

Financing Climate Adaptation and Resilience: Ten Policy Approaches

Policymakers are key to scaling resilience investment

Driven by increasing budgetary demands for climate-related disaster response and relief efforts, governments are looking to ramp up expenditure on adaptation and resilience (A&R). Climate-related disaster exposure has increased by 80% since 2005, with approximately 3.5 billion people living in highly vulnerable regions.¹ Climate change shocks can put significant strain on government finances, with capital losses and reduced labour productivity leading to lower tax revenue, in addition to recovery expenditure.² Many vulnerable countries lack the fiscal space or insurance penetration needed to absorb resulting economic shocks; on average, less than 10% of losses are insured in emerging markets and developing economies (EMDEs).³



EMDEs have previously relied on international aid and climate finance for A&R. However, by 2035, the investment need will reach 12 times current levels of international public flows, with costs reaching USD310–365bn annually.

With resilience investment needs far higher than public capabilities, policymakers are looking to scale up private sector adaptation finance, currently estimated at only around USD5bn per year.

Estimates suggest this could increase to around USD50bn annually if supported by the right policy frameworks and financing mechanisms.⁴ The A&R market could reach up to USD1.3tn/year by 2030; it is crucial to capture the broader economic benefits of A&R investments in order to increase private capital mobilisation.^{5,6}

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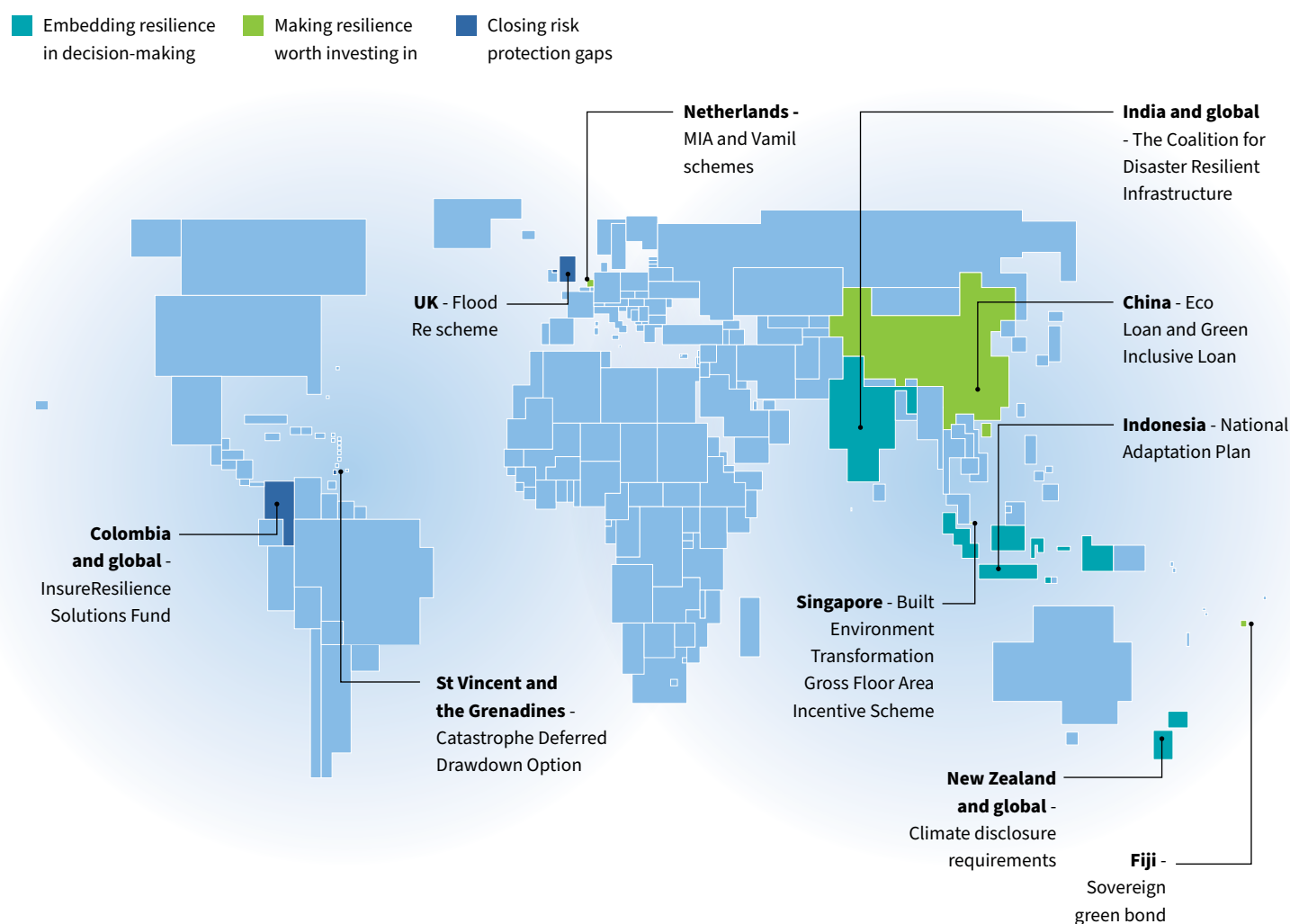
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Policymakers have a wide range of tools to mobilise adaptation and resilience investment

This paper highlights ten examples from developed markets (DMs) and EMDEs that address some of the key barriers to resilience investment across the investment cycle, by embedding resilience in decision-making, strengthening investment incentives, and closing crucial risk protection gaps. While the examples differ in geography and design, they demonstrate a common lesson: scaling adaptation finance requires a portfolio of complementary policies rather than a single financial instrument.

Scaling of resilience finance is not primarily hindered by shortage of capital. It requires reshaping of policy and financial systems that have been developed without physical climate risk in mind. Policymakers therefore have a critical role in reshaping these systems. The ten examples below illustrate different ways governments and public institutions are doing exactly that.

Figure 1: Distribution of the ten policy examples



Source: Climate Bonds Initiative

Embedding resilience in decision-making



1. Indonesia’s National Adaptation Plan: a whole-of-government approach to adaptation and resilience policy

Jurisdiction	Market classification	Policy objective	Sources of finance	Replicability
Indonesia	EMDE	Coordination	International climate finance, national budget	High

A clear plan for A&R is of paramount importance for Indonesia, an archipelago state highly vulnerability to climate change. Indonesia’s densely populated shorelines, including the coastal cities of Jakarta, Surabaya, and Palembang, are highly exposed to storm surges, coastal erosion, storm tide inundation, and permanent flooding. It sits within the top third of countries globally affected by climate risks, with climate change expected to increase its annual flood-induced damage in urban areas up to more than four-fold by 2030.^{7,8}

National Adaptation Plans (NAPs) are central to A&R efforts as they set the overarching direction at a national level and unlock aid for A&R planning and implementation. Since 2010, least developed countries have been invited to submit their NAPs to the United Nations Framework Convention on Climate Change (UNFCCC) on a regular cycle. Access to international finance for A&R policy formulation and implementation is dependent on NAP submission. In 2025, USD1bn of NAP-linked international aid was disbursed by the Green Climate Fund to developing countries. As of September 2025, 144 countries had initiated the formal NAP process and 67 developing countries had submitted their NAPs.⁹

Indonesia’s latest NAP (2026–2030) stands out as providing a particularly strong institutional framework for A&R policy, fully aligned with Indonesia’s long-term and medium-term national development plans.¹⁰ The NAP builds on two previous adaptation strategies and focuses on five priority sectors: health, water, food, energy, and ecosystem. It cascades 87 adaptation measures against these priorities, geographic focus areas, and institutions responsible for delivery (see Figure 2 for the food sector).¹¹ The NAP also establishes a monitoring, evaluation, and learning framework which tracks progress (including delivery outcomes and high-level impacts on disaster losses), poverty rates, and hazard exposures, to provide a broad-based assessment. Alignment with the UNFCCC NAP process has enabled access to USD70m of Green Climate Fund financing, including a USD3m project to enhance the underlying risk assessment of the NAP.¹²

Indonesia’s NAP ensures that policy across climate adaptation, economic growth, and social development can be considered in a whole-of-government approach. UNFCCC’s technical guidance highlights the importance of formally integrating climate change adaptation into national planning (e.g., through budget processes) to ensure that A&R is successfully mainstreamed in policy. There is increasing guidance on aligning NAPs and Nationally Determined Contributions (NDCs), and around 80% of NDCs – including Indonesia’s – now include an explicit adaptation component.¹³

The NAP sets out how to mobilise finance against the five priorities, situating adaptation finance in the context of its broader fiscal framework. As of 2025, only around a third of developing countries had developed a financing and implementation strategy as part of their broader NAP formulation and implementation, while many adaptation planning policies are outdated.^{14,15} Indonesia’s NAP sets out how domestic public finance will continue to be the main source of adaptation finance, while international finance and blended finance schemes serve as a complementary mechanism to increase scale.¹⁶ Indonesia’s Ministry of Finance has been operating a climate budget tagging system since 2016. This ensures that A&R finance is incorporated within government planning and budgeting, and provides a monitoring function to assess planned versus actual climate-related spending.¹⁷

Private sector engagement in the NAP process, from planning through to implementation and monitoring, should help to mobilise finance, innovation, and technical expertise for adaptation.¹⁸ In Indonesia, further strengthening channels for private sector participation within the NAP process could support the development of investable adaptation pipelines, enabling businesses and financial institutions to contribute their expertise, data, and financing capacity to national resilience objectives.

Figure 2: Mapping actions against priorities and geographic focus areas: Indonesia's proposed climate change adaptation actions for the food section



Source: Ministry of Environment/Environmental Protection Agency, Republic of Indonesia²¹

Focused effort on policy coordination across the multiple institutions responsible for adaptation governance is important for effective policy implementation.¹⁹ Responsibilities span the National Development Planning Agency and the Ministry of Environment. The latest NAP does improve coordination through the National Adaptation Committee, but mandates for adaptation planning, budgeting, and reporting remain dispersed.²⁰ A key challenge is ensuring that adaptation priorities are supported by clear national budget commitments, rather than relying primarily on external sources of finance such as the Green Climate Fund and grant funding, which may not provide a sustainable basis for long-term implementation. A clearer definition of roles across ministries will help to achieve meaningful impact across the 87 adaptation actions.

2. The Coalition for Disaster Resilient Infrastructure: how middle powers can help drive global adaptation and resilience efforts

Jurisdiction	Market classification	Policy objective	Sources of finance	Replicability
India and global	EMDE	Capacity building	No direct sources	Medium

The Coalition for Disaster Resilient Infrastructure (CDRI), led by India, shows how middle powers can sustain attention on adaptation by framing infrastructure resilience as a global public good amid geopolitical fragmentation. With 58 member countries and 12 partner organisations, CDRI uses coalition building and issue-specific diplomacy to advance cooperation in global climate governance.²² However, it relies on voluntary membership and does not have binding implementation mechanisms or a dedicated large-scale financing facility. Its impact sits in its convening and agenda-setting powers and in developing practical tools for the market.

CDRI aims for USD10tn of new and existing infrastructure investments and services to be resilient to natural hazards and climate change by 2050, through coordinated policy change and capacity building.²³ This is supported by estimates that every USD1 invested in disaster-resilient infrastructure can generate approximately USD7 in economic returns, rising to USD12–17 for certain assets.²⁴ However, this goal remains largely aspirational and there is limited evidence to date that CDRI's activities have materially influenced infrastructure investment decisions at scale or systematically altered capital allocation.

Rather than directly financing projects, CDRI seeks to strengthen the enabling environment for resilient infrastructure investment. It facilitates the development of blended finance frameworks, private sector engagement, and resilience standards and fiscal risk assessment tools that aim to improve project bankability and attract capital.²⁵ CDRI has sought to strengthen investment decision-making through initiatives such as its Resilience Cost-Benefit Analysis tool, and its Disaster Resilience Toolkit which supports the integration of resilience into infrastructure planning and delivery.²⁷ While these initiatives remain at an early stage, they have the potential to strengthen resilient infrastructure financing as they are developed.

CDRI's convening role is most visible in its engagement with small island developing states (SIDS), which face some of the highest levels of climate and disaster risk.²⁸ Through its Infrastructure for Resilient Island States (IRIS) initiative, launched at COP26, CDRI has worked with island nations to strengthen the resilience of critical infrastructure – including transport, energy, water, and communications systems – through project preparation and access to international sources of climate and development finance.²⁹ It is unclear whether such approaches reduce structural dependence on external finance or primarily improve access to already limited funding streams.

While initiatives such as IRIS can help to address long-standing capacity constraints and improve the uptake of risk-informed infrastructure planning, they do not automatically translate into measurable reductions in risk exposure or disaster losses.³⁰ Since IRIS – and CDRI more broadly – is not itself a financing mechanism, its ability to shift infrastructure outcomes ultimately depends on alignment with existing sources of finance such as development banks or national fiscal space, raising questions about scalability and enforceability in practice. As a result, IRIS can be seen as an enabling coordination layer whose effectiveness remains contingent on broader structural conditions in global climate and development finance.

In India, CDRI's impact is most evident through the institutionalisation of resilience within core infrastructure systems, although this remains uneven across sectors and largely dependent on pilot initiatives. CDRI's collaboration with the Indian government on telecommunications resilience has produced a national risk and resilience assessment framework, mapping critical infrastructure vulnerabilities and proposing reforms to address points of failure, interoperability, and service continuity during disaster events.³¹ However, the framework's influence appears strongest at the diagnostic and planning stages, with less clarity on the extent to which it has impacted regulatory requirements or investment decisions.

A digital twin pilot for coastal infrastructure in India demonstrates an emerging shift toward predictive, data-driven risk management. AI-enabled modelling, geospatial data, and real-time monitoring systems assess the exposure of underground infrastructure (tunnels and pipelines) to multiple hazards such as earthquakes and floods.³² In principle, the digital twin approach can enable real-time assessment of infrastructure performance under multi-hazard conditions and support maintenance and early identification of vulnerabilities. However, scalability and long-term operational integration of this pilot initiative remain uncertain, and resilience gains are contingent on availability of data, institutional capacity, and investment response to these findings.

3. Mandatory climate disclosure requirements: embedding adaptation and resilience metrics and requirements would accelerate investment

Jurisdiction	Market classification	Policy objective	Level of intervention	Sources of finance	Replicability
Global	DM and EMDE	Resilience data availability	National	No direct sources	High

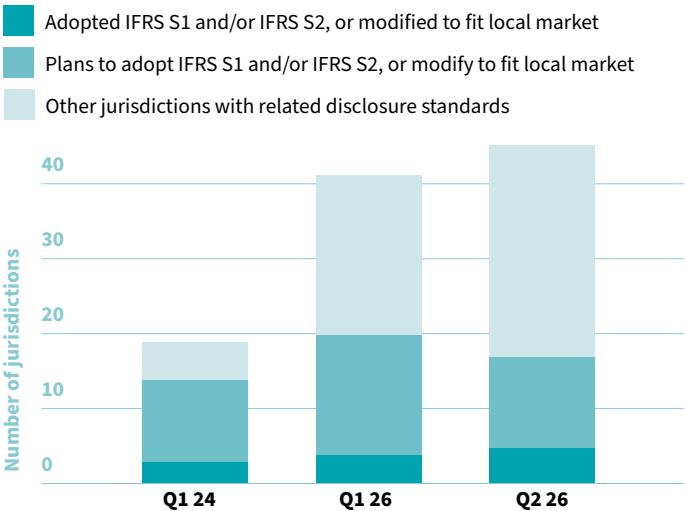
Climate-related disclosure requirements have been developed in multiple jurisdictions to drive capital to climate investments, but they are mostly limited to financially material disclosures, limiting the incentives for organisations to identify and communicate preventative adaptation measures.³³ As a result, adaptation measures that strengthen long-term resilience, but whose financial impacts are not yet material, may receive insufficient attention. This highlights a limitation of investor-focused disclosure frameworks. Strengthening forward-looking physical climate risk and resilience considerations within corporate reporting could help to encourage earlier adaptation investment.

The International Sustainability Standards Board (ISSB) International Financial Reporting Standards Sustainability 2 (IFRS S2) requires companies to disclose the physical risk exposure and resilience of their strategy and business model to these risks, but emphasis remains on disclosure of financially material risk.³⁴ Forty jurisdictions, representing over 60% of global gross domestic product (GDP), have adopted or announced plans to adopt IFRS S1 and/or S2 (see Figure 3).³⁵ Five other jurisdictions have adopted related disclosure standards. The IFRS standards require the disclosure of current and anticipated adaptation efforts and any climate-related transition plan, and introduce a mandate for companies to conduct scenario analysis to understand their resilience. However, IFRS S2 does not require companies to disclose adaptation expenditure or avoided losses, or to report on common resilience metrics or on whether planned adaptation action is sufficient.^{36 37}

New Zealand’s mandatory climate financial reporting shows that disclosure requirements can effectively influence capital allocation, demonstrating the potential impact of robust resilience disclosure requirements. Since 2024, approximately 200 of the country’s largest corporates, insurers, banks, and fund managers have been legally obliged to disclose their climate-related risks and opportunities against the Aotearoa New Zealand Climate Standards, broadly aligned with IFRS reporting standards.³⁸ The introduction of mandatory climate reporting has expanded the availability and consistency of climate-related information. The Financial Markets Authority’s first review of climate statements found that entities had made substantial efforts to implement the new requirements, while providing guidance to further improve the quality and comparability of future disclosures.³⁹ Mandated fund managers demonstrated improved portfolio environmental, social, and governance (ESG) performance and decreased carbon intensities of portfolios, versus non-mandated peers post-mandate.⁴⁰

Strengthening A&R disclosures within reporting requirements, including through common resilience metrics and adaptation targets, would help to maintain the quality and relevance of sustainability reporting, while avoiding unnecessary reporting burdens. For example, the European Sustainability Reporting Standards (ESRS) already require companies to identify and disclose material physical climate risks, assess the resilience of their strategy and business model, explain how adaptation actions contribute

Figure 3: ISSB standards emerging as a global benchmark: number of jurisdictions globally with ISSB-related sustainability frameworks and standards



Source: S&P Global⁴¹

to resilience, and report the anticipated financial effects of material physical climate risks.⁴¹ However, the ESRS do not require a common set of resilience metrics or standardised adaptation targets, limiting the comparability of disclosures across companies and sectors. Building on the existing ESRS framework through a core set of A&R metrics would enable investors to better assess companies’ exposure and preparedness for physical climate risks.

Requiring disclosure against standardised resilience metrics, such as those adopted by the UNFCCC, would help to drive A&R investment. The localised nature of physical climate risk and the context-specific outcomes of resilience investment make it significantly harder to measure than mitigation, where a uniform measure of tonnes of greenhouse gases avoided can be used. Significant gaps remain, specifically in the availability of hazard maps, local climate scenarios, and high-resolution weather data.⁴² Hence, the UNFCCC adopted a set of 59 adaptation indicators in 2023 to provide a common framework for assessing and reporting on adaptation.⁴³

Disclosure requirements could help to embed adaptation targets into transition plans. Transition plans, primarily intended to articulate a company’s approach to climate mitigation, are increasingly being considered as a tool for supporting adaptation efforts.⁴⁴ However, only around a third of companies currently have adaptation strategies in place.⁴⁵ Mandating an explicit adaptation target as part of transition plans, as suggested by European Central Bank staff research in 2026, would help to bridge the gap.⁴⁶

Making resilience worth investing in

4. China’s provincial Eco-Loan and Green Inclusive Loan schemes: expanding lending schemes to advance adaptation and resilience objectives

Jurisdiction	Market classification	Policy objective	Sources of finance	Replicability
China	EMDE	Stimulate green lending	Public subsidy	Medium

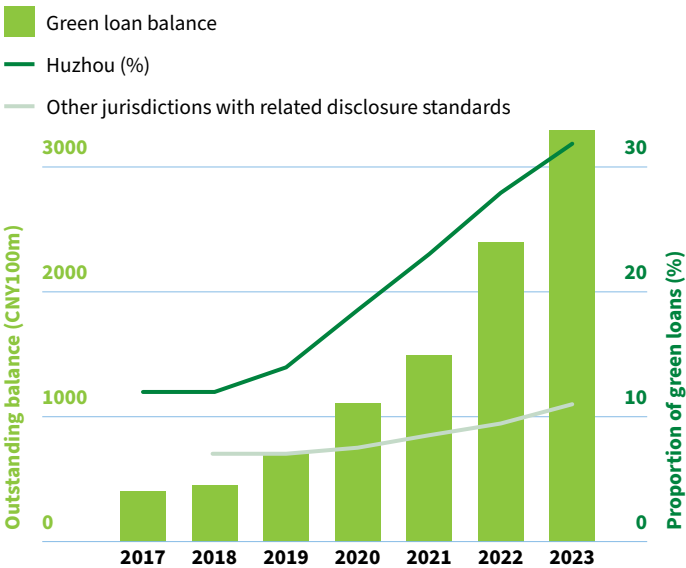
Banks may require additional incentives to lend to A&R projects, which can provide less favourable returns than other projects. In China, the Carbon Emissions Reduction Facility (CERF) has been incentivising green lending since 2021, with the current programme due to run until the end of 2027.⁴⁸ After eligible loans are issued, participating financial institutions can access refinancing from the People’s Bank of China covering up to 60% of the loan principal for eligible projects, including clean energy, energy conservation and environmental protection, and carbon-reduction technologies.^{49 50} The scheme has supported loans to the value of CNY1.38tn (USD204bn) as of end Q2 2025.^{51 52}

Complementary provincial pilot schemes showcase how green lending schemes can be targeted to stimulate A&R activity. The Guangxi Zhuang Autonomous Region Eco-Loan programme, launched in 2023, provides a three-percentage-point interest subsidy to listed companies, to support environmental conservation and restoration projects.⁵³ In the absence of a dedicated resilience taxonomy, it is not clear how many of these projects would count as A&R. Within the first four months of the Eco-Loan scheme, nine companies received CNY9.8m (USD1.35m) in interest subsidies.⁵⁴

The city of Huzhou’s Green Inclusive Loan scheme has contributed to significantly higher proportions of green loans than the national average (see Figure 4). Interest subsidies of up to 12% of China’s loan prime rate are provided to lenders based on their green finance performance. This is one of a wide range of sustainable finance incentives introduced by Huzhou, including rewarding banks for meeting green lending targets. Financial institutions have developed innovative financial products in response, offering more than 180 products from loans to insurance, although these are mainly targeted at mitigation rather than A&R.⁵⁵ As of March 2023, 31% of total loans in Huzhou were green, compared with 10% nationally, although causation is difficult to attribute to the subsidy schemes.

Making A&R and dual-benefit (adaptation and mitigation) loans eligible for the CERF can help to meet growing needs for adaptation financing. Mitigation projects still dominate green finance flows, receiving around 27 times more investment than adaptation globally.⁵⁶ The CERF does not currently have a dedicated A&R eligibility framework. The development of a resilience taxonomy by the People’s Bank of China could provide the foundation for future policies and lending schemes that more explicitly support A&R.⁵⁷ Monetary policy tools such as the CERF can complement transparency and supervisory measures by more directly incentivising investments which support A&R.

Figure 4: Impact of lending schemes: growth of green loans in Huzhou and China (2017–2023)



Source: CFA Institute⁶¹

Expanding associated reporting requirements (and penalties) to include physical climate risks and other adaptation metrics will limit greenwashing risks. Banks which make use of the CERF must provide related emissions data and certain public disclosures.⁵⁸ In efforts to ensure accountability and transparency, Huzhou introduced greenwashing penalties for activities such as false disclosure of carbon emissions, fraudulent application for government subsidies, or false advertisements about green financial products.⁵⁹

While other jurisdictions are not making as much use of monetary policy in their policy mixes, the subnational schemes could be more easily replicated outside of China.⁶⁰ Provincial and municipal schemes, such as interest subsidies and green lending incentives, demonstrate how public finance can complement central bank measures by helping to de-risk investment, encourage financial innovation, and channel capital towards resilience priorities.

5. The Netherlands’ tax incentive schemes: encouraging companies to commit to emerging adaptation and resilience technologies

Jurisdiction	Market classification	Policy objective	Sources of finance	Replicability
Netherlands	DM	Stimulate investment in sustainability technologies	National budget	Medium

Tax incentives are important policy instruments to incentivise private A&R investment. While overall A&R spending has shown modest growth in recent years, private investment accounts for only around 6% (2019–2024).⁶² Tax benefit schemes can improve project cashflow in the early years of an investment. This is particularly valuable for A&R investments, which often involve substantial upfront costs but generate (partially non-monetised) benefits over a longer time period.⁶³

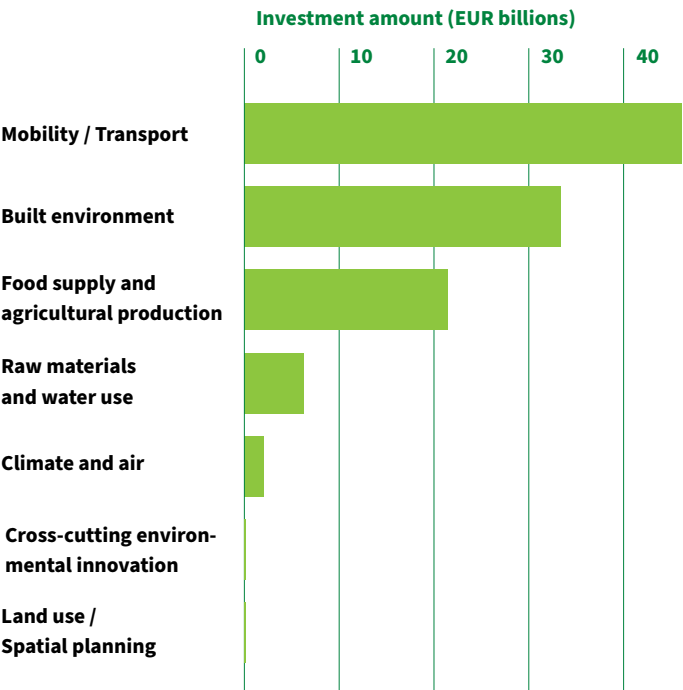
The Netherlands’ environmental investment deduction (MIA) and random depreciation of environmental investments (Vamil) schemes are separate but complimentary schemes which support environmental investments, including A&R. These can be used together against investments listed in a government-approved Environmental List. With the MIA scheme, companies can deduct up to 45% of the cost against their profits, reducing their tax liability and creating a financial incentive to purchase the asset. The government budget for this scheme for 2026 is EUR135m.⁶⁴

The Vamil accelerated depreciation scheme gives companies the flexibility to manage their liquidity and tax liabilities over the lifetime of the asset. Companies can decide when to write off 75% of their investment costs. Immediate application reduces the upfront cost of purchasing the asset. EUR20m is earmarked for Vamil in the 2026 budget.⁶⁵ Between 2017 and 2021, for each EUR1 of government subsidy, the schemes generated EUR6–11 of private investment (for both mitigation and adaptation), underscoring their cost effectiveness.⁶⁶

Vamil and MIA prove that tax schemes can be successfully employed to encourage private A&R investment, while remaining cost-effective. While the schemes also cover environmental objectives such as raw materials and water use, food supply and agricultural production, mobility, and climate and air, the largest investment amount in 2025 was into the built environment and climate adaptation, standing at EUR1.9bn or 61% of the total.⁶⁷ Between 2017–2021, on the other hand, the largest total investment was into mobility (see Figure 5). In 2023, Dutch companies invested over EUR5.8bn through the two schemes, representing 14% of total climate-related investment in the Netherlands.^{68 69}

As well as providing a financial incentive, the schemes also work through increasing awareness of new environmental technologies. The Environmental List, which screens for eligibility, also serves as a government-backed reference list of emerging technologies. Updated each year, it currently contains more than 200 business assets across technologies promoting climate adaptation, supporting soil protection, managing and protecting water, and promoting nature protection and biodiversity.⁷⁰

Figure 5: Vamil and MIA drive investment across mobility and built environment sectors: investment totals by theme (EURbn, 2017–2021)



Source: Ministry of Infrastructure and Water Management, Netherlands Government⁷³

It is important to target the schemes towards new and emerging technologies, to avoid subsidising investments which would have taken place anyway; hence, the Dutch government explicitly states that annual revisions of the Environmental List are intended to target emerging environmental innovations and remove technologies that have become mainstream.⁷¹ Additionality can be boosted with targeted inclusion criteria. On average, around 40% of MIA and Vamil investment in 2017–2021 was estimated to be non-additional, i.e., it would have taken place even without the tax incentive.⁷² MIA and Vamil saw the strongest additionality for investments in early-stage technologies, where financial viability is less certain.

6. Singapore’s incentives schemes for green buildings: achieving fiscally efficient heat stress resilience

Jurisdiction	Market classification	Policy objective	Sources of finance	Replicability
Singapore	DM	Stimulate green infrastructure development	Private capital (indirect)	High

Integrating resilience into permit requirements for buildings, infrastructure, and other developments can help to tilt private investment flows without large government expense. In this context, resilience-conditional permitting, accelerated permitting for resilient investments, and floor space incentive schemes represent fiscally efficient policies that can drive resilient development.

Singapore’s Built Environment Transformation Gross Floor Area (GFA) Incentive Scheme has helped to incentivise green development. The 2021–2026 iteration builds on a range of bonus GFA incentive schemes dating back to 2005.⁷⁴ The scheme grants developers up to 3% additional floor area for meeting advanced sustainability, digitalisation, and productivity targets.⁷⁵ This creates economic value for developers who meet environmental goals without requiring direct public expenditure, although the scheme is not entirely cost-free to the public. Granting additional GFA entails an opportunity cost, as these development rights could otherwise have been allocated to alternative uses or captured to advance other public objectives. A scheme for retrofits that uses financial incentives, the Green Mark Incentive Scheme for Existing Buildings 2.0, was launched in 2022.⁷⁶

While the scheme targets climate mitigation, these standards boost heat stress resilience. The scheme rewards developers for attaining Green Mark Platinum Super Low Energy (SLE) certification, which is dependent on meeting stringent energy efficiency standards.⁷⁷ Green Mark-certified buildings have been found to maintain better indoor environment conditions, maintaining temperature and humidity more consistently compared with non-green counterparts, thus boosting resilience to heat stress.⁷⁸

An earlier version of the scheme saw the number of registered new builds availing themselves of the scheme increase by a factor of almost 75 within seven years.⁷⁹ The share of new developments achieving Singapore’s SLE standard increased from around 7% of new building GFA in 2022 to 26% in 2024, while more than 150 buildings had met or exceeded the SLE standard by 2025.⁸⁰

Broadening the scope of the GFA and similar schemes to more directly target A&R would help to ensure resilience outcomes at both the individual building level and city level. Building incentive schemes such as the GFA need careful design so that they do not incentivise developers to maximise building size at the expense of green urban spaces, adding to the urban heat island effect. This is a particular issue for Singapore as a densely populated city-state. Urbanisation alone could increase Singapore’s urban air temperature by up to 0.79°C in the 2030s, compounding the 0.6°C rise expected due to global climate change.⁸¹ Broadening the scope of schemes such as the GFA to explicitly link rewards to A&R factors such as green roof coverage or rainwater harvesting could help to reduce this risk.

Like many incentive-based planning instruments, the scheme would benefit from an ex-post evaluation against a credible counterfactual. For example, participating developments could be compared with similar projects not receiving the bonus GFA to determine whether the scheme generated genuinely additional investment or primarily rewarded projects that would have met the higher standards regardless. Such an evaluation should also assess the scheme’s fiscal efficiency by examining the value of the additional development rights relative to the environmental and productivity outcomes achieved, as well as any market distortion effects on broader adoption of higher building standards.

7. Fiji's sovereign green bond: accessing global adaptation finance

Jurisdiction	Market classification	Policy objective	Sources of finance	Replicability
Fiji	EMDE	Finance public resilience expenditure	Capital markets	High

Fiji, a SIDS, is acutely vulnerable to climate change impacts, from both a social and economic perspective. Fiji loses almost 6% of annual GDP to cyclones and floods, causing an average of 25,700 people to fall into short-term poverty every year.⁸² By 2050, almost 20% of the Pacific Islands region's 10 million people could be displaced due to climate change.⁸³

Many resilience investments such as flood defences are typically public goods that generate strong social and economic returns but limited direct cashflows, making them difficult to finance through commercial project finance structures.⁸⁴ Sovereign bonds allow governments to finance resilience investments over time, rather than funding them entirely through current budgets.

Sovereign green and resilience bonds help to attract dedicated pools of capital and demonstrate policy commitment for large-scale investment, but they do entail fiscal costs.⁸⁵ Debt financing increases future debt servicing obligations and therefore has fiscal implications. Principal and interest payments remain liabilities of the issuing sovereign and ultimately require repayment through future government resources, potentially affecting fiscal choices through higher taxation or reduced public spending elsewhere.

Fiji, the first emerging market to issue a sovereign green bond, is a regular issuer with a strong adaptation component. Its first issue in 2017 raised USD50m, with 91% of the proceeds allocated to disaster relief and climate adaptation projects.⁸⁶ The bond met the criteria for inclusion in the Climate Bonds Initiative Green Bond Dataset, and almost two thirds of the bond's proceeds supported cyclone rehabilitation and emergency roadworks in the wake of 2016's Tropical Cyclone Winston.⁸⁷ ⁸⁸ Schools

were rebuilt according to cyclone-resilient engineering standards, and the transport rebuilds improved drainage to reduce flooding risks.⁸⁹ The Green Bond Framework was updated in 2022 to include priority areas such as nature-based solutions for coastal protection for low-lying vulnerability communities, aquaculture, and development of sustainable towns and cities using integrated planning solutions (see Figure 6).⁹⁰ This helped to pave the way for Fiji's USD9m sovereign blue bond in 2023.

Sovereign green bond proceeds can translate into measurable improvements in physical resilience, essential service access and emissions reduction, while also mobilising private capital for climate investment. The proceeds of Fiji's 2017 bond supported the rebuilding of 101 cyclone-damaged schools, including 65 structures capable of serving as evacuation centres; rehabilitation of roads, bridges, drainage, and coastal protection; and rural water and rainwater-harvesting programmes providing improved water access to more than 40,000 people.⁹¹

The Fiji experience demonstrates that sovereigns do not need to wait for the full sustainable finance architecture before going to the bond market. Fiji's sovereign issuance came a full seven years in advance of launching its Green Finance Taxonomy in 2025. Fiji went through a budget tagging exercise to determine exactly which expenditures were suitable for inclusion. This helped to familiarise policymakers with the system of classifying expenditures according to green and social taxonomies, the data needed to make those assessments, and differences among various standards.⁹² This suggests that taxonomy development and sovereign issuance can operate in parallel and provide mutually re-enforcing learnings.

Figure 6: Alignment between A&R and developmental priorities – use of proceeds (UoP) from Fiji's 2017 green bond mapped against the Sustainable Development Goals

	13 CLIMATE ACTION	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	15 LIFE ON LAND
Rural water supply programme					
Rainwater harvesting system					
Tropical Cyclone Winston rehabilitation and construction of schools					
Emergency road works and drainage improvements					
Solar home systems new installations					
"Reducing Emissions from Deforestation and forest Degradation" programme					

Closing risk protection gaps

8. The United Kingdom’s Flood Re scheme: maintaining insurance coverage and affordability

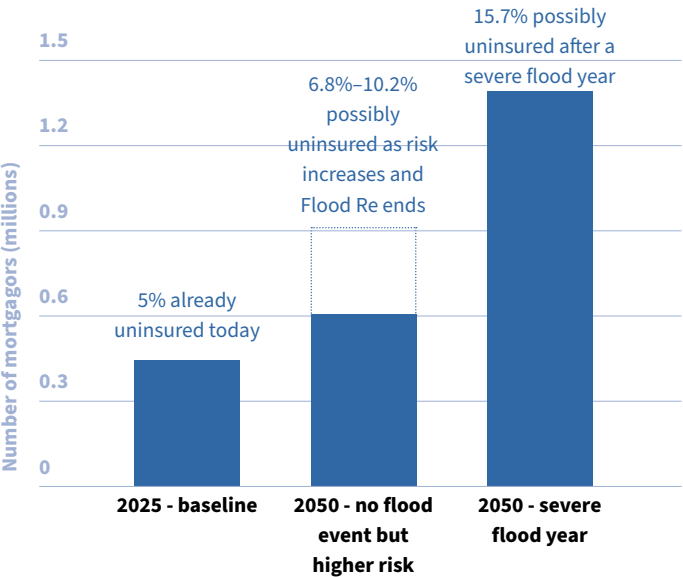
Jurisdiction	Market classification	Policy objective	Sources of finance	Replicability
UK	DM	Insurance availability and coverage	Levy on private insurance	Medium

As physical climate events become more frequent and severe, rising losses from flooding, wildfires, and extreme weather are increasing insurance costs and leading to reduced availability of coverage.⁹⁴ Households in high-risk areas across Europe are increasingly at risk of becoming uninsurable, limiting access to mortgages and investment, and slowing down recovery and reconstruction after events. Currently, only about a quarter of climate-related catastrophe losses are insured in Europe.⁹⁵

Introduced in 2016, the UK’s Flood Re scheme is designed to maintain affordable flood insurance for high-risk households, alongside an intended transition of the insurance market to property-level risk-reflective pricing. Introduced as a transitional mechanism with a planned end date of 2039, Flood Re addresses the availability and affordability of insurance for households with high flood risk.⁹⁶ Established through an agreement between government and the insurance industry, Flood Re is funded by all insurers who offer UK home insurance, via a levy. The amount an insurer contributes is reflective of their share of the home insurance market. In return, insurers can cede the flood-risk element of eligible home or contents insurance policies to Flood Re, which holds this risk at a fixed, capped premium paid by insurers, based on the property’s council tax band. Flood Re then manages this risk through its own financial resources, levy income, and reserves, while transferring a significant proportion of its aggregate risk to the international reinsurance market.

Flood Re also has a Build Back Better (BBB) scheme, which seeks to incentivise resilience measures at the property level. Since its launch in 2022, BBB has enabled participating insurers to access up to GBP10,000 per claim to fund resilient reinstatement through property-level flood resilience measures. BBB covers the additional cost of upgrading a standard repair to a more flood-resilient alternative.⁹⁷ Flood Re has recommended that the government should increase the limit to GBP15,000.⁹⁸ However, uptake among customers remains relatively low, with only around one-third of eligible policyholders accepting it as of end 2025, due to limited awareness and technical challenges in rebuild processes.⁹⁹⁻¹⁰⁰ Flood Re is engaging with industry professionals and the public to promote awareness and uptake of BBB.¹⁰¹

Figure 7: UK households in high-risk areas are at increasing risk of becoming uninsurable: estimates of the insurance protection gap



Source: Bank Underground, Bank of England¹¹⁴

As part of its transition planning for the post-2039 flood insurance market, Flood Re is piloting Flood Performance Certificates (FPCs) to help buyers, sellers, insurers, and lenders understand exposure early in the homebuying process and incentivise home resilience renovations.¹⁰² FPCs, modelled on Energy Performance Certificates, provide clearer guidance on what resilience measures may be needed, and how these can be reflected in property valuations, insurance terms, and mortgage lending decisions.¹⁰³ The ultimate goal of FPCs is to create an avenue to insurance for even the most at-risk properties, by evidencing to insurers that resilience measures have been installed and the property’s risk reduced.¹⁰⁴ Evidence remains limited as to how greater flood risk transparency would affect property values, mortgage availability, and sales. Whether these incentives can translate into greater resilience investment or improved property marketability in practice will be a key question for the pilot.¹⁰⁵

Flood Re has significantly reduced the cost of flood insurance for affected households, with average premiums for homes that have previously been flooded falling from around GBP4,400 prior to its introduction to an average of GBP1,316 by March 2026. It is also addressing gaps in cover, with 96% of affected householders now able to access quotes from over 15 insurers, and 100% of householders now able to get quotes from five or more insurers.^{106 107} Flood Re's liability limit was increased from GBP2.3bn to GBP3.2bn in April 2025, reflecting the scheme's efforts to maintain sufficient capacity as flood risk and policyholder exposure grew. However, this raises longer-term questions about whether the scheme's capacity can continue to keep pace with the impacts of climate change.¹⁰⁸ The scheme is however taking steps to manage its future risk portfolio and ensure that it can better support properties in lower council tax brackets.

Flood Re should be seen as one of multiple tools to address flood risk. While Flood Re addresses affordability and insurability risks, land use planning decisions continue to increase underlying exposure to flooding. As Figure 7 shows, up to 1.39 million mortgagors could possibly be uninsured after a severe flood year by 2050. To avoid creating a moral hazard where developers build in high-risk locations expecting to access subsidised insurance support, the scheme excludes properties built after 2009.¹⁰⁹ However, it cannot outright prevent new development in flood-risk areas. It has been claimed that one in nine new homes built in England between 2022 and 2024 were located in areas of medium or high flood risk, although the Environment Agency has highlighted the need to take account of flood defences.^{110,111}

If underlying flood risk is not materially reduced before 2039, the end of Flood Re could expose high-risk households to sudden premium increases or reduced availability of insurance, creating a disorderly transition rather than a smooth one, although the aim of the scheme is to avoid this.¹¹² The Environment Agency estimates that one in four properties (around 8 million) in England could be at risk of flooding by mid-century.¹¹³ Without sufficient investment in flood resilience before the scheme ends in 2039, higher insurance costs and reduced mortgage availability could create wider risks for property markets, lenders, and financial stability.

9. InsuResilience Solutions Fund: pre-arranged financing to address climate insurance gaps in emerging markets and developing economies

Jurisdiction	Market classification	Policy objective	Sources of finance	Replicability
Colombia	EMDE	Improving parametric risk insurance coverage	International development finance	Medium

The InsuResilience Solutions Fund, established by KfW Development Bank, aims to support innovative solutions that improve access to climate risk insurance in vulnerable countries, enabling faster post-disaster finance while strengthening local insurance capacity and long-term risk transfer markets.¹¹⁵ The fund combines technical and financial support to develop innovative climate risk insurance solutions through risk modelling, product design (including sovereign, meso-, and microinsurance), and institutional capacity building across governments, regulators, local insurers, and beneficiaries. This helps to address barriers such as high setup costs, limited market experience, and uncertain demand in low- and middle-income countries. Grant funding supports the development, piloting, and scaling of climate risk insurance products.

By absorbing part of the upfront costs and risks associated with market creation, the fund helps to mobilise private insurers and reinsurers, while building the infrastructure and capacity needed for new risk transfer markets.¹¹⁶ Since 2019, the InsuResilience Solutions Fund has co-funded and concluded the development of 20 climate risk insurance projects, and is currently co-funding the development of a further 29 projects. Notably, a significant share of product development costs (39% – EUR38.6m) has been co-financed by the private sector, but it is difficult to establish whether these products would have been developed in its absence.¹¹⁷

The broader InsuResilience Global Partnership, of which the fund is a part, has substantially expanded climate and disaster risk insurance since its inception, supporting the development of sovereign risk pools, microinsurance schemes, and other risk-financing mechanisms across vulnerable countries. By 2024, 319 million people had benefited from climate and disaster risk finance and insurance instruments.¹¹⁸ However, this remains below the partnership's more ambitious Vision 2025 target of protecting 500 million poor and vulnerable people by 2025.^{119,120}

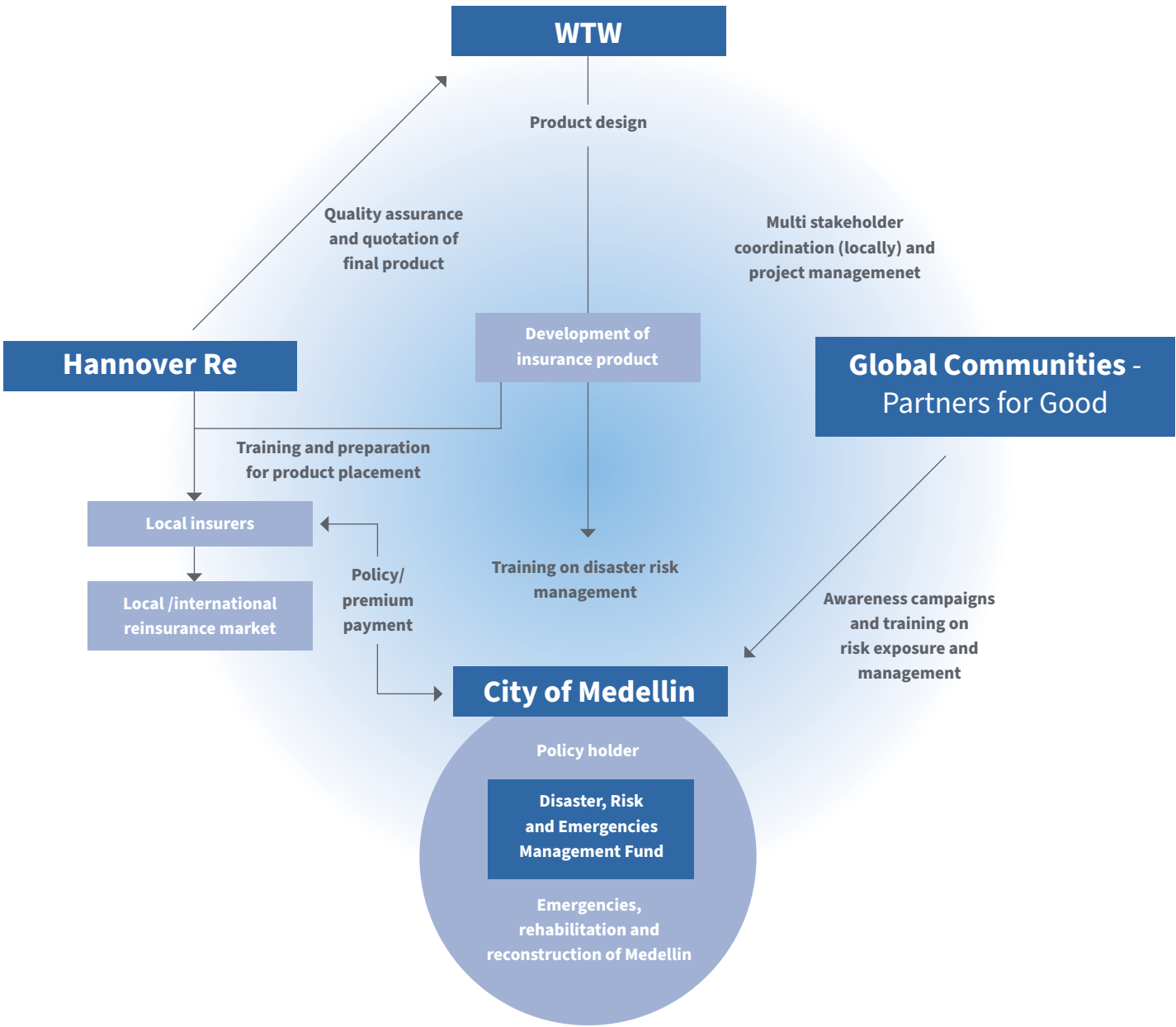
The fund's partnership with the City of Medellín in Colombia demonstrates how rapid disaster payouts can strengthen municipal resilience and improve post-disaster response capacity. Medellín is one of the country's most climate-vulnerable cities, with more than 4% of the city exposed to high flood risk and 20% subject to landslide risk.¹²¹ As shown in Figure 8, the partnership brought together the municipality, insurers, and risk-modelling providers – contributing core insurance design and reinsurance expertise – alongside local stakeholders to develop a parametric insurance solution that enables rapid fund disbursement without the need for loss verification.¹²² The initiative has embedded climate risk transfer within the city's Disaster Risk and Emergency Management Fund and supported regulatory reforms clarifying the legal status of parametric insurance in Colombia. This is helping to create an enabling environment for future climate risk transfer solutions, and offers a potentially replicable model for other cities.

It remains difficult to assess the extent to which expanded insurance coverage has translated into reduced financial impacts of climate disaster, faster recovery, or durable financial protection for vulnerable populations. Project-related research, already underway, will help to evaluate the fund's long-term impact and ultimate success in expanding access to climate risk insurance solutions for vulnerable populations.¹²³

Much of the available analysis is reported by the initiative itself, through programme reporting and implementation documentation, and focuses on outputs such as product development, regulatory reform, and private-sector co-financing. As projects and reporting requirements end after successful product development, long-term impact assessment is limited.¹²⁴ To address this, a complementary academic research agenda is being developed to provide independent evidence on whether the interventions have created sustainable insurance markets, improved affordability, and strengthened resilience outcomes.¹²⁵

The experience of the fund reflects wider structural limitations observed across climate and disaster risk finance and insurance instruments, including persistent challenges in achieving scale, affordability, and inclusivity. Insurance penetration in many low- and middle-income countries remains low, with coverage often concentrated among higher-income groups rather than the most vulnerable households. As a result, interventions are frequently assessed in terms of financial flows and coverage metrics rather than demonstrable improvements in resilience outcomes, highlighting the need for more robust and standardised evaluation frameworks that can better capture additionality, effectiveness, and real-world impact.¹²⁶

Figure 8: Structure of the Medellin initiative with private sector involvement



Source: InsuResilience Solutions Fund¹²⁷

10. St Vincent and the Grenadines: closing liquidity gaps while incentivising climate resilience reforms

Jurisdiction	Market classification	Policy objective	Sources of finance	Replicability
St Vincent and the Grenadines	EMDE	Provide liquidity for disaster relief	International development finance	High

St Vincent and the Grenadines’ access to the World Bank’s Catastrophe Deferred Drawdown Option (Cat DDO) contingent credit line shows how the instrument can provide critical liquidity after climate-related disasters, enabling governments to respond immediately rather than waiting for aid, insurance payouts, or reconstruction financing. In July 2024, following Hurricane Beryl – the strongest storm to hit the country since 1875 – the country accessed a USD20m Cat DDO within days.¹²⁸ The hurricane resulted in estimated economic losses of USD230.6m, equivalent to 22% of 2023 GDP.

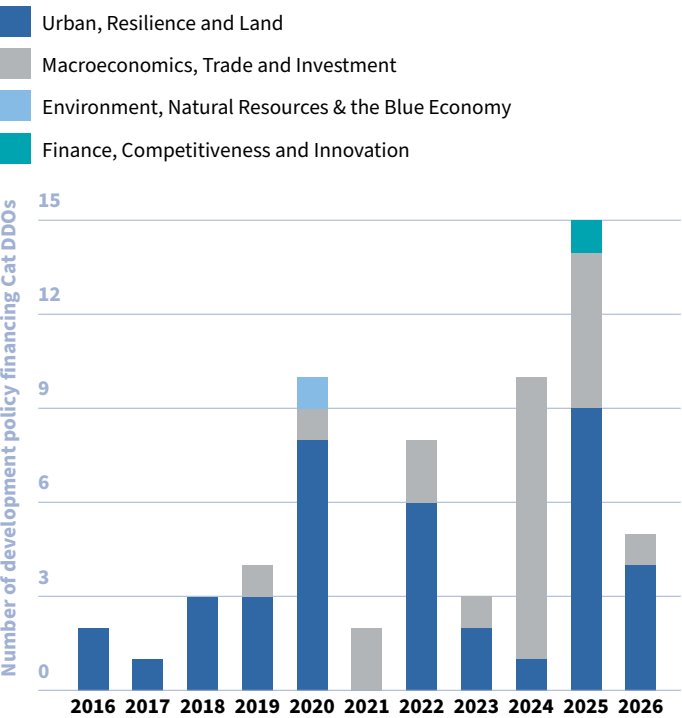
Cat DDOs are contingent credit facilities that provide rapid liquidity following a disaster, conditional on the implementation of disaster risk management and resilience policies.¹²⁹ They sit within the World Bank’s Crisis Preparedness and Response Toolkit, alongside other measures to enable fast access to emergency response, such as expanded catastrophe insurance and a debt pause mechanism when hit by applicable perils.¹³⁰ Disaster relief is not necessarily a resilience investment, but effective post-disaster recovery can provide an opportunity to build back better, strengthening resilience to future events.

Cat DDO-associated reforms included the introduction of a national disaster management policy. In 2025, the World Bank approved a second USD20m Cat DDO.¹³¹ The new facility requires further reforms including modernised land use regulations, updated environmental assessment procedures, updated school safety procedures, improved climate governance coordination mechanisms, and the introduction of dedicated systems for tracking disaster-related and climate expenditure. These reforms are explicitly framed around climate and disaster risk resilience, reflecting the country’s high exposure to increasingly intense hurricanes, coastal erosion, flooding, and drought.

Since being rolled out to International Development Association (IDA) countries, Cat DDOs have transitioned from being a tool targeted towards middle-income and creditworthy low-income countries to becoming a key tool for lower-income countries in their preparation for future crises. To improve affordability, the World Bank reduced the share of Cat DDOs funded from country allocations, to help governments preserve concessional resources while maintaining access to rapid post-disaster liquidity. Following this reform and the expansion of eligibility, there is a cumulative total of 34 IDA countries with approved Cat DDOs, compared with 28 International Bank for Reconstruction and Development countries.¹³² A defining feature of Cat DDOs is their use of policy conditionality to strengthen resilience before disasters occur. Figure 9 shows that, since 2016, the majority of Cat DDOs have supported reforms in urban, resilience and land management, demonstrating the instrument’s emphasis on reducing disaster risk alongside providing contingent finance.

Cat DDOs are designed primarily as contingent liquidity instruments and therefore remain largely undrawn in SIDS, with only 37% of the USD745 million in agreed facilities having been accessed to date.¹³³ This pattern of utilisation is consistent with their purpose, which is to provide rapid access to finance following major disasters, rather than to serve as a continuously

Figure 9: The majority of Cat DDOs are in the Urban, Resilience and Land category



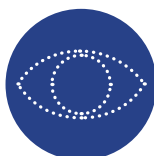
Source: World Bank Dashboard¹³⁶

drawn source of funding. Low rates of drawdown may reflect a range of factors, including the absence of qualifying disaster events of sufficient scale, or governments’ preference for accessing grants, reserves, insurance payouts, or other financing sources before drawing on contingent credit. As Cat DDOs are typically provided as loans, despite around one-third of those approved for lower-income countries being grant-based, governments may reserve them for more severe shocks to avoid increasing public debt.

While uptake has increased across the Caribbean, Cat DDOs remain one component of a wider resilience financing architecture. Several SIDS, including Dominica, St Lucia, Grenada, Jamaica, and Barbados, have adopted the instrument as part of wider resilience strategies. These facilities primarily serve as precautionary buffers alongside contingency funds, parametric insurance, and multilateral support.¹³⁴ Recognising the importance of pre-arranged finance, the World Bank’s most recent replenishment of IDA funding placed renewed emphasis on scaling crisis preparedness instruments. Within this wider framework, Cat DDOs are distinctive in linking rapid liquidity to disaster risk management and preparedness reforms. Used alongside other pre-arranged financing mechanisms, they support a shift from reactive disaster recovery towards more proactive risk management and resilience.¹³⁵

Looking ahead

The ten case studies demonstrate that there is no single pathway to scaling resilience finance. Strategic planning, regulation, fiscal incentives, and risk-transfer mechanisms each address different barriers to resilience investment. No single instrument can overcome the multiple barriers that constrain A&R investment, making a combination of policy interventions essential.



Replicability and scalability remain a central challenge to accelerating A&R investment. While many of the case studies demonstrate successful approaches, translating individual and often highly tailored examples into widespread adoption is not guaranteed. Widespread implementation requires stronger institutional capacity, improved climate risk data, and greater collaboration between governments, development finance institutions, regulators, insurers, and investors to embed resilience considerations across policy and financial systems.

Investment in A&R is also not the final goal; financial mobilisation is not the same as resilience outcomes. Policies must be assessed not only on capital mobilised, but on whether vulnerability is reduced. This will ensure that capital is flowing not only where it is most needed, but also in the correct forms needed to deliver on-the-ground resilience improvements.

Developing strong A&R investment systems requires a range of actions from governments, central banks and regulators, and international development finance institutions. Climate Bonds Initiative is currently developing targeted policy guidance to unlock capital for EMDE A&R and would welcome discussion on this topic. Contact policy@climatebonds.net to find out more.

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Abbreviations

A&R	adaptation and resilience
BBB	Build Back Better (United Kingdom)
Cat DDO	Catastrophe Deferred Drawdown Option
CERF	Carbon Emissions Reduction Facility (China)
DM	developed market
EMDE	emerging markets and developing economies
ESG	environmental, social and governance
ESRS	European Sustainability Reporting Standards
FPC	Flood Performance Certificate
GDP	gross domestic product
GFA	gross floor area
IDA	International Development Association
IFRS	International Financial Reporting Standards
IRIS	Infrastructure for Resilient Island States
ISSB	International Sustainability Standards Board
MIA	Environmental investment deduction scheme (Netherlands)
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
SIDS	small island developing state
SLE	Super Low Energy (Singapore)
UNFCCC	United Nations Framework Convention on Climate Change
UoP	use of proceeds
Vamil	Random depreciation of environmental investments scheme (Netherlands)

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