G20 BRASIL 2024

BUILDING A JUST WORLD
AND A SUSTAINABLE PLANET

Financing options for resilient solutions

Input paper to the G20 DRR Working Group

Knowledge partner

UNDRR
UN Office for Disaster Risk Reduction














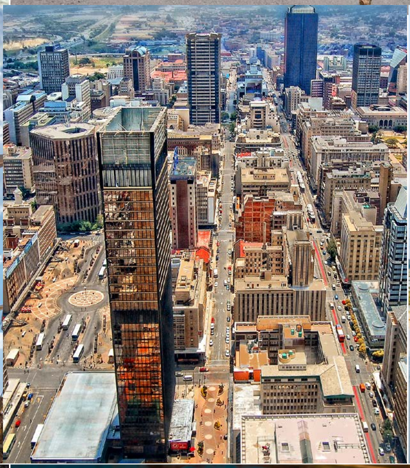


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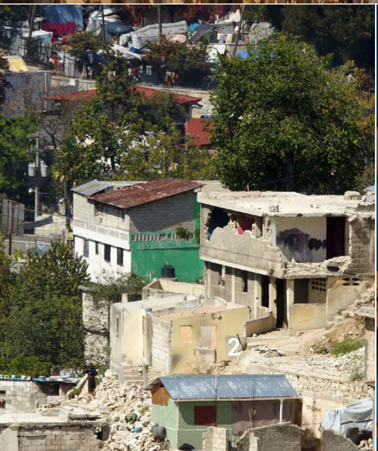
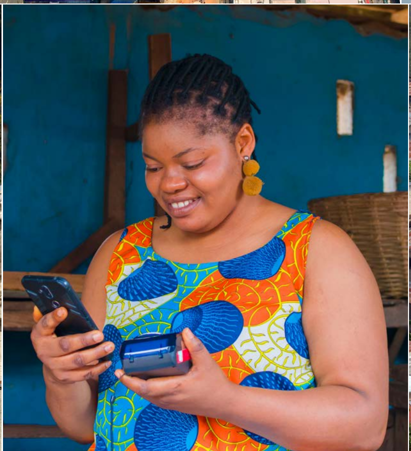
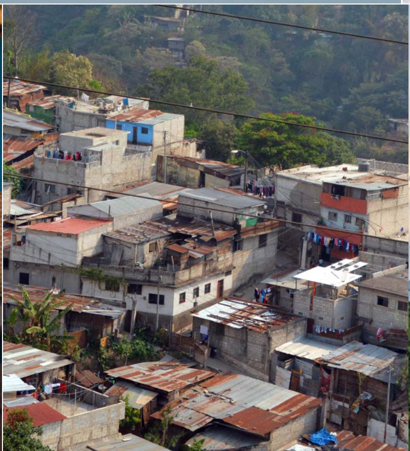


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G20 link and possible next steps

Adopting comprehensive disaster-related financing approaches is key to managing risks effectively and requires understanding the range of financial instruments available, their strengths and weaknesses, and their applicability to different needs. It also necessitates de-risking investment in resilience to make projects more attractive and feasible for private sector participation.

In the Outcome Document and Chair's Summary of the G20 DRR Working Group in 2023, G20 members expressed concerns that the prevailing reactive approach to disaster-related financing was inadequate to address complex disaster risks.

To enhance financing for disaster risk reduction (DRR) and de-risk investments in all sectors for resilience against disasters, it was agreed to pursue, among others, the following actions and recommendations:

- *Support developing countries in producing national financing strategies for DRR, which may include financial, technical, and capacity-building assistance, including through the integrated national financing framework approach.*
- *Promote the allocation and effective use of financial resources dedicated to DRR, generating evidence on the benefits of these investments in DRR measures, including through tagging and tracking, where applicable*

In addition to investing in prevention and DRR, G20 members also mentioned that measures to address residual risks will always be necessary and should be strengthened.

The 2024 Brazil Issue Note for the G20 DRR Working Group also mentioned as expected results and products for its Priority 4 on Financing DRR. This includes developing an inventory of financing tools for DRR, including best practices on legal, administrative, and regulatory measures, as one of the deliverables outlined in the Roadmap of the G20 DRRWG,

This input paper has been developed with this context in mind and aims to support the delivery of Priority 4 of the G20 DRR Working Group with a menu of options tailored to specific resilient themes that countries could utilize as appropriate and as relevant to their national circumstances, priorities, and needs.

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Introduction

Disaster Risk Reduction (DRR) is crosscutting by nature and encompasses multiple sectors. It can be integrated and streamlined into strategies and existing policies related to public, private, and international sources of finance. For instance, governments can enhance internal processes to effectively incorporate DRR considerations into their budget allocations. Likewise, policymakers can develop and implement regulatory frameworks that incentivize the private sector and financial markets to comprehensively account for disaster risks. Policymakers can also identify mechanisms for engaging the insurance sector, including public-private partnerships and risk-sharing arrangements, to support national development objectives.

Table 1 below summarizes a variety of possible legal or regulatory measures, financing instruments, and processes that can support achieving DRR objectives while linking these policy options with their targeted audience. These policy options, previously detailed in an input paper to the G20 DRR Working Group and illustrated with country examples, serve as foundational elements for the strategies outlined in this document[1].

In this paper, these options are used as reference points to introduce options tailored to seven broad themes (see Figure 1) that establish the sectors and subsectors where investments in adaptation and resilience are necessary. These themes are derived from a thorough analysis of authoritative sources, including the Sendai Framework for Disaster Risk Reduction, and are highly interconnected reflecting the systemic nature of DRR financing[2]:

- **Resilient Infrastructure** - Infrastructure that provides essential services on which populations and wider economic activity depend, e.g., water & wastewater, transportation, information & communication technology (ICT) and electricity

- **Resilient Nature & Biodiversity** - Terrestrial, freshwater, coastal or marine ecosystems and the biodiversity they support and the natural capital and ecosystem services (e.g., freshwater provision, flood management, protection from erosion, oxygen replenishment) they provide

- **Resilient Agriculture and Food Systems** – Systems for the production and provision of food and other related products, encompassing primary production, sustainable and effective irrigation, processing, logistics, storage, wholesaling, and retail, including the capacities and knowledge of policymakers, service providers (public and private) and populations

- **Resilient Health** - Systems, facilities, services, and capacities for protecting and improving human health and for pre-empting and responding to new health challenges and health-related

1 UNDRR/UNDESA - Guidance Note on Leveraging Integrated National Financing Frameworks (INFF) for DRR

2 For more information see UNDRR/CBI - Designing a climate resilience classification framework to facilitate investment in climate resilience through capital markets.

emergencies, including the capacities and knowledge of policymakers, service providers (public and private), and populations

- **Resilient Industry & Commerce** - Industrial and commercial operations encompassing extractive industries, manufacturing, and service-based industries (e.g., professional services, financial services, tourism, leisure, etc.)

- **Resilient Cities** - Human settlements whether large (e.g., cities) or small (e.g. villages), urban or rural, encompassing buildings (residential, commercial & public), planning, development & management of urban areas and settlements, and cultural heritage

- **Resilient Societies** - Systems and services for ensuring social well-being, safety and the creation/protection of social capital across populations, covering social protection, education, financial inclusion, digital inclusion, disaster risk (DRR and emergency services), and including the capacities and knowledge of policymakers, service providers (public and private) and populations

For each of these themes, the sections below unpack the concrete investments that build resilience in these areas. This allows countries to select resilience-building activities suitable to their context, or already included in their DRR strategies, national adaptation plans, and other policy documents.

Next to these resilience-building activities, the following sections present tailored options to mobilize financing in these areas, while linking these options to the menu of options presented in Table 1. These options cover policies and instruments available to advance DRR interventions, but also mechanisms to create financial resilience in case of disasters, such as risk retention mechanisms (e.g., reserve funds) and risk transfer instruments (e.g., insurance).

The financing mobilized through these options can come from public, private (business/ individuals, financial sector, insurance), and international sources. The feasibility of each option will need to be assessed while recognizing the need to adapt them to the specific economic and social contexts of each country.

By matching DRR needs with options to mobilize financing, the G20 input paper can help countries navigate and select among the range of investments required to build resilience. Meanwhile, the examples and experiences from other countries provided throughout the G20 input paper should facilitate internal discussions and engagement with development partners, as well as efforts to prepare actions for achieving DRR objectives in countries.

Figure 1: The seven resilience themes

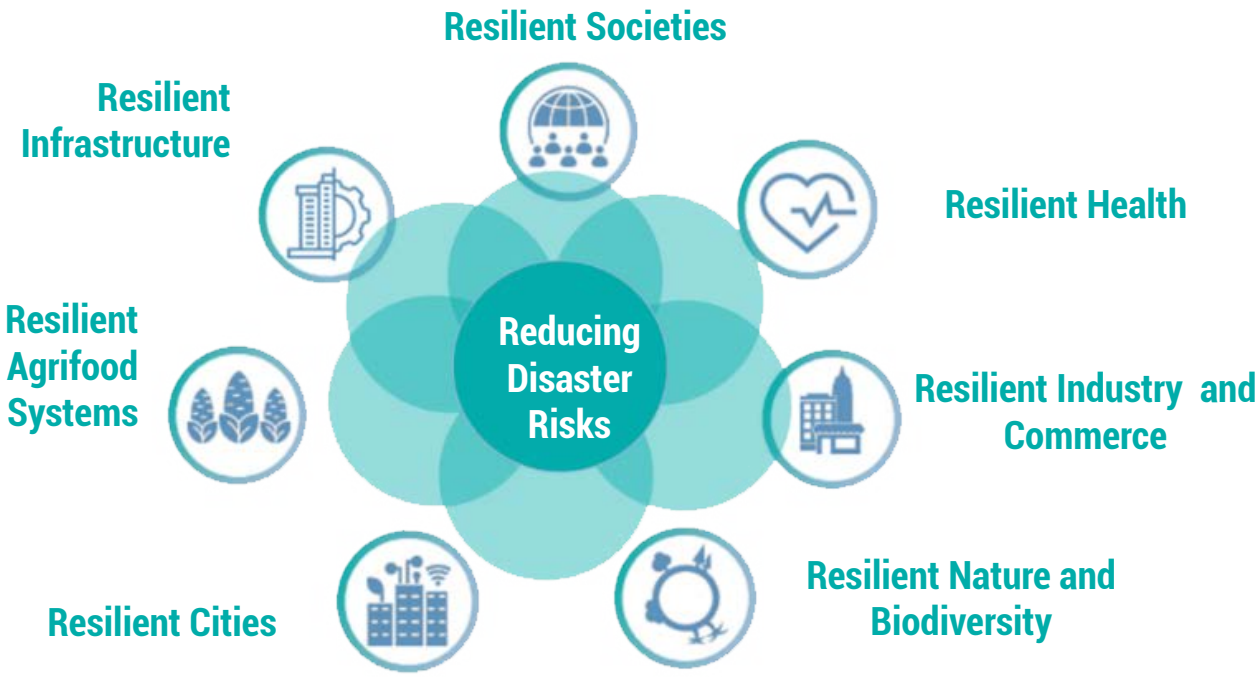

Table 1: Menu of Options to Mobilize Financing for DRR and Disaster Shock Absorption

Public Domestic Resources	Businesses / Individuals	Financial Sector	Insurance	INTERNATIONAL Community
Assign a minimum share of budgetary resources to DRR activities	Build regulatory frameworks that enhance resilience*	Develop taxonomies for DRR investment*	Reduce the protection gaps through promoting uptake in coverage	Embed DRR in development and humanitarian partners' projects
Create a budget tagging and tracking system for DRR-related expenditures	Use financial incentives for leveraging private investment into DRR	Issue resilience bonds and call for credit enhancement mechanisms	shift the insurance's mindset from protection to prevention	Ring-fencing funds for DRR-related activities
Mainstream DRR in infrastructure services planning and delivery	Review "Force Majeure" and other clauses in public-private partnerships	Conduct disaster scenarios / stress testing to assess the country's financial stability	Suport innovative risk transfer solutions and reinsurance mechanisms	Work with IMF, World Bank an other DFIs in relation to DRR
Add DRR criteria to public procurement selection	Request corporate and investor disclosure on risk exposure and management	Require commercial banks to include disaster risk assessment in credit allocation		Factor in country vulnerabilities for concessional finance elegibility
Use national reserve (or contingency) fund for building back better	Address vulnerabilities from global value chains (concentration, overdependency, etc.)	Advocate for legthening the time horizon of Credit Rating Agencies		Create international pooling mechanisms to diversify risks
Connect anticipatory finance with social protection systems		Facilitate access to finance for resilience-building activities		Ensure acces to mergency liquidity such as Catastrophe Deferred Drawdown Option (Cat DDO)
Recoup DRR invest-ment by taxing land value creation		Issue catastrophe bonds (CAT bonds)		Explore debt-for-climate/ environment swaps for resilience investment
				Introduce disaster-related clauses in sovereign debt instruments**

Source: adapted from UNDRR/UNDESA - Guidance Note on Leveraging Integrated National Financing Frameworks (INFF) for DRR

Note: In addition to the options mentioned in the table, it is suggested to also consider the option "Coordinate with nature protection and restoration funds", as these funds can finance activities highly relevant to DRR. These funds may originate from various sources, including government budgets, international organizations, private sector contributions, and environmental NGOs, making them difficult to classify under one specific column in the table.

* Regulatory frameworks are built by policymakers but were included in the business column to reflect that they could be designed to reduce the creation of risks by private companies and promote resilience-building practices. Similarly, taxonomies and disclosure requirements are also developed by the public but are aimed inter alia at supporting capital market investments from private investors.

** Climate resilient debt clauses (CRDCs) or pause clauses are a state-contingent debt instrument. IDB was the first public development bank to introduce them, but CRDCs have also had uptake by the World Bank, AfDB, and EBRD. Other bilateral donors such as the UK, Spain, Canada, France, and the US have either introduced them in their lending or plan to. Because MDBs and bilateral donors are public actors, these options have been included in the international community column (although they could also be adopted by private lenders).

Resilient Infrastructure

Building resilience into infrastructure systems is estimated to add only 3 percent to the total investment cost, though this can vary based on local conditions and specific infrastructure needs. These costs can easily be recouped through the significant benefits provided over the lifetime of an infrastructure asset. In a median scenario in low- and middle-income countries, each $1 investment could bring a $4 benefit, amounting to $4.2 trillion in benefits, while the cost of inaction for the 2020-2030 period may amount to around $1 trillion[3].

3 Source: Lifelines. The Resilient Infrastructure Opportunity, World Bank, 2019

Main Investment Areas

Note: Financing options are color-coded based on their primary target audience (public, private; and international). These options are drawn from the menu presented in Table 1, while the description column illustrates how these options are applied in specific contexts.

Investment in	Challenge	Options to mobilize financing	Description
Protective infrastructure (e.g., flood walls, overflow water reservoirs, breakwaters)	Protective assets typically do not generate revenue streams, making them challenging for private investors.	Assign a minimum share of budgetary resources to DRR activities Ring-fence funds for DRR-related activities	Proper cost-benefit analysis can demonstrate the value for money for investing in protective infrastructure and green infrastructure. These cost-benefit analyses can then be used by government officials and policymakers to advocate for public budget allocation and donor support.
		Mainstream DRR in infrastructure services planning and delivery	Mainstreaming DRR in infrastructure planning should lead to the identification of areas where protective infrastructure is needed.
		Recoup investment by taxing land value creation	Protective infrastructure may increase the value of surrounding properties, as those become less exposed to disaster risks. Public authorities could capture the added value through property tax or other mechanisms to finance the initial investment in resiliency.
		Issue resilience bonds	Bonds can attract private investment in protective infrastructure

Investment in	Challenge	Options to mobilize financing	Description
Resilience of new infrastructure projects (e.g., underground telecom cables, back-up generators, raising road or train tracks above flooding line)	Enhancing the resiliency of new infrastructure projects often comes with additional costs but benefits typically outweigh them over the infrastructure lifetime (e.g., reduced damages and decreased downtime).	Mainstream DRR in infrastructure services planning and delivery Add DRR criteria to public procurement selection	Policymakers need to adapt project planning and selection criteria (including for public procurement) to properly value resiliency benefits. International support and capacity building are crucial for enabling countries, particularly those with budget constraints, to implement resilience measures in new infrastructure projects.
		Request corporate and investor disclosure on risk exposure and management in a manner that reflects national circumstances, capabilities, cost, data availability and technical considerations Require commercial banks to include disaster risk assessment in credit allocation Embed DRR in development partners' projects	Mainstreaming DRR in infrastructure planning should lead to the iden Financiers have a role to play in ensuring that the projects they finance properly account for disaster risks, including during their due diligence and investment screening process[4]. Policymakers can incentivize these practices by calling/ requesting banks and investors to conduct robust disaster risk assessments prior to any financing decisions, for instance as part of their Environmental Impact Assessment (EIA). This assessment should also positively consider the resilience measures taken by the borrowers, therefore rewarding those taking appropriate actions to reduce risks. tification of areas where protective infrastructure is needed.
		Develop taxonomies for DRR investment	Policymakers could develop a national resilience taxonomy to incentivize private investment in this area. Indeed, a resilience taxonomy provides a foundation/ reference framework for financial market participants to identify, evaluate, and invest in opportunities that enhance resilience, including investment in resilient infrastructure assets.

4 See for example Physical Climate Risk Assessment Methodology (PCRAM)

Investment in	Challenge	Options to mobilize financing	Description
More robust infrastructure practices, including risk-informed development	Infrastructure resilience is not only about physical, and engineering solutions often requires changes in the way infrastructure systems are planned, operated and managed.	Mainstream DRR in infrastructure services planning and delivery. Build regulatory frameworks that enhance resilience Coordinate with nature protection and restoration funds	Policymakers can improve their infrastructure practices by applying the Principles for Resilient Infrastructure or other similar frameworks. For example, these principles require conducting proper assessment/ stress testing of infrastructure systems that will help identify vulnerabilities and spur actions by public and private operators and owners. To foster actions, policymakers can mandate through regulation stress-testing of critical infrastructure and asset management systems (e.g., tracking asset conditions and maintenance history). Similarly, policymakers can ensure that disaster risks are considered in development plans, urban planning, and other upstream planning relevant to infrastructure.
Maintaining/ Upgrading existing infrastructure networks	Lack of investment in infrastructure maintenance leads to degradation, higher repair costs, reduction in the lifespan of assets and structural weaknesses, increasing the likelihood of disasters.	Assign a minimum share of budgetary resources to DRR activities (i.e., strategic budget allocation)	Policymakers can create a dedicated funding source for infrastructure maintenance, for instance by setting aside a portion of government revenues or allocating a percentage of user fees for this purpose. While investment in maintenance is not purely about DRR, it has a positive contribution to it. For instance, regular maintenance, like fixing cracks, clearing debris, and maintaining drainage systems, reduces the risk of infrastructure failure in case of disasters.
		Review "Force Majeure" and other clauses in public-private partnerships Use financial incentives for leveraging private investment into DRR	Reviewing "Force Majeure" and other clauses in public-private partnerships (PPPs) helps ensure that responsibilities for disaster-related disruptions are not automatically transferred to the public partner but that the private partner is incentivized to minimize these disruptions. Also, under a PPP contract, the maintenance of infrastructure assets falls under the responsibility of the private partners. Policymakers can link the private partner's payment to the achievements of resilience performance metrics.

Investment in	Challenge	Options to mobilize financing	Description
Increased insurance coverage of infrastructure assets	Proper insurance can boost investor confidence (e.g., in Public-Private Partnerships) and protect investments. Yet, these instruments are not always available.	Reduce the insurance protection gaps through promoting the uptake of insurance coverage	Policymakers can promote the uptake of insurance for infrastructure assets, for instance by mandating the insurance of public assets. Policymakers can also promote broader insurance coverage by incentivizing comprehensive policies that address a range of risks, including those related to climate and disaster risks. Furthermore, insurance design should encourage building resilient infrastructure.

Resilient Nature and Biodiversity

Protecting nature and deploying nature-based solutions and ecosystem-based approaches to DRR (eco-DRR) are effective, scalable, and cost-efficient ways to reduce disaster risk while also providing multiple co-benefits. For example, besides the $80 billion per year in avoided losses from coastal flooding, mangrove forests contribute as much as $40-50 billion annually in non-market benefits associated with fisheries, forestry, and recreation.[5] Meanwhile, failure to act on ecosystem rehabilitation is costing $20 trillion to the global economy in lost ecosystem goods and services.[6] Many benefits are non-monetary and thus hard to quantify. Green infrastructure often offers significant returns on investment and multiple co-benefits, particularly when combined with grey infrastructure solutions in a complementary manner.[7] In that sense, there is clear connections between this theme and the preceding one on resilient infrastructure.

Main investment areas

Note: Financing options are color-coded based on their primary target audience (public, private; and international). These options are derived from the menu presented in Table 1, with the description column illustrating how they are applied in specific contexts.

Investment in	Challenge	Options to mobilize financing	Description
Nature-based Solutions (NbS) (e.g., forests and wetlands for water treatment and stormwater management; mangroves for increased coastal resilience; coral reefs to reduce wave energy during storms, green roofs and permeable pavement for urban resilience)	The current rate of NbS deployment is slow. NbS projects tend to be small and in the vast majority funded by the public as the benefits they create cannot always be monetized by private investors. Meanwhile, the regulations in place can make them difficult to consider, highlighting the need to integrate NbS in regulations and building codes. Benefits also tend to take time to materialize which creates challenges for investors with short-term horizon.	Mainstream eco-DRR in infrastructure services planning and delivery Embed eco-DRR in development and humanitarian partners' projects Coordinate with nature protection and restoration funds Build regulatory frameworks that enhance resilience	To foster nature-based solutions, governments can **mandate considering green and blue infrastructure** as an alternative to traditional grey infrastructure solutions when infrastructure projects are planned/ developed, permits are issued and/or private partners are selected. They can also initiate reviews of infrastructure services to see where green solutions would be appropriate, either as a replacement for grey infrastructure or in combination through grey-green (hybrid) infrastructure such as: mangroves with seawalls, and marshes with levees. Increased adoption of green solutions could also be achieved by ensuring that **co-benefits are properly valued** during project evaluation.

5 Adapt now: a global call for leadership on climate resilience, Global Center on Adaptation, 2019

6 UNDP, Issues Brief on Nature-Based Climate Solutions, 2020

7 UNDRR, Ecosystem-Based Disaster Risk Reduction, Implementing Nature-based Solutions for Resilience, 2020

8 https://www.eib.org/attachments/lucalli/20230095_investing_in_nature_based_solutions_en.pdf

Investment in	Challenge	Options to mobilize financing	Description
			Similarly, **development partners** may ensure that the projects they support properly consider nature-based solutions. Nature protection and restoration funds could also be used to finance NbS that reduce disaster risks, making the case for coordination DRR interventions with these finance mechanisms.
		Build regulatory frameworks that enhance resilience	**Construction permits** and **building codes** can be leveraged to encourage the use of green infrastructure, such as green roofs in urban settings, while **land-use zoning** can be revised to protect sensitive areas and further integrate nature-based solutions into urban planning (e.g., creating connectivity through parks and green areas and constructed wetlands). Broader spatial and land-use planning may also integrate nature-based solutions outside cities that help increase the resilience of urban areas (e.g., floodplains). These regulations should help direct financing towards investments that reduce disaster risks and avoid the creation of new risks.
		Support innovative risk transfer solutions for eco-DRR	**Parametric insurance** and other disaster risk financing instruments can be designed to support the quick restoration of natural infrastructure once a set of parameters is reached. For example, in 2019, Swiss RE provided an insurance solution to protect coral reefs along a coastline of 160 km of the Yucatan peninsula of Mexico against storms.[9]

9 IISD, Building the Investment Case for Nature-Based Infrastructure, The role of insurance solutions, 2020.

Investment in	Challenge	Options to mobilize financing	Description
		Facilitate access to finance for resilience-building activities Embed eco-DRR in development and humanitarian partners' projects Coordinate with nature protection and restoration funds	Governments can support access to finance for private projects in nature-based solutions through **co-financing, guarantees, or other blended finance instruments.** However, this has a cost and is not without risk for public finance. Blended finance solutions need to be carefully designed to ensure the appropriate use of subsidies and guarantees (see for instance OECD principles for blended finance).
Biodiversity and nature conservation and/or restoration (e.g., protected areas, other effective area-based conservation measures (OECMs), World Heritage sites)	Biodiversity loss is a disaster in itself, while ecosystem degradation exacerbates the risk of disasters. Societies depend on healthy ecosystems for human well-being and socio-economic prosperity as ecosystems provide many important services, such as drinking water, timber, medicine, etc. Ecosystems also provide buffers that mitigate disasters. However, they are often not properly valued given their public good nature.	Assign a minimum share of budgetary resources to eco-DRR activities	Public finance is likely to remain the main contributor to investment in biodiversity and nature conservation, so a sufficient budget must be allocated to/preserved for this priority. Governments can also consider redirecting funds from or removing harmful subsidies to advance biodiversity goals.
		Use financial incentives for leveraging private investment into eco-DRR	To offset the ecological loss of a development project, investors may have to buy **environment credits** (e.g., mitigation banks) to compensate for the preservation and restoration of a comparable ecosystem in a different area. However, these practices have been quite controversial as some critics argue that these credits do not adequately compensate for the damage caused and often suffer a lack of transparency and adequate regulatory oversight.
		Use financial incentives for leveraging private investment into eco-DRR Embed eco-DRR in development and humanitarian partners' projects	**Payment for ecosystem services** (e.g., clean water) is another way to create a revenue stream and financing from those providing these services, which can help reduce disaster risks. Payments can come from governments, NGOs, and private companies, for instance, to encourage landowners to protect or restore natural ecosystems. They can also come from the international community to support countries providing these services to the rest of the world (e.g., REDD+).

Investment in	Challenge	Options to mobilize financing	Description
			In addition to payment for ecosystem services, grant-based projects can also have as an objective to generate livelihoods from the Nature-based Solutions implemented (e.g. employing people to engage in nature restoration activities).
		Use financial incentives for leveraging private investment into eco-DRR Build regulatory frameworks that enhance resilience	**Eco-tourism**, ecologically balanced **afforestation**, and other similar economic activities can generate revenues while creating a positive impact on biodiversity and nature conservation. Governments can consider means to promote this type of activity either through grants and other financial mechanisms and/or via supportive regulatory frameworks.
		Request corporate and investor disclosure on risk exposure and management	When in line with their mandates, regulators can incentivize business and financial actors to integrate nature into their decision-making process by requiring them to **disclose information** on their **nature-related dependencies, impact, risks** and opportunities (see for instance recommendations from the Taskforce on Nature-related Financial Disclosures or **TNFD**). This could enable transparency on the impact of companies on biodiversity loss and create accountability. This increased transparency may push companies to better manage risks related to these issues and make investment that reduce these risks. Similarly, investors may be able to identify companies properly managing these risks and direct their investments accordingly.

Resilient Agriculture and Food Systems[10]

At least US$3.8 trillion worth of crops and livestock production has been lost due to disasters, in the last 30 years corresponding to **$123 billion per year** or 5% of the annual global agricultural GDP. The impact has been particularly strong on low and lower-middle-income countries where losses amount to between **10 and 15% of their total agricultural GDP**.[11] Meanwhile, climate change and environmental degradation are affecting agricultural productivity and creating more frequent anomalies in crop yield patterns. Extreme and slow-onset disaster events create not only food security risks but also significant socio-economic impacts as the food systems employ the majority of people in developing countries who rely on agriculture for their livelihood.[12]

Despite the critical role of small-scale agriculture in ensuring food security and livelihoods in developing countries, only about 1.7% of total climate finance tracked in 2017/2018 was directed toward this sector.[13] This highlights a significant gap in funding that must be addressed to build resilient agriculture and food systems. This is despite the positive cost-benefit ratio that could be delivered by investment in resilience-building practices in the agricultural sector, such as smart and effective irrigation, cultivating drought-tolerant crop varieties combined with soil and water conservation practices. Anecdotal evidence has shown that investment in good resilience practices could lead up to $8 in benefit for every $1 invested.[14] Similarly, anticipatory actions have proven to be cost-effective with a benefit-cost ratio of up to 7:1.[15] These actions include, for instance, protecting livestock ahead of a forecasted hazard following an early warning alert.

Main investment areas

Note: Financing options are color-coded based on their primary target audience: public, private; and international). They are coming from the menu of options presented in Table 1 while the description column showcases how these options are applied to a specific context. While investment in nature and biodiversity has a positive impact on the resilient agriculture and food services, they are not mentioned below as they have been covered in the precedent theme.

Investment in	Challenge	Options to mobilize financing	Description
Crop and income diversification	Smallholders may lack knowledge regarding resilience practices suited to their local context and/or access to finance to implement these practices, for instance,	Facilitate access to finance for resilience-building activities Embed DRR in development and humanitarian partners' projects	Government and development partners can support access to finance by smallholder farmers through partnering with local microfinance institutions and banks.[16]

10 Please note that aquaculture and fisheries are part of agriculture and food systems.

11 FAO, 2023, The Impact of Disasters on Agriculture and Food Security

12 World Bank, 2017, Future of Food: Shaping the Food System to Deliver Jobs – Please also refer to the world bank report on recipe for a livable planet for more data on investment needs.

13 Chiriac, D., Naran, B., & Falconer, A. (2020). Examining the climate finance gap for small-scale agriculture. Climate Policy Initiative and IFAD Rome.

14 FAO, 2023, The Impact of Disasters on Agriculture and Food Security

15 FAO, 2023, The Impact of Disasters on Agriculture and Food Security

16 See for example, OECD DAC Blended Finance Principles

Investment in	Challenge	Options to mobilize financing	Description
	due to high-risk perception, small transaction size, lack of collateral, and limited land tenure rights. Meanwhile, some countries spent significant budgets in support of their agricultural sector. However, these programs often fail to incentivize resilient agricultural practices.		They could provide them with incentives for financing investment into resiliency through **co-financing, guarantees, or other blended finance instruments**. However, these instruments have a cost and are not without risk for public finance. They need to be carefully designed to ensure the appropriate use of subsidies and guarantees.
Water-use efficiency (e.g., drip irrigation, rainwater harvesting)		Assign a minimum share of budgetary resources to DRR activities Embed DRR in development partners' projects	Public actors can set up programmes, for example with local NGOs, to support farmers with **capacity-building support** such as training on: - crop diversification (e.g., flood- and heat-resistant varieties) - drip irrigation - income diversification (e.g., agroforestry, livestock integration) - conservation agriculture - organic agriculture
Conservation agriculture (e.g., crop rotation, soil health protection, ecosystem-based approaches)		Build regulatory frameworks that enhance resilience Request corporate and investor disclosure on risk exposure and management in a manner that reflects national circumstances, capabilities, cost, data availability and technical considerations	**Regulations** and policies can promote resilient practices. For example, they can include guidance on water extraction and irrigation practices, as well as water usage quotas. Similarly, they may require farmers to monitor soil health and limit the usage of certain fertilizers. By requesting, large companies to be transparent about their resiliency measures, policymakers force these companies to identify, assess, and address potential disaster risks and vulnerabilities in their operations and supply chains, for instance by reporting on **standardized indicators relevant to agrifood companies.**

Investment in	Challenge	Options to mobilize financing	Description
		Use financial incentives for leveraging private investment into DRR	Failing to consider DRR in national **incentives** and **subsidies** to farmers might lead to public investment directed towards lower resilient food production areas. Reviewing and reorienting public finance toward promoting resilient and sustainable food systems would ensure that public support for agriculture and food systems is aligned with sustainable and resilient national goals. This could include incentivizing R&D investment toward resistant crops and promoting infrastructure that prevents runoff of agrochemicals and sediment into rivers or coastal basins during flooding.
Risk protection (e.g., crop losses, anticipatory actions)	Smallholder farmers tend to have limited savings and may be unable to recover from disasters and fall into extreme poverty as a consequence.	Reduce the insurance protection gaps through promoting the uptake of insurance coverage Embed DRR with nature protection and restoration funds	**Parametric insurance** can help farmers mitigate the financial risks associated with unpredictable weather events and other types of hazards, which can push farmers into poverty. Unlike traditional insurance, which relies on time-consuming claims assessment processes, parametric insurance pays out based on pre-defined triggers such as rainfall levels or earthquake magnitudes, allowing for quicker financial assistance. Government and donor funding is often used to subsidize (or pay) the premiums to make insurance more inclusive and address affordability constraints (see example from Fiji). Other innovative insurance models should also be explored and implemented, such as microinsurance and index-based insurance, to make risk protection more affordable and accessible to smallholder farmers.

Investment in	Challenge	Options to mobilize financing	Description
	Many farmers have limited resources to implement anticipatory actions that can reduce the damages caused by disasters.	Connect anticipatory finance with social protection systems Support innovative risk transfer solutions for DRR	**Social security systems** can be leveraged to rapidly send money to people ahead of a forecasted hazard since these systems have established databases and mechanisms for identifying eligible beneficiaries and channelling funds to them. Connecting anticipatory actions with social protection systems thus helps achieve efficiency gains while enabling cost-effective measures for mitigating the impact of disasters. Similarly, **insurance** products could be designed to allow payouts to reach beneficiaries once an event is forecasted rather than after the event to allow beneficiaries to take anticipatory actions, although care should be paid to avoid possible moral hazards resulting from the fact that policyholders receive funds before the actual loss occurs. These complementary approaches to anticipatory actions could also include measures to ensure that farmers have access to meteorological services and are covered by early warning systems.
Food security reserves	Food security can be at risk due to crop failures and other disasters	Assign a minimum share of budgetary resources to DRR activities	Countries can maintain food reserves as a strategic measure to ensure food security and stability in times of crisis,
Consumer education and awareness for locally produced products	High dependency on a few global crops limits the redundancy and resilience of the agriculture and food system	Assign a minimum share of budgetary resources to DRR activities Address vulnerabilities from global value chains	Governments can promote demand for diverse crops and locally produced food, for example through public campaigns. This can reduce the dependency on long value chains exposed to higher uncertainty, with positive impacts on smallholder farmers and small-scale fishers.

Resilient Health

The COVID-19 pandemic highlighted the importance of building strong and resilient healthcare systems capable of withstanding and responding to unexpected crises. Inadequate prevention and preparation can have dramatic consequences. Due to the COVID-19 pandemic, as many as 18 million people may have died worldwide.[17] The economic impact was also considerable with rising poverty and inequality. [18]

Climate change and environmental degradation exacerbates health issues and fosters the emergence of new diseases due to extreme weather events and changing ecosystems. Implementing adaptation measures, such as cooling shelters, may be required to mitigate heat stress, other types of natural hazards, and safeguard public health against rising temperatures.

Investing in resilient health systems and implementing the One Health approach are critical to prevent the next crisis, which could go beyond a pandemic (e.g., antimicrobial resistance), and be prepared to respond to it (e.g., disaster preparedness simulations, containment measures, surge capacity, and emergency supplies). WHO has been working closely with countries to assess their capacities to prevent, detect and rapidly respond to public health risks through Join External Evaluation (JEE) and develop National Action Plan for Health Security (NAPHS), including detailed cost of improving health capabilities at the national level.

Yet, challenges remain with health systems underdeveloped in many countries with about 4.5 billion people were not fully covered by essential health services globally..[19] There is an opportunity to enhance funding for prevention in health systems, where current expenditure levels even in advanced economies are relatively modest (less than 3% of total health expenditure). Overall, addressing the health systems resilience is estimated to require an annual investment boost of 1.4% of GDP across OECD countries.[20]

Main investment areas

Note: Financing options are color-coded based on their primary target audience: public, private; and international). They are coming from the menu of options presented in Table 1 while the description column showcases how these options are applied to a specific context.

Investment in	Challenge	Options to mobilize financing	Description
Health workforce (e.g., surge capacity)	A workforce shortage is a significant risk to health systems' resiliency and is difficult to tackle in the midst of a crisis as it takes time to recruit and train staff.	Assign a minimum share of budgetary resources to DRR activities	A resilient health workforce is key to responding effectively to health crises, but many countries face challenges in maintaining workforce capacity. Health systems are typically funded by public resources (e.g., budget, donors).

17 OECD (2023), Ready for the Next Crisis? Investing in Health System Resilience, OECD Publishing, Paris.

18 World Bank. 2022. World Development Report 2022: Finance for an Equitable Recovery. Washington, DC: World Bank.

19 WHO (2023), Universal health coverage (UHC)

20 OECD (2023), Ready for the Next Crisis? Investing in Health System Resilience, OECD Publishing, Paris.

Investment in	Challenge	Options to mobilize financing	Description
		Create a budget tagging and tracking system for DRR-related expenditures Embed DRR in development and humanitarian partners' projects	Assessing whether these systems are adequately resourced to prevent and deal with crises can uncover funding gaps and help build the case for additional investment. Maintaining a medical reserve is another way to ensure a surge capacity in times of need (e.g., retired health professionals, military health professionals, students). Countries can also invest in technology to address capacity constraints (e.g., telemedicine in remote areas). Meanwhile, there is a need to also invest in training, retention, and equitable distribution of healthcare professionals, particularly in underserved regions, to ensure a robust and resilient health workforce capable of responding to crises.
Essential health products and equipment (e.g., medical devices, protective equipment, and hospital beds)	Stockpiling essential health products is necessary for resilience, but supply chain disruptions pose a significant risk. Building a stockpile has a cost but can deliver benefits in terms of response and prevention of disaster expansion	Assign a minimum share of budgetary resources to DRR activities Add DRR criteria to public procurement selection	To be functional, health facilities should have enough core (e.g., hospital/ICU beds) and personal equipment for the threats ahead. Governments could anticipate potential threats by embedding DRR criteria and risk information in public procurement processes related to the health sector. Similarly, there is a need for funding and planning for the distribution and administration of essential health products to final beneficiaries (i.e., last-mile delivery)
	Having a limited number of suppliers for essential products creates a strong vulnerability	Address vulnerabilities from global value chains (concentration, overdependency, etc.)	Countries need to assess potential risks coming from supply chains by reviewing suppliers and countries of origin for key inputs and finished products. This would allow them to seek diversification opportunities and investment in local production capacities for essential health products and equipment to reduce reliance on external suppliers.
		Use financial incentives for leveraging private investment into DRR	Governments can partner with private entities to stimulate the local production and distribution of critical equipment and products.

Investment in	Challenge	Options to mobilize financing	Description
Vaccines roll-out	Vaccine programmes contribute to resilient health systems but may not be realized due to affordability constraints, limited supply, and/or insufficient buy-in from the population.	Assign a minimum share of budgetary resources to DRR activities Embed DRR in development and humanitarian partners' projects	The government can allocate budgetary resources to vaccination programmes, while international initiatives, such as Gavi, can provide co-financing for poorer countries to cover their vaccination costs and safe injection devices.
Essential health products and equipment (e.g., medical devices, protective equipment, and hospital beds)		Shift the insurance's mindset from protection to prevention	Recognizing these benefits, insurance companies may offer to reimburse vaccination costs to encourage uptake by policyholders.
		Build regulatory frameworks that enhance resilience	Patent rights may limit the production of vaccines and create unequal distribution, as highlighted during the Covid pandemic. There is a range of solutions to this issue, including waiving Intellectual Property Rights, facilitating technology transfer, and voluntary licensing.
Antibiotic stewardship	Extended use of antibiotics promotes microbial resistance reducing the efficacy of existing treatments.	Build regulatory frameworks that enhance resilience	Regulation can contribute to the responsible use of antibiotics, such as for monitoring prescriptions, restricting access, and ensuring proper disposal.
R&D for new medicines	Investment in R&D is crucial for developing new medicines, but collaboration is needed to accelerate progress. Pharmaceutical companies may delay R&D investments due to uncertainty about future market demand.	Use financial incentives for leveraging private investment into DRR Embed DRR in development and partners' projects	R&D for new vaccines and treatments can be incentivized with suitable grants and subsidies, especially when they lead to further private investment for promising medicines and treatments. Development programmes can also target market failures that prevent low-income countries from being properly served. Strengthen international collaboration and foster public-private partnerships to accelerate research and development for new medicines and treatments, particularly for emerging health threats.

Investment in	Challenge	Options to mobilize financing	Description
Data collection and health surveillance	Rapid identification and response to new health risks require timely and accurate information. However, health data are often not available due to a lack of reporting, technological barriers and privacy concerns.	Assign a minimum share of budgetary resources to DRR activities Embed DRR in development and humanitarian partners' projects	Countries should assign budgets to information technologies in public health systems (e.g., early warning systems). Additionally, surveillance systems, including testing for existing and new infections, should be linked to the rest of the health system for rapid reaction.
		Shift the insurance's mindset from protection to prevention	Insurance companies have access to a lot of health data and could help public authorities in identifying early on emerging threats. Yet, legal and ethical data protection issues (e.g. confidentiality) must be addressed before insurers can share data with government officials.
Resilient hospital infrastructure	Disasters may disrupt the hospital's functioning by causing structural damages (Up to 70% of budgets for Health Ministries can be taken up by hospitals which can be destroyed or damaged if poorly done).	Mainstream DRR in infrastructure services planning and delivery	The construction and maintenance of health facilities should comply or exceed safety standards to remain functional during emergencies – Please also refers to the Safe Hospital [21]initiative from WHO (*See the Resilient Infrastructure note for more information)*
Risk protection (e.g., epidemic insurance)		Support innovative risk-transfer solutions	Epidemic insurance is intended to deliver predictable funding at the early-response phase of an outbreak or epidemic before it reaches the pandemic level. In 2022, the African Risk Capacity launched the first parametric insurance solution in Senegal as protection against pathogens responsible for Ebola, Marburg, and meningitis.[22]

Note: Social security programs contribute to health resilience, even though their primary objective is to ensure access to health services. Financing health systems requires cost-recovery mechanisms, such as user fees, insurance premiums, and/or social contributions.

21 WHO, Making health facilities safe in emergencies and disasters, accessed on 1 October 2024

22 For more information, see: "The Role of Disaster Risk Finance in Tackling Pandemic and Epidemic Risk" by Stefan, Kiggell and DeGrauw (2023).

Resilient Industry and Commerce

Industries and commerce can be at risk from/or the source of disasters causing broad economic impact. A sample of 100 major businesses reported that the financial impacts due to physical climate risk equal to about 10% of annual sales.[23] At a global level, economic output could decrease by 11-18% by 2050 due to climate change.[24] SMEs are particularly vulnerable as they bear around 75% of losses experienced by businesses after a disaster.[25] Overall, businesses face a wide range of risks, including climate change, pandemics, and cybersecurity. In addition, business and industrial activities may cause disastrous consequences, such as environmental pollution.

As risks become more frequent and severe, investing in business resilience also becomes more relevant. A high-level analysis found that adopting DRR measures can reduce disaster losses for SMEs by up to a third globally.[26] Climate adaptation and other risks also provide business opportunities, for instance to those developing sustainable products, business models with reduced pollution risks (e.g., Circular Economy), and services needed to address these risks (e.g., companies providing innovative solutions for managing water scarcity).

Main Investment Areas

Note: Financing options are color-coded based on their primary target audience (public, private; and international). These options are derived from the menu in Table 1, with the description column illustrating how they are applied in specific contexts.

Investment in	Challenge	Options to mobilize financing	Description
Supply chain resiliency	Understanding risks in global supply chains is crucial for building resilience, but diversification remains a challenge. Companies, and more broadly countries, may rely on a few international suppliers for critical inputs (e.g., raw materials, technology)	Address vulnerabilities from global value chains (concentration, unsustainable use of natural resources, overdependency, etc.)	Investing in diversifying supply chains and developing local or regional supply chains can reduce dependency on single sources and enhance the overall resilience of industries. Likewise, investing in **understanding risks posed by over-exposure / reliance** on a limited number of suppliers can help identify solutions (e.g., developing local solutions, building redundancy, extending product lifecycle). In addition, **investment screening regulations** may be necessary to avoid market concentration and protect domestic interests.

23 World Economic Forum. Accelerating Business Action on Climate Change Adaptation, 2023

24 Swiss Re Institute, The economics of climate change, 2021

25 UNDRR, Focus on prevention: Increasing SME uptake of disaster risk reduction: recommendations for policymakers, financiers and the broader business community, 2021

26 For instance, the study found reductions on disaster losses of up to 28% in construction, 30% in wholesale and retail trade, 31% in manufacturing and 35% in agriculture. UNDRR, Focus on prevention: Increasing SME uptake of disaster risk reduction: recommendations for policymakers, financiers and the broader business community, 2021

Investment in	Challenge	Options to mobilize financing	Description
Pollution prevention	Industries using hazardous substances or processes pose a risk to societies and to ecosystems.	Build regulatory frameworks that enhance resilience	Some industries require the use of materials or processes that involve a certain level of risk. Governments should make sure to have in place proper **regulations and controls** to avoid potential disasters such as chemical spills and pollution to water, soil and air.
Business adaptation and resilience measures	Risks taken by individual companies can generate cascading risks throughout the economy	Request corporate and investor disclosure on risk exposure and management in a manner that reflects national circumstances, capabilities, cost, data availability and technical considerations	Regulators can mandate the **disclosure of risk exposure and management** by private companies, forcing them to be transparent about their risks (e.g., Task Force on Climate-Related Financial Disclosures – TCFD) and how they plan to manage them (e.g., business continuity plans). This also allows financiers to embed risks into investment decision processes, and reward businesses better managing risks. Integrate resilience considerations into corporate governance and strategic planning processes helps ensure that resilience is a core component of long-term business strategies.
	Companies will need to access capital to finance resilience-building measures.	Develop taxonomies for DRR investment	By developing a **resilience taxonomy,** policymakers provide the market standards required for the emergence of financial instruments that target investments in resilience (e.g., resilience bonds)
Cybersecurity	Businesses' reliance on digital technologies poses cybersecurity risks (e.g., data breaches, and operational disruption from cyberattacks), potentially compromising the functioning of an economy (e.g., the collapse of a financial system).	Build regulatory frameworks that enhance resilience	**Regulatory frameworks** can outline cybersecurity standards, requirements, and best practices and mandate compliance, for instance in terms of data protection, incident reporting, and cybersecurity training for employees. These frameworks need to be continuously reviewed and updated to adapt to evolving threats and technologies.

Investment in	Challenge	Options to mobilize financing	Description
Increased insurance coverage	Companies may not have the necessary resources to address the consequences of disasters they cause or suffer from.	Reduce the insurance protection gaps through promoting the uptake of insurance coverage	Policymakers can promote **broader insurance coverage** to increase the resilience of the economic system as a whole, for instance by making certain types of insurance coverage mandatory for businesses, especially for risks that have broader societal implications (e.g., workers' compensation, liability insurance, and environmental liability coverage) or by requiring that coverage for relevant catastrophe perils be included with standard property insurance coverage (i.e. automatic inclusion. Yet, this can be done only to the extent private markets have the capacity to provide such coverage and encourage take-up without jeopardizing insurer solvency. Developing affordable insurance products tailored to the needs of small and medium-sized enterprises (SMEs) may also require public support, potentially through public-private partnerships to close protection gaps and enhance business resilience.
Companies providing resilience and adaptation solutions	Industries and commerce have a pivotal role to play in making societies more resilient to disasters.	Facilitate access to finance for resilience-building activities	Governments can provide targeted catalytic capital and concessional finance to de-risk and foster investment in companies providing adaption and resilience solutions (e.g., climate analytics, water efficiency, regenerative agriculture).

Resilient Cities

Cities generate more than 80% of global GDP, making the reduction of urban disaster risk a priority. Of the 100 fastest-growing cities in the world by population, 84 are at extreme risk of severe climate change, and 14 face high risk.[27] Without significant investments in urban resilience, disasters, environmental degradation, climate change, and natural hazards could cost cities more than $300 billion annually by 2030.[28]

By 2050, another source estimates that rising sea levels and storm surges could cost coastal cities USD 1 trillion annually and affect more than 800 million people.[29] While protecting global urban infrastructure from climate risk is estimated to require between USD 11-20 billion by 2050,[30] past investment in urban adaptation projects amounted to less than USD 4 billion annually in 2017-2018,[31] mostly provided by the public sector.[32]

Main Investment Areas

Note: Financing options are color-coded by their primary target audience (public, private; and international). These options are drawn from the menu presented in Table 1, with the description column illustrating how they are applied in specific contexts.
Many financing options related to other themes, such as resilient infrastructure and nature-based solutions, apply to cities but are not repeated in the table below to avoid duplication.

Investment in	Challenge	Options to mobilize financing	Description
Risk-informed urban planning and development	Investments based on outdated or deficient risk information lock-in populations in disaster-prone areas	Assign a minimum share of budgetary resources to DRR activities	**Risk assessments** should be regularly updated and incorporated into land-zone planning to discourage public and private urban investment in high-risk areas.
	Urban development may happen without proper consideration of disaster risks.	Assign a minimum share of budgetary resources to DRR activities	**Urban planning** has a great role to play in reducing disaster risks. For instance, urban areas may experience higher temperatures due to the "heat island effect", which results from a lower land's ability to absorb heat due to a high concentration of buildings as well as materials retaining heat. Urban planning strategies can help ensure natural ventilation and sufficient vegetation providing shade.

27 Verisk Maplecroft, 84% of world's fastest growing cities face 'extreme' climate change risks, 2018.

28 World Bank. How Can We Finance the Resilient Cities of the Future?, 2016

29 Knight and Negreiros, "Policy Brief: How to Increase Financing for Urban Climate Adaptation and Resilience", CCFLA. 2021

30 WRI. 2019. "Unlocking the Potential for Transformative Climate Adaptation in Cities".

31 Cities Climate Finance Leadership Alliance (CCFLA). Blog: An Analysis of Urban Climate Adaptation Finance. 2021

32 Negreiros et al. 2021. "The State of Cities Climate Finance." CCFLA

Investment in	Challenge	Options to mobilize financing	Description
			Nature-based solutions in the urban context can also reduce the risk of floods and slow the movement of water in cities, providing time for infrastructure to cope (see the Resilient Nature and Biodiversity theme).
Resilient real estate	Real estate development that is not resilient creates and exacerbates disaster risks.	Build regulatory frameworks that enhance resilience Use financial incentives for leveraging private investment into DRR	**Building codes and construction standards**, if properly enforced, can ensure that structures are designed to withstand potential disasters (e.g., seismic-resistant designs, porous pavements, green spaces). Regulators can also use permitting processes to restrict construction in high-risk areas. Meanwhile, policymakers can also leverage building codes and **taxes** to promote greener solutions (e.g., green roofs, taxes proportional to the area on a property not allowing rain to infiltrate, such as asphalt driveways). Financial incentives, such as tax breaks or subsidies, can encourage private developers to incorporate resilience measures into real estate projects, ensuring that new developments are better equipped to withstand disasters.
		Require commercial banks to include disaster risk assessment in credit allocation Develop taxonomies for DRR investment	**Banks** can incentivize resilient development by embedding disaster assessment in their lending decisions, while regulators could encourage mortgages to projects meeting disaster risk reduction standards through prudential regulations. **Investors** could also decide to allocate funding only to resilient projects. **Taxonomies** and resilient **ratings** can help guide this type of financing decisions.
Community-based disaster preparedness	Significant disaster losses can be prevented if communities are trained and prepared to anticipate and act appropriately during a disaster	Assign a minimum share of budgetary resources to DRR activities	Well-organized and prepared communities are capable of reducing the impacts of a disaster by anticipating disasters and acting quickly at the local level. Governments should invest in programs to **build local communities' capacity** to anticipate and act in a disaster.

Resilient Societies

Resilient societies depend on investments made in resilient infrastructure, nature and biodiversity, health, cities, agriculture and food systems, and industry and commerce, which are the themes already covered in this document (and not repeated here). However, it also includes cross-cutting topics such as early warning systems and anticipatory action.

Early warning systems and anticipatory action protect societies from disasters as they enable people to act before a disaster hits (e.g., early evacuation and reinforcing homes, inter alia). Countries with limited to moderate multi-hazard early warning systems coverage have nearly six times higher disaster-related mortality ratio than countries with substantial to comprehensive coverage.[33] Meanwhile, investments in anticipatory action have demonstrated substantial potential returns, with some studies indicating gains of up to seven dollars in avoided losses and added benefits for every dollar invested.[34] As such these systems have broad societal and economic benefits.

Meanwhile, access to finance is primordial to enable countries to conduct all the necessary resilient-building investments. Private investment, including from capital markets, as well as international sources of finance, can complement domestic public investment. For example, insurance policies could incentivize private investment in resilience measures.

Pre-arrangement financial mechanisms also play an important role because they contribute to preserving the economic stability of people and governments in the event of a disaster. Where possible, these instruments should be triggered based on forecasted events or responding to them to increase inclusive and resilient recovery. Yet, pre-arranged financing remains a small proportion of international crisis financing, just 2.2% of this financing was pre-arranged from 2017-2021.[35]

To create resilient societies, it is also key to consider the needs of particularly marginalized groups and women, in line with the Sendai Framework's Gender Action Plan. Financial mechanisms shall not only preserve the economic stability of people but also be provided inclusively, ensuring easy access for vulnerable people.

Main Investment Areas

Note: Financing options are color-coded based on their primary target audience (public, private; and international).

Investment in	Challenge	Options to mobilize financing	Description
Early Warning Systems (EWS)	As public goods, EWS tend to rely on government budgets and donor support, although they also require partnerships	Assign a minimum share of budgetary resources to DRR activities	The 4 pillars of Early Warnings for All need funding - Disaster risk knowledge - Detection, observation, monitoring, and forecasting of hazards

33 UNDRR, Global status of multi-hazard early warning systems 2023

34 FAO, Anticipatory action: Changing the way we manage disasters, Rome (2021)

35 CDP, The State of Pre-Arranged Financing Report, Poole & Plichta, (2023)

Investment in	Challenge	Options to mobilize financing	Description
	with private companies (e.g., for disseminating alert messages)	Embed DRR in development and humanitarian partners' projects Ring-fence funds for DRR-related activities	- Warning dissemination and communication - Preparedness to respond In addition to national budgets, bilateral aid, funding from multilateral development banks and climate financing mechanisms can be mobilized to support these activities. For example, capacity-building support can be provided by the Climate Risk and Early Warning Systems (CREWS) initiatives, while the Systematic Observations Financing Facility (SOFF) helps address data gaps in basic weather observations.
Anticipatory Action (AA) (i.e., taking action before a predicted hazardous event occurs, to prevent or reduce its impact)	Investment is required to: (i) Build the operational system for AA, often requiring changes in legal frameworks and significant coordination efforts. (ii) 'Fuel' the system so that money is released for AA. The unpredictability of AA, as it may or may not be triggered, adds a layer of complexity from a budgeting perspective. There are also concerns about the accuracy of data and forecasts used for activation of AA.	Connect anticipatory finance with social protection systems Assign a minimum share of budgetary resources to DRR activities	**Social protection systems** can be used to distribute anticipatory finance through, for example, distributing additional support before the lean season starts. Examples include work by WFP and the World Bank as well as work by the Philippines, Mozambique and the Dominican Republic. **Governments** may have **contingency budgets or specific disaster funds** that may be adapted so that they can be used for AA. This would require legal and public financial management reform.
		Embed DRR in development and humanitarian partners' projects Ring-fence funds for DRR-related activities	**Pooled funds financed by international donors** have been the main sources of anticipatory finance to date, mainly OCHA, CERF, FAO, SFERA, IFRC, DREF, Start Network funds, WFP AA Trust Fund. Specific triggers and processes are built in that specify how and when funds will be released, to whom and for what activities. These funds are typically accessible only to UN/member agencies and not to governments directly.

Investment in	Challenge	Options to mobilize financing	Description
			Ad-hoc and/or project-based AA funding exists but is often spent on "build" costs of AA, rather than triggerable "fuel" finance. **Crisis modifiers** act as contingency funds within existing **development programmes** and/or as a pre-approved budget reallocation mechanism for imminent disasters. Discussions are ongoing on whether **climate funds** (e.g., GCF) might provide fuel money for AA.
		Shift the insurance's mindset from protection to prevention	Parametric insurance pays out based on pre-agreed triggers and can integrate AA. For example, the African Risk Capacity has provided anticipatory insurance product for drought in Malawi and Zambia. Yet, parametric insurance products are not without risks, including the risk of designing triggers incorrectly,
Insurance coverage	Insurance coverage remains limited in many developing countries despite their benefits in terms of resiliency. When there is limited coverage, governments are often constrained to step in after a disaster, creating a risk for public finance. Insurance coverage may also become unaffordable for regions disproportionally affected by natural hazards or when there is no possibility of diversifying risks across regions. Limited data might also impact the availability of insurance. Because data helps price insurance, data limitations can cause insurers to charge a higher premium to cover their risk.	Reduce the insurance protection gaps through promoting the uptake of insurance coverage	Governments can promote the uptake of insurance by businesses and individuals, for example, by making the regulatory environment more enabling to support the development of innovative insurance products or services or by mandating minimum insurance coverage (e.g., business liability), to the extent that private markets have the capacity to provide such coverage and encourage take-up. Meanwhile, it is important to develop and promote innovative insurance products tailored to the needs of low-income households and small businesses, ensuring broader access to financial protection and resilience, which may require public support.

Investment in	Challenge	Options to mobilize financing	Description
	The relationship between data and insurance is cyclical in that an established insurance market will produce good data that can inform risk management.	Support innovative risk transfer solutions for DRR	Governments can partner with the insurance industry to develop tailored solutions (e.g., **parametric insurance** for local farmers with the premium paid by the government). Premium subsidies may also be provided by donors to improve insurance affordability. Donors and development partners provide support in this area. For example, the Global Shield aims to provide and facilitate more and better pre-arranged protection against climate and disaster-related risks for vulnerable people and countries. A related initiative is the UNDP's Insurance and Risk Finance Facility. Although they require complex structures**, risk pooling mechanisms** have also been created to diversify risks across a larger group and create affordable coverage, including through donor support such as the Global Shield and through collaboration with the reinsurance sector. Examples of risk pools include the African Risk Capacity (ARC), the Caribbean Catastrophe Risk Insurance Facility (CCRIF), and the Pacific one (PCRAFI) as well as the Southeast Asia Disaster Risk Insurance Facility (SEADRIF).
Financial instruments strengthening the resiliency of public finance	When disaster strikes, the need for immediate funds to respond to the emergency and initiate recovery might pull away funds from other important sectors of the economy leading to instability and longer recovery periods	Ensure sufficient access to emergency liquidity Conduct disaster scenarios/stress testing to assess the country's financial stability Use national reserve (or contingency) fund for building back better	Countries should prepare to respond to a disaster through mechanisms such as **national reserve funds** or **emergency liquidity facilities** secured from international partners (e.g., Catastrophe Deferred Drawdown Option (Cat DDO) from World Bank). Governments can also conduct fiscal **risk assessments,** including scenarios/stress testing, to estimate the funds required to maintain fiscal risk at an acceptable level.

Investment in	Challenge	Options to mobilize financing	Description
			When emergency funds are being implemented, they must include disaster risk reduction measures to integrate **Building Back Better** (BBB) principles and ensure the long-term sustainability of recovery efforts
		Support innovative risk transfer solutions for DRR	Beyond traditional insurance, **catastrophe (cat) bonds** also provide a risk transfer solution for governments as these bonds allow the issuer to receive funding from capital market investors if certain conditions are met within the bond period (e.g., hurricane) in exchange for paying an interest rate to investors. As for other risk-transfer solutions, it is important to consider the affordability of these mechanisms for the issuer.
	At the time of a disaster, public finances are under strain due to costly recovery efforts, creating risks of debt distress.	Introduce disaster-related clauses in sovereign debt instruments	**Disaster-related clauses in sovereign debt** suspend debt repayment for a certain period if a pre-defined type and magnitude of disaster happens. Disaster-related clauses do not provide 'free' resources for governments as they are currently designed as net present value (NPV) neutral. This means that the debt is simply deferred but will have to be repaid either during the remaining duration of the debt or through an extension of the debt maturity.
Capital market development for DRR activities	Lack of clarity on what constitutes DRR investments prevents willing investors from supporting resilience activities	Develop taxonomies for DRR investment Issue resilience bonds and call for credit enhancement mechanisms	A **taxonomy** helps identify investments that positively contribute to disaster risk reduction and provide credibility checks for investors. It also enables private companies and governments to issue **resilience bonds.** Through **credit enhancement** mechanisms, international partners can lower the cost of financing faced by less advanced countries for resilience-building measures.

Investment in	Challenge	Options to mobilize financing	Description
Engagement with the international community on concessional resources	Disaster-prone countries can face significant financial constraints (high borrowing costs and debt ceiling) that prevent them from investing in resilience-building measures. This can result in a vicious cycle of disaster > response > recovery > repeat. Freeing additional concessional resources may enable countries to carry on investments that reduce the cost of future disasters.	Work with IMF, World Bank, and other DFIs in relation to DRR	Countries could engage with the IMF, World Bank's and other DFIs to further integrate of DRR into their programmes, thereby enhancing access to finance for resilience-building measures (e.g., IMF Resilience and Sustainability Trust)
		Explore debt-for-climate and environment swaps for resilience investment	Countries facing high debt burden could explore with their creditors, donors and/or private foundations the possibility to restructure part of their debts in exchange of commitments to use funds saved from debt servicing to finance specific environment or climate-related projects with positive impact on the country's disaster resilience.

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