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WORKING PAPER

From bonds to blended finance

How a diverse range of financial instruments are financing climate adaptation and resilience

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Highlights

- This study highlights the diversity of financial instruments used for climate adaptation. It compiles a dataset of 11 different instrument types used in 162 cases from 2015–25 to finance adaptation to six different types of physical climate risks.
- The financial instruments include blended finance, bonds, concessional and market-based loans, debt swaps, disaster risk financing, equity, grants, guarantees, insurance/risk transfer, and payment for ecosystem services.
- While countries at all income levels use virtually all instrument types, blended finance is most frequently used except in high-income countries, which rely relatively more on grants.
- Cases were tagged as financing physical risk reduction (64 percent), risk management (32 percent), or both (4 percent). The focus on risk reduction is likely because ex-ante investments often have high rates of return, whereas ex-post risk management instruments are more generally perceived as costs.
- Project- and country-specific financial instruments are uncommon. More common are instruments pooled through programs, funds, facilities, or mechanisms (75 percent of cases). Additionally, 47 percent of instruments targeted multiple countries in 2024, up from 16 percent in 2015.
- Given the need to scale up levels of adaptation finance worldwide, the market will benefit from continued innovation by funders, guarantors, implementing agents, and borrowers.

Executive summary

Context

A wide range of financial instruments are used to mobilize capital from diverse sources in support of a range of climate adaptation needs. Finance for climate adaptation flows both internationally and domestically from public and private sources. As shown in this study, diverse financial instruments are deployed to mobilize capital for climate adaptation, including blended finance, bonds, concessional and market-based loans, debt swaps, disaster risk financing (DRF), equity, grants, guarantees, insurance/risk transfer, and payment for ecosystem services. National and subnational governments, as well as the private sector, face many choices among financial instruments to adapt to various types of climate risks, including droughts, storms, floods, heatwaves, ecosystem degradation, and wildfires.

Investments in climate adaptation will help reduce climate-related losses and generate economic, social, and environmental benefits. A recent WRI analysis of the costs and benefits of 320 adaptation investments across the agriculture, health, infrastructure, and water sectors between 2015 and 2024 found that the expected economic internal rate of return (EIRR) for adaptation is, on average, 27 percent (Brandon et al. 2025). This high EIRR is driven not only by avoided losses from physical risk but also by the expected induced economic, social, and environmental benefits of those investments, which accrue even when the anticipated climate extreme event does not strike.

An improved understanding of the different types of financial instruments being used to finance climate adaptation can help national governments, mayors, and the private sector mobilize finance. Improved financial literacy is required to close the persistent adaptation finance gap. That annual gap, currently estimated to be US$187 to $359 billion, is the difference between the finance currently mobilized for climate adaptation and the amount needed to adapt (UNEP 2024; CPI 2024).

About this working paper

This study sheds light on how 11 different types of financial instruments have mobilized capital for climate adaptation. It does so by analyzing the scope and characteristics of instruments used in 162 cases over the past decade. The study is primarily concerned with whether, and how, each financial instrument enables risk reduction or management—the two components of climate adaptation (GCA 2019). This study also explores the level and sources of the mobilized capital, as well as the roles of different actors.

The cases included in this study were identified through mixed methods and compiled into a dataset for analysis. Relevant cases were first sourced from country members and institutional knowledge partners to the Group of Twenty (G20) Sustainable Finance Working Group (SFWG), a key stakeholder group for this study. To complement these recommendations, cases were also identified through a systematic literature review that combined risk- and instrument-specific search terms. Only cases launched since 2015 were included in the analysis.

This study aims to support public and private actors in navigating the current adaptation finance landscape. Readers can search the publicly available dataset to find additional data and references for cases of interest. However, the dataset is not statistically representative of all financial instruments for adaptation by either the frequency with which they have been used or the total volume of finance mobilized. For example, concessional loans from multilateral development banks (MDBs) and other donor grants have traditionally dominated adaptation finance but do not appear with a similar frequency in this dataset (see "Methodology"). Nevertheless, the study represents a first effort to connect different types of financial instruments with various physical climate risks, illustrating the growing level of diversity in the adaptation finance landscape.

Key findings

There are many routes to mobilize capital for adaptation. Five of the 11 instrument types—bonds, DRF, equity, grants, and payment for ecosystem services—are used to finance adaptation to all six physical climate risks included in the study. Eighty-two cases, or over 50 percent, address multiple risks. The flexibility that some financial instruments offer in addressing multiple physical climate risks suggests that they can be tailored to various contextual factors, including macroeconomic conditions, institutional capacity, and the investment environment.

There is great diversity in how financial instruments are used to address climate risks. While blended finance is the single most frequently used financing instrument except in high-income countries, which rely relatively more on government grants, all countries use a wide range of financing instruments. The use of blended finance is followed by bonds, concessional loans, DRF, and insurance/risk transfer schemes. With a few exceptions, all 11 instrument types are tapped by countries in each of the four country income levels. While not every instrument is used for every physical risk, multiple instruments have been used for every risk.

Financial instruments for climate adaptation tend to focus on proactive (ex-ante) risk reduction rather than reactive (ex-post) risk management. Of the 162 cases analyzed, 103 (64 percent) focus on risk reduction, 52 (32 percent) target risk management, and 7 (4 percent) enable both. Loans, blended finance, bonds, and grants predominantly finance risk reduction, whereas DRF and insurance/risk transfer instruments mainly help manage risks through disaster response and recovery. As a recent WRI study found, risk reduction investments often have high average economic rates of return because they can also generate economic, social, and environmental benefits that go beyond avoided losses and accrue even when disasters do not strike (Brandon et al. 2025). In contrast, risk management benefits are typically limited to compensating for losses and supporting recovery when a disaster does strike.

Cases of project-specific financing are rare, and country-specific cases are reducing in number: finance for adaptation is generally pooled through programs, funds, facilities, or mechanisms. In 75 percent of the study's cases, sources of finance are pooled at a non-project level, presumably to increase their scope and impact, while only 25 percent of cases are project specific. Similarly, instruments targeting multiple countries are increasing in number. In our dataset, the number of multicountry approaches grew over time, from 1 in 2015 to 11 in 2019. Seventy percent of these multicountry instruments are blended finance, DRF, or insurance/risk transfer instruments, some of which demonstrate novel design features.

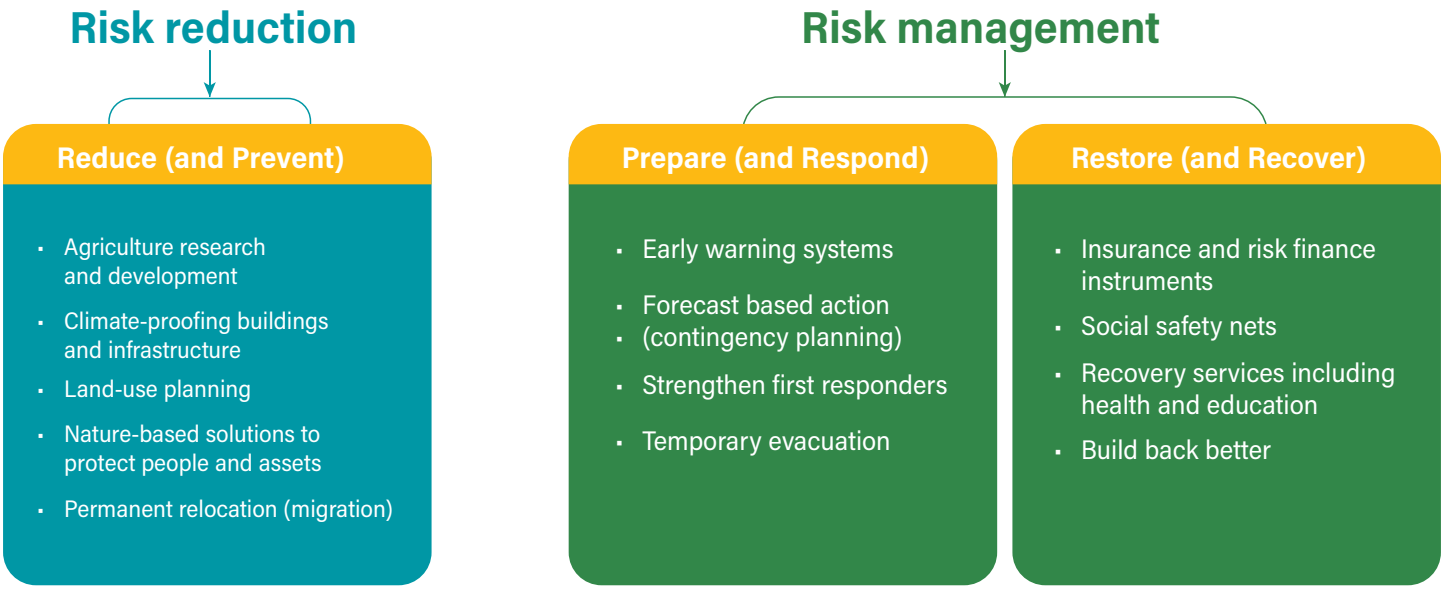
Introduction

Many national and subnational governments, as well as private sector entities, are increasingly focused on identifying and addressing key barriers to scaling up sustainable finance for low-carbon, climate-resilient development. These barriers include poor access to low-interest finance, high transaction costs, and unidentified avenues for investment. Significant strides have been made in mobilizing finance for climate mitigation, which increased from $757 billion in 2018 to $1.78 trillion in 2023 (Naran et al. 2025). Far less attention and investment have historically been directed toward climate adaptation, however, with tracked adaptation flows only increasing from $37 billion to $65 billion over the same period (Naran et al. 2025).

Adaptation involves a wide range of actions that are essential for protecting people's lives, livelihoods, and the systems they depend on. From building infrastructure that is resilient to extreme weather events to developing drought-resistant crops, improving access to climate data, and expanding early warning systems, investments in adaptation can help to avoid climate-related losses while also contributing to development goals. These investments help reduce and manage the escalating risks posed by climate change (see Figure 1).

Investments in adaptation are often misunderstood as having low rates of return despite growing evidence to the contrary. A recent WRI analysis of 320 adaptation investments found, for example, that adaptation investments can also deliver economic,

Figure 1 | **Basic elements of climate change adaptation**



Source: Adapted from the Global Commission on Adaptation (2019, 17).

social, and environmental benefits that do not depend on the occurrence of climate-related disasters or extreme weather events, with average expected returns of 27 percent (Brandon et al. 2025).

Finance for adaptation flows from diverse sources and through an array of financial instruments. It includes both international and domestic finance flows from public and private sources, such as governments, corporations, financial institutions, philanthropies, and banks. Finance for adaptation is delivered through diverse financial instruments, 11 of which are examined in this report (see Table 1). Each instrument carries inherent risk-return profiles, structures, and incentives that depend on the context, project type, and financing needs.

Adaptation finance continues to fall short of the needs of developing countries. According to the most recent Adaptation Gap Report, in 2022, international public adaptation finance flows of $27.5 billion would leave developing countries with an outstanding annual need ranging from $188 to $366 billion through 2030 (UNEP 2024). This gap is expected to widen significantly as climate impacts increase in frequency and intensity. Many developing countries, while among the most vulnerable to climate impacts, are constrained by high debt burdens, limited fiscal space, and elevated costs of capital that reduce the overall finance available to invest in adaptation action.

Building on the priorities of current and previous Group of Twenty (G20) presidencies, the 2025 South African presidency, through the Sustainable Finance Working Group (SFWG), is placing renewed emphasis on strengthening disaster resilience and response while scaling up finance for adaptation in support of just transitions toward climate-resilient, low-carbon economies (G20 South Africa n.d.). This requires an improved understanding of how financial instruments can be leveraged to mobilize finance for adaptation in ways that build on existing analyses of the current adaptation finance landscape (GCA and CPI 2024; CPI 2024; UNEP 2024).

Given this context, this study sheds light on how financial instruments are being used to mobilize capital for climate adaptation and resilience. It does so by compiling and analyzing 162 cases of financial instruments—across 11 instrument types—that have been used over the past decade to reduce and/or manage the impacts of physical climate risks. By showcasing how financial instruments have been tailored to meet diverse adaptation needs, this study supports public and private actors seeking to understand patterns and options available today to build climate resilience.

Table 1 | **List of financial instruments and physical risks analyzed**

FINANCIAL INSTRUMENTS		PHYSICAL RISKS
▪ Blended finance	▪ Grants	▪ Droughts
▪ Bonds	▪ Guarantees	▪ Storms
▪ Concessional loans	▪ Insurance/risk transfer	▪ Floods
▪ Debt swaps	▪ Market-based loans	▪ Heatwaves
▪ Disaster risk financing	▪ Payment for ecosystem services	▪ Land and ecosystem degradation
▪ Equity		▪ Resilience
		▪ Wildfires

Note: Resilience is not a physical climate risk but is included in this study to capture instruments intended to build climate resilience without specifying a particular type of risk.
Source: WRI authors.

Methodology

Scope

This study evaluates 162 cases of financial instruments used to reduce and/or manage physical risks between 2015 and 2025. It does not address transition risks associated with decarbonization. The sample includes 11 financial instrument types (see Table 2). Two of the instruments listed – blended finance and disaster risk finance (DRF)– are not strictly financial instruments. Rather, they are strategic approaches that may have multiple components, including some of the other instruments listed below, However, given their prominence in enabling adaptation action, for simplicity's sake they are referred to below as financial instruments.

This study covers physical risks that are driven by climate-related hazards, exposure, and vulnerabilities. The Intergovernmental Panel on Climate Change (IPCC) defines physical climate risk as the "potential for adverse consequences for human or ecological systems, recognizing the diversity of values and objectives associated with such systems" (Reisinger et al. 2020). This study focuses on six physical climate risks: droughts, storms (including cyclones, hurricanes, and typhoons), floods, heatwaves, land and ecosystem degradation, and wildfires, the majority of which can be considered rapid-onset risks (see Table 3). Although not a

Table 2 | **Description of financial instrument types**

INSTRUMENT	DESCRIPTION
Blended finance	A strategic combination of catalytic capital from public or philanthropic sources to increase private sector investment in sustainable development. The concessional element helps to de-risk investments, making them more financially viable and attractive to private investors (Convergence 2025). Blended finance packages may include various components, such as equity, debt, guarantees, and other incentives.
Bond	Debt security instruments issued by governments, municipalities, corporations, and other entities to raise money from investors willing to lend capital for a certain amount of time at a specific rate of interest. Issuers must repay the principal value of the bond at maturity (US SEC 2025).
Concessional loan	Below-market loans offered by major financial institutions, such as development banks and multilateral funds, to developing countries. Concessional loans have more generous terms than market loans, including lower interest rates and/or longer grace periods (ASPI 2025).
Debt swap	An agreement between a government and one or more of its creditors to replace existing sovereign debt with one or more liabilities—a new debt with different terms or equity—that entail a spending commitment over time toward a specific goal; for example, climate action, environmental conservation, or development goals (World Bank and IMF 2024).
Disaster risk financing (DRF)	A strategic combination of approaches that supports countries' financial resilience to natural disasters and helps them address fiscal impacts, economic losses, and recovery (World Bank 2025). A complete DRF package may include precautionary funds, contingent finance, catastrophe insurance, risk-transfer mechanisms, and new debt for reconstruction. A DRF initiative may include another of the eleven instruments listed here, but is shown separately as it embodies a more holistic approach.
Grant	Nonrepayable funds provided to a recipient for a specific purpose, such as a project or program. They are often used for initiatives that may not generate financial returns but have significant social or environmental benefits.
Guarantee	A legally binding agreement wherein a guarantor assumes responsibility for the debt or performance obligations of the borrower in the event of a default. Guarantees can reduce the perceived risk of an investment and encourage lending among risk-averse investors (CFI 2025b).
Insurance/risk transfer	A means of protection from future financial losses incurred due to specific events, such as natural disasters or project failures. An insurer agrees to compensate the insured for those losses in exchange for a premium. Insurance reduces financial risks and can provide a safety net (PWC 2025).
Market-based loan	Distinct from traditional aid, these loans are provided by development banks and institutions on commercial terms rather than concessional terms and reflect the borrower's market conditions and creditworthiness (Leigland et al. 2016).
Payment for ecosystem services	Payments in kind or in cash to participants—typically landowners—who volunteer to provide services to a specific user or to society. Payments are conditional on natural resource management practices, such as ecosystem protection and conservation, rather than on delivery of services (James and Sills 2019).

Source: WRI authors.

Table 3 | **Descriptions of physical risks**

PHYSICAL RISK	DESCRIPTION
Droughts	When precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems (IPCC 2018).
Storms	An extreme weather condition characterized by very strong winds and heavy rain. In the context of this study, storms include hurricanes, cyclones, typhoons, and subsequent storm surges.
Floods	The overflowing of the normal confines of a body of water or the accumulation of water over areas that are not normally submerged. Floods include river floods, flash floods, urban floods, and sewer floods, and can be caused by intense and/or long-lasting precipitation, snowmelt, dam break, or reduced conveyance due to ice jams or landslides.
Heatwaves	Periods during which local excess heat accumulates over a sequence of unusually hot days and nights, lasting from a few days to months (WMO 2023).
Land and ecosystem degradation	Land degradation is the reduction in the capability of the land to produce benefits from a particular land use under a specified form of land management (UNDRR 1999). Ecosystem degradation refers to the profound impacts on various ecosystems caused by human stressors, leading to a decline in ecosystem health and services (Glavovic et al. 2015).
Resilience*	The capacity to prepare for, respond to, and recover from the impacts of hazardous climatic events while incurring minimal damage to societal well-being, the economy, and the environment (LSE Grantham Research Institute on Climate Change and the Environment 2022).
Wildfires	Uncontrolled fires that burn in wildland vegetation, often in rural areas, and can affect forests, grasslands, and other ecosystems (IPCC 2018).

Note: *Resilience is not a physical climate risk but is included in this study to capture instruments intended to build climate resilience without specifying a particular type of risk.
Source: WRI authors.

specific physical climate risk, climate resilience is also listed as a seventh risk in order to capture instruments that aim to enhance resilience against a range of unspecified physical climate risks.

Data collection

Cases of financial instruments for adaptation included in this study were identified in three ways and compiled into a dataset for analysis. First, SFWG members and knowledge partners recommended exemplary instruments believed to demonstrate noteworthy approaches or significant impact. The dataset includes 61 recommended cases (37 percent of the sample) that cover a wide range of countries, instrument types, and physical risks.

Second, the research team conducted a systematic review using Google Search to identify additional examples of financial instruments used for adaptation finance. These cases represent 61 percent of the sample. Standardized search terms were applied for each instrument type and range of physical risks (see Appendix A for search terms used) to identify cases from around the world and across both public and private sources. Including a string of risk-specific terms (e.g., floods, droughts, and storms) ensured that the dataset includes cases that aren't explicitly labeled as adaptation but nonetheless finance adaptation. To optimize the relevance of the study, researchers excluded documents published before 2019. Given time constraints, researchers reviewed all sources generated within the first five pages of results. All relevant cases in those sources—another 99 cases—were included in the sample. Finally, two cases were sourced from previous WRI research.

The research team applied three criteria for the selection of financial instruments. First, only instruments that explicitly aimed to reduce and/or manage a specific physical climate risk(s) or enhance climate resilience were included to ensure that they could be mapped to those risks. Second, it focuses on financing elements of adaptation strategies including contingency finance and safety net, but it does not include emergency response and recovery operations in response to specific events.

Third, the study focuses on instruments launched in the last decade to ensure that the dataset represents the contemporary adaptation finance landscape and is relevant to deepening our understanding of it.

The distribution of these 162 cases by instrument type is provided in Table 4. For each case, the dataset captures the year of mobilization (see Figure 2), whether it aimed to support risk reduction and/or management, the types of physical risk(s) addressed, geographic scope (see Figure 3), economic and financial characteristics of destination countries, the roles of actors involved, sectors covered, innovative components or features, and intended amount of finance mobilized. The source of finance—international domestic, or both—and whether finance is pooled as a facility, fund, mechanism, or program are also captured. Table 5 provides a definition for each financial arrangement used to tag cases.

Figures 2 and 3 and Table 6 profile the resulting data by the year in which they were launched and by country of implementation. Figure 2 shows the gradual increase in the number of instruments used for adaptation since 2019, with 26 cases each in 2023 and 2024. There are only nine cases from 2025 in the dataset because the data collection process was completed in June and, therefore, does not cover all cases from this year. Figure 3 shows the highest concentrations of cases in large countries, such as the United States, Mexico, Brazil, Russia, Nigeria, India, Indonesia, and Australia, although, again, the dataset is designed to be more illustrative than statistically significant. The high number of cases in the United States reflects the prevalence of both national and subnational adaptation actions. Notably, the map does not represent the 60 multicountry cases in the dataset, as it was not possible to determine all countries covered by those instruments. Table 6 shows that blended finance, an increasingly common instrument used for managing risk, is by far the instrument most commonly structured around multicountry approaches.

Table 4 | **Representation of financial instruments by instrument type**

INSTRUMENT TYPE	COUNT	SHARE OF SAMPLE (%)
Blended finance	34	21
Bond	28	17
Concessional loan	10	6
Debt swap	6	4
Disaster risk financing	13	8
Equity	4	2
Grant	30	19
Guarantee	5	3
Insurance or risk transfer	21	13
Market-based loan	5	3
Payment for ecosystem services	6	4
Total	**162**	**100**

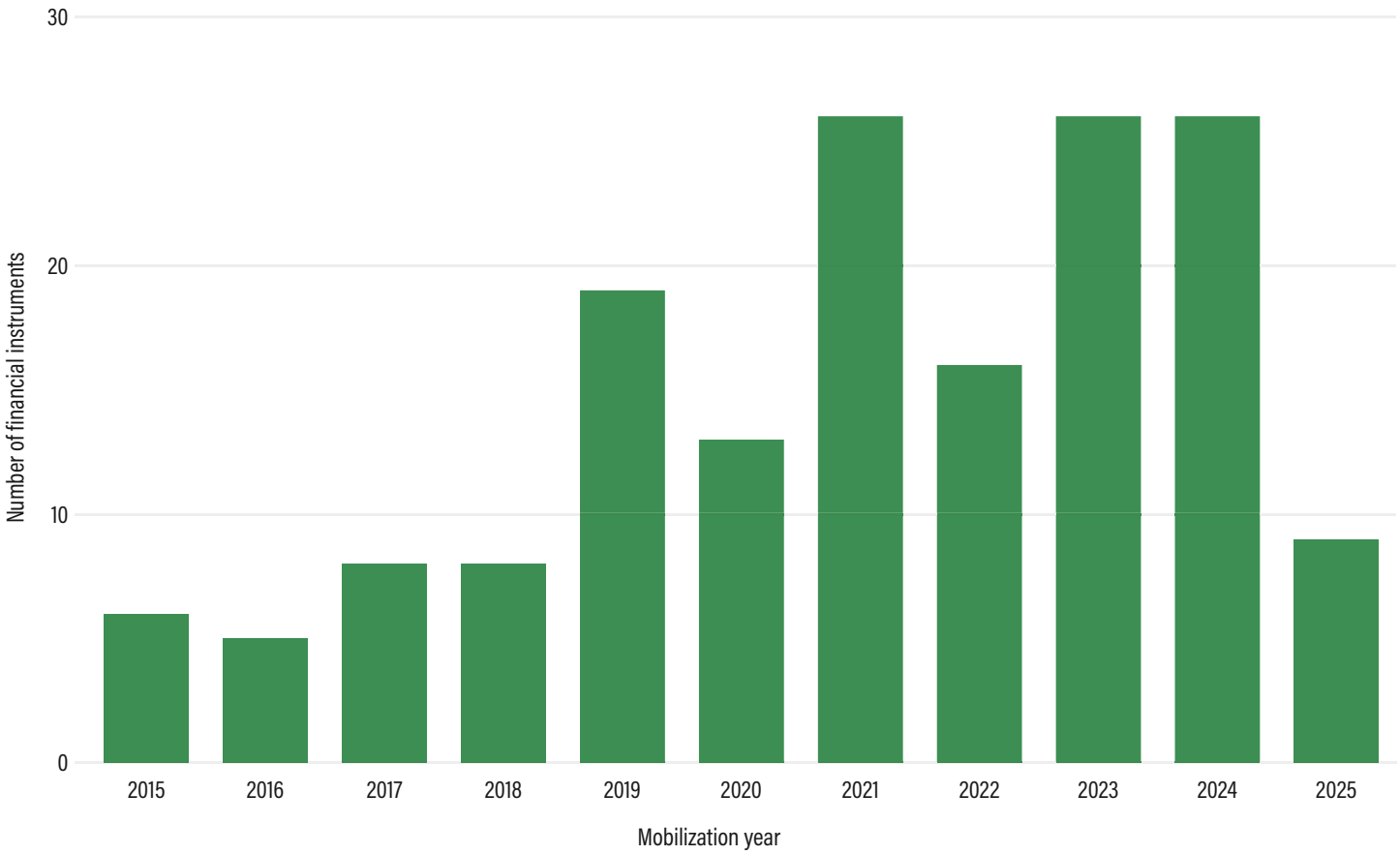
Source: WRI authors.

Table 5 | **Descriptions of financial arrangements**

	DESCRIPTION
Facility	An agreement between a source of funds and a recipient that outlines the terms and conditions for accessing funds. It is essentially a way for recipients to access capital when needed, providing them with the resources to support operations, cover expenses, or manage unexpected financial challenges.
Fund	A pool of money invested by multiple investors, managed by professionals, and used to purchase various assets, such as stocks, bonds, or real estate. This collective investment approach aims to offer diversification and potentially better returns than individual investments.
Mechanism	A structured way to provide financial resources, often used to address specific needs or objectives. It can involve funding, risk transfer, or other financial tools to achieve a particular goal. A mechanism, unlike a facility or a fund, often does not manage dedicated funds.
Program	In project management, a "program" is a group of related projects that are managed in a coordinated way to achieve broader, strategic objectives. Programs are typically long-term and aim to deliver organizational benefits that wouldn't be possible by managing individual projects separately.
Project	"Project-specific" finance is arranged between two or more parties but not as part of a larger program, facility, fund, or mechanism. This classification also includes bonds, since bonds have specific issuing entities.

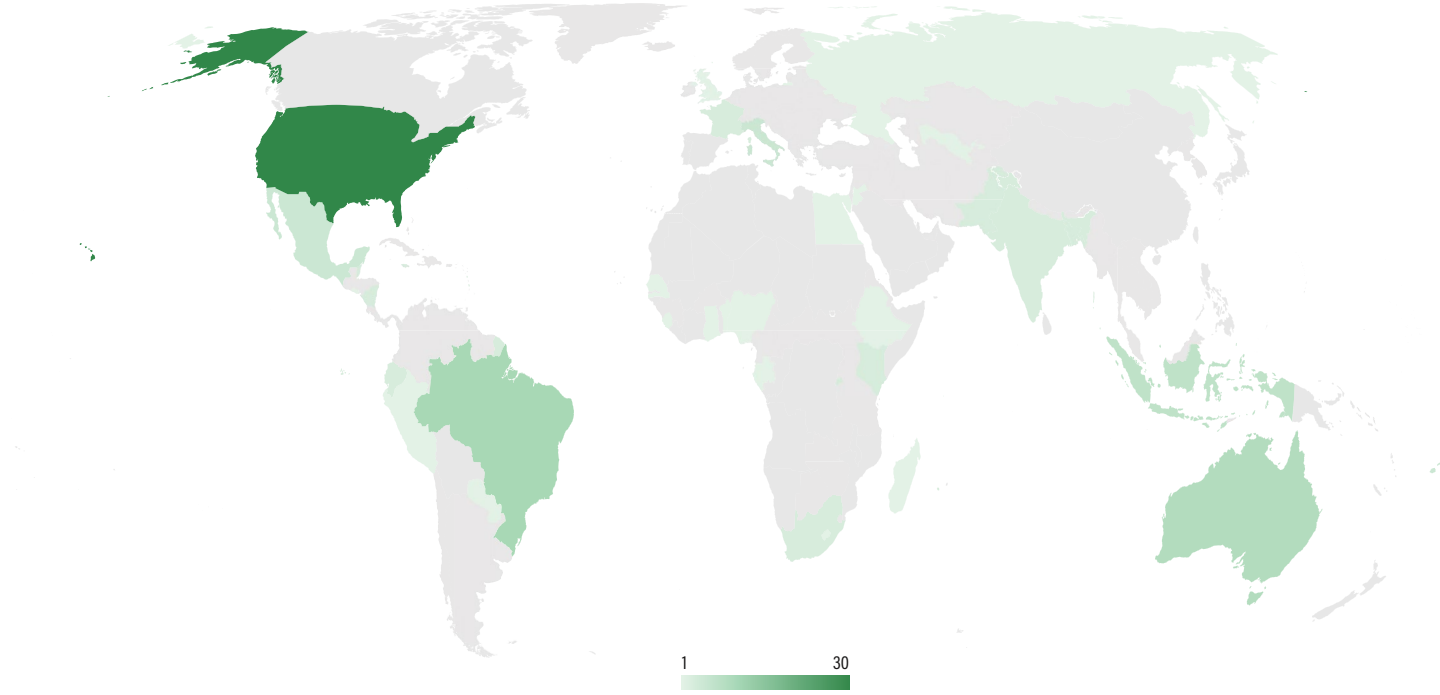
Source: WRI authors.

Figure 2 | **Distribution of cases by year**



Note: 2025 includes only partial data.
Source: WRI authors.

Figure 3 | **Distribution of cases by country**



Source: WRI authors.

Table 6 | **Distribution of cases by instrument type and region**

INSTRUMENT TYPE	AFRICA (%)	ASIA (%)*	LATIN AMERICA (%)*	OECD (%)	GLOBAL/REGIONAL/ MULTIREGIONAL (%)
Blended finance	23	10	22	2	55
Bond	23	13	7	30	6
Concessional loan	7	7	15	2	3
Debt swap	7	0	15	0	0
Disaster risk financing	7	17	15	0	6
Equity	3	0	0	2	6
Grant	7	20	0	48	3
Guarantee	0	3	7	0	6
Insurance/risk transfer instrument	10	20	11	14	10
Market-based loans	7	3	4	0	3
Payment for ecosystem services	7	7	4	2	0
Total	**100**	**100**	**100**	**100**	**100**

Note: *These data do not include the region's OECD member countries.
Source: WRI authors.

Limitations

The primary limitation of this study is the availability of data on finance for adaptation, which is an evolving and debated concept. While not an exhaustive or statistically representative sample of the current financial landscape for adaptation, the study's sample is nonetheless illustrative of the diversity of financial instruments available for adaptation and disaster risk management and their uses across a range of risks, geographies, and actors.

In addition, this study's methodology and subsequent findings face the following limitations:

- The 11 financial instrument types included in this study reflect those commonly used at the time of data collection. They do not, however, include instruments for which there is no or limited publicly available information.
- The current analysis does not represent the monetary value of finance mobilized in each case, only the frequency of cases by instrument type. It also does not evaluate the quality of finance mobilized, which varies by instrument type and conditions of deployment. These analyses are beyond the scope of this paper, although integral to a borrower's full understanding of any given adaptation finance option.
- The distribution of instruments in the dataset is representative of the universe of instruments based on a systematic search and SFWG partner recommendations. It is not, however, statistically representative of either the global frequency with which each instrument type may have been used for adaptation or the frequency used in any particular location.
- Development-oriented loans from multilateral development banks (MDBs) are not typically captured in this dataset, even though some do build resilience in selected project subcomponents. This is because MDB project descriptions focus on development benefits more than on climate adaptation co-benefits and are therefore not picked up by the search algorithm. As a result, the role of MDB-financed concessional loans is underrepresented in the dataset.
- The dataset captures whether one financial instrument addresses multiple risks, but it does not show if one risk (e.g., flooding in Lagos) may be addressed by multiple instruments or investments.
- The study's search results are not exhaustive; they did not yield many examples of financial instruments deployed, for example, at the local level beyond those in the United States and Europe. This may be because there is limited information available related to financial flows at the subnational level in developing countries, or simply because the scale of locally led adaptation remains small. The fact that this study's comprehensive search parameters did not yield results of instruments being applied at the local level in other countries may indicate that this is an important and outstanding gap in the adaptation finance landscape.

Despite these limitations, the sample improves our understanding of the diversity of financial instruments that contribute to risk reduction and management, the channels through which capital is mobilized, and the roles of various actors involved in the design and deployment of financial instruments for adaptation. Perhaps most importantly, it highlights the kind of financial innovation and structuring that can help to scale flows of finance for adaptation (see Table 7).

Findings

Each financial instrument type addresses a range of physical risks

While not every instrument is used for every physical risk, multiple instruments have been used for each risk. Figure 4 illustrates how each financial instrument addresses each of the seven risk types. As shown, none of the 11 financial instrument types addresses a single physical risk only. Payment for ecosystem services, grants, equity, DRF, concessional loans, and bonds are all used, for example, to finance adaptation to each physical risk included in this study. The range of physical risks that each financial instrument type addresses highlights their potential to mobilize finance for diverse adaptation needs. Table 7 profiles illustrative cases across instrument types and physical risks included in this study.

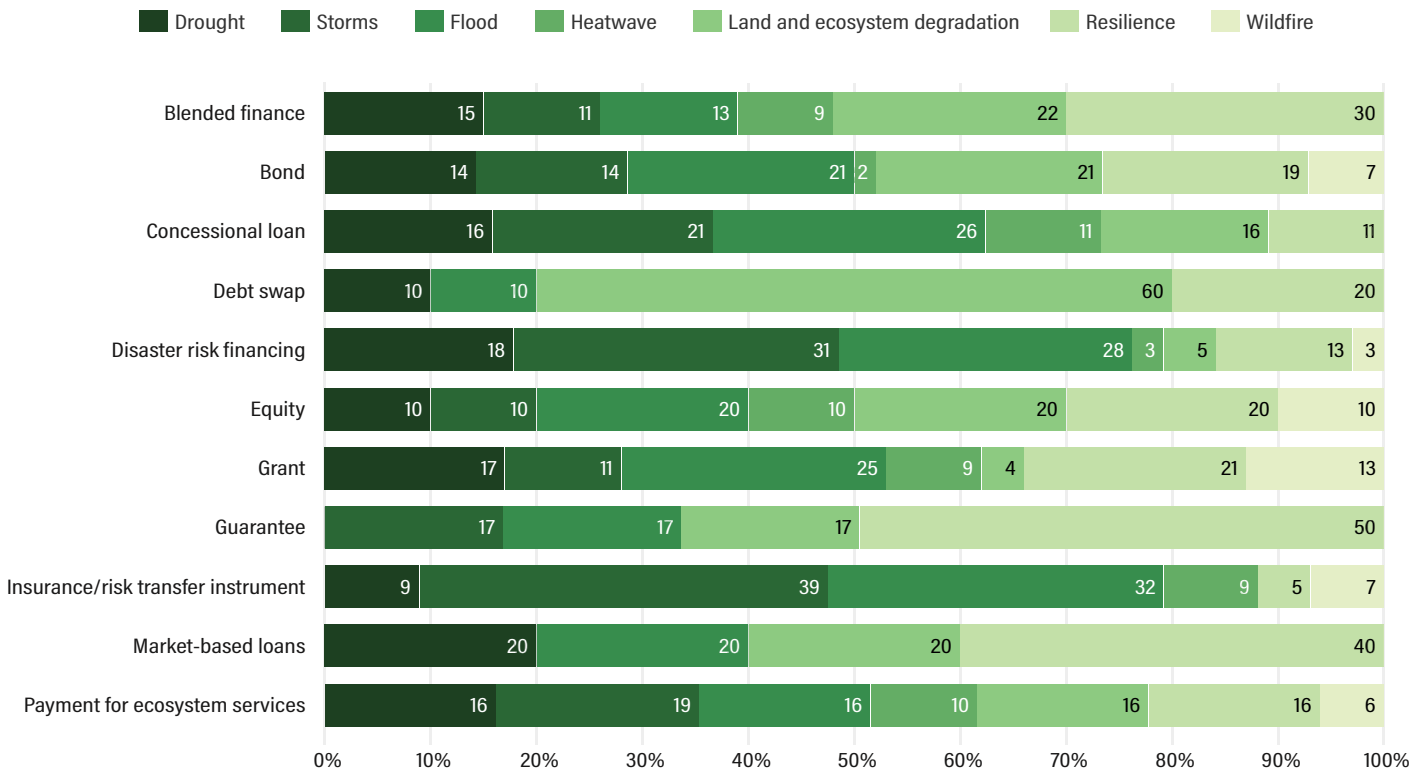
Some instrument types in the sample are used more frequently to address specific physical risks. For example, 60 percent of debt swaps were used to address land and ecosystem degradation—the prevention of which is enshrined in the Kunming-Montreal Global Biodiversity Framework—six times more than they are used to address droughts or floods. In the first debt-for-nature swap executed in Africa, Gabon refinanced $500 million of its sovereign debt through the issuance of a blue bond designed to unlock $165 million for marine conservation initiatives over 15 years, helping to build economic and environmental resilience (TNC 2023). Additionally, 28 percent of the blended finance cases and 50 percent of the guarantees analyzed in this study aim to build capacity to address multiple risks. The Sustainable

Development Goals (SDGs) Loan Fund, for instance, is a $1.1 billion blended finance vehicle that seeks to advance the United Nations SDGs in emerging and frontier markets through high-impact loans to local companies in Latin America, Asia, Africa, and Eastern Europe (Allianz SE 2023).

Analyzing the use of financial instrument types by physical risk is particularly useful for national and subnational governments. Figure 5 shows the inverse of Figure 4: how often adaptation to each risk type is financed by each of the 11 financial instrument types. This view shows which instrument types most commonly address the problems governments face and, therefore, have the potential to be replicated. For floods, for example, a wide variety of instruments have been used. In contrast, payment for ecosystem services (PES) schemes have been used most frequently for droughts, and grants have been used most frequently for wildfire protection.

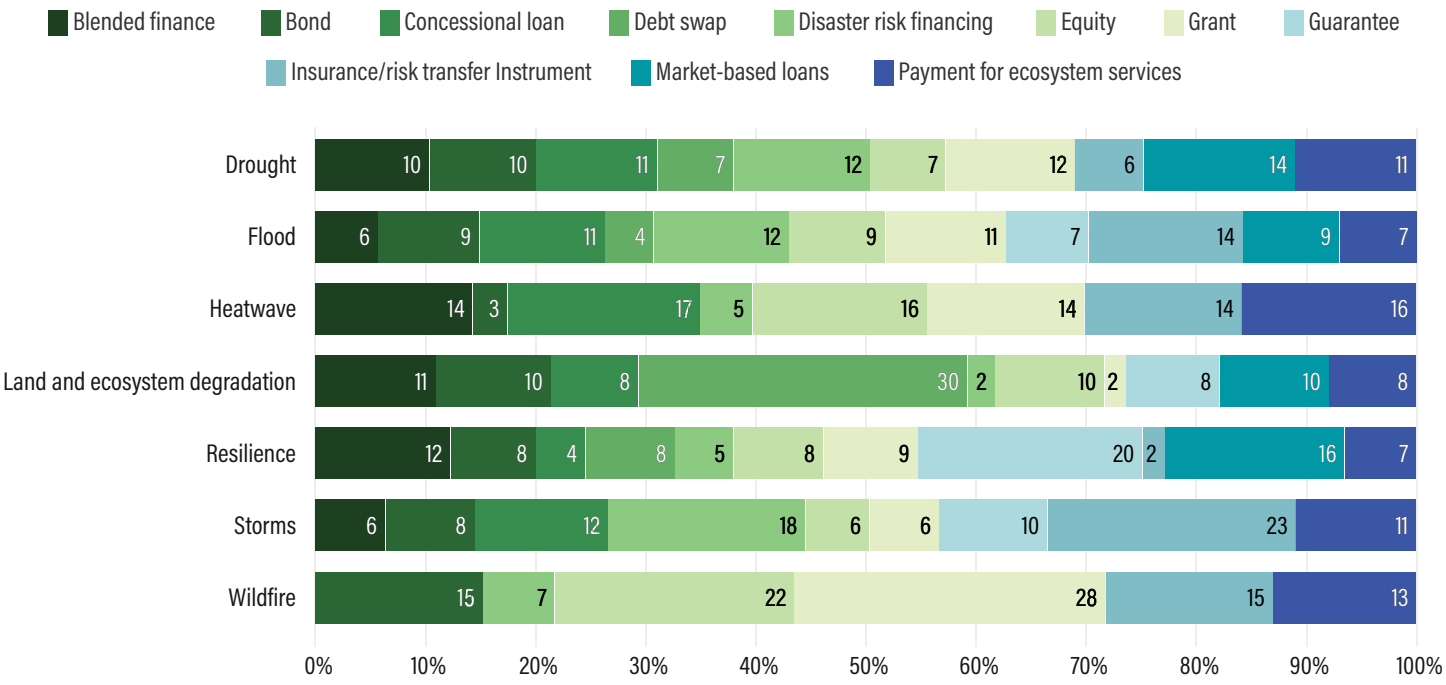
Some financial instrument types, however, do not address certain physical risks. No blended finance instrument included in this study, for example, was found to support adaptation to wildfires. Debt swaps and market-based loans are neither used to reduce nor manage the impacts of storms, heatwaves, or wildfires, which suggests some degree of specialization.

Figure 4 | **Physical climate risks by financial instrument type**



Source: WRI authors' analysis of 162 financial instruments used for climate adaptation.

Figure 5 | **Types of financial instruments by physical climate risk**



Source: WRI authors' analysis of 162 financial instruments used for climate adaptation.

Table 7 | **Illustrative cases of financial instruments for climate adaptation**

CASE NAME	DESCRIPTION	INSTRUMENT TYPE	ADAPTATION COMPONENT	PHYSICAL RISK(S) ADDRESSED
Global Fund for Coral Reefs (GFCR) (Global)	GFCR was established by the United Nations Development Programme (UNDP) in 2020 as the first—and only—global blended finance instrument dedicated to strengthening the resilience of coastal reef ecosystems, communities, and economies to climate change by mobilizing new public and private resources. The GCFR consists of two funds. The United Nations manages a fund that provides grants, technical assistance, and concessional finance, while the equity fund is managed by Pegasus Capital Advisors and invests in commercial projects and companies with business models that reduce threats to coral reefs. Since its establishment, the GFCR has mobilized $500 million (CFA n.d.; GCF n.d.; GFCR n.d.).	Blended finance	Risk reduction	Land and ecosystem degradation
InsuResilience Solutions Fund (ISF) (Global)	Launched in 2018 by KfW on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) and managed by the Frankfurt School of Finance & Management, the ISF provides grants for designing, pilot testing, and launching innovative climate risk insurance products in developing countries, targeting households, small and medium-sized enterprises (SMEs), humanitarian organizations, and governments vulnerable to climatic shocks such as floods, droughts, and storms (InsuResilience Global Partnership 2018).	Blended finance	Risk management	Droughts, storms, and floods

Table 7 | **Illustrative cases of financial instruments for climate adaptation (cont.)**

CASE NAME	DESCRIPTION	INSTRUMENT TYPE	ADAPTATION COMPONENT	PHYSICAL RISK(S) ADDRESSED
Gabon's debt for nature swap (Gabon)	Gabon refinanced $500 million of its sovereign debt in 2023 through the issuance of a "blue bond" for the first time in Africa. The instrument aims to unlock approximately $163 million over 15 years for marine conservation initiatives to combat ecosystem degradation, including through the expansion and improved management of marine protected areas and enforcement against illegal fishing activities (TNC 2023; UNEP 2023).	Debt Swap	Risk reduction	Land and ecosystem degradation
Inter-American Development Bank (IDB) Flexible Finance Facility (FFF) (Latin America)	The IDB builds in Catastrophe Protection Conversions through which sovereign borrowers can manage exposure to catastrophe risk. The FFF provides borrowers with a cost-effective, streamlined way to secure catastrophe risk transfer instruments. If a predefined catastrophe occurs, the country receives a corresponding cash payout from the IDB. In exchange for this protection, the country pays the costs of the market instrument issued by the IDB, plus an applicable fee (IDB n.d.).	Disaster risk financing	Risk management	Storms
Equity fund under the InvestEU program (European Union)	InvestEU is a cornerstone of the European Union's strategy to mobilize private finance for strategic investments, with a particular emphasis on climate and environmental sustainability. InvestEU integrates EU budgetary guarantees with private capital to bridge the climate investment gap. The European Investment Bank (EIB), as the main implementing partner, plays a pivotal role in deploying loans, guarantees, and equity through both the EIB and European Investment Fund (EIF). The EIB focuses on large-scale infrastructure and adaptation projects in renewable energy, sustainable transport, and resilient cities, while the EIF targets SMEs and mid-caps, providing risk-sharing solutions that stimulate private investment in climate innovation. The guarantee mechanism supports mobilizing investments for specific thematic areas, including climate adaptation mobilized by financial intermediaries. For example, the EIF is deployed to venture capital, private equity, and private credit. The equity fund has so far mobilized approximately €10 billion in sustainable infrastructure, including nature and the environment (EIF n.d.).	Equity	Risk management	Storms, floods, heatwaves, land and ecosystem degradation, and wildfires
The Green Guarantee Company (GGC)(Global)	The GGC is the world's first climate-focused financial guarantor, established to mobilize private capital for climate mitigation and adaptation projects in developing countries. By providing credit guarantees, the GGC enhances the creditworthiness of green bonds and loans, enabling borrowers in emerging markets to access global capital markets. It also provides borrowers with technical assistance for project preparation, certification, and capacity-building (GGC n.d.).	Guarantee	Risk reduction	Resilience
Cyclone Reinsurance Pool (CRP) (Australia)	The CRP is an initiative operated by the Australian Reinsurance Pool Corporation (ARPC); it is designed to provide reinsurance for cyclones and related flood damage. Commencing operations in July 2022 and supported with an annual AU$ 10 billion guarantee by the Australian Government, the CRP aims to improve the accessibility and affordability of insurance for households and small businesses in cyclone-prone areas across Australia (Australian Government n.d.).	Insurance or risk transfer: reinsurance scheme	Risk management	Storms and floods
Quintana Roo Reef Protection policy (Mexico)	Mexico's Quintana Roo Reef Protection policy is a parametric insurance policy designed to protect 100 miles of the Yucatán coastline in Mexico. The claim payment is triggered when hurricane wind speeds reach a pre-agreed level, allowing the policyholder to receive funds to help repair the area's coral reef quickly. The policy was launched in 2018 by the Swiss Re Group and The Nature Conservancy (TNC). The Coastal Management Zone Trust purchased the policy using coastal concession fees from the tourism industry and coastal property–adjacent owners or users, in addition to some government funding. The policy helps to maintain the reef and, by extension, the resilience of the community that relies on it (GFI n.d.).	Insurance or risk transfer: parametric insurance	Risk management	Storms

Table 7 | **Illustrative cases of financial instruments for climate adaptation (cont.)**

CASE NAME	DESCRIPTION	INSTRUMENT TYPE	ADAPTATION COMPONENT	PHYSICAL RISK(S) ADDRESSED
Wildfire Resilience Insurance (United States)	A pioneering insurance policy launched in April 2025, Wildfire Resilience Insurance is designed to incentivize and reward proactive wildfire risk reduction efforts by reducing insurance premiums based on the implementation of ecological forest management practices (e.g., tree thinning and planned fires). Structured by Willis Towers Watson and developed in collaboration with TNC and the Center for Law, Energy & the Environment (CLEE) at the University of California, Berkeley, this policy integrates ecological forest management practices into insurance underwriting. It was first implemented for Tahoe Donner, a private homeowners association in Truckee, California, covering 1,345 acres of forested and recreational land (UC Berkeley Law 2024).	Insurance or risk transfer: proactive risk reduction measure	Risk management	Wildfires
Water security and climate adaptation (Jordan)	Financed by a €400 million loan from the EIB, this is a comprehensive program aimed at increasing Jordan's water security and resilience to climate change. The program focuses on improving water infrastructure, reducing nonrevenue water losses, and implementing climate adaptation measures in alignment with Jordan's National Water Strategy and related policies. An example of results-based financing, loan disbursements are triggered by enhanced efficiency and accountability in water management (EIB 2024).	Market-based loan	Risk reduction	Droughts
Grassroot level Response towards Ecosystem Enhancement and Nurturing (GREEN) Meghalaya scheme (India)	Managed and funded by the Meghalaya Basin Management Agency, India's GREEN Meghalaya scheme incentivizes communities to protect their existing ecological assets, including sacred groves, and to develop new forests. In addition to providing technical assistance, the PES scheme compensates landowners for conserving forests for a period of 30 years (MBMA 2025).	Payment for ecosystem services	Risk reduction	Droughts, storms, floods, land and ecosystem degradation, and resilience

Source: WRI authors.

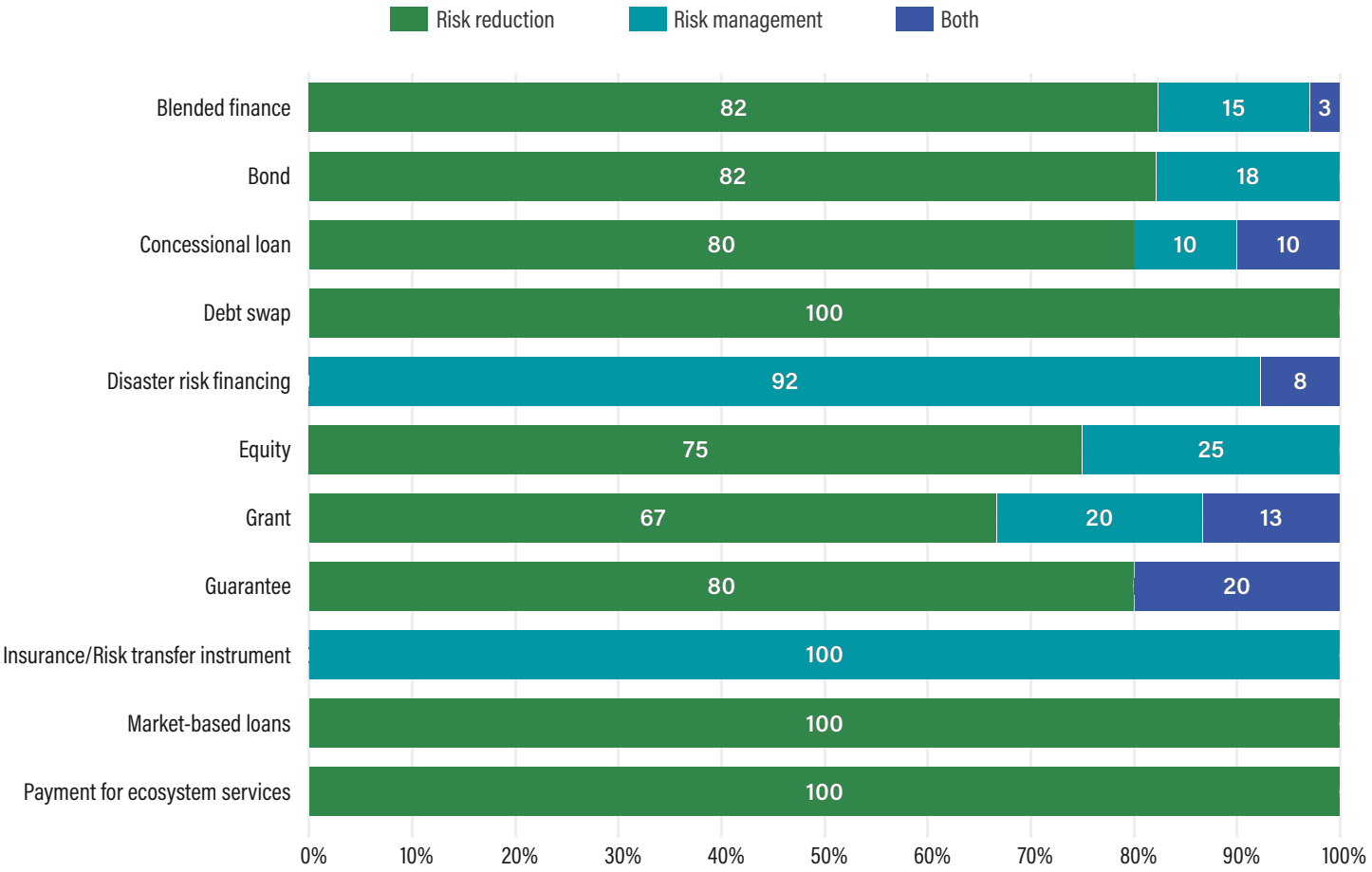
Financial instruments for adaptation focus on risk reduction more than risk management

Most financial instruments included in this study aim to reduce, rather than manage, the impacts of physical risks (see Figure 6). Risk reduction refers to ex-ante investments aimed at reducing the impact of climate-related events on lives and livelihoods, while risk management involves investing in disaster response and recovery measures (GCA 2019). All PES schemes, market-based loans, and debt swaps analyzed were used exclusively to reduce the impact of risks (see Figure 7). For example, the Grassroot level Response towards Ecosystem Enhancement and Nurturing (GREEN) Meghalaya PES scheme compensates communities for conserving and protecting forests for a minimum of 30 years to ensure long-term ecological balance, biodiversity conservation, and climate resilience (MBMA 2025).

In contrast, insurance or risk transfer instruments and DRF instruments are designed to be triggered in the event of a disaster and provide capital for disaster response and recovery. This study analyzed several parametric insurance products—the Quintana Roo Reef Protection policy in Mexico and the multicountry STORM and Descartes tropical cyclone insurance schemes, for example—that use weather data to track wind speeds during a hurricane or tropical cyclone that, once exceeding an agreed threshold, trigger a predetermined payout (Descartes n.d.; GFI n.d.; Swiss Re n.d.). All the insurance or risk transfer instruments and DRF instruments were used exclusively for risk management rather than risk reduction activities.

Instruments that reduce risks are likely used more frequently because ex-ante investments that build the resilience of infrastructure, services, and systems to future hazards are more economically efficient than recovering from the impacts of those hazards. Risk reduction investments have greater potential to generate returns even if anticipated extreme events do not

Figure 6 | **Cases that reduce and/or manage physical risk by instrument type**



Source: WRI authors

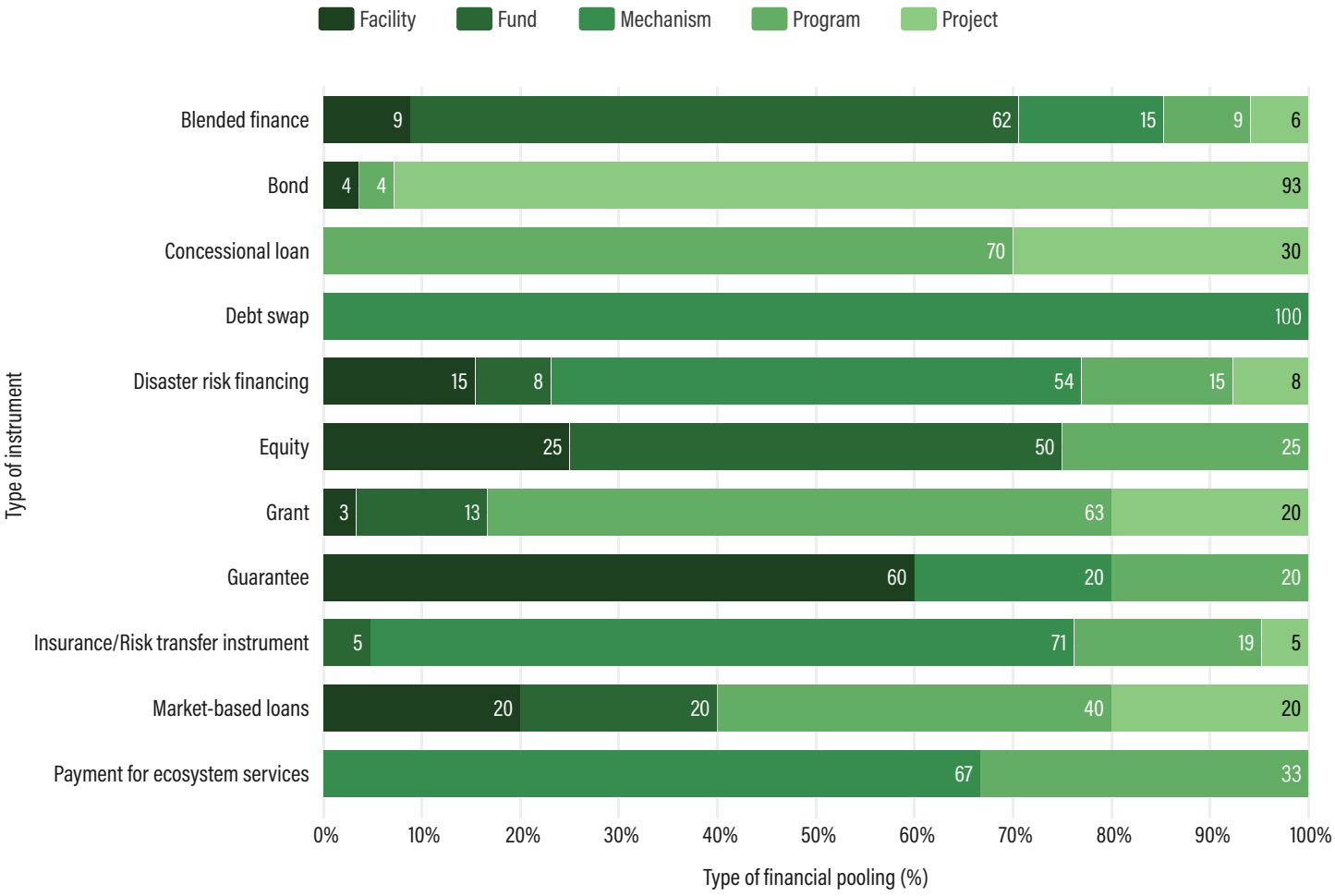
occur. Still, risk management expenditures are a necessary, if not sufficient, component of any comprehensive climate adaptation strategy.

Finance for adaptation is mostly pooled through programs

Four approaches to pooled finance emerged from cases included in this study's sample: funds, facilities, mechanisms, and programs. Project finance, including bonds, typically enables financial flows from the investor to the recipient through a single specialized agreement between the financing entity and borrower or recipient toward a specific outcome or set of outcomes. Pooled finance, on the other hand, refers to the grouping of finance—typically from multiple sources—that is allocated across multiple projects with similar or complementary outcomes.

Most financial instruments (75 percent) pool adaptation finance resources at a non-project level, with only 25 percent of the cases involving project-specific finance. Forty-two (or 26 percent) of the financial instruments analyzed in this study pool finance through programs, the highest of which (45 percent) are grant programs. Additionally, 70 percent of funds are structured as blended finance, and the highest category of mechanisms is insurance and risk transfer instruments (37 percent). Australia's Reinsurance Pool Corporation's Cyclone Pool exemplifies such a mechanism; as a reinsurance arrangement between insurers and the Australian Reinsurance Pool Corporation, the Cyclone Pool reduces insurance premiums for households and small businesses facing high cyclone risk by reducing the cost of reinsurance (Australian Government n.d.).

Figure 7 | **Cases by instrument type and financial pooling**



Source: WRI authors.

Multicountry instruments are increasing in number

Instruments that provide finance to multiple countries account for 47 percent of the instruments included in this study. The share of multicountry instruments, including both regional and cross-regional instruments, has been increasing over the past eight years. While only 16 percent of the instruments were found to have been used across multiple countries in 2015, their share increased to 47 percent in 2024. Seventy percent of these multicountry instruments are blended finance, DRF, or insurance/risk transfer instruments.

This growth in multicountry blended finance and insurance/risk transfer instruments could be attributed to risk pooling, transactional efficiency, and greater demand for those instruments that already tend to be multicountry. First, investors can better manage and transfer risks associated with climate change through multicountry instruments, which better distribute not only physical risks but also currency and market risks. Second, since there are substantial costs and complexities associated with setting up and replicating these instruments, they might target multiple countries to overcome these challenges. For addressing certain risks—particularly storms and floods—financial instruments need not be designed specifically for a single country. A third possible reason is that blended finance, DRF, and insurance/risk transfer instruments are increasing as a share of total adaptation finance.

Some multicountry instruments reflect new financial structures. The Catalyst Fund, for example, is a blended finance impact fund and accelerator that supports early stage technology start-

ups building a climate-resilient future in Africa through equity investments. With access to over 250 investors and partners with diverse goals, the fund blends concessional and commercial equity capital to invest $200,000 in selected pre-seed portfolio companies. In addition to capital and venture-building support, the fund also provides product, data, technological, operational, growth marketing, and fundraising support (Catalyst Fund n.d.; Global Innovation Lab for Climate Finance n.d.).

Country income status and financial instruments

This study captured the income status and credit rating of each country to analyze whether those factors appear to influence the choice of financial instruments. Table 8 shows the share of financial instruments by instrument type mapped to country income status. For cases mobilized in more than one type of country, the case was counted more than once. Cases that did not specify the countries in which they were mobilized are not included in this table since country income statuses could not be determined.

The data show that low-income countries (LICs) in the dataset have used every financial instrument type for adaptation except for debt swaps and equity. Blended finance instruments were the most frequently used instruments in LICs, accounting for nearly 50 percent of all instrument types. This might point to the catalytic use of public finance to de-risk and unlock private finance as a preferred approach by governments in LICs to scale up investment in adaptation. Debt swaps, on the other hand, are better suited to countries with sustainable levels of debt, as opposed to those in debt distress. Additionally, debt swaps are complex arrangements that require technical capacity for implementation and monitoring. This point is supported by the fact that five of the six analyzed debt swaps are being deployed in upper-middle-income countries (UMICs): Barbados, Belize, Ecuador, Gabon, and Peru. As noted in the "Limitations" section, the low rate of concessional loans in the dataset for LICs does not imply that MDBs are not financing climate adaptation through development-oriented loans; rather, those adaptation co-benefits are not typically captured by this study's search algorithm.

Table 8 | **Distribution of financial instruments by country income status**

INSTRUMENT TYPE	LOW INCOME (%)	LOWER-MIDDLE INCOME (%)	UPPER-MIDDLE INCOME (%)	HIGH-INCOME (%)
Blended finance	52	35	35	2
Bond	7	15	11	26
Concessional loan*	0	10	8	2
Debt swap	0	0	6	4
Disaster risk financing	11	6	13	2
Equity	0	5	3	2
Grant	7	5	5	46
Guarantee	4	5	5	0
Insurance/risk transfer instrument	7	10	10	14
Market-based loan	7	5	3	0
Payment for ecosystem services	4	5	2	2
Total	**100**	**100**	**100**	**100**

Note: *Given the study's search algorithm, development-oriented loans from MDBs are not typically captured in this dataset, even if those loans may have climate adaptation co-benefits.

Source: WRI authors.

Similarly, lower-middle-income countries (LMICs) deployed blended finance instruments more frequently than other instrument types, followed by bonds. Just over one-third (35 percent) of all cases in LMICs involved blended finance. Bonds are the second most frequently used instrument in LMICs, at 15 percent of the share. This is an interesting finding that challenges the perceived relationship between a country's income status and credit rating; it highlights the important role that third parties can play in bond issuances. For instance, among the LMICs in the dataset, Pakistan, the Philippines, and Kenya either obtained a 100 percent guarantee or relied on the World Bank and International Finance Corporation (IFC) to issue the bond. Notably, Benin's SDG Bond, Egypt's Sovereign Green Bond, and Ghana's Green Bond were all sovereign issuances that performed well despite the countries' low credit ratings.

Blended finance instruments also have the largest share of all instruments in UMICs. However, DRF (13 percent) and bonds (11 percent) are also prominent. Bonds in this group are issued by countries such as Ecuador (the Bolivariano Blue Bond), Fiji (the Sovereign Green Bond), Mexico (the Sovereign SDG Bond), and South Africa (the City of Cape Town's Green Bond and FirstRand's Green Bonds for Climate Adaptation). DRF instruments were implemented in Fiji, Indonesia, and Tuvalu to address multiple physical risks, as well as in Jamaica to provide financial protection against tropical storms.

High-income countries (HICs) were found to most frequently use grants, followed by bonds. Subnational grants provided by federal agencies in the United States account for all the grants in this category. (In lower- and middle-income countries, grants would more likely be funded internationally rather than locally.) Given that bond issuances rely on the issuer's creditworthiness, it is not entirely surprising that HICs with good credit ratings, such as the United States, have the capacity to issue bonds to raise capital for climate adaptation projects. Insurance also features prominently in HICs, highlighting the overall higher rates of insurance penetration.

Instrument profiles

This section covers the design, deployment, and frequent sources of capital across instrument types. It highlights the diverse actors engaged—and the complex collaboration often required among them—in mobilizing capital for adaptation. In addition, Table 9 provides the monetary ranges of each instrument type, per the dataset, and indicates whether an instrument typically generates returns or requires repayments.

- **Blended finance.** For all country income levels except for HICs, blended finance is the most frequently used financing instrument. The 34 blended finance cases are funded by diverse actors, including local savings banks, commercial capital, bilateral government funders, development finance institutions, and MDBs. These structures pool capital through various sources and may use a combination of debt, equity, and grant components to provide capital to borrowers and recipients. Blended finance structures typically involve different layers of financial risks shared by public and private actors, depending on their appetite. Of the 34 cases, 17 are structured and managed by a fund manager. Four cases involve predominantly multilateral climate funds and MDBs, and two are primarily based on concessional funding, grants, or technical assistance. Four cases rest upon a broad alliance of actors, including research institutions, philanthropies, development finance institutions (DFIs), MDBs, national development banks, government ministries, and private investors that tend to cater to multiple countries globally and/or a vast ecosystem (e.g., marine protected areas). Two of the 34 cases are focused on highly specific services or subsectors, such as providing cooling services or water, which generate direct-to-consumer services.
- **Bonds.** Of the 28 bonds captured in the study, 9 were issued by sovereign governments and 9 by local governments, the latter mostly in the United States. Subnational bonds, common in the United States, are not permitted in many developing countries or are not supported by local capital markets. The remaining bonds were issued by MDBs, multi-entity groups, the private sector, and one foundation. Several were for infrastructure projects that ranged from women-led micro-infrastructure projects to green infrastructure to large-scale stormwater management, and many mentioned water as a key focus. A few provided funding for parametric insurance that would provide payouts once a specific threshold of impacts, usually from flooding, was passed. Many of the bonds involved partnerships among multiple actors in roles such as financier, fund manager, and implementer, among others.
- **Concessional loans.** Borrowers of 6 of the 10 concessional loans in the sample were sovereign governments, with the remaining 4 consisting of a commercial bank, households, local communities, and a government agency. An MDB provided the finance in all but one case. Agricultural producers were the ultimate targets of 4 of the 10 loans, while the others covered water providers, climate educators, and more general resilience-building activities. As mentioned

in the "Limitations" section, MDB loans to governments with adaptation co-benefits are underrepresented in this dataset.

- **Debt swaps.** National governments featured prominently as initiators, implementers, and beneficiaries of the six debt swaps included in this analysis. In several cases, international NGOs acted as managers and provided technical support. Most featured a guarantor such as the United States International Development Finance Corporation (DFC). In four of the six cases, MDBs, multilateral funds, private banks, or NGOs provided additional capital to enable buybacks of bonds so that countries could reduce their total debt burden.
- **Disaster risk financing.** The 13 DRF cases included in the sample were generally funded by MDBs or multi-donor trust funds. In most cases, national government agencies acted as implementers, although, in some cases, this role was filled by multilateral funders or other entities. Some involved private sector entities for services like loan structuring or risk modeling.
- **Equity.** Private equity companies and investors are at the heart of equity instruments for adaptation. Three of the four instruments included in the sample were led by the private sector but received technical and financial support from multilateral funders. Implementing agents included public-private partnerships, investment funds, and international nonprofit organizations.
- **Grants.** Of the 30 grant instruments included in the sample, 18 were directly funded and implemented by a subnational level entity (e.g., a US state or county), whereas 7 were funded by a central government ministry or national authority. Five out of the 30 grant instruments were driven by multilateral concessional funds, MDBs, or regional institutions. Only one project in our sample involved a private partnership. In this sample, grants are overwhelmingly implemented and funded at the subnational level. The source of finance stands out from the cases collected: HICs tend to use domestic funds, whereas international public finance channeled through multilateral climate funds, international organizations, or bilateral donors is the primary source of grant finance for LICs.
- **Guarantees.** Of the five guarantees included in our sample, the lead investor was most commonly an MDB, often with multiple bilateral donors contributing. Implementing agencies tended to be national or regional governmental entities or MDBs.
- **Insurance/risk transfer instruments.** The 21 insurance/risk transfer instruments in the sample relied on private sector insurance and reinsurance companies to provide insurance coverage, which was often backed by governmental guarantees. Many of the mechanisms also included technical expertise from academic or international nonprofit organizations. Seven of the cases specified parametric insurance, meaning that payouts are based on a specific event or parameter that is clearly defined ahead of time (e.g., a hurricane with wind speeds above a certain threshold) and pay out a predetermined amount. This type of financial mechanism is particularly appropriate for enabling communities that have been affected by climate extremes to recover faster while also improving transparency. One noteworthy insurance scheme is the wildfire resilience insurance scheme piloted in California, which proactively incentivizes protection against further events and benefits both clients (lower losses) and insurance companies (lower payouts).
- **Market-based loans.** The five market-based loan instruments in the sample were predominantly funded by MDBs, including the World Bank, the European Bank for Reconstruction and Development, and the Inter-American Development Bank, although two were primarily funded by private limited companies. Most received additional funding from other MDBs, DFIs, or private capital sources. They tended to be implemented by national or local governments or governmental agencies. Beneficiaries were often local communities.
- **Payment for ecosystem services.** Three of the six PES instruments included in the analysis were funded by MDBs. In each case, additional finance was provided by national governments (bilateral donors in three cases and the beneficiary country government in one). The other three cases were funded by an international NGO, an Indian state government, and a US county government. In most cases, a national or subnational government agency acted as project implementer and intermediary between the funders and beneficiaries/participants, the latter of whom tended to be local actors who were paid to protect resources or manage them according to approved practices, or to engage in restoration activities.

Table 9 | **Key characteristics of financial instruments**

FINANCIAL INSTRUMENT	RANGE OF INSTRUMENT SIZES (US$, MILLIONS)	SOURCE OF FUNDS		RECIPIENT OF FUNDS		GENERATES RETURNS?	REPAYMENT REQUIRED?
		TYPE	SHARE (%)	TYPE	SHARE (%)		
Blended finance	10.8–1,480	Climate funds, DFIs, and MDBs	58	Private sector entities	29	Varies	Varies
Bond	8.7–10,000	Bond holder	90	Sovereign and local governments	62	Yes	Yes
Concessional loan	41–575	MDBs	90	Sovereign governments	60	Yes	Yes
Debt swap	297–742	MDBs and bilateral donors	83	Sovereign governments	100	Yes	Yes
Disaster risk financing	0.85–926	MDBs	69	Sovereign governments	86	No	No
Equity	175–11,765	Companies and funds (at least one is supported by international climate funds and MDBs)	75	Private sector entities like businesses and start-ups	100	Yes	Yes
Grant	0.5–2,708	Local-level governments	51	Multiple entities, including local governments, households, community organizations, and SMEs	27	No	No
Guarantee	5–2,500	MDBs	80	No dominant borrower or recipient (includes MDBs, sovereign governments, and private entities)	N/A	No	No
Insurance/ risk transfer instrument	6–5,434	Sovereign-backed	30	Sovereign governments	35	No	Premiums required
		Premiums-based	35	Private sector entities	25		
Market-based loan	7–1,184	MDBs	60	Sovereign governments	60	Yes	Yes
Payment for ecosystem services	3.6–171	International fund for agricultural development, with support from sovereign governments	50	Smallholder farmers or communities at the local level	100	Yes	No

Notes: The columns with "share" for sources and recipients of funds represent the number of times those actors appear in the list of actors, represented as a share of the total. Blended finance shares of funders are hard to quantify because many actors are typically engaged in financing one fund. This number reflects the frequency with which these funders appear as funding entities. Each entity shown (i.e., climate funds, DFIs, and MDBs) was counted separately. If a fund included all three funders, they appear three times in the count.

Source: WRI authors' review of 162 financial instruments used for climate adaptation.

Conclusion

This study analyzes 162 cases of financial instruments for climate adaptation over the past decade to identify patterns that support governments, funders, and financial institutions seeking to scale adaptation finance. The key findings not only highlight the diversity in physical risks, actors, and instruments that compose an evolving adaptation finance landscape but also the financial design, engineering, and collaboration required to mobilize capital for adaptation. The range and increasing number of nontraditional financial instruments indicate the growing need—and potential—for innovative financial solutions from a range of actors to scale adaptation finance.

Financial instruments for adaptation must respond to a range of context-specific factors, including physical risks, macro-fiscal conditions, institutional capacities, and business environments. The diversity of actors—each of whom fulfills a specific role in the design and deployment of financial instruments for

adaptation—engaged in each instrument shows that innovative financial engineering and collaboration is necessary to unlock finance for adaptation. Additional research that explores the suitability of financial instruments for different climate risks, and the determinants of using a particular financial instrument in a given context, could offer valuable insights that build on this study (see Box 1).

The tendency of financial instruments included in this study to focus more on risk reduction than on risk management likely reflects a growing recognition that proactive adaptation investments can yield high social, environmental, and economic returns. Effective risk reduction investments—those that reduce the impact of a climate-related event—must address the root causes of vulnerability, which can lead to broader economic, social, and environmental benefits. The blended finance, bond, concessional finance, and grant instruments included in this study are especially focused on proactive interventions that enable adaptation to current and future risks, while DRF and parametric insurance products enable, by design, swift recoveries and help build back better after climate shocks.

Unlike more traditional development finance, where project-based financing is most prevalent, adaptation finance is predominantly delivered through various forms of pooled finance, such as programs, funds, mechanisms, or facilities. These pooled structures bring together MDBs, government agencies, private investors, SMEs, smallholder farmers, and property owners, among many others, and typically involve the layering of concessional and commercial capital by actors, depending on their objectives and risk appetite.

Further, an increasing number of adaptation instruments are multicountry in scope, allowing for regional financial and climate risk pooling and enabling more innovative blended finance or risk transfer instruments for addressing physical risks. Pooled finance can help investors balance the political and financial uncertainties typically associated with investing in a country, thereby removing barriers to investment. These pooled risk instruments highlight that both physical and financial risks can be shared—and thus mitigated—while still financing adaptation actions that are cognizant of local contexts, governance structures and capacities, and systems for tracking generated results.

This paper contributes to the rich and growing discourse on scaling finance for climate adaptation and aims to help both the public and private sectors better discern financing opportunities that meet their adaptation needs. By exploring how different financial solutions are applied to different physical risks across unique contexts, this study can help inform the selection, design, and management of financial instruments for adaptation. Furthermore, it is hoped that the study's interactive dataset will allow countries and investors to explore how their financing needs may be similar to existing financial solutions for climate adaptation and resilience.

Box 1 | **Potential areas for future research**

- Additional research that explores which financial instrument is best suited to address specific climate risks, what determines the use of a particular financial instrument in a given context, and what could be improved to promote certain instruments.
- Additional details on the financial aspects of each instrument (e.g., amounts, costs, benefits, and impacts) and when the use of more than one instrument might be appropriate.
- Review of the essential policy and market preconditions that might influence the uptake of each instrument type. This could include macro-fiscal conditions, sovereign debt levels, technical parameters, and institutional factors, especially as related to blended finance, bonds, debt swaps, insurance/risk transfer schemes, and PES schemes.
- Analysis of the private sector role in financing, managing, or benefiting from the various adaptation financing instruments.
- Concrete guidance for governments—at both the national and subnational levels—searching for the right instrument type or financial approach to mobilize adaptation finance.
- Further research concerning financial instruments that reward proactive risk reduction efforts via reduced insurance premiums.
- Ways to "scale up" debt swap operations in poor countries that build resilience, through the use of funds from existing mechanisms including climate funds and/or integration with ongoing debt swaps.

Appendix A.
Additional methodological details

The search terms below were used to conduct a systematic review of financial instruments for climate adaptation to complement the instruments recommended by the G20 Sustainable Finance Working Group. The search terms were designed to capture mentions of particular physical risks included in this study—recognizing that many financial instruments used for adaptation are not necessarily labeled as such—and the instrument types themselves. An additional search was conducted that used "finance" and "instrument" instead of "bond," "debt swap," etc., including the following:

- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND ("finance" OR "instrument")
- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND ("blended finance")
- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND ("bond" OR "bonds")
- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND ("debt swap")
- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND ("disaster risk finance" OR "disaster risk financing")
- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND ("equity")
- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND ("grant" OR "grants")
- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND ("guarantee" OR "guarantees")
- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND (insurance OR "risk transfer")
- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND ("loan" OR "loans")
- ("climate change" OR "drought" OR "flood" OR "rain" OR "storm" OR "cyclone" OR "hurricane" OR "heat" OR "wildfire" OR "biodiversity loss" OR "extreme weather") AND ("payment for ecosystem services")

The interactive dataset is available on the same WRI webpage as the working paper and will allow countries and investors to explore how their financing needs may be similar to existing financial solutions for climate adaptation and resilience.

Table A-1 | **Overview of dataset fields**

Case name	Sector(s) addressed	Level of finance pooling
Description	Region of implementation	Domestic or international source of finance
Year of mobilization	Country/countries of implementation	Instrument size
Instrument type	Country income status	Roles of actors involved
Instrument subtype	Country credit rating	Innovative or novel design features
Risk reduction or management	Borrower type	Impact, scale, and replication
Physical risk(s) addressed	Name of borrower/recipient/issuer	References

Source: WRI authors.

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