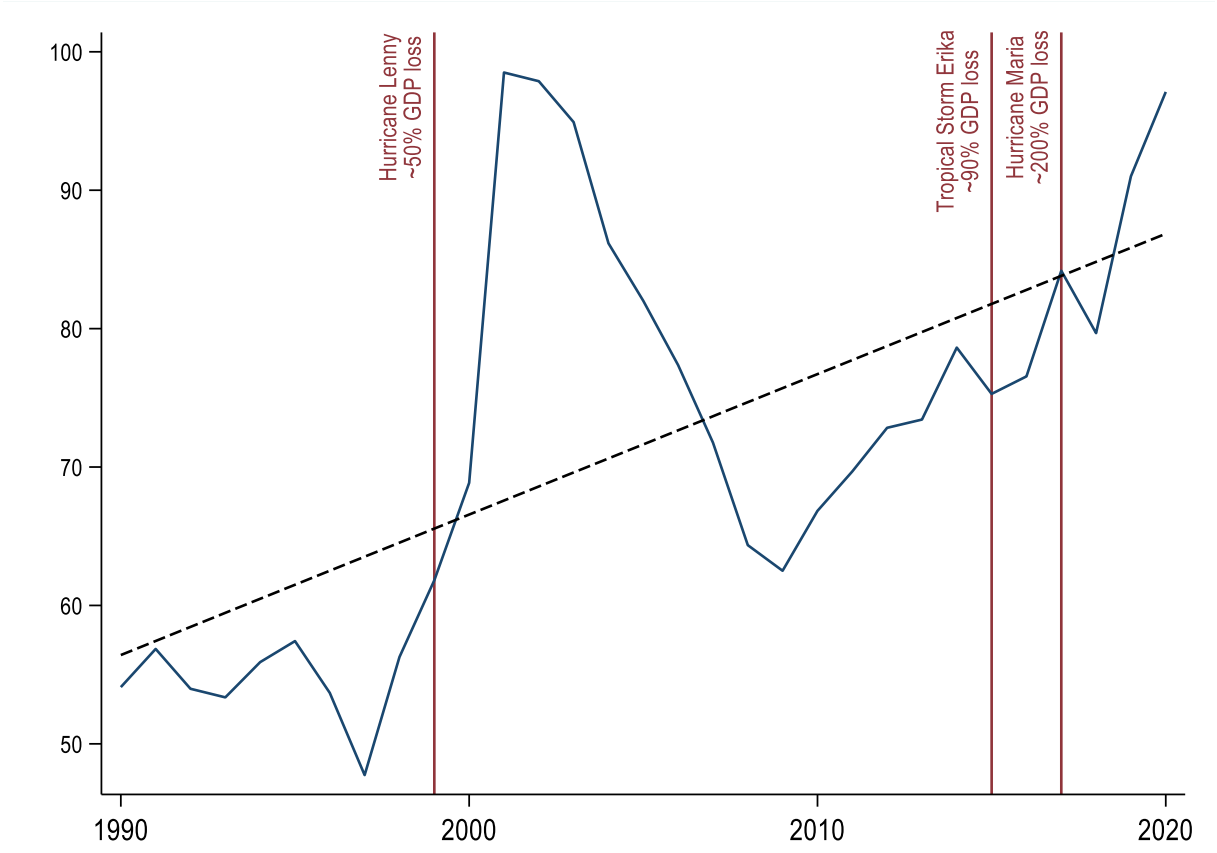
The need for increased spending coupled with lower revenues from less economic activity will put pressure on fiscal sustainability. Sometimes affected countries, like the Bahamas, are not eligible for ODA, giving rise to sovereign debt challenges (discussed in Section 5.4). Evidence suggests *ex ante* measures, such as to reduce risks of losses and damages lead to better macroeconomic outcomes (Catalano, Forni and Pezzolla, 2020[36]). However, fiscal risks can also reduce a government's ability to implement such measures, forcing them to rely on less effective *ex post* measures.

Debt sustainability was, and remains, an issue beyond climate change, but climate change will exacerbate these concerns. Half of the low-income developing countries are in debt distress or at the risk of it, meaning

they experience difficulties in repaying their debt (IMF, 2021[37]). Debt servicing was estimated at over USD 3 trillion for developing countries in 2020-21 alone, at a time when revenues are limited (Steele and Patel, 2020[38]). The length and persistence of the effects on debt and debt repayment as a result of climate-related hazards are crucial when assessing debt sustainability. Estimates of repayment of the costs of events range from around two to three years (Ouattara and Strobl, 2013[39]; Mohan and Strobl, 2020[40]) to over ten years (Koetsier, 2017[41]; Deryugina, 2017[14]), depending on institutional settings and socio-economic characteristics of the country. For example, Figure 5.2. shows the debt-to-GDP ratio of Dominica from 1990 until 2020. Horizontal red lines show the occurrence of the major hurricanes with GDP loss. Debt increases sharply after hurricanes. While debt starts to decrease after the hurricanes, they occurred quite frequently so the average level of debt steadily increased (see dashed trend line).

Adverse climate impacts can lead to a vicious cycle. First, countries struggle to repay their debt. Thus, high debt levels limit the possibilities for them to recover and rebuild after the disaster (Fresnillo, 2020[42]). This is of particular concern in LDCs. Fiscal sustainability can therefore constrain the ability of governments to pursue sustainable development (including through adaptation and mitigation activities) and address poverty and other priorities. Money that should have gone to education, health care or infrastructure may get diverted to emergency response, rehabilitation and reconstruction, while access to new finance is limited (Ameli et al., 2021[43]).

### Figure 5.2. The effect of repeated cyclones on the government debt of Dominica




Note: The figure shows the evolution of Dominica's government debt-to-GDP ratio (blue line) against the major extreme events (red vertical lines). Dashed line shows the linear trend.
Source: Based on (IMF, 2021[1]).

Foreign and domestic debt have different implications for debt sustainability, and ideally would be balanced according to the circumstances of the country (Reinhart and Rogoff, 2011[44]; Gros, 2013[45]). In theory, domestic debt could be paid by either raising revenues or decreasing the value of debt. In practice, this approach would create inflation, which may have other damaging consequences. Additionally, domestic debt provides a redistribution within the country, but most funds stay within borders. Therefore, most of the funds to repay the debt will still be available to raise capital for investment in long-term resilience. Foreign debt is almost always denominated in a foreign currency. This makes the debt riskier since governments are exposed to changes in exchange rates. The central bank, in theory, can run out of foreign currency to repay external creditors. This risk may be heightened if the adverse impact reduces the ability of the economy to generate foreign currency earnings (e.g. tourism, agricultural exports). There is also a transfer risk from the imposition of capital outflow controls. For these reasons, foreign debt generally requires a risk premium and presents a larger problem for fiscal sustainability than domestic debt (Gros, 2013[45]).

After an adverse climate impact, the funds needed for reconstruction and social protection tend to be leveraged from foreign sources. This happens simply because domestic investors have less wealth and income to invest. With climate-related hazards that impact on capital assets, interest rates may increase to reflect the higher marginal return on capital (Mohan and Strobl, 2020[40]). Thus, climate change raises debt levels. Moreover, this increase is likely driven by an increase in riskier, foreign debt. For developing countries, international co-operation can also provide an important source of concessional finance. However, in higher-income developing countries not eligible for ODA, this can give rise to sovereign debt challenges as discussed in Section 5.4.4.

### *Budgeting for fiscal sustainability*

In more developed countries, private insurance and central budgetary resources can usually support areas suffering adverse climate impacts; this is not the case in many developing countries. Since the impacts from climate-related hazards cannot be completely eliminated, all countries should adopt measures that reduce the cost of disasters (IMF, 2019[15]). This includes creating fiscal space (e.g. contingent reserves, low debt levels and high insurance coverage), institutional capacity and *ex ante* preparedness. Such actions must be complemented by efforts to strengthen the climate resilience of assets and investments, raise awareness and enhance the capacity of all stakeholders to reduce and manage risks (ADB, 2018[46]). Enhanced financial development also reduces the possible effects of extreme events on public debt (Zhang and Managi, 2020[47]). In the absence of such precautionary approaches, countries risk facing high financing needs at a time when a disaster would have undermined their credit worthiness (IMF, 2019[15]). Governments need to use the different risk management instruments in a complementary way to address the challenges they face, as discussed below.

Traditional fiscal policy approaches, such as fiscal rules, could be important. Fiscal rules are rules that governments need to consider when planning budgets to help ensure fiscal sustainability. Examples for such rules include establishing a debt ceiling or a maximum fiscal deficit. Countries introducing fiscal rules into their constitutions have lower debt and saw improved fiscal sustainability (Asatryan, Castellón and Stratmann, 2018[48]). Such rules might need modification to incorporate the effects of climate change. An escape clause could be inserted in case of severe extreme events (Nakatani, 2021[49]), similar to the “hurricane clauses” in external debt financing (see Section 5.4.4). However, the clause should be clearly defined because vague or flexible applicability hinders stabilisation of debt (Combes, Minea and Sow, 2017[50]). Debt financing will have different effects on debt sustainability depending on whether such debt is domestic or foreign, as discussed in the previous subsection.

### Box 5.2. The impact of climate-related hazards on the finance sector

Financial systems (institutions and markets) provide many essential services that could be threatened by climate-related hazards. For example, frequent severe extreme weather events put investment and loan portfolios at risk. Despite this risk, climate-related hazards do not always seem to be considered when pricing financial assets (Ramani, 2020[51]; IMF, 2020[52]). Some financial assets, such as sovereign bonds, are already priced incorporating at least some of the climate risk the country faces (Cevik and Jalles, 2020[53]).

Since financial institutions interact extensively, they form an interconnected system through which financial contagion can spread. Negative effects on one or more independent institutions (depending on their size and connectedness) increases systemic risks for the whole economy (Battiston and Martinez-Jaramillo, 2018[54]; Dastkhan and Gharneh, 2018[55]). Systemic risks may extend across borders, triggering financial crises in other countries, or indeed at the global level (Saha and Viney, 2019[56]). Thus, any material effects on the finance sector can seriously affect the real economy as well. The global financial assets at risk from climate change are estimated at USD 2.5-4.2 trillion and potentially as high as USD 24 trillion (Dietz et al., 2016[57]; Watts, 2015[58]). Consequently, an increasing number of financial regulators, including the insurance regulatory community, are requiring disclosure of climate risks to uncover exposures and vulnerabilities of the financial system (Jones, 2021[59]) (see also Box 5.7).

Systemic financial risks also affect the public budget balances of countries, and vice versa. For example, central governments usually provide guarantees to banks, which means that governments will shoulder some of the costs in a crisis. Additionally, banks are an essential part of the monetary system and critical to the effective functioning of the economy. The potential bail-out of banks by the government encourages banks to take more risks than they would otherwise. On the other hand, the central government may not be considered a creditworthy guarantor; this status will affect banks through multiple channels (Brunnermeier et al., 2016[60]). In case of sovereign default, banks (domestic and foreign) holding sovereign bonds will likely face sudden losses. Additionally, increases in the risks of international debt default may trigger financial contagion. In this case, the debt of countries in similar situations would be repriced to reflect higher perceived risks.

Finally, public debt is used as both asset and collateral by banks and other financial actors. Increase in the riskiness of sovereign debt will affect how easily households, firms and subnational governments can access funds from international financial markets.

## 5.3. Roles of finance in reducing and managing the risks of losses and damages

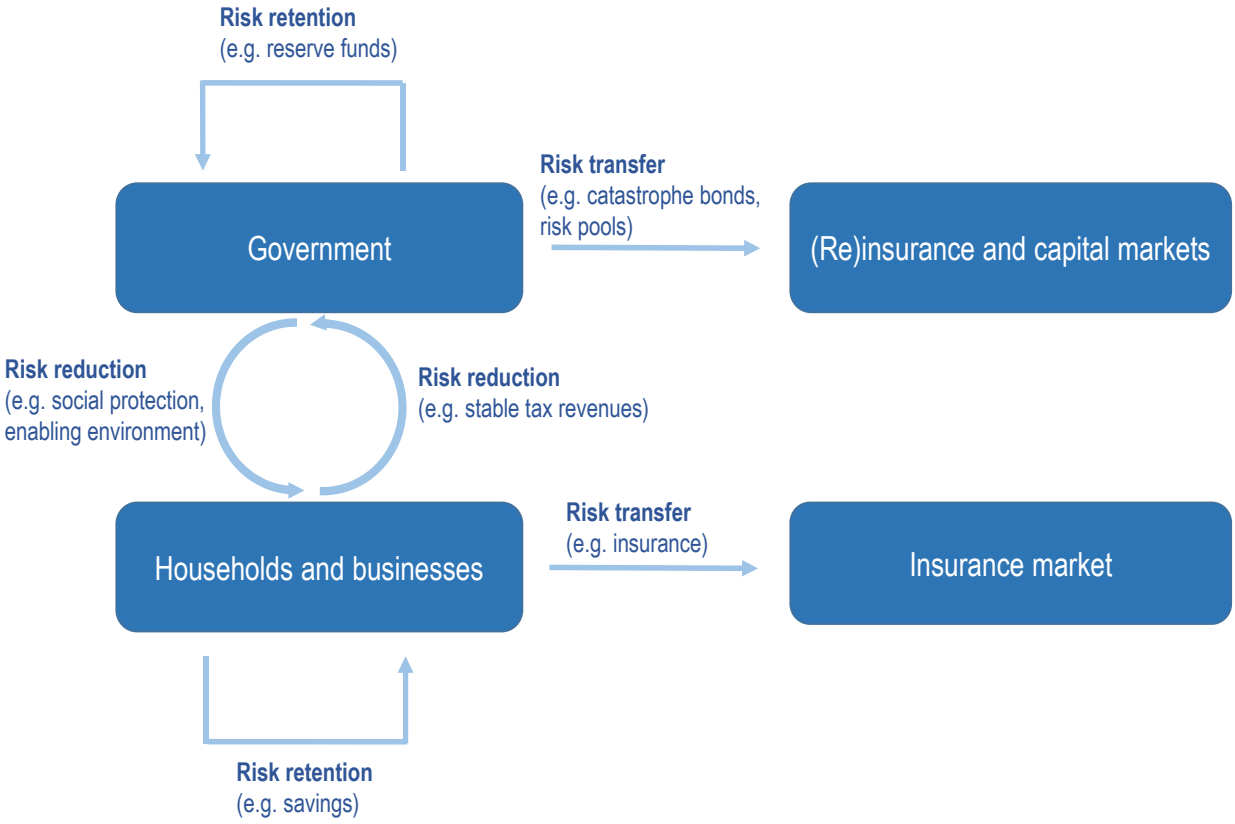
This section examines the (actual and potential) roles that finance can play in reducing and managing the risks of losses and damages from climate change. Finance in this context may be public or private, domestic or international. Governments can use different approaches to access funds to reduce and manage the risks. The discussion is structured around three key functions:

1. risk reduction
2. risk retention
3. risk transfer.

Particular financial interventions can be used for more than one of these purposes simultaneously. This may create important synergies but also trade-offs (see discussion of social protection below). An ideal risk management strategy employs and blends these approaches in a comprehensive manner. The

approaches have been captured in a stylised way in Figure 5.3 to illustrate the different intervention points for different measures. This is, of necessity, a simplification and abstraction of the dilemmas and options facing decision-makers on different timescales. Each approach has distinct characteristics in terms of timeliness, access and relative costs, as outlined below and summarised in Table 5.1.

### Figure 5.3. Stylised illustration of the role of finance in addressing current and future risks of losses and damages




The World Bank recommends a layered approach to funding government contingent liabilities. This would involve risk retention (savings and current funds) for frequent but less severe hazards (e.g. annual flooding/localised drought). Funds would be borrowed for hazards that occur at a medium frequency and with medium severity (e.g. widespread flooding). For less frequent hazards with potentially high impacts, risk transfers are more suitable (e.g. severe droughts or catastrophic cyclones) (Calcutt, Maher and Fitzgibbon, 2021[61]).

Risk management also needs to be embedded into fiscal and public finance mechanisms. This could occur through, for example, risk-sensitive budgetary processes, risk tagging and tracking of budgets, and by integrating risk management into sectoral budgets. The applicability of specific types of financial mechanisms to these current or near-term problems is indicated where relevant throughout the rest of the chapter. The potential role of the different approaches for the recovery and reconstruction phase is highlighted in Box 5.3.

## Table 5.1. Options for funding government's climate-related contingent liabilities

| | Funding mechanism | Speed of access | Relative cost |
|---|---|---|---|
| **Risk reduction** | *Social protection:* supporting the most vulnerable segments of society in strengthening their resilience, providing direct relief to affected households following a disaster, and potentially supporting recovery efforts. | Relatively quick, as it is calculated in the budget. | Depends on the opportunity cost related to alternative uses of the allocated funds. |
| | *Providing enabling environment:* engaging private sector. | No direct access but important for incentivising action and in some cases mobilising private sector engagement. | Usually small fiscal costs, when raising awareness, potentially larger political and financial costs when designing a regulatory environment. |
| **Risk retention (savings and current funds)** | *Dedicated reserve fund for climate risk or contingencies (more generally)*: a set amount of funds allocated annually to address expenses related to climate events or a broader set of contingencies. | Very quick as there is normally no need for additional spending authority. | Depends on the opportunity cost related to alternative uses of the allocated funds. |
| | *Emergency budget re-allocations*: funds re-allocated from other spending priorities or uses. | Relatively quick, depending on what additional executive or legislative authorities are required for re-allocation. | Can be relatively high cost as funds will, by definition, be re-allocated from other spending priorities. |
| **Risk retention (borrowing)** | *Prearranged contingent credit facilities*: loan facilities that can be accessed based on a climate event. | Very quick, depending on the conditions that must be met to allow access to the fund. | Can be relatively low cost, depending on cost of borrowing. In the case of developing countries, credit facilities can be arranged with development banks and other development partners at low interest rates. Must be repaid – which could lead to debt sustainability risks. |
| | *Debt issuance*: the sale of additional government bills or bonds. | Relatively quick, depending on existing access to capital markets and debt issuance experience. | Can be relatively high cost if issued in the midst of a crisis involving heightened credit risk for investors. May have wider debt sustainability consequences. |
| | *Increased taxation:* the imposition of new or extraordinary/temporary taxes. | Relatively slow as new executive or legislative authorities are likely to be necessary and it will take time to collect funds from taxpayers. | Likely to be high cost in terms of impact on household and business recovery, particularly if those impacted by climate event face additional taxation. |
| **Risk transfer** | *Indemnity insurance for buildings and infrastructure:* insurance coverage for actual rebuilding costs incurred can be acquired from private insurance markets. | Relatively slow as claims payments would only be made once losses are assessed and coverage confirmed, although hybrid products that provide some advance payment could mitigate. | Can be relatively high cost, if damage occurs relatively frequently although suitable for less frequent losses and costs can be reduced through pooling arrangements. |
| | *Financial protection for general government costs (e.g. regional risk pools, catastrophe bonds, parametric insurance):* a set amount of financial protection can be acquired to provide a general source of funding for events of a specific level of severity. | Relatively quick as pay-outs are usually based on event characteristics that can be confirmed quickly. | Might be high cost if threshold for pay-out is calibrated for relatively frequent events (more appropriate for less frequent events). There might also be high transaction costs that can be reduced by cost-sharing through regional co-operation. It does not create additional debt sustainability problems, because pay-outs do not need to paid back. |

### Box 5.3. Recovery and reconstruction

The risk financing strategies in this chapter can also be applied to recovery and reconstruction. Recovery and reconstruction denotes the phases after the immediate humanitarian crisis has been averted. At these stages, basic services can be restored, reconstruction and asset recovery can happen, and restoration of livelihoods can take priority. On occasion, "building back better" might be possible, an effort to reconstruct while increasing resilience. Building back better may decrease the impact of climate and weather events on well-being by around a third (Hallegate, Renschler and Walsh, 2018[62]).

Therefore, while providing relief after a weather or climate event is of utmost importance, it is also crucial to consider the inclusiveness and long-term needs of the society during recovery. For example, following Hurricane Maria in 2017, the government of Puerto Rico permanently closed 250 schools. Most school closures, however, occurred in rural areas. This negatively impacted the rural communities in multiple ways in the long term (Finucane et al., 2020[63]).

Adaptive financing proposes a method to develop more flexible financial instruments, and enable engagement of private finance in recovery. Before the event, a financial instrument (e.g. a loan) is approved in many forms (e.g. size of fund, coverage). Each has different financing requirements (e.g. interest rates). As a climate-related hazard materialises, the instrument can be quickly offered based on preliminary information, which in theory can be updated. Such instruments are usually offered with complementary programmes, such as social protection to enhance and hasten recovery (Hammet and Mixter, 2017[64]).

### *5.3.1. Risk reduction*

Finance is fundamental for enabling and accelerating climate action to reduce and manage the serious and potentially devastating current and future impacts of climate change. As highlighted in Chapters 1 and 4, this requires both climate change mitigation and adaptation, as well as other interventions such as disaster risk reduction, disaster risk finance, and humanitarian assistance. This section focuses on the role of finance in reducing and managing economic losses, i.e. damage to property and loss of income and livelihoods. It understands property as both privately owned buildings and infrastructure, such as homes and businesses. Property also includes publicly owned buildings and infrastructure, such as schools, hospitals, roads and power generation and distribution infrastructure. Risk reduction is focused on reducing current vulnerability and manage risk of future losses. Social protection mechanisms can address both these areas, and are therefore the starting point of this discussion.

#### *Protecting livelihoods, reducing precarity*

##### The role of social protection

Social protection mechanisms can play a critical role in supporting households' immediate needs and ability to recover. This is especially the case where insurance coverage is unavailable or unaffordable to segments of the population. Social protection refers to policies and programmes designed to reduce and prevent poverty and vulnerability to different types of risks (ILO, 2017[65]). Some definitions also highlight the role of social protection in enhancing the social status and rights of marginalised segments of the population, reducing their economic and social vulnerability (Sabates-Wheeler and Devereux, 2007[66]). Approaches with an explicit focus on human rights provide a lens through which to analyse the obligations, inequalities and vulnerabilities of the population and to tackle discriminatory practices that undercut human

rights (UNRISD, 2016[67]). Social protection mechanisms can broadly be categorised around four common functions (Devereux and Sabates-Wheeler, 2004[68]):

- ***Protection***: providing direct relief from deprivation in the form of, for example, pensions, unemployment and health insurance.
- ***Prevention***: seeking to avert deprivation as a result of a shock through, for example, cash and food transfers, public works programmes and school feeding programmes.
- ***Promotion***: enhancing income and capabilities to enhance livelihoods, for example, through labour market interventions (job market integration, job benefits and labour standards) and social services (social care, nutrition services and disability services).
- ***Transformation***: addressing concerns of social equity and exclusion.

Social protection programmes can reduce the vulnerability of individuals and households to different types of risks, including climate risks (Costella, Bachofen and Marcondes, 2017[69]; Carter et al., 2019[70]). For example, regular cash transfers to segments of the population based on a set of criteria such as age, income or disability can ensure alternative sources of income. This, in turn, reduces the impact of crop failures on peoples' health. Similarly, cash transfers may reduce pressure on families to resort to harmful coping strategies. In response to climate-related hazards, for example, cash transfers mean they would not have to remove children from school for income-earning activities or to sell their livestock (de Janvry et al., 2006[71]). In many developing countries, social protection interventions, such as food aid and cash transfers (also called "safety nets"), comprise the primary focus of government interventions for vulnerable groups (Calcutt, Maher and Fitzgibbon, 2021[61]).

Complementing the broader notion of social protection, adaptive social protection includes a specific focus on the management of shocks, most commonly in the context of disasters. Such adaptive social protection systems can contribute to climate resilience of communities by directly investing in the capacity of societies to prepare, cope and adapt to the impacts of climate change. They aim to reduce the impact of risks to peoples' well-being by informing and enabling action; preparing for risks through private and public safety net programmes; and by reducing over time the exposure and vulnerability to the risks to build resilience (Bowen et al., 2020[72]). As such, they address current vulnerabilities *and* seek to reduce and manage future risks of losses and damages. Examples include the Kenya Hunger Safety Net Programme, Ethiopia's Productive Safety Net Project and the World Bank's Sahel Adaptive Social Protection Programme. These programmes use climate observations to trigger actions to build resilience. In this way, individuals and communities can better respond to climate-related hazards and other shocks to protect their assets and livelihoods (Daron et al., 2020[73]; World Bank, 2020[74]). Such established programmes contain detailed information on the vulnerability of the population and can adapt their offer of temporary assistance depending on the context. This makes the programmes effective in channelling emergency relief in the context of a shock (Calcutt, Maher and Fitzgibbon, 2021[61]). In some cases, these programmes are supported by development co-operation or the private sector (see Box 5.4).

Adaptive social protection measures could bring about change if they address the inequalities at the root of peoples' vulnerabilities to climate change (Davies et al., 2009[75]). Ethiopia's Productive Safety Net Programme, for example, absorbed an additional 3.1 million people threatened by the 2011 drought in the Horn of Africa and prevented the shock from becoming a humanitarian crisis (Hobson and Campbell, 2012[76]). It has also had a positive impact on food security and asset protection. However, evaluations suggest it has been less effective in protecting participating households from severe shocks, especially drought (Tenzing, 2019[77]). Malawi's Farm Input Support Programme similarly advanced food security by improving agricultural productivity. However, it was less effective in reducing long-term vulnerability to shocks and stresses as demonstrated by 2015 flooding and 2016 drought (Tenzing, 2019[77]).

An evaluation of the World Food Programme's insurance-related programmes revealed similar results. It found that insurance pay-outs enabled households to absorb the effects of failed agricultural seasons through purchasing of food, followed by investments in agricultural or livestock inputs (WFP, 2021[78]). Such

insurance products were either delivered through multi-year programmes that could be integrated into broader resilience-building initiatives or as a standalone product. Integrated programmes had a positive impact. In such programmes, insurance was provided with other risk management approaches, such as access to natural capital, information and finance. The synergies created by the different components increased resilience of participants. Conversely, when insurance was provided as a standalone product, pay-outs could help participants absorb the immediate effects of drought events but had no effect on long-term resilience (WFP, 2021[78]).

With increasing climate-related hazards, the risk increases for migration (temporary or permanent, voluntary or involuntary) and displacement (see Box 4.6). As a consequence, it is important to consider the transferability of social protection programmes. For example, decentralised social protection programmes could provide benefits more quickly and effectively than a centralised system, especially in a crisis. A decentralised system would also help make social protection more portable. For example, a decentralised approach in Tanzania proved more cost effective in improving resilience than centralised mechanisms, partly because all stakeholders were involved from the beginning (Greene, 2019[79]).

Climate change may increase pressure on social protection programmes. National governments, for example, may provide high levels of *ex post* financial support for losses incurred by households, businesses or subnational governments. Such losses could have been insured or avoided through proper risk management. Consequently, financial support is likely to reduce incentives to manage or protect against these risks in the future (i.e. moral hazards might emerge). Different domestic and international initiatives should thus be complementary, making the most effective use of scarce resources and avoiding such moral hazards, to the extent possible. Some households, businesses and subnational governments exposed to climate risks have the financial capacity to manage those risks. Governments must ensure all these segments of society have appropriate incentives to manage their own exposures. This includes measures such as risk reduction and risk transfer to insurance markets (see Section 5.3.3).

### Box 5.4. Engaging the private sector in strengthening social protection systems: The case of Senegal

The R4 Rural Resilience Initiative delivers integrated risk management services to over 91 000 households in Ethiopia, Kenya, Malawi, Senegal, Zambia and Zimbabwe. It combines several risk management strategies, including risk reduction (improved resource management through asset creation); risk transfer (insurance); risk retention (savings and microcredit); and social protection (through livelihood diversification and building insurance into social safety nets). The insurance interventions help households cope with shocks by providing timely support after an extreme event. In so doing, they allow insured households to meet their basic needs, prevent negative coping mechanisms and smooth incomes. In 2018, for example, low rainfall led to nearly 30 000 farmers in Ethiopia, Kenya, Malawi, Senegal and Zambia receiving insurance pay-outs amounting to USD 1.5 million (WFP, n.d.[80]).

In the case of Senegal, the R4 Initiative worked through the *Compagnie Nationale d'Assurance Agricole du Sénégal* (CNAAS), a public-private insurance company. CNAAS, which specialises in risk insurance solutions for farmers, was supported by a range of development co-operation providers. CNAAS shareholders include the Senegalese government, insurance companies, *Banque Agricole* (a commercial bank) and farmer associations. *Banque Agricole* provides loans and insurance products to micro-, small- and medium-sized enterprises, which are organised around producer organisations, agricultural co-operatives, or groups of micro or individual businesses. These stakeholders sign collective, communal contracts with *Banque Agricole*. The use of such contracts can reduce transaction costs and increase access to credits and financial products to otherwise marginalised stakeholders that largely operate in the informal sector. By contracting this insurance, farmers can take some risks and invest, including in ways that enhance their resilience (e.g. diversifying produce, improving storage facilities, reaching new markets). Unorganised farmers in the informal sector, however, remain excluded from this system, as they are often not part of such producer organisations (Casado-Asensio, Kato and Shin, 2021[81]).

### The role of humanitarian assistance

Humanitarian assistance plays an important role in providing relief. This is true in response to both slow-onset changes and extreme events, and in-kind support (including provision of food, water, medicines and tents) (OECD, 2021[82]). While post-disaster humanitarian assistance from donors is a crucial source of funding, the timing and volume can be unpredictable and slow to mobilise (Bowen et al., 2020[72]). In recent years, anticipatory humanitarian assistance has gained traction with experiences in over 60 countries (see Section 5.4.2 with its relation to development finance). This includes programmes by the International Federation of Red Cross and Red Crescent Societies and national societies, the START Network and a number of UN agencies (including the World Food Programme, the Food and Agriculture Organization and the UN Office for the Coordination of Humanitarian Affairs (IFRC, 2020[83]). Other providers are increasingly integrating anticipatory action into existing development (German Federal Foreign Office, 2020[84]; Levine et al., 2020[85]; Kuriyama et al., 2020[86]) and humanitarian programmes (UK Government, 2021[87]).

Anticipatory action refers to a set of actions that help prevent or mitigate potential disaster impacts before a hazard event. It uses weather and other forecasts to trigger funding for pre-determined actions before the hazard turns into a disaster (WFP, 2020[88]). Initiatives that focus on anticipatory action are also referred to as forecast-based early action, forecast-based financing, or early warning and early action. In many developing countries, humanitarian organisations are increasingly integrating forecast-based financing into their approaches to disaster risk management and response. With forecast-based financing, payments before a catastrophe can help beneficiaries prepare for an event, and potentially protect themselves against the impending impact. Vulnerable households in Bangladesh that received forecast-based financing in advance of flooding in 2017 fared better than those that did not receive it. Households with advanced funding reportedly had improved access to food, accumulated less (high-interest) debt and suffered from lower levels of stress during and after the flood (Gros et al., 2019[89]). Enabling actors to take action before an extreme event more effectively mitigates impacts than conventional risk finance instruments, which usually disburse finance following a disaster. These developments closely parallel those in insurance, discussed below. Anticipatory action, however, might have limited applicability with climate-related hazards that are difficult to predict.

Disbursements are often contingent on the monitoring of imminent climate-related hazards, enabling forecast-based financing to contribute to multiple benefits. These benefits include strengthened early warning communication capacity and investments in risk reduction (e.g. to prevent flooding), bridging the gap between climate information to early action (UNFCCC, 2019[90]). The emphasis on *ex ante* prevention also reduces the adverse impact of disasters on development gains (OECD, forthcoming[91]). In Kenya and Sudan, early provision of supplementary livestock feed in anticipation of droughts resulted in lower mortality rates of livestock for beneficiaries (FAO, 2019[92]). Different global initiatives focused on anticipatory action are highlighted in Box 5.5. This aims to provide insights into different initiatives rather than attempting a complete overview. Complementing the initiatives mentioned in the box are a number of different platforms and partnerships that support the scale-up of anticipatory action and promote synergies between the humanitarian, climate and development communities.

### Box 5.5. Global initiatives to scale up anticipatory action

***The Disaster Relief Emergency Fund and Forecast-based Financing***

In 2018, the International Federation of Red Cross and Red Crescent Societies set up the Disaster Relief Emergency Fund to promote forecast-based action through a dedicated financial mechanism (IFRC, 2020[83]). The Fund helps implement anticipatory action by the National Red Cross and Red Crescent Societies and expands its scope. Forecast-based funding builds upon traditional early warning approaches, incorporating impact-based forecasting mechanisms. It does not replace post-disaster response but rather reduces the financial need for coping measures by vulnerable communities after a shock. In Bangladesh, development co-operation providers contribute to a one-off cash transfer to 274 000 households in advance of floods or cyclones to avoid high evacuation costs after disasters (Casado-Asensio, Kato and Shin, 2021[81]). During the 2020 floods in Bangladesh, for instance, the German Federal Foreign Office distributed payments of between USD 61 to USD 3 000 to households, helping those affected to evacuate by boat (German Federal Foreign Office, 2020[84]).

***UN Office for the Coordination of Humanitarian Affairs (OCHA) Central Emergency Response Fund***

OCHA manages the Central Emergency Response Fund and is undertaking pilots for anticipatory action (e.g. in Somalia to address droughts). The pilots demonstrate how collective anticipatory action can work at scale. For instance, rehabilitation and upgrading of boreholes ahead of a drought can improve household finances, strengthen mental health, keep livestock healthy and reduce disputes related to water (Wittig, 2021[93]). Prior to this, the OCHA-managed Country-Based Pool Funds addressed losses and damages by supporting early action in response to droughts in Afghanistan and Somalia. However, while these pilots focused on rapid response, they were less focused on preparedness, recovery and sustainable development (Willitts-King et al., 2020[94]).

***Climate Risk and Early Warning Systems***

Climate Risk and Early Warning Systems is a financial mechanism that aims to save lives and livelihoods through the expansion of early warning systems and services in LDCs and SIDS. Established in 2015, it is a collaboration between the World Meteorological Organization, the United Nations Office for Disaster Risk Reduction and the World Bank's Global Facility for Disaster Reduction and Recovery. The initiative focuses on increasing the capabilities of the countries and island states to detect, monitor and forecast severe high-impact weather events. This is complemented by a focus on access to longer-term seasonal predictions and operational early warning and response plans that increase access of vulnerable people to warnings.

Not all anticipatory action has been successful (WFP, 2020[88]). However, it can complement longer-term investment in adaptation, disaster risk reduction and development. These influence the capacity of households and communities to reduce and manage the risks of losses and damages from climate change. Thus, *ex ante* prevention can complement *ex post* disaster risk recovery with a focus on building back better. In this way, anticipatory action is critical for breaking the vicious cycle of extreme weather events turning into humanitarian crises that wipe out development progress. There is scope for governments, humanitarian agencies and development co-operation providers to strengthen synergies between anticipatory financial support and other measures to reduce the risks (Levine et al., 2020[85]). With assistance from Japan, for example, Peru, El Salvador, Fiji and the Philippines received contingency credits and other types of disaster risk financing. At the same time, they developed contingency plans to better prepare for long-term disaster risks (ADB, 2018[95]). The African Risk Capacity similarly emphasis the importance of contingency plans being in place (see Box 5.11). Enhanced collaboration is also needed between those working on climate change adaptation and disaster risk reduction. This may require efforts

to harmonise the mandates, interests and priorities of government and development co-operation agencies (Casado-Asensio, Kato and Shin, 2021[81]; OECD, 2020[96]).

### *Finance in relation to adaptation and mitigation actions*

Current levels of exposure and resilience determine the extent of losses and damages after a hazardous event. Effective investment in adaptation will enhance resilience and reduce exposures to future such events. Current resilience and exposures will also determine the domestic resources available to governments, households and firms. Many poorer countries have low levels of resilience and high exposure to hazardous events. This combination can make it difficult for them to overcome a vicious cycle of high levels of losses and damages. Such a cycle leads to lower levels of investment in development and inadequate levels of adaptation spending, increasing vulnerability to future (likely more frequent and intense) hazards.

The vicious cycle can occur despite the high level of returns on many adaptation investments. For example, the Global Commission on Adaptation estimates that a USD 1.8 trillion investment in adaptation could generate USD 7.1 trillion of avoided costs and non-monetary social and environmental benefits (GCA, 2019[97]). Examples of adaptation include early warning systems (EWS), climate-resilient infrastructure, improved dryland agriculture, global mangrove protection and resilient water resources. Countries may need to supplement domestic resources for these costs with international development finance. They will also need to mobilise private finance to the extent possible. Lack of a clear revenue stream to underpin the business case for private investment is a barrier to scaling up mobilisation of adaptation activities.

Private finance as a label hides a large heterogeneity: local producers, international finance corporations and multinationals could all play different roles. Engaging these entities is crucial as the brunt of the losses and damages will fall on private individuals and companies. It can be difficult to raise private finance for approaches that do not have direct revenue stream (e.g. coastal flood management), but good practices are emerging (Hallegatte, Rentschler and Rozenberg, 2019[98]; Casado-Asensio, Kato and Shin, 2021[81]). Even with a tangible revenue stream, the benefits for the wider community are larger than for private actors. A dam, for example, will protect both a factory and surrounding areas. Thus, it is unsurprising (if undesirable) that private sources provided only about 1.6% of adaptation finance in 2017-18 (Tall et al., 2021[99]) (although accounting for all private investments that takes into account climate risks is impossible. As another concern, the regulatory environment is often not well suited for private investments to reduce and manage their risks. Providing an enabling environment can help engage private sources. For example, providing information about climate-related hazards can help private actors manage their own risk (see discussion below).

Incentives for mitigation activities are different. Reducing climate-forcing agents (e.g. the major greenhouse gases (GHGs) that are well-mixed in the atmosphere) contributes to a global public good, with all the risks of under provision and free-riding that this entails. The transparency and review mechanisms of the Paris Agreement are intended to ratchet up the scale of activity over time, but there is little time left to meet the temperature goal of the Agreement. Moreover, governments often see mitigation as a cost in the present with any benefits flowing in the future, which discourages investments. This is a misguided view: mitigation actions could contribute significantly to important improvements in human well-being at the present in relation to the Sustainable Development Goals. By integrating climate action and action on sustainable development, governments can realise early benefits from health improvements and accessibility, as well as job creation, for example. These benefits then enhance the financial and political case for early action on mitigation. Potential trade-offs, such as energy affordability and competitiveness, would need to be identified and addressed to ensure just transition (OECD, 2019[100]).

All countries will need mitigation action to achieve the climate neutrality. However, in practice, the efforts of many poor developing countries with negligible share of global GHG emissions will not significantly affect risks of losses and damages. The main emitting countries will, however, need to make rapid and

deep cuts to achieve the goal of the Paris Agreement. Therefore, climate finance to cover the incremental costs of clean technologies for developing countries will be needed to accelerate their mitigation action. Encouragingly, rapid deployment of some clean technologies, such as solar PV and on-shore wind, mean that costs for such technologies have plummeted. In some cases, these price drops have made clean technologies cost competitive compared to fossil fuel alternatives. Such renewable technologies can also enhance energy security and reduce reliance on imported fuels in some countries. Small-scale renewables coupled with energy storage can also provide much-needed off-grid electricity where there is no access to electricity grids. In this way, they can help improve health through the use of clean appliances to reduce indoor air pollution (Obeng et al., 2008[101]).

Development co-operation providers can help partner countries manage the risks of climate-related losses and damages in two ways. First, they can use more predictable and flexible financing to meet immediate humanitarian needs. Second, they can be flexible with programming in response to changing circumstances and future climate risks (Bowen et al., 2020[72]; OECD, 2021[102]) (See Section 5.4).

### *Choosing the investment portfolio*

Governments face a choice when determining investments, commonly using cost-benefit analysis (CBA) to guide decisions. Such analysis estimates the advantages and disadvantages of different options usually in monetary terms. This helps determine which path provides the most benefits net of costs. However, CBAs have been criticised based on ethical and methodological grounds. For example, the IPCC Second Assessment Report valued lives in lower-income countries much less than lives in higher-income countries, which caused controversy (IPCC, 1995[103]; Dennig, 2017[104]; Aldred, 2009[105]).

By their nature, CBAs are useful for illustrating trade-offs between different investments (OECD, 2018[106]). However, they have several limitations when it comes to climate change related to both socio-economic and physical uncertainties. Specifically, the frequency and intensity of future extreme weather events and the unknown long-term trajectory of socio-economic development limit the usefulness of CBA. The range of uncertainties and potentially catastrophic hazards cannot be ruled out even in the relatively near future (see Chapter 3). This underlines the need for caution in placing too much weight on CBA. Their outcomes are heavily determined by a single, unknown and normatively-determined parameter – the discount rate (see Chapter 2).

At times, political, socio-economic or cultural values demand action even in the absence of a CBA – as many countries have done in response to the COVID pandemic. In such cases, there is no reason to compare costs with benefits; the action or project is so vital that the desired benefits must be secured. A more appropriate approach is comparing various plans to ensure the project is carried out at least cost. Typically, a cost-effectiveness analysis is easier to carry out than CBAs because it does not need to monetise every aspect (e.g. lives saved, impact of uncertain catastrophic events) (OECD, 2007[107]). Similar to a CBA, the costs are assessed in monetary terms. However, usually only direct costs are considered (although some do consider co-benefits of mitigation choices). If the impact can be measured without being monetised, the policies might be characterised by their cost-effectiveness ratio (OECD, 2007[107]; Tuominen et al., 2015[108]). Box 6.6 also discusses possible tools for valuing investment options. Any decision-making process should be participatory to ensure consideration of diverse perspectives.

Certain adaptation measures might have unintended or unanticipated consequences that increase risks. Adaptation measures that reduce vulnerability may create short-term incentives not aligned with long-term resilience. For example, the cost of building a sea wall depends on the length – rather than the value of assets – of the exposed coastline. This suggests the need to protect only high-value assets in a limited, well-defined area; low-value assets, or assets spread over a large exposed area, are not worth protecting. Such protection then creates the incentive to relocate or concentrate assets in the protected area, thereby increasing exposure (Gibbs, 2015[109]). Relocation of assets to the area is usually in the interest of local

governments as well. More assets provide a larger revenue base, even if additional exposure can be difficult to justify economically (OECD, 2018[110]).

### *The role of government in facilitating action by others*

Governments can reduce their financing needs by providing an enabling environment for the private sector to manage its own risks. Periods of high regulatory uncertainty hinder investment. Investors wait until uncertainty declines or choose to invest in more certain regions or sectors (Baker, Bloom and Davis, 2016[111]; Bloom, 2009[112]). High levels of policy uncertainty also reduce the effectiveness of policies. This is especially the case for sectors most directly affected and in which the investment decisions are the most difficult to reverse (Bloom, Bond and Van Reenen, 2007[113]; Gulen and Ion, 2015[114]). Investment decisions in mitigation and some adaptation are typically difficult to reverse, which makes them especially sensitive to policy uncertainty (Fankhauser and Burton, 2011[115]). This underlines the importance of long-term policy making and a consensus-based vision. A policy that remains relatively unaffected by periods of political uncertainty like election cycles can help mobilise private investment.

Lack of awareness of climate-related hazards is a principal obstacle in reducing and managing the exposure and vulnerability of private actors to these hazards (see Box 5.6 for an example). Perceptions and expectations about risks are among the most important drivers of managing those risks. When unaware households and firms are informed about the climate risks they face, they tend to change their behaviour (Halady and Rao, 2010[116]; Andre et al., 2021[117]). One, undesirable, way to learn about the risks is to experience the impacts first hand. People become more risk averse when impacted negatively by hazards (Sakha, 2019[118]). For example, municipal bonds in California were only priced for disaster risks after the devastating effects of Hurricane Katrina in 2005 because investors required a raise in the risk premium (Fowles, Liu and Mamaril, 2009[119]). Credit rating agencies behave similarly. For example, following Hurricane Harvey, Moody's downgraded Port Arthur from A1 to A2. It referred to its "weak liquidity position that is exposed to additional financial obligations from the recent hurricane damage that are above and beyond the city's regular scope of operations" (Four Twenty Seven, 2018[120]). This is likely to be the case with slow-onset events as well. Farmers, who are typically more vulnerable to changes in the climate than those working outside agriculture, have higher risk perception for changing weather patterns (Schneiderbauer et al., 2021[121]). The financial sector could also be vulnerable to some climate-related hazards (see Box 5.2), which is why central banks and other financial regulators also play a role (see Box 5.7).

#### Box 5.6. Lack of information leads to overvaluation of properties exposed to floods

Properties exposed to floods or sea-level rise (SLR) are a well-documented example of how lack of information about climate-related hazards creates market failures. In multiple countries, property prices do not fully reflect the cost of flood and SLR inundation risks (Sandink, 2015[122]; Storey et al., 2020[123]). For example, in the United States, the property values in flood plains are overestimated by about 10% (Bakkensen and Barrage, 2017[124]; Hino and Burke, 2021[125]). The most relevant explanation seems to be lack of awareness (Shao et al., 2017[126]). Detailed information on hazards, such as maps, became available relatively recently. Consequently, they may not have been internalised by markets. Lack of awareness can be alleviated through personal experience. Once floods materialise and have a direct impact in the area, risks are priced: the property values decrease and demand for insurance increases (Pilla, Gharbia and Lyons, 2019[127]; Storey and Noy, 2017[128]). Neighbouring localities not directly affected by the flood may experience some of this effect (Gallagher, 2014[129]). Investigations also indicate a gradual fading of the effect, as people tend to forget or decrease their expectations over time (Gallagher, 2014[129]). Therefore, better communication about the risks and possible impacts encourages the property market to price homes appropriately and set the right incentives to move or take up insurance (policies and regulation also play an important role, of course). In France, for example, property sales and rentals are required to disclose risk (OECD, 2016[130]).

Nevertheless, climate change awareness itself is not always enough to spur action. Choosing action also often requires knowledge on context-specific opportunities, institutions and impacts (Dessai and Sims, 2010[131]). Since climate change awareness differs across countries and populations, communication approaches need to be tailored (Lee et al., 2015[132]) (see Chapter 2). Where climate change is deeply political, information about the economic and non-economic benefits of climate action would perhaps be a more fruitful communication strategy than detailing climate risks (Bain et al., 2015[133]). The exact formulation of an awareness campaign depends on the audience and message (Bolsen, Palm and Kingsland, 2019[134]).

### Box 5.7. The possible role of central banks

Central banks are one of the most important institutions to provide a safe economic environment for the population. Typically, their mandates include ensuring stability of price levels and employment (Bodea and Hicks, 2014[135]; Blinder et al., 2017[136]; Fontana, 2006[137]). Both of these are affected by climate risks, yet only around one-tenth of the world's central banks have mandates to consider environmental sustainability (Dikau and Volz, 2021[138]). Regulators and supervisors of national (or regional) banking systems and security exchanges have the tools to create an environment that encourages the management of risks. For example, some assets including financial assets are mispriced, as prices do not always reflect the cost of climate risks (IMF, 2020[52]).

Providing disclosure rules for climate sensitivity and making stress tests incorporating climate risk are ways of providing financial stability. Stress tests assume future scenarios, observing how those scenarios would affect individual banks and the financial system based on balance sheets. The Network of Central Banks and Supervisors for Greening the Financial System is one of the main pioneers of assessing physical climate risks on financial risks (NFGS, 2019[139]). Given the nature and complexity of climate change, conducting stress tests for climate risks is challenging. It has only started recently in a few countries (Baudion and Svoronos, 2021[140]). Such tests help identify possible weaknesses of the financial system with respect to climate risks. As such, they could potentially help focus adaptation efforts or highlight areas in need of government intervention.

In 2015, the Financial Stability Board established the Task Force on Climate-related Financial Disclosures (TCFD) to promote and increase consistency in climate-related financial disclosures across countries and companies. The TCFD provides recommendations on disclosures relating to companies' governance, strategy, risk management and metrics. Such transparency contributes to enabling financial markets to price climate-related risks. This, in turn, provides incentives to reduce or manage them, and governments to better target policies (TFCD, 2017[141]; Jones, 2021[59]). Therefore, an increasing number of central banks have started implementing the TCFD guidelines (Bank of England, 2020[142]; European Central Bank, 2021[143]).

### *5.3.2. Risk retention*

Risks can be reduced but unlikely to be eliminated, materialising as losses and damages from climate change. Governments are exposed to losses and damages from climate-related hazards (i.e. contingent liabilities), both as a result of damages to public assets and due to their role as insurer of last resort. For example, Germany recently announced it will provide financial aid to households affected by the 2021 floods, both with and without insurance (Moulson, 2021[144]). Germany is a fiscally disciplined country where insurance is widely available. Moreover, a relatively high share of losses and damages is insured. Yet even in such a country, the government faces large pressures to provide financial aid in the event of a disaster.

A strategy for managing climate risks requires assessment of the potential explicit and implicit contingent liabilities that governments could face in the aftermath of climate and weather events. However, few governments quantify their potential exposures to climate-related contingent liabilities. This is especially true of the implicit liabilities that tend to arise in the aftermath of extreme events where affected parties have limited insurance coverage. Specifically, when the magnitude or scale of risks transcends efforts to reduce them, individuals who may not have insurance or savings to recover losses will absorb the costs. Alternatively, costs will be transferred across levels of governance or stakeholder groups. Examples include the following (Sudmeier-Rieux et al., 2015[145]):

- ***From the private sector to the public sector.*** The former is responsible for large shares of investments that contribute to a country's income. However, these investments also generate many risks to the public sector, which may need to financially support it in response to disasters.
- ***From developing countries to developed countries***. The latter will share the costs, in the form of humanitarian assistance, in response to declared emergencies or development finance supporting low-carbon, climate-resilient development pathways.
- ***From subnational governments to national governments.*** Subnational governments (at the forefront of reducing climate risks through implementation) would transfer costs to national governments (that are ultimately responsible for public safety).

Identifying potential needs for central government financial support for subnational governments remains a key challenge. This is especially the case in countries with decentralised systems of governance. The OECD and World Bank have proposed a framework for managing disaster-related contingent liabilities within public finance frameworks. It involves identification and quantification of potential public finance exposures, and measures to mitigate those risks and to manage remaining residual risks (OECD/World Bank, 2019[146]). Once governments have identified their exposure to climate-related contingent liabilities, they should develop a strategy to ensure that sufficient funding can be accessed to meet spending needs when required. Such a strategy will require the use of multiple instruments including possibly forms of risk retention:

- ***Risk retention – savings and current funds***: Dedicated reserve or contingency funds, such as the national Disaster Management Fund in Mozambique (World Bank, 2019[147]), can absorb climate-related losses within budgetary resources. Such funds could be quickly accessed if need arises. However, setting aside part of the budget for an uncertain future need has both an opportunity cost and a "political" cost. The opportunity cost arises because funds could otherwise be allocated to other spending needs; a political cost is paid if other spending needs are unmet. This political cost also puts reserve funds at risk of diversion to other needs if the funds are not sufficiently protected from political interference. Climate change is likely to exacerbate this challenge. The second option is *ex post* re-allocation of funds, but that also has drawbacks. In case hazard materialises, budget re-allocations can put other priorities at risk. They may require additional legislative approvals, affecting their timeliness.
- ***Risk retention – borrowing***: Prearranged contingent credit facilities are generally well suited for financing medium frequency and intensity hazards that would be costly or politically difficult to address within annual budgets. Several multilateral development banks and bilateral development agencies make contingent credit available to catastrophe-exposed developing countries at relatively low interest rates. Further, they also work with borrowing countries to support risk management in the context of the contingent lending agreements (see Section 5.4). However, this option is also driven by political costs since long tenure make these credits attractive to politicians who are no longer accountable once the credits need to be repaid. In comparison, borrowing or taxation to meet funding needs after an event has disadvantages. Borrowing in the midst of a crisis, for example, might raise fiscal sustainability concerns. Meanwhile, taxation could impose additional burdens on affected households and business, prolonging their recovery. These instruments

should, therefore, only be considered in extreme scenarios where other funding options are not available. Climate change could increase a country's cost of borrowing in the aftermath of a major catastrophe (see Section 5.2.1). For this reason, there have been calls from some countries to include a "hurricane clause" in their debt. Essentially, this is a moratorium on debt repayment when a disaster occurs, making it easier for countries to recover from an extreme weather event (Wigglesworth and Smith, 2019[148]). For example, such clauses were added during the bond restructuring of Grenada in 2015 and Barbados in 2019 (West, 2020[149]) (see Section 5.4).

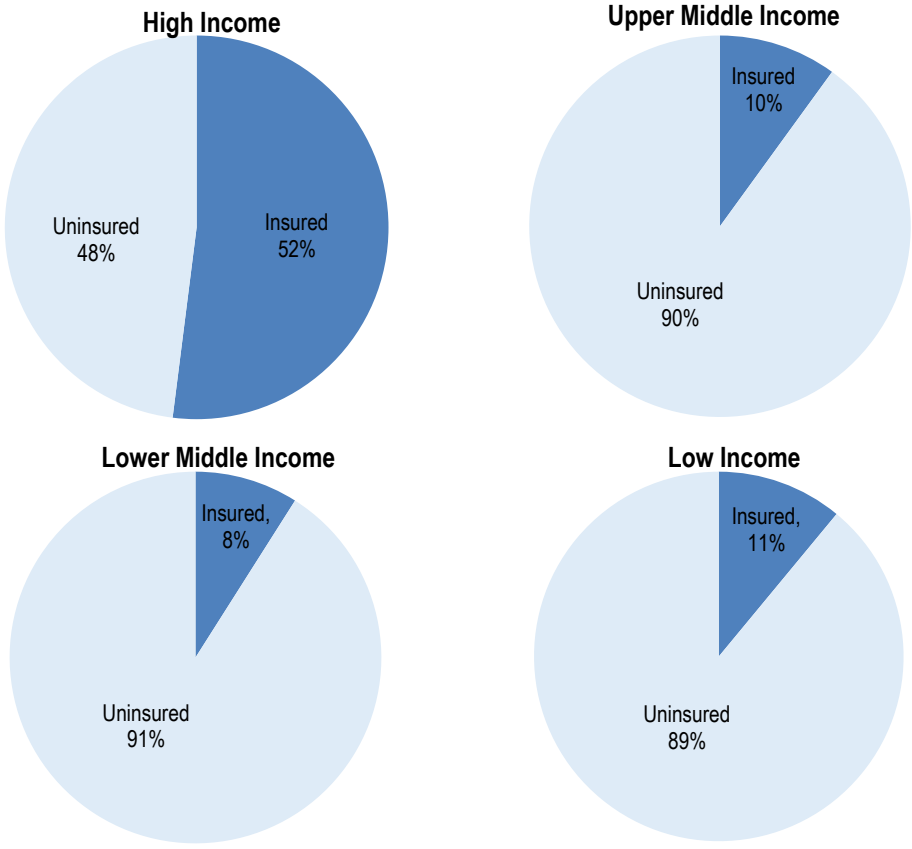
The different approaches play different roles in terms of an overall strategy for funding contingent liabilities. For example, funds for emergency management and support to households and businesses faced with losses in income or revenue are the priority. Such funds are likely to be needed much sooner than funds for rebuilding (non-essential) publicly owned buildings or infrastructure.

### *5.3.3. Risk transfer*

Insurance coverage can reduce the economic consequences of adverse climate impacts. Higher levels of insurance penetration or coverage have been found to reduce contractions in economic activity after disaster events (Melecky and Raddatz, 2011[150]) or eliminate them in the case of full insurance (Von Peter, Von Dahlen and Saxena, 2012[151]). One recent study examined the economic implications of more than 100 past disaster events. It found that countries with higher insurance penetration recover on average within 12 months. Conversely, those with lower penetration face average recovery periods of four years (Cambridge Centre for Risk Studies and AXA XL, 2020[152]). OECD (2018[153]) identified a similar positive impact on post-disaster recovery from greater use of international property catastrophe reinsurance. In addition to absorbing losses and accelerating economic recovery, the development of insurance markets for climate-related hazards can also help improve risk management.

In many countries, the vast majority of economic losses from climate-related extreme events tend to be absorbed through risk retention (i.e. savings, re-allocation of current income or borrowing). Insurance and other risk transfer arrangements[1] have played only a limited role in absorbing public and private losses and damages. Between 2000 and 2019, approximately 42% of all reported economic losses from climate-related events were insured.[2] This overall figure, however, hides large discrepancies between developed and developing countries. In developed (high-income) countries, 52% of reported economic losses from climate-related events were insured. In developing countries, less than 10% of reported economic losses were insured (see Figure 5.4.). For some especially vulnerable countries, this percentage can be as low as 1-3% (Sheehan, 2021[154]).

## Figure 5.4. Insured and uninsured share of climate-related extreme event losses (2000-19)




Note: The calculation includes only events with reported economic and insured losses (i.e. events with no reported insured losses were excluded from the calculation). Countries are classified by income level based on World Bank Country and Lending Groups (World Bank, 2021[155]).
Source: OECD calculations based on data provided by Swiss Re sigma and PCS.

Low levels of insurance coverage of climate-related hazards may be due to factors that generate several effects. They could increase the cost of insurance coverage; limit the willingness of insurance companies to offer coverage; or reduce the premium that households, businesses and governments are willing to pay:

- ***Severity of hazards:*** Low frequency and high impact events with high levels of correlation of losses across policyholders are difficult and costly to insure. The higher severity of catastrophe events also requires insurance companies to hold large reserves to cover potential losses or to purchase reinsurance coverage to protect against catastrophic losses. This increases their premiums and possibly leads to affordability challenges (see below).
- ***Consumer behaviour***: For low frequency events, the willingness of policyholders to pay for insurance coverage may be limited. This is because the probability of facing losses may seem remote. They may also expect government compensation for any incurred losses and damages (McClelland, Schulze and Coursey, 1993[156]).
- ***Lack of financial literacy:*** Another reason for limited take-up is lack of understanding of insurance products and markets among the affected population. People who do not understand insurance products because they lack financial literacy will be unable to assess their value and thus will not purchase them.

*Measures to increase the contribution of insurance to absorbing climate-related losses*

The following provides an overview of policy and regulatory measures that could improve the contribution of insurance markets to absorbing the financial consequences of climate-related losses (Box 5.8).

### Box 5.8. The potential risk management benefits of insurance market development

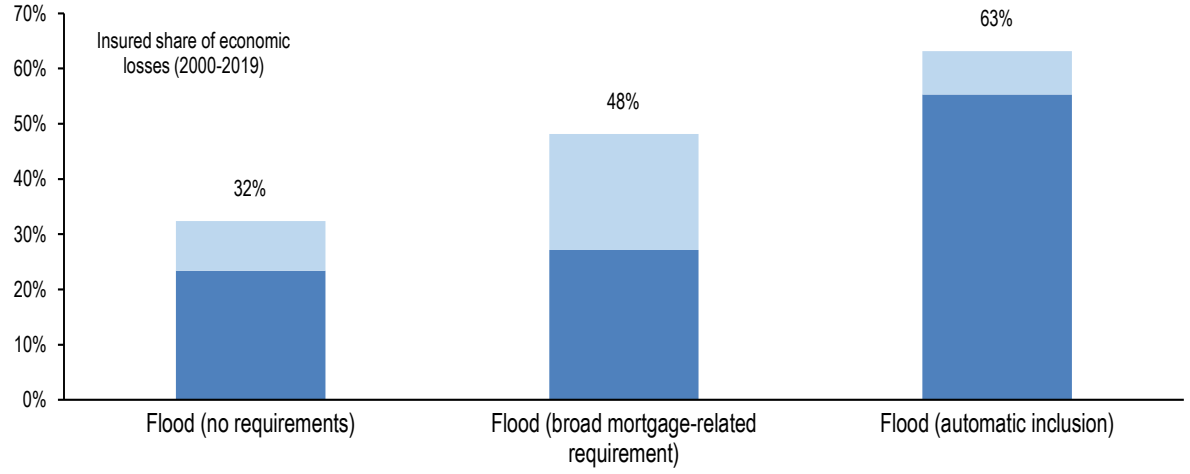
Developed insurance markets that make coverage available for climate-related risks can also contribute to improving overall risk management. Insurance companies use risk assessment tools to underwrite coverage, such as catastrophe models, and to provide probabilistic assessment of future losses. Such tools can be equally applied to decisions on risk mitigation or adaptation investments. Where allowed, insurance premiums that vary by level of risk can provide important incentives for policyholders. Specifically, they could encourage investment in risk reduction and adaptation to benefit from reduced insurance premium costs. For larger policyholders, such as large corporates, insurance companies often offer advice on risk prevention. In addition, insurance companies often play an important advocacy role for land-use planning and building codes to reduce losses on assumed risks.

**Ensuring that households and businesses are offered relevant insurance coverage**

Measures that ensure that insurance companies make coverage for climate-related hazards available, encourage take-up by policy holders at risk as a result (OECD, 2021[157]; OECD, 2016[158]). In a mandatory offer, for example, insurance companies are required to make insurance coverage available for specific risks. Examples of take-up include automatic inclusion in property insurance or opt-out requirements. In some countries, banking regulators require banks to ensure their borrowers have insurance coverage for relevant risk for properties with outstanding mortgages. This protects the financial system against post-catastrophe borrower defaults. Figure 5.5 shows the level of insurance coverage for past flood-related losses in OECD countries. This is based on differences in requirements on including such coverage in property insurance policies and for having such coverage on properties with mortgage loans. Box 5.9 illustrates the consequences of how insurance is offered based on the experience of India and Myanmar.

Households with higher level of financial literacy are more likely to take insurance in both developing and developed countries (Liu et al., 2021[159]; Weedige et al., 2019[160]). Actors can decide to take up insurance based on similar decisions of others for several reasons. First, some types of insurance are likely to become cheaper as more people buy it because risks can be spread more evenly. Climate hazards like SLR, however, may in the future strain this model, because SLR will happen simultaneously on every coastline, potentially making risk transfer more difficult and costly (Santeramo et al., 2016[161]). Second, a person taking up insurance makes it more likely for others to purchase insurance (Millo and Pasini, 2010[162]). Policy makers are therefore well placed to raise awareness about risk management options and raise financial literacy by offering financial education. Education programmes will likely be more effective if they recognise the differences of individual preferences, circumstances and financial knowledge (Amagir et al., 2017[163]). This would form a basis, not only of insurance, but more generally of climate risk management literacy.

## Figure 5.5. Insured share of flood losses by offer or purchase requirement (OECD countries)




Note: The chart shows two estimates: i) the total share of economic losses insured for all events that occurred between 2000-19; and ii) the simple average of the share of losses insured for each individual event. The figure shown refers to the higher of the two estimates. Information on the form of coverage offer for flood insurance is from OECD (2016[130]). OECD countries are classified as follows: no requirements includes Australia (storm surge), Canada, Chile, Colombia, Czech Republic, Germany, Greece, Italy, Japan, Mexico, New Zealand, Portugal and Turkey; broad-mortgage related requirements includes Ireland and the United States; automatic inclusion includes Australia (rainfall flooding), Belgium, Denmark, France, Poland, Spain, Switzerland and the United Kingdom.
Source: OECD calculations based on data on natural catastrophe losses provided by Swiss Re sigma and PCS.

### Box 5.9. Insurance for climate-related catastrophe risks in India and Myanmar

India and Myanmar have similar levels of overall property insurance penetration (property premiums as a share of GDP of approximately 0.06%). However, they have different levels of insurance coverage for climate-related catastrophe hazards. In India, approximately 10-18% of economic losses from floods and storms (including cyclones) between 2000 and 2019 were insured relative to 1-6% in Myanmar. In India, Standard Fire and Special Perils policies offered to commercial/industrial and residential policyholders usually include (automatic) coverage for storm, typhoon, cyclone, tempest, tornado, hurricane, flood or inundation (although policyholders can opt out). As a result, the vast majority of households and business with property insurance also have coverage for damages from storms and floods. In Myanmar, separate coverage endorsements are required for storm, typhoon, hurricane, tempest, cyclone, and flood and inundation. This means that households and businesses with property insurance policies must be offered this additional coverage and choose to acquire it. However, some lending banks do set requirements for adequate insurance coverage for properties with mortgages.

Source: (OECD, 2020[164]).

#### Addressing insurance affordability challenges

Low insurance coverage highlights the need for governments to address insurability challenges. Government needs to create conditions under which insurance remains a viable option for climate-related hazards. Such challenges are already emerging in several countries (see Box 5.10), possibly due to potential hazards impacting many policyholders simultaneously. The combined impact of hazards

decreases the benefits of diversification on which the insurance business model is based. In some cases, hazards might become uninsurable as private insurers refuse to cover them. Private insurance market withdrawals might be temporary. In the United States, for example, private flood insurers are returning to the market because they can better quantify these risks. If the demand for insurance increases, households and business may also be willing to pay the higher premiums to the insurance companies supplying it.

### Box 5.10. Insurability challenges of climate-related hazards in the United States

A number of large catastrophic wildfires in recent years has led to insurability challenges within the United States, state of California. Households in areas of high risk of wildfire have faced premium increases and insurer-initiated non-renewals of coverage. In response, the California Department of Insurance has imposed moratoriums on non-renewals (California Department of Insurance, 2019[165]; Insurance Journal, 2020[166]). In addition, it held a virtual investigative hearing in October 2020 to find a solution to the challenges in the insurance sector (Jergler, 2020[167]). There are also recent reports of insurability challenges related to hurricane (wind) coverage in the state of Florida. These include reports of non-renewals by insurers (Insurance Journal, 2018[168]), requests for regulatory approval of large premium rate increases, and an increase in policy count in 2020 and 2021 at Citizens (a publicly owned residual insurer) (Saunders, 2020[169]; O'Connor, 2021[170]).

Premiums based on level of risk to the covered building or infrastructure asset can provide an important pricing signal on risk exposure. This should encourage households and businesses to reduce their risk (i.e. alleviate moral hazards) to benefit from lower insurance costs. The effectiveness of insurance pricing to reduce risks depends on a number of factors. These include the nature of the hazards; the cost of effective mitigation measures; and the ability of insurance companies to measure the risk reduction and offer a lower premium. However, risk-based premiums may be unaffordable for households or businesses facing high levels of risk exposure or limited capacity to pay for insurance coverage. In such cases, various types of catastrophe risk insurance programmes may offer a solution. In one option, insurance companies (or a single public insurer) pool catastrophe exposure to build a diversified portfolio of risks that reduces the aggregate cost of reinsurance coverage. In another, the programmes provide some form of government backstop for extreme losses. Both options ultimately support the affordability of insurance coverage for hazards. The existence of a catastrophe risk insurance programme tends to be correlated with higher levels of insurance coverage of economic losses from hazards. This is especially the case in countries with lower levels of property insurance penetration.[3]

One response to the affordability challenge is a government-backed mandatory insurance scheme or a public insurance provider. Such insurance could be cheaper, than ones provided in a purely private insurance market because insurance penetration – and hence the ability to spread risks – is higher. In theory, a public insurer could be better informed than its private counterpart. As a public body, it could have access to more information about risks facing the insurance holder (such as building codes). It could also integrate insurance policies into the wider climate strategy. However, this information only decreases moral hazards if the insurance premiums are risk-based. This is often considered to be politically unfeasible in case of public insurance schemes (Paleari, 2019[171]). For example, Romania introduced compulsory disaster insurance in 2008 whose premium depends on building quality. This provides some incentive to improve the physical resilience of buildings. However, it does not address other types of moral hazards, such as decreasing exposure or other vulnerabilities (Hanger et al., 2017[172]). Governments might also choose to provide insurance coverage to a selection of citizens. The government of Colombia, for example, included uninsured buildings of the poorest two social groups as a government responsibility (Colombia Ministry of Finance and Public Credit, 2011[173]; Gamper et al., 2017[174]). Despite their shortcomings, mandatory schemes are sometimes preferred to budget re-allocations since the uncertain and *ex post* nature of re-allocations do not provide incentives to decrease moral hazards. According to theoretical

investigations, the most efficient and equitable intervention may be a private insurance market partially subsidised by the government. These might include government-backed vouchers or rely increasingly on public-partnership programmes (Hudson, Botzen and Aerts, 2019[175]).

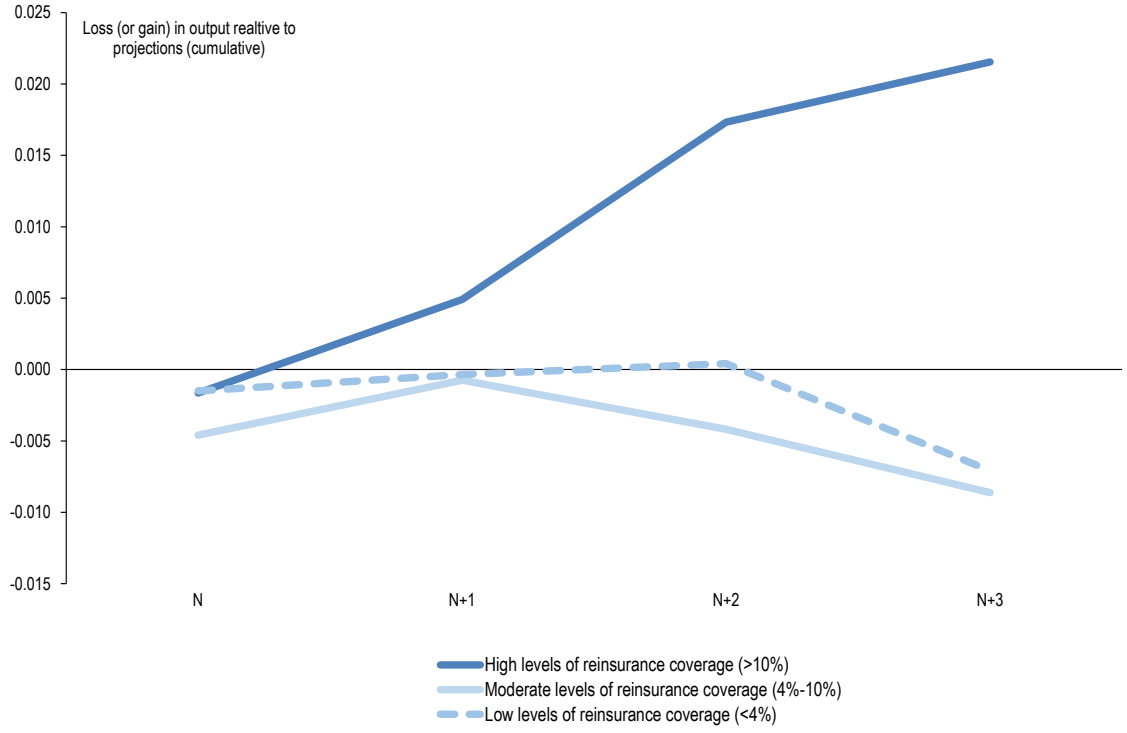
Two additional points are worth making. First, moral hazards might not arise with insurance at all. Insurance holders may be sufficiently risk averse to continue reducing risk, even with insurance coverage (Hudson et al., 2017[176]; Mol, Botzen and Blasch, 2020[177]). Thus, risk aversion of the population is a key ingredient when designing a policy intervention. Second, the uninsurability of assets is not unanimously negative. If assets cannot be insured, there is an incentive to move them from the uninsured location or at least not to place assets in those locations. These incentives themselves, however, are not always enough. In several countries, properties continue to be built in exposed coastal areas or in areas at risk of wildfires. This calls for dissemination of information and raising awareness (see Section 5.3.1).

#### *Maximising access to international reinsurance and capital market capacity*

Global reinsurance and capital markets play a critical role in providing an additional layer of loss absorption capacity and diversifying catastrophe risks internationally. This allows for international markets (and some investors) to absorb some portion of the losses from a catastrophic event. It also diversifies the burden away from the domestic financial system. However, several countries impose various restrictions on the transfer of risk to reinsurance and capital markets (and, particularly, for cross-border risk transfer). For example, countries like India and Indonesia limit the amount of risk that can be transferred to reinsurance companies without a local presence. Other countries do not recognise risk transfer to capital markets as an effective way for insurers to reduce the amount of capital they hold (OECD, 2018[153]). As a result, catastrophe (including climate) risks are concentrated in the domestic market or domestic reinsurance companies. This creates risks to the broader economy, limiting the ability of insurance companies to fully capitalise on the benefits of risk transfer to reinsurance markets.

Risk transfer to reinsurance markets provide potentially large benefits. The economy recovered much more quickly in countries where international reinsurance markets absorbed a larger share of losses (OECD, 2018[153]) (see Figure 5.6.). Ultimately, greater access to the capacity available in international reinsurance and capital markets may be necessary. Such access should provide insurance companies with enough protection to manage the expected increase in losses from future climate-related risks.

## Figure 5.6. Cumulative loss (or gain) in GDP relative to pre-event projections for different levels of reinsurance coverage




Note: The chart shows actual (post-catastrophe) growth relative to (pre-catastrophe) growth projections at impacted country-level for three categories of catastrophe events: i) those with high levels of reinsurance coverage (where reinsurance covered more than 10% of all reported economic losses); ii) those with moderate levels of reinsurance coverage (where reinsurance covered between 4% and 10% of all reported economic losses); and iii) those with low levels of reinsurance coverage (where reinsurance covered less than 4% of all reported economic losses.
Source: (OECD, 2018[153]).

### Insurance for public exposures

Similar to insurance coverage for privately owned buildings, indemnity insurance will normally reimburse most costs incurred to rebuild public buildings and infrastructure to its original form. Some governments (national or subnational) can also acquire financial protection for more general funding needs following a climate-related hazard. This type of financial protection is generally triggered based on the parameters of an event. For example, wind speed or rainfall might exceed a pre-defined level or a modelled-loss might exceed a pre-defined amount. Such protection, known as parametric insurance, provides a quick source of funding and liquidity.

The main advantage of parametric insurance is its simplicity. Coverage can be underwritten based solely on the probability of an event that meets the thresholds for a pay-out occurring at a given location. Further, claims payments are based solely on the occurrence of the triggering event. The main disadvantage of parametric insurance is the potential for significant basis risk. In other words, the coverage might be triggered even if no loss is incurred. Similarly, the policy may not be not triggered when a loss has occurred (e.g. if the specific threshold has not been met). Improvements in the accuracy of risk assessment from new data sources and analytical techniques should reduce this risk over time (ADB and OECD, 2020[178]).

Catastrophe bonds, for example, are a form of debt issued by a “transferor” (a country, for example) through a special purpose entity to transfer risks to capital market investors. If a triggering event occurs,

some portion of the funds placed in a special purpose entity is made available to the transferor, and the bond defaults.

Risk pooling may lower the cost of risk transfer tools. Several regional risk pooling arrangements have been established, including in the Caribbean and Central America, the Pacific Islands, in Southeast Asia and in Africa (ARC) (see Box 5.11). These arrangements usually provide a specified amount of quick funding to support recovery needs rather than reconstruction; pay-out is based on some form of parametric trigger. Participating countries benefit from sharing the cost of necessary modelling. They also benefit from more affordable reinsurance coverage based on the diversification benefits achieved by approaching the reinsurance market as a collective. Some programmes like ARC require contributing countries to develop *ex ante* contingency plans on how to use the funds. These define disbursement processes and responsibilities, decreasing uncertainty in case of an event.

Investing in better quality models could improve effectiveness of risk pools as could extending coverage for different types of extreme events. For example, ARC introduced coverage for tropical cyclones in 2020. Other improvement measures are rule-based processes to manage unmet expectations, and possibly including secondary triggers to reduce basis risk. Integrating risk pool disbursements into social protection measures could also improve efficiency, shorten recovery times and help reduce hardship within vulnerable communities. New, sustained support from donors and development banks could further expand risk pools, providing an alternative to sporadic donor funds designated for finance-specific instruments (Martinez-Diaz and McClamrock, 2019[179]).

Governments can also take advantage of economies of scale by pooling the acquisition of insurance coverage for public assets. They can benefit from lower cost access to insurance or reinsurance markets by seeking coverage for a pool of assets (with different risk characteristics). Several countries have established public insurance or compensation arrangements at the national and subnational level. These provide insurance coverage for public assets and subsequently transfer some of the risk assumed to private reinsurance markets.

### Challenges for insurance in managing the risks of losses and damages

The growing impact of climate change on the insurance and reinsurance industry is well understood (Krauss et al., 2019[180]). As losses grow, the need for additional funding rises, increasing insurance premiums. One estimate predicts that global premiums collected for property insurance will raise by USD 149 billion to USD 183 billion by 2040 (i.e. an 33-45% growth relative to 2020). This estimate aims to account for the rise in insured catastrophe losses, including as a result of climate change.

Globally linked weather events may also become more difficult to diversify (Herweijer, Ranger and Ward, 2009[181]; Boers et al., 2019[182]). Insurers may also withdraw coverage if the increase in premiums needed to cover losses is greater than the willingness (or capacity) of households and businesses to pay. As a result, insurance will become more progressively expensive, making it difficult for developing countries and poor households to obtain coverage (Duus-Otterström and Jagers, 2011[183]), exacerbating inequalities. This underlines the need for risk reduction to maintain the insurability of climate-related risks by decreasing exposures and vulnerabilities.

### Box 5.11. The African Risk Capacity

The African Risk Capacity (ARC) is a regional risk pool established by the African Union. It helps African governments improve their capacities to plan, prepare and respond to extreme weather and climate events through collaboration. To that end, it helps countries harness state-of-the-art technology, as well as gain access to innovative finance mechanisms. While droughts are common across Africa, the ARC assumes they will not likely occur in the same year in all parts of the continent.

In return for an annual premium payment, participating countries can access pay-outs if a pre-determined triggering event occurs. The risk transfer parameters selected by each country determine the pay-out threshold. These parameters include the following:

- ***Deductible/attachment point***: the risk the country wants to retain and manage using other resources.
- ***Exhaustion point***: the maximum modelled drought risk that the country wishes to cover in the insurance policy.
- ***The limit***: the maximum pay-out for a country in case of an extreme drought.
- ***Ceding percentage***: the percentage of the total modelled risk the country wishes to transfer to the pool.

The ARC on average covers USD 30 million per country per season for drought events that occur with a frequency of one in five years or more (though the exact amount varies widely). The ARC makes pay-outs to the national treasury within two to four weeks of the end of the rainfall season. Subsequently, the treasury can use the pay-out to support affected households using a pre-approved contingency plan. The ARC expands climate risk insurance coverage through ARC Replica, an insurance product for the World Food Programme and other humanitarian partners. It aims to improve the effectiveness of emergency humanitarian response in vulnerable African countries prone to climate risks (WFP, 2018[184]).

To be eligible for the ARC, participating governments must develop a contingency plan. This outlines how they will use pay-outs quickly and effectively. It also describes how they will reach those most impacted by the extreme weather event in an efficient and timely manner to protect livelihoods. Whereas the funds ideally should be implemented within 120 days of an ARC pay-out, funded activities should be completed within six months.

Providers of development co-operation, along with participating African Union members, can contribute to the ARC through annual premiums. For example, as part of its COVID-19 Emergency Programme, Germany provided premium payments in 2020 for the ARC to support up to 20 million people in the 2020-21 agricultural season (BMZ, 2021[185]). The United States, the United Kingdom and Switzerland have also supported ARC member states and replica partners with premium financing.

Source: https://www.africanriskcapacity.org.

## 5.4. Role of development co-operation in supporting developing country approaches to reduce and manage the risks of losses and damages

The challenges outlined in previous sections highlight the importance of access to and use of diverse sources of finance by all stakeholders to reduce and manage the risks of losses and damages. This section explores the role of development finance from bilateral and multilateral providers, including operations

linked with climate-related humanitarian assistance. It first lays out the development finance landscape that directly or indirectly supports developing country efforts to reduce and manage climate risks. This is complemented by a short discussion on how providers are integrating risks of losses and damages across their strategic and programming frameworks. Next, it outlines insights on the finance commitments by bilateral and multilateral providers to address the risks of losses and damages from climate change. This analysis builds upon a methodology developed for this report. Finally, the section highlights broader issues that providers need to consider, ending with the role of development finance in the context of fiscal sustainability.

Lack of consensus on a definition of losses and damages politically and in the academic literature (Doelle and Seck, 2020[186]; Toussaint, 2021[187]) permeates to how these concepts are understood in the context of development co-operation. In the broadest understanding, all efforts to curb the global average temperature increase, and to adapt to the adverse effects of climate change, can help reduce and manage the risks of losses and damages from climate change (UNFCCC, 2019[90]). Improved public sector financial management, for example, is not generally defined as climate action. However, it can still help mobilise domestic resources for climate change adaptation (MOPAN, 2021[188]). Other interventions that fall outside the climate sphere may indirectly contribute to adaptation and disaster risk reduction. Examples include education, broader poverty reduction efforts and social protection. Such a broad approach, however, does not shed light on the extent to which providers are considering and addressing the risks of losses and damages in their programming and financing.

A narrower approach informs the analysis in this section, building upon elements discussed and agreed upon through the United Nations (UN) climate negotiations. Article 8 of the Paris Agreement highlights the importance of averting, minimising and addressing loss and damage associated with the adverse effects of climate change. It highlights eight areas of co-operation and facilitation to enhance understanding, action and support (UNFCCC, 2015[189]). It also reaffirms the Warsaw International Mechanism for Loss and Damage (WIM) as the main vehicle for taking these issues forward. Subsequent decisions agreed by countries through the international climate process have further clarified what constitutes different types of losses and damages. Countries are not obliged to separately track or report finance associated with activities for reducing and managing the risk of losses and damages. Instead, support for these activities is partially tracked through established adaptation finance reporting mechanisms such as biennial reports, national communications, biennial update reports and (under the Paris Agreement) biennial transparency reports.

### *5.4.1. Strategic and programming approaches*

#### *Climate-related funds and programmes*

The development finance landscape supporting efforts to reduce and manage the risks of losses and damages from climate change includes both bilateral and multilateral providers. This section briefly outlines some key components that fall under the broader heading of multilateral finance, which includes climate-related funds and programmes. The United Nations Framework Convention on Climate Change (UNFCCC) has a number of dedicated financial mechanisms to provide finance for climate action in developing countries. The Green Climate Fund (GCF), an operating entity within the UNFCCC, is mandated to support developing countries take climate action. This includes support to country approaches to avert, minimise and address loss and damage through existing investment frameworks and funding windows (Green Climate Fund, 2021[190]; Kempa et al., 2021[191]). This support reflects decisions made in the context of the climate negotiations. The GCF is also committed to spend half of its resources on climate change adaptation (in grant-equivalent terms).

Other operating entities have been entrusted to the Global Environment Facility (GEF). The GEF Trust Fund, for example, supports enabling activities, notably for reporting on adaptation and other climate

change activities under the Convention. The Least Developed Countries Fund supports preparation and implementation of risk assessments and early-warning systems. Meanwhile, the Special Climate Change Fund finances non-LDC pilot or demonstration adaptation activities. In addition, the Adaptation Fund, created under the Kyoto Protocol, supports climate change adaptation projects and programmes in vulnerable developing countries. Finally, the Climate Investment Funds, through the Pilot Program for Climate Resilience, supports the integration of climate risk and resilience into national development planning and implementation.

Different actors play complementary roles in providing climate finance to partner countries. Multilateral and regional development banks often focus on support for larger investments through concessional loans, working with a broad range of partners including from the private sector. Development finance institutions, such as France's AFD or Germany's KfW, also finance large infrastructure projects through concessional loans. Other multilateral and international organisations, such as the UNFCCC financial mechanisms described above, can play different roles, depending on their mandate and financial resources. Bilateral providers of development finance may be relatively well placed to support partner countries in integrating climate change into their national development planning processes. They do this through pilot initiatives, capacity development, technical assistance and technology transfer. Bilateral providers play an equally important role in provision and delivery of humanitarian assistance in response to a climate-related disaster.

### *Access to finance*

The availability of funds does not guarantee access to them. Access is limited by several factors. Accreditation procedures are often complex and differing across funds. Application processes and fiduciary requirements often place a disproportionate burden on institutions in developing countries; yet these countries often have limited administrative and technical capacities. Climate-related funds and programmes are working to address access issues. The GCF, for example, has introduced direct access modality, following the lead of the Adaptation Fund. However, there is growing recognition that more action is needed and that structural issues go beyond the design of individual funds. Environments or credit ratings of individual countries, for example, have also been identified as issues.

In response to these perceived shortcomings of the international development financing architecture (UK Government, 2021[192]; LIFE-AR, 2019[193]), different stakeholders are highlighting the urgent need for enhanced and simplified access to finance to complement the provision and mobilisation of climate finance. To address this challenge, the LDCs Initiative for Effective Adaptation and Resilience (LIFE-AR) seeks to deepen climate knowledge and access to predictable and reliable finance – domestic, international, public and private. Such access would be guided by the principles of inclusion, participation, local action, justice, equity and leaving no one behind (LIFE-AR, 2019[193]). The United Kingdom, in its capacity as incoming COP26 President, has established a Taskforce on Access to Climate Finance. Co-chaired by the United Kingdom and Fiji, the taskforce highlights four principles for effective access (UK Government, 2021[192]): i) national ownership and co-ordination; ii) an aligned, co-ordinated and programmatic response by providers of development co-operation; iii) pragmatism and co-ordination with initiatives; and iv) inclusivity. This is consistent with calls made by the Ministers of Finance of the Vulnerable Twenty Group (V20) for "more robust support and synergistic engagement of the international economic community in support of climate-resilient economies" (V20, 2021[194]).

### *Strategic and programming frameworks*

The focus and approach of development finance providers is informed by increased emphasis of the climate negotiations on Loss and Damage from climate change but also in response to the felt climate impacts of developing countries. One example is the 2021 commitment by the G7 to strengthen support for prearranged risk finance, including through the Centre for Disaster Protection's Crisis Lookout

Campaign. Providers do not use a harmonised terminology. In fact, they often integrate support to reduce and manage the risks of losses and damages into established adaptation, climate resilience and disaster risk reduction initiatives. However, some providers are explicitly referring to losses and damages in their strategic frameworks and programmes:

- The German development agency (GIZ) introduced the *Global Programme on Risk Assessment and Management for Adaptation to Climate Change (Loss and Damage)* in 2013. It aims to support partner countries in developing and implementing measures to "avert, minimise and address" losses and damages from climate change and to mainstream these approaches (GIZ, 2018[195]). Additionally, in its new strategy on climate and energy, the German Federal Ministry for Economic Cooperation and Development explicitly refers to the issue of climate-related loss and damage. The strategy refers to concrete ways to support partner countries, such as promoting climate and disaster risk financing measures; supporting EWS; and providing targeted support to climate risk analyses and management, and capacity- and knowledge-building relating to climate-induced migration and displacement. It also acknowledges the need for a more systematic approach to deal with the vulnerability of partner countries. For example, under the umbrella of the InsuResilience Global Partnership (IGP), KfW Development Bank is supporting a number of relevant funds. These include the InsuResilience Solutions Fund and the InsuResilience Investment Fund. The IGP aims to scale up Climate and Disaster Risk Finance and Insurance solutions in developing and emerging countries (see Box 5.12).
- Denmark's new Strategy for Global Climate Action aims to "contribute to preventing and reducing the risk of losses and damage as a result of climate change, and to help with rebuilding efforts in the wake of climate disasters" through green development co-operation (Government of Denmark, 2020[196]). Denmark, through its Danish International Development Agency (DANIDA) had been helping address climate-related losses and damages before this strategic change. In northern Kenya, for instance, DANIDA supports pastoralists forced to abandon their traditional way of life that includes moving their livestock in search of water and land to graze. It does so through vocational training of herders who have lost their livelihoods, in line with Kenya's National Climate Change Action Plan (Ministry of Foreign Affairs of Denmark, 2020[197]).
- The World Bank's *Climate Action Plan (2021-25)* includes a financing strategy that covers climate change adaptation and losses and damages. It emphasises catastrophe-linked bonds (CAT-bonds) that offer pay-outs when, for example, tropical cyclones meet pre-defined criteria under the bond terms (World Bank, 2021[198]). The World Bank also helped establish programmes such as regional risk pools (e.g. the Caribbean Catastrophe Risk Insurance Facility and the Pacific Catastrophe Risk Assessment and Financing Initiative). In addition, it runs other programmes such as the Global Risk Financing (GRiF) and the Global Facility for Disaster Reduction and Recovery with support from a range of donors. The GRiF aims to pilot and scale up support to strengthen the resilience of vulnerable countries to climate and disaster shocks. To that end, it enables earlier and more reliable response and recovery through prearranged risk financing instruments, including market-based instruments like insurance.

Providers are also using risk assessment to inform responses to climate change. As highlighted in the UNFCCC Suva expert dialogue, this includes the use of risk assessments relevant to averting, minimising and addressing climate impacts. It also includes ongoing work in the areas of open source risk assessment tools to support decision making, national risk profiling and probabilistic risk modelling (UNFCCC, 2019[90]). Climate risk screening tools provide a preventive approach to managing climate and disaster risks by helping to integrate resilience measures into the design of initiatives (World Bank, 2021[199]; AfDB, 2014[200]; ADB, 2014[201]; USAID, 2017[202]; BMZ, 2019[203]). The factors driving climate risks and the associated uncertainties are complex. Consequently, the application of climate risk screening tools faces certain technical challenges (see Chapter 2).

Some providers have developed *ex post* tools to assess needs following climate-related and other hazards. For example, the UN Development Group, the World Bank and the European Union jointly developed the Post-Disaster Needs Assessment (PDNA) in 2008. PDNAs provide a comprehensive assessment to estimate losses and damages, identifying needs of the affected population. They plan the restoration of damaged infrastructure, houses, livelihoods, services, governance and social systems with emphasis on reducing future disaster risks and building resilience. The methodology shapes investment decisions of providers such as the Islamic Development Bank (IsDB, 2019[204]).

### Box 5.12. InsuResilience Global Partnership

The InsuResilience Global Partnership (IGP) is an international alliance supporting resilience to climate risks. It aims to help protect the lives and livelihoods of poor and vulnerable people through Climate and Disaster Risk Finance and Insurance (CDRFI) solutions. IGP grew out of the 2015 G7 InsuResilience initiative. It was launched by a group of industrialised countries and members of the G20 and V20 group of vulnerable countries in 2017 at the UNFCCC COP23. IGP works within the international resilience community for mobilising action, raising ambition and fostering coherence of CDRFI contributions across a diverse range of partners. It brings together over 100 members from different stakeholder groups (countries, private sector, multilateral organisations, development banks, civil society and academia).

Since 2017, different actors have met annually through the Partnership Forum, which provides a platform to exchange on best practice, key learnings and future directions of the community on Climate and Disaster Risk Finance and Insurance. Guided by its Vision 2025, presented at the UN Climate Action Summit 2019, IGP enables faster, more reliable and cost-effective responses to climate shocks and disasters, shifting from reactive crisis management to proactive risk management. One of its main targets is to cover 500 million poor and vulnerable people annually by 2025. In 2020, 137 million people in more than 100 countries were reached through 22 implementing programmes under the Forum.

Source: (BMZ, 2021[185]; InsuResilience Global Partnership, 2021[205]).

### *5.4.2. Humanitarian assistance in response to losses and damages*

Humanitarian assistance plays an important role in response to both slow-onset changes and extreme events. It takes the form of relief, as well as in-kind support such as food, water, medicines and tents. While post-disaster humanitarian assistance from donors is crucial, the timing and volume can be unpredictable and slow to mobilise (Bowen et al., 2020[72]). Development co-operation providers can help partner countries manage the risks of climate-related losses and damages in several ways. First, they could use more predictable and flexible financing to meet immediate humanitarian needs. Second, their interventions could adapt to changing circumstances and future climate risks (Bowen et al., 2020[72]; OECD, 2021[102]). Providers are also increasingly integrating anticipatory action into development (German Federal Foreign Office, 2020[84]; Levine et al., 2020[85]; Kuriyama et al., 2020[86]) and humanitarian programmes (UK Government, 2021[87]). Some bilateral and multilateral providers have started to use climate vulnerability indexes to guide investment decisions (see Box 5.13).

### Box 5.13. Climate vulnerability indexes and frameworks

Using climate vulnerability indexes may be useful when deploying humanitarian assistance *ex ante* where providers may not have a field presence. The Fragile States Index, for example, highlights social, economic, climate and other vulnerabilities that contribute to the risk of state fragility (The Fund for Peace, n.d.[206]). For its part, the Global Climate Risk Index maps levels of exposure and vulnerability to extreme weather events that countries can use as warnings to prepare for future events (Germanwatch, 2021[207]). The OECD States of Fragility programme helps providers explore approaches to development co-operation so they can achieve greater resilience in fragile and conflict-affected countries. This programme includes the concept of environmental fragility, which encompasses climate-related risks. It shows how providers can factor in these concepts when programming activities in affected countries (OECD, 2020[208]). Such indexes and frameworks help integrate climate-related considerations into regular development co-operation activities, enhancing the contribution of the investments to resilience and sustainable development.

Section 5.3 highlighted the trade-offs governments face when determining the appropriate financing mechanisms in the context of losses and damages (e.g. *ex ante* dedicated reserve funds compared to *ex post* budget re-allocation). Such trade-offs can emerge given the potential risk of diverting resources from broader investments in development. Development co-operation providers face a similar challenge. They must weigh the trade-off between rapid humanitarian assistance and support for recovery versus medium- to longer-term investments to achieve sustainable development (Fanning and Fullwood-Thomas, 2019[209]). Yet development co-operation providers often plan and implement their development interventions, including on climate change, separately from their humanitarian assistance. Different teams or agencies frequently manage the two types of support according to distinct rules, decision-making processes, programming cycles and budget envelopes (OECD, 2019[210]). With mounting losses and damages, the need for greater collaboration across humanitarian and development actors is increasingly recognised (United Nations, 2016[211]). In fact, collaboration between the humanitarian and development co-operation communities will require more synergies. Providers must respond to people's immediate needs, while contributing to their resilience in the wake of both already experienced and projected hazards. They can do this by planning and investing early in preparedness, as noted by the G7 (UK Government, 2021[212]), through their choices of programming, and through early and sustained engagement with local capacities (see Box 5.14).

### Box 5.14. Implications of climate change for humanitarian action

Climate-related hazards are among the top drivers exacerbating the need for humanitarian assistance in protracted crises. In addition, the global landscape of humanitarian action has expanded with a proliferation of non-traditional response plans. Humanitarian organisations, local civil society groups and volunteer responders have been on the frontline dealing with the impacts and risks of the climate crisis to communities, lives and livelihoods. The widening gap between need and ability to respond will overwhelm both local and international levels. Therefore, in addition to increased resources, there is an urgent need to adjust the modalities of humanitarian support to contribute directly to global adaptation and community resilience. As input to this process, the United Nations Office for the Coordination of Humanitarian Affairs recommended five ways the humanitarian community can adjust to this growing need:

- ***Act early***: Offsetting the increase in humanitarian need requires getting ahead of the crisis, through preparedness and disaster risk reduction, scaled-up system-wide anticipatory action, and ambitious risk financing and insurance models.
- ***Act long-term***: Long-term action requires long-term funding and programming and an expansion of the humanitarian toolkit to include support, for example, for social protection, effective climate governance structures, climate change adaptation and mitigation. Multi-year funding and programming has lower operational costs and provides a more effective response. This helps develop capacity and enhances resilience at the local level.
- ***Act together***: Addressing increasing fragility, vulnerability and need requires new ways to engage the capacities and expertise of a wider range of actors. Interconnected and co-ordinated networks to reduce climate risk and facilitate climate change adaptation requires time, breaking down systemic silos and forging new, broader partnerships. Networks should include, notably, local-level humanitarian actors, climate science and academic sectors, and the private sector.
- ***Act inclusively***: An equity lens is indispensable to programming, funding and policy making that Does No Harm and addresses the disproportionate impact of climate change and pre-existing inequalities. This requires humanitarian and long-term programmes targeting the most vulnerable and marginalised to go hand in hand. They should ensure equitable access to services that address the unique vulnerabilities of people in need, while empowering them in the process.
- ***Act as translators***: More effective translation of science and research is needed to increase understanding of climate change impacts and adaptation strategies across local communities, governments, sectors and donors. The humanitarian community must equally understand the future threats of the climate crisis. It needs to adapt its operating systems and mechanisms to address expanding demands without increased resources.

Source: UNOCHA (forthcoming), *No Return to Normal: The Growing Humanitarian Climate Crisis*, UNOCHA Policy Branch, New York.

### *5.4.3. Trends in development finance addressing losses and damages*

This section explores trends in development finance for approaches that reduce and manage the risks of losses and damages. The analysis covers ODA commitments by members of the OECD Development Assistance Committee (DAC) and multilateral providers for 2018-19. It draws on the OECD Creditor Reporting System (CRS), a database with project-level information for each development co-operation activity funded by DAC members and multilateral providers. Each project in the CRS is categorised by sector and information on provider and partner countries, financial instruments used and amounts

committed, among other fields. The CRS also tracks policy commitments through a system of policy markers, including on climate change, disaster risk reduction, biodiversity and desertification (see Box 5.15).

### Box 5.15. The system of markers in the OECD DAC CRS

Since 1998, the Development Assistance Committee (DAC) has monitored development finance flows targeting the objectives of the Rio Conventions on biodiversity, climate change and desertification through the CRS using the "Rio markers". The Rio markers were originally designed to help members prepare their National Communications or National Reports to the Rio Conventions by identifying activities that mainstream the Conventions' objectives into development co-operation. DAC members indicate for each development finance activity if it targets environmental or climate objectives. The Rio markers on biodiversity, climate change mitigation and desertification were introduced in 1998. A fourth marker on climate change adaptation has been applied since 2010. An additional marker to track commitments with a focus on disaster risk reduction was subsequently introduced and data from 2018 onwards are available. In the years following the introduction of a marker, providers usually need to adjust their monitoring systems to fully report against the marker, which could mean that some data are missed.

It is mandatory for DAC members to report on the Rio makers. This is not the case for multilateral providers. Some climate-related funds (e.g. the Green Climate Fund and the Adaptation Fund), however, apply the Rio marker methodology. In contrast, multilateral development banks (MDBs) only report the climate components within projects, based on a joint MDB methodology (AfDB et al., 2020[213]). Some multilateral funds (e.g. the International Fund for Agricultural Development) also apply the climate component methodology for their reporting. Since commitments by multilateral providers can be either reported using the Rio maker methodology of the MDB climate component methodology, the analysis in this section distinguishes between the approach used (i.e. Rio maker or climate component) rather than by provider (i.e. bilateral or multilateral).

The analysis is also based on data on official development assistance (ODA). As such, it excludes analysis of other official flows (OOF), which are defined as official sector transactions that do not meet ODA criteria. OOF include grants to developing countries for representational or essentially commercial purposes; official bilateral transactions to promote development but with a grant element of less than 25%; and, official bilateral transactions, whatever their grant element, that seek primarily to facilitate exports. By definition, this category includes export credits extended directly to an aid recipient by an official agency or institution (official direct export credits); the net acquisition by governments and central monetary institutions of securities issued by multilateral development banks at market terms; subsidies (grants) to the private sector to soften its credits to developing countries; and, funds in support of private investment (OECD, n.d.[214]). The analysis excludes OOF partly because of incomplete reporting by all bilateral and multilateral providers of development co-operation. In addition, OOF flows appear to be less relevant to climate change adaptation or disaster risk reduction type investments. Hence, their exclusion would not alter substantially the conclusions extracted from the data presented here.

The CRS and the policy markers were developed before discussions on losses and damages became salient in the political agenda or appeared in the context of UNFCCC negotiations. This limits the explicit references to project objectives in support of efforts to reduce and manage the risks of losses and damages. Other factors that may limit such explicit references in project descriptions include the following:

- There is no consensus on how to define activities related to losses and damages and no requirement or method to track development finance for this purpose.

- The political focus on losses and damages is relatively recent and has not fully permeated explicitly to the operational level yet.
- Some activities related to losses and damages may use different terminology (e.g. addressing climate impacts) and be partially captured by other elements reported, notably those related to climate change adaptation and disaster risk reduction.
- The CRS records financial commitments for projects and programmes. Conversely, Article 8 of the Paris Agreement and the work streams of the WIM refer to process-based activities, which are more difficult to quantify (e.g. slow-onset events, non-economic losses).

These factors pose challenges for identifying and analysing development finance that directly or indirectly supports efforts to reduce or manage the risks of losses and damages. The CRS still constitutes the most comprehensive database for development finance commitments. As such, it can shed light on the nature of commitments that support these objectives.

Against this background, the analysis in this section is informed by relevant decisions agreed upon by countries in the context of climate negotiations on losses and damages – Article 8 of the Paris Agreement on Loss and Damage and the WIM (see Table 5.2). This guidance informed identification of a set of sector codes in the CRS. When screened against activities that report a focus on adaptation and disaster risk reduction, these codes indicate the scale of commitments for 2018-19 (see Annex 5.A for further information on the OECD statistical framework and the methodology used).

### Table 5.2. Sources that informed the quantitative analysis

| Article 8 | WIM work stream | Guidance available |
|---|---|---|
| Early warning systems | | See below under comprehensive risk assessment and management. |
| Emergency preparedness | | No official definition (but focus clear). |
| Slow-onset event | (a) slow-onset events | UNFCCC Decision 1/CP.16 (UNFCCC, 2010[215]); WIM work on slow-onset events (UNFCCC, n.d.[216]); COP17 technical paper under the work programme of loss and damage (UNFCCC, 2011[217]). |
| Events that may involve irreversible and permanent loss and damage | | No official definition. |
| Comprehensive risk assessment and management | (c) comprehensive risk management approaches (including emergency preparedness?) | WIM work definition (UNFCCC, n.d.[218]). |
| Risk insurance facilities, climate risk pooling and other insurance solutions | | No official definition (but focus clear). |
| Non-economic losses | (b) non-economic losses | UNFCCC technical paper (UNFCCC, 2013[219]). |
| Resilience of communities, livelihoods and ecosystems | | No official definition. |
| | (d) human mobility, including migration, displacement and planned relocation | |
| | (e) enhanced co-operation and facilitation in relation to action and support including finance, technology and capacity building. | |

Note: In cases where no official definition was available, the wording of Article 8 and WIM work stream was used to compare CRS purpose codes. These codes were then evaluated on a project-by-project basis to decide whether they were relevant to the losses and damages discussion.

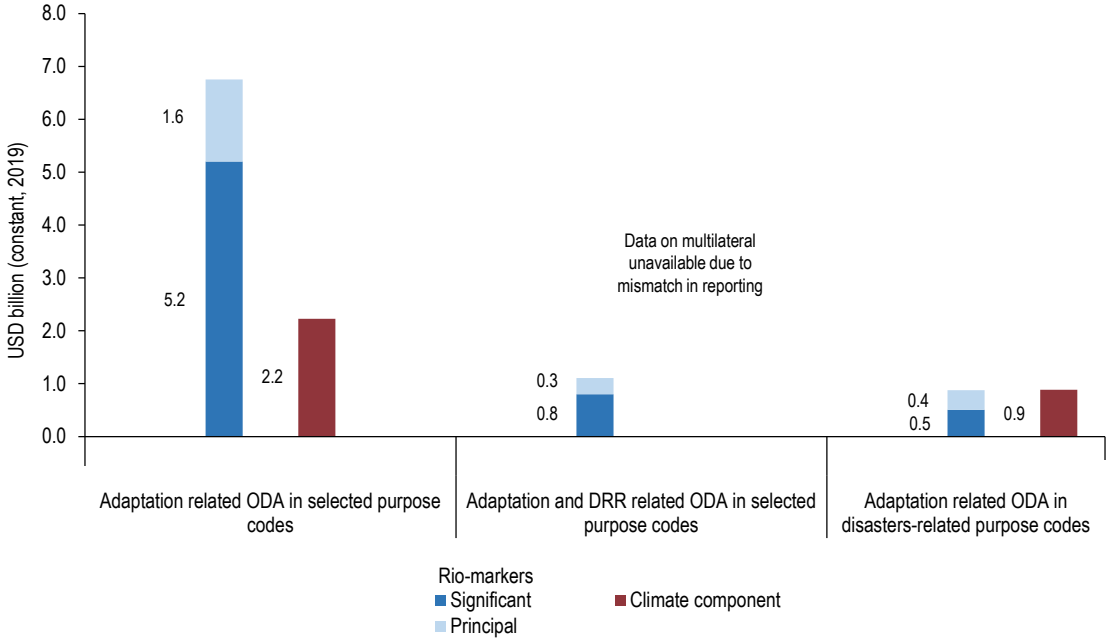
There can be no one estimate of commitments given the lack of an agreed definition of activities related to losses and damages. This report does not put forward such a definition since this falls within the mandate of the UN climate processes. Instead, Figure 5.7. summarises different ranges of development finance commitments that support partner country efforts to reduce and manage their risks of losses and damages

from climate change. The analysis is concentrated around three approaches (see Annex 5.A for further details):

- ***Approach 1***: Commitments include a focus on climate change adaptation (using the climate change adaptation marker for bilateral commitments and the climate component methodology for some multilateral providers). Further, they target a defined set of sector codes identified as including activities related to efforts to reduce and manage the risks of losses and damages.
- ***Approach 2***: Commitments include a focus on both climate change adaptation and disaster risk reduction (again using the climate change adaptation marker for bilateral commitments and the climate component methodology for some multilateral providers). They target the sector codes identified as including activities related to efforts to reduce and manage the risks of losses and damages.
- ***Approach 3***: Commitments to three sector codes (disaster risk reduction, multi-hazard response preparedness and immediate post-emergency reconstruction and rehabilitation) that also include a focus on climate change adaptation (using the climate change adaptation marker and the component methodology).

## Figure 5.7. Different measurements of losses and damages-related commitments from bilateral and multilateral providers, by reporting method

2018-19 annual average, USD billions, commitments




Note: The climate component methodology only takes into account the share of financing allocated for climate change purposes within a specific reported activity. The Rio-markers methodology captures the full face value of the commitment.
Source: (OECD, 2021[82])

The analysis excludes commitments for climate change mitigation despite the need to scale up mitigation overall to limit global average temperature increases and thus avoid losses and damages (see Chapter 1). The CRS only includes mitigation action in developing countries supported by climate-related development finance. As such, it provides an incomplete picture of these efforts by excluding domestic and developed country commitments. At the same time, it focuses on countries that have contributed little to climate change. Box 5.16, however, summarises mitigation-related development finance for ODA-eligible G20 countries. G20 countries account for over 75% of global emissions, which means mitigation efforts in some

## Box 5.16. Development finance in support of mitigation in major emitting economies

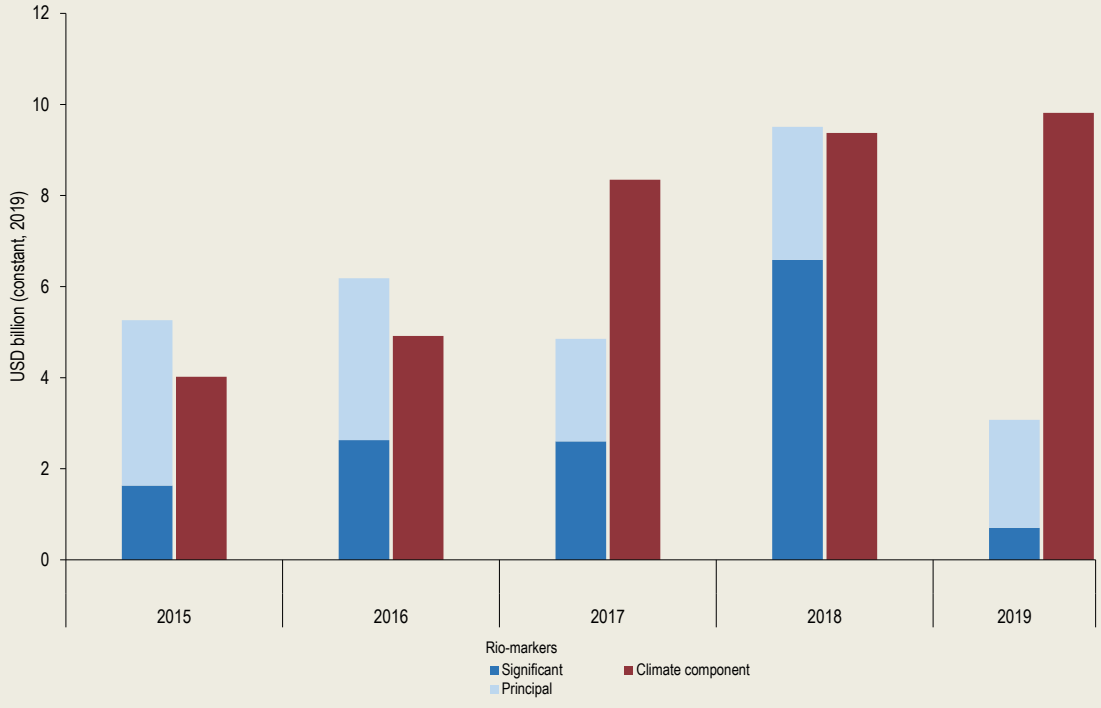
The IPCC climate risk framework highlights the importance of limiting the creation of climate-related hazards, in addition to reducing the exposure and vulnerability to the hazards. Most developing countries contribute little to greenhouse gas (GHG) emissions. However, a few large emerging economies (and members of the Group of Twenty [G20][1]) account for over 40% of global GHG emissions. These countries do receive support from development providers for climate mitigation objectives. Reducing GHG emissions in these countries, therefore, can have significant impact on future losses and damages.

In 2018-19, mitigation-related official development assistance (ODA) and other official flows (OOF) to G20 ODA-eligible countries from DAC members and other multilateral providers that report with the Rio Marker[2] Methodology reached USD 6.3 billion on average per year (see Figure 5.8). This includes projects with a primary (or principal) focus on mitigation or where it was a significant component. For multilateral providers reporting through the climate component methodology, overall flows (ODA and OOF) amounted to USD 9.6 billion on average in 2018-19, an increase from USD 4.5 billion in 2015-16.

DAC members mainly use ODA, but some multilateral providers resort to concessional financing according to ODA-related criteria (e.g. GCF and other climate funds). Other multilateral providers do not extend concessional finance based on ODA-related considerations. Instead, they provide non-concessional finance based on the income group status of the recipient. In practice, such loans still have favourable terms and conditions compared to the capital market and/or are provided for activities in which the private sector may be reluctant to participate.

### Figure 5.8. Climate mitigation ODA and other official flows in G20 ODA-eligible countries, by reporting method

2018-19 annual average, USD billion, gross commitments



Notes:
[1] ODA-eligible G20 countries include Argentina, Brazil, China, India, Indonesia, Mexico, South Africa and Turkey. The climate component methodology only considers the share of financing allocated for climate mitigation purposes within a specific reported activity. The Rio Markers Methodology captures the full face value of the commitment.
[2] Multilateral institutions reporting with the Rio marker methodology are Adaptation Fund, Caribbean Development Bank, Climate Investment Funds, the Food and Agriculture Organization, the Green Climate Fund, the Global Environment Facility, the Global Green Growth Institute, the International Fund for Agricultural Development, the Nordic Development Fund and the United Nations Development Programme.
Source: (UNFCCC, 2019[90]; OECD, 2021[82]).

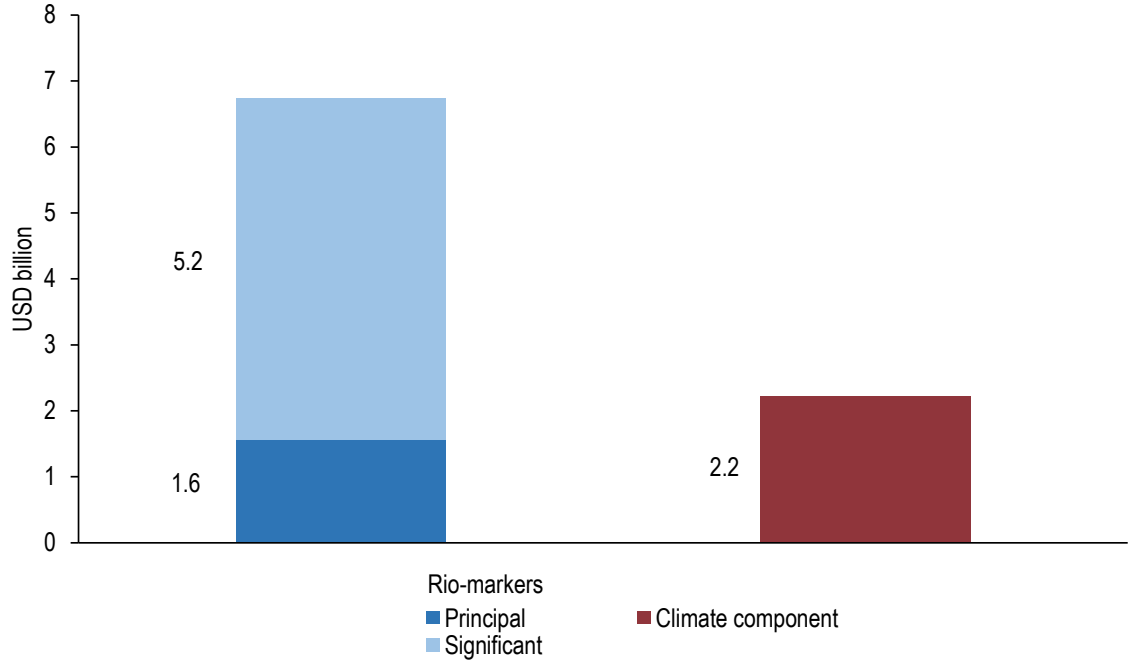
of these countries will contribute significantly to efforts to limit global average temperature increase (Climate Analytics, World Resources Institute, 2021[220]). The same data constraints apply to the rest of the analysis, i.e. it excludes domestic, state and non-state action. However, this analysis focuses on support to developing countries particularly vulnerable to the impacts of climate change.

*Approach 1: Commitments for adaptation in selected purpose codes*

In 2019, 27% of bilateral ODA (USD 28.6 billion) focused on climate change as either a principal or significant objective, a small increase from 26% in 2018 (OECD, 2020[221]). Climate change adaptation-related commitments *in sectors related to activities for reducing and managing the risks of losses and damages* from DAC members amounted to USD 6.8 billion a year on average in 2018-19. This includes both commitments that integrated climate change adaptation as a principal or significant objective. For multilateral providers, commitments that include a focus on adaptation and the sub-set of sectors identified amounted in 2018-19 to USD 2.2 billion a year (see Figure 5.9.). Note, that multilateral commitments appear in both the Rio-marker and the climate component categories – see Box 5.15 for more details on the markers.

## Figure 5.9. Adaptation-related commitments by bilateral and multilateral providers in selected purpose codes, by reporting method

2018-19 annual average, USD billions, gross commitments



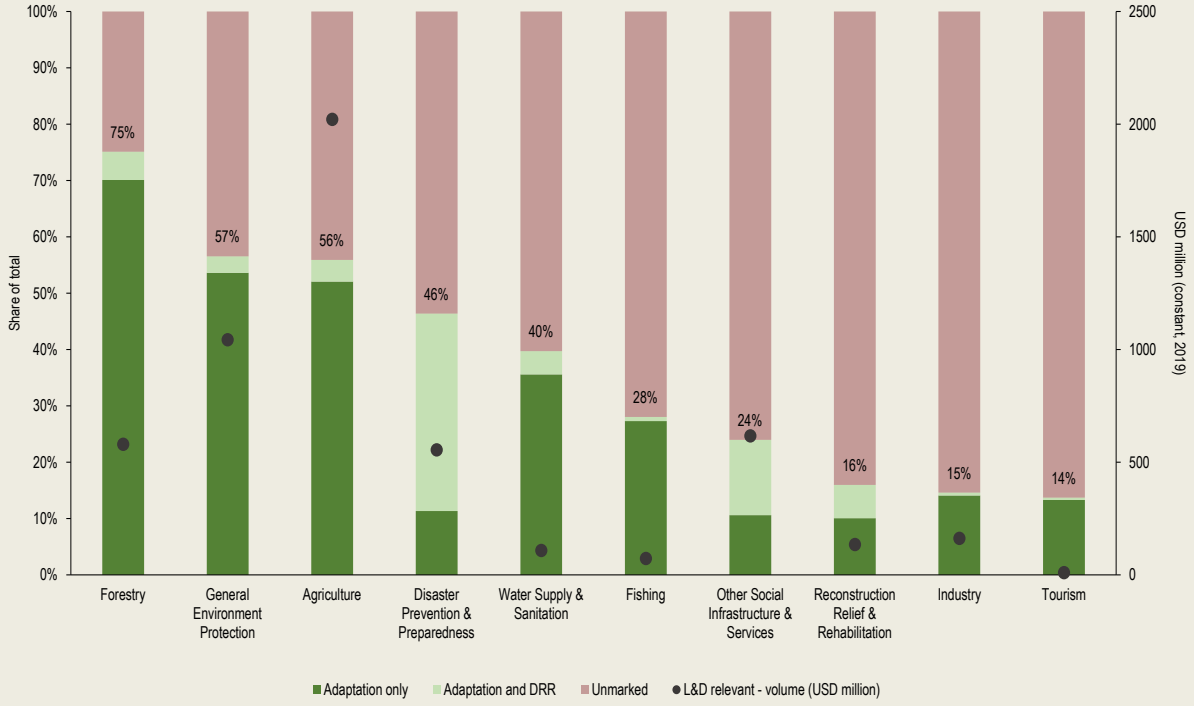
Note: The climate component methodology only considers the share of financing allocated for adaptation purposes. The Rio-markers methodology captures the full face value of the commitment.
Source: (OECD, 2021[82]).

Addressing the vulnerability of developing countries to climate risks that may result in losses and damages, coupled with countries' level of exposure, requires a systemic approach (UNFCCC, 2019[90]). There are several ways to observe how this is achieved. One method is to analyse the level of mainstreaming of climate change adaptation across sectors relevant for losses and damages (see Box 5.17); another is to explore the co-benefits across policy objectives. Providers can use several markers when reporting to the OECD. Doing so may be driven by co-benefits in the implementation of activities. For example, climate-smart agriculture can contribute towards climate resilience, reduced GHG emissions through increased sequestration, and increased productivity and incomes. This analysis shows that 56% (USD 3.4 billion) of bilateral adaptation-related commitments by DAC members in the identified sectors codes in 2018-19 also intersect with other policy markers. Of this share, 40% include a complementary focus on biodiversity, 21% a focus on desertification and 18% a focus on disaster risk reduction.

## Box 5.17. Climate change adaptation across sectors relevant for losses and damages

Forestry appears to be the sector where adaptation-related issues are most mainstreamed (75% of all commitments). This is followed by general environment protection (57%), agriculture (56%) and disaster prevention and preparedness (46%). These levels of mainstreaming signal a higher priority and integration of risks and impacts deriving from climate change across activities in these areas. However, this does not reflect volumes. For example, the agriculture sector is only the third sector in terms of mainstreaming but it receives the largest volume of adaptation-related commitments (USD 2 billion) (see right axis of Figure 5.10.).

### Figure 5.10. Level of mainstreaming by bilateral providers only in selected purpose codes relevant for losses and damages, by sector




Note: Only losses and damages-relevant purpose codes within each sector were considered (See Annex 5.A.) The purpose code for disaster risk reduction was included under the Sector Disaster Prevention and Preparedness.
Source: (OECD, 2021[82]).

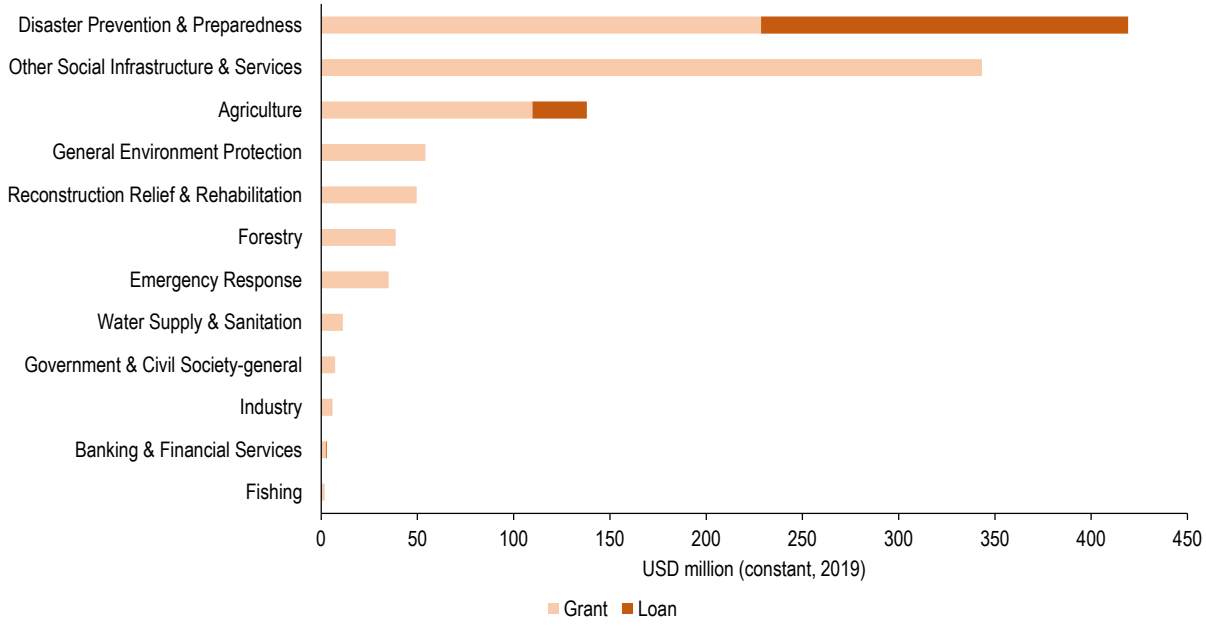
*Approach 2: Commitments for adaptation and disaster risk reduction in selected purpose codes*

In 2018-19, DAC members committed USD 1.1 billion on average per year for activities that included a focus on both climate change adaptation and disaster risk reduction in the purpose codes deemed relevant for losses and damages (see Figure 5.11. ). Similar information on commitments with a focus on disaster risk reduction is not available for multilateral providers given differing reporting obligations to the CRS. The analysis under Approach 2 thus excludes potentially important multilateral commitments; some of these will be reflected under Approach 3. For Approach 2, the most targeted sectors are disaster prevention and preparedness (USD 419 million), other social infrastructure and services (USD 343 million) and agriculture

(USD 138 million). The relatively small dataset means that individual large commitments can influence the overall picture. The relatively large share of commitments provided in loans for Disaster Prevention and Preparedness, for example, was due to a large concessional loan to mitigate urban flood risk provided to a lower middle-income country.

### Figure 5.11. ODA commitments by bilateral providers for adaptation and disaster risk reduction in selected purpose codes by sector

2018-19 annual average, USD million, commitment

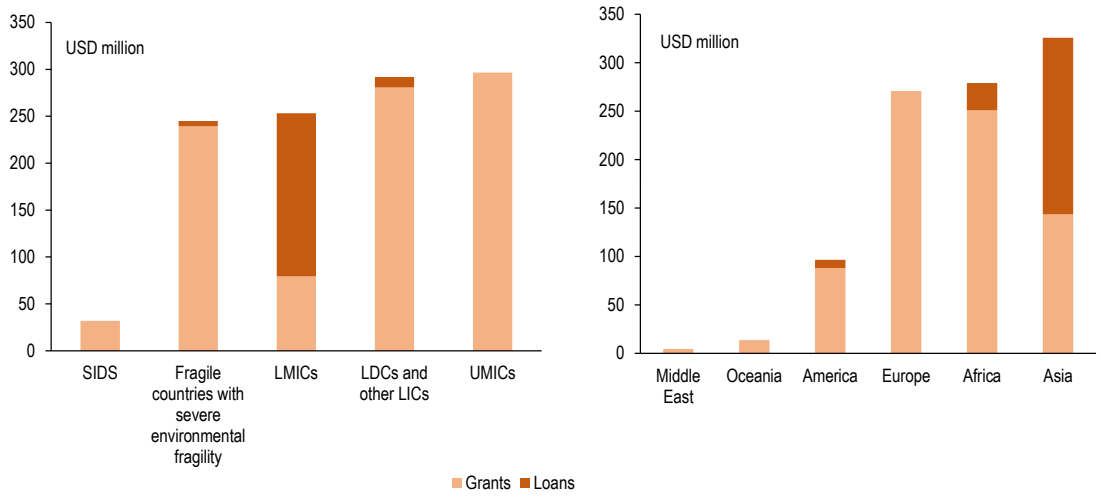



Source: (OECD, 2021[82]).

The use of grants is widespread under Approach 2 accounting for 81% of commitments. The remaining 19% are provided as concessional loans, with the share varying across income and country groupings (see Figure 5.12.). This share of grants is above that for overall adaptation-related ODA commitments for the same period, where grants represent 77%. Grants can help address challenges around debt levels in partner countries in the context of losses and damages (discussed below). They also have potential to catalyse and mobilise further development finance and private sector investment. In addition, grants can play an important role in supporting the implementation of enabling policy environments for climate action, such as National Adaptation Plans; Nationally Determined Contributions; National Disaster Risk Reduction Strategies; contingency plans and related regulatory frameworks. Further, grants can support climate risk and vulnerability assessments and are commonly used to develop risk transfer and pooling mechanisms (OECD/World Bank, 2019[146]) (see example from the Philippines in Box 5.18). Grant-only mechanisms, however, may not offer the rapid, large-scale financing required after certain extreme events, except in some instances, such as grants used to partially subsidise insurance premiums. Another form of grant finance to address losses and damages is humanitarian aid for disaster response and recovery measures, discussed above.

## Figure 5.12. Climate adaptation and disaster risk reduction in selected purpose codes by instrument and country grouping

2018-19 annual average, USD million, commitment




Note: The relatively small dataset means that large individual commitments can influence the overall picture as illustrated with the shares of loans to Low and Middle-Income Countries (LMICs). LDCs=Least Developed Countries; SIDS=Small Island Developing States; UMICs=Upper Middle-Income Countries.
Source: (OECD, 2021[82]).

### Box 5.18. Disaster and climate risk management in the Philippines

In 2014, the government of Australia provided a grant of USD 6.6 million to the Philippines, via the United Nations Development Programme (UNDP) for the Disaster and Climate Risk Management initiative (OECD, 2020[96]), an initiative also supported by the World Bank. With a total value of USD 31 million, the initiative aims to develop the capacity of the government's technical agencies in various areas. These include disaster response and monitoring, early warning and forecasting, hazard and risk analysis, climate science and adaptation options to better inform disaster and climate risk management in vulnerable areas. The initiative also involves knowledge sharing between relevant agencies in the Philippines and their Australian counterparts, as well as non-governmental organisations. Some capacity development components have also targeted communities to prepare for and respond to the impacts of disasters. In 2021, Australia and the UNDP agreed to follow up with the initiative *Strengthening Institutions and Empowering Localities against Disasters and Climate Change*. It focuses on strengthening disaster and climate resilience of local government units and communities in the Philippines. Australia will invest USD 14 million in this programme over the next six years (OECD, 2020[96]).

Concessional loans have softer terms and conditions than market rates.[4] Lending at concessional terms can in some cases be suitable for reducing risks through, for instance, investments in climate-resilient infrastructure. Some providers are also piloting novel financial instruments to reinforce this aspect, such as KfW's pilot on shock-resilient loans (KfW, n.d.[222]). These aim to support investments that will bring down investment costs in the long term. Concessional loans, for example, can take the form of Catastrophe Deferred Drawdown Option, the World Bank's Contingency Emergency Response Component and contingent credit lines. Such loans have already been provided to several countries, including Peru and

the Philippines (OECD, 2020[96]; OECD/World Bank, 2019[146]). These mechanisms allow for the immediate transfer of financial assistance in response to a disaster that meets pre-defined thresholds (see Box 5.19). Concessional loans have also been used to pay for insurance premiums.

### Box 5.19. Reducing vulnerabilities to disasters in Jamaica

The government of Jamaica in collaboration with the Inter-American Development Bank (IADB) and the World Bank developed Jamaica's Strategic Programme for Climate Resilience (PPCR) that aims to strengthen resilience through enhancing adaptive capacity across priority sectors (PPCR, n.d.[223]). In 2016, the IADB approved two initiatives in the country. The Disaster Vulnerability Reduction Project (USD 30 million) improves disaster and climate resilience planning, and risk reduction, including retrofitting of vulnerable key assets and securing coastline. Meanwhile, a Contingency Emergency Response Component supports the country's emergency preparedness and response capacity. These initiatives have helped strengthen the regulatory, institutional and budgetary framework for disaster risk management. Jamaica has also taken steps to strengthen its fiscal resilience to natural shocks and climate impacts. First, it obtained parametric insurance coverage for hurricanes, earthquakes and excessive rainfall events under the regional Caribbean Catastrophe Risk Insurance Facility. Second, it secured a Contingent Credit Facility with the IADB (IADB, 2020[224]).

In 2020, the government received a Fiscal Sustainability and Climate Resilience Development Policy Loan (USD 70 million). This loan seeks to promote fiscal sustainability and inclusion, enhance fiscal and financial resilience against climate and disaster risks, and improve the investment climate for sustainable growth (World Bank, 2020[225]). The loan helps strengthen institutional mechanisms for greater fiscal responsibility, while also increasing sustainability of the social protection system. It supports measures to ensure that resources are available to adequately cope with climate-related hazards. It also improves policies to reinforce the resilience of Jamaica's infrastructure to multiple types of disaster risk. This includes reforms to land titling and to the application approval process for development and building permits, as well as for the effective management and sustainable development of fisheries. Jamaica's portfolio of disaster risk financing instruments is still expanding. In 2021, the World Bank agreed to a catastrophe bond to reduce risk to the insurance sector priced at USD 185 million for 2021-23 to minimise losses from tropical cyclones. Jamaica is the first country in the region to independently sponsor a catastrophe bond to prepare in advance of climate shocks, disasters and crises (World Bank, 2021[226]).

The use of concessional loans, for climate but also for broader development, can overburden countries with the accumulation of debt, even at below market-level interest rates. For instance, contingent loans can be quickly exhausted in the face of climate-related shocks and their recurrent use may add to a country's debt burdens (Bowen et al., 2020[72]). Unsustainable debt levels can threaten the stability of economies of already vulnerable countries, thereby undermining their fiscal resilience against climate-related hazards. This, in turn, could derail what would otherwise look like a clear and robust payback stream. Some even warn against the cost of external finance exacerbating a "climate investment trap" in developing economies (Ameli et al., 2021[43]) (see Section 5.4.4). These dynamics are often observed in SIDS. These countries receive concessional loans as some of them are upper middle-income countries, yet highly exposed and vulnerable to climate-related hazards. Providers therefore need to balance use of concessional loans and grants, especially in vulnerable settings, which is why some donors are piloting new instruments [e.g. (KfW, n.d.[222])]. In some cases, more emphasis on grants may be needed. Moreover, larger grants would be more effective than funding many small projects that do not achieve transformational impact (Ameli et al., 2021[43]) or funding through many channels with relatively small individual pots of grant funding (MOPAN, 2021[188]). While such risks are not evident from Figure 5.12., the data only analysed

accounts for a small sub-set of commitments that may support efforts to reduce and manage the risks of losses and damages.

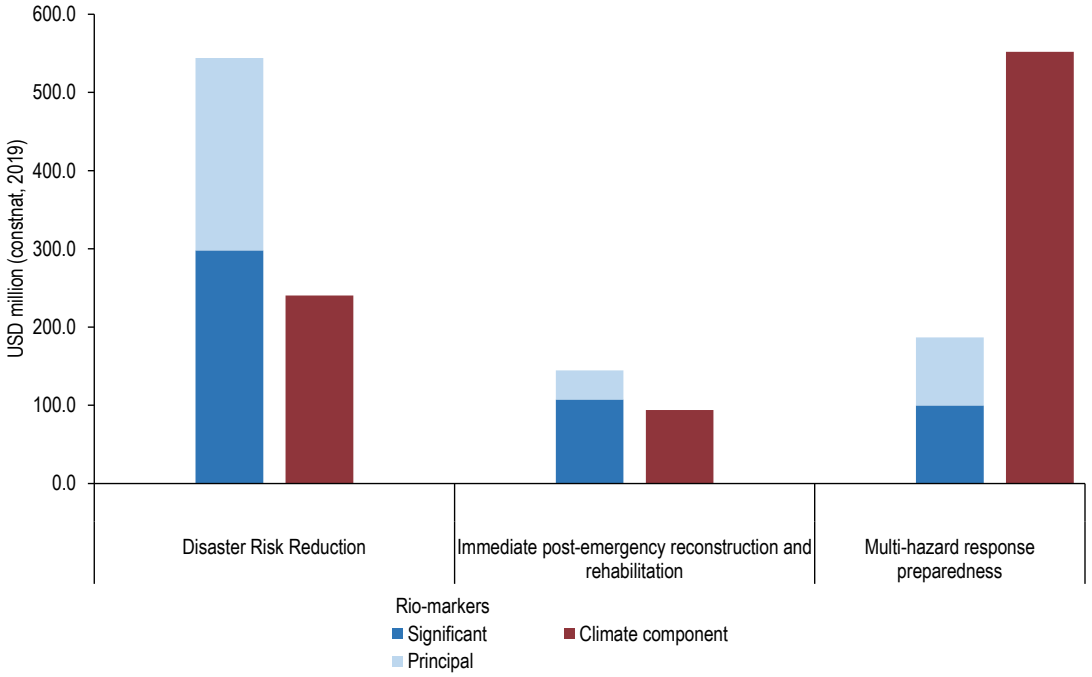
The bulk of commitments at the intersection between adaptation and disaster risk reduction is directed to more vulnerable settings, such as SIDS or LDCs. In LDCs and low-income countries, grants represent 96% of total commitments. In lower middle-income countries, the share of grants is lower at 31%. SIDS receive 100% of financing in the form of grants, while African countries receive 90%. This suggests the bulk of funding for losses and damages is in the form of grants and that providers tend to adjust modalities used depending on the level of vulnerability of partner countries.

*Approach 3: Commitments for selected sector codes related to activities for reducing and managing the risk of losses and damages*

Among the purpose codes covered by the CRS, three are particularly relevant for losses and damages, namely i) disaster risk reduction; ii) multi-hazard response preparedness; and iii) immediate post-emergency reconstruction and rehabilitation (see Figure 5.13). These mainly focus on climate-related disasters and do not shed light on how providers are responding to the risks of slow-onset events or non-economic losses. Based on application of the climate change adaptation marker in these three purpose codes, ODA from DAC members reached USD 689 million a year in 2018-19. This includes projects that integrated adaptation as a principal or significant component. Multilateral providers committed USD 1.1 billion, USD 886 million reported through the climate component methodology and USD 186 million using the Rio Markers Methodology.

## Figure 5.13. Adaptation-related commitments by bilateral and multilateral providers for three sector codes

By reporting method, 2018-19 annual average, USD million, gross commitments




Note: The climate component methodology only considers the share of financing allocated for adaptation purposes. The Rio-markers methodology captures the full face value of the commitment.
Source: (OECD, 2021[82]).

*Other sources of development finance*

Other sources of development finance need to be closely monitored for future analyses. First, private philanthropy, which increasingly reports to the CRS, is starting to focus on climate change (OECD, 2021[82]). In early 2020, for instance, leading foundations such as the Bill & Melinda Gates Foundation revealed they consider climate change as a top priority; in 2019, the Foundation disbursed USD 150 million towards mitigation and adaptation. However, their reporting to the OECD does not yet reveal that losses and damages or climate change adaptation is an explicit priority.

Second, providers also use official channels, as well as guarantees, to mobilise private finance for development. In the context of climate change, the level of mobilisation has been lower than expected, perhaps reflecting the changing composition of climate finance in aggregate (OECD, 2021[227]). In 2019, private finance mobilised for climate action reached USD 14 billion, a decrease of 4% compared to 2018 (USD 14.6 billion). Private finance mobilised by bilateral public climate finance via direct investment in companies and projects, simple co-financing schemes and credit lines increased; that mobilised by multilateral finance was through guarantees and syndicated loans decreased (OECD, 2021[227]).

Finding more robust ways to work with the private sector in leveraging multilateral and bilateral funds to crowd in private sector funds would help scale up resources, including for climate change adaptation and activities to reduce and manage losses and damages. This goal must recognise, however, that private sector engagement will not be viable in all cases. The insurance sector has a strong competence, for example, in understanding of, and mitigation of risks, expertise that in the right context does not have to be reserved to the sector but can benefit broader decision-making processes.

### *5.4.4. Fiscal sustainability and development co-operations*

*Sustainable debt levels in the face of growing climate risks*

Debt sustainability is a major concern for many developing countries (see Section 5.2.1), where debt levels reached over USD 8.5 trillion in 2020 (World Bank, 2021[228]) . Providers of development co-operation have started to consider debt sustainability in their activities. In fact, with the ODA reform of 2016, the DAC has explicitly linked its loan policy to compliance with International Monetary Fund (IMF) and World Bank rules for sustainable debt (OECD, 2016[158]). The debt sustainability analyses (DSAs) by the IMF and World Bank assess risk on a scale ranging from "low" to "moderate", "high" or even "over-indebted"; IDA grant-financing is tied to these classifications. By incorporating DSA results in providers' lending process, financing flows can be confined to countries with a public finance position deemed sufficiently sustainable. Moreover, the eligibility conditions have become more favourable for the poorest countries, with the minimum grant element rising from 25% to over 45%. For example, an IMF-World Bank programme in Burkina Faso imposed tighter rules (i.e. a 35% minimum concessionality threshold) (Government of France, 2016[229]). Finally, some providers are directly changing the nature of their loans. For example, as noted earlier, Germany's KfW is piloting shock-resilient loans. These concessional loans include clauses of debt redemption or deferral of instalments in case of an event to limit fiscal burdens and free budget funds for disaster relief (KfW, n.d.[222]).

Compliance with these debt limits is intended to strengthen the debt sustainability framework promoted by the IMF and World Bank in their bilateral loan policies. However, the system may not always capture the consequences of extreme weather and climate events and how they can cause debt distress in developing countries. As noted earlier, Mozambique faced over USD 873 million in damages in 2019 following cyclones Idai and Kenneth when the country was already heading towards unsustainable debt levels. In response to the two cyclones, the IMF agreed to a USD 118 million emergency loan (IMF, 2019[230]). Although the country was in debt distress, climate vulnerabilities were not included in the debt sustainability analysis. Therefore, the country did not qualify for IMF emergency debt relief (Fresnillo, 2020[42]). This

affected the concessionality terms that the DAC and other providers could apply to the country, and in turn other resources (including from the private sector) that could have been unlocked to support recovery.

The IMF and other providers of development finance (e.g. the IADB) are aware of these challenges. They are experimenting with novel instruments, including "hurricane clauses" that help mitigate the impact of a disaster on a country's public finances and its debt sustainability [see e.g. (Robinson, 2016[231])]. Broader approaches and types of instruments could also be considered, such as insurance, in the blend of instruments available to governments or promote *ex ante* approaches in the first place.

Against this background, providers can ensure their concessional financing does not worsen debt in partner countries. As one option, they could promote alternative financing instruments such as debt-for-climate or debt-for-nature swaps. Such swaps enable a creditor to reduce its debt in one of two ways. The creditor could convert the debt to local currency, repaying it at a lower interest rate. Alternatively, it could use some other form of debt write-off. Funds saved through this tool can then be used to invest in adaptation, mitigation or biodiversity protection initiatives. As such, the swaps might create more fiscal space for climate, environmental and development commitments. For example, the United States backed a debt-for-nature swap with Costa Rica, trimming off USD 26 million of the country's foreign debt in exchange for tropical forest conservation (OECD, 2019[232]). The United States has developed similar schemes with the governments of Brazil, Indonesia, Guatemala and Jamaica, among others (Sommer, Restivo and Shandra, 2020[233]). While these swaps can lead to high transaction costs and have long timeframes (Cassimon, Prowse and Essers, 2011[234]), they are benefiting from renewed interest by development co-operation providers (Steele and Patel, 2020[38]; Sommer, Restivo and Shandra, 2020[233]; Yue and Wang, 2021[235]). Compared to older schemes, newer swaps set out to help address the debt, climate and biodiversity crises. To that end, the capital saved by partner countries is invested in poverty-reducing climate resilience, climate emissions mitigation or biodiversity protection initiatives, which are key for the COVID-19 recovery (Picolotti and Miller, 2020[236]).

### *Reinstatement of countries that have graduated from the ODA-eligible status: An option for the future?*

Poorer countries are generally more vulnerable to the impacts of climate change. Higher-income developing countries, including some SIDS, can also be very exposed to climate-related hazards. The 2016 hurricanes in the Caribbean, for example, caused a great deal of damage in countries no longer eligible for ODA due to their level of per capita income. This led to calls for some affected territories (such as the British Virgin Islands) to be temporarily reinstated to the list of ODA-eligible countries. This would allow funding for post-hurricane reconstruction to count as ODA (Tew, 2017[237]), which would make access to finance easier.

These calls underscore that climate risks are redefining the traditional ways to understand ODA eligibility. The level of development is no longer only assessed through the level of income (OECD, 2018[238]). Instead, it is increasingly taking into account the level of exposure and vulnerability to climate-related hazards. Some DAC members have agreed to support countries hit by a disaster, even when the countries have already graduated from ODA. For instance, high-income SIDS can still access the European Development Fund (that will be phased out in favour of the Neighbourhood, Development and International Cooperation Instrument). This fund uses an economic vulnerability index in its country allocations formula (Inter-agency Task Force on Financing for Development, 2020[239]). Meanwhile, the International Development Association also has an exemption clause for SIDS, but these flows would not count as ODA. Work is also ongoing in relation to the methodology for updating the DAC List of ODA Recipients (e.g. reinstating countries or territories in case of catastrophic humanitarian crisis) (OECD, 2019[240]). For their part, multilateral processes are discussing how to formalise other measures, such as an interest-free moratorium on debt payments in the aftermath of a climate disaster (Inter-agency Task Force on Financing for Development, 2020[239]).

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# Annex 5.A. Statistical framework and methodology

## Methodological considerations

The OECD Development Assistance Committee (DAC) gathers on an annual basis statistics on official development assistance (ODA) and other resource flows to developing countries from bilateral and multilateral development co-operation providers. The data are publicly available in the Creditor Reporting System (CRS) database.

### *Overview of data coverage in the CRS*

Data are collected on individual projects and programmes from bilateral and multilateral providers. Reporting is mandatory for members of the DAC. In their reporting to the CRS, DAC members include information on the purpose of the support provided through the use of sector and sub-sector codes. In reporting on the sector, providers are encouraged to answer the question "which specific area of the recipient's economic or social structure is the transfer intended to foster" [the list of all OECD DAC purpose codes is available at (OECD, n.d.[241])]. Further, the CRS includes a policy marker system that facilitates the monitoring of members' activities in support of the objectives of the 1992 Rio Conventions on climate change, biodiversity and desertification, using the "Rio markers". Reporting on climate change mitigation, biodiversity and desertification became mandatory for members of the DAC in 2006 and on climate change adaptation in 2010. The definition and eligibility criteria for the climate change adaptation marker is summarised in Annex Table 5.A.1. For each activity reported, DAC members (and other bilateral providers) indicate whether it targets the objectives of the Rio Conventions as a "principal" or "significant" objective. Activities marked "principal" would not have been funded but for that policy objective; activities marked "significant" have other prime objectives but have been formulated or adjusted to help meet the policy objective. This differentiation indicates the degree of mainstreaming of environmental considerations into development co-operation portfolios.

## Annex Table 5.A.1. Definition and eligibility criteria for the Rio marker for climate change adaptation

| Aid targeting the objectives of the Framework Convention on Climate Change: Climate change adaptation | |
|---|---|
| DEFINITION<br>An activity should be classified as adaptation related (score Principal or Significant) if: | It intends to reduce the vulnerability of human or natural systems to the current and expected impacts of climate change, including climate variability, by maintaining or increasing resilience, through increased ability to adapt to, or absorb, climate change stresses, shocks and variability and/or by helping reduce exposure to them. This encompasses a range of activities from information and knowledge generation, to capacity development, planning and the implementation of climate change adaptation actions. |
| CRITERIA FOR ELIGIBILITY<br>An activity is eligible for the climate change adaptation marker if: | a) the climate change adaptation objective is explicitly indicated in the activity documentation; and b) the activity contains specific measures targeting the definition above. Carrying out an assessment of vulnerability to climate variability and change, either separately or as an integral part of agencies' standard procedures, facilitates this approach.<br>To guide scoring, a three-step approach is recommended as a "best practice", in particular to justify for a principal score:<br>• Setting out the context of risks, vulnerabilities and impacts related to climate variability and climate change: for a project to be considered as one that contributes to adaptation to climate change, the context of climate vulnerability should be set out clearly using a robust evidence base. This could take a variety of forms, including use of material from existing analyses and reports, or original, bespoke climate vulnerability assessment analysis carried out as part of the preparation of a project.<br>• Stating the intent to address the identified risks, vulnerabilities and impacts in project documentation: The project should set out how it intends to address the context- and location-specific climate change vulnerabilities, as set out in existing analyses, reports or the project's climate vulnerability assessment.<br>• Demonstrating a clear and direct link between the identified risks, vulnerabilities and impacts and the specific project activities: the project should explicitly address risk and vulnerabilities under current and future climate change as identified in the project documentation. |

Source: (OECD, 2020[96]).

In 2018, a new policy marker on disaster risk reduction was approved (see definition and eligibility criteria summarised in Annex Table 5.A.2). Reporting on this marker started in 2019 on 2018 flows. In 2018 and 2019, DAC members reported 5 975 ODA-eligible activities using this marker. The number of marked activities increased by 38% over 2018-19. In 2018, three members (United Kingdom, Belgium and Hungary) did not report any activity against this marker, while they did in 2019. Several countries also substantially increased the number of initiatives reported over this period. These increases are unlikely to highlight a change in policy priorities (or a large disaster in that period) that could have triggered a renewed focus on these issues. Rather, the changes reflect the usual trajectory for new markers: it may take a few reporting cycles for a marker to reflect the policy focus.

## Annex Table 5.A.2. Definition and eligibility criteria for the policy marker on the Sendai Framework for Disaster Risk Reduction

| Aid targeting the objectives of the Sendai Framework for Disaster Risk Reduction | |
|---|---|
| DEFINITION<br>An activity should be classified as related to disaster risk reduction (DRR) (score Principal or Significant) if: | It promotes the goal and global targets* of the Sendai Framework to achieve substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries. |
| CRITERIA<br>FOR ELIGIBILITY | The activity contributes to the prevention of new disaster risk, and/or the reduction of existing disaster risk, and/or the strengthening of resilience through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, and increase preparedness for response and recovery with the explicit purpose of increasing human security, well-being, quality of life, resilience and sustainable development. The activity will score "principal objective" if it directly and explicitly contributes to at least one of the four Priorities for Action of the Sendai Framework:<br>• Priority 1: Understanding disaster risk.<br>• Priority 2: Strengthening disaster risk governance to manage disaster risk.<br>• Priority 3: Investing in disaster risk reduction for resilience.<br>• Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction. |
| EXAMPLES OF TYPICAL ACTIVITIES | Support for design, implementation, and evaluation of strategies, policies, and measures to improve the understanding of disaster risk, DRR considerations integrated into development policies, planning and legislation, fostering political commitment and community participation in DRR, multi-hazard risk mapping, modelling, assessments and dissemination, decision support tools for risk-sensitive planning, early warning systems with outreach to communities, developing knowledge, public awareness and co-operation on DRR, inclusion of DRR into curricula and capacity building for educators, disaster risk management training to communities, local authorities, and targeted sectors, DRR considerations integrated with the climate change adaptation, social protection and environmental policies, legal norms for resilient infrastructure and land use planning, disaster financing and insurance, disaster preparedness planning and regular drills for enhancing response, protective infrastructure and equipment, and resilient recovery planning and financing |

Source: (OECD, 2017[242]).

Activities may qualify for more than one marker; this needs to be considered when aggregating data across the markers. In this chapter, aggregate figures for climate change adaptation and DDR-related development finance have not been added up in order to avoid double counting. In general, statistical presentations should either be prepared for one marker at a time (without adding up the resulting totals) or the overlap should be presented and treated to avoid double counting. This analysis considers the overlaps across markers to avoid double counting.

The methodology described above applies to DAC members but not to all multilateral providers of development co-operation. Climate-related funds (e.g. the Green Climate Fund and the Adaptation Fund) apply the Rio marker methodology. However, multilateral development banks (MDBs) only report the climate components within projects, based on a joint MDB methodology (AfDB et al., 2020[213]). While multilateral providers in theory could report against the disaster risk reduction marker, only 618 activities from four organisations (Asian Development Bank, Global Green Growth Institute, Green Climate Fund and World Health Organization) were reported in 2018-19. Multilateral providers are therefore excluded from the analysis that covers the disaster risk reduction components in loss and damage sectors.

### *Methodological considerations*

The statistical analysis focuses on all adaptation-marked activities (including the overlapping elements with biodiversity, mitigation, desertification, environment and disaster risk reduction markers). Given the disaster risk reduction marker was only introduced in 2018, the analysis is centred on 2018-19 commitments. Data for 2020 will be available in late 2021.

The analysis focuses on bilateral providers, i.e. the 30 OECD DAC members that report aid flows to the CRS at the activity level and apply the Rio Marker Methodology. This includes Australia, Austria, Belgium, Canada, Czech Republic, Denmark, European Union, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom and the United States. While Korea is listed in the list of UNFCCC Non-Annex I countries, it is a DAC member and thus included in this analysis. The CRS includes data from 30 other bilateral providers of development co-operation beyond the DAC. However, the use of the Rio Marker Methodology is limited across these members. They have therefore been excluded from this analysis.

In addition, several multilateral development banks and a few climate-specific funds and programmes report project-level data on their climate-related development finance to the OECD. These are the Adaptation Fund; African Development Bank; African Development Fund; Asian Development Bank; Development Bank of Latin America; Caribbean Development Bank; Climate Investment Funds; European Investment Bank; Food and Agriculture Organization of the United Nations; Green Climate Fund; Global Environment Facility; Global Green Growth Institute; Inter-American Development Bank; IDB Invest; International Fund for Agricultural Development; Islamic Development Bank; Nordic Development Fund; UNDP; International Bank for Reconstruction and Development; and International Development Association. For analyses going beyond ODA, information also includes data from the Asian Infrastructure Investment Bank, the Council of Europe Development Bank and the European Bank for Reconstruction and Development. As noted, not all of these use the Rio Marker Methodology. The group that uses this methodology is distinguished from those that use the joint methodology (using separate bars for DAC members and multilateral providers that use different methodologies).

The analysis is based on a number of relevant purpose codes that can help address losses and damages, using the UNFCCC process definitions as guidance to define these codes (i.e. Article 8 of the Paris Agreement, the five work streams of the WIM and agreed COP definitions). A manual revision of these codes (and excluded codes that at first glance appeared to be relevant given the definition of the purpose code in the OECD DAC statistical guidelines) helped narrow down the list to codes most relevant to losses and damages (see Annex Table 5.A.3). This analysis will help approximate the extent to which providers are including considerations related to the reduction and management of the risk of losses and damages from climate change in their development finance.

## Annex Table 5.A.3. Losses and damages-relevant purpose codes

| Article 8 | WIM work stream | Relevant purpose codes |
|---|---|---|
| **Early warning systems** | | |
| **Slow-onset event** | (a) slow onset events | Biosphere protection – 41020<br>Biodiversity – 41030<br>Forestry development – 31220<br>Forestry policy and administrative management – 31210<br>Basic drinking water supply – 14031 |
| **Events that may involve irreversible and permanent loss and damage** | | Material relief assistance and services – 72010 (73011 and 73012)<br>Emergency food assistance – 72040<br>Reconstruction, relief and rehabilitation – 730 (73010)<br>Emergency response (720) (excluding relief co-ordination and support services – 72050) |
| **Comprehensive risk assessment and management** | (c) comprehensive risk management approaches | Disaster prevention and preparedness – 740 (including 74020)<br>Disaster risk reduction – 43060<br>Social protection – 16010<br>Social protection and welfare services policy, planning and administration – 16011<br>Multisector aid for basic social services – 16050 |
| **Risk insurance facilities, climate risk pooling and other insurance solutions** | | Financial policy and administrative management – 24010<br>Formal sector financial intermediaries – 24030<br>Informal/semi-formal financial intermediaries – 24040<br>Agricultural financial services – 31193 |
| **Non-economic losses** | (b) non-economic losses | |
| **Resilience of communities, livelihoods and ecosystems** | | Rural development – 43042<br>Employment creation – 16020<br>Agricultural development – 31120<br>Agricultural land resources – 31130<br>Agricultural water resources – 31140<br>Agricultural inputs – 31150<br>Food crop production – 31161<br>Fishery development – 31320<br>Fishery education/training – 31381<br>Fishery research – 31382<br>Fishery services – 31391<br>Tourism policy and administrative management – 33210<br>Small and medium-sized enterprises development – 32130 |
| | (d) human mobility, including migration, displacement and planned relocation | Facilitation of orderly, safe, regular and responsible migration and mobility – 15190 |
| | (e) enhanced co-operation and facilitation in relation to action and support including finance, technology and capacity building | Technological research and development – 32182<br>Telecommunications – 22020<br>Information and communication technology (ICT) – 22040<br>Meteorological services – 15143<br>Education and training in water supply and sanitation – 14081<br>Agricultural extension – 31166<br>Agricultural education/training – 31181<br>Agricultural research – 31182<br>Fishery education/training – 31381<br>Fishery research – 31382<br>Environmental education/training – 41081<br>Environmental research – 41082<br>Forestry research – 31282 |

Source: (OECD, n.d.[241])

## Notes

[1] Insurance and other risk transfer arrangements also involve costs for household, business and government policyholders. They pay a premium for the coverage provided, which is usually meant to be sufficient to cover expected losses.

[2] Estimate based on data provided by Swiss Re sigma and PCS. The calculation includes only events with reported economic and insured losses (i.e. events with no reported insured losses were excluded from the calculation).

[3] Between 2000 and 2019, about 58% of economic losses from floods were insured in OECD countries with a catastrophe risk insurance programme covering flood compared to about 31% in countries without a programme. For storms, about 59% of economic losses were covered in countries with programmes relative to 50% in countries without them. In Spain, a public insurer provides coverage for a broad range of hazards. As a result, the share of economic losses covered by insurance is significantly higher than in other countries with similar levels of property insurance penetration (Greece, Italy, Mexico).

[4] While non-concessional loans are provided at, or near to, market terms, concessional loans are provided at softer terms. To help distinguish ODA from other official flows, a minimum grant element of 25% has been specified. See OECD (n.d.[241]) for further information.